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CHAPTER-1 Introduction to Strategic Cost Management

Section B – Case Scenarios & Case Studies

CASE SCENARIOS

Question 1

ABC Ltd. is engaged in business of manufacturing branded readymade garments. It has a single manufacturing facility at Ludhiana. Raw material is supplied by various suppliers.
Majority of its revenue comes from export to Euro Zone and US. To strengthen its position further in the Global Market, it is planning to enhance quality and provide assurance through long term warranty.
For the coming years company has set objective to reduce the quality costs in each of the primary activities in its value chain.

Required

STATE the primary activities as per Porter's Value Chain Analysis in the value chain of ABC Ltd with brief description (Study Material)

Answer

Primary activities are the activities that are directly involved in transforming inputs into outputs and delivery and after-sales support to output. Following are the primary activities in the value chain of ABC Ltd.:-

(i) **Inbound Logistics**: These activities are related to the material handling and warehousing. It also covers transporting raw material (yarn or fabric) from the supplier to the place of processing inside the factory at Ludhiana.

(ii) **Operations:** These activities are directly responsible for the transformation of yarn or fabric into final readymade garments for the delivery to the consumers.

(iii) **Outbound Logistics:** These activities are involved in movement of readymade garments to the point of sales. Order processing and distribution are major part of these activities.

(iv) **Marketing and Sales:** These activities are performed for demand creation and customer solicitation. Communication, pricing and channel management are major part of these activities.

(v) **Service:** These activities are performed after selling the goods to the consumers. i.e. replacing after a couple of sessions.

Question 2

WDG is a family owned business. The family owns 80% of the shares. The remaining 20% is owned by six non- family shareholders. It manufactures Cardboard Boxes for customers which are mainly manufacturers of shoes, cloths, crackers etc. Now, the board is considering to join the Paper Tubes market as well. Paper Tubes, also known as Cardboard Tubes, are cylinder- shaped components that are made with Cardboard. Paper Tubes can be used for a wide range of functions. Paper Tubes are usually ordered in bulk by many industries that rely Paper Tubes include food processing, shipping and the postal service, automotive manufacturing, material handling, textile, pulp and paper, packaging, and art etc. The Paper Tubes cost approximately 1% - 3% of the total cost of the customer's finished goods. The information about Paper Tubes is as follows:

(i) The Paper Tubes are made in machines of different size. The lowest cost machine is of ₹ 1,89,000 including GST @5% and only one operator is required to run this machine. Two days training program is required to enable untrained person to run such a machine efficiently and effectively. A special paper is used in making Paper Tubes and this paper remains in short supply.

(ii) Presently, five major manufacturers of Paper Tubes have a total market share of 75%, offer product ranges which are similar in size and quality. The market leader currently has 24% share and the four remaining competitors hold on average 12.75% share. The annual market growth is 3% per annum during recent years.

(iii) A current report "Insight on Global Activities of Foreign Based MNCs" released the news that now MNC's are planning to expand their packaging operations in overseas market by installing automated machines to produce Paper Tubes of any size.

(iv) Another company, HEG manufactures a small, however increasing, range of Plastic Tubes which are capable of housing small products such as foils and paper-based products. Currently, these tubes are on an average 15% more costly than the equivalent sized Paper Tubes.

Required

ASSESS whether WDG should join the Paper Tubes market as a performance improvement strategy? (Study Material) (RTP MAY.19) (MTP MARCH.19)

Answer

To assess the feasibility of joining Paper Tubes market, Michael Porter's 'five forces model' can be used. It analyses the competitive environment of an industry. It is an important tool for understanding the competitive structure of a particular industry. This complete analysis includes five forces: buyer's bargaining power, supplier's bargaining power, the threat of substitute products, the threat of new entrants and the intra industry competition.

While applying this model to the above case, it can be observed that the low cost of the machine along with the fact that an untrained person will only need two day's training as to be able to operate a machine, will form comparatively low costs of entry to the market. Therefore, WDG may reasonably consider high threat of new entrants.

Customer's (buyer) power could be high since customers buy Paper Tubes in bulk along with the fact that there is insignificant difference between the products of alternative suppliers. Paper Tubes cost approximately 1% - 3% of the total cost of the customer's finished goods also indicates that customer's power is high.

The fact that the special paper from which the tubes are made remain in short supply, signals high threat from suppliers. Hence, suppliers may raise their prices that would result in reduction of profit.

Five major players with 75% market share, offer product ranges which are similar in size and quality, besides, the market is a slow growing i.e. annual growth of 3% p.a., indicate high rivalry among competitors.

A little real threat from a substitute product exist since HEG manufactures a narrow range of Plastic Tubes. This threat might go up if the product range of HEG is expanded or the price of Plastic Tubes goes down sharply.

Major threat from potential new entrants can be seen, as foreign-based MNCs are planning to joining this market and it seems that these giant corporations might be able to gain economies of scale from automated machines and large production lines with manufacturing flexibility.

WDG might enter this market due to low capital investment but this would also lead to other potential entrants. The easy entry, threat of substitute, the existence of established competitors in the market, the possible entry of a MNCs, and competitors struggling due to slow growth market are putting the potential of WDG into the question to achieve any sort of competitive advantage.

Joining this market might be a good move, if WDG would be able manufacture Paper Tubes at lowest cost within the industry. To assess feasibility, WDG must take into consideration all possible synergies between its existing operations of Card Boxes and the proposed operations of Paper Tubes.

From the available information, joining the market for Paper Tubes does not seem to be attractive. Thus, WDG should go for other alternative performance improvement strategy.

Question 3

Wireless is a manufacturer of mobile phones. The company operates in a market that is dynamic, extremely competitive and consumer centric. The market is broadly fragmented into those customers who are price conscious looking only for basic features and those who are technology savvy wanting to try out the latest offering. Wireless manufactures phones that cater to both these segments.

Mobile A has the very basic features that a customer requires from a phone. It is marketed to attract the price conscious customers. There are many other manufacturers who have similar product offering for this market. Mobile Z offers the latest technology features and an attractive design. Wireless has invested substantial amount in research and development that has resulted in Mobile Z having many unique features. It is marketed to attract customers willing to try out newer products. The research has also yielded results whereby a large section of the design of Mobile A and Z can be standardized to have a similar components and engineering. This would enable Wireless to enter into agreements with its suppliers to provide components Just in Time based on the production schedule. With this change, the quality of Mobile A is expected to improve, thereby improving its sales off take manifold.

Online shopping has given customers complete access to the prices of phones offered by different manufacturers. This channel of shopping contributes to almost 70% of the sales. Huge discounts by its rivals has forced Wireless to reduce the prices of Mobile A as well. This has stretched its profit margins. Various cost reduction measures have been initiated to maintain profitability. Mobile Z on the other hand is currently doing well since it is targeted at a more niche segment of customers. Wireless is able to charge premium price for Mobile

Z. The latest news in the industry of personal devices like mobiles, laptops etc. is the use of Artificial Intelligence and Augmented Reality to enhance user experience. The technical staff at Wireless feel that this could be the next new frontier that could really change the way we use our devices, most of which could even go redundant.

Required

(i) IDENTIFY the strategy that Wireless is using for Mobile A and Mobile Z.
(ii) DISCUSS the risks involved in each of these strategies.
(iii) ADVISE Wireless to sustain its current strategy for Mobile A? (Study Material)

Answer

(i)   Wireless is following the "low cost strategy" for Mobile A and "differentiation strategy" for Mobile Z. Mobile A is being offered at discounted rates to meet the prices of its competitors. This is being done in order to gain market share from its competitors. To maintain its profitability, Wireless has to find means to keep its manufacturing, distributing and other costs low.

Mobile Z is being perceived by customers as a unique product, with features different from its competitors. This is "differentiation strategy". Differentiation can be achieved from superior product quality, innovation and customer responsiveness.

(ii) The risks involved in a "low cost strategy" for Mobile A is that any price reduction by Wireless will be followed by an equivalent price reduction by its competitors. This price war will ultimately eliminate players who are unprofitable. This strategy will put margins under pressure. The company has to find ways to its costs low on a sustained basis. The "low cost advantage" will be lost once its competitors find a way to lower their costs as well. The other risk would be to that the quality of the product could be impacted negatively due to lowering of costs.

The risks in differentiation strategy is that it will work only when customers are not price sensitive. The mobile market that Wireless operates is a competitive market. As long as certain customers are will to pay extra for additional features, Mobile Z will have a competitive advantage. If these customers also become price sensitive, they fail to see the value for paying extra for the additional features, the sales of Mobile Z will start falling. The other risk in this strategy would be in the ability of competitors to replicate the features of Mobile Z. Therefore, Wireless should protect its intellectual property rights in order to prevent its competitors from replicating the design and features of Mobile Z. It only when these risks are contained, that Wireless would be able to maintain its premium price for Mobile Z for its unique features.

An external risk factor for Wireless would also be from the developments in the fields of Artificial Intelligence and Augmented Reality. Wireless has to constantly monitor and assess how these technological developments can impact its business. It must be flexible to adapt to changes as they take place, in order not to become redundant in business.

(iii) "Low cost advantage" can be maintained by copying designs rather than creating them, attaining economies of scale by high-volume sales, getting discounts on bulk purchases and gaining learning and experience curve benefits.

Learnings and experience from research for Mobile Z can be leveraged for Mobile A. Standardization of design for Mobile Z and A would improve the quality of the product since the design is based on a product that has premium range of customers. Since these features can improve the sales of Mobile A, costs would benefit from economies of scale due to larger production volumes.

Bulk purchase of components for Mobile A and Z gives Wireless the advantage of negotiating for discounts on purchases. It could also negotiate for favorable delivery terms, like just in time purchasing agreements. This would reduce the inventory holding costs for Wireless.

All this contributes towards lowering the costs of production of Mobile A. This will help Wireless sustain its low-cost advantage.

Question 4

Staywell Hotels was established 10 years ago as a budget hotel in the vicinity of Mumbai airport. It provides accommodation for cost-conscious travelers visiting the city for short stay lasting a day or two. Typically, a room would provide comfortable beds, high speed internet connection, air conditioning facility, coffee machine, fridge and free television service. Food

service based on a limited menu is provided on the premises. It has few conference rooms that provide space for guests to hold business meetings. This saves them precious time otherwise wasted in travelling on congested city roads. The hotel provides free shuttle service to and from the airport at specific times during the entire day. Hotel's proximity to the airport, the free shuttle service and convenience of conducting work at the conference rooms have been marketed to attract guests to stay here. The guests also comprise of people who are in transit between airports. Also, when there are long- duration delays in flight operations due to which passengers need to be provided overnight accommodation, few airline operators host their guests here. Like all other guests, these airline operators are also interested in Staywell for its location and low-cost room rental.

Over the past decade, management of Staywell has ploughed in profits from this establishment to acquire similar properties in other major cities. They function based on business model similar to the original establishment in Mumbai. All of them are now functioning as well-established budget hotels near city airports for cost-conscious business travelers. In all, Staywell hotels have 18 properties spread over 15 cities. To keep its costs of operations within control, Staywell hotels has outsourced its cleaning and food service to specialized vendors. Cleaning service includes cleaning of kitchen crockery, bedding, laundry and housekeeping of premises. The entire set of activities related to preparation of food has been outsourced. Vendor service has been satisfactory, barring few instances where guests have complained of unhygienic rooms or non- palatable food service. However, due to high guest volume and quick turnover of guests due to short stay periods, this has never been a hindrance to business.

This business model has been profitable since its establishment. Staywell Hotels has a sizeable market share in this segment. Competition has increased in the recent past. Price wars have put pressure on profit margins in this segment. The management plans to continue to operate in this segment to maintain its market presence. At the same time, to sustain business in the long term, the management of Staywell Hotels now wants to foray into developing properties for luxury resorts. Target guest segment are vacationing tourists interested in an enjoying a laid-back time in scenic places. These guests would not mind paying premium for availing good quality service.

Required

(i) IDENTIFY and EXPLAIN the various primary activities of Staywell in its value chain.

(ii) IDENTIFY and EXPLAIN the stage of product life-cycle.

(iii) EVALUATE the risks of outsourcing cleaning and food services for the luxury resort properties. (RTP NOV.19)

Answer

(i) **The five Primary Activities of Michael Porter's Value Chain Model Inbound Logistics**

Activities related to receiving, handling of materials from the supplier and their storage until further use later in operations. In the case of Staywell Hotels, materials would include food service received from the vendor. This needs to be stored and maintained properly until the item is ordered by the guest. Similarly, the vendor delivering freshly laundered crockery, bedding and laundry would be materials that need to be stored until their use to serve the guests. These are inbound logistics for the hotel.

Operations

Activities related to converting inputs into production of output or service. In the case of Staywell Hotels, operations would include maintenance of hotel premises including guest rooms, conference rooms and common area. Activities related to ensuring cleanliness and safety of rooms, working order of facilities offered like TV and internet service, coffee machines, shuttle service are part of hotels operations.

Outbound Logistics

Storage and movement of the end product from the production line to the customer. In the case of Staywell Hotels, it includes activities such as maintaining "non- smoking" rooms as such, so that when the customer finally uses it comes across as a "non-smoking" room. Likewise, the food should be prepared in a professional manner, stored in such a way that it ensures customer satisfaction and safety. Therefore, the review of food items to remove the ones past expiry would be part of Outbound Logistics. Therefore, any activity relating to making sure that the guests get what they have ordered for, would be part of outbound logistics.

Marketing and Sales

The activities related to communicating, selling, and delivering the product or service to the customer. In the case of Staywell Hotels, advertising its properties to the cost and time conscious traveller would be a marketing activity. Free shuttle service is a promotional activity to attract guests. Any agreement with airline companies to accommodate guests would also form part of this activity.

Service

All types of service such as after sale service, handling customer complaints, customer support, training etc. In the case of Staywell, service is one of the most important activities in their value chain model. Good service ensures happy guests. Therefore, all activities from front-desk, room service, catering, repair services, shuttle service would be included here. All employees have to trained to handle needs of the guests in an effective and efficient manner.

(ii) Product Life-cycle Stage of Staywell Hotels

"Budget Accommodation" to the cost and time conscious traveller is the current product offering of Staywell Hotels. Starting out with a single establishment, Staywell Hotels ploughed in profits to expand its business offering to other cities as well. The product has been well established in the past decade. Competition is intense indicating similar offering by rivals. Price wars have put pressure on profit margins. Staywell Hotels plans to continue in this segment due to its sizeable market share. This information indicates that Staywell Hotels is in the <u>maturity stage</u> of its product lifecycle. It has a well-established product, with a sizeable market share at the same time it is now facing competition. Business has hit a plateau. Hence, Staywell Hotels needs to improve its product offering to beat competition. The management's plans to foray into luxury resort business is an indication of its future plans to sustain business.

(iii) Risks of Outsourcing Cleaning and Food Service under the Luxury Resort Model

Staywell Hotels is a budget accommodation provider to the cost and time conscious traveller. Primary feature of this model is "value for money". To remain profitable the cleaning and food service has been outsourced, which enables Staywell Hotels to keep the costs of operation low. There have been instances of dis-satisfaction among guests as regards quality of cleaning and food service. However, since the turnover of guests is quick due to high volume and short stay

period, it has not negatively impacted business.

In the luxury resort business, the target guests are travellers on leisure. The primary feature of this model would be "good quality of service". Maintaining cleanliness of premises and food service are critical activities in the operation of luxury hotels. Therefore, customer satisfaction on these metrics is paramount to sustain and grow business. With the ability to post reviews online on booking portals, any negative review (whether justified or not) can reach very easily to a large number of potential guests. This can negatively impact future business. Hence, Staywell Hotels has to ensure that the quality of service that it provides in terms of cleanliness and food should meet and beat the guest's expectation.

Outsourcing these services to well established vendors is advantageous since the focus can remain on improving guest experience. It may also be cost advantageous in many cases. However, there a number of risks in this model. Detailed **service level agreements** need to be drawn up to ensure that the required quality of service is being provided. Staywell Hotels should be able to monitor the performance of these vendors. In cases of non-delivery of the required level of service, the agreement should provide for means of redressal. This could vary from compensation for any loss in business to immediate termination of service. Staywell Hotels should ensure that it can easily and economically switch service providers if required. For this it has to identify alternate vendors who can provide the same level of service as the current ones. The other risk in outsourcing could be of instances where well performing vendors could go bankrupt and shut shop. In such cases, Staywell Hotel's operations could be immediately impacted since such services can no longer be availed from these vendors. Again, list of alternate service providers is a necessary back-up that the hotel should have.

Alternatively, since these are very critical activities to business operations, Staywell Hotels may choose to have complete control over them. This can be achieved by having in-house departments that cater to cleanliness and food service. Control over factors such as input material used, the performance of service, equipment used, training of staff and other essential activities can ensure that the required service quality can be achieved. Better service enhances guest experience. Compared to outsourcing, this might be a costlier option. However, since the guests are ready to pay a premium for service quality, within reasonable limits cost need not be a primary concern for Staywell Hotels for this business model.

CASE STUDIES

Question 5

You are the Finance Manager of DP Limited which is in the business of manufacturing wire rods. A division in the company manufactures copper wire rods from a single manufacturing plant in Central India. The division purchases raw material (copper cathodes) from various suppliers across the country. The cathodes are melted and wire rods of various dimensions are produced. Each batch of wire rods produced are tested for quality and strength.

The wire rods are stored in rolls in the warehouse and dispatched in company owned trucks as per the requirement of the customers. The customers are required to pay 50% of invoice value as advance and balance 50% within 30 days of delivery of goods. The company prices its copper wire rods based on the price prevailing on London Metal Exchange after adjusting it with a factor to cover conversion costs and profits.

The company explores newer markets by advertising in national dailies and participating in various industrial events in India as well as abroad. An annual conference of customers is conducted by the company to improve customer relationships and attract newer customers. The customers have right to return the material if quality specifications are not met. There is   a separate team to handle such complaints.

The following email was sent by the Chief Financial Officer of the company to you.

From: Chief Financial Officer To: Finance Manager

Subject – Commodity Price Fluctuation

The board is quite aware of foreign exchange fluctuation related risks. However, they are not much aware of risks related to fluctuation in commodity prices. The prices   of copper which are used to manufacture copper wire rods have fallen down by over 20% in the last   six months owing to global factors.

The procurement team of Copper Wire Division has been waiting for the right time to buy these metals as they expect the prices to fall down further. However, we are at a verge of stock
-out of these metals as no purchase was made in the last one month.

The bonus of procurement team largely depends on the annual savings as compared to the budgeted cost of purchase. I am not happy with the approach of speculation and making profits out of price fluctuation in raw materials. Could you highlight the issues related with our performance measurement mechanism and suggest how it could be improved?

Regards,
Chief Financial Officer

Attachment:

Copper Prices Quoted on LME
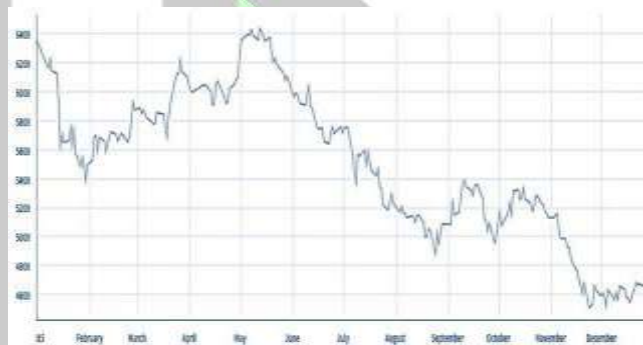
Required

(i)   EXPLAIN and IDENTIFY the various primary activities of Copper Division
(ii)   DISCUSS the issues with performance measure in force in the company.
(iii)   ADVISE an alternate performance measure and Identify Key Performance Indicators (KPI). (STUDY MATERIAL)

Answer

(i) Value chain is defined as "a chain of value added activities; products pass through the activities in a chain, gaining value at each stage". Value chain focuses on systems, and how business inputs are changed into business outputs purchased by customers. The entire set of activities that a business undertakes to covert inputs to outputs are interlinked to each other.

Porter's value chain classifies activities into primary activity and secondary activity.

Primary Activities

Primary activities are those activities that are directly related with creating and delivering a product to the end customers. The following activities are considered as primary activities:

Inbound Logistics

Inbound logistics involves arranging inbound movement of materials from suppliers to the manufacturing plants. The activities related to inbound logistics in the case of copper division of DP limited would involve transporting copper cathodes from multiple suppliers across the country and storing them in the warehouse. The cathodes stored in warehouse would be issued to the production facilities depending on the requirement of the production plants.

Operations

Operations involve those activities which are concerned with conversion of input into outputs in case of manufacturing companies. The activities under operations would include those related to melting of copper cathode and converting the copper cathodes into wire rods. The quality tests carried out for wire rods would also be included as a part of operations.

Outbound Logistics

These include planning and dispatch, distribution management, transportation, warehousing, and order fulfilment. This includes warehousing of finished goods (copper wire rods) and distribution of copper wire rods to its customers. The company uses its own trucks to distribute finished goods to its customers. The scheduling of trucks and dispatch of material would also be a part of outbound logistics.

Marketing & Sales

Marketing and sales are the means whereby consumers and customers are made aware of the product which is ultimately sold to them. The activities include selling products to the end customers covering activities like product management, price management, promotion and marketing management. DP limited uses advertisement in national dailies and holds conferences as a part of its marketing and sales efforts. The company also holds annual customer conference to improve customer relations and attract new customers.

Service

In case of manufacturing industry, service generally refers to the after sales service which are required to maintain the value of product and includes activities like installation, repair etc. The service team is also expected to handle customer returns on account of poor quality of copper wire rods.

(ii) **What is the issue?**

A procurement team is generally a cost centre and the most appropriate way to evaluate performance of cost centre is the comparison between actual cost and budgeted cost (also called variance). A large portion of bonus (performance measurement) is dependent on the savings in

actual purchases.

The company has adopted variance analysis as a measure of performance. If the team is able to reduce the actual cost of purchase as compared to the budgeted cost, a higher bonus is paid. The procurement team has stopped purchase of copper cathodes to save on the purchase budget which ultimately would translate into higher pay-out of bonus.

The commodity prices of copper have fallen by about 20% in the last six months. The speculation of fall in price has resulted in halting of procurement process. It is very difficult to time the market and such speculation could lead to losses to the company. There could be a stock-out situation if the procurement is not resumed and the situation could hamper the production and overall delivery schedules.

The procurement team appears to have taken a short- term view of price movement. The team is focused on earning higher bonus and hence is waiting to buy at lower prices. There is a larger impact of not being able to deliver product on time which could damage the reputation of the company. This has been ignored by the procurement team. Managers must be encouraged to consider the impact on the company as a whole and not on just the own department.

The company is using just a financial measure to measure performance. This can result in lopsided view of the goals and objectives of the company. Managers tend to look at short term profits and ignore the long-term growth.

Optimum Performance Measurement

A performance measurement is most effective when the goals of the respective departments are aligned with that of the company. This ensures that each employee within the company works towards the overall objective of the company. The company manufactures wire rods and the objective of the copper division is to manufacture copper wire rods as per the requirement of the customers.

The profit flows from the main business of the company. If a department focusses on an objective which is not aligned with the main goal, the company as a whole suffers. A stock- out like situation would hamper the image of a company, if wire rods are not delivered as per schedule to the customers.

Another aspect to be considered is that managers and employees are evaluated only on those parameters which are controlled by them. If for example, the procurement team is able to purchase copper at a discount to market price because of their efforts, it could be considered as saving.

The prices of copper are determined by the prices on commodity exchanges and are not in the control of procurement managers. The performance of managers and employees should not be impacted by global change in prices of commodities as they are not controlled by the concerned employees.

(iii) Alternate Performance Measure

The issue with financial performance measures alone is that managers tend to have a short- term view as can be seen in our case. In order overcome possible short-termism of financial measures Kaplan and Norton developed the Balanced Scorecard which outlined four key areas in which company and divisional performance should be measured to focus on both the short and long term needs of the organisation.

The key idea is that managers are to be appraised on a variety of measures which include non-financial measures so that their focus is both long and short term. The four perspectives used to measure performance measure in a Balanced Scorecard is given below:

Financial Perspective: This measures the financial performance which is linked to the overall objective of

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maximising shareholder's wealth. We already use financial measures to measure performance. The weightage could be reduced to include other measures. Also, factors beyond the control of managers like commodity prices should be excluded.

Customer Perspective: This includes focussing on customers and meeting their needs. Measures could include quality of material produced, optimum levels of inventory maintained, number of stock-out instances, etc.

Internal Business Perspective: This includes measures to evaluate the performance of business processes with particular emphasis on productivity and efficiency. Measures could include procurement lead time, number of defective purchases etc. The company could use measures like JIT to reduce the procurement lead time.

Training and Growth: This includes focusing on innovating in processes and developing and learning for the future. Trainings could be given to procurement managers to identify best quality of copper cathodes, aspects related to purity etc.

Question 6

S-Mart was founded in 1990 as a departmental store catering to the entire household requirements (from grocery to clothing) of middle income groups. The company since has grown leaps and bounds and inaugurated its 100th store in 2017. S-Mart is known for high quality products which are available at discount to the market price at its store. The company claims to give at least 5% discount on listed price across product segments. The sales of company have grown 30% on Y-o-Y basis. The company has highest net profit margin and highest return on equity in the industry.

S-Mart has tie-ups with more than 500 vendors across India who provide high quality products on demand. S-Mart pays all its suppliers in advance and hence enjoys preferential pricing as compared to its competitors. The company procures products using the Just-In- Time (JIT) philosophy which helps it to keep low level of inventories and thereby freeing up significant amount of working capital. The products are directly delivered to the stores by company owned trucks and mini-vans and hence, there is no requirement of warehouses to store products.

The company sells products which are required by households on a day to day basis and is not keen to sell premium products which have higher margin but lower demand. This ensures that inventory is moved out of the stores faster and increases the inventory turnover ratio. The company owns all the stores which it operates under its brand name.

There is no third-party franchisee appointed to operate the stores. Since the products are directly procured from he manufactures and sold to customers, there are no intermediaries in between.

S-Mart invests in superior quality products and high level of customer services than aggressive marketing. The company believes that it can attract more customers by offering quality products at reasonable prices rather than spend huge amount on marketing. However, need based marketing activities are carried out by the company. S-Mart aims to build customer loyalty through high level of customer service at its store.

S-Mart is one of the few companies which has witnessed a low employee turnover in the industry in which it operates. The motivation level of employees are very high which results in excellent performance across all levels. Company rewards its employees generously through employee stock options plan. The company conducts training sessions for its employees periodically to equip them with

latest techniques in areas of procurement, sales, marketing, and customer service. The result of these efforts is clearly visible in the company's growth.

The company has a solid Information Technology infrastructure for all its activities. The company has leveraged technology across all departments - be it procurement, logistics or sales. It has implemented

SAP-R3 which is one of the leading Enterprise Resource Planning system globally. Various reports relating to inventory levels, sales, liquidity position etc. are available on a real - time basis to the senior management.

Required

Map the various activities performed at S-mart to the Porter's Value Chain model. (STUDY MATERIAL)

Answer

Introduction

Value chain is defined as "a chain of value added activities; products pass through the activities in a chain, gaining value at each stage". Value chain focuses on systems, and how business inputs are changed into business outputs purchased by customers. The entire set of activities that a business undertakes to covert inputs to outputs are interlinked to each other. A business carries out these activities to earn a profit or margin.

A business should undertake only those activities which add value to the end product being delivered to the customer. A value chain analysis helps business identify those activities which are not adding value (in other words wasteful activities). An example of a wasteful activity could be unnecessary storage of products which increases the inventory and working capital requirement. Such activities must be removed to ensure that the margin of business improves. Value Chain Analysis is one way of identifying which activities are best undertaken by a business and which are best outsourced.

Porter's value chain classifies activities into primary activity and secondary activity.

Primary Activities

Primary activities are those activities that are directly related with creating and delivering a product to the end customers. The following activities are considered as primary activities -

Inbound Logistics

Inbound logistics involves arranging inbound movement of materials or finished goods from suppliers to the manufacturing plants or retail stores. Since S-Mart is not involved in manufacturing, all the activities that it undertakes to deliver the products to its retail stores would form part of Inbound Logistics. The company has its own transport fleet to ensure timely delivery of products to the retail stores. The company also has a JIT system in place which ensures minimum inventory level. A reason why the company uses its own fleet of trucks is to ensure that there are no failures on the supply side. In JIT systems and especially in retail business, it is very important that stock outs are avoided.

Operations

Operations involve those activities which are concerned with conversion of input into outputs in case of manufacturing companies. In retail business, it comprises of those activities which are concerned with running of stores, planning of inventory levels of various products, deciding the layout of various stores etc. The company operates through 100 stores which are owned by itself. The company does not have franchisee or agent model for operation of its stores. The ownership of the stores ensure that the quality standards are maintained across various stores and customer get the best value. Since the stores are owned, the company does not face any risk of closing the stores due to expiry of lease arrangements. The

company can also invest to build the best layout for the stores.

Outbound Logistics

These include planning and dispatch, distribution management, transportation, warehousing, and order fulfilment. In case of a retail business, this includes activities carried out to deliver the product to the customer. S-Mart operates through its own stores and there are no outsourcing or franchisee arrangements. The company does not have any warehousing requirement as the product are directly delivered to the retail stores. The customers directly pick up the products from the stores and there is no transport requirement in this case. The company must however ensure that the customer waiting time is low at the time of invoicing and checkout from the store.

Marketing & Sales

Marketing and sales are the means whereby consumers and customers are made aware of the product which is ultimately sold to them. The activities include selling products to the end customers covering activities like product management, price management, promotion, and marketing management. S-Mart builds customer loyalty by offering high quality products at affordable pricing. The company does not spend a huge amount on marketing.

Service

In case of manufacturing industry, service generally refers to the after sales service which are required to maintain the value of product and includes activities like installation, repair etc. In case of retail stores, service would encompass a superior experience at the stores and managing return of products by the customers. S-Mart aims to build customer loyalty through high level of customer service at its store.

Secondary Activities

Secondary activities are those activities which support the primary activities in their function.

The following are the broad classification of secondary activities:

Procurement

Procurement refers to the processes of acquiring various products and include activities like identifying sources of these products, vendor selection, placing an order, purchase of products etc.

The company deals with over 500 vendors across India on advance payment terms to procure high quality products at preferential pricing. This helps the company get better discounts which it can pass it onto the customers. This ensures that the company does not carry the burden of discounts being offered to the customers.

Technology Development

Technology spans across all the primary activities of an organisation. It includes activities like process automation, an Enterprise Resource Planning (ERP) system, inventory management systems etc. The company has implemented SAP R/3 - an ERP package which helps in the management of various functions of procurement, logistics and sales. A robust system is always necessary to ensure that the JIT systems

work effectively. Such systems assist in real- time monitoring of inventory levels and triggering purchase orders when inventory levels are low. The entire flow of products from an order placement till the delivery to customer can be tracked seamlessly.

Human Resource Management

This involves areas of recruiting, managing, training, developing and rewarding people within an organisation. S- Mart has a very low employee turnover and a very high level of employee motivation. The company rewards all its employees generously and conducts periodic training and development programmes for its employees. This ensures that the employees are highly motivated which translates into a consistently high performance.

Infrastructure

This includes not only the physical infrastructure but also all departments of management, finance, legal which are required to keep the company's store operational. All these are important for organisation's performance in primary activities.

Question 7

Westwood Solar Solutions (WSS) has mastered the art of developing Solar Domestic Water Heater that fulfil customer's needs. WSS's designers and product developers focus on solutions to get rid of everyday hassles and transform these into a pleasant experience. WSS also has a wide service network that spans the length and breadth of India to ensure good care of customers and products, by providing a prompt and pleasant service experience. In the past, WSS had a dominant position in the Indian market. However, over the past four years, it has been found that its profits and its share in the market have come down.

WSS has business Model comprising of following steps:

- Firstly, WSS's highly qualified and skilled experts visit customer's locations to identify and design the appropriate heater as per customer's requirements. WSS's experts are recognized as the best in the industry, and customers agree that they produce the most effective solutions to their complaints.

- At WSS, in the laboratories, the heater design goes through intricate, complex, and dynamic process. Prototypes are developed on the basis of discussions in previous step. Thereafter, these prototypes are tested. Once a final design is decided, such design is passed to the manufacturing division for production.

- Then, WSS manufactures appropriate Solar Water Heater to the desired specification and installs at the customer's location.

- After the heater's installation, WSS renders annual maintenance services for which it is well- known in the industry.

WSS's customers pay a total price for design, manufacture and initial installation of the Solar Water Heater and an annual maintenance charge after that. Total prices are quoted before design work begins.

Although customers appreciate the high quality of the solutions provided by WSS's team, however, they are complaining that the overall prices are too high. Customers have said that although other suppliers do not solve their problems as WSS does, they do charge less. Consequently, WSS has lower down its prices to compete in the market. There is a doubt that the manufacturing and installation stages of the business model are not contributing sufficiently to the firm since costs at both stages are going high.

Partners of WSS have considered that this situation should no longer continue and have recommended

that a value chain analysis to be conducted as to identify the way forward for WSS. Although majority of partners are in the agreement with the proposed value chain analysis, however senior partner 'W' has stated that value chain analysis is inappropriate idea. She says that she has heard a number of criticisms of the value chain model.

Assuming yourself as management accountant of WSS, answer the following questions:

Required
(i)   DISCUSS the benefits that may accrue to WSS from conducting a value chain analysis.
(ii)   DISCUSS the criticisms of Porter's value chain model in the context of WSS
(iii)   EXPLAIN other form of Value Chain Analysis that may be more suitable for WSS (STUDY MATERIAL)

Answer

(i)   There are following benefits accruing to WSS through a value chain analysis:

☐   Value chain analysis is a process by which a firm identifies and analysis various activities that add value to the final product. The idea is to identify those activities which do not add value to the final product/service thereafter eliminating such non-value adding activities. The analysis of value chain help a firm in obtaining cost leadership or improve product differentiation. For WSS, value chain can provide with more unambiguous picture of the value of the manufacturing function as perceived by customers.

☐   This model also helps in analyzing other firms within the same industry. As WSS observed that other firms in the industry are considered to be more cost effective in terms of manufacturing, it may plan to use the value chain model to examine the reason for the same.

☐   The value chain will assist WSS to determine ways to get best approach towards developing higher level competitive performance. This model assists firms in finding ways to develop higher level of performance either by cost leadership or product differentiation. Right now, WSS is in a situation wherein it is being defeated on price by some of its competitors, however is recognized as the best solutions provider to customer's problems. Through detailed value chain analysis, WSS may be able to ascertain the reason of falling down in such situation and partners may be able to take decision regarding the future vision of the firm.

☐   Through this analysis, WSS may apply other relevant management techniques as well. Post value chain analysis, WSS will be in a position to decide whether it is worthwhile to continue the technique of benchmark (processes and performance) against its rivals, to develop an information systems strategy, to carry out a business process re- engineering process or to adopt activity-based management.

☐   Further, WSS may decide to outsource manufacturing and keep focus on design and services by following value chain analysis model. This technique may be appropriate for WSS as by outsourcing manufacturing, WSS may be able to focus on its core area for which it is well-known in the industry.

☐   Value Chain analysis will also facilitate the development of performance metrics for WSS. By developing such metrics WSS may be able to identify which aspects of its business model are not contributing to the overall value and profits of the firm. Although currently WSS has suspicion that

manufacturing and installation are the weak parts of its operation, development of transparent and appropriate metrics would enable WSS to recognize where value and profit are being added in the business model.

(ii)   Number of criticisms of the value chain developed by Michael Porter have been:

▪ This value chain analysis cannot easily be applied to firms belonging to service industries. This criticism is particularly imperative in the context of WSS which has upward profits from rendering solutions and services rather than that from manufacturing tangibles products. Many people appreciate that the model is more suitable to manufacturing-based industries, rather than service based industries.

▪ Often this model is seen as complicated and perhaps could be a source of frustration for the management of a firm. Although the staff of WSS includes bright and intelligent experts, they may not see the value in-depth analyses of business which is required for a full value chain analysis.

▪ This analysis has a linear approach and ignores the concept of value networks. This criticism is specifically relevant to WSS because its major business resort to the cooperative relationship that the experts have with their customers. If, WSS decides to outsource manufacturing and focus on design and service, this will become even more relevant where relationships are utmost important.

▪ Often value chain analysis is perceived as time consuming and expensive as a whole. However, if the analysis is to be completed timely, there will be requirement of reliable data such as cost of components in business model. However, in the absence of good cost capturing system, this model could prove to be a costly process. After completion of this process, still there is no guarantee that the process lead to have upward trend in profitability and where it does, it may take some time in realization.

(iii)   WSS requires to acknowledge that the nature of its business is turning from manufacturing zone to a solutions provider or professional services firm.

From this point of view, it would be better for WSS to analyze its business using the Professional Services Value Chain/ Value Shop Model. The concept of Value Shop came in to lime light holding the hand of Charles B. Stabell and Oystein D. Fjeldstad in 19 98.This concept aims to serve firms from service sector. It only deals with problems, figure out the main area requiring service and finally come with the solution. This approach is designed to solve customer's problems rather than creating value by producing output from an input of raw materials.

A Value Shop mobilizes resources (say: people, knowledge or money) to solve specific problems such as delivering a solution to business problem. This shop model is iterative, involving repeatedly performing a generic set of activities until a solution is reached.

Secondary activities in the Professional Service Value Chain have same support activities as those in the porter's value chain, However the primary activities are described differently to recognize the different nature of a service-oriented business. In value shop, primary activities are performed in a circle within a firm to perform generic set of activities iteratively before reaching a conclusion. Since WSS team communicate with customers to find a solution before testing of developed prototypes, so they will find the vale shop, compatible and effective model to use.

Question 8

In the 'Five Forces Model', one of the crux is that companies or divisions compete with their buyers and suppliers. The same model can be used to evaluate the competitive environment of the divisions of large, complex companies. In such companies, some of the divisions may be buyer and supplier to one another. This leads to management accountants becoming involved in negotiations leading to the agreement of suitable transfer prices between these divisions.

Required

(i) EXPLAIN, how the forces applied in a relationship between supplier and buyer led Michael Porter to reach a conclusion that companies compete with their buyers and suppliers.

(ii) DISCUSS, the issues of negotiating and agreeing transfer prices between divisions within a large, complex organization. Make references to Michael Porter's model, and your arguments in part (i) where appropriate (STUDY MATERIAL)

Answer

(i) Michael Porter concluded that companies or divisions compete with their buyers and sup - pliers because they exercise bargaining power over one another. The relative competitive advantage is determined by the degree of bargaining power of each of the parties. Porter viewed competition as activity that affects margins where buyers and suppliers struggle to steal margin from each other.

The competitive forces between buyer and supplier affect price and quality. A large order or **powerful buyer** will exercise force by trying to encourage the supplier to improve quality, either of the product or service being provided, or of the services supporting the product. As another option, a **powerful buyer** might be willing to accept the standard product, but demands a discount, thus increasing its own margin at the expense of the supplier.

Relative size of the parties also determines the bargaining power, or it also depend on the degree of reliance on one another. A large buyer or supplier, for whom the other party is a small or unimportant portion of business, is more likely to exercise power to get a "good deal". It is clear that a buyer placing a small order is in a worse position to ask for a discount than one placing a very large order. In the same way, if a buyer represents a major portion of turnover, a supplier will work hard to keep such a buyer happy, thus may increase the service package to support the product by incurring costs.

A buyer or supplier also has greater bargaining power if **switching costs** in doing business elsewhere is incurred by other party. This cost would, if incurred, reduce margins. This will lead to the party being less likely to break up the relationship with other party.

Some elements of the bargaining power are also determined by the **availability of alternative suppliers or buyers**. A large supplier will give no concessions to a very small buyer if it is confident that another buyer will be available to replace it. Similarly, a buyer looking for a very special material or service may find that it has no alternative than to accept the terms offered by a single supplier.

Thus, companies and divisions "compete" with their buyers and suppliers. However, this depends on how broad the definition of "competition" is. Michael Porter started from the premise of a very broad definition, consequently could prove his hypothesis.

(ii) In a large and complex company, divisions may have been developed or acquired along a supply chain. This means that, within the company, there are divisions that are buyers and suppliers for each other. The logic behind establishing this structure is that it reduces transaction costs, cuts out supplier margins and secures reliable supply of raw materials or components. In this situation, the company faces the risk of sacrificing any saving in transaction costs if management needed to invest considerable time in transfer pricing negotiation.

In effect, the divisions concerned will be competing with one another like buyer and supplier during the negotiation, in the same way as described in Part (i). The transfer price agreed will affect, to some extent, the profitability of each of the divisions. If bonuses are paid to managers as per divisional performance, the transfer price will determine the level of bonus paid. Thus, managers may have a personal interest in enduring negotiations that will destroy value in the company.

The parent company must determine whether the transfer price is in the best interests of the

company. If it is, it should simply be imposed. This finish off competition but may discourage managers, especially when divisional bonuses are paid. In most companies, some level of negotiation is allowed, but this may be not realistic if transfer is necessary. In this case, the bargaining power of the supplier division is vastly increased, thus destroy the balance of the negotiation.

The opposite is the case if the supplier division is not allowed to make external sales, or if there is no external market (for example, for a special component). In this situation, the bargaining power clearly lies with the buyer division, as the supplier has no choice but to make the transfer. However, if the special component or supply is not available from elsewhere, the bargaining power may shift to the supplier division as its product is of different nature.

The outcome of any transfer price negotiation must be ended in a transfer at a fair price. In this case, fair means that the price must be comprehended as fair by the division concerned. Any other outcome may lead to loss of motivation in one or both of the divisions. A fair price can be easily determined if there is a free market of the product, component or service being transferred (in other words, it can be both sold and bought outside). If this case does not exist, the range of transfer prices may fall between marginal cost of a unit and full cost plus normal margin.

In corporate terms, the most important transfer pricing issue is that while consolidating the accounts, the transfer price cease to exist. While consolidating the supplier and buyer division accounts, the revenue from the transfer price cancels out the cost of purchase, so the net result is that the transfer disappears. In entire development, most of time and efforts are wasted and simply rise in internal transaction costs. Accordingly, any competition between the divisions is worthless. If the management accountants comprehend this, and the relative bargaining power of the divisions concerned, it is possible to determine negotiations quickly, thus distorting as little value as possible.
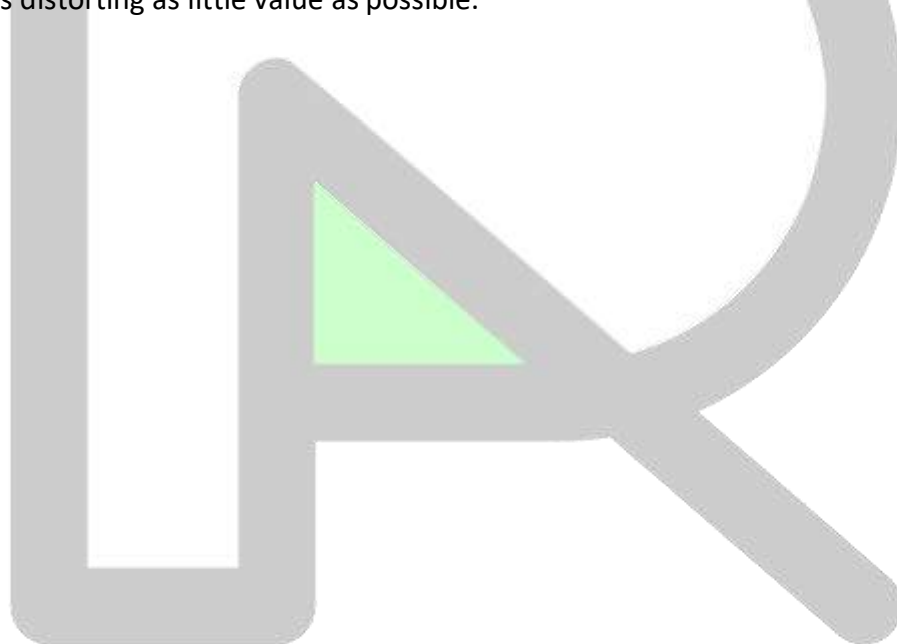
CHAPTER-2 Modern Business Environment

Section A – Practical Questions

Cost of Quality

Question 1

Hindustan Bikes Ltd. (HBL) formerly known as HELCO is an Indian multinational company. It's headquarter is located in Bengaluru, India. It has been founded in the year 1990 as a manufacturer of locomotives. The company is presently listed locally as well as in international stock market. HBL's parent company is Hindustan Group. The management of HBL recognizes the need to establish a culture at the company so that -

"Do the right things, right the first time, every time".

Management has provide you following actual information for the most recent month of the current year:

Cost Data

Customer Support Centre Cost	35 per hr.
Equipment Testing Cost	18 per hr.
Warranty Repair Cost	1,560 per bike
Manufacturing Rework Cost	228 per bike

Volume and Activity Data

Bikes Requiring Manufacturing Rework	3,200 bikes
Bikes Requiring Warranty Repair	2,600 bikes
Production Line Equipment Testing Time	1,600 hrs.
Customer Support Centre Time	2,000 hrs.

Additional information

HBL carried out a quality review of its existing suppliers to enhance quality levels during the month at a cost of ` 1,25,000. Due to the quality issues in the month, the bike production line experienced unproductive 'down time' which cost ` 7,70,000.

Required

Prepare a statement showing 'Total Quality Cost' (RTP MAY 18)

Answer

Statement Showing "Total Quality Cost"

Particulars of Costs	`
Prevention Costs	
Supplier Review	**1,25,000**
Appraisal Costs	
Equipment Testing (`18 × 1,600 hrs.)	**28,800**
Internal Failure Costs	
Down Time	**7,70,000**
Manufacturing Rework (`228 × 3,200 bikes)	**7,29,600**

External Failure Costs	
Customer Support (`35 × 2,000 hrs.)	**70,000**
Warranty Repair (`1,560 × 2,600 bikes)	**40,56,000**
Total Quality Costs	57,79,400

Question 2

Particulars	2019	2020
		(Figures in `'000)
Sales	6,000	6,000
Scrap	600	300
Rework	500	400
Production Inspection	200	240
Product Warranty	300	150
Quality Training	75	150
Materials Inspection	80	60

Required

(i) Classify the quality costs as prevention, appraisal, internal failure and external failure and express each class as a percentage of sales.

(ii) Compute the amount of increase in profits due to quality improvement. (RTP MAY 18)

Answer

(i)   Statement Showing Classification of Quality Costs"

	2019 ` '000	2019 % of Sales	2020 ` '000	2020 % of Sales
Prevention:				
Quality Training	75	1.25%	150	2.50%
Appraisal:				
Product Inspection	200	3.33..%	240	4.00%
Materials Inspection	80	1.33..%	60	1.00%
Internal Failure:				
Scrap	600	10.00%	300	5.00%
Rework	500	8.33..%	400	6.66..%
External Failure:				
Product Warranty	300	5.00%	150	2.5
Total	**1,755**	**29.25%**	**1,300**	**21.66%**

(ii)   Cost reduction was effected by 7.583% (29.25 – 21.66) of sales, which is an increase in profit by
`4,54,980.

Question 3

A company produces and sells a single product. The cost data per unit for the year 2017 is predicted
as below:

	` per unit
Direct material	35
Direct labour	25
Variable overheads	15
Selling price	90

The company has forecast that demand for the product during the year 2017 will be 28,000 units.
However to satisfy this level of demand, production quantity will be increased?

There are no opening stock and closing stock of the product.

The stock level of material remains unchanged throughout the period.

The following additional information regarding costs and revenue are given:

—   12.5% of the items delivered to customers will be rejected due to specification failure and
will require free replacement. The cost of delivering the replacement item is `5 per unit.

—   20% of the items produced will be discovered faulty at the inspection stage before they are
delivered to customers.

—   10% of the direct material will be scrapped due to damage while in storage. Due to above, total
quality costs for the year is expected to be `10,75,556.

—   The company is now considering the following proposal:

1. To introduce training programmes for the workers which, the management of the company believes, will reduce the level of faulty production to 10%. This training programme will cost ` 4,50,000 per annum.

2. To avail the services of quality control consultant at an annual charges of ` 50,000 which would reduce the percentage of faulty items delivered to customers to 9.5%.

Required

(i)   Prepare a statement of expected quality costs the company would incur if it accepts the proposal. Costs are to be calculated using the four recognised quality costs heads.

(ii) Would you recommend the proposal? Give financial and non-financial reasons. (Study Material)

Answer (MTP OCT.19) (MTP APRIL.18)

(i) Statement Showing 'Expected Quality Costs'

Particulars	Current Situation (`)	Proposed Situation (`)
Prevention Costs	---	4,50,000
Appraisal Costs	---	50,000
External Failure Costs	3,20,000	2,35,120
Internal Failure Costs	7,55,556	3,91,538
Total Quality Costs	10,75,556	11,26,658

Workings

External Failure Cost

Particulars	Current Situation	Proposed Situation
Customer's Demand	28,000 units	28,000 units
Number of units Dispatched to Customers .... (B)	32,000 units	30,939 units
Number of units Replaced ......(B)–(A)	4,000 units	2939 units
External Failure Cost {4,000 units ×`(35+25+15+5)}; {2,939 units ×`(35+25+15+5)}	`3,20,000	`2,35,120

Internal Failure Cost

Particulars	Current Situation	Proposed Situation
Number of units Dispatched to Customers ...(A)	32,000 units	30,939 units
Number of units Produced & Rejected ...(B)	40,000 units	34,377 units

Number of units Discovered Fault … (B) – (A)	8,000 units	3,438 units
Cost of Faulty Production …(D) {8,000 units × `(35+25+15)}; {3,438 units × `(35+25+15)}	`6,00,000	`2,57,850
Material Scrapped	4,444.44 units	3,819.67 units
Cost of Material Scrapped …(E) {4,444.44 units × `35}; {3,819.67 units × `35}	`1,55,556	`1,33,688
Internal Failure Cost …(D) + (E)	`7,55,556	`3,91,538

(ii) On purely financial grounds the company should not accept the proposal because there is an increase of `51,102 in quality costs. However there may be other factors to consider as the company may enhance its reputation as a company that cares about quality products and this may increase the company's market share.

On balance the company should accept the proposal to improve its long-term performance.

Question 6

Livewell Limited is a manufacturing company that produces a wide range of consumer products for home consumption. Among the popular products are its energy efficient and environment friendly LED lamps. The company has a quality control department that monitors the quality of production.

As per the recent cost of poor quality report, the current rejection rate for LED lamps is 5% of units input. 5,000 units of input go through the process each day. Each unit that is rejected results in a `200 loss to the company. The quality control department has proposed few changes to the inspection process that would enable early detection of defects. This would reduce the overall rejection rate from 5% to 3% of units input. The improved inspection process would cost the company `15,000 each day.

Required

(i) ANALYSE the proposal and suggest if it would be beneficial for the company to implement it.

After implementation, ANALYSE the maximum rejection rate beyond which the proposal ceases to be beneficial? (Study Material) (MTP APRIL.19)

Answer

(i) Analysis of the proposal to make changes to the inspection process:

The company wants to reduce the cost of poor quality on account of rejected items from the process. The current rejection rate is 5% that is proposed to be improved to 3% of units input.

The expected benefit to the company can be worked out as follows:

The units of input each day = 5,000. At the current rate of 5%, 250 units of input are rejected each day. It is proposed to reduce rejection rate to 3%, that is 150 units of input rejected each day. Therefore, improvements to the inspection process would reduce the number of units rejected by 100 units each day. The resultant cost of poor quality would reduce by `20,000 each day (100 units of input × `200 cost of one rejected unit).

The cost of implementing these additional controls to the inspection process would be `15,000 each day.

The net benefit to the company on implementing the proposal would be `5,000 each day. Therefore, the company should implement the proposal.

Analysis of maximum rejection rate beyond which the proposal ceases to be beneficial The cost of improving controls to the inspection process is `15,000 each day. The number of units of input processed each day is 5,000. The cost of rejection is `200 per unit.

It makes sense to implement the improvements to controls only if the benefit is greater than the cost involved. To find out the point where the benefits equal the cost, solve the following equation

Let the number of reduction in rejections each day due to improved controls be R. At

`200 per unit, benefits from reduction in rejection would be `200 × R.

At what point, would this be equal to the cost of control of `15,000 per day?

Solving `200 × R = `15,000; R = 75 units. That is if the improvements to inspection process control reduces the number of rejections by 75 units each day, the benefit to the company would be `15,000 each day.

That is if the rejection rate improves by 1.5% (75 units / 5,000 units) then the benefits accruing to the company will equal the cost incurred.

In other words, when the rejection rate is 3.5% (current rate 5% - improvement of 1.5% to the rate) or below, the proposal will be beneficial. In this range, the savings to the cost of poor quality will be more than the cost involved. For example, as explained above, when the improved rejection rate is 3%, the net benefit to the company is
`5,000 each day.
Beyond 3.5% rejection rate, the proposal will result in savings to the cost of poor quality that is less than the cost involved of `15,000 each day.

Question 7

Cool Air Private Ltd. manufactures electronic components for cars. Car manufacturers are the primary customers of these products. Raw material components are bought, assembled and the electronic car components are sold to the customers.

The market demand for these components is 500,000 units per annum. Cool Air has a market share of 100,000 units per annum (20% market share) for its products. Below are some of the details relating to the product:

Selling price	`2,500 per unit
Raw material cost	`900 per unit
Assembly & machine cost	`500 per unit
Delivery cost	`100 per unit
Contribution	`1,000 per unit

The customers due to defects in the product return 5,000 units each year. They are replaced free of charge by Cool Air. The replaced components cannot be repaired and do not have any scrap value. If these defective components had not been supplied, that is had the sale returns due to defective units been nil, customers' perception about the quality of the product would improve. This could yield 10% increase in market share for Cool Air, that is demand for its products could increase to 150,000 units per annum. Required

(i) ANALYZE, the cost of poor quality per annum due to supply of defective items to the customers.

(ii)   The company management is considering a proposal to implement an inspection process immediately before delivery of products to the customers. This would ensure nil sales returns. The cost of having such a facility would be `2 crores per annum, this would include

(iii)   materials and equipment for quality check, overheads and utilities, salaries to quality control inspectors etc. ANALYZE the net benefit, if any, to the company if it implements this proposal.

(iv)   Quality control investigations reveal that defective production is entirely on account of inferior quality raw material components procured from a large base of 30 suppliers. Currently there is no inspection at the procurement stage to check the quality of these materials. The management has a proposal to have inspectors check the quality control at the procurement stage itself. Any defective raw material component will be replaced free of cost by the supplier. This will ensure that no product produced by Cool Air is defective. The cost of inspection for quality control (materials, equipment, salaries of inspectors etc.) would be `4 crores per annum. ANALYZE the net benefit to the company if it implements this proposal? Please note that scenarios in questions (ii) and are independent and not related to each other.

Between inspection at the end of the process and inspection at the raw material procurement stage, ADVISE a better proposal to implement (a) in terms of profitability and (b) in terms of long term business strategy? (Study Material) (RTP MAY.19) (MTP MARCH.19)

Answer

(i)   Customer demand for Cool Air's products is 100,000 units per annum. However, 5,000 defective units supplied are to be replaced free of charge by the company. Therefore, the total number of items supplied to customers per annum = 100,000 + 5,000 units = 105,000 units. The cost of replacement would include raw material cost, assembly & machining cost and delivery cost of 5,000 units = 5,000 units × (900+500+100) per unit = 5,000 units × `1,500 per unit = `75,00,000 per annum. Further, had the sale returns not happened, market share would have increased by 50,000 units. Contribution is `1,000 per unit, for 50,000 units contribution would be `5,00,00,000. Therefore, the cost of poor quality per annum = cost of replacement + contribution from lost sales = `75,00,000 + `5,00,00,000 = `5,75,00,000 per annum.

(ii)   Inspection at the end of the process would detect defects before delivery to the customers. This would ensure that the sale returns would be nil. Given in the problem, 5,000 units supplied are defective and would need to be replaced, in other words, they need to be manufactured again. In other words, inspection after production, before delivery to customers would not prevent production of defective units. However, compared to the current scenario, since these defective units have not yet been delivered to the customer, the cost for additional delivery of replaced products would be saved. This savings in the extra delivery   cost = 5,000 units × `100 per unit
= `5,00,000 per annum. Further, had the sale returns not happened, market share would have increased by 50,000 units. Contribution is `1,000 per unit, for 50,000 units it would be `5,00,00,000 per annum. Therefore, the total benefit from the inspection process before delivery to customers = savings on delivery costs + contribution from incremental sales = `5,00,000 + `5,00,00,000 = `5,05,00,000 per annum. The cost to the company to maintain good quality of its products through inspection = `2,00,00,000 per annum. Therefore, the net benefit to the company would be `3,05,00,000.

(iii) Inspection of raw material at the procurement stage could entirely eliminate defective production. The benefit would be two-fold, the current replacement cost for 5,000 units will no longer be incurred. Secondly, due to better customer perception, market share would increase, resulting in an increased contribution / revenue to the company. In other words, the cost of poor quality will be nil.

As explained in solution (i), the cost of poor quality per annum = cost of replacement + contribution from lost sales = `75,00,000 + `5,00,00,000 = `5,75,00,000 per annum. This would be the benefit by implementing the proposal.

Cool Air has to incur an inspection cost to ensure this highest standard of quality (0% defects) which would cost `4,00,00,000 per annum. Therefore, the net benefit to the company would be `1,75,00,000 per annum.

(iv)   **(a)** The proposal to implement inspection immediately before delivering goods to the customers results in a net benefit of `3,05,00,000 per annum. Alternately, the proposal to implement inspection at the raw material procurement  stage  results  in a net benefit of `1,75,00,000 per annum. Therefore, from a profitability point of view, inspection immediately before delivery of goods to the customer would the preferred option.

(b) The drawback of inspection at the end of the production process is that (1) it cannot prevent production of defective goods and (2) information regarding the root cause of defective production, in this case, supply of defective raw materials will not get tracked. Therefore, inspection at the end of production does not contribute to resolving the root cause of defective production. On the other hand, inspection at the procurement stage can eliminate production of defective goods. This will ensure a much higher quality of production, better utilization of resources and production capacity. Therefore, from a long-term strategy point of view, inspection at the raw material procurement stage will be very beneficial. Currently the cost of ensuring this highest quality of production (0% defects) is
`4 crores per annum. The cost of ensuring 100% quality is quite high, such that the net benefit to the company is lesser than the other proposal. However, due to its long-term benefit, Cool Air may consider some minimum essential quality control checks at the procurement stage. Although selective quality check might not ensure complete elimination of defective production, it can contribute towards reducing it. At the same time cost of selective quality check would not be so high as to override its benefits. To determine the extent of quality control inspection, Cool Air should determine its tolerance limit for defective production and do an analysis of the quality / cost trade-off.

Question 8

EKS Ltd. manufactures a single product, which requires three components. The company purchases one of the components from three suppliers. DE Ltd., PE Ltd. and ZE Ltd. The following information are available:

	DE Ltd.	PE Ltd.	ZE Ltd.
Price quoted by supplier (per hundred units)	`240	`234	`260
% of Defective of total receipts	3%	5%	2%

If the defectives are not detected they are utilized in production causing a damage of `200 per 100 units of the component. Total requirements are 12,000 units of the components.

The company intends to introduce a system of inspection for the components on receipt. The inspection cost is estimated at `26 per 100 units of the components. Such as inspection will be able to detect only 90% of the defective components received. No payment will be made for components found to be defective in inspection.

Required

(i)   Advice whether inspection at the point of receipt is justified.

(ii)   Which of the three suppliers should be asked to supply?(Study Material)

Answer

(i)   **A: Statement Showing Computation of Effective Cost before Inspection**

Particulars	DE Ltd.	PE Ltd.	ZE Ltd.
Units Supplies (No.s)	12,000	12,000	12,000
Defectives Expected (No.s)	360	600	240
Costs:			
Purchase of Components	28,800	28,080	31,200
Add: Production Damage on Defective Components (@ `200 per 100 components)	720	1,200	480
Total	29,520	29,280	31,680
Good Components (Nos.)	11,640	11,400	11,760
Cost per 100 Good Components	253.61	256.84	269.39

B: Statement Showing Computation of Effective Cost after Inspection

Particulars	DE Ltd.	PE Ltd.	ZE Ltd.
Units Supplies (No.s)	12,000	12,000	12,000
Defects Not Expected (No.s)	36	60	24
Defectives Expected (No.s)	324	540	216
Components Paid For	11,676	11,460	11,784
Costs:			
Purchase of Components	28,022.40	26,816.40	30,638.40
Add: Inspection Cost	3,120.00	3,120.00	3,120.00
Add: Production Damage on Defective Components (@ `200 per 100 components)	72.00	120.00	48.00
Total	31,214.40	30,056.40	33,806.40
Good Components (Nos.)	11,640	11,400	11,760
Cost per 100 Good Components	268.16	263.65	287.47

Advice Whether Inspection at the Point of Receipt is Justified

On comparing the cost under situation, A and B shown above, we find that it will not be economical to install a system of inspection.

Further we also need to consider that presently many organizations are undergoing Just in Time (JIT) implementation. JIT aims to find a way of working and managing to eliminate wastes in a process. Achievement of this is ensured through eliminating the need to perform incoming inspection. Inspection does not reduce the number of defects, it does not help in improving quality. In general inspection, does not add value to the product. It simply serves as a means of identifying defects the supplier has failed to recognize subsequent to the manufacturing of the product.

As a matter of fact, organizations implementing JIT are seeking eventually to eliminate the need for performing incoming inspection activities through a combination of reducing the supplier base, selection through qualification and vendor development. Vendor development and its proper management seeks to assist the supplier who maintains an interest in striving to provide 100% defect-free materials and parts.

So, to decision whether inspection at the point of receipt is justified or not will also depend on Qualitative factors as well.

(ii) On comparing the buying cost of components under different situations, as analysed and advised above, if company decides not to install a system of inspection, supplier DE would be cheaper otherwise supplier PE would be cheaper and company may choose supplier accordingly.

Theory of Constraints/Throughput Accounting

Question 9

BTS Ltd. produces three products A, B and C. The following information is available for a period:

	A	B	C
Contribution (per unit)	`30	`25	`15 [Sales – Direct materials]

Machine hours required per unit of production

	A	B	C	Hours Through Accounting Ratio
Machine 1	10	2	4	133. 33%
Machine 2	15	3	6	200.00 %
Machine 3	5	1	2	66.67%

Estimated sales demand for A, B and C are 500 units each and machine capacity is limited to 6,000 hours for each machine.

Required

Analyse the above information and apply theory of constraints process to remove the constraints. How many units of each product will be made? (RTP NOV 18)

Answer

Throughout Accounting Ratio is highest for 'Machine 2'. Accordingly 'Machine 2' is the bottleneck. Total 6,000 'Machine 2' hours are available.

Contribution per unit of Bottleneck Machine hour

Particulars		A	B	C
Contribution *per unit* (`)	...(A)	30	25	15
'Machine 2' Hours	...(B)	15	3	6
Contribution *per* 'Machine 2' *hours* ...(C) = (A) / (B)		2	8.33	2.50
Ranking	...(D)	3	1	2
Maximum Demand	...(E)	500	500	500
'Machine 2' Hours Require ...(F) = (B) × (E)		7,500	1,500	3,000
'Machine 2' Hours Available	...(G)	1,500* (Balance)	1,500	3,000
Units ...(H) = (G) / (B)		100	500	500

(*) [6,000 hrs – 1,500 hrs – 3,000hrs]

Question 10

Phi Ltd. produces 4 products P, Q, R and S by using three different machines X, Y and Z. Each machine capacity is limited to 6,000 hours per month. The details given below are for July, 2013:

Particulars	P	Q	R	S
Selling Price p.u. (`)	10,000	8,000	6,000	4,000
Variable Cost p.u. (`)	7,000	5,600	4,000	2,800
Machine Hours Required p.u.				
Machine X	20	12	4	2
Machine Y	20	18	6	3
Machine Z	20	6	2	1
Expected Demand (units)	200	200	200	200

Required

(i) Find out the bottleneck activity.

(ii) Allocate the machine hours on the basis of the bottleneck.

(iii) Ascertain the profit expected in the month if the monthly fixed cost amounts to ` 9,50,000.

(iv) Calculate the unused spare hours of each machine.(PM)

Answer

(i)

Mach.	Time Required for Products (Hours)				Total Time	Time Avail.	Machine Utilization
	P	**Q**	**R**	**S**			
X	4,000 (200 units × 20 hours)	2,400 (200 units × 12 hours)	800 (200 units × 4 hours)	400 (200 units × 2 hours)	7,600	6,000	126.67%
Y	4,000 (200 units × 20 hours)	3,600 (200 units × 18 hours)	1,200 (200 units × 6 hours)	600 (200 units × 3 hours)	9,400	6,000	156.67%
Z	4,000 (200 units × 20 hours)	1,200 (200 units × 6 hours)	400 (200 units × 2 hours)	200 (200 units × 1 hours)	5,800	6,000	96.67%

Since Machine Y has the highest machine utilization it represents the bottleneck activity. Hence Product Ranking & Resource Allocation should be based on Contribution/Machine Hour of Machine Y.

(ii)

Allocation of Resources						
Particulars	**P**	**Q**	**R**	**S**	**Machine Utilization**	**Spare Capacity**
Selling Price *per unit* (`)	10,000	8,000	6,000	4,000		
Variable Cost *per unit* (`)	7,000	5,600	4,000	2,800		
Contribution *per unit* (`)	3,000	2,400	2,000	1,200		
Time Required in Machine 'Y' (hrs.)	20	18	6	3		
Contribution per Machine Hour (`)	150	133.33	333.33	400		
Rank	III	IV	II	I		
Allocation of Machine 'Y' time (hrs.)	4,000 (200 units × 20 hrs.)	200 (Balance)	1,200 (200 units × 6 hrs.)	600 (200 units × 3 hrs.)	6,000	
Production (units)	200	11.11 (200 hrs. /	200	200		

		18 hrs.)				
Allocation of Machine 'X' time (hrs.)	4,000 (200 units × 20 hrs.)	133.32 (11.11 units × 12 hrs.)	800 (200 units × 4 hrs.)	400 (200 units × 2 hrs.)	5,333.32	666.68
Allocation of Machine 'Z' time (hrs.)	4,000 (200 units × 20 hrs.)	66.66 (11.11 units × 6 hrs.)	400 (200 units × 2 hrs.)	200 (200 units × 1 hr.)	4,666.66	1,333.34

(iii) Calculation of Expected Profit

Particulars	Amount (`)
P (200 units × ` 3,000)	6,00,000
Q (11.11 units × ` 2,400)	26,664
R (200 units × ` 2,000)	4,00,000
S (200 units × ` 1,200)	2,40,000
Total Contribution	12,66,664
Less: Fixed Cost	9,50,000
Expected Profit	3,16,664

(iv) Unused Spare Hours Machine 'X'

Particulars	Amount (`)
Machine Hours Available	6,000.00 hrs.
Less: Machine Hours Utilized	5,333.32 hrs.
Spare Hours	666.68 hrs.

Machine 'Z'

Particulars	Amount (`)
Machine Hours Available	6,000.00 hrs.
Less: Machine Hours Utilized	4,666.66 hrs.
Spare Hours	1,333.34 hrs.

Question 11

H. Ltd. manufactures three products. The material cost, selling price and bottleneck resource details per unit are as follows:

Particulars	duct X	Product Y	Product Z
Selling Price (`)	66	75	90
Material and Other Variable Cost (`)	24	30	40

Bottleneck Resource Time (Minutes)	15	15	20

Budgeted factory costs for the period are ` 2,21,600. The bottleneck resources time available is 75,120 minutes per period.

Required

(i) Company adopted throughput accounting and products are ranked according to 'product return per minute'. Select the highest rank product.

(ii) Calculate throughput accounting ratio and comment on it. (Study Material)

Answer

(i) Calculation of Rank According to 'Product Return per minute'

Particulars	X	Y	Z
Selling Price	66	75	90
Variable Cost	24	30	40
Throughput Contribution	42	45	50
Minutes *per unit*	15	15	20
Contribution *per minute*	2.8	3	2.5
Ranking	II	I	III

(ii) Ranking Based on 'TA Ratio'

Contribution per minute	2.80	3.00	2.50
Factory Cost per minute (2,21,600 / 75,120)	2.95	2.95	2.95
TA Ratio (Cont. per minute / Cost per minute)	0.95	1.02	0.85
Ranking Based on TA Ratio	II	I	III

Comment

Product Y yields more contribution compared to average factory contribution per minute, whereas X and Z yield less.

Question 12

Z Plus Security (ZPS) manufactures surveillance camera equipment that are sold to

various office establishments. The firm also installs the equipment at the client's place to ensure that it works properly. Each camera is sold for `2,500. Direct material cost of `1,000 for each camera is the only variable cost. All other costs are fixed. Below is the information for manufacturing and installation of this equipment:

Particulars	Manufacture	Installation
Annual Capacity (camera units)	750	500
Actual Yearly Production and Installation (camera units)	500	500

Required

The questions below are separate scenarios and are not related to each other.

(i) IDENTIFY the bottleneck in the operation cycle that ZPS should focus on improving. Give reasoning for your answer.

(ii) An improvement in the installation technique could increase the number of installations to 550 camera units. This would involve total additional expenditure of `40,000. ADVISE ZPS whether they should implement this technique?

(iii) Engineers have identified ways to improve manufacturing technique that would increase production by 150 camera units. This would involve a cost `100 per camera unit due to necessary changes to made in direct materials. ADVISE ZPS whether they should implement this new technique. (Study Material) (RTP MAY.20)

Answer

(i) **Identification of Bottleneck:** Installation of cameras is the bottleneck in the operation cycle. The annual capacity for manufacturing and installation are given to be 750 camera units and 500 camera units respectively. Actual capacity utilization is 500 camera units, which is the maximum capacity for the installation process. Although, ZPS can additionally manufacture 250 camera units, it is constrained by the maximum units that can be installed. Therefore, the number of units manufactured is limited to 500 camera units, subordinating to the bottleneck installation operation. Therefore, ZPS should focus on improving the installation process.

Improving Capacity of Installation Technique: Every camera sold increases the through put contribution by `1,500 per camera unit (sale price `2,500 per camera unit less direct material cost `1,000 per camera unit). By improving the current installation technique an additional 50 camera units can be sold and installed. This would involve total additional expenditure of `40,000. Hence, the incremental benefit would be:

Particulars	Amount (`)
Increase in throughput contribution (additional 50 camera units `1,500 per camera unit)	75,000
Less: Increase in total expenditure	40,000
Incremental benefit	35,000

Since the annual incremental benefit is `35,000 per annum, ZPS should implement this improvement to installation technique, the current bottleneck operation.

(ii) **Improving Manufacturing Capacity:** Every camera sold increases the throughput contribution by `1,500 per camera unit (sale price `2,500 per camera unit less direct material cost `1,000 per camera unit). By improving the current manufacturing technique an additional 150 camera units can produced. This would involve a cost `100 per camera unit due to necessary changes to made in direct materials. Therefore, number of units manufactured can increase to 650 camera units. However, production of 150 camera units will not translate into additional sales, because each sale also requires installation by ZPS. In a year only 500 camera installations can be made, leading to an inventory pile up of 150 camera units. This is detrimental to ZPS, since it does not earn any contribution by holding inventory. Therefore, ZPS should not go ahead with the proposal to improve the manufacturing technique.

(iii) **Improving Manufacturing Capacity:** Every camera sold increases the throughput contribution by `1,500

per camera unit (sale price `2,500 per camera unit less direct material cost `1,000 per camera unit). By improving the current manufacturing technique an additional 150 camera units can produced. This would involve a cost `100 per camera unit due to necessary changes to made in direct materials. Therefore, number of units manufactured can increase to 650 camera units. However, production of 150 camera units will not translate into additional sales, because each sale also requires installation by ZPS. In a year only 500 camera installations can be made, leading to an inventory pile up of 150 camera units. This is detrimental to ZPS, since it does not earn any contribution by holding inventory. Therefore, ZPS should not go ahead with the proposal to improve the manufacturing technique.

Customer Lifetime Value

Question 13

Cineworld is a movie theater is located in a town with many colleges and universities around it. The town has a substantial student population, most of whom are avid movie goers. Business for Cineworld has been slow in the recent years due to the advent of streaming websites, that show the latest and popular movies online. However, the management of Cineworld continue to feel students would still enjoy the watching movies on big-screen, along with the facilities and ambience that only a movie theater can offer. Accordingly, they have framed a plan to attract students by offering discounts on movie tickets.

The average time a student spends at the college or university is 4 years, which i s the average duration of any course. For a nominal one-time subscription fee, Cineworld plans to offer students discounts on movie tickets for a period of 4 years. By attracting more footfalls, Cineworld targets to cross sell it food & beverages and souvenirs. This would help it sustain a reasonable revenue each year.

Cineworld would attract attention to the plan by initially offering free tickets, food and beverage and gift vouchers. This one time initial expense, net of the one-time subscription fee collected, would cost `5,000 per student. On subscription to the plan, the viewership and purchases of each student is expected to be as follows:

Particulars	Years 1 and 2	Years 3 and 4
Spend on movie tickets per year	2,000	1,500
Spend on food and beverage per year	4,000	3,000
Spend on souvenirs and accessories per year	2,250	750

Assumptions
1. Only 50% of the subscribers are expected to visit the theatres in years 3 and 4 Across all years, only 75% of the subscribers who visit the theatre are expected to buy food and beverage.
2. Only 25% of the subscribers who visit are expected to buy souvenirs in years 1 and 2, and 10% of them in years 3 and 4.

Given that PVIFA of `1 for 4 years at 10% = 3.169 and PVIFA of `1 for 2 years at 10% = 1.735.

Required

CALCULATE the customer lifetime value per subscriber for the above plan. (Study Material) (RTP MAY.19)

Answer

Customer lifetime value per subscriber can be found by calculating the present value of the revenue that is generated over the period of 4 years. This netted out with the cost incurred to attract subscribers, would give the customer lifetime value per subscriber.

Sr. No.	Particulars	Revenue (per year)	PVIFA	PV of Revenue	Probability of Usage	Net Revenue
1	Net cost of attracting students (onetime expense)					5,000
2	Net revenue from movie tickets					
	Years 1-2	2,000	1.735	3,470	100%	3,470
	Years 3-4 (refer note 1)	1,500	1.434	2,151	50%	1,076
3	Sale of food and beverages					
	Years 1-2	4,000	1.735	6,940	75%	5,205
	Years 3-4 (refer note 2)	3,000	1.434	4,302	37.5%	1,613
4	Sale of souvenirs and accessories					
	Years 1-2	2,250	1.735	3,904	25%	976
	Years (refer note 3)	750	1.434	1,076	5%	54
5	Total revenue (Steps 2+3+4)					12,394
6	Net revenue from subscription plan (steps 5-1)					7,394

Note 1:
PVIFA (10%, 4 years) = 3.169 and PVIFA (10%, 2 years) is 1.735. Therefore , PVIF for years 3 and 4 = PVIFA (10%, 4 years) - PVIFA (10%, 2 years) = 3.169 - 1.735 = 1.434.

Note 2:
Only 50% of the subscribers are expected to attend in years 3 and 4. Out of those only 75% are expected to buy food and beverage. Therefore, only 38% of the subscribers (75% of 50% subscribers who visit) are expected to buy souvenirs in years 3 and 4.

Note 3:
Only 50% of the subscribers are expected to attend in years 3 and 4. Out of those only 10% are expected to buy souvenirs. Therefore, only 5% of the subscribers (10% of 50% subscribers who visit) are expected to buy souvenirs in years 3 and 4

Present value of total revenue generated over the four -year period by a customer is `12,393 while the corresponding expense is `5,000. Therefore, the customer lifetime value per subscriber is `7,393. Cineworld has to multiply this with the expected number of subscribers each year, to find out if this would be a profitable proposition.

Question 14

X is a leading toy manufacturing firm. Having commenced its commercial operations in the year 1990, the firm has a state-of-the-art manufacturing facility in India. It sells toys through retail outlets and the firm's website. X has been pioneering the concepts of quality and safety in toys and has been instrumental in raising the quality standards of toys in the Indian Market.

X's mission is to influence parents to spend on toys that enable every child to grow with quality toys that contributes to his/ her wholesome development.

X procures the materials from a number of different suppliers. All of the purchased material are dispatched to its warehouse located at its factory and are held there unless they are moved to production. After production is completed, finished toys are moved to X's retail outlets by its own vehicles. Each week, the vehicles follow the same time schedule regardless of the weight they are carrying. Finished toys that are sold through the X's website are dispatched to its distribution centre.

X has recently got the contract to manufacture a new toy that is 'Ty-Z', a mini cartoon based on a character from a famous international animated film. X has not been given any target price, hence is free to set the selling price of 'Ty-Z', however, must pay a royalty of 10% of the selling price to the film director. X is also planning to sell 'Ty-Z' through its retail outlets.

X has decided to follow a target costing technique for 'Ty-Z'. Marketing manager has determined the selling price to be around ₹1,750 per 'Ty-Z'. X needs a margin of 26% of the selling price of 'Ty-Z'. For the estimated costs per 'Ty-Z' refer Annexure.

Required

DISCUSS three primary activities of value chain through which X can minimise gap if any

Annexure

Estimated Costs per 'Ty-Z'

Material C	**150.50**
Material D	**122.50**
Other Material	**see note below**
Labour (0.4 hours at `1,050 per hour)	**420.00**
'Ty-Z'- specific production overhead cost	**132.30**
'Ty-Z'- specific selling and distribution cost	**166.60**
Note- Each 'Ty-Z' requires 0.70 kg of 'other materials'. These 'other materials' are procured from a supplier at a cost of ₹280 per kg and around 5% of all purchased materials are found to be downgraded.	

(RTP-NOV 2020)

ANSWER:

In case of X, there is a **cost gap of `78.22**. Where a gap exists between the *current estimated cost levels* and the *target cost*, it is essential that this gap be closed. Cost gap can be removed by **reducing the cost over all the Value Chain** through the development of the spirit co-operation and understanding among all members of organizations associated with the product from suppliers, producers, customers, agents and service providers.

In Xs Value Chain, three primary activities are:-

Inbound logistics

These are activities concerned with receiving, storing and distributing the inputs (raw material) to the production process. The *relationship with supplier* is a key component in this process. Currently, X procures materials from multiple suppliers and stores these materials in its store. **Shifting to a just-in-time (JIT) system technique** in procurement of materials could possibly save substantial storage costs provided the JIT supplier must agree to take the responsibility for the good quality of materials supplied. This will also become a source of savings because downgraded items will be removed. However, X might have to pay additional payout to a supplier for JIT purchasing to work.

Outbound logistics

These activities involve collecting, storing and distributing the products to the customers. At X, scheduled transportation of toys to retail outlets is outbound logistics activity. Potentially, the scheduled transportation of toys to retail outlets every week is not an efficient way. Such deliveries do not consider whether toy is required at retail outlets or not, hence X may possibly deliver toys to retail outlets those do not need toys and suffer unnecessary transportation costs.

X should plan to **implement EDI system** that will help it to improve warehousing and logistics by automatically tracking inbound shipments as well as outbound products. Adopting EDI, X can not only improve processes but also streamline inventory management across many channels. However, it will require setup time and a learning curve to implement the same.

Marketing and sales

Marketing and sales provide the means by which the customers are made aware of the product. At X, the sales of toys via its retail outlets and website are marketing and sales activities. X is planning to sell 'Ty-Z' via retailers. If X **sales 'Ty-Z' through its website** rather than through retail outlet, significant cost could easily be avoided. Simultaneously, X will be able to expose itself to **attract international customers** to buy 'Ty-Z' as product is based on character from a famous international animated film.

Overall, X may create a *cost advantage* by **reconfiguring** the Value Chain. Reconfiguration means structural changes such a new production process, new distribution channels or a different sales approach as discussed above.

Workings

Statement Showing Computation of Cost GAP

Sales Price	1,750.00
Less: Royalty @10%	175.00
Less: Profit @26%	455.00
Target Cost 'Ty-Z'	**1,120.00**
Material C	150.50
Material D	122.50
Labour (0.40 hours at ₹1,050 per hour)	420.00
Other Material (0.70 kg × ₹280 per kg) / 0.95	206.32
Production Overheads Cost	132.30
Distribution and Sales Cost	166.60
Estimated Cost 'Ty-Z'	**1,198.22**
Cost Gap	**78.22**

Question 15

ZED produces two types of products Z and D at its manufacturing plant. Both the products are produced using the same materials, machinery and skilled labour. Machine hours available for the year is 4,000 hours.

Information relating to products are as follows:

Particulars	Z	D
Selling Price *per unit*	₹16,000	₹4,000
Material Costs *per unit*	₹7,000	₹1,200
Machine Hours *per unit*	1.6 hrs.	0.8 hrs.
Maximum Annual Demand	2,000 units	1,600 units
Online Booking (already accepted for)	400 units	1,200 units

Due to poor productivity levels, late order and declining profits over recent years, the CEO has suggested the introduction of throughput accounting in the company. The total of all factory costs is ₹1,42,60,000, excluding material.

Required

i   Using throughput accounting, PREPARE statement to determine the optimum production mix and maximum profit for the next year.

ii   CALCULATE the amount of profit lost due to acceptance of online booking of the products.

iii   RECOMMEND the options to be followed in order to avoid any loss of profit.

iv   LIST various ways through which price customization could be done.

 Given that products Z and D are respectively in 'maturity stage' and 'introduction stage' of their life cycle. STATE the most appropriate pricing policy that could be followed by the ZED for Z and D as per their life cycle

ANSWER:

(i) Statement Showing Machine Hours

Product	Maximum Demand	Machine Hours/ Unit	Total Machine Hours
Z	2,000 units	1.6	3,200
D	1,600 units	0.8	1,280
Total machine hours required to meet maximum demand		4,480	
Machine hours available		4,000	
Shortage of machine hours		480	

'Machine hours' is the bottleneck activity.

Statement of Ranking

Particulars	Z	D
Selling Price *per unit*	₹16,000	₹4,000
Less: Material Costs *per unit*	₹7,000	₹1,200
Throughput *per unit*	₹9,000	₹2,800
Machine Hour Required *per unit*	1.6	0.8
Throughput Return *per hour*	₹9,000/1.6 = ₹5,625	₹2,800/0.8 = ₹3,500
Throughput Accounting (TA) Ratio (throughput return per hour/ cost per factory hour)	5,625/3,565 =1.58	3,500/3,565 =0.98
Ranking	I	II

Cost per factory hour = ₹1,42,60,000/ 4,000 hrs. = ₹3,565

Optimum Production Plan

Product	No of units	Machine hr. per unit	Total Machine hrs.	T/P per hr. ₹	Total T/P ₹
Z (online orders)	400	1.6	640	5,625	36,00,000
D (online orders)	1,200	0.8	960	3,500	33,60,000
Z	2,400/1.6 =1,500	1.6	2,400 (b/f)	5,625	1,35,00,000
Total			2,04,60,000		
Less: Total Factory Costs			1,42,60,000		
Profit			62,00,000		

(ii) Had there been no online booking first product Z should be produced = 2,000 units using 3,200 machine hours (2,000 × 1.6). Because of online booking already accepted for 1,200 units of product D, unfulfilled demand of product Z = 2,000 -1,900 = 100 units

Machine Hrs. Required for 100 units of Z (100 × 1.6)	160 hrs.
Throughput Lost for Product Z (160 hrs. × 5,625)	₹9,00,000
Throughput Return Earned for Product D (160 hrs. × 3,500)	₹5,60,000
Throughput lost	₹3,40,000

(iii) Recommendation

Option-1

Throughput accounting ratio is the throughput return earned in an hour divided by the factory cost (labour and overheads) incurred by the factory in one hour. Factory cost is generally fixed in nature. A ratio above 1 signifies that the throughput return is greater than the factory cost and therefore the

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product is profitable. Product Z has a throughput accounting ratio of 1.58 while Product D has a throughput accounting ratio of 0.98, this indicates that hourly return from Product A can cover the hourly factory cost,, it is profitable. Product D does not yield enough hourly return to cover the hourly factory cost, it is not profitable. Therefore, ZED should consider ways of improving throughput accounting ratio of Product D (i.e. above 1.0). TA ratio could be improved by:

▪ Increasing the selling price of the Product D but the demand may fall.

▪ Reducing the material cost per unit as well as operating costs. However, there may be quality issues.

▪ Improving efficiency e.g. increase number of units that are made in each bottleneck hour.

▪ Raising up bottleneck so that more hours are available of bottleneck resource.

Option-2

ZED has to prioritize production of Product Z since it is more profitable than Product D. As per the throughput accounting ratio, Product D does not yield sufficient return per hour to cover the hourly overhead cost therefore, gets second priority over Product Z.

Since machine hours are the bottle neck, if production for entire 4,000 hours is focused on Product Z, return yielded would be sufficient to cover the factory overheads. However, Product Z has a maximum demand of 2,000 units, that requires 3,200 machine hours (2,000 units × 1.6 hours per unit of production). Remaining 800 machine hours can be devoted to Product D, during which 1,000 units can be produced (800 machine hours / 0.8 hours per unit). Maximum demand for Product D is 1,600 units. Therefore, the balance demand of 600 units of Product D will remain unsatisfied.

However, to meet unsatisfied demand of Product D, ZED may consider the option of sub-contracting either a part of whole of the production of Product D. This way it can meet the entire demand for Product D for 1,600 units. If it subcontracts the entire production of Product D, it can also scale down its in-house capacity. Sub-contracting decision requires suitable cost benefit analysis. Moreover, the risk associated with outsourcing like unsatisfactory quality and service or failure of supplier cannot be ignored.

Overall, to enhance profitability or avoid any type of loss of profit, ZED may consider the options recommended above with a long term perspective.

(iv) Pricing of a product is sometimes customized keeping taste, preference, and perceived value of a customer into consideration. Price customization is done in the following ways:

▪ Based on product line: When products are customized as per the customer's requirements, pricing can be adapted based on the customer's specifications. Standard products can have a base price, to which the company can top-up charges to any additional customization.

▪ Based on customer's past behavior: Customers with good payment record have established their credit-worthiness. To sustain business, they may be extended additional discounts as compared to other customers.

▪ Based on demographics: Different pricing strategies may be adopted based on age or social status. For example, railway fare discounts for senior citizens or concessional price tickets for military

personnel.

▪ Based on time differential: Different price for different time periods. If a customer extends a long-term contract, an additional discount may be extended since business is contracted for a longer period of time. Example, discounted price for data usage provided by a broadband service provider if subscription paid for six months or more.

Apart from the above accounting principles, other macro economic and legal factors should also be given importance while chalking out a pricing strategy.

(v) The life-cycle of a product has 4 stages namely Introductory stage, Growth stage, Maturity stage and Decline stage.

Product Z is given to be in the maturity stage. This third stage of product life cycle is characterized by an established market for the product. After rapid growth in sale volume in the previous stages, growth of sales for the product will saturate. Competition would be high due to large number of rivals in the market, this may lead to decreasing market share. Unit selling price may remain constant since the market is well established. Occasional offers may be used to tempt customers, otherwise this stage will mark consolidation of the market.

Product D is in the introduction stage, the first stage of product life cycle. Penetration pricing is adopted to charge a low price in the initial stage for penetrating the market as quickly as possible. For a new product this low price strategy will popularize the product. Once the market is established, the price may be increased. Penetration pricing will be suitable when:

(i) Demand for the product is elastic, more demand when prices are low.

(ii) Large scale production of the product yields economies of scale.

(iii) Threat of competition requires prices to be set low. It serves as an entry barrier to prospective competitors as well.

However, if Product D is a highly innovative product, it may adopt Skimming price policy. The product with unique features will differentiate it from other products leading to a revolutionary impact on market and customer behavior. Customers may not mind paying a premium for the unique product offering. Focus may be on promoting the product to gain market share. Skimming price policy may work when:

(i) There seem to be no competitors providing similar products.

(ii) Demand is inelastic.

Over time, competitors can reverse engineer and offer similar products. Therefore, the price may be lowered in the long run to retain market share.

Question 16

The CEO of P Limited is concerned with the amounts of resources currently spent on customers' warranty claims. Each box of its product is printed with the logo: "satisfaction guaranteed or your money back". P Limited is having difficulty competing with X Limited because it does not have the reputation for high quality that X Limited enjoys. Since the warranty claims are so high, the CEO of P Limited would like to evaluate what costs are being incurred to ensure the quality of the product.

Following information is collected from various departments within the company relating to 2019-20

Particulars of Costs	(`)
Warranty claims	4,25,000
Employee training costs	1,20,000
Rework	3,00,000
Lost profits from lost customers due to impaired reputation	8,10,000
Cost of rejected units	50,000
Sales return processing	1,75,000
Testing	1,70,000

For the year 2020-21, the CEO is considering spending the following amounts on a new quality programme:

Inspect raw material	1,20,000
Reengineer the production process to improve product quality	7,50,000
Supplier screening and certification	30,000
Preventive maintenance on plant equipment	70,000

P Limited expects the new quality programme to save costs by the following amounts:

Reduction in lost profits from lost sales due to impaired reputation	8,00,000
Reduction in rework costs	2,50,000
Reduction in warranty costs	3,25,000
Reduction in sales return processing	1,50,000

Required

i   PREPARE a 'Cost of Quality Statement' for the year 2019-20 showing the percentage of the total costs of quality incurred in each cost category.

ii   PREPARE a 'Cost Benefit Analysis' of the new quality programme showing how the quality initiative will affect each cost category.

iii   STATE how the manager trade-offs among the four categories of quality costs.
(STUDY MATERIAL)

ANSWER:
(i) Cost of Quality Statement
For the year 2019-20

Particulars of Costs	Cost Incurred (₹)	Total Cost Incurred (₹)	% of Total Costs of Quality
Preventive Costs:			
Employee training	1,20,000	1,20,000	5.85%
Appraisal Costs:			
Testing	1,70,000	1,70,000	8.29%
Internal Failure Costs:			
Rework	3,00,000	3,50,000	17.08%
Cost of rejected units	50,000		
External Failure Costs:			
Lost profits from lost sales due to impaired reputation	8,10,000	14,10,000	68.78%
Sales return processing	1,75,000		
Warranty costs	4,25,000		
Total Cost of Quality	**20,50,000**		**100%**

(ii) Cost Benefit Analysis of New Quality Programme

Particulars of Costs	Additional (Costs) / Cost Savings (₹)	Total New (Costs) / Cost Saving (₹)
Preventive Costs:		
Reengineer the production process	(7,50,000)	(8,50,000)
Supplier screening and certification	(30,000)	
Preventive maintenance on equipment	(70,000)	
Appraisal Costs:		
Inspect Raw Materials	(1,20,000)	(1,20,000)
Internal Failure Costs:		
Reduction in rework costs	2,50,000	2,50,000
External Failure Costs:		
Reduction of lost profits from lost sales	8,00,000	12,75,000
Reduction from sales return	1,50,000	
Reduction from warranty costs	3,25,000	
Total Savings/ (Costs) from Quality Programme		**5,55,000**

(iii) Investment in prevention costs and appraisal costs (also known as costs of good quality), reduces internal and external failure costs (also known as cost of poor quality).
Costs incurred before actual production begins, to prevent defects and other product quality issues, are known as preventive costs. In the given example, reengineering production process, screening /

certification of suppliers and preventive maintenance of equipment are preventive costs. Likewise, appraisal costs are incurred to ensure that activities conform to desired quality requirements. They are incurred in all stages of production. In the given example inspection of raw material is an appraisal cost.

While preventive and appraisal costs would not directly improve the quality of the product, they would definitely reduce internal failure costs like rework costs or external failure costs like sales returns or warranty claims. These would also enhance the reputation of the product for its standard of quality. Conversely, it follows that internal failure costs may be preferable to external failure costs since it affects the company's brand image.

Costs incurred to ensure conformance to quality will ensure higher chances of detection of defects in the product. At the same time ensuring zero defective rate may require huge resources and therefore may be costly. Instead, companies may have the ability to absorb costs incurred due to rework, warranty claims or lost sales. Therefore, they must determine a reasonable threshold defective rate that is acceptable, a normal cost in business operations. Tools for quality production management like Total Quality Management (TQM) will help in determining the optimum cost of quality that the company is willing to bear. TQM focus on continuous improvement of an organization's business activities. This creates an awareness of quality that the company comes to expect from various processes. Things need to be done right the first time, consequently eliminating defects and waste from operations. At the same time, an in-depth knowledge of business processes provides information that can help the management set acceptable threshold limits for reasonable level of defects it is willing to bear.

Question 17

H Automobile Group is among top 20 business houses in India. It has been founded in the year 1930, at the height of India's movement for independence from the British, the group has an illustrious history. H's footprint stretches over a wide range of industries, spanning automobiles (two wheelers manufacturer and three wheelers manufacturer). H's headquarter is located at Hyderabad. Bike Production is one of segment of H Group. Management of H wants to analyse the following actual information for the April:

Cost Data

Customer Complaints Centre Cost	35 per hr.
Equipment Testing Cost	18 per hr.
Warranty Repair Cost	1,560 per bike
Manufacturing Rework Cost	228 per bike

Volume and Activity Data

Bikes Requiring Manufacturing Rework	3,200 bikes
Bikes Requiring Warranty Repair	2,600 bikes
Production Line Equipment Testing Time	1,600 hrs.
Customer Complaints Centre Time	2,000 hrs.

Additional Information
Due to the quality issues in the month, the bike production line experienced unproductive 'down time' which cost `7,70,000. H carried out a quality review of its existing suppliers to enhance quality levels during the month at a cost of `1,25,000.
Required
i   PREPARE a statement showing 'Total Quality Costs'.

ii   ADVISE any TWO measures to reduce the non- conformance cost.
(STUDY MATERIAL)

ANSWER:

(i) Statement Showing 'Total Quality Costs'

Particulars of Costs	₹
Prevention Costs	
Supplier Review	1,25,000
Appraisal Costs	
Equipment Testing (₹18 × 1,600 hrs.)	28,800
Internal Failure Costs	
Down Time	7,70,000
Manufacturing Rework (₹228 × 3,200 bikes)	7,29,600
External Failure Costs	
Customer Complaints (₹35 × 2,000 hrs.)	70,000
Warranty Repair (₹1,560 × 2,600 bikes)	40,56,000
Total Quality Costs	**57,79,400**

(ii) The reporting of quality costs highlights the *cost of quality activities* at H. The total quality costs statement clearly displays the relationship between conformance costs (prevention and appraisal costs) and non-conformance costs (internal failure and external failure costs) and the drivers of a reduction in the overall spending on quality. Statement indicates that only 2.16% of the total quality cost is the cost of preventing quality problems while 0.50% is the cost of appraisal activities. Thus, prevention and appraisal costs make up only 2.66% of total quality costs. In contrast, 97.34% of quality control costs are incurred for internal and external failure costs. Following two measures can be used to reduce non- conformance cost:
Total Productive Maintenance (TPM) is a system of maintaining and improving the integrity of production and quality system through *keeping all equipment in top working condition* so as to avoid breakdowns and delays in manufacturing processes. It involves identifying machines in every division (including planning, manufacturing, maintenance) and then planning & executing a maintenance programme covering their entire useful life.

In this scenario, TPM will help in reducing internal failure cost (i.e. downtime and manufacturing rework cost), which constitutes 25.95% of total quality cost, by keeping all equipment in good working conditions so that there is no downtime or machine breakdown and ensuring that all equipment run smoothly. If machines work properly, the chances of rework will reduce, ultimately will also reduce chances of warranty repair and customer complaints (comprising 71.39% of total quality cost which is the major part of total quality cost).
Total Quality Management (TQM) aims at improving the quality of organisational output, including goods and services, through *continual improvement* of internal practices. Its objective is to eradicate waste and increase efficiency without compromising with the quality. It requires that company maintain this quality standards in all aspects of business by ensuring that things are done right the first time so that defects and waste are eliminated from operation.
It appears that H is not a TQM company at present due to *huge disparity between conformance costs and non-conformance costs.* In order to make H to be successful, all staff at H must be engaged in the improvement process and share in the continuous improvement ethos. In order to establish a reputation as a high- quality bike manufacturer H must ensure staff are focused on quality *and* attitudes changed toward the importance of conformance activities, for instance, H can conduct third party inspection of raw material at supplier's workplace leading to maintenances of quality standards.

Overall, **while applying above two measures, in the H, consideration must therefore be given to the** *optimum balance* **between the costs of conformance and the costs of non-conformance.**

ILLUSTRATIONS

1. The following are the income statements of two firms in the same industry.

	Firm WD (₹)	Firm WG (₹)
Revenues	20,00,000	40,00,000
Less: Variable costs	9,00,000	24,00,000
Contribution margin	11,00,000	16,00,000
Less: Fixed costs	7,00,000	12,00,000
Profit before taxes	4,00,000	4,00,000

Required
IDENTIFY the strategy (cost leadership vs. differentiation) followed by two firms. JUSTIFY your classification (RTP-NOV 2020)
Solution
Higher contribution margin ratio exhibited by firm WD indicates that firm WD is following a ***differentiation strategy*** while firm WG appears to be more focused on cost leadership. This is also substantiated by higher fixed costs i.e. R&D, innovation etc. for each sale ` in firm WD. Innovation allows a firm to command

premium prices and earn more contribution per sales `. However, innovation is expensive.

	Firm WD	Firm WG
Contribution margin/ Sales	0.55	0.40
Fixed costs/ Sales	0.35	0.30
Profit margin/ Sales	0.20	0.10

Section B – Case Scenarios & Case Studies

Case Scenarios

Question 1

JK Ltd. produces and sells a single product. Presently the company is having its quality control system in a small way at an annual external failure and internal failure costs of `4,40,000 and `8,50,000 respectively. As the company is not able to ensure supply of good quality products upto the expectations of its customers and wants to manage competition to retain market share considers an alternative quality control system. It is expected that the implementation of the system annually will lead to a prevention cost of `5,60,000 and an appraisal cost of `70,000. The external and internal failure costs will reduce by `1,00,000 and `4,10,000 respectively in the new system. All other activities and costs will remain unchanged.

Required

(i) EXAMINE the new quality control proposal and recommend the acceptance or otherwise of the proposal both from financial and non-financial perspectives.

(ii) What is your ADVICE to the company, if the company wants to achieve zero defect through a continuous quality improvement programme?

SUGGEST a suitable quality control level at a minimum cost. (Study Material) (PYQ MAY.18)

Answer

(i) Implementation of new system will reduce costs of the non - conformance (internal and external failure) by `5,10,000 (-40%). However, this will also increase costs of conformance by `6,30,000. There is inverse relationship between the costs of the conformance and the costs of non-conformance. JK Ltd. should try to avoid costs of non- conformance because both internal and external failure affect customer's satisfaction and organisations profitability. The company should focus on preventing the error such that it ensures that product is of good quality when it reaches the customer at the very first instance. This enhances the customer experience and therefore eliminating the scope for external failures like sales returns and warranty claims. Better quality can yield further sales. Therefore, an increase in spending on quality measures is justified since it not only yields significant improvements to quality but also brings in more sales orders.

Accordingly, from the financial perspective point of view the new proposal for quality control should not be accepted as it will lead to an additional cost of `1,20,000 (`6,30,000 - `5,10,000). However, from non-financial perspective point of view as stated above the company should accept the new proposal.

(ii) It is possible to increase quality while at the same time reducing both conformance and non-conformance costs if a programme of aiming for zero defect/ and or continuous improvement is followed. Zero defect advocates continuous improvement. To implement this elimination of all forms of waste, including reworks, yield losses, unproductive time, over-design, inventory, idle facilities, safety accidents, etc. is necessary.

(iii) To achieve 0% defects, costs of conformance must be high. As a greater proportion of defects are accepted, however, these costs can be reduced. At a level of 0% defects, cost of non-conformance should be nil but these will increase as the accepted level of defects rises. There should therefore be an acceptable level of defects at which the total costs of quality are at a minimum.

Question 2

CIMZ is a new banking company which is about to open its first branch in INDIA. CIMZ believes that in order to win customers from the market, it needs to offer potential customers a new banking experience. Other banking companies are focusing on interest rates and bank charges, whereas CIMZ believes that quality and timely availability of service is an important factor to attract customers.

Required

EXPLAIN how Total Quality Management would enable CIMZ to gain competitive advantage in the banking sector. (Study Material)

Answer

Total Quality Management is a management philosophy. It concerns itself with managing the processes and people to make sure that the customer is satisfied at each and every stage. This means making the needs of the customer the priority, expanding the relationship beyond traditional services and incorporating the customer's needs in the company's business plan and corporate strategy. In TQM, the concept of "quality" is perceived exclusively from the frame of reference of the customer. These customers can be internal, such as, those working in another department and there can be external customers who are the end recipients of the product or services. The organisation should attempt for continuous improvement in the quality that it delivers with the ultimate aim of achieving zero defects in this quality.

TQM should be view as an investment rather than as a cost that should be minimised. There are many ways in which investment can be made in TQM.:

- ⬜ fine-tuning the product mix,
- ⬜ fine-tuning of the processes of ensuring quality,
- ⬜ introducing employee development programmes with the nature of an academic course,
- ⬜ empowering the employees professionally and personally,
- ⬜ improving the top management commitment to quality,
- ⬜ monitoring of the performances and proper rewarding based on achievements,
- ⬜ ensuring the customer satisfaction etc.

CIMZ could provide its employees with training in the technical aspects of banking practice as well as in customer care. Customers would thus get a better service not only technically but also from a customer care perspective. This should lead to smaller customer complaints and greater customer satisfaction. It could also motivate customers to recommend others to use this bank.

TQM also requires CIMZ to respond to its customer's requirements immediately for example by providing more staff to reduce the lengths of queues in festive/ seasonal/ busy time. If Bank could also be opened for longer hours to allow customers to complete their bank related requirements and have meetings with bank employees at a time that is more convenient for the customer, this would lead to more satisfaction to customers.

In long run, if bank continue to follow TQM, the bank would have higher profits and competitive advantage in banking sector despite incurring additional expenditure to improve quality.

Question 5

Raya Health Care Limited is a leading healthcare service provider in Mumbai, it has approximately 450 potential beds, it provides diagnostic and day care speciality facilities also. In diagnostic centres they are using traditional devices for CT Scan and MRI which are not enough as per demand. Patients waited more than weeks for CT and MRI scans, this problem can cause delay in diagnosing illness; waste of time and other resources; not just in radiology but throughout the healthcare system.

Raya has planned to outsource CT scan and MRI services to Livlife, which has world- class international chain of diagnostic centre. Livlife promise to provide radiologist report within 24 hours. However, finance manager of Raya doubt that it will not be a profitable arrangement. For the satisfaction of Raya, Livlife has entered an agreement to provide its services to Raya with no guarantee of receiving payment. Raya agrees to the following conditions:

- Cost savings generated in first year, the same will be retained by Livlife.
- Cost savings generated in second and third year will be shared between Raya and Livlife at a ratio of 30%:70%.
- Cost savings generated in the fourth year will be passed to Raya.
- Any cost savings generated by an idea proposed exclusively by Raya that does not require capital investment by Livlife will be immediately passed along to Raya.

Required

DISCUSS the agreement between Raya and Livlife. (RTP MAY.20)

Answer

The agreement between Raya and Livlife is **Gain Sharing Arrangement**. Gain sharing (also known as cost saving sharing) arrangement is an approach to the review and adjustment of an existing contract, or series of contracts, where the adjustment provides benefits to both parties. A fundamental form of gain-sharing is where a supplier agrees to perform its side of the contract with no guarantee of receiving a payment. Instead, any payment received is based upon the benefits that emerge to the customer as a result of the successful completion of the supplier's side of the bargain.

Livlife and Raya has also entered into such arrangement. This is clearly a risky stance for the supplier i.e. Livlife, because it could spend a fortune and walk away with nothing. Alternatively, if the benefits to Raya are substantial, Livlife could find itself rewarded with a large return. Cost savings might be attained from reducing the cost of supplies, implementing new skill and technologies, revised delivery time, improvements in operations etc.

The gain, benefit, or advantage to be shared is **not necessarily financial,** although financial benefits are expected to occur frequently. The Raya, for instance, will not necessarily take cost savings in the form of a lower contract value but might require a higher specification for medical treatment. However, to assess any financial benefit, both parties have to provide each other with access to relevant cost numbers to determine the basis for the assessment of the benefit and the calculation and sharing of the benefit**.** Many contracts involving these arrangements have emphasis on greater openness and shared development and improvement. In the given case gain-sharing deals are, on the face of it, a win-win situation for both Raya and Livlife, interest of both are aligned. Livlife is trying to save costs of Raya while Raya is trying to get world class services.

Question 6

Sprinter Sportswear is a multi-national company with that has a market presence in 23 countries. Yet, the company does not own even a single factory. Production has been entirely outsourced to 175 factories located in places where cost of operations is low. Factories cater entirely to Sprinter's procurement demands. These factories operate independently, Sprinter plays no role in their operations. Procurement from this supplier network is the stored at distribution centers from where dispatches are made to wholesalers of sportswear and apparel.

Recent news reports from some of the Third World foreign countries have indicated that high child labor employment. Child labor although against the law in these countries is resorted in order to keep cost of operations low. Factories in these countries do not directly employ children. Instead

they subcontract the work to contractors. These contractors in turn hire children illegally without the local knowledge of local law enforcement authorities. In addition, working conditions in these factories are very unhygienic and oppressive.

Sprinter initially turned a blind eye to this problem, since it only acts as a customer of these factories. Sprinter, as a company, has done nothing illegal as part of company operations. However, increased focus given to corporate social responsibility, has forced the Board members to consider taking action against such factories.

Required

(i)   DISCUSS why Sprinter sportswear should attempt to address this issue.

(ii)   SUGGEST some of the actions that the company can take to address this issue. (RTP NOV.19)

Answer

(i)   Work can be outsourced to locations to countries on the other side of the globe, in order to achieve low cost advantage. A company may not be directly responsible for faulty practices of its suppliers. However, modern organizations have a moral duty of care to a wider range of stakeholders who may not directly be related to the company. In this case, it owes a duty of care towards employees hired by factories within its supply chain. The issue it is dealing with relates to exploitation of child workers by factories, perpetrated by sub-contracting work to third party workers. While Sprinter sportswear has not done anything illegal, it owes moral responsibility towards these children. Children have a right to education, because of which child labor is illegal in most countries. Since children are employed directly on account of the work that has been outsourced, Sprinter should attempt to address this issue. Also, any negative news about how its products are made, could impact its business.

(ii)   Sprinter should aim to make its products responsibly. Some actions it can take are:

▪   Sprinter can develop a Code of Conduct that details the acceptable standards of conducting business. These standards could relate to hiring practices, of which it can specify that workers should be above a particular age to be employed for manufacturing a product. Others could relate to workplace environment, safety, and environment sustainability. Sprinter should insist that suppliers implement these Codes of Conduct along with other complying with laws. It should insist that the supplier be open to periodic inspection by Sprinter to ensure compliance with standards as per its Code.

▪   Sprinter can set up an audit team that regularly audits factories on the pre- sourcing and follow-up stages. Sprinter should do business only with those factories are complying with its standards. Any offenders to the Code of Conduct in the follow-up stages, should be appropriately be liable to penalty or termination of contract for serious offenses.

▪   Sprinter can list on its website location wise suppliers from whom it procures its products. It can even give information about products made by each of its suppliers, average age, worker diversity etc. This will enable watch groups to know who the suppliers are and warn the company if there are any labor issues within these factories.

Question 7

Mount Sports Manufacturing Facilities (MSMF) deals in manufacturing of sports articles. Although MSMF is major market player but can capture the market further. Currently MSMF manufactures five types of badminton shuttle named as P-101, P-102, P103, P- 104 and P-105. Production facilities are limiting factor at MSMF. Production and marginal cost data of these 5 products are specified in table below;

Particulars	P-101	P-102	P-103	P-104	P-105
Monthly production (in units)	1,000	1,200	2,000	3,000	1,500
Direct Material Cost (₹per unit)	6	4	7	3	6
Direct Labour Cost (₹per unit)	4	9	5	8	5
Variable Production Overhead (₹per unit)	2	3	2	2	1

On drive to cost leadership strategy, MSMF is thinking to out-source some of the products. Shuttles can be sourced from a well-established company 'Protease' at the following prices. There is no tie-in between products, all products can outsources individually. These costs are on CIF basis;

Particulars	P-101	P-102	P-103	P-104	P-105
Outsourcing Cost/Buy in Cost (₹per unit)	17	18	18	11	15

Company-wide fixed overheads are of ₹15 Lacs each year. Out of which ₹2,40,000 is directly attributable to the production of these 5 products on annual basis. This fixed overhead of ₹2,40,000 is evenly split across such 5 products and entirely avoidable. Till date company does not have experience to outsource any element of production.

Mr. Singh who is newly appointed management accountant, bring the huge experience to the organization on cost control and reduction techniques. While discussing the possibility of outsourcing with CFO, Mr. Singh explained the limitation of out-sourcing and also presents a white paper on gain sharing arrangement; which can be entered with supplier to whom outsourcing is considered.

CEO just entered into the office of CFO (where such discussion is ongoing) on verge of such discussion, but he heard about gain sharing arrangement and curious to know further about the same.

Required

CEO post presentation/ discussion seeks report from Mr. Singh to RECOMMEND, the product/(s) which should be outsourced. Report should also EXPLAIN gain sharing arrangement along with aspects that MSMF need to consider, ensuring success out of gain sharing arrangement as a part of out-sourcing contract with Protease. (RTP MAY.20)

Answer

Report to; Office of CEO,

Mount Sports Manufacturing Facilities (MSMF), Dated – 03rd Jan 2020

Report on Outsourcing of Products to Protease

Recommendation on out-sourcing of the products – Product **P-102** and **P-104** can be out-sourced.

(see computations below)

Particulars	P-101	P-102	P-103	P-104	P-105
a. Monthly production (in units)	1,000	1,200	2,000	3,000	1,500
b. Direct Material Cost (₹per unit)	6	4	7	3	6
c. Direct Labour Cost (₹per unit)	4	9	5	8	5
d. Variable Production Overhead (₹per unit)	2	3	2	2	1
e. Marginal Cost (₹per unit) …(b)+(c)+(d)	12	16	14	13	12
Monthly Total Marginal Cost/Variable Cost …(e)×(a)	12,000	19,200	28,000	39,000	18,000
g. Monthly Allocable Fixed Overhead*	4,000	4,000	4,000	4,000	4,000
Total Monthly Cost Production-in- house …(f)+(g)	16,000	23,200	32,000	43,000	22,000
i. Outsourcing Cost/Buy in Cost (₹per unit)	17	18	18	11	15
Total Monthly Cost - Outsourcing/Buy in …(i)×(a)	17,000	**21,600**	36,000	**33,000**	22,500

Total monthly cost of in house production is ₹1,36,200 and Total comparable monthly cost of outsourcing/Buy-in is ₹1,30,100. There is overall saving of ₹6,100, but since there is no tie-in between products, hence decision on all products whether can be outsourced or produced in-house can be taken individually.

The above calculation suggests that only **P-102** and **P-104** can be sourced through outsourcing due to, whereas **P-101**, **P-103** and **P-105** can be produced more cheaply in- house.

(*)Since avoidable in nature, hence relevant for decision making. ₹2,40,000 is annual cost, hence monthly fixed overhead expenditure will be ₹20,000.

However, following aspects needs to be kept in mind, prior to entering to out- sourcing arrangement of product P-102 and P-104

Issue 1

If products **P-102 and P-104** are outsourced, the company would then have spare capacity. Since the production function/capacity is a limiting factor and there is scope of selling the further units of **P-101**, **P-103** and **P-105;** in order to acquire the market share. Hence, spare capacity is of great importance and will be a powerful argument for outsourcing.

Issue 2

The reaction of the workforce at MSMF is also need to be considered because of two reasons;

a. If production of **P-101**, **P-103** and **P-105** cannot be expanded to take up the spare capacity on account of out-sourcing of **P-102 and P-104**, then lay-off may be required – Which may cause problem like strike by remain workforce or an industrial dispute.

b. Facts also suggest that products **P-102 and P-104** are labour intensive (due to high comparative high labour cost). Hence, even the spare capacity on account of out- sourcing of **P-102 and P-104** is used, and then also the some of labour forces need to be retrenched.

Issue 3

Even if lay-off is accepted by workforce, then also cost associated with redundancies may be critical. Such cost is relevant for decision-making, hence should be considered.

Issue 4

Since the MSMF has no experience in the outsourcing till now, hence while dealing with Protease, MSMF need to ensure;
a. Timely delivery in right quantity
b. Quality of supplies
c. Penalties in case of default

Gain Sharing Arrangement by MSMF as part of outsourcing agreement with Protease

Gain Sharing Arrangement is a contractual arrangement where, entity (MSMF) & outsourcing supplier (In this case protease) share the financial gain which result out of either productivity gains or increased efficiency at end of outsourcing supplier from continuous improvement, transformation, or innovation.

This arrangement in form of clause is usually included in Master Agreement of outsourcing. Outsource supplier find it unique selling point and entity is also on for continuous improvement apart this both will get share in cost saved.

Although gain sharing arrangement is largely useful in case of outsourcing services agreement, but MSMF can also while entering out-sourcing contract with Protease for **P-102** and **P-104**; but following aspects need to be considered;

Reason of failure of Gain Sharing Arrangement - Gain Sharing Arrangement sounds great but in practice it is quite difficult to execute. Even after a considerable level of efforts due to following reasons it may fail;
a. Unstructured/Poorly structured terms of arrangement, in outsourcing contracts.
b. Error in implementation.
c. Relationship between outsource supplier and entity.

Precaution need to be taken - Action plan for executing gain share arrangement must contain;
a. Be specific in outsourcing agreement.
b. Predefined formula for sharing of benefits and period thereof.
c. Effort from entity, because innovation is not only responsibility of outsource supplier.
d. Constitute innovation team to create an innovation structure, generate the idea and execution of same.

Overall

In consideration of above analysis, company should consider the outsourcing of **P-102** and **P-104** by entering out-sourcing contract with Protease. At this point, it is important to note that cost analysis emphasizes purely quantitative, financial considerations. However, outsourcing decisions are often influenced by qualitative factors, which are not directly affected in calculations. The impact of the same should also be taken into consideration. The issues suggested above are not exhaustive. Further, before opting gain sharing arrangement, the same should also be reviewed carefully from a business, legal, and tax perspective.

I hope this helps - if you need any further information, please let me know. Closure of Report

Mr. Singh,

Management Accountant

(For Management Accounting Division)

Mount Sports Manufacturing Facilities (MSMF)

Case Studies

Question 8

As a guest lecturer at a symposium for Business Excellence where you are giving a lecture on "Sustaining Business Excellence". A manufacturer of a fashion clothing line is one of the participants at the symposium. He has the following query:

"We are an apparel company that manufacture and sell our fashion clothing and accessories directly through 30 stores spread across India. Shortly we are planning to establish similar outlets overseas. Our business is under constant change due to changing customer trends. At the same time, we are the largest company in our industry segment in India, both in terms of market share and profits. We have a satisfied base of customers who are loyal to our brand. Shareholders are also satisfied stakeholders due to good returns provided on their investments. What would be the relevance of Business Excellence model to our company? Thank you!"

You are required to frame an appropriate response to this query.

Required

(i) EXPLAIN the importance of business excellence to an organization.

(ii) LIST the tool available to achieve and sustain excellence.

(iii) APPLY the fundamentals of EFQM model on the apparel company. (STUDY MATERIAL)

(iv) EXPLAIN the relationship between various criteria of the model in general terms. (RTP MAY.19)

Answer

(i) Business Excellence is a philosophy for developing and strengthening the management systems and processes of an organization to improve performance and create value for stakeholders. Stakeholders in an organization are not limited to shareholders (business) alone. They include also customers, employees (people) and society. What an organization does impact all the stakeholders in different

ways, yet they are all interlinked to each other. Customers' needs are of paramount importance to companies. Yet given uncertain conditions, shareholders demand challenging return on their investments. Employees need more from their company than just their pay- check. They want the company to enable to grow their knowledge and experience that can improve their career growth. Society expects companies to operate ethically and for the overall betterment of the society and environment.

For several years businesses have been operating under challenging circumstances. For example, landline phones have been entirely replaced by mobile phones. Television programs can be watched seamlessly on internet enabled mobile phones.

Not just this, today's smartphones have computing capability much more than the computers that were used in Apollo Mission to send the first man to moon! The proliferation of mobile phones has changed not just the telecom industry but also others like communication, banking, e - commerce etc. The pace of change is both exhilarating and challenging.

To manage this complex scenario, a company cannot focus on only one aspect of their operations. Optimize processes, delivery quality to customers, manage employee talents, earn required return on investment while managing to be a socially responsible organization. In short, the company should achieve excellence in all aspects of its operations. This is business excellence. Business excellence principles emerged because of development of quality drive into traditional business management. It is imperative not just to achieve excellence but also to sustain it.

Business excellence models are holistic tools that help companies develop stakeholder focused strategy. Each operation within a company enables a corresponding result. Business models present a formal, standardized cause effect relationship between different operations (enablers) and their resultant consequences. If the company want to achieve a different result, it has to do things differently. This can be better analysed through these models. Continuous improvement on various operations will ultimately lead to excellence. More importantly, these models need to be used to sustain and maintain excellence to retain their competitive advantage. They are not to be taken as one time exercise by the company. Assessments using this model have to be made periodically so that timely action can be taken to achieve the desired result.

(i) Some of the popular business excellence models are (i) the European Foundation Quality Management (EFQM) model (ii) Baldrige Criteria for Performance Excellence

(iii) Singapore BE Framework (iv) Japan Quality Award Model and (iv) Australian Business Excellence Framework.

(ii) The apparel company is a well-established player in the industry. It is a growing company that is looking to expand its operations overseas. To achieve business excellence in this environment, the company could adopt the EFQM model, which is a popular model.

The EFQM model was developed by the European Foundation for Quality Management. The model provides an all-round view of the organization and it can be used to determine how different methods fit together and complement each other. It can help the company understand the cause and effect relationships between what their organization does and the results it achieves. Creating an EFQM Management Document gives the organization a holistic overview of its strategic goals, the key approaches it has adopted and the key results it has achieved.

The fundamental concepts for excellence are the basic principles that describe the essential foundation for any organization to achieve sustainable excellence. With respect to the company they can be detailed as below:

(a) **Adding value to customers:** Companies need to understand their customers, their needs, anticipate their needs and make use of opportunities to fulfil their expectations.

In the current case, fashion apparel business is ever changing and dynamic due to the changing trends in customer's tastes. This could differ across locations within India and abroad. In the era of e-commerce, competition would be cut- throat. Before going to "how" it can meet customer's needs, the company should be clear on "what" need of the customer it can satisfy. For example, should the company cater to Indian apparel market, western apparel market, men or women or children apparel market etc. Once the "what" is clear, the company should have mechanisms in place to find out and anticipate customer tastes. Accordingly, it should structure its operations to add value to the customers in terms of quality, availability, support, and experience.

(b) **Creating a sustainable future:** Society and environment (People and Planet of Triple Bottom-line concept) play a major role in ensuring the sustainability of business. A company should have as much positive impact on its surroundings and try to minimize any negative impact on the same. Here, the company should assess the environmental impact of its operations, measures to minimize adverse impacts, business impact on the society etc. For example, leather is contended to be harmful to the environment since it requires the skin of animals specially cattle hide, needs huge amount of energy and chemicals to process it. This has a negative environmental impact. As regards societal impact, suppliers of cloth to the apparel company should not indulge in labor malpractice like child labor and should adhere to safety standards within its factories. The company should procure cloth only from suppliers who adhere to such standards.

(c) **Developing Organizational Capability:** Companies need to manage change within the organization and beyond. The company should identify "what it is capable of being great at?" in order to differentiate it from its competitors. For example, the apparel company may have the capability of tracking its inventory at the stores on real time basis. As soon as the inventory falls below a certain level, the stores issues fresh products to stock up. This ensures that there are no stock outs at the retail outlet. This ability to track inventory real time and ability to stock up quickly may be unique to the company that gives it a competitive edge. Another can be the ability to quickly change the apparel production to meet changing trends. Likewise, the company should identify and develop unique capabilities to have a competitive edge in the market.

(d) **Harnessing creativity and innovation:** Continuous improvement and innovation brings value to the company. The company should promote a working environment that enables and appreciates creativity and innovation. For example, new apparel desi gns can be promoted to test the market. If found feasible, the company can go for mass production of the same.

(e) **Leading with vision, inspiration, and integrity:** The tone at the top defines the rest of the company. The leaders and management of the company should have a clear vision of what the company wants to achieve, develop strategy to achieve it, work with integrity and ethics. Leaders shape the future of the organization.

(f) **Managing with agility:** Agility would be the capability to identify and effectively respond to opportunities and threats. For example, although the apparel company is in an expansionary phase, it should consider the threat, yet opportunity of using e- commerce as a platform to reach out to customers directly. Brick and mortar stores are becoming largely redundant due to online platforms, a threat the company should recognize and act upon.

(g) **Succeeding through the talent of people:** An organization is only as good as the people who work in it. There should be an atmosphere of teamwork that enable achievement of organizational and personal goals. Performance evaluation, reward and recognition programs, training and talent network are ways to cultivate talent within the organization.

(h) **Sustaining outstanding results:** Use of EFQM model is not a onetime exercise. Constant and periodic evaluation is required to keep up and sustain excellence.

(iv) The criteria of the model are comprised of 5 enablers and 4 results. Enablers covers what an organization does (its objective) and how it does it (strategy, use of resources to achieve it).

(a) Leadership: A leader defines the organization's culture. They enable the organization to achieve its goals by taking the correct decisions at the correct time. To do this they should have sufficient skill, work as per the company's code of conduct and should be ethical in their dealings.

(b) Strategy: Operations should be planned and directed as per a clearly defined strategy. The company's vision and mission statement with respect to its various stakeholders are the goals that the

organization wishes to achieve. Strategy (plan) enables the company to achieve these goals.

(c) People: Excellence is possible only if the people working in the company wish to achieve it. They must be motivated, recognized, and managed to enable them to work towards the company's vision and mission. The work culture should be that this opens up opportunities for personal development as well. This would cultivate a bond with the organization, which enables people working within to strive for excellence.

(d) Partnerships and resources: Effective management of partnerships that the company has with other organizations is critical to success. Partners could be external vendors, suppliers, and service providers. The services of partners enable business to operate smoothly. Resources, both tangible and intangible should be managed optimally. Tangible resources can be financial (cash, bank accounts) and physical assets (machinery, building, land etc.). Intangible resources would be intellectual property rights, information technology, licenses etc. Proper management of resources enables optimal results.

(e) Processes, Products, and Services: A company exists because of its processes, products, and services. They should be managed and continuously improved to create value to the stakeholders.

Results are what the organization achieves following its operations and decisions. As explained before, the stakeholders of the company are investors (business), people (employees), customers and society. In order to track performance, the company has to develop Key Performance Indicators (KPI)s for each of the stakeholder groups. Results should be tracked periodically. Changes to targets and benchmarks should be continuously made to reflect the current objectives that the company wants to achieve. Some of the results that the company can look at are:

(a) Customer results: Are the customers of the company satisfied with the products and service? How does the company fare in terms of brand loyalty? Is the customer base growing to indicate increasing market share?

(b) People results: Does the company have skilled and motivated employees? What is the employee turnover with reasons for the same? Does the company have proper access to hire required talent? Are the employees motivated, trained, recognized, and rewarded for their performance? What is performance measurement system, is it robust and accurate to measure performance?

(c) Society results: Is the company a good corporate citizen. Are the objectives of corporate social responsibility being met? If the organization is a not for profit organization, is it meeting its objectives and goals?

(d) Business results: Is a for profit organization achieving the required return on investment, profitability that the shareholders and other investor demand? Has the company been able to manage financial and other risks properly?

Enablers enable achievement of results. EFQM model documents this flow and symbiosis in a structured way. It highlights the strength and weakness of the enablers. With this information, the company can alter its operations and strategy to achieve desired results. On assessment, there is a flow from results to enablers. If the results have been achieved, enablers continue to operate status quo. If the results fall short of targets, changes have to be made to enablers to improve performance. Therefore, it can be concluded the EFQM model encourages constant self-assessment to achieve excellence.

When a company wins an excellence award based on a business excellence model, it gains in stature within the industry. This recognition could work to its advantage financially and otherwise.

Question 9

Sun Electronics manufactures and sells various electronic goods like mobile phones, laptops, televisions, refrigerator etc. The company sells these goods through the 30 stores situated in different parts of the country. The store managers place a request to the centralised team situated in Mumbai on a monthly basis. One store can send only one requisition per month.

The requirements of the stores are forwarded to the production planning team which is responsible for scheduling the manufacturing of these produc ts. Once the goods are manufactured, the goods are sent to a central warehouse in Mumbai and are dispatched to different stores according to the store requirements. The time taken from placing a request from store to the delivery of product to the store takes about 30-40 days on an average. In the process the company procures parts from more than 100 vendors. The company has faced quality related issues with many vendors leading to delay in production.

The average holding period of inventory in Sun Electronics is very high at 45 days as against an industry average of 15 days. Since the order to delivery time at a store is very high, the company has traditionally allowed high inventory holding to reduce the stock outs at store level. The company is under severe pressure to improve its working capital cycle.

A high amount of inventory held at each store also means that the products become obsolete quickly. In case of products like mobile phones, new and upgraded versions are available in the market as early as six months from the date of initial launch of a particular model. A significant portion of inventory of mobile phones becomes obsolete every year. The company generally resorts to a discounted sale to liquidate such obsolete models.

The management at Sun Electronics has identified e-commerce as an opportunity for faster growth, both in terms of revenues and profitability. The company is considering launch of its own e-commerce website to sell all products which are currently being sold in physical stores . Depending upon the success of online sales, the company might choose to optimize and close certain physical stores in the next couple of years.

The management of the company is cognizant of the fact that existing inventory procurement and management system will not fit in the new e-commerce business. E-commerce works on a inventory light model and quick as well as on time delivery of products of the customers. The fact that customers could be from a location other than those where Sun Electronics has physical presence makes the matter complex.

Required

The company is considering implementation of a supply chain management system. Will a supply chain management system be of use to Sun Electronics in light of the e -commerce venture? You are required to EXPLAIN the concept of Supply Chain Management and EVALUATE the applicability of in the current case. (STUDY MATERIAL) (MTP MARCH.19)

Answer

Issue
Sun electronics manufactures and sells various electronic products through its physical stores. The existing manufacturing system does not take into consider the demand of products in the market. Store managers are allowed to submit only one order per month. A high level of inventory can be seen at Sun Electronics as compared to the industry average.

The store managers tend to keep high level of inventories as a safeguard against stock-outs. Whereas, keeping inventory to meet customer requirement is good, high level of inventories due to inefficient processes is not advisable.

The company also has a longer working cycle because of a long order to deliver time and excess holding of inventory. A significant amount of working capital is blocked due to this practice. Technology changes rapidly and the company is expected to roll out latest products in the market. A product like mobile gets outdated very soon and the company has to resort to discounted sales. This results in financial losses to the company.

The company has identified an opportunity in e-commerce. E-commerce businesses require leaner models and faster response time. The production must be based on the demand from the customer and not on an ad-hoc basis. In the following paragraphs, the importance of supply chain management (SCM) and its applicability in the current case is discussed.

Supply Chain Management (SCM)

Supply Chain Management can be defined as the management of flow of products, services and information, which begins from the origin of products and ends at the product's consumption at consumer's end. SCM also involves movement and storage of raw material, work-in-progress and finished goods. In other words, supply chain management involves management of all activities associated with moving goods from the raw materials stage to the end user. An important objective of SCM is to correlate the production and distribution of goods and services with demand of the product.

The following are the various activities which an organisation carries out to meet the customer requirements (Primary activities under value chain model) -

- Inbound Logistics covering procurement and related activities.
- Operations covering conversion of raw materials into finished products
- Outbound Logistics covering movement of products from plants to end users
- Marketing and Sales
- Service

Supply Chain Management looks each of the above activities as integrated and interrelated to each other. None of the activities can be looked in silos. In the case of Sun Electronics , there is a restriction on number of orders which a store manager can place. This would lead to excess ordering because of the fear of stock-outs.

The customer demand is completely ignored and hence the production is not in sync with the market demand. This could lead to excess production, higher inventory holding and longer working capital cycles.

The facts presented in the case indicate the following problems at Sun Electronics:
- Production planning is not based on customer demand & is done on an ad-hoc basis.
- Inventory Holding period is very high (45 days against an industry average of 15 days).
- The working capital cycle is longer.
- The time take to fulfil an order from the store is very high.
- The production is dispatched to a central warehouse for further deliveries to the stores. This could be an inefficient process.
- Liquidation of products at discount for products with low shelf life.

SCM Process and applicability to Sun Electronics

The SCM process is explained below:

☐ **Plan** - The first step in SCM process is to develop a plan to address the requirements of the customer. Sun Electronics must shift its focus from ad hoc and predetermined production planning to understanding the requirements of customers. Production must be planned based on the demand of products. The focus must be on producing what the customer wants.

☐ **Develop (procure)** - In this step, the materials required for production is sourced from various suppliers. A good relationship with supplier is required to ensure that the parts/materials are received as and when required by the production team. It is also important that the vendors supply quality material which is not the case in Sun Electronics. The company must select suppliers which are dependable and can deliver quality products in the stipulated time. The company must focus in reducing the lead time required for sourcing materials which will reduce the inventory holding period.

☐ **Make** - The third step is making or manufacturing the products required by the customer. This is quite different from the existing practice in Sun Electronics where store managers are allowed to place only one order. This would mean that the company is not considering the ever changing demands and tastes of the customers.

☐ **Deliver** - The fourth stage is to deliver the products manufactured for the customers. This stage is concerned with logistics. The time required to deliver to the store in case of Sun Electronics is very high. The company must evaluate if the centralised warehouse is causing delay in delivery of products to the stores.

Logistics is one of the important component of the entire supply chain process. Right from procurement of material, movement of raw material in the plants and final delivery of products of customers, logistics play a critical role. An excellent system must be in place to ensure that the movement of materials and final product are uninterrupted.

Warehousing also plays an important role in today's business environment. The company has a centralised warehouse to meet the needs of all its stores. This would not be the most efficient way. The company must evaluate creation of additional storage facility which would ensure timely delivery of goods to the stores. Newer products can reach the market faster.

Benefits of SCM to Sun Electronics

SCM looks at the entire value chain process as an integrated process. There is a seamless flow of information and products between suppliers and customers. The customer's requirements would be captured to plan the production. The suppliers would be intimated to supply the materials according the the production plan. An effective logistics system ensures that movement of materials is seamless. Sun Electronics can also consider implementing an integrated ERP which would also interact with vendors on real time basis.

The following benefits of SCM can be envisaged for Sun Electronics -
☐ Better Customer Service as customer is supplied with what he/she wants in the minimum time.
☐ Better delivery mechanism for goods.
☐ Improves productivity across various functions and departments.
☐ Minimises cost (both direct and indirect).
☐ Reduces the inventory holding time and improves the working capital cycle.
☐ Enhances inventory management and assists in implementation of JIT systems.

⸰   Assists companies in minimising wastes and reduce costs.

⸰   Improves supplier relationship.

E-Commerce and SCM

The SCM is the backbone of E-commerce industry. Customers buying products online want deliveries to be faster. Another distinct feature of e-commerce is that buyers could be located in any corner of the country and not just restricted to the cities where Sun Limited has physical presence. This definitely means that the company must have an effective Supply Chain Management in place which could meet the customer's requirement.

The existing practice of one order per month from each store would not work in the e - commerce space. Orders can come at any time and from anywhere. Supply Chain Management would be required for success of e-commerce business.

Customer Orders

The company must have an effective mechanism to capture customer orders and feed it into the production planning on a real time basis. An integrated ERP system would be required for this purpose. Any delay in intimating the production team would mean delay in production and delivery which would not be taken positively by the customers. The existing system of one order per month from a store would not fit the purpose. A real time flow of information would mean lower inventory holding.

Procurement

The material requirements must be communicated to suppliers seamlessly. The company must identify those vendors who can deliver quality materials in the required time frame. A delay in supplies would delay the production process. A company cannot afford this in e- commerce business. Automatic exchange of information using EDI (Electronic Data Interchange) or Integrated ERP systems would ensure that the vendors receive material requirements in a timely manner.

Production

As discussed earlier, the production must be in accordance with the customer order. This requires a shift in approach of the production team. Business environments have shifted from "Customer will buy what we produce" to "We have to produce what the customers require". The company would ideally not produce products to store them and sell later.

Logistics

Logistics would be the backbone of entire e-commerce set up. Right from sourcing of materials to delivery of products at the customer's door step, logistics would play an important role. If the company has an in-house logistics facility, the logistics team must be trained with the requirement of the new business. If the company has outsourced the logistics, vendors must be briefed about the requirements of the e-commerce. The company might have to tie up with new logistic vendors to avoid any delay in deliveries.

Question 10

Memorable Travels is a tour operator offering holiday packages to a variety of customers. They advertise and promote their packages using print advertising in newspapers and colourful brochures. A basic holiday package would include transport from the city to the destination, stay, food, attractions, or

activities. Memorable Travels has been in business for the past 15 years. It has standard agreements with its suppliers based on which it has been offering standard holiday packages to its customers. Profitable business over these years has resulted in surplus cash that the company intends to reinvest in its business. Recently, the management has noticed increase in the number of complaints regarding these packages. This has resulted in lesser number of customers opting for these tours.

A study of these complaints has indicated that customer expectations from a holiday trip vary depending on their age group. Accordingly, Memorable Travels wants to offer customized holiday package trips that would suit the travellers' expectations. It wants to increase the number of packages offered to customers in addition to adding variety to them. This would provide customers the choices from which they can customize their holidays with the help of Memorable Travels.

The management wants to understand the need and importance of supplier chain management in a service organization such as itself.

Required

(i) DEFINE the objective of Memorable Travels should have when considers incorporating the supply chain management framework into its business model.

(ii) IDENTIFY possible components of Memorable Travels' upstream supply chain. (iii)SUGGEST the key processes in the business model of Memorable Travels.

Answer (STUDY MATERIAL)

(i) Memorable Travels is providing a service wherein it uses its assets, staff, and resources to provide customized travel packages to its customers. It should consider how to utilize its assets and staff to design and manage its supply chain such that it meets the customers' demand in a cost-effective manner. Customers' demand is uncertain due to (a) customization of holiday packages to suit their individual expectations and (b) sensitivity of travel to factors like economic prosperity, law, and order etc.

Business processes must be effectively coordinated across organizations and functions to meet the customers' expectation in the best possible manner. The ability of Memorable Travels to respond to its customers' demand defines its operational capacity. Having more capacity (capability) to meet customers' demand helps it be more responsive and flexible. However, t his has to be balanced with its ability to maintain an effective supply chain management. A supply chain is effective only when Memorable Travels and consequently the ultimate customer, is able to get the required level of service from its suppliers.

(ii) As mentioned in the problem, a basic holiday package would include transport from the city to the destination, stay, food, attractions, or activities. Accordingly, possible components of Memorable Travels upstream supply chain would include **partnerships with**:

(a) Transport providers – road, rail, and air travel providers. This includes travel to the holiday destination as well as the local transport within that location.

(b) Lodging and accommodation providers – hotels, bed, and breakfast providers etc.

(c) Local food producers and restaurants.

(d) Providers of tourist attractions and activities.

(iii) Key processes in the business model of Memorable Travels would be:

Information Flow

Information flow is **critical** at various stages:

- to understand expectations of customers

- to share this information with the suppliers of service with whom Memorable Travels has partnership

- to establish clear service level agreements with these suppliers and to clearly define the scope of work

- to be able to monitor the performance of these suppliers. Performance has to be monitored because it will impact payment settlements with these suppliers

- to collect constructive feedback from customers about the performance of these suppliers

Capacity and Skills Management

Memorable Travels has to develop the ability to cater to various expectations of its customers. It has to develop assets and skilled staff who can attract customers and help them customize their holiday packages. To enable this, the company has to invest in its organization, processes, assets and staff. As mentioned above in point (a), information flow is a key process in this business model. The company has to invest in its processes to ensure that information flow is smooth and accurate. Similarly, it has to invest in assets like IT infrastructure, offices and also develop a skilled staff who can provide quality service. Memorable Travels should also have the ability to develop pool of suppliers who provide good quality service. Better capacity to cater to customers' demand better will ensure that Memorable Travel can

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develop and maintain its business efficiently. However, since building capacity and developing skills comes with a cost, that has to be balanced out with the revenue it generates.

Demand Management

Memorable Travels will have to focus on how to generate demand for its products. In tune with changing times, Memorable Travels will have to change its marketing from print based advertising to online advertising in order to have a larger outreach to attract customers. The company should be able to manage variation in customers' expectations in a cost- effective way. As explained in point (b) above, this will be determined by the capacity of its operations and skills of its employees. Higher the capacity more the flexibility in its operations.

Customer Relationship Management

Customer segmentation and monitoring help in understanding customer's needs in a better way and to focus on efforts to meet those needs through proper and timely communication of information with its service suppliers. However, the cost of maintaining this framework should not exceed the revenue that each customer segment generates. Accordingly, customer account profitability analysis should be prepared for each customer segment.

Supplier Relationship Management

As part of the customer relationship management, specific needs of customers would be identified. Based on these needs, potential suppliers who provide services of the requisite quality need to be identified. Service level agreements need to be drawn up after comprehensive rounds of negotiations. It is imperative to have a clear understanding with these suppliers regarding the quality service expected.

Service Delivery Management

Agreements with suppliers will help to ensure that expectations of customers of Memorable Travels are being met. Service performance must be monitored, checked continuously for compliance. Any deviation from scope may have an impact on the payment settlement to be made with the supplier.

Cash Flow

As mentioned above, service delivery should be monitored to ensure that payment is made only to the extent the agreed quality of service is delivered. Periodic payments to suppliers should be made based on service level agreements. Similarly, cash inflow from customers should be monitored to avoid any bad debts. Pricing for packages should be based on the level of service offered. Again, clear understanding of the terms of contract is essential to avoid uncertainties.

All processes within the company are linked to each other. Understanding the customers' expectations have a direct impact on the supply chain. Therefore, proper co- ordination is required for smooth functioning of the organization and its supply chain.

CHAPTER-3 Lean System and Innovation

Section A – Practical Questions

Just In Time

Question 1

A manufacturer is considering implementing Just in time inventory system for some of its raw material purchases. As per the current inventory policy, raw materials required for 1 month's production and finished goods equivalent to the level of 1 week's production are kept in stock. This is done to ensure that the company can cater to sudden spurt in consumers' demand. However, the carrying cost of inventory has been increasing recently. Hence, the consideration to move to a more robust just in time purchasing system that can reduce the inventory carrying cost. Details relevant to raw material inventory are given below:

- Average inventory of raw material held by the company throughout the year is ₹ 1 crore. Procurement of raw material for the year is ₹12 crore. By moving to just in time procurement system, the company aims at eliminating holding this stock completely in its warehouse. Instead, suppliers of these materials are ready to provide the goods as per its production requirements on an immediate basis. Suppliers will now be responsible for quality check of raw material such that the raw material can be used in the assembly line as soon as it is delivered at the company's factory shop floor.

- Increased quality check service done by the suppliers as well as to compensate them for the risk of holding the inventory to provide just in time service, the company is willing to pay a higher price to procure raw material. Therefore, procurement cost will increase by 30%, total procurement cost will be ₹15.6 crore per year. Consequently, quality check and material handling cost for the company would reduce by ₹1 crore per year. Similarly, insurance cost on raw material inventory of ₹20 lakh per year need not be incurred any longer.

- Raw material is stored in a warehouse that costs the company rent of ₹3 crore per annum. On changing to Just in time procurement, this warehouse space would no longer be required.

- Production is 150,000 per year. The company plans to maintain its finished goods inventory equivalent to 1 week's production. Despite this, in order to have a complete cost benefit analysis, the management is also factoring the possibility of production stops due to unavailability of raw material from the suppliers. This could happen due to of delay in delivery or non-conformance of goods to the standard required. Labor works in one 8-hour shift per day and will remain idle if there is no material to work on. Due to stop of production for the above reason, it is possible to have stockout of 3,000 units in a year. Stock out represents lost sales opportunity due to unavailability of finished goods, the customer walks away without purchasing any product from the company. Therefore, in order to reduce this opportunity cost and to make up for the lost production hours, labor can work overtime that would cost the company ₹10 lakh per annum. This is the maximum capacity in terms of hours that the labor can work. With this overtime, stockout can reduce to 2,000 units.

- Currently, sale price of phone is ₹5,000 per unit, variable production cost is ₹2,000 per unit while variable selling, general and administration (SG&A) cost is ₹750 per unit. Raw material procurement cost is currently ₹800 per unit, that will increase by 30% to
₹1,040 per unit under Just in time inventory system.

- **On an average, the long-term return on investment for the company is 15% per annum.**

Required

(i) **CALCULATE the benefit or loss if the company decides to move from current system to Just in Time procurement system.**

(ii) **RECOMMEND factors that the management needs to consider before implementing the just in time procurement system. (Study Material) (RTP NOV.18)**

Answer

(i) Implementing Just in time procurement system will benefit the company by
₹ **11,27,000** per year as explained below:
Therefore,

Particulars	Current Purchasing Policy (₹)	JIT Procurement System (₹)
Raw material procurement cost per year	12,00,00,000	15,60,00,000
Quality check and material handling cost (No longer required in JIT)	1,00,00,000	---
Insurance Cost on raw material inventory (No longer required in JIT)	20,00,000	---
Warehouse rental for storing raw material (No longer required in JIT)	3,00,00,000	---
Overtime Charges under JIT to reduce Stockouts (note1)	---	10,00,000
Stockout Cost (note 2)	---	40,20,000
Total Relevant Cost	**16,20,00,000**	**16,10,20,000**

Therefore, moving to just in time procurement system results in savings of ₹980,000 per year for the company. If reinvested, long term return on investment for the company at 15% would yield a return of ₹147,000 per year. Therefore, total benefit for the company would be ₹11,27,000 per year.

Note 1: Should overtime cost be incurred to reduce Stockouts?

Contribution per unit = Sale price - Variable production cost -Variable selling, distribution cost per unit; Variable production cost under the just in time system =
₹2,000+ ₹(1,040-800) = ₹2,240 per unit; Contribution per unit = ₹5,000 - ₹2,240-₹750 per unit = ₹2,010 per unit.

Overtime cost can reduce stockouts from 3,000 units to 2,000 units that is customers' demand of 1,000 units more can be met.

Contribution earned from selling these 1,000 units = 1,000 × ₹2,010 per unit = ₹20,10,000.

Therefore, the contribution earned of ₹20,10,000 is more than the related overtime cost of ₹10,00,000. Therefore, it is profitable to incur the overtime cost.

Note 2: Stockout Costs

Out of the total shortfall of 3,000 units, by spending on overtime 1,000 units of demand can be met. Therefore, actual stockout units is only 2,000 units. As explained above, contribution per unit is ₹2,010 per unit. Therefore, stockout cost = 2,000 units
× ₹2,010 per unit = ₹40,20,000.

(ii) The company plans to eliminate its raw material inventory altogether. Raw material will be delivered as per production schedule directly at the factory shop floor, from whence production will begin. The management should therefore carefully consider the following points:

(a) The entire production process has to be detailed and integrated sequentially. This is essential to know because it should be known in advance when in the sub- assembly process is each raw material is required and in what quantity.

(b) Since production is dependent on delivery and quality of raw material, heavy reliance is being placed on suppliers. They should be able to guarantee timely delivery of raw material of the appropriate quality. The company is paying a premium of 30% of original cost, that is ₹240 per unit (₹1,040 - ₹800 per unit) in order to ensure the same. Each unit gives a contribution of ₹ 2,010 per unit, which is 40.2% of the sale price per unit. Lost sales opportunities due to unavailability of raw material or non-conformance of the material can result in substantial losses to the company. While, portion of this has been factored while doing the cost benefit analysis of implementing Just-in-time systems, it needs careful consideration and monitoring even after implementation. Therefore, to hedge its loss, the management and suppliers should agree on penalties or costs the supplier should incur should there be any delay or non-conformance in quality of materials beyond certain thresholds.

(c) Accurate prediction of sales trends is important to determine the production schedule and finished goods planning.

(d) Continuous monitoring of the system even after implementation is essential to ensure smooth operations. Management commitment and leadership support is essential for its successful implementation and working.

Question 2

United Video International Company (UVIC) sells package of blank video tapes to its customer. It purchases video tapes from Indian Tape Company (ITC) @ ₹ 140 a package. ITC pays all freight to UVIC. No incoming inspection is necessary because ITC has a superb reputation for delivery of quality merchandise. Annual demand of UVIC is 13,000 packages. UVIC requires 15% annual return on investment. The purchase order lead time is two weeks. The purchase order is passed through Internet and it costs ₹ 2 per order. The relevant insurance, material handling etc ₹ 3.10 per package per year. UVIC has to decide whether or not to shift to JIT purchasing. ITC agrees to deliver 100 packages of video tapes 130 times per year (5 times every two weeks) instead of existing delivery system of 1,000 packages 13 times a year with additional amount of ₹ 0.02 per package. UVIC incurs no stock out under its current purchasing policy. It is estimated UVIC incurs stock out cost on 50 video tape packages under a JIT purchasing policy. In the event of a stock out, UVIC has to rush order tape packages which costs ₹ 4 per package. Comment whether UVIC should implement JIT purchasing system.

Hindustan Tape Company (HTC) also supplies video tapes. It agrees to supply @ ₹ 136 per package under JIT delivery system. If video tape purchased from HTC, relevant carrying cost would be ₹ 3 per package against ₹ 3.10 in case of purchasing from ITC. However HTC. doesn't enjoy so sterling a reputation for quality. UVIC anticipates following negative aspects of purchasing tapes from HTC.

— To incur additional inspection cost of 5 paisa per package.

— Average stock out of 360 tapes packages per year would occur, largely resulting from late deliveries. HTC cannot rush order at short notice. UVIC anticipates lost contribution margin per package of ₹ 8 from stock out.

— Customer would likely return 2% of all packages due to poor quality of the tape and to handle this return an additional cost of ₹ 25 per package.

Required

Comment whether UVIC places order to HTC. (RTP MAY 18)

Answer

Comparative 'Statement of Cost' for Purchasing from ITC under 'Current Policy' & 'JIT'

Particulars	Current Policy (₹)	JIT (₹)
Purchasing Cost	18,20,000 (13,000 Packages × ₹140)	18,20,260 (13,000 Packages × ₹140.02)
Ordering Cost	26.00 (₹2 × 13 Orders)	260.00 (₹2 ×130 Orders)
Opportunity / Carrying Cost	10,500.00 (1/2 × 1,000 Packages ×₹140 × 15%)	1,050 (1/2 × 100 Packages × ₹140.02 × 15%)
Other Carrying Cost (Insurance, Material Handling etc)	1,550.00 (1/2 × 1,000 Packages ×₹3.10)	155.00 (1/2 × 100 Packages × ₹3.10)
Stock Out Cost	---	200 (50 Packages × ₹4.00)
Total Relevant Cost	18,32,076	18,21,925

Comments

As may be seen from above, the relevant cost under the JIT purchasing policy is lower than the cost incurred under the existing system. Hence, a JIT purchasing policy should be adopted by the company.

'Statement of Cost' for Purchasing from HTC under 'JIT'

Particulars	JIT (₹)
Purchasing Cost	17,68,000 (13,000 Packages × ₹136)
Ordering Cost	260.00 (₹2 ×130 Orders)

Opportunity / Carrying Cost	1,020
	(1/2 × 100 Packages × ₹ 136 × 15%)
Other Carrying Cost (Insurance, Material Handling etc)	150.00
	(1/2 × 100 Packages × ₹3.00)
Inspection Cost	650
	(13,000 Packages × ₹0.05)
Stock Out Cost	2,880

	(360Packages × ₹8.00)
Customer Return Cost	6,500
	(13,000 Packages × 2% × ₹25.00)
Total Relevant Cost	17,79,460

Comments

The comparative costs are as follows:

Under Current Policy	₹18,32,076
Under Purchase under JIT from ITC	₹18,21,925
Under Purchase under JIT from HTC	₹17,79,460

Packages should be bought from HTC under JIT as it is the cheapest.

Question 3

KP Ltd. (KPL) manufactures and sells one product called "KEIA". Managing Director is not happy with its current purchasing and production system. There has been considerable discussion at the corporate level as to use of 'Just in Time' system for "KEIA". As per the opinion of managing director of KPL Ltd. –

"Just-in-time system is a pull system, which responds to demand, in contrast to a push system, in which stocks act as buffers between the different elements of the system such as purchasing, production and sales. By using Just in Time system, it is possible to reduce carrying cost as well as other overheads". KPL is dependent on contractual labour which has efficiency of 95%, for its production. The labour has to be paid for minimum of 4,000 hours per month to which they produce 3,800 standard hours.

For availing services of labour above 4,000 hours in a month, KPL has to pay overtime rate which is 45% premium to the normal hourly rate of ₹110 per hour. For avoiding this overtime payment, KPL in its current production and purchase plan utilizes full available normal working hours so that the higher inventory levels in the month of lower demand would be able to meet sales of month with higher demand level. KPL has determined that the cost of holding inventory is ₹70 per month for each standard hour of output that is held in inventory.

KPL has forecast the demand for its products for the first six months of year 2014 as follows:

Month	Demand (Std. Hrs.)
Jan'14	3,150
Feb'14	3,760
Mar'14	4,060
Apr'14	3,350
May'14	3,650
Jun'14	4,830

Following other information is given:

(i)   All other production costs are either fixed or are not driven by labour hours worked.

(ii)   Production and sales occur evenly during each month and at present there is no stock at the end of Dec'13.

(iii) The labour are to be paid for their minimum contracted hours in each month irrespective of any purchase and production system.

Required

As a chief accountant you are requested to comment on managing director's view. (Study Material)

Answer

Workings

Statement Showing 'Inventory Holding Cost' under Current System

Particulars	Jan	Feb	Mar	Apr	May	Jun
Opening Inventory* (A)	---	650	690	430	880	1,030
Add: Production*	3,800	3,800	3,800	3,800	3,800	3,800
Less: Demand*	3,150	3,760	4,060	3,350	3,650	4,830
Closing Inventory* (B)	650	690	430	880	1,030	-
Average Inventory ($\frac{A+B}{2}$)	325	670	560	655	955	515
Inventory Holding Cost @ ₹70	22,750	46,900	39,200	45,850	66,850	36,050

(*) in terms of standard labour hours

Inventory Holding Cost for the six months   =   ₹2,57,600 (₹22,750 + ₹46,900 +

₹39,200 + ₹45,850 + ₹66,850 + ₹36,050)

Calculation of Relevant Overtime Cost under JIT System

Particulars	Jan	Feb	Mar	Apr	May	Jun
Demand*	3,150	3,760	4,060	3,350	3,650	4,830
Production*	3,150	3,760	4,060	3,350	3,650	4,830
Normal Availablility*	3,800	3,800	3,800	3,800	3,800	3,800
Shortage (=Overtime*) (C)	---	---	260	----	----	1,030

Actual Overtime Hours $(\frac{€}{0.96})$	---	---	273.68	----	----	1,084.21
Overtime Payment @ ₹159.50 [110+45%]	---	---	43,652	----	----	1,72,931

(*) in terms of standard labour hours

Total Overtime payment   =₹2,16,583 (₹43,652 + ₹1,72,931)

Therefore, saving in JIT system   =₹2,57,600 – ₹2,16,583 = ₹41,017

Comments

Though KPL is saving ₹41,017 by changing its production system to Just-in-time but it has to consider other factors as well before taking any final call which are as follows:-

(i)   KPL has to ensure that it receives materials from its suppliers on the exact date and at the exact time when they are needed. Credentials and reliability of supplier must be thoroughly checked.

(ii)   To remove any quality issues, the engineering staff must visit supplier's sites and examine their processes, not only to see if they can reliably ship high-quality parts but also to provide them with engineering assistance to bring them up to a higher standard of product.

(iii)   KPL should also aim to improve quality at its process and design levels with the purpose of achieving "Zero Defects" in the production process.

(iv)   KPL should also keep in mind the efficiency of its work force. KPL must ensure that labour's learning curve has reached at steady rate so that they are capable of performing a variety of operations at effective and efficient manner. The workforce must be completely retrained and focused on a wide range of activities.

Total Productive Maintenance

Question 5

Gold Coast Company Ltd. manufactures spare parts. It works in two shifts of 8 hours for 6 days in a week. Lunch break is 45 mins and other miscellaneous breaks add up to 25 minutes. The following details are collected for the last 4 weeks by the TPM team for one of their important equipment

Hours for Planned Preventive Maintenance = 15 minutes per shift For Breakdown Maintenance = 6 hours

Total Set up Changes = 15 hours Total Power Failure = 4 hours

Total Standard Cycle Time per piece = 3 minutes No of Parts Produced per shift = 120

Parts Accepted per shift = 115

Required

CALCULATE 'OEE'. (Study Material)

Answer

Calculation of Shifts

Days per week	…(A)	6
Shifts per week	…(B)	2

Total Working Shifts per week	…(C = A × B)	12
Total Weeks	…(D)	4
Total Shifts	…(E = C × D)	48

Calculation of Loss of Time per shift

Breakdown Maintenance (in mins)	360
Set up Changes (in mins)	900
Power Failure (in mins)	240
Total …(A)	1,500
Loss of Minutes per shift …(A/ 48)	31.25
Add: Lunch Breaks per shift	45
Add: Other Breaks	25
Add: Preventive Maintenance	15
Total Time Loss (in Minutes) per shift	116.25

Availability Ratio per shift $= \left\{ \dfrac{480 \text{ mins} - 116.25 \text{ mins}}{480 \text{ mins.}} \right\} \times 100\%$

	=	75.78 %
Actual Production	=	120 units per shift
Standard time	=	3 minutes
Standard Time Required	=	120 units × 3 minutes

	=	360 minutes
Actual Time Taken	=	480 mins. – 116.25 mins.
Performance Ratio	=	363.75 minutes
	=	$\left\{ \dfrac{360 \text{ mins}}{} \right\} \times 100\%$
	=	98.96%
Quality Ratio	=	$\left\{ \dfrac{115 \text{ Parts}}{} \right\} \times 100\%$
	=	95.83%
Thus, OEE	=	0.7578 × .9896 × .9583 = 71.86%

Question 6

SSK Pharmaceuticals Ltd. is producing medication products (pills, balms etc.) and can be called high volume based production environment. There are several different automated production machines located in the plant, through which production of medicines is accomplished and fulfilled the demands. Plant operates in double shift a day each consisting of 8 hours with 30 minutes' lunch break and tea break of 15 minutes. Following data pertains to automated machine 'X-78'.

X-78

14 February 2019, Wednesday

Breakdown, repair and start up time	68 minutes
Standard cycle time	2.5 minutes per tablet
Quality loss due to scrap, rework, and rejection	50 tablets
Total quantity produced	280 tablets

Required

COMMENT on OEE. (Study Material)

Answer

Calculation of Loss of Time Per Shift

Lunch Break	30
Tea Break	15
Breakdown, Repair, and Start-up Time (68 mins / 2 Shift)	34
Total Time Loss Per Shift	79

Availability Ratio per shift	$=$	$\{\dfrac{480 \text{ mins}-79 \text{ mins}}{480 \text{ mins.}}\} \times 100\%$
	$=$	83.54 %
Actual Production	$=$	140 tablets per shift
Standard time	$=$	2.5 minutes
Standard Time Required	$=$	140 units × 2.5 minutes

Actual Time Taken	$=$	330 minutes
	$=$	480 mins. – 79 mins.
Performance Ratio	$=$	401 minutes
	$=$	$\{\dfrac{350 \text{ mins}}{401 \text{ mins.}}\} \times 100\%$
Quality Ratio	$=$	87.28%
	$=$	$\{\dfrac{140 \text{ tab.}-25 \text{ tab.}}{140 \text{ tab.}}\} \times 100\%$

Thus, OEE	=	82.14%
	=	0.8354 × .8728 × .8214 = 59.89%

Since OEE of SSK Pharmaceuticals Ltd. is lesser than 85 % i.e. World Class Performance Level, Company is advised to improve its each ratio i.e. availability ratio, performance ratio and quality ratio by collecting information related to all downtime and losses on machines, analyzing such information through graphs and charts, making improvement decisions thereon like autonomous maintenance, preventive maintenance, reduction in set up time etc. and implementing the same.

Question 7

Hindustan Ltd. supplies the following information relating to a vital equipment used in its production activity for April, 2019:

Total time worked during the month	210 hrs.
Total production during the month	2,800 units
No. of units accepted out of total production	2,520 units
Standard time for actual production of the month	180 hrs.
Time lost during the month	28 hrs.

Required

(i)   STATE an appropriate approach to measure the total productive maintenance performance of an equipment.

(ii)   Quantify the total productive maintenance performance of the above-mentioned equipment by using the approach stated in (i) above.

(iii)   COMMENT on the effectiveness of maintenance of the equipment. (Study Material)

Answer (PYQ MAY.18)

(i)   The most important approach to the measurement of TPM performance is known as Overall Equipment Effectiveness (OEE) measure. The calculation of OEE measure requires the identification of "six big losses"

1. Equipment Failure/ Breakdown
2. Set-up/ Adjustments
3. Idling and Minor Stops
4. Reduced Speed
5. Reduced Yield and
6. Quality Defects and Rework

The first two losses refer to time losses and are used to calculate the availability of equipment. The third and fourth losses are speed losses that determine performance efficiency of equipment. The last two losses are regarded as quality losses.

Performance × Availability × Quality = OEE %

OEE may be applied to any individual assets or to a process. It is unlikely that any manufacturing process can run at 100% OEE.

(ii) Availability Ratio per shift $= \{\dfrac{210 \text{ mins}}{210 \text{ hrs.}+28 \text{ hrs}}\} \times 100\%$

$= 88.24\%$

Performance Ratio $= \{\dfrac{180 \text{ hrs}}{210 \text{ hrs.}}\} \times 100\%$

$= 85.71\%$

Quality Ratio $= \{\dfrac{2{,}520 \text{ units}}{2{,}800 \text{ units}}\} \times 100\%$

$= 90.00\%$

Thus, **OEE** $= 0.8824 \times 0.8571 \times 0.90$

$= 68.06\%$

This question has been solved by considering "**Time Available** equals to **Total Time Worked** plus **Time Lost**".

(iii) Comment

World Class OEE is 85% or greater, Hindustan Ltd.'s OEE is somewhere around 68%. It just means that company got some opportunities for improvement. Hindustan Ltd. may improve OEE by collecting information related to all downtime and losses on equipment, analyzing such information through graphs and charts, making improvement decisions thereon like autonomous maintenance, preventive maintenance, reduction in set up time etc. and implementing the same.

Question 8

Kiwi Ltd. manufactures spare parts and can be called "high volume based" manufacturing environment. The company is using the system of Total Productive Maintenance for maintaining and improving the integrity of manufacturing process. There are several different automated manufacturing machines located in the plant, through which manufacturing of spare parts are done and supplied to cater the demand in the market.

A 12 hour shift is scheduled to produce a spare part in APZ Company Ltd. as shown in the schedule below. The shift has three 15 minute breaks and a 10 minute clean up period.

Production Schedule for Automated machine A 10:
Cycle: 10 (seconds),
Spare parts Manufactured: 3,360, SCRAP: 75, Unplanned Downtime: 36 minutes

Required

(i)   CALCULATE OEE (Overall Equipment Effectiveness) and comment on it.

(ii)   The management of company has decided to ensure that things are done right the first time and that the defects and waste are eliminated from operations. Thus, they are planning to implement Total Quality Management (TQM) also.

(iii) SUMMARIZE the connection between Total Quality Managemenct (TQM) and Total Productive Maintenance (TPM).

Answer(PYQ MAY.19)

(i)   Calculation of Loss of Time Per Shift   Mins.

Break	45
Clean up Period	10
Unplanned Downtime	36
Total Time Loss Per Shift	91

$$\text{Availability Ratio } per\ shift = \left\{\frac{720\ mins. - 91\ mins.}{720\ mins.}\right\} \times 100\%$$

= **87.36 %**

Actual Production   =   3,360 parts

Standard time   =   10 seconds

Standard Time Required = 3,360 parts ×

10 seconds/ 60 (Ideal Time)   = 560 minutes   mins.

Actual Time Taken   =   720 mins. – 91

=   629 minutes

$$\text{Performance Ratio} = \left\{\frac{560\ mins.}{629\ mins.}\right\} \times 100\%$$

= **89.03%**

$$\text{Quality Ratio} = \left\{\frac{3,360\ parts - 75\ parts}{3,360\ parts}\right\} \times 100\%$$

Thus, **OEE**   =   0.8736 × 0.8903 × 0.9777

=   **76.04%**

Comment

Since OEE of APZ Company Ltd. is lesser than 85 % i.e. World Class Performance Level, Company is advised to improve its each ratio i.e. availability ratio, performance ratio and quality ratio by collecting information related to all downtime and losses on machines, analyzing such information through graphs and charts, making improvement decisions thereon like autonomous maintenance, preventive maintenance, reduction in set up time etc. and implementing the same.

(ii)   The connection between TQM and TPM are summarized below:

- TQM and TPM make company more competitive by reducing costs, improving customer satisfactions and slashing lead times. Involvement of the workers into all phases of TQM and TPM is necessary.
- Both processes need fundamental training and education of participants.
- TPM and TQM take long time to notice sustained tangible benefits.
- Commitment from top managements is necessary for success of implementation.

Question 9

Pacific Coast Company Ltd. manufactures spare parts. It works in two shifts of 9 hours for 6 days in a week. Lunch break is 30 mins and other miscellaneous breaks add up to 15 minutes. The following details are collected for the last 4 weeks by the TPM team for one of their important equipment

Hours for Planned Preventive Maintenance = 15 minutes per shift

For Breakdown Maintenance = 6 hours total

Set up Changes = 14 hours total

Power Failure = 4 hours total

Standard Cycle Time per piece = 3 minutes

No of Parts Produced per shift = 140

Parts Accepted per shift = 131

Required (STUDY MATERIAL)

CALCULATE 'OEE'.

ANSWER:

Calculation of Shifts

Days *per week* …(A)	6
Shifts *per week* …(B)	2
Total Working Shifts *per week* …(C = A × B)	12
Total Weeks …(D)	4
Total Shifts …(E = C × D)	48

Calculation of Un-Planned Downtime

Breakdown Maintenance (in mins)	360
Set up Changes (in mins)	840
Power Failure (in mins)	240
Total …(A)	1,440
Loss of Minutes *per shift* …(A/ 48)	30

Calculation of Planned Production Time Mins.

Total time (9 hrs. × 60 mins.)	540
Less: Planned downtime	
Lunch break	30
Miscellaneous breaks	15
Preventive maintenance	15
Planned Production Time	480

$$\text{Availability Ratio} = \left\{\frac{480 \text{ mins. - } 30 \text{ mins.}}{480 \text{ mins.}}\right\} \times 100$$

$$= 93.75\%$$

Actual Production	=	140 units *per shift*
Standard time	=	3 minutes
Standard Time Required	=	140 units × 3 minutes
	=	420 minutes
Actual Time Taken	=	480 mins. – 30 mins.
	=	450 minutes

$$\text{Performance Ratio} = \left\{\frac{420 \text{ mins.}}{450 \text{ mins.}}\right\} \times 100$$

$$= 93.33\%$$

$$\text{Quality Ratio} = \left\{\frac{131 \text{ parts}}{140 \text{ parts}}\right\} \times 100$$

$$= 93.57\%$$

$$\text{Thus, } \textbf{OEE} = 0.9375 \times 0.9333 \times 0.9357 = 81.87\%$$

Section B – Case Scenarios & Case Studies

Case Scenarios

Question 1

M. India Ltd. (MIL) is an automobile manufacturer in India and a subsidiary of Japanese automobile and motorcycle manufacturer Leon. It manufactures and sells a complete range of cars from the entry level to the hatchback to sedans and has a present market share of 22% of the Indian passenger car markets. MIL uses a system of standard costing to set its budgets. Budgets are set semi-annually by the Finance department after the approval of the Board of Directors at MIL. The Finance department prepares variance reports each month for review in the Board of Directors meeting, where actual performance is compared with the budgeted figures. Mr. Suzuki, group CEO of the Leon is of the opinion that Kaizen costing method should be implemented as a system of planning and control in the MIL.

Required

RECOMMEND key changes vital to MIL's planning and control system to support the adoption of 'Kaizen Costing Concepts'. **(Study Material)**

Answer

Kaizen Costing emphasizes on small but continuous improvement. Targets once set at the beginning of the year or activities are updated continuously to reflect the improvement that has already been achieved and that are yet to be achieved.

The suggestive changes which are required to be adopted Kaizen Costing concepts in MIL are as follows:

Standard Cost Control System to Cost Reduction System: Traditionally Standard Costing system assumes stability in the current manufacturing process and standards are set keeping the normal manufacturing process into account thus the whole effort is on to meet performance cost standard.

On the other hand Kaizen Costing believes in continuous improvements in manufacturing processes and hence, the goal is to achieve cost reduction target. The first change required is the standard setting methodology i.e. from earlier Cost Control System to Cost Reduction System.

Reduction in the periodicity of setting Standards and Variance Analysis: Under the existing planning and control system followed by the MIL, standards are set semi-annually and based on these standards monthly variance reports are generated for analysis. But under Kaizen Costing system cost reduction targets are set for small periods say for a week   or a   month. So the period covered under a standard should be reduced from semi-annually to monthly and the current practice of generating variance reports may be continued or may be reduced to a week.

Participation of Executives or Workers in standard setting: Under the Kaizen Costing system participation of workers or executives who are actually involved in the manufacturing process are highly appreciated while setting standards. So the current system of setting budgets and standards by the Finance department with the mere consent of Board of Directors required to be changed.

Question 2

Y & E Chartered Accountants offers a wide range of specialized, multi-disciplinary professional services that meet the immediate as well as the long-term business needs of clients. One of partner 'E' was upset with office documentation. 'E' argued that a document management solution is needed to maximize efficiency within the firm. The senior partner 'Y' has recently attended a seminar on lean system and heard the '5S'. He said that old files hide the key files from the eye and forces staff to ask which to use. Accordingly, he desires to implement '5S'.'

Required

ADVISE on implementation of '5S' in Y & E. (Study Material)

Answer

Office processes often have huge amounts of paperwork and this not only makes processes slower but also allows errors to be introduced. 5S is a method of both cleaning out the working area and maintaining the cleanliness to improve process quality. The 5S process is based on:

Sort (Seiri

This is sorting and removal of unnecessary files, papers, books and documents in the work area. Sorting is designed to make the work area neat, organized and arranged so that relevant items can be found easily. If an item is not relevant for the work, then it should not be in the work area.

Set in Order (Seiton)

Set in order means systematic arrangement of things i.e. arrange all necessary items into most efficient and accessible arrangement so that they can be easily be identified for use. It is advisable to have proper indexing of files and proper documentation i.e. proper index should be made and pasted on each file about

its contents and in that pattern of contents, documents should be kept inside the files so that specific document can easily be traced and withdrawn on time. Even inside cupboard, paper of indexing about files with its name should be pasted so that specific file can easily be traced. Same can be done w.r.t. folders in computer, right file should be saved in right folder with identifiable name so that anyone can easily find any file. Frequent use items should be close by and infrequent use items can be further away in a central area. All storage areas should be clearly labelled to allow items to be put in the correct place, e.g. where did I leave the office stamp again?

Shine (Seiso)

After sorting and simplifying, it is necessary to keep the work area clean and safe. Shining is also an inspection process for the area, i.e. is everything in good condition. It is desirable to involve employees for 15-20 minutes each day to clean the work area so that they can have the habit of cleanness. In the same way, unimportant files either in desktop or any driver should be permanently deleted.

Standardize (Seiketsu)

A clean and tidy work area allows the process to be standardized and examined for quality or process improvements. Best practices are documented and rolled out across the work area, standards and process measures are established and displayed in the work area.

For example, red file can be standardized for very important files (can be required anytime), green file for important files and yellow file for unimportant files.

Sustain (Shitsuke)

It means to maintain discipline, this can only be achieved by auditing work areas and processes to make sure that the 5S standards are maintained. It is worthwhile to apply 5S standards continuously i.e. daily basis and check for any upgradation if needed, so that firm can have good management in terms of documentation, cleanness, time saving of partners as well as clients.

Overall, 5S in offices streamlines the work (low to reduce errors as well as improving process times) and employee satisfaction.

Question 3

Gold-Star Limited deals in manufacturing of traditional cycles. Recently apart from manufacturing old style cycles, GSL starts assembly of electronic cycles.

Since GSL didn't expand the factory area, post starting assembly of electronic cycles; hence production floor largely remains over-occupied with all sort of material, jigs, and tools; some of them are frequently useful, some are often and other are less often; even some are quite rare.

Workers usually complaint that all categories of jigs and tools are not available, tools which are available also of those belongs to those product design which are outdated (majority of such product are not further manufactured by GSL) accessible. Although floor manager is of opinion instead saying tools are not available, it can be said they are not accessible; because workers pick the tool from tool kit or tool board; but not place it back after use; hence it become difficult to locate such tool later or identify worker; with whom these may available.

On name of maintenance department, there are only two staff members, who are responsible for ensuring that every machine or equipment must be in running order and effective. Due to shortage of staff in maintenance department, requests for repairs of plant or machines are not handled

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within reasonable time frame and same will result in sharp deterioration of utility/ effectiveness of such plant or machine. Even in some of circumstances, replacements become/ remain only alternative.

GSL has reasonable standardise operating procedure for manufacturing of cycles business, but scenario is worse in case of assembly of electronic cycles. Since GSL is recently entered into assembly of electronic cycles, hence KPIs are not established for all factors which are part of assembly process including critical success factors.

At GSL, the attrition rate at senior management positions is quite high and no formal hierarchy tree is established, which result in drastic shifts in workplace culture (due to frequently changing role & responsibility).

Regarding safety of man and material, GSL is on front foot, taking all reasonable care; which is essential for purpose of eliminating any possibility of workplace accident. But assembly line of electronic cycles witness an incident recently, where one of model "x- 2" during assembly caught fire because wires set of "x-2" come into exposure of sparking from the light point near to such assembly line. Such fire causes burn of some of other material too, which are lying near to such assembly line.

Post such incident, CEO call for meeting with all the top tier executives, majorly including production and operation manager, safety staff, maintenance staff and store manager apart from management accountant. During the meeting while production and operation manager highlights some of problem areas, management accountant quoted 5S as solutions to problems faced by GSL.

CEO asked Management Accountant to be ready with report and presentation on 5S, which can highlight the operational aspect of 5S.

Required

You are deputy to management accountant and asked by him to prepare a case, in form of report; in favour of implementing/ APPLYING 5S at GSL and EXPLAINING the expected benefit from implementation of 5S. (RTP MAY.20)

Answer

Report

Addressed to; Office of CEO, Gold Star Limited (GSL).

Dated – 07th Jan 2020

Report on operational aspect of 5S and expected advantage

5S represent scientific way of workplace management so that work can be performed effectively, efficiently, and safely. 5S was come into practice as part of Toyota Production System in early of mid- 20th century. 5S is usually considered as essential component of lean manufacturing, and foundation of eight pillars of TPM. The 5S refer to five Japanese words- seiri (sort), seiton (set in order), seiso (shine), seiketsu (standardize), and shitsuke (sustain). They define a system for workplace organization and standardization. Sort means to separate needed and unneeded materials and to remove latter. Set in Order means to arrange materials and equipment so that they are easy to find and use. Shine means to conduct a clean-up campaign. Standardize means to formalize procedures and practices to ensure that all steps are performed correctly.

Finally, sustain means to form habit of always following first four Ss through training, communication etc.

Note - Later 6th S was also introduced and i.e. safety.

S1 - Sorting

In order to over-come the problem of 'idle laying over material' all across production floor area, sorting of material is need to be done in following categories:

- Not needed at all – to be moved to red tag area.
- Needed but not now – need to be moved to store with yellow tag.

- Needed but not here – to be moved to red tag area.
- Needed but not so much quantity.

For purpose of doing sorting GSL need to be answered following questions:

- What is required?
- How much required?
- When it is required?
- Where it is required?

Sorted material depending upon category can be **separated** and made ready for movement/ shift, in order to segregate the sorted material; visual aid technique can be used by attaching coloured tags to each category of material (called visual sorting). Following two categories of tag can be used:

Red tag – A card containing detailed information of 'unwanted things' with a given time limit for further action to be taken.

Yellow tag – A card containing detailed information of 'needed things', but not now with a given time limit for further action to be taken – usually kept in store.

Sorting can help GSL to identify:

a) Obsolete material; parts (jigs/tooling) not required as the design has become obsolete.

b) Defective material; part can't be used as it is.

c) Scrap material.

d) Material which not in place – kept at wrong place.

e) Unnecessary/extra/not useful material.

Sorting can also help GSL in reduction of material lying vacant on production floor, by segregating them into different categories and ensure that rarely used material either removed or tagged in red tape area. If material were sorted than 'loss of material' which was lying vacant near to assembly line during fire incident could be saved.

S2 - Set in order

Systemic arrangement by ensuring 'place for everything and everything in its place'. Purpose is to save search time and eliminate motion waste, through <u>visual management</u>; with search-free and count

free arrangement.

Colour can be best visual aid – RYGB

R – Red – Critical
Y – Yellow – Reorder
G – Green – Design
B – Blue – Excess

Note – Mapping of RYGB to feature is purely illustrative.

In order to implement **systematic arrangement**, GSL need to consider and answer;

⬜ Analyse status.

⬜ Decide – Which things will belong where?

⬜ Decide – How they should be put away?

⬜ Get everybody to follow rules through indexing, labelling etc.

Expected benefits of set in order to GSL

a) Faster retrieval of things results in elimination of search time.

b) Opportunity to correct the abnormalities faster as visibility improve by system itself.

c) Space saving by systematic arrangement.

d) Efficiency of work improves as things are available when they are actually needed. Thus, S can solve the specifically problem of non-accessibility of tools.

S3 – Shine

Ensure there must be cleanliness 'in and of' everything. Obviously, if there less number of items, then there is less to clean.

⬜ Cleaning should be with meaning.

⬜ Cleaning is inspection (from all aspects – front, rear, left right, top and bottom).

Shine will help GSL to keep things in order with regular **cleaning** and **upkeep**, so that maintenance become 'preventive function' rather corrective and any incident, likewise fire occurrence on assembly-line; must be avoided. This will ensure larger utility out of Machine and Plants which will increase replacement cycle and save investment by lowering down maintenance and replacement cost.

S4 – Standardization

Establishing the **'standards'** and make **'operating procedure'** to create consistency and ensure that all steps are performed correctly. There are;

⬜ Fix responsibilities for implementing & evaluating system.

⬜ Integrate these responsibilities into routine work.

⬜ Check how well the system is working and sustaining itself.

In order to ensure TPM all 5S are essential, but standardisation is key, GSL is facing large set of problem in assembly of electronic cycles and reason being absence of SOPs. Hence, by establishing the standardised process GSL can identify Critical Success Factors (CSFs) and benchmark the Key

Performance Indicator (KPIs) against each CSFs.

S5 – Sustain

In order to sustain with the established standard, it is required to do;
- Daily monitoring
- Improving ownership by allocating areas
- Using 'red tag campaign'
- Communicating visually through fixed point photography
- Structured communication
- Continuous training of all employees
- Periodic audits at all level
- Motivating staff through recognition

Since 5S is not a onetime exercise, it is continuous process, hence, it is essential to **sustain the practices followed** during earlier 5Ss. GSL witness the high attrition rate at top management level, hence, it is important that GSL must inculcate practice of 5S in the system and work culture and sustain them on continuous basis, irrespective of attrition.

Sixth S is 'safety' which was added later on, in order to ensure safety while performing all the remaining 5S.

Further details can be tabled on requisition basis.

Closure of Report Management Accountant
(For Management Accounting Division) Gold Star Limited

Question 4

Derby Grey is leading manufacturer of leather luggage bags (up to 62") for the style - conscious people around the globe. It is made up of two independent divisions in New Delhi. The division 'Mx' performs all manufacturing and packaging operations. All sales are made through the division 'Rx' which has 11 retail stores in New Delhi, as well as through Derby Grey's own well - developed website. Derby Grey has also retail operations in Dubai, Kuala Lumpur, Bangkok as well as in Singapore. These overseas businesses operate as independent subsidiaries within the Division 'Rx'.

Derby Grey revolutionized the industry by offering cheap but stylish luggage bags. Derby Grey is able to keep its prices low by offering a very basic level of service. Luggage Bags are sold in boxes for customers to assemble themselves and all deliveries are made through third party distributor 'Çosta Cruise'.

Dr. Philips (Managing Partner) is bothered about increasing sales returns and massive complaints about product purchased from Derby Grey on social media. With this concern, Dr. Philips has appointed you as performance management expert to help the firm to execute six sigma technique to reduce number of sales returns and to evaluate firm's existing performance.

Dr. Philips has heard that Six Sigma analysis involves large quantities of data. Dr. Philips stated–
"I'm not confident on our current IT systems. I doubt whether system would be able to identify the required data related to cutting, preparation, closing, lasting etc. These manufacturing sub divisions may be the root causes of the problem. Further, quarterly compiled sales return data has not enough detail. We may need to do more analysis on customer satisfaction and manufacturing quality."
You have been given access to feedback given by customers for returning goods to measure existing

performance in this area (refer below):

Difficult to assemble or pieces missing (47%) – Bags were not as demanded (24%) – Poor Quality (19%) – Arrived damaged (9%) – Arrived late (1%)

Required

ADVISE Managing Partner on Six Sigma implementation to reduce number of sales return using DMAIC method. (Study Material)

Answer

DMAIC is a methodology of Six Sigma used to improve existing business process. It is advisable to Managing Partner to execute following phases of DMAIC–

Define the process

This phase emphases exactly what customer's requirements are? In this case focus is precisely on why bags are returned. The objective of the process needs to be clear as in this case to reduce the number of customer returns. Customers expect certain minimum requirements from the manufacturing and packaging process, for example, that the bags are properly packed in boxes. They also expect the goods be delivered undamaged within a reasonable time and delivered at the time and date when committed. Further, customer's perceptions of quality should coincide with the price paid, though different customers may have different expectations.

Measure the existing process

This phase measure the process to determine existing performance. In this case, the sales returns figures do not show complete picture as to why customers return bags, which of the class belong to 'poor packing', which one belong to 'defective item', which one belong to 'activities of other sub divisions' etc. The ambiguity of the data and classification of definitions will need to be addressed as to enable the process to be measured effectively.

Analyse

This phase detects the root cause of the problems. Possible root cause of sales return are as follows:

- Difficult to assemble or pieces missing (47%) – Returns could be because the bags were not manufactured or packed properly in the 'Mx' division, but could also be due to poor design, customers losing pieces or simply being unable to assemble   bag.
- Bags were not as demanded and of poor quality (43%) – Returns could be due to defective manufacture or if the customer had merely changed their minds and no longer required the bag. In 'bags were not as demanded', the identification of 'defective items' are too vast.
- Arrived damaged (9%) – It may be that customers wrongly classified defective bags as damaged. Though bags may become damaged by the 'Çosta Cruise', only a small number of returns relate directly to them.
- Arrived late (1%) – Reasons of arrived late could be either 'Costa Cruise' could not make delivery on time or 'Mx' division could not complete order on time and this causes only 1% of returns, is relatively insignificant.

Further, information could be analysed, like country wise sales returns, product wise sale, or with more clear definition of 'defective items' from customer's perspective . By doing so, firm may easily get information related to areas of the business where sales returns are high and hence be able to focus on.

Improve

In this phase, recommendations are made to minimize or eliminate the root cause of the problem and then those recommendations are implemented to improve the process in a systematic manner. Derby Grey is required to consider aspects of production or packaging which could be improved, for example, timely repair and maintenance of equipment or training to existing staff etc. Further, availability of resources and likely costs of making the improvements need to be carefully considered.

Control

Here control means maintaining the improved performance and future performance. Derby Grey would be required to monitor the performance ongoing basis. If sales return reach above particular level, it should be reported to responsible person and he should act immediately.

In addition, Derby Grey need to redesign IT system in such a way so that it can provide required detail. Since this is continuous monitoring so it may also require revisiting of some phases in DMAIC.

Question 5

ANI is a government-owned bank. The Bank has over 2,500 branches in country 'A' spread over all states/ union territories including specialized branches. These branches are controlled through 27 Zonal Offices and 4 NBG Offices. As a government owned bank it has usually been the first preference for customers while choosing a bank. In the last six years, the Government has permitted a number of foreign banks to operate within the country in order to solve the problem of foreign exchange shortage and open up foreign trade as an instrument to promote economic development. These foreign banks offer diverse range of services such as direct access to executive management, a single point of contact to coordinate all banking needs, appointment banking to save time, free online banking services 24/7, free unlimited ATM access etc. In contrast, ANI has very elementary information systems, covering only for internal transaction handling and accounting activities. Customers have to visit banks to carry out transactions like- checking bank balance, cash deposit and withdrawals, transferring money from one account to another in operational hours. Often customers complain about the amount of time as the employees and clerical staff of the bank can attend only few customers at a time. Customer service evaluation has never been undertaken by ANI. Other processes, new account applications, are complex, requiring completion of many documents formalities. Board of Directors were worried from growing popularity of new style banks. The Board of Directors of ANI has recently held meeting to discuss the shortfalls in its current services and the need to re- engineer the ANI's business processes.

Required

ADVISE how Business Process Reengineering (BPR) can be used to improve ANI's current processes. (Study Material) (MTP MARCH.18)

Answer

BPR is the fundamental rethinking and radical redesign of business processes to achieve dramatic improvement in critical contemporary measures of performance, such as cost, quality, service, and speed. In other words, BPR is concerned with the result of the process (i.e., with those activities that add value to

the process). To implement BPR, firstly, each business process of ANI needs to be divided into a series of processes. Then each business process requires to be documented and analysed to find out whether it is essential, whether it provides support to other valuable processes and whether it is adding value. Any process which does not add value or does not provide essential support to the value adding activities must be removed. Those processes that remain require to be re-engineered/re-structured so that can be as efficient as possible. For ANI, new technology should be introduced to improve these processes. However, ANI must ensure that the statutory compliances regarding these processes are not undermined.

ANI is facing a hyper-competitive marketplace where customers expect a superior experience. BPR activities would help ANI in understanding those processes which ANI's customers value the most and remove those that are not valued. Foreign banks are offering diverse range of services such as direct access to executive management, a single point of contact to coordinate
all banking needs, appointment banking to save time, free online banking services 24/7, free unlimited ATM access etc. Clearly these are valuable business processes valued by the customer. ANI should incorporate all these facilities in their banking processes to enhance customer satisfaction and service level.

Opening of new accounts in ANI is complex processes since it requires multiple forms to be complied with. Through BPR, ANI would analyse the whole process and identify the need for only one form that contain all of the necessary customer information. Further, it is also possible to initiate opening of new account through the development of an online application form on ANI's website. Online entry would remove the possibility of forms being lost or incorrect, again enhancing customer satisfaction since customers need not to visit ANI's branch to open account. There should also be online processing authentications/ validations as to ensure that data fields are correctly filled by customers that would result in error reduction. This would also remove unnecessary staff activities in checking and re- processing forms.

It is likely that BPR may increase costs in short-term as investment in technology. However, this would also reduce substantial levels of manual activities and processes thereby providing speedy services to customers. In long term, this would result in high levels of efficiency, profitability and better levels of customer satisfaction and retention.

Question 6 History

ANA is one of Country 'I''s top footwear companies and other equipment. Since its foundation in 1988, ANA has been one of the all-inclusive footwear brand that is committed to nurturing the youth across the world through sports to contribute to society. Over more than three decades, the company inherits its values and provides own products while capturing the changes in the social environment. It's state-of-the-art production facilities are located strategically across the Country 'I' and produces all kinds of footwear. ANA is best known for its high ethical standards towards its workers, suppliers and the environment and voluntarily publish CSR report every year.

Organizational Structure and Footwear Market

ANA is organized into conventional functional departments such as procurement on order basis, sales, and finance, most of which have their non-reliable excel sheet-based systems for planning and reporting. Consequently, it often fails to generate accurate, timely and consistent information to monitor its own performance, thus, company faces failures in

achieving the performance and delivery targets set by its retail customers.

In Country 'I', footwear market is competitive and seasonal. Retailers, who are ANA's customers, for footwear, they have two main demands, they want –

(i)   footwear at lower prices to pass it on to consumers.
(ii)   suppliers to meet performance and delivery targets relating to lead times and quality.

In order to comply with the retailer's demands, ANA's competitors have discontinued all their own manufacturing facilities and outsourced all production to suppliers, who have much larger production lines and lower costs. To reduce the shipment cost over long distances, competitors have invested in advanced procurement software to consolidate orders so that each 40-foot shipping container gets fully loaded. Purchase invoice processing is also automated via the integration of information systems into the supplier 's software.

Proposal of Outsourcing

In order to mitigate costs, it has been proposed to outsource the manufacture of footwear, to a Chinese Supplier 3,750 km away. A comparison of the average cost of manufacturing and the cost of outsourcing footwear is given below–

Particulars	Manufacturing	Outsourcing
Average manufacturing cost per pair	BND 625	---
Purchase cost per pair	---	CNY 28

Notes-

1.   Country 'I''s home currency is the BND.

2.   Exchange Rate 1CNY = 18 BND.

3.   In addition to the purchase cost from the supplier, ANA will be subject to pay for shipping costs at the rate of BND 40,000 for each large, standard sized shipping container, regardless of the number of units in it. Each container contains 5,000 pairs when fully loaded.

4.   Custom tariffs are expected to change soon, footwear imports into ANI's home country might be subject to 10% basic custom duty (plus 1% social welfare surcharge on duty) on the assessable value of imports excluding shipping costs.

Therefore, to implement the proposal, restructuring of functional departments into multi-disciplinary teams are needed to serve major buyer accounts. Each team is required to perform all activities, related to the buyer account management from order taking (sales order) to procurement to arranging shipping and after sales services. Team members dealing with buyers will work in ANA's corporate office, while those like QC etc. managing quality and supplier audits, will work at the manufacturing site of Chinese Supplier. Teams will be given greater independence to selling prices to reflect market conditions or setting a price based on the value of the product in the perception of the customer. Many support staff will work as helper roles, or be offered new jobs opportunities overseas after the restructuring.

Expert Advise

Prof. WD, Performance Management Consultant has advised ANA that the proposal has features of re-engineered processes and can be defined as business process re-engineering (BPR). Prof. advised, for evaluating the proposal, ANA should consider software development for full front-end order entry, purchasing, and inventory management solution which may be required along with ethical aspect of the proposed changes.

Required

(i)   ADVISE on information system which would be required for the reengineering.

(ii)   ASSESS the likely impact of reengineering on the ANA's high ethical standards and accordingly on business performance. EVALUATE how the BPR proposal can improve ANA's performance in relation to retail customers. (Study Material) (MTP APRIL.19)

Answer

(i)   Advise on Information System

Combining several jobs into one, permitting workers to make more decision themselves, defining different versions of processes for simple cases vs complex ones, minimizing situations when one person check someone else's work, and reorganizing jobs to give individuals more understanding and more responsibility are characteristics of re- engineered processes.

In ANA, outlays can be saved by rearranging staff into multidisciplinary teams, for example, reducing number of excess staff at different stages – cutting, preparation, finish etc. These savings can be utilized in additional costs such as investment in new information systems. Hammer and Champy stress the use of information technology as a catalyst for major changes. BPR organizes work around customer processes rather than functional hierarchies.

Presently, ANA's departments have their own excel sheet-based systems for planning and reporting which is unreliable and inconsistent. They are inadequate to provide the accurate, timely and consistent data which ANA needs to meet its own performance and delivery targets. There must a shared database that should be accessible by all parts of the functional teams. This should have real time updation, so that employees in different time zones can use updated data. The database should include financial data and non- financial data, like cost information, data related to lead times and quality. Information systems must be featured with all required reports like performance report, budget report etc.

In addition, ANA is required to invest in special system as advised by Prof. WD for full front-end order entry, purchasing, and inventory management solution to minimize shipping costs by ensuring that the shipping containers get fully loaded and to integrate with supplier's information systems to automate purchase invoicing.

Overall, ANA must analyze that whether the benefits due to information technology are worthy.

(ii)   Assessment of Likely Impact of Re-engineering on Ethical Standards Workers

ANA is famous for its high ethical standards towards workers and staff. Because of
adopting BPR proposal, manufacturing staff are likely to be unemployed. Competitors, have already shutdown their factories, these workers may not be able to find analogous jobs.

Employees who continue in work may become disappointed if they think the application of BPR to all products. This may reduce productivity, increase staff turnover or difficulties in recruiting new staff. In addition, they may also be demotivated if they are appointed in unfamiliar roles, or may not be willing to learn new skills.

Some of staff members may be motivated by the opportunity to perform new types of work, learn new skills or work outside India. This maybe enhance their individual performance.

Suppliers

Any association with non-ethical practices, for example, if the Chinese supplier is indulged in using non-acceptable working practices, could seriously spoil ANA's

reputation for high ethical standards. This could undermine financial performance because customers may not buy its products, or possible investors might refuse from providing capital. Staff members located at the manufacturing site is responsible for supplier audits, which may assist to mitigate this risk.

Environment

ANA should consider the environmental impact of importing goods from long distances. The environmental related credentials of the Chinese Supplier are not known. Since, ANA voluntarily publishes a corporate sustainability report, any distortion in its performance on environmental issues might undermine the financial performance.

(iii) Evaluation of BPR Proposal in relation to Retailer's Demand Lower Prices

In order to sell footwear at lower prices, there is proposal to reduce costs by outsourcing production to supplier. The current average production cost of manufacturing is BND

625.00 per unit. The cost of purchase from an external supplier is BND 512, which is BND 504 (CNY18 × BND28) purchase cost, plus BND 8 (BND 40,000/ 5,000) shipping cost. This 18.08% (113/ 625) saving is a substantial improvement in financial performance, but not a dramatic one. It may be noted that BPR is a methodology that should be applied only when radical or dramatic change is required. Further, exchange rate movements may also slash the cost saving significantly. In the near future, expected changes to international trade tariffs will increase the unit cost to CNY30.83 (CNY28.00 × 110.10%) i.e. 562.94 BND (CNY30.83 x 18 + 8) and reduce the cost saving to just 9.93% (62.06/ 625).

Meeting Performance Targets Lead times

Current lead times for customer orders are not ascertainable. Since the proposed
Chinese Supplier is 3,750 km away, consignment will take several weeks to be imported by sea. This may increase lead times substantially, although may be set off by faster production times in supplier's plant. As ANA's sales are seasonal, retailers may order in advance, decreasing the long lead times. In order to decrease shipping costs, shipping containers must be full, meaning that deliveries must be in larger quantities.

Quality

ANA is already known for manufacturing high quality footwears. The quality of the new supplier's footwear needs to be checked. Any distortion in the quality of footwear will deteriorate its reputation and decrease long-term business performance since only few customers would order. Quality standards checking is more difficult while using outside suppliers, especially at long distance, than manufacturing in ANA's own factory. In BPR, work is done where it makes most sense to do so. In this aspect, having employees responsible for quality checking and supplier audits (working at the manufacturing site, abroad) will assist ANA in sustaining the best supplier relationship management.

Question 7

Pearson Metal and Motor Works (PM^{2}W) deals in manufacturing of the copper wired electronic motor, which is specifically designed. PM^{2}W is thinking to shift from traditional system to JIT system as part of process innovation.

CEO among the other top bosses at PM^{2}W are hopeful that implementation of JIT will not only improve value in value chain for end consumer, but also improve overall manufacturing cycle efficiency. JIT pre-implementation team was formed to evaluate the probabilities, which collects following actual and estimated data about process;

Activity Category	Traditional System (Actual)	JIT System (Estimated)
Inspection	40	30
Storage	80	20
Moving	20	10
Processing	60	40

 # All data in minutes

Further, PM^{2}W decided to practice single piece flow under JIT. PM^{2}W received an order which is due to manufacture and delivered for 10 such motors. Total available production time to produce what customer demands is 480 minutes out of which it normal practice that 30 minutes will be spent in shutdown and cleaning. CEO is also considering JIT purchase apart from JIT production.

Required

(i)   EXPLAIN just in time.

(ii) CALCULATE the 'takt time' and INTERPRET the results.

(iii) ADVISE whether company should shift to JIT. (RTP MAY.20)

Answer

(i)   **Just-in-time (JIT)** is a collection of ideas that streamline a company's production process activities to such an extent that wastage of all kind viz., of time, material and labour systematically driven out of the process with single piece flow after considering takt time.

In JIT, production facility is required to be integrated with vendor system for signal (Kanban) based automatic supply which depends upon demand based consumption. Under JIT system of inventory storage cost is at lowest level due to direct issue of material to production department as and when required and resultantly less/no material lying over in store or production floor.

Prerequisite of JIT system is integration with vendor, if vendor is not integrated properly or less reliable, then situation of stock out can arise and which can result into loss of contribution.

Multitasking by employee is another key feature of JIT, group of employees should be made based upon product instead based upon function. Hence, functional allocations of cost become less appropriate.

Overall, JIT enhance the quality into the product by eliminating the waste and continuous improvement of productivity.

(ii) **Takt Time** is the maximum available time to meet the demands of the customer; this will help to decide the speed of/ at manufacturing facility.

Takt time is the average time between the start of production of one unit and the start of production of the next unit, when these production starts are set to match the rate of customer demand.

Takt Time = $\dfrac{\text{Available Production Time}}{\text{Total Quality Required}}$

Here, Available Production Time is 'total available time for production' – 'planned

downtime i.e. spent in shutdown and cleaning' i.e. 450 minutes = 480 minutes – 30 minutes.

Total Quantity Required is 10 units

$$\text{Takt Time} = \frac{450 \text{minutes}}{10 \text{units}}$$

$$= 45 \text{ Minutes}$$

Note - Heijunka can be applied in order to reduce variation between 'Takt times' over the production.

Interpretation

Customer's demand is 10 units, to calculate the takt time, divide the available production time (in minutes) by the total quantity required. The takt time would be 45 minutes. This means that process must be set up to produce one unit for every 45 minutes throughout the time available. As order volume increases or decreases, takt time may be adjusted so that production and demand are synchronized. **Advise on Shifting to JIT**

To evaluate how much of the old cycle time was spent in inventory, we need to know how organizations assess the efficiency of their **manufacturing processes**. One commonly used measure is process cycle efficiency and to calculate the same every process is breakdown into combination of activities such as value added activities, non-value added activities and non-value added activities but strategic activities. In order to generate highest value to customer, only value added activities are included in process. But those non-value added activities, which are strategic in nature, also need to be part of process. Therefore, it may be possible that entire process is not efficient.

To measure efficiency of process, managers keep track of the relation between 'times taken by value added activities' in comparison 'total cycle time'. Such relation/ratio is processing cycle efficiency.

Process Cycle Efficiency = $\dfrac{\text{Value Added Time}}{\text{Cycle Time}}$

Processing time is considered as value added time; whereas time spend on inspection, storage and moving is non-value added time and included in cycle time. The higher the percentage, less the time (and costs) needs to be spent on non- value added activities such as moving and storing etc.

Computation of Processing Cycle Efficiency

Sr. No.	Activity Category	Traditional System (Actual)	JIT System (Estimated)
A.	Inspection	40	30
B.	Storage	80	20
C.	Moving	20	10
D.	Processing	60	40
E.	Value Added Time …(D)	60	40
F.	Cycle Time …(A)+(B)+(C)+(D)	200	100
G.	Process Cycle Efficiency (E)/ (F)×100	30%	40%

Of the 200 minutes required for manufacturing cycle under PM^{2}W's traditional system, only 60 minutes were spent on actual processing. The other 140 minutes were spent on non- value added activities, such as inspection, storage, and moving. The process cycle efficiency formula shows that processing time equaled to 30% of total cycle time. The cycle time is reduced substantially in the JIT system from 200 minutes to 100 minutes. In addition to this, the amount of time that used up in inventory i.e. non-value-added activities is also reduced. Therefore, process cycle efficiency has been increased from 30% to 40%. This significant improvement in efficiency over the previous system comes from the implementation of JIT system. Therefore, it is advantageous to shift to JIT system.

Case Studies

Question 8

Zen Limited is a leading mobile manufacturing company and sells its mobile phone across the world. In a fast-changing technological environment, Zen has been able to maintain its leadership in smartphones segment for third year in a row now. Though the revenues have grown year on year, the costs have increased at a higher rate in the mobile phone industry as a whole.

"We have been leaders in revenue. We must lead in cost reduction front as well. I believe we can achieve this with improvements overtime, however minor they might be!"

– This is what the CEO of Zen has told its directors in a recently concluded board meeting.

The net profit margins of the company has fallen from 10% in 2018 to 8% in 2019 owing to rise in raw material & repair cost. Another significant rise in the cost was on account of repairs of mobiles which are under warranty. There was an increase in these repair costs by ₹1.5 crores which represents 1% of the total turnover of the company.

The process of repairs/ replacement of under warranty product is outlined below:
- The company own 200 repair centres in various cities in India.
- A customer whose phone is under warranty and requires replacement/ repair visits any of the 200 centres to deposit the faulty mobile phone.
- The technician at service centres examines the phone and the service centre sends the phone to a centralised repair centre at Mumbai. The phones are sent to Mumbai even for minor repairs which can be done locally if requisite infrastructure is provided to the service centres.
- The phones are sent in batches. Each service centre creates 3-4 batches of mobile phones in a day. (A recent study showed that the batches could be combined into a single batch per day)
- The phones are repaired in Mumbai's centralised centres and sent back to the respective service centres for handing them back to the customer. The phones which are repaired are sent in separate batches and those which are replaced are sent in separate batches.

Required

You are working as a Finance Manager in Zen. The finance director has approached you to understand whether the minor improvement would be useful given the size of the company. The Finance Director has asked you to examine the process of warranty repairs and replacement and submit a report covering the following aspects:

(i) What is the CEO referring to when he says "minor improvements"? EXPLAIN.

(ii) LIST the benefits of such minor improvements.

(iii) APPLY the above process to the warranty claim process and explain how the process can be improved.

(iv) Any other matter which you consider relevant (STUDY MATERIAL)

Answer

Issue

Zen limited is a leader in manufacturing of mobiles and is concerned about increasing costs. The increase in warranty related costs has been significant in the current year as compared to previous year. This has reduced the net profit of the company by 1% of sales.

Applicability of Kaizen Costing

"Kaizen" is a Japanese word which means "Change for Better". In business parlance, Kaizen is used to refer to small and continuous improvement across all functions, processes and employees. Kaizen costing is a cost reduction system. Yashihuro Moden defines Kaizen Costing as "the maintenance of present cost levels for products currently being manufactured via systematic efforts to achieve the desired cost level.

Toyota Production System is considered as a pioneer in Kaizen Costing. Though the model was used for eliminating wastage from production at factory initially, the concept can be applied in any of the processes in a business. Since Kaizen is a continuous improvement process, a radical change or disruptive innovation is not expected in Kaizen costing.

The following are the key features of Kaizen -

- Kaizen processes focus on eliminating waste in the systems and processes of an organisation, improving productivity and achieving sustained continual improvement.
- Application of small, incremental changes routinely applied and sustained over a long period can lead to significant improvements.
- It aims to involve workers from multiple functions and levels in the organisation.
- A value chain analysis helps to quickly identify opportunities to eliminate wastage
- Although incremental changes can often be too small to be seen, Kaizen can be very effective in the long run. An airline which identified that 75% of its flyers would leave the olive from salad, the airline decided to remove it from its servings. This saved the airline $ 40,000 per year. Another example is where an airline stopped printing its logo in the rubbish bags as it did not add value saved over $ 300,000 per year.

The CEO is referring to Kaizen costing when he mentions minor improvements to save costs over time. Kaizen costing takes into consideration various costs such as costs of supply chain, manufacturing costs, marketing, sales, distribution costs etc.

Benefits of Kaizen Costing

- Kaizen reduces waste in areas such as employees waiting time, transportation, excess inventory etc., which leads to improved efficiency in overall business processes and systems.
- A company applying Kaizen philosophy can achieve cost reduction through small incremental improvements and cost savings.
- Kaizen looks at functions and processes at all levels of organisation and requires participation of all employees and massive as well as open communication system. This participative approach improves teamwork across the organisation.

- Product improvement using Kaizen is likely to result in less number of defective products leading to customer satisfaction and reduction in warranty related costs.
- The reduction in wastage, improved efficiency and cost reduction improves the overall profitability of the company.

Implementation of Kaizen in the Current Case

The implementation of Kaizen as a cost reduction techniques can take several forms. The key question to ask for implementation is - "Can we eliminate waste?". The waste can take several forms like -

- Unnecessary movement of material and men - Travelling for meeting in cases where a video conferencing could help.
- Unwanted part in a product which if removed is not likely to impact the performance of the product. (Nano sim card has reduced a significant portion of use fibre boards as compared to the traditional sim cards.)
- Defects which involve extra cost in terms of reworks.
- Waiting time - A simple example could be locating for files in your computer which has not be arranged properly. This leads to waste of time.

    The above is just an indicative list where improvements can be made. However, an important point to note is that reduction of waste should not be done by compromising the quality of product. Apple launched iPhone 5c as a budget phone by using plastic material instead of Aluminium. The market did not like the product as it was considered to be an inferior product as compared to iPhone 5s.

Another way of looking at Kaizen is asking following questions -

- Can we eliminate functions from the production process without compromising the quality and utility of end products? - Removing unnecessary movements of material and men.
- Can we eliminate some durability? - Use of unbreakable plastic for producing disposable glasses would be waste of resources
- Can we minimise design? - e.g. use of Nano Sims.
- Can we substitute parts of the product being manufactured?
- Can we take supplier's assistance to get better quality parts?
- Is there a better way? - This is a question which must be asked continuously to ensure that the improvement is not a one-time exercise.

    (The above questions also form a part of the Value Engineering Process)

    ### Application of Kaizen at Zen Limited

    The current warranty claim process at Zen involves movement of mobile phones from various service centers across the country to a centralised centre in Mumbai. The possible improvements in the claim process is explained below -

- The company needs to analyse whether it requires to own 200 centers by itself across the country. The company can evaluate closing down centers with less customer footfalls or outsource the ones which are not located at the strategic location. This would save some cost to the company.
- The current process requires each service centre to send the faulty mobile phones back to Mumbai for repair or replacement. This is done even in case of minor repairs which can be handled locally. The company can provide necessary infrastructure to the service centres to carry out

minor repairs locally. This would save logistics cost of sending the phones to Mumbai and back to service centre. The company should analyse the past data to understand the proportion of phones which require minor repair. Repairing the phones locally would also reduce the turnaround time and the customer will get back the phone faster.

- The current process is to send phones in 3-4 batches in a day. This effectively means creating 3-4 consignments, documents for dispatches and incurring extra costs for transportation. Combining the phones in a single batch would reduce the cost of transportation and administrative cost as well.

- The phones can be sent back from Mumbai in single batch instead of creating multiple batches to save transportation costs.

  The above improvements must be revisited continuously to derive required benefit from Kaizen process.

  Apart from eliminating waste in the warranty claim process, the company must also identify root causes of increase in warranty claims in the current year as compared to previous year. Every phone being sent back for repair/replacement involves avoidable cost. The company must also revisit the manufacturing process and quality control processes to eliminate wastage in production process and improve quality.

- Zen can consider producing better quality mobiles at the manufacturing process to reduce the warranty claims.

- The pattern of warranty claim must be analysed to understand whether there is certain common problem related to repair claims. If the issue has some relation with parts used in mobile, the issue can be taken up with supplier of such parts.

Question 9

Super Refineries Limited is a leading oil refining company operating in India. The company has three plants - one each situated in North, South and West. The company has a refining capacity of 30 million barrels. The company currently enjoys a 40% share of the domestic market. The plants run on all 365 days in a year and operate at 100% of the capacity. The company currently does not have any maintenance schedule in place for its plant and machinery. Any repair requirement of plant and machinery is carried out on ad- hoc basis.

The company has implemented Total Quality Management (TQM) to ensure that the company rolls out top quality products. The company did not receive any complaints from its customers regarding poor quality of products or products not meeting the specifications. The entire production team is quite excited with superior quality of products.

However, in the last three months, about 30% of the dispatches to customers were delayed. This comes at a time when the entire plant had to be shut for maintenance activity due to breakdown in the machineries for a week. The company also witnessed 20% rejection of the final products. The customers claimed that the products did not meet the specification agreed by them with the company. The Director of Refineries is worried about the worsening situation of production at plants. Another concern for the director is the increase in number of accidents and loss of productive time due to this.

The chairman of the company convened an urgent meeting of the Board of Directors to understand the impact and reasons of the situation at production plants. A key issue highlighted by plant supervisors is that the scheduled maintenance activity for plants was never carried out. The underlying assumption for not carrying out such maintenance activity was - "Since the plant is running smoothly, there is no requirement of preventive maintenance activity. Such activities cost a lot in terms of money and also cause loss of productive time which could otherwise be used for production". The maintenance departments and production department functioned in silos with almost no co-ordination amongst themselves. The most critical parts of the plant were not maintained for a long time.

The chairman called you after the meeting and asked you to help him understand the current issue at the plant. "We had Total Quality Management (TQM) in place at all our plants. I understand from the production director that TQM is working as intended. Why are we facing the breakdown problem inspite of having a TQM in place" - said the Chairman?

Required

The Chairman has asked you to quickly prepare a note highlighting the following points -

(i)   LIST the likely losses arising due to breakdown of machinery due to non- maintenance.
(ii)   EXPLAIN the key features of such programme.
(iii) COMPARE the programme identified above and TQM.
(iv)   ADVISE the various types of maintenance practices that the company can implement.

Answer (STUDY MATERIAL)

Issue Super Refineries Limited has implemented a Total Quality Management and is known for producing top quality products. The company enjoys 40% market share in the domestic market. The plants operate at 100% capacity and on all days of the year. This indicates that the company does not carry out preventive and corrective maintenance. The company has not received any complaints with respect to quality from its customers. This can be attributed a solid TQM in place. However, in the last three months, the company has faced delayed in supplies and customer rejections. The delay in supplies could be attributed to the breakdown in the machineries. The production could have been of an inferior quality if the production managers would have rushed to meet the production deadlines due to loss of production time owing to breakdown.

The discussions at the board meeting indicate that the company has not prioritized preventive maintenance. Maintenance is being carried out on an ad-hoc basis with a proper preventive maintenance schedule. The company is concerned about costs of maintenance and hence no preventive maintenance was carried out. Further, there is no co-ordination between the production team and maintenance team.

Losses Arising Due to Breakdown

The following are the losses which can be associated with the breakdown of machinery at Super Refineries Limited -

–   Equipment failure leading to unexpected loss of time - The production at plants was interrupted and the supplies to customers were delay in case of Super Refinery Limited.

–   Idle waits and stops due to ad hoc maintenance requirements. Since the interruption is unplanned, the productive labour time is wasted.

–   Production of inferior quality products causes financial losses. The company would also incur additional costs to remake the product without any additional revenues.

–   The company would also incur losses in terms of additional set up costs. Every time a machine

breaks down, a significant amount of time would be wasted in setting up the production processes again.

Total Productive Maintenance (TPM)

Based on the facts of the case, it is very clear that the company has not prioritised maintenance. The company can use TPM philosophy to address the issue.

TPM is a maintenance philosophy aimed at eliminating production losses due to faulty equipment. The objective of TPM is to keep equipment (plant, machinery etc.) in such a position to produce expected quality products at the maximum capacity with no unscheduled stops. This also includes attaining:

– Zero breakdowns.
– Zero downtimes.
– Zero failures attributed to poor condition of equipment.
– No loss of efficiency or production capacity due to the equipment.

The concept was initially applied to equipment i.e., plant and machinery. Of late, the concept has also been extended to processes and employees. TPM focusses in keeping equipment and employees in top working condition to avoid any breakdowns and delays in manufacturing process.

Traditionally, maintenance work has been considered as a responsibility of the Maintenance Team which is different from the production team. Total Productive Maintenance seeks to involve workers in all departments and levels in ensuring the effective operations of the plant. When both the teams work in alignment, learnings can be shared with each other. The production team also takes ownership of maintenance requirement. A sole focus on higher production without taking care of maintenance requirement can hamper the long-term production requirements, as could be seen in the case of Super Refinery Limited.

Features

– Traditional maintenance is centred in the maintenance department. However, TPM seeks to involve workers at all departments and levels. There is a great amount of co- ordination between the production and maintenance team in TPM.
– Autonomous maintenance focusses on training operators to be able to take care of minor maintenance tasks. This relieves specialised maintenance staff to focus on critical issues.
– TPM focusses on achieving and sustaining zero loses with respect to minor stops, measurement and adjustments, defects, and unavoidable downtimes.
– Planned Maintenance is aimed to have trouble free machines and equipment producing defect free products for total customer satisfaction. The approach here is proactive maintenance instead of reactive maintenance. Super Refinery limited had a reactive approach to maintenance where maintenance was carried out on an ad hoc basis.
– TPM emphasises on training of workers across all levels and departments. The ultimate objective is to have a factory full of skilled workers.

The issues faced by Super Refinery Limited due to unplanned shutdowns can be addressed using a Total Productive Maintenance philosophy.

The following are the Eight Pillars or Principles of TPM -
– Autonomous Maintenance
– Focused Improvement
– Planned Maintenance
– Early Equipment Management
– Quality Maintenance

- Education and Training
- Office TPM
- Safety, Health and Environment

TQM and TPM

Total Quality Management (TQM) and Total Productive Maintenance are often used interchangeably. However, TQM and TPM are considered as two different approaches. TQM attempts to increase the quality of goods, services and concomitant customer satisfaction by raising awareness of quality concerns across the organisation. In other words, TQM focuses on the quality of the product, while TPM focuses on the equipment used to produce the products. By preventing equipment break-down, improving the quality of the equipment and by standardising the equipment, the quality of the products increases. TQM and TPM can both result in an increase of quality. However, the approach of each is different. TPM can be seen as a way to help achieving the goal of TQM.

Super Refinery Limited has implemented TQM and is delivering high quality products to its customers. TQM focusses on the end product being supplied to the customer. In the process of producing high quality and volumes of products, the maintenance aspect of plant and mac hinery was ignored by all. This led to breakdowns and unplanned shutdown of the plant and machineries. The TPM philosophy would focus on the equipment which support production of high quality products under TQM.

Types of Maintenance under TPM

The following are the types of Maintenance Programmes which Super Refineries Limited can implement-

Breakdown Maintenance

No maintenance is carried out unless the equipment actually fails. This is the approach taken by Super Refineries Limited currently. This type of maintenance is used when the equipment failure does not impact the operations and production significantly and the only cost incurred is the cost of repair. This is not advisable in case of Super Refineries as breakdown of machineries have led to significant delays in deliveries and poor quality of production.

Preventive Maintenance

It is a daily maintenance (cleaning, inspection, oiling and re-tightening), designed to retain the healthy condition of equipment and prevent failure through the prevention of deterioration, periodic inspection or equipment condition diagnosis, to measure deterioration. This can be compared with a routine and periodic maintenance activity of a vehicle.

Corrective Maintenance

Corrective maintenance focusses on making machines easier to clean and maintain. There could be reconfiguration of certain parts of the machines (say, a lubricating pipe) to ensure that the maintenance staff can carry out maintenance effectively and easily.

Maintenance Prevention

Through the analysis of maintenance data, the maintenance technicians can work with the designers of our machines to create machines that are more reliable. Maintenance and repairs that are required can be made as simple and as easy as possible to reduce time, save money and improve safety.

Autonomous Maintenance

In case of autonomous maintenance, minor and day to day repairs are carried out by the operators of plant

themselves instead of waiting for technicians. Activities like lubricating, bolt tightening etc. are done along with minor repairs by the floor workers or operators. Maintenance team is called only when sophisticated and highly technical maintenance work is required. You may change the tires of your car on your own but to repair a puncture or wheel alignment, you visit a technician.

Conclusion

Super Refinery Limited should implement a TPM which would complement and support the TQM philosophy. This would also address the issue of the production team and maintenance team not working in co-ordination. Down time for maintenance should not be considered as a cost or unproductive activity. This should be an integral part of the overall manufacturing plan. This would ensure that emergency and unplanned downtime are kept to a minimum.

Question 10

Absolute Singapore Pte Ltd. (ASPL) manufactures electronic components for washing machines in an assembly line. Recent market survey reports indicate erosion of its clientele. Feedback taken from customers suggest that the company's products were not of good quality. ASPL is concerned because its competitors have been able to achieve zero defect performance in terms of nil sale returns on account of quality and nil subsequent warranty cost. Therefore, the competitors enjoy huge customer loyalty.

To satisfy its customers, the company ASPL wants to improve its product quality. Consequently, it has decided to undertake Six Sigma study of its operations.

Below is the additional information given about ASPL's operations:

Yearly sales of electronic components are 25,000 units at ₹20,000 each. Of these, 1% sales are returned due to quality issues. These are scrapped and a replacement is made by the company. In addition, each product is under warranty for one year after sale. If a claim is accepted under warranty, service and replacement of parts is done free of cost. Current yearly warranty claims (these are separate from sales returns), which is also representative of the average yearly warranty claims, amount to ₹30,00,000 per annum.

Quality control check and inspection is carried out directly at the assembly line. There is no quality check done at any other point in the entire work flow. Total time spent on inspection is 2,000 hours in a year which costs the company ₹10,00,000 per annum. Inspection leads to 10% rejection i.e. 2,525 units. These units require only one cycle of rework, after which they are ready for sale. Rate of rework in the units rejected on inspection at the assembly line is 5 units in 1 hour. Cost of rework is ₹6,250 per hour.

The variable cost of electronic component is ₹12,500.

The Six Sigma team as part of its study found that rework on products was mainly due to the following reasons:

(1)   Assembly line workers, including new hires, learnt on the job as to how to assemble the input material to produce the final electronic component. This lead to many errors due to lack of proper standardized training. Therefore, on account of these errors, the entire electronic component has to assembled again.

(2)   Sub-standard quality of raw material is detected on inspection only at the assembly line. By this time, the defective material is already fitted into the final electronic component. Therefore, entire component has to be reworked upon to replace the defective raw material input.

(3)   Machines are outdated and are not entirely suitable for the current production methodology.

Proposed solutions to tackle these issues are as follows:

(1) Provide training to assembly line workers to train them on the production methodology. This training is expected to standardize work flow, thereby reducing errors. Such training programs will be held regularly to update the workers on new methodologies. These programs can also serve as employee feedback sessions about the actual working conditions at the assembly line. This two-way communication can improve and streamline the production process. Brainstorming can help detect or give heads up about potential problems in the production process. Total training hours in a year are expected to be 5,000 hours, costing ₹1,000 each hour.

(2) Currently poor quality of raw material input is detected only on inspection at the assembly line. This results in wastage of resources in terms of material, time and capacity. In addition to the existing inspection at the assembly line, a new functional area for quality planning and improvement is proposed to be set up. At the time of procurement, the department will determine the appropriate quality of raw material input, ensure that suppliers supply material as per these requirements as well as suggest alternatives that can help improve produc t quality. By ensuring quality of raw materials at the beginning of the production process, wastage of resources is reduced, if not can be eliminated. Cost of setting up such a facility will be ₹1,50,00,000. In addition to this facility, inspection will continue at the assembly line.

This ensures complete quality check during the entire production cycle. At the same time, due to the introduction of this new functionality for quality control, the pressure on resources for inspection at the assembly line would reduce.

(3) Current machines should be replaced entirely with new machines. Old machines can be sold for negligible amount as scrap. New machines would cost ₹3,60,00,000 having a life of three years.

Implementation of the above three solutions can have the following impact:

• Rework of products can be entirely eliminated.

• Sale returns will reduce from 1% to 0% due to better quality of products.

• Yearly warranty claims will reduce from ₹30,00,000 to nil per annum.

• With the introduction of the new facility, time required for inspection at the assembly line would reduce from 2,000 hours to 1,200 hours. Cost of inspection to do quality check at the assembly line would reduce from ₹10,00,000 per annum to ₹600,000 per annum.

• Due to better quality, ASPL can build better reputation with the customers which can further yield additional sales of 5,000 units per year.

Required

You are the management accountant at ASPL. As part of the Six Sigma project implementation team, you are requested to EVALUATE proposals suggested by the Six Sigma team. The team has used the DMAIC technique to assess quality improvements.

Answer (STUDY MATERIAL) (MTP APRIL.18)

DMAIC technique analyses operational problems by assessing them in the following phases (1) Define; (2) Measure; (3) Analyze; (4) Improve and (6) Control.

(1) **Define** the problem, project goals and customer requirements : Poor quality leading to erosion of clientele.

Customers feedback indicates that product quality requires improvement. Dis- satisfaction is reflected in the form of sale returns and warranty claims. Competitors have no sale returns on account of poor quality as well as no warranty claims on its products. Hence, in an environment where 100% quality can be achieved, **ASPL is facing quality issues**. This is the problem to be addressed. Failure to do so would result in loss of clientele, leading to a possibility of going out of business. The goal of the project is to identify what is the sigma level at which the company is operating and to suggest improvements to the production process it achieve 6σ level of operations.

(2) **Measure** current performance: Indicators of poor quality to find out what is the sigma level of the current operations?

Current performance focusing on quality can be determined based on the cost incurred in the following phases:

(a) Sale returns: Sale returns are 1% of total sales. Gross sales are 25,000 units per annum at selling price of ₹20,000 each, therefore having a value of

₹50,00,00,000. Sales returns @1% amount to ₹50,00,000 that represent the return of 250 units per annum. The cost of poor quality on account of these sale returns is the variable cost of the product ₹ 12,500 per unit. This is an avoidable cost amounting to ₹31,25,000 per annum that is 0.63% of sales (₹31,25,000/₹ 50,00,00,000).

(b) Warranty claims: Warranty is an undertaking given by the company to repair the electronic component free of cost if defect occurs within a specific period of time. Hence, when the customer files a claim that is accepted by the company, it means that there has been an issue with the quality of the product. This is a liability / cost that should ideally be kept minimum, if not nil like ASPL's competitors.

Warranty for the product is for one year from the date of sale. Warranty claims this year is ₹30,00,000, which is given to be representative of the average yearly warranty cost. Therefore, currently this cost amount to 0.60% of sales (₹30,00,000/ ₹50,00,00,000).

Summarizing sale returns and warranty claims alone represent 1.23% of current sales. Considering the current percentage of deficiency, the **company is operating between 3σ and 4σ level**. The rest of the industry is able to achieve 6 σ level of operations. At zero defective production, there are no sale returns on account of quality and no warranty claim costs. Therefore, is **tremendous scope for improvement in ASPL's operations**.

(3) **Analyze:** What is the cause of poor quality? What is the cost of resources focused on quality?

Six sigma team studied the production process in detail. Replicating the issues detailed in the given problem:

(a) Problem 1: Assembly line workers, including new hires, learnt on the job as to how to assemble the input material to produce the final electronic component. This lead to many errors due to lack of proper standardized training. Therefore, on account of these errors, the entire electronic component has to assembled again.

(b) Problem 2: Sub-standard quality of raw material is detected on inspection only at the assembly line. Inspection leads to 10% rejection of units. By this time, the defective material is already fitted into the final electronic component. Therefore, to entire component has to be reworked upon to replace the defective raw material input.

(c)   Problem 3: Machines are outdated and are not entirely suitable for the current production methodology.

The above factors result in rework on products, an internal failure cost, that lead to wastage of material, resources, and capacity.

Two costs incurred to focus on quality are cost of inspection and cost of rework, 2,525 units are reworked upon. Time required to rework 2,525 units per year = 2,525 units / 5 units per hour = 505 hours per year. Cost of rework is given to be ₹6,250 per hour. Therefore, total cost of rework per year = ₹31,56,250.

Inspection cost for 2,000 hours at the assembly line is given to be ₹10,00,000 per annum. Therefore, total cost of resources currently incurred for quality = ₹41,56,250 per annum.

(4)   **Improve:** Reduce errors and improve quality of the product

While cost of resources currently incurred for quality is only 0.83% of sales (₹41,56,250/ ₹50,00,00,000), a detailed analysis brings forth many qualitative aspects that ASPL needs to be address. If its competitors are able to achieve excellence in quality, so must ASPL, in order to remain in business. Therefore, following are the proposals that can provide solutions to the problems referred to above:

(a)   Solution to Problem 1: Periodic training sessions to educate new hires and update workers in the assembly line on the latest techniques in production. Standardized and informed working will lead to lower errors and thereby improving product quality. Cost per year = 5,000 hours yearly training × ₹1,000 per hour = ₹50,00,000.

(b)   Solution to Problem 2: Delay in detection of poor quality input can be resolved by streamlining the work flow. New function for quality planning and improvement, at the beginning of the process helps in early detection, without wastage of resources. Cost per year for introducing this functionality = ₹1,50,00,000.

(c)   Solution to Problem 3: Replace old machines with newer ones. Machine upgrade will align the resource with the production requirements. This reduce chances of errors in the production process. Cost of procurement: ₹3,60,00,000 has a life of 3 years. Therefore, annual depreciation is ₹1,20,00,000.

(d)   Consequences of implementing these proposals, as given in the problem, can result in the following improvements:

(i)   Rework of products can be entirely eliminated.

(ii)   Sale returns will reduce from 1% to 0% due to better quality of products.

(iii)   Yearly Warranty claims will reduce from ₹30,00,000 to nil per annum.

(iv)   With the introduction of the new facility, time required for inspection at the assembly line would reduce from 2,000 hours to 1,200 hours. Cost of inspection at the assembly line would reduce from ₹10,00,000 per annum to ₹6,00,000 per annum.

(v)   Due to better quality, ASPL can build better reputation with the customers which can further yield additional sales of 5,000 units per year.

When the company is capable to achieve points (i), (ii) and (iii) milestones, it would have achieved 6σ operational level. The cost of quality report summarizes the above discussion:

Cost of Quality Report

Cost of Quality Component	Before Improvements		After Improvements	
	Current Cost ₹	% of Sales	Projected Cost ₹	% of Sales
Preventive Cost				
Training (5,000 hrs. × ₹1,000 per hour)	×××	×××	50,00,000	0.83%
Quality Planning and Improvement	×××	×××	1,50,00,000	2.50%
Appraisal Cost				
Inspection Cost	10,00,000	0.20%	6,00,000	0.10%

Internal Failure Cost				
Rework	31,56,250	0.63%	×××	0.00%
External Failure Cost				
Sale Returns	31,25,000	0.63%	×××	0.00%
Warranty Claims	30,00,000	0.60%	×××	0.00%
Total Cost of Quality	1,02,81,250	2.06%	2,06,00,000	3.43%
Yearly Sales	50,00,00,000		60,00,00,000	
Total Cost of Quality / Sales (%)	**2.06%**		**3.43%**	

(e) Cost of quality is 2.06% of sales of which 1.23% alone is external failure cost. This has an impact on the customer experience and can erode customer base. By implementing the six-sigma team's proposal, this external failure cost on account of sale returns and warranty costs, can completely eliminated. Internal failure cost can also be eliminated. The increase in cost of quality proposed to be made would be a preventive cost to avoid failure of quality. The company should focus on preventing the error such that it ensures that product is of good quality when it reaches the customer at the very first instance.

This enhances the customer experience and therefore eliminating the scope for external failures like sales returns and warranty claims. Better quality can yield further sales of 5,000 units per year. Therefore, an increase in spending on quality measures is justified since it not only yields significant improvements to quality but also brings in more sales orders.

Improvement to the financial position of the firm is summarized below:

Particulars		Amount ₹
Improved Contribution Margin (Ref. note 1)		3,75,00,000
Elimination of Goods Replacement		31,25,000
Elimination of Warranty Claims		30,00,000
Elimination of Rework		31,56,250
Savings in Inspection Cost		4,00,000
Total Benefit	…(A)	4,71,81,250
Additional Costs Incurred		
Training		50,00,000
Quality Planning and Improvement		1,50,00,000
Increase in Fixed Cost (Yearly Depreciation of Upgraded Machines)		1,20,00,000
Total Additional Cost	…(B)	3,20,00,000
Net Benefit	…(A) - (B)	1,51,81,250

Note 1: Incremental Contribution:

Sales have increased by 5,000 units. Selling Price is ₹20,000 per unit while variable cost is ₹12,500 per unit. Contribution is ₹7,500 per unit.

Conclusion: Six Sigma team's proposals are focused on preventing the error from occurring. Consequently, quality improves, sale improves and thereby can yield a net benefit of ₹1,51,81,250 per year to the company.

(5)   Control: Maintain quality at 6σ level and keep the production facilities updated.

(i) Training sessions with workers can serve as two-way communication platform to detect other problems that can be resolved in more timely manner. Inputs received can also be used to improve the production work flow as well.

(ii) New function of quality planning and improvement can help the company be better informed about the latest production methodologies.

(iii) Updated machines are better equipped to handled changes in the production process since they are built with the latest technology. ASPL should do a continuous assessment of the state of its machines and upgrade them when necessary.

CHAPTER-4 Cost Management Techniques

Section A – Practical Questions

Target Costing

Question 1

Kowloon Toy Company (KTC) expects to successfully launch Toy "H" based on a Disney character. KTC must pay 15% royalty on the selling price to the Disneyland. KTC targets a selling price of ₹100 per toy and profit of 25% on selling price.

The following are the cost data forecast:

	₹/ toy
Component H1	8.50
Component H2	7.00
Labour: 0.40 hr. @ ₹60 per hr.	24.00
Product Specific Overheads	13.50

In addition, each toy requires 0.6 kg of other materials, which are supplied at a cost of ₹16 per kg. with a normal 4% substandard quality, which is not usable in the manufacture.

Required

Determine if the above cost structure is within the target cost. If not, what should be the extent of cost reduction?(Study Material)

Answer

Target Cost "H"

	₹ / Toy
Target Selling Price	100.00
Less: Royalty @15%	15.00
Less: Profit @ 25%	25.00
Target Cost	60.00

Cost Structure "H"

	₹ / Toy
Component H1	8.50
Component H2	7.00
Labour (0.40 hr. × ₹ 60 per hr.)	24.00
Product Specific Overheads	13.50
Other Material (0.6 kg / 96% × ₹16)	10.00
Total Cost of Manufacturing	63.00

Total Cost of Manufacturing is ₹ 63 while Target Cost is ₹ 60. Company KTC should make efforts to **reduce its manufacturing cost by ₹ 3** to achieve Target Selling Price of ₹100.

Question 2

UK Ltd. prepared a draft budget for the next year as follows:
Quantity – 10,000 units

	₹
Selling Price per unit	60
Variable Cost per unit	
Direct Materials	16
Direct Labour (2 hrs × ₹6)	12
Variable Overheads (2 hrs × ₹1)	2
Contribution per unit	30
Total Budgeted Contribution	3,00,000
Total Budgeted Fixed Overheads	2,80,000
Total Budgeted Profit	20,000

The board of directors are not satisfied with this draft budget and suggested the following changes for the better profit:

(i) The budgeted profit is ₹ 50,000,

(ii) The company should spend ₹ 57,000 on advertisement and the target sales price up to 64 per unit.

(iii) It is expected that the sales volume will also rise, inspite of the price rise, to 12,000 units. In order to achieve the extra production capacity, however, the work force must be able to reduce the time taken to make each unit of the product. It is proposed to offer a pay and productivity deal in which the wages rate per hour is increased to ₹ 8. The hourly rate for variable overheads will be unaffected.

Required
Calculate the target labour time require to achieve the target profit. (Study Material)

Answer

Statement Showing 'Target Cost of Direct Labour & Variable Overheads'

Particulars	Amount (₹)
Expected Sales (₹ 64 × 12,000 units)	7,68,000
Less: Direct Material (₹ 16 × 12,000 units)	1,92,000
Advertisement Expenses	57,000
Fixed Overheads	2,80,000
Target Profit	50,000
Target Cost of Direct Labour and Variable Overheads	1,89,000

Target Labour Time Required to achieve Target Profit

$=$ Total €ost of Direct Labour and Variable Overheads Wages Rate+Variable Overhead Rate

$=$ Rs 1,89,000 Rs.8 ± Rs.1

= 21,000 hour

Question 3

Storewell Industries Ltd. manufactures standard heavy duty steel storage racks for industrial use. Each storage rack is sold for ₹750 each. The company produces 10,000 racks per annum. Relevant cost data per annum are as follows:

Cost Component	Budget	Actual	Cost p.a. (₹)
Direct Material	5,00,000 sq. ft.	5,20,000 sq. ft.	20,00,000
Direct Labour	90,000 hrs.	1,00,000 hrs.	10,00,000
Machine Setup	15,000 hrs.	15,000 hrs.	1,50,000
Mechanical Assembly	200,000 hrs.	200,000 hrs.	30,00,000

The actual and budgeted operating levels are the same. Actual and standard rates of material procurement and hourly labor rate are also the same. Any variance in cost is solely on account of difference in the material usage and hours required to complete production. Aggressive pricing from competitors has driven down sales. A comparable rack is available in the market for ₹675 each. Vishal, the marketing manager has determined that in order to maintain the company's existing market share of 10,000 racks, Storewell Industries must reduce the price of each rack to ₹675.

Required

(i) CALCULATE the current cost and profit per unit. IDENTIFY the non-value added activities in the production process.

(ii) CALCULATE the new target cost per unit for a sales price of ₹675 if the profit per unit is maintained.

(iii) RECOMMEND what strategy Storewell Industries should adopt to attain target cost calculated in (ii) above.(Study Material)

Answer

The current cost and profit per unit are calculated as below:

Cost Component	Units	Actual Cost p.a. for 10,000 racks (₹)	Actual Cost per rack (₹)
Revenue	10,000 racks	75,00,000	750
Direct Material	5,20,000 sq. ft.	20,00,000	200
Direct Labour	1,00,000 hrs.	10,00,000	100
Machine Setup	15,000 hrs.	1,50,000	15
Mechanical Assembly	200,000 hrs.	30,00,000	300
Total Cost		61,50,000	615
Profit		13,50,000	135

Therefore, the current cost is ₹615 p.u. while the profit is ₹135 p.u. Machine setup is the time required to get the machines and the assembly line ready for production. In this case, 15,000 hours spent on setting up does not add value to the storage racks directly. Hence, it is a non-value add activity.

(ii) New sale price per rack is ₹675 per unit. The profit per unit needs to be maintained at ₹135 per unit. Hence, the new target cost per unit = new selling price per unit – required profit per unit = ₹675 - ₹135 = ₹540 per unit.

(iii) As explained above, current cost per unit is ₹615 while the target cost per unit is ₹540. Hence, the cost has to be reduced at least by ₹75 per unit. Analysis of the cost data shows the variances between the budget and actual material usage and labor hours. It is given that the material procurement rate and labor hour rate is the same for budgets and actuals. Hence, the increment in cost of direct materials and labor is due to inefficient use of material and labor hours to complete the same level of production of 10,000 storage racks.

Corrective actions to address these inefficiencies could result in the following savings:

(a) Inefficiencies resulted in use of extra 20,000 sq. ft. of material.
Material cost per sq. ft. = Actual cost / Actual material usage = ₹20,00,000/5,20,000 sq. ft. = ₹3.85 per sq. ft.
Therefore, inefficiencies resulted in extra cost = 20,000 sq. ft. × ₹3.85 per sq. ft. = ₹77,000.
If corrective action is taken, for 10,000 racks this translates to a saving of ₹7.70 per unit.

(b) Inefficiencies resulted in extra 10,000 hrs. to be spent in production.
Labor cost per hr. = Actual cost / Actual labor hrs. = ₹10,00,000/10,000 hrs. = ₹10 per hr.
Therefore, inefficiencies resulted in extra cost = 10,000 hrs. × ₹10 per hour = ₹100,000.
If corrective action is taken, for 10,000 racks this translates to a saving of ₹10 per unit.

(c) Machine setup cost is a non-value added cost. Value analysis can be done to determine if the setup time of 15,000 hrs. can be reduced. However, since these activities have been carried out for a reason, car e should be taken to ensure that this change should not adversely impact the production activity later down the stream.

(d) Mechanical assembly cost is almost half of the total cost. These are costs incurred during the production process on the assembly line. Value analysis can be done to

determine if the production process can be made more efficient. For example, the process can be streamlined, such that steps can be combined that can be handled by fewer people (process centering). Similarly, value analysis / value engineering can focus on the product design.

Some questions to raise may be:
- Can the product be designed better to make the production more efficient?
- Can the design be minimized to include fewer parts and thus make it easier and efficient to manufacture?
- Can be substitute parts to make it more efficient? Or
- Is there simply a better way of producing the same product?

While target costing is a dynamic and corrective approach, care must the taken the product quality, characteristics and utility are maintained.

Question 4

NEC Ltd., forms a Committee consisting of its Production, Marketing, and Finance Directors to prepare a budget for the next year. The Committee submits a draft budget as detailed below:

Particulars	₹
Selling Price per unit	50
Less: Direct Material Cost per unit	9
Direct Labour Cost per unit	9
Variable Overhead per unit (3 hrs. @ ₹2)	6
Contribution per unit	26
Budgeted Sales Quantity	25,000 units
Budgeted Contribution (25,000 × ₹26)	6,50,000
Less: Budgeted Fixed Cost	5,00,000
Budgeted Profit	1,50,000

The Management is not happy with the budgeted profit as it is almost equal to the previous year's profit. Therefore, it asks the Committee to prepare a budget to earn at least a profit of ₹3,00,000. To achieve the target profit, the Committee reports back with the following suggestions:

The unit selling price should be raised to ₹55.

The sales volume should be increased by 5,000 units.

To attain the above said increase in sales, the company should spend ₹40,000 for advertising.

The production time per unit should be reduced.

To win the acceptance of the workers in this regard the hourly rate should be increased by ₹ 3 besides an annual group bonus of ₹30,000.

There is no change in the amount and rates of other expenses. The company has sufficient production capacity. As the implementation of the above proposal needs the acceptance of the work force to increase the speed of work and to reduce the production time per unit, the Board wants to know the extent of reduction in per unit production time.

Required

(i) CALCULATE the target production time per unit and the time to be reduced per unit.

(ii) IDENTIFY the other problems that may arise in production due to decrease in unit production time and also suggest the remedial measures to be taken.

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(iii) STATE the most suitable situation for the adoption of Target Costing. (Study Material)

Answer (PYQ NOV.18)

(i) Target Production Time per unit

(₹3 + ₹3 + ₹2) × hrs. × 30,000 units	=₹5,10,000
Hrs.	=2.125
Time to be reduced per unit	=3 hrs. – 2.125 hrs.
	=0. 875 hrs.

Workings

Statement Showing Target Cost (Direct Labour and Variable Overhead)

Particulars	Amount (₹)
Target Sales (₹55 × 30,000 units)	16,50,000
Less: Target Profit	3,00,000
Less: Direct Material Cost (₹9 × 30,000 units)	2,70,000
Less: Budgeted Fixed Costs	5,00,000
Less: Proposed Advertising	40,000
Less: Proposed Annual Group Bonus	30,000
Target Cost (Variable Overhead and Direct Labour) for 30,000 units	5,10,000

(ii) Problem

The target-costing method is applicable particularly for repetitive manufacturing. It should however be recognised that some products often bear a high degree of repetition and that there often are considerable repetitions where reduction targets could come into play as a framework for improving design. Working under pressure to finish new design assignments in a short time may take development resources away from efforts to optimise or re-engineer production processes. If approaching product design as an activity to be optimised independently there is a risk that target costing may not succeed to satisfactorily addressing overall performance, so in short decrease in unit production time may lead to unwanted pressure on design and its implementation stage.

Remedial Measures

As a remedial action organisation should retain strong control over the design teams headed by a good team leader. This person must have an exceptional knowledge of the design process, good interpersonal skills, and a commitment to staying within both time and cost budgets for a design project. If the time is too short even an organisation may reject a project for the time being. Later, it can be tried out with new cost reduction methods or less expensive materials to achieve target cost and control overall production activities.

Target costing is most useful in situations where the majority of product costs are locked in during the product design phase. This is the case for most manufactured products, but few services. In the services area, such as consulting, the bulk of all activities can be reconfigured for cost reduction during the "production" phase, which is when services are being provided directly to the customer. In the services environment, the "design team" is still present but is more commonly concerned with streamlining the activities conducted by the employees providing the service, which can continue to be enhanced at any

time, not just when the initial services process is being laid out.

Question 5

Pixel Limited is a toy manufacturing company. It sells toys through its own retail outlets. It purchases materials needed to manufacture toys from a number of different suppliers. Recently, due to the entity of few reputed foreign brands in the toy market and particularly in the segment in which Pixel Ltd. is doing business, it is facing a threat to operate profitably.

Each toy requires 4 kg. of materials at ₹ 19 per kg. and 5% of all materials supplied by the suppliers are found to be substandard. Labour hour requirement for each toy is 0.4 hour at ₹ 120 per hour.

Market research has determined that the selling price will be ₹ 240 per toy. The company requires a profit margin of 15% of the selling price. Expected demand for toy in the coming year will be 50,000 toys. Sales and variable overhead per unit for the four quarters of the year will be as follows:

	Q1	Q2	Q3 (Festive season)	Q4 (Festive season)
Sales (units)	7,500	9,000	15,500	18,000 ·
Variable overhead per unit (₹)	22	22	24	25

Total fixed overheads are expected to be ₹ 6,25,000 for each quarter.

The production manager has decided to produce 12,500 units in each quarter. Inventory holding costs will be ₹ 18 per unit of average inventory per quarter. Inventory holding costs are not included in above. Normal production capacity per quarter is 15,000 toys. The company can produce further up to 6,000 units per quarter by resorting to overtime working. Overtime wages will be at 150% of normal wage rate.

Assume zero opening inventory.

Required

(i) CALCULATE the cost gap that exists between the total cost per toy as per the production plan and the target cost per toy.

(ii) DISCUSS how just-in-time purchasing and just-in-time production will remove the cost gap calculated in (i) above. Show calculations in support of your answer.

(iii) EXPLAIN, how implementation of JIT production method can be a major source of competitive advantage and success of the company.(PYQ MAY.19)

Answer

(i) **Cost gap between Total Cost per toy as per the production plan and the Target Cost per toy**
Target Cost per toy

Sr. No.	Particulars	₹ per unit	For Annual Sales of 50,000 units
1	Selling Price per toy	240	1,20,00,000
2	Required Profit Margin (15% of selling price =15% ×₹240 per unit)	36	18,00,000
3	Target Cost per annum (Step 1 - 2)		1,02,00,000
4	Target Cost per toy (Step 3 / 50,000 units)		**204.00**

Therefore, Target Cost is ₹**204** per toy.

Total Cost as per production plan

Pixel Ltd. has an annual production requirement of 50,000 toys, which is also its annual sales. Given that opening inventory for the first quarter is nil. The production manager wants to produce 12,500 units per quarter irrespective of the sales demand for the quarter. This implies that during some quarters, there might be unsold inventory, for which inventory holding cost has to be borne. This type of production is called "produce to stock".

Production Schedule and Inventory Holding Cost for the year

Sr. No.	Particulars	Q1	Q2	Q3	Q4	Total for the year
1	Opening Stock (units)	-	5,000	8,500	5,500	
2	Production (units)	12,500	12,500	12,500	12,500	50,000
3	Sales (units)	7,500	9,000	15,500	18,000	50,000
4	Closing Stock (units) (Step 1 + 2 – 3)	5,000	8,500	5,500	-	
5	Average Inventory = (Step 1+ Step 4)/ 2	2,500	6,750	7,000	2,750	
6	InventoryHolding Cost(Average Inventory × ₹18 per unit of Average Inventory)	₹45,000	₹1,21,500	₹1,26,000	₹49,500	₹**3,42,000**

Total Cost of Production per toy as per production plan

Sr. No.	Particulars	Q1	Q2	Q3	Q4	Total for 50,000 units
1	Direct Material Cost per unit (Note 1)	₹80	₹80	₹80	₹80	₹40,00,000
2	Direct Labour Cost per unit (Note 2)	₹48	₹48	₹48	₹48	₹24,00,000
3	Variable Overhead Cost per unit	₹22	₹22	₹24	₹25	₹11,62,500
4	Total Variable Cost per unit for the quarter (other than inventory holding cost) [Steps 1+ 2+3]	₹150	₹150	₹152	₹153	
5	Production (units) for quarter (refer production	12,500	12,500	12,500	12,500	50,000

	schedule above)					
6	Total Variable Cost for the quarter (other than inventory holding cost) [Step 4 × Step 5]	₹18,75,000	₹18,75,000	₹19,00,000	₹19,12,500	₹75,62,500
7	Inventory Holding Cost for the quarter (refer to the production schedule above)	₹45,000	₹1,21,500	₹1,26,000	₹49,500	**₹3,42,000**
8	Fixed Overheads	₹6,25,000	₹6,25,000	₹6,25,000	₹6,25,000	₹25,00,000
9	Total Cost [Step 6 + Step 7+Step 8]	₹25,45,000	₹26,21,500	₹26,51,000	₹25,87,000	₹1,04,04,500
10	Total Cost per toy as per production schedule (Step 9 / 50,000 units)					**₹208.09**

Note 1
Each toy requires 4kg of material, 5% of all materials is substandard. Therefore, procurement should factor this substandard quality.
Material required per unit = 4 kg / 95% = 4.21 kg
Material Cost per toy produced = 4.21 kg ×₹19 per kg = ₹80 per unit

Note 2
Each toy requires 0.40 hours. Rate per hour is ₹120 per hour. Therefore, Cost per toy = 0.40 × ₹120 = ₹48 per unit

Cost Gap

= Total Cost per toy as per production schedule – Target Cost per toy
= ₹208.09 - ₹204.00 per toy
= ₹4.09 per toy

JIT System

(ii) Just in Time Purchasing and Just in Time Production is aimed at eliminating inventory holding of raw material and finished goods respectively. Components are purchased only when there is a requirement in the production process. Similarly, finished goods are produced only when there is a demand for them. This type of production is called "produce to order". Hence, there is neither any opening inventory nor any closing inventory, thereby no inventory holding cost. In the given problem, this savings is off-set by the extra payment to be made to labor for overtime. Production capacity is 15,000 toys per quarter. This can be increased by 6,000 toys per quarter by incurring additional overtime cost.

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The Production Plan under the Just in Time System

Sr. No.	Particulars	Q 1	Q 2	Q 3	Q 4	Total for the year
1	Opening Stock (units)	-	-	-	-	
2	Production (units)	7,500	9,000	15,500	18,000	50,000
3	Sales (units)	7,500	9,000	15,500	18,000	50,000
4	Closing (units)	-	-	-	-	
5	Inventory Holding Cost	-	-	-	-	
6	Production Beyond Capacity of 15,000 Toys per quarter (units)	-	-	500	3,000	

Total Cost of Production under JIT System

Sr. No.	Particulars	Q1	Q2	Q3	Q4	Total for 50,000 units
1	Direct Material Cost per unit (Note 1)	₹76	₹76	₹76	₹76	38,00,000
2	Direct Labour Cost per unit	₹48	₹48	₹48	₹48	24,00,000
3	Variable Overhead Cost per unit	₹22	₹22	₹24	₹25	11,85,000
4	Total Variable Cost per unit (Steps 1+ 2+3)	₹146	₹146	₹148	₹149	
5	Production (units) for the quarter (Refer JIT Production schedule above)	7,500	9,000	15,500	18,000	50,000
6	Total Variable Cost for the quarter (Step 4 × Step 5)	₹10,95,000	₹13,14,000	₹22,94,000	₹26,82,000	₹73,85,000
7	Production (units) for the quarter in excess of capacity (Refer JIT Production schedule above)	-	-	500	3,000	3,500
8	Overtime Labour Cost for production in excess of capacity (Note 2) [Step 7 × 0.40 × 50% ×₹120 per hour]	₹0	₹0	₹12,000	₹72,000	**₹84,000**
9	Fixed Overheads	₹6,25,000	₹6,25,000	₹6,25,000	₹6,25,000	₹25,00,000
10	Total Cost for production under the JIT System (Step 6 + Step 8+ Step 9)	₹17,20,000	₹19,39,000	₹29,31,000	₹33,79,000	₹99,69,000

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11	Total Cost per toy as per production schedule (Step 10 / 50,000 units)					**₹199.38**

Note 1

Carefully selected suppliers of delivering high quality materials in a timely manner directly at the shop floor, reducing the material receipt time and loss due to sub- standard material.

Note 2

Overtime wages are 150% of normal wage rate. Therefore, for every toy produced over the quarterly production capacity of 15,000 toys, 50% extra wage over and above the hourly rate has to be paid as overtime wages. Each toy needs 0.40 hours for production. Therefore, overtime cost for excess production = excess production units × 0.40× 50% ×₹120 per hour.

<u>Cost Gap</u>

The cost of production per toy under the JIT system is ₹199.38 per toy as compared to the target cost of ₹204 per toy and **save ₹ 4.62 per toy**.

The savings primarily comes from eliminating the inventory holding cost of ₹3,42,000 per annum and sub- standard material cost of ₹2,00,000 per annum under the previous production system. This is slightly offset by the additional cost of ₹84,000 per annum that has to be paid towards overtime labor charges and ₹22,500 towards additional variable overheads. However, by switching to the JIT system, Pixel Ltd. could reduce its production cost below the target cost per toy.

(iii) JIT system aims at:
  ▪ Meeting customer demand in a timely manner.
  ▪ Providing high quality products and
  ▪ Providing products at the lowest possible price. The main features of the JIT production system are:
  ▪ **Material handling cost is reduced –** materials move from one machine to another in an organized sequence. The production process is grouped into to manufacturing cells. These can be managed with minimal labor. This reduces material handling costs as also any pile up of inventory in the form of work-in- progress. In JIT procurement process, the raw material is received only when needed. Due to significant reduction in inventory, inventory holding costs, normal wastage cost and spoilage can be avoided. Optimum arrangement of cells can lead to lesser floor space requirement, thereby reducing factory rental and overhead cost.
  ▪ **Multi-skilled labor:** Hire and retain multi-skilled workers who are capable of performing a variety in operations including repairs and maintenance. Therefore, a worker is not confined to only one process in the production process. He can contribute towards other processes as well. This reduces the workforce requirement and labor idle time. The company can have a more efficient workforce, with lesser number of workers. There is potential to reduce labor cost on account of this.
  ▪ **Minimizing defects rework and scrap**: Each stage of the production process is tightly linked in a sequential manner. Defective output from one stage will stop the work at the next stage. Due to this, workers can identify and correct errors or defects instantaneously. JIT creates urgency for eliminating defects as quickly as possible since the downstream work also stops due to error in any workstation. Production process efficiency improves and reduces rework or scrap. The overall

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quality of production improves. There are other benefits to streamlining production process: lesser need for inspection of final output and lesser sales returns due to defects. This would contribute to the product's brand value.

- **Reduced set-up time:** Streamlined production process under JIT reduces set- up time at the workstations. When the production process has to change to make the product per the customers' demands, set-up time is incurred at the workstation. By streamlining operations, JIT system aims at reducing the set- up time, so that production can continue with the least possible interruption. This brings flexibility in the operations since the company can quickly change the production requirement, to make products to meet the customer's demand. Quick turnover improves productivity of the machine, thereby increasing the production capacity. Lesser time is spent on set-up which is not a value adding activity.

- **Reduces lead time for receiving materials** since the suppliers of raw material are capable of delivering high quality materials in a timely manner directly at the shop. Proper selection of such suppliers is imperative for the JIT system to be successful. If this can be achieved, then it is beneficial for the company since inventory holding of material is eliminated along with receiving better quality of raw material in a timely manner.

Eliminating inventory holding, scrap, material wastage, flexibility in operations by reducing set-up time, better response time to customer's demands, **better** skilled workforce, better quality of production, lower workforce requirement, lower floor space requirement all of these contribute towards lowering working capital requirements. These contribute to a company's competitive edge and success.

Question 6

P & G International Ltd. (PGIL) has developed a new product "K" which is about to be launched into the market and anticipates to sell 80,000 of these units at a sales price of
₹300 over the product's life cycle of four years. Data pertaining to product "K" are as follows:

Costs of Design and Development of Molds, Dies, and Other Tools	₹8,25,000
Manufacturing Costs	₹125 per unit
Selling Costs	₹12,500 per year + ₹100 per unit
Administration Costs	₹50,000 per year
Warranty Expenses	5 Replacement Parts per 25 units at ₹10 per part ; 1 Visit per 500 units (Cost ₹ 500 per visit)

Required

(i)   Compute the product "K"'s 'Life Cycle Cost'.

(ii)   Suppose PGIL can increase sales volume by 25% through 10% reduction in selling price. Should PGIL choose the lower price? (Study Material)

Answer

Statement Showing "K's Life Cycle Cost (80,000 units)"

Particulars	Amount (₹)
Costs of Design and Development of Molds, Dies, and Other Tools	8,25,000
Manufacturing Costs (₹125 × 80,000 units)	1,00,00,000
Selling Costs (₹100 × 80,000 units + ₹12,500 × 4)	80,50,000
Administration Costs (₹50,000 × 4)	2,00,000
Warranty (80,000 units / 25 units × 5 parts × ₹10) (80,000 units / 500 units × 1 visit × ₹500)	 1,60,000 80,000
Total Cost	1,93,15,000

Statement Showing "K's Life Cycle Cost (1,00,000 units)"

Particulars	Amount (₹)
Costs of Design and Development of Molds, Dies, and Other Tools	8,25,000
Manufacturing Costs (₹125 × 1,00,000 units)	1,25,00,000
Selling Costs (₹100 × 1,00,000 units + ₹12,500 × 4)	1,00,50,000
Administration Costs (₹50,000 × 4)	2,00,000
Warranty (1,00,000 units / 25 units × 5 parts × ₹10) (1,00,000 units / 500 units × 1 visit × ₹500)	 2,00,000 1,00,000
Total Cost	2,38,75,000

Statement Showing "K's Life Time Profit"

Particulars	Amount (₹) for 80,000 units	Amount (₹) for 100,000 units
Sales	2,40,00,000 (80,000 × ₹300)	2,70,00,000 (1,00,000 × ₹270)
Less: Total Cost	1,93,15,000	2,38,75,000
Profit	46,85,000	31,25,000

Decision

Reducing the price by 10% will decrease profit by 33% (₹15,60,000). Therefore, PGIL should not cut the price.

Question 7

Y-Connections, China based firm, has just developed ultra-thin tablet S-5 with few features like the ability to open two apps at the same time. This tablet cost ₹ 5,00,000 to develop; it has undergone extensive research and is ready for production. Currently, the firm is deciding on plant capacity, which could cost either ₹ 35,00,000 or ₹ 52,00,000. The additional outlay would allow the plant to increase capacity from 500 units to 750 units. The relevant data for the life cycle of the tablet at different capacity level are as under:

Expected Sales	500 units	750 units
Sale Price	₹79,600 per unit	₹69,600 per unit
Variable Selling Costs	10% of Selling Price	10% of Selling Price
Salvage Value - Plant	₹ 6,25,000	₹ 9,00,000
Profit Volume Ratio	40%	

Required

Advise Y-Connections, regarding the 'Optimal Plant Capacity' to install. The tablet's life cycle is two years.

Note: Ignore the time value of money. (Study Material)

Answer

Workings

Statement Showing "Variable Manufacturing Cost per unit"

Particulars of Costs	₹ / unit
Sales	79,600
Less: Contribution (40%)	31,840
Variable Cost	47,760
Less: Variable Selling Costs (₹79,600 × 0.1)	7,960
Variable Manufacturing Cost	39,800

Statement Showing "Expected Profit"

Particulars of Costs	('000) ₹	/ unit
	500 units	750 units
Sales	39,800 (₹79,600 x 500)	52,200 (₹69,600 x 750)
Less: Variable Mfg. Cost	19,900 (₹39,800 x 500)	29,850 (₹39,800 x 750)
Less: Variable Selling Cost	3,980 (₹39,800 x 0.1)	5,220 (₹52,200 x 0.1)
Add: Salvage Value	625	900
Less: Cost of Plant	3,500	5,200
Net Profit	13,045	12,830

Development cost is sunk and is not relevant.

Advice

Based on the above 'Expected Profit' statement which is purely based on financial considerations firm may go for high price – low volume i.e. 500 units level. However, non- financial considerations are also given due importance as they account for actions that may not contribute directly to profits in the short run but may contribute significantly to profits in long run. Here, it is important to note that life cycle of product is two years and there is no significant difference between the profits at both levels. In this scenario firm may opt the plant having high capacity not only to increase its market share but also to establish a long term brand image.

Question 7

P & G International Ltd. (PGIL) has developed a new product ' α^3 'which is about to be launched into the market. Company has spent ₹ 30,00,000 on R&D of product ' α^3 '. It has also bought a machine to produce the product ' α^3 ' costing ₹ 11,25,000 with a capacity of producing 1,100 units per week. Machine has no residual value.

The company has decided to charge price that will change with the cumulative numbers of units sold:

Cumulative Sales (units)	Selling Price ₹ per unit
0 to 2,200	750
2,201 to 7,700	600
7,701 to 15,950	525
15,951 to 59,950	450
59,951 and above	300

Based on these selling prices, it is expected that sales demand will be as shown below:

Weeks	Sales Demand per week (units)
1-10	220
11-20	550
21-30	825
31-70	1,100
71-80	880
81-90	660
91-100	440
101-110	220
Thereafter	NIL

Unit variable costs are expected to be as follows:

	₹ per unit
First 2,200 units	375
Next 13,750 units	300
Next 22,000 units	225
Next 22,000 units	188
Thereafter	225

PGIL uses just-in-time production system. Following is the total contribution statement of the product ' α^3 ' for its Introduction and Growth phase:

	Introduction	Growth	
Weeks	1 - 10	11 - 30	
Number of units Produced and Sold	2,200	5,500	8,250
Selling Price per unit (₹)	750	600	525
Variable Cost per unit (₹)	375	300	300
Contribution per unit (₹)	375	300	225
Total Contribution (₹)	8,25,000	16,50,000	18,56,250

Required

(i)   Prepare the total contribution statement for each of the remaining two phases of the product's life cycle.

(ii) Discuss Pricing Strategy of the product ' α^3 '.

(iii) Find possible reasons for the changes in cost during the life cycle of the product ' α^3 '.

Note: Ignore the time value of money. (MTP MARCH.18)

Answer

(i)   **Total Contribution Statement**

Statement Showing "Total Contribution- for remaining two phases"

Particulars	Maturity		Decline
Weeks	31 - 50	51 - 70	71 - 110
Number of units Produced and Sold	22,000	22,000	22,000
Selling Price per unit (₹)	450	450	300
Less: Unit Variable Cost (₹)	225	188	225
Unit Contribution (₹)	225	262	75
Total Contribution (₹)	49,50,000	57,64,000	16,50,000

(ii)   **Pricing Strategy for Product α^3**

PGIL is following the skimming price strategy that's why it has planned to launch the product α^3 initially with high price tag.

A skimming strategy may be recommended when a firm has incurred large sums of money on research and development for a new product.

In the problem, PGIL has incurred a huge amount on research and development. Also, it is very difficult to start with a low price and then raise the price. Raising a low price may annoy potential customers.

Price of the product α^3 is decreasing gradually stage by stage. This is happening because PGIL wants to tap the mass market by lowering the price.

(iii)   Possible Reasons for the changes in cost during the life cycle of the product 'α^3'

Product life cycle costing involves tracing of costs and revenues of each product over several calendar periods throughout their entire life cycle. Possible reasons for the changes in cost during the life cycle of the product are as follows:

PGIL is expecting reduction in unit cost of the product α^3 over the life of product as a consequence of economies of scale and learning / experience curves.

Learning effect may be the possible reason for reduction in per unit cost if the process is labour intensive. When a new product or process is started, performance of worker is not at its best and learning phenomenon takes place. As the experience is gained, the performance of worker improves, time taken per unit reduces and thus his productivity goes up. The amount of improvement or experience gained is reflected in a decrease in cost.

Till the stage of maturity, PGIL is in the expansion mode. The PGIL may be able to take advantages of quantity discount offered by suppliers or may negotiate the price with suppliers.

Product α^3 has the least variable cost ₹188 in last phase of maturity stage; this is because a product which is in the mature stage may require less marketing support than a product which is in the growth stage so, there is a saving of marketing cost per unit.

Again the cost per unit of the product α^3 jumps to ₹225 in decline stage. As soon as the product reaches its decline stage, the need or demand for the product disappear and quantity discount may not be available. Even PGIL may have to incur heavy marketing expenses for stock clearance.

Workings

Statement of Cumulative Sales along with Sales Price and Variable Cost

Weeks	Demand per week	Total Sales	Cumulative Sales	Selling Price per unit (₹)	Variable Cost per unit (₹)
1 – 10	220	2,200	2,200	750	375
11 – 20	550	5,500	7,700	600	300
21 – 30	825	8,250	15,950	525	300
31 – 50	1,100	22,000	37,950	450	225

51 – 70	1,100	22,000	59,950	450	188
71 – 80	880	8,800	68,750	300	225
81 – 90	660	6,600	75,350	300	225
91 - 100	440	4,400	79,750	300	225
101 - 110	220	2,200	81,950	300	225

Pareto Analysis

Question 8

The following information is given about the type of defects during a production period and the frequencies of their occurrence in a spectacle manufacturing company:

Defect	No. of items
End Frame not equidistant from the centre	10
Non-uniform grinding of lenses	60
Power mismatches	20
Scratches on the surface	110
Spots / Stains on lenses	5
Rough edges of lenses	70
Frame colours-shade differences	25

Required

PREPARE a frequency table so that a Pareto Chart can be constructed for the defect type. Also, IDENTIFY key areas of focus. (Study Material)

Answer

Statement Showing "Pareto Analysis of Defects"

Defect Type	No. of Items	% of Total Items	Cumulative Total
Scratches on the surface	110	36.67%	36.67%
Rough edges of lenses	70	23.33%	60.00%
Non-uniform grinding of lenses	60	20.00%	80.00%
Frame colours-shade differences	25	8.33%	88.33%
Power mismatches	20	6.67%	95.00%
End frame not equidistant from the centre	10	3.33%	98.33%
Spots/ Strain on lenses	5	1.67%	100.00%
	300	**100.00%**	

The company should focus on eliminating scratches on the surface, rough edges of lenses and grinding of lenses related defects which constitute 80% portion, according to Pareto Theory.

Question 9

Generation 2050 Technologies Ltd. develops cutting-edge innovations that are powering the next revolution in mobility and has nine tablet smart phone models currently in the market whose previous year financial data is given below:

Model	Sales (₹'000)	Profit-Volume (PV) Ratio
Tab - A001	5,100	3.53%
Tab - B002	3,000	23.00%
Tab - C003	2,100	14.29%
Tab - D004	1,800	14.17%
Tab - E005	1,050	41.43%
Tab - F006	750	26.00%
Tab - G007	450	26.67%
Tab - H008	225	6.67%
Tab - I009	75	60.00%

Required

(i) Using the financial data, carry out a Pareto ANALYSIS (80/20 rule) of Sales and Contribution.

(ii) DISCUSS your findings with appropriate RECOMMENDATIONS. (Study Material)

Answer (MTP MARCH.18)

"Pareto Analysis"

Model	Sales (₹'000)	of Total Sales	mulative Total	Model	Cont. (₹'000)	% of Total Cont.	umulative Total %
Pareto Analysis Sales				Pareto Analysis Contribution			
A001	5,100	35.05%	35.05%	B002	690	30.87%	30.87%
B002	3,000	20.62%	55.67%	E005	435	19.47%*	50.34%
C003	2,100	14.43%	70.10%	C003	300	13.42%	63.76%
D004	1,800	12.37%	82.47%	D004	255	11.41%	75.17%
E005	1,050	7.22%	89.69%	F006	195	8.73%*	83.90%
F006	750	5.15%	94.84%	A001	180	8.05%	91.95%
G007	450	3.09%	97.93%	G007	120	5.37%	97.32%
H008	225	1.55%	99.48%	I009	45	2.01%	99.33%
I009	75	0.52%	100.00%	H008	15	0.67%	100.00%
	14,550	100.00%			2,235	100.00%	

Diagram Showing "Sales and Contribution"
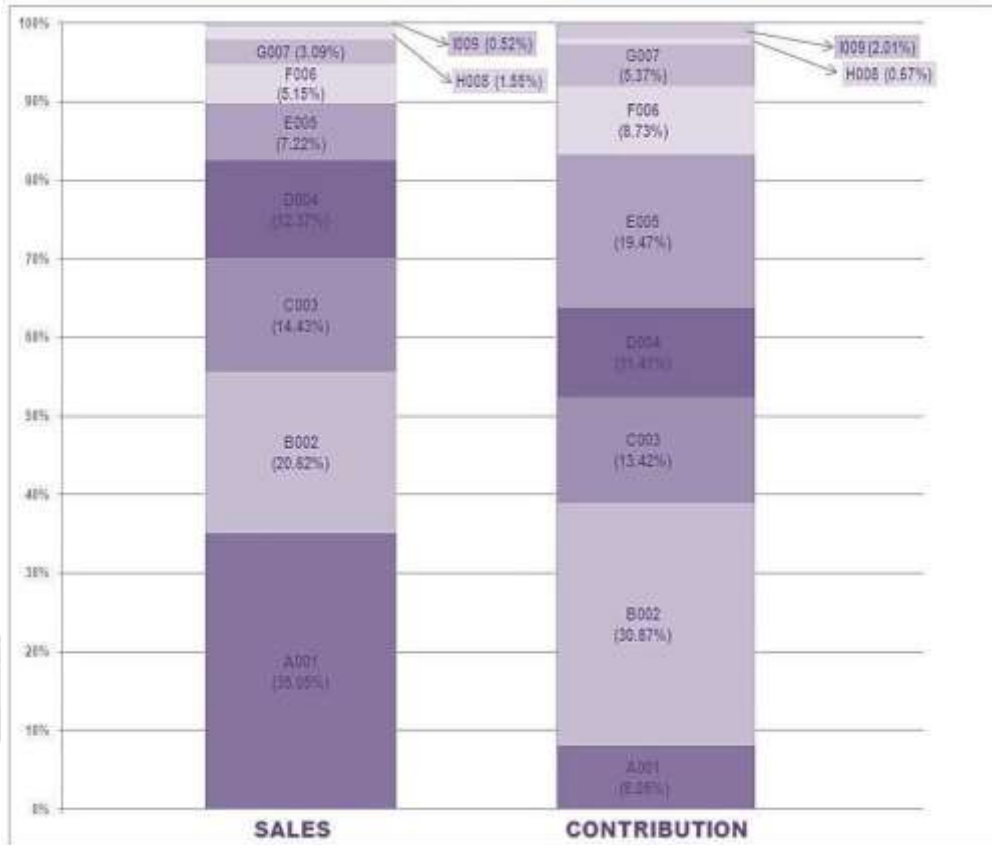
Recommendations

Pareto Analysis is a rule that recommends focus on most important aspects of the decision making in order to simplify the process of decision making. The very purpose of this analysis is to direct attention and efforts of management to the product or area where best returns can be achieved by taking appropriate actions.

Pareto Analysis is based on the 80/20 rule which implies that 20% of the products account for 80% of the revenue. But this is not the fixed percentage rule; in general business sense, it means that a few of the products, goods or customers may make up most of the value for the firm.

In present case, five models namely A001, B002, C003, D004 account for 80% of total sales where as 80% of the company's contribution is derived from models B002 , E005, C003, D004 and F006.

Models B002 and E005 together account for 50.34% of total contribution but having only 27.84% share in total sales. So, these two models are the key models and should be the top priority of management. Both C003 and D004 are among the models giving 80% of total contribution as well as 80% of total sales so; they can also be clubbed with B002 and E005 as key models. Management of the company should allocate maximum resources to these four models.

Model F006 features among the models giving 80%of total contribution with relatively lower share in total sales. Management should focus on its promotional activities.

Model A001 accounts for 35.05% of total sales with only 8.05% share in total contribution. Company should review its pricing structure to enhance its contribution.

Models G007, H008 and I009 have lower share in both total sales as well as contribution. Company can delegate the pricing decision of these models to the lower levels of management, thus freeing themselves to focus on the pricing decisions for key models.

Question 10

The information given below pertains to ABC Enterprises, a specialized car garage door installation company. ABC Enterprises use to get multiple service calls from the customers with variety of requirements. They may have to Install, Replace, Adjust or Lubricate some part or other to make the door functional. They work with 5 parts as given in the table, namely Door, Motor, Track, Trimmer and T -Lock.

	Parts	Type of Service				Total
		Install	Replace	Adjust	Lube	
1	Door	2	5	1	0	8
2	Motor	3	2	16	9	30
3	Track	5	0	6	6	17
4	Trimmer	14	6	0	0	20
5	T-Lock	5	0	1	0	6
6	Miscellaneous	0	2	1	1	4
	Total	29	15	25	16	85

Required

(i) Using the above data, carry out a Pareto Analysis (80/20 rule) of Total Parts.

(ii) Using the same data carry out the second level Pareto Analysis on the type of services with respect to Motors only.

(iii) Give your RECOMMENDATIONS on the basis of your calculations in (i) and (ii) above. (PYQ NOV)

Answer

(i) Statement Showing "Pareto Analysis of Total Parts"

Parts	No. of Items	% of Total Items	Cumulative Total
Motor	30	35.29	35.29%
Trimmer	20	23.53	58.82%
Track	17	20.00	78.82%
Door	8	9.41	88.23%
T-Lock	6	7.06	95.29%
Miscellaneous	4	4.71	100.00%

(ii) Statement Showing "Pareto Analysis of Type of Services (Motor)"

Type of Services	No. of Items	% of Total Items	Cumulative Total
Adjust	16	53.33	53.33%
Lube	9	30.00	83.33%
Install	3	10.00	93.33%
Replace	2	6.67	100.00%
	30		

(iii) Pareto Analysis is a rule that recommends focus on most important aspects of the decision making in order to simplify the process of decision making. The very purpose of this analysis is to direct attention and efforts of management to the product area where best returns can be achieved by taking appropriate actions. Pareto Analysis is based on the 80/20 rule which implies that 20% of the products account for 80% of the revenue. But this is not the fixed percentage rule. In general business sense, it means that a few of the products, goods or customers may make up most of the value for the firm.

The present case stands in a difference to 80/20 rule. Because the company installs doors, they sometimes have multiple service calls to install each door piece by piece. They may have to install, replace, adjust, or lubricate some part to get the door working properly. They work with five main parts: door, motor, track, trimmer and t- lock. The service calls with reference to motors are heavy and accounted for as much as 35.29% of the number of calls attended. Motor together with trimmer accounted for 58.82%. So, these two parts are to be considered as key parts and ABC enterprises must be ever ready to cater to all provisional requirements for attending these classes without any inordinate delay. Any delay in service these calls is likely to damage its service rendering reputation within a very short span of time. Further, the second level Pareto Analysis on motors has revealed a particular reference to the service problems related to motors. Adjustments and Lubrication issues cover up 83.33% of the total service problems exclusively connected to Motors. So, ABC Enterprise must direct its best efforts and develop specific expertise to solve these problems in the best interest of the customers.

Environmental Management Accounting

Question 11

A chemical company produces two chemicals SX and ZX. Environmental activities and costs associated with the two chemicals are as follows :

	SX	ZX
Unit produced (kg.)	6,00,000	15,00,000
Packing Materials (kg.)	80,000	40,000
Energy Usage (KWH)	60,000	30,000
Toxin releases (Pounds into air)	2,00,000	40,000
Pollution control machine hours	32,000	8,000
Cost of environmental activities :		
Packing material Costs		₹ 3,60,000
Energy Costs		₹ 96,000
Fines for release of toxins into air		₹ 48,000
Operating costs of pollution control equipments		₹ 1,12,000

Required
CALCULATE the environmental cost per kilogram for each chemical produced by the company. (PYQ MAY.19)

Answer

Environment Cost Allocation

Allocation of environment costs incurred by the company can be allocated to products using (i) Input-Out analysis (ii) Flow Cost Accounting (iii) Life cycle costing and (iv) Activity Based Costing

Environment costs can be allocated to Chemicals SX and ZX using Activity Based Costing.

S. No.	Type of Environment cost	Allocation Basis	Cost Allocation ₹		
			Chemical SX	Chemical ZX	Total
1	Packing Material Costs	Packing Materials(kg.) SX 80,000 kg. ZX 40,000 kg.	2,40,000	1,20,000	3,60,000
2	Energy Cost	Energy Usage (KWH) SX 60,000 kwh ZX 30,000 kwh	64,000	32,000	96,000
3	Fines for Release of Toxins into Air	Toxins Released (Pounds into air) SX 200,000 pounds ZX 40,000 pounds	40,000	8,000	48,000
4	Operating Costs of Pollution Control Equipment	Pollution Control Machine Hours SX 32,000 hrs ZX 8,000 hrs	89,600	22,400	1,12,000
5	Total Cost Allocation	Sum of Steps 1 to 4	4,33,600	1,82,400	6,16,000
6	Units Produced (kg.)		6,00,000	15,00,000	21,00,000
7	Environment Cost per unit produced (Step 5 / Step 6)		₹0.7227	₹0.1216	₹0.2933

The environment cost allocation per kilogram for Chemical SX is ₹0.72 per kg and Chemical ZX is ₹0.12 per kg.

The average environment cost per kg for overall production is ₹0.2933 per kg.

Question 12

A fertilizer company produces Grade A and Grade B fertilizers. One kilogram of Grade A fertilizer sells for ₹280 per kilogram and one kilogram of Grade B fertilizer sells for ₹400 per kilogram.

The products pass through three cost centers CC1, CC2 and CC3 during the manufacturing process. Total direct material cost per kilogram of fertilizer produced is ₹300 and direct labor cost per kilogram of fertilizer produced is ₹200. Allocation between the cost centres is given below:

Particulars	CC1	CC2	CC3	Total
Cost of Direct Material (per kg of fertilizer produced)	₹90	₹120	₹90	₹300
Cost of Direct Labour (per kg of fertilizer produced)	₹60	₹80	₹60	₹200
Cost Allocation to Grade A	30%	50%	30%	
Cost Allocation to Grade B	70%	50%	70%	

All of expenses (considered to be overheads) per kilogram of fertilizer produced is ₹150. This is allocated equally between Grade A and Grade B fertilizer. Pricing decisions for the fertilizers is made based on the above cost allocation.

The management accountant of the company has recently come across the concept of environmental management accounting. Pricing of products should also factor in the environmental cost generated by each product. An analysis of the overhead expenses revealed that the total cost of ₹150 per kilogram of fertilizer produced, includes incinerator costs of ₹90 per kilogram of fertilizer produced. The incinerator is used to dispose the solid waste produced during the manufacturing process. Below is the cost center and product wise information of solid waste produced:

Waste produced (in tonnes per annum)	CC1	CC2	CC3	Total
Grade A	2	3	1	6
Grade B	2	2	5	9

Based in the impact that each product has on the environment, the management would like to revise the cost allocation to products based taking into account the incinerator cost that each product generates. The remaining overhead expenses of ₹60 per kilogram of fertilizer produced can be allocated equally.

Required

(i) CALCULATE product wise profitability based on the original cost allocation. RECALCULATE the product wise profitability based on activity based costing methodology (environmental management accounting).

(ii) ANALYZE difference in product profitability as per both the methods.

(iii) RECOMMEND key takeaways for the company to undertake the above analysis of overhead costs and pricing as per environmental management accounting. (Study Material) (RTP NOV.18)

Answer

(i) Product Wise Profitability as per Original Allocation Methodology

(Figures in ₹ per kilogram of fertilizer produced)

Particulars	Grade A	Grade B	Total
Selling Price	280	400	680
Direct Material (Refer Table 1)	114	186	300
Direct Labour (Refer Table 1)	76	124	200
Overheads (allocated equally)	75	75	150
Total Expenses	265	385	650
Profit	15	15	30
Profitability	5.36%	3.75%	×

Table 1 Allocation of Direct Materials and Labour as per Cost Centre and Product

Particulars	CC1			CC2			CC3			Total for the company		
	A	B	CC Total	A	B	CC Total	A	B	CC Total	Gr. A	Gr. B	Grand Total
Direct Material	27	63	90	60	60	120	27	63	90	114	186	300
Direct Labour	18	42	60	40	40	80	18	42	60	76	124	200

Accordingly, the **Revised Product Profitability** would be as follows:

Product Wise Profitability (activity based costing using environmental management accounting) requires the following **steps**:

1. Overhead expenses of ₹ 150 per kilogram of fertilizer produced be first bifurcated into incinerator costs and other overhead costs.
2. Incinerator costs of ₹ 90 per kilogram of fertilizer needs to be allocated first to the cost centres. This is done based on the waste generated at each cost centre. The individual cost allocated to each cost centre is again allocated to products based on the waste generated at each cost centre by each product. Refer part a of table 2 for detailed calculations.
3. As mentioned in the problem, other overhead costs are allocated to each product at each cost centre level equally. Refer part b of table 2 for detailed calculations.
4. The above allocations to each product at a cost centre level is then summed up to get the product wise overhead cost allocation. Refer part c of table 2 for detailed calculations.

(Figures in ₹ per kilogram of fertilizer produced)

Particulars	Grade A	Grade B	Total
Selling Price	280	400	680
Less: Direct Material (refer table 1)	114	186	300
Less: Direct Labour (refer table 1)	76	124	200
Less: Overheads (refer table 2)	66	84	150
Profit	24	6	30
Profitability	8.57%	1.50%	×

Table 2 Allocation of Overhead Expenses to each Cost Centre and Product

(Figures in ₹ per kilogram of fertilizer produced)

Product Waste Produced (in tonnes per annum)	CC1	CC2	CC3	Total
Grade A	2	3	1	6
Grade B	2	2	5	9
Total Waste (in tonnes)	**4**	**5**	**6**	**15**
Incinerator Cost Allocated to Cost Centres (based on waste generated)	24	30	36	90

Other Overhead Expenses	20	20	20	60
Total Cost Centre Wise Overhead Cost	**44**	**50**	**56**	**150**

Part A: Allocation of Incinerator Cost from Cost Centre to each product (based on waste produced at each cost centre by each product)				
Product	**CC1**	**CC2**	**CC3**	**Total**
Grade A	12	18	6	36
Grade B	12	12	30	54
Total Incinerator Cost	**24**	**30**	**36**	**90**
Part B: Allocation of Other Overhead Cost from Cost Centre to each product				
Product	**CC1**	**CC2**	**CC3**	**Total**
Grade A	10	10	10	30
Grade B	10	10	10	30
Total Other Overhead Cost	**20**	**20**	**20**	**60**
Part C: Total Overhead Cost (Cost Centre and Product Wise i.e. part a + b)				

Product	**CC1**	**CC2**	**CC3**	**Total**
Grade A	22	28	16	66
Grade B	22	22	40	84
Total Overhead Cost	**44**	**50**	**56**	**150**

Summarizing Product Profitability as per both methods:

Product	₹ per kg of fertilizer produced)		Profit %	
	Original Method	**ABC (as per EMA) Method**	**Original Method**	**ABC (as per EMA) Method**
Grade A	15	24	5.36%	8.57%
Grade B	15	6	3.75%	1.50%

(ii) As summarized above, originally the profit generated from Grade A and Grade B products, was ₹15 per kilogram. Grade A was the more profitable product giving return of 5.36% compared to Grade B's return of 3.75%. This has been calculated by allocating overheads equally to Grade A and B.

During the year, 15 tons of waste is produced during the manufacturing process. Grade B fertilizer produces more waste that accounts for 60% of the waste. Therefore, Grade B should bear higher amount of the incinerator cost compared to Grade A. Allocation based on this premise, dramatically changes the profitability of the products. As calculated above, Grade A fertilizer, due to lower incinerator cost allocation, generates a profit of ₹24 per kilogram of fertilizer. Grade B's profits accordingly are lower, since the product generates more waste and has to bear a larger share of clean-up expenses. Profitability of Grade A increases to 8.57% while Grade B falls dramatically to 1.50%.

(iii) The company can draw a number of conclusions from this analysis of overhead costs as per environmental management accounting. This analysis has helped the company reach the conclusion that Grade B fertilizer produces more waste. The company could adopt either of the following

approaches:

(a) To maintain the same level of profitability, the company can increase the price of Grade B by another ₹9 per kilogram. This is a 2.25% increase in the sale price of Grade B fertilizer. Depending on the market for this grade of fertilizer, the company has to decide whether to increase the price of the product. While a price increase may be possible if the company has a strong market hold, it might be difficult if competition in the market is high. or

(b) The other approach, a more sustainable approach that is the aim of environmental management accounting, would be to reduce the waste produced in the manufacturing process. This analysis, has quantified the waste generated in the process. Better manufacturing techniques, could save the company incinerator costs, that would yield better profits for the company.

Question 13

Excel Ltd. is the leading manufacturer and exporter of high quality leather products - Product A and Product B.

Selling price per unit of Product A and Product B is ₹ 620 and ₹ 420 respectively.

Both the products pass through three processes - Tanning, Dyeing and Finishing during manufacturing process. Allocation of costs per unit of leather products manufactured among the processes are given below:

Particulars	Tanning	Dyeing	Finishing	Total
Direct Materials per unit	140	180	140	460
Direct Labour per unit	90	120	90	300
Cost allocation to Product A	70%	50%	70%	
Cost allocation to Product B	30%	50%	30%	

General overheads per unit of leather products manufactured are ₹ 230 which is allocated equally between Product A and Product B. Above cost allocation is the basis for the decisions regarding pricing of the products.

In this Industry, all the major production processes have environmental impact at all stages of the process, including generation of waste, emission of harmful gases, noise pollution, water contamination etc.

The management of the company is worried about the above environmental impact and has taken initiative to preserve the environment like - research and development activities aimed at reducing pollution level, planting trees, treatment of harmful gases and airborne emissions, wastewater treatment etc.

The management of the company desires to adopt Environmental Management Accounting as a part of strategic decision making process. Pricing of products should also factor in environmental cost generated by each product.

General overheads per unit of leather products manufactured are ₹ 230 which includes : Treatment cost of harmful gases…₹ 80
Wastewater treatment cost .... ₹ 100
Cost of planting of trees .... ₹ 20

Process wise information related to generation of wastewater and harmful gases is given as below:

	Tanning	Dyeing	Finishing	Total
Wastewater generated (litres per week)	900	600	0	1,500
Emission of harmful gases (cc per week)	400	300	100	800
Cost allocation to Product A	70%	50%	70%	
Cost allocation to Product B	30%	50%	30%	

The remaining overheads cost and cost of planting trees can be allocated equally between Product A and Product B.

Required

(a) CALCULATE the product wise profitability based on the original cost allocation.

(b) RECALCULATE the product wise profitability based on activity based costing (Environment driven costs).

(c) ANALYZE the difference in product profitability as per both the methods.

(d) RECOMMEND and EXPLAIN the four management accounting techniques for the identification and allocation of environmental costs.

(e) STATE why the management of environmental costs is becoming increasingly important in organizations. Give reasons (PYQ NOV.18).

Answer

(a)   Product Wise Profitability as per Original Allocation Methodology

(Figures in ₹ per unit of leather produced)

Particulars	Product A	Product B	Total
Selling Price	620	420	1,040
Direct Material (Refer Table 1)	286	174	460
Direct Labour (Refer Table 1)	186	114	300
Overheads (allocated equally)	115	115	230
Total Expenses	587	403	990
Profit	33	17	50
Profitability (%)	**5.32%**	**4.05%**	×

Workings

Table 1 Cost Allocation to the Products

(Figures in ₹ per unit of leather produced)

	Tanning			Dyeing			Finishing			Total		
	A	B	Total	A	B	Total	A	B	Total	A	B	Grand Total
Direct Material	98	42	140	90	90	180	98	42	140	286	174	460
Direct Labour	63	27	90	60	60	120	63	27	90	186	114	300

(b) Product wise profitability based on activity based costing using environment driven costs requires the following steps:

- Breakdown of overhead cost of ₹ 230 per unit into treatment cost of harmful gases, wastewater treatment cost, cost of planting trees and other overhead costs. Refer Table 2 for the breakup.

- Treatment cost of harmful gases, wastewater treatment cost need to be individually allocated to various processes based on relevant cost drivers. Refer Table 3 for cost allocation to process.

- The overheads mentioned in point 2 thus allocated to the various processes, will be further allocated to products based on the specific ratios given in the problem. Refer Table 4 for cost allocation to products.

Product Wise Profitability Statement based on ABC using environment driven costs (Figures in ₹per unit of leather produced)

Particulars	Product A	Product B	Total
Selling Price	620	420	1,040
Direct Material (Refer Table 1)	286	174	460
Direct Labour (Refer Table 1)	186	114	300
Allocation of Overheads			
Treatment Cost of Harmful Gases (Refer Table 4)	50	30	80
Wastewater Treatment Cost (Refer Table 4)	62	38	100
Cost of Planting Trees (shared equally)	10	10	20
Other Overhead Cost (shared equally)	15	15	30
Total Expenses	609	381	990
Profit	11	39	50
Profitability %	**1.77%**	**9.29%**	×

Workings

Table 2: Breakdown of General Overheads per unit

Overhead	Amount (₹)	Allocation basis between products
Treatment Cost of Harmful Gases	80	Emission of Harmful Gases (cc per week)
Wastewater Treatment Cost	100	Wastewater Generated (litres per week)
Cost of Planting Trees	20	Equally between Products A and B
Other Overheads (balancing figure)	**30**	Equally between Products A and B
Total General Overheads per unit	230	

Table 3: Allocation of Treatment Cost to various process Process Wise Information

Overhead	Amount (₹)	Allocation Basis Between Products	Tanning	Dyeing	Finishing	Total
Treatment Cost of Harmful Gases	80	Emission of Harmful Gases (cc per week)	400cc	300cc	100cc	800cc
Wastewater Treatment Cost	100	Wastewater Generated (ltr. per week)	900lt.	600lt.	---	1,500lt.

Cost Allocation to Process

Overhead	Amount (₹)	Allocation Basis Between Products	Tanning (₹)	Dyeing (₹)	Finishing (₹)	Total (₹)
Treatment Cost of Harmful Gases	80	Emission of Harmful Gases (cc per week)	40	30	10	80
Wastewater Treatment Cost	100	Wastewater Generated (litres per week)	60	40	0	100

Table 4: Allocation of Treatment Cost to Product A and B(₹)

Overhead	Tanning	Dyeing	Finishing	Total
Treatment Cost of Harmful Gases	₹40	₹30	₹10	₹80
Cost Allocation % to Product A	70%	50%	70%	×
Cost Allocation % to Product B	30%	50%	30%	×
Cost Allocation to Product A	₹28	₹15	₹7	₹50
Cost Allocation to Product B	₹12	₹15	₹3	₹30

Wastewater Treatment Cost	₹60	₹40	---	₹100
Cost Allocation % to Product A	70%	50%	70%	×
Cost Allocation % to Product B	30%	50%	30%	×
Cost Allocation to Product A	₹42	₹20	---	₹62
Cost Allocation to Product B	₹18	₹20	---	₹38

(c) Analysis of the difference in product profitability as per both the methods

In the first method, general overhead costs are allocated to the products A and B, irrespective of the environment costs that each product incurs. General overhead costs are to each product equally. The resultant product profitability shows that Product A yields 5.32% and Product B yields 4.05% profitability. Therefore, the Excel Ltd. would conclude that Product A is more profitable.

In the next method, general overhead costs are bifurcated to identify "hidden" environment costs that are incurred on account of manufacturing these products. Environment costs are first traced to the process that generates harmful gases and wastewater, for which treatment is done. It can be seen that Tanning process, followed by Dyeing and Finishing process generates the maximum amount of waste. Therefore, by proportioning the cost based on the waste generated, more cost is allocated to Tanning the process. Similarly, Dyeing and Finishing are allocated lesser cost since they do not generate as much waste. It is further given that 70% of the cost of Tanning relates to Product A. This is much higher than the 50% that was allocated to the Product as per the first method.

Accordingly, the revised workings show that Product A yields 1.77% and Product B yields 9.29% profitability. The reason being, Product A generates more environment driven costs as compared to Product B.

Excel Ltd. would therefore increase the selling price of Product A if it wants to maintain profitability as per the original method. However, the more sustainable approach would be find out ways of reducing wastewater and harmful gases the manufacturing process produces. This would in turn result in reduction of environment driven costs such as wastewater treatment and treatment of harmful gases. This would sustain profits in the long run.

(d) Four Techniques for the identification and allocation of Environmental Costs

Input-Output Analysis: This technique monitors the material input with the output that is produced. For example, if 100kg of material have been bought and input in the process resulting in 80kg output material, the 20kg must been accounted in some way. Some part of this may say 10% (2kgs) may have been sold as scrap while the remaining 90% (18kgs) of it may be waste. Possibly scrap can be reused therefore may have neutral environment impact. The company can then concentrate on minimizing waste generation.

Flow Cost Accounting: This technique uses not only material flows but also the organizational structure. Classic material flows are recorded as well as material losses incurred at various stages of production. Flow cost accounting makes material flows transparent. It tracks:

   (i) quantities (physical data);

   (ii) costs (monetary data) and

   (iii) values = (quantities × costs).

Material flows are divided into three categories: material, system, and delivery/disposal.

(i) The material values and costs apply to the materials which are involved in the various processes.

(ii) The system values and costs are the in-house handling costs, which are incurred inside the company for the purpose of maintaining and supporting material throughput. Example personnel costs or depreciation.

(iii) The delivery and disposal values and costs refer to the costs of flows leaving the company for example transport costs or cost of disposing waste.

The focus of flow cost accounting is on reducing the quantities of materials, which leads to increased ecological efficiency.

Life Cycle Costing: This technique considers the costs and revenues of a product over its whole life rather than one accounting period. Therefore, the full environmental cost of producing a product will be taken into account. In order to reduce lifecycle costs, an organization may adopt a TQM approach. Good environmental management is increasingly recognized as an essential component of TQM. Such organizations pursue objectives that may include zero complaints, zero spills, zero pollution, zero waste and zero accidents. Information systems need to be able to support such environmental objectives via provision of feedback of the organizational efforts in achieving such objectives.

Activity Based Costing (ABC): ABC allocates internal costs to cost centres and cost drivers on the basis of the activities that give rise to the costs. Environment- related costs can be attributed to joint cost centers and environment-driven costs are hidden on general overheads. Environment-driven costs are removed from general overheads and traced to products or services. The cost drivers are determined on environment impact that activities have and costs are charged accordingly. This should give a good attribution of environmental costs to individual products that should result in better control of costs.

(e)   Reasons why environmental costs is becoming **important in organizations**

(i) "Carbon footprint" measures the total greenhouse gas emissions caused directly and indirectly by a person, organization, event or product. People are now becoming aware about the carbon footprint and recycling. Several companies have initiated CSR committees as they feel that portraying themselves as environmentally responsible makes them popular among their consumers.

(ii) Environmental costs are becoming huge for some companies particularly those operating in highly industrialized sectors such as oil production. Such significant costs need to be managed.

(iii) Regulation is increasing worldwide at a rapid pace, with penalties for non- compliance also increasing accordingly.

QUESTION 15

In WM Ltd. the 'OB' equipment is about to be replaced either by 'CF' system or by an 'OF' system. Finance costs 12% a year and the other estimated costs are as follows

	CF (₹)	OF (₹)
Initial Cost	28,000	40,000
Annual Operating Costs	24,000 p.a.	18,000 p.a.

Required If the company expected the new system (either CF or OF) to last at least for 12 years, which system should be chosen? COMMENT. (STUDY MATERIAL)
ANSWER:

Calculation of Life-cycle Costs

	CF (₹)	OF (₹)
Initial Cost	28,000	40,000
Add: Present value of annual operating costs over the life-time	1,48,656 (₹ 24,000 x 6.194)	1,11,492 (₹ 18,000 x 6.194)
Total Life Cycle Costs	1,76,656	1,51,492

The annuity factor of 12% finance costs for 12 years is 6.194.
Analysis
When we compare only the initial cost, we will tend to purchase CF system, for its cheap acquisition cost. But when we compare the total life-cycle costs, the OF system is most preferable, for its lowest total life-cycle costs.

QUESTION 16
Lite Limited willing to inculcate life cycle costing in its costing system. Product manager define the phases of the product as Design, Manufacturing, Operations, and End of life; Can you assist the management accountant to LIST the type of cost which will be significantly incurred at Lite limited under identified four phases? (STUDY MATERIAL)
Solution
Although the four phases are Introduction, Growth, Maturity, and Decline, It may be possible for any organisation to customise the model as per their need and wisdom to analyse the cost and corresponding revenue over the life of the product.
Type of Costs, Lite Limited is expected to incure during different stages

Phase/Stage	Cost
Design	Research, Development, Design & Testing
Manufacturing	Material, Labour, Overheads, Machine Set-up, Inventory, Training, Production Machine, Maintenance, and Depreciation
Operation	Distribution, Advertising, and warranty claims
End of Life	Environmental Clean-up, Disposal and Discommissioning

Note – The above categorisation of cost is purely based upon significance %age of the cost incurred, it may possible that certain category of the cost incurred over more than one phase of the life cycle. For example, product development cost needs to be incurred in each phase till maturity phase, earlier for creation and then for differentiation (even in decline phase too with intent to product extension)

QUESTION 17

Storewell Industries Ltd. manufactures standard heavy duty steel storage racks for industrial use. Each storage rack is sold for `750 each. The company produces 10,000 racks per annum. Relevant cost data per annum are as follows:

Cost Component	Budget	Actual	Actual Cost p.a. (`)
Direct Material	5,00,000 sq. ft.	5,20,000 sq. ft.	20,00,000
Direct Labour	90,000 hrs.	1,00,000 hrs.	10,00,000
Machine Setup	15,000 hrs.	15,000 hrs.	1,50,000
Mechanical Assembly	200,000 hrs.	200,000 hrs.	30,00,000

The actual and budgeted operating levels are the same. Actual and standard rates of material procurement and hourly labor rate are also the same. Any variance in cost is solely on account of difference in the material usage and hours required to complete production. Aggressive pricing from competitors has driven down sales. A comparable rack is available in the market for `675 each. Vishal, the marketing manager has determined that in order to maintain the company's existing market share of 10,000 racks, Storewell Industries must reduce the price of each rack to `675.

Required

i   (CALCULATE the current cost and profit per unit. IDENTIFY the non-value added activities in the production process.

ii   CALCULATE the new target cost per unit for a sales price of `675 if the profit per unit is maintained.

iii   RECOMMEND what strategy Storewell Industries should adopt to attain target cost calculated in (ii) above.

(STUDY MATERIAL)

ANSWER:

(i) The current cost and profit per unit are calculated as below:

Cost Component	Units	Actual Cost p.a. for 10,000 racks (₹)	Actual Cost per rack (₹)
Revenue	10,000 racks	75,00,000	750
Direct Material	5,20,000 sq. ft.	20,00,000	200
Direct Labour	1,00,000 hrs.	10,00,000	100
Machine Setup	15,000 hrs.	1,50,000	15
Mechanical Assembly	200,000 hrs.	30,00,000	300
Total Cost		61,50,000	615
Profit		13,50,000	135

Therefore, the current cost is `615 p.u. while the profit is `135 p.u. Machine setup is the time required to get the machines and the assembly line ready for production. In this case, 15,000 hours spent on setting up does not add value to the storage racks directly. Hence, it is a non-value add activity.

(ii) New sale price per rack is `675 per unit. The profit per unit needs to be maintained at `135 per unit. Hence, the new target cost per unit = new selling price per unit – required profit per unit = `675 - `135 = `540 per unit.

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(iii) As explained above, current cost per unit is `615 while the target cost per unit is `540. Hence, the cost has to be reduced at least by `75 per unit. Analysis of the cost data shows the variances between the budget and actual material usage and labor hours. It is given that the material procurement rate and labor hour rate is the same for budgets and actuals. Hence, the increment in cost of direct materials and labor is due to inefficient use of material and labor hours to complete the same level of production of 10,000 storage racks.

Corrective actions to address these inefficiencies could result in the following savings:

(a) Inefficiencies resulted in use of extra 20,000 sq. ft. of material.

Material cost per sq. ft. = Actual cost / Actual material usage = `20,00,000 / 5,20,000 sq. ft. = `3.85 per sq. ft.

Therefore, inefficiencies resulted in extra cost = 20,000 sq. ft. × `3.85 per sq. ft. = `77,000.

If corrective action is taken, for 10,000 racks this translates to a saving of `7.70 per unit.

(b) Inefficiencies resulted in extra 10,000 hrs. to be spent in production.

Labor cost per hr. = Actual cost / Actual labor hrs. = `10,00,000 / 10,000 hrs. = `10 per hr.

Therefore, inefficiencies resulted in extra cost = 10,000 hrs. × `10 per hour = `100,000.

If corrective action is taken, for 10,000 racks this translates to a saving of `10 per unit.

(c) Machine setup cost is a non-value added cost. Value analysis can be done to determine if the setup time of 15,000 hrs. can be reduced. However, since these activities have been carried out for a reason, care should be taken to ensure that this change should not adversely impact the production activity later down the stream.

(d) Mechanical assembly cost is almost half of the total cost. These are costs incurred during the production process on the assembly line. Value analysis can be done to determine if the production process can be made more efficient. For example, the process can be streamlined, such that steps can be combined that can be handled by fewer people (process centering). Similarly, value analysis / value engineering can focus on the product design.

Some questions to raise may be:

- Can the product be designed better to make the production more efficient?

- Can the design be minimized to include fewer parts and thus make it easier and efficient to manufacture?

- Can be substitute parts to make it more efficient? *Or*

- Is there simply a better way of producing the same product?

While target costing is a dynamic and corrective approach, care must the taken the product quality, characteristics and utility are maintained.

QUESTION 18

Tt Co. Ltd. makes digital watches. The company is preparing a product life cycle budget for a new watch. Development on the new watch is to start shortly. Estimates for new watch are as under:

Life Cycle Units Manufactured and Sold	2,40,000	**Marketing Costs:**	
Selling Price Per Watch	₹500	Variable Cost Per Batch	₹24
Life Cycle Costs:		Watches Per Batch	96
R&D and Design Cost	₹80 Lakh	Fixed Costs	₹8 Lakh
Manufacturing Costs:		**Distribution Costs:**	
Variable Cost Per Watch	₹120	Variable Cost Per Watch	₹240
Variable Cost Per Batch	₹4,000	Fixed Costs	₹45 Lakh
Watches Per Batch	300	**Customer Service Cost:**	
Fixed Costs	₹112 lakh	Variable Cost Per Watch	₹10

Required
(i) CALCULATE the budgeted life cycle operating income for the new watch.
(ii) COMPUTE % of budgeted total product life-cycle costs incurred till the R & D and design stages.
(iii) ADVISE the strategies to be adopted by the Tt Co. Ltd. to develop a new watch.
(STUDY MATERIAL)
ANSWER:
(i) Statement Showing Budgeted Life-Cycle Operating Income

Particulars	(₹)
Revenues (₹500 × 2,40,000 units)	12,00,00,000
Less: R&D and Design Costs	80,00,000
Manufacturing Costs:	
Variable (₹120 × 2,40,000 units)	2,88,00,000
Batch $\left(2,40,000 \times \dfrac{₹4,000}{3,000}\right)$	32,00,000
Fixed	1,12,00,000
Marketing Costs:	
Batch $\left(2,40,000 \times \dfrac{₹24}{96}\right)$	60,000
Fixed	8,00,000
Distribution Costs:	
Variable (₹240 × 2,40,000)	5,76,00,000
Fixed	45,00,000
Customer Service Costs:	
Variable (₹10 × 2,40,000)	24,00,000
Total Costs	11,65,60,000
Operating Income	34,40,000

(ii) % of Budgeted Total Product Life-Cycle Costs incurred till the R & D and Design Stages:

$$\left(\frac{₹80,00,000}{₹11,65,60,000} \times 100\right) = 6.86\%$$

(iii) We can see from the below figure that approximately 80% of a product's cost are committed during the planning and design stage. At this stage product designers determine the product's design and the production process. In contrast, the majority of costs are incurred at the manufacturing stage, but they have already become locked in at the planning and design stage and are difficult to alter.

Product life-cycle phase
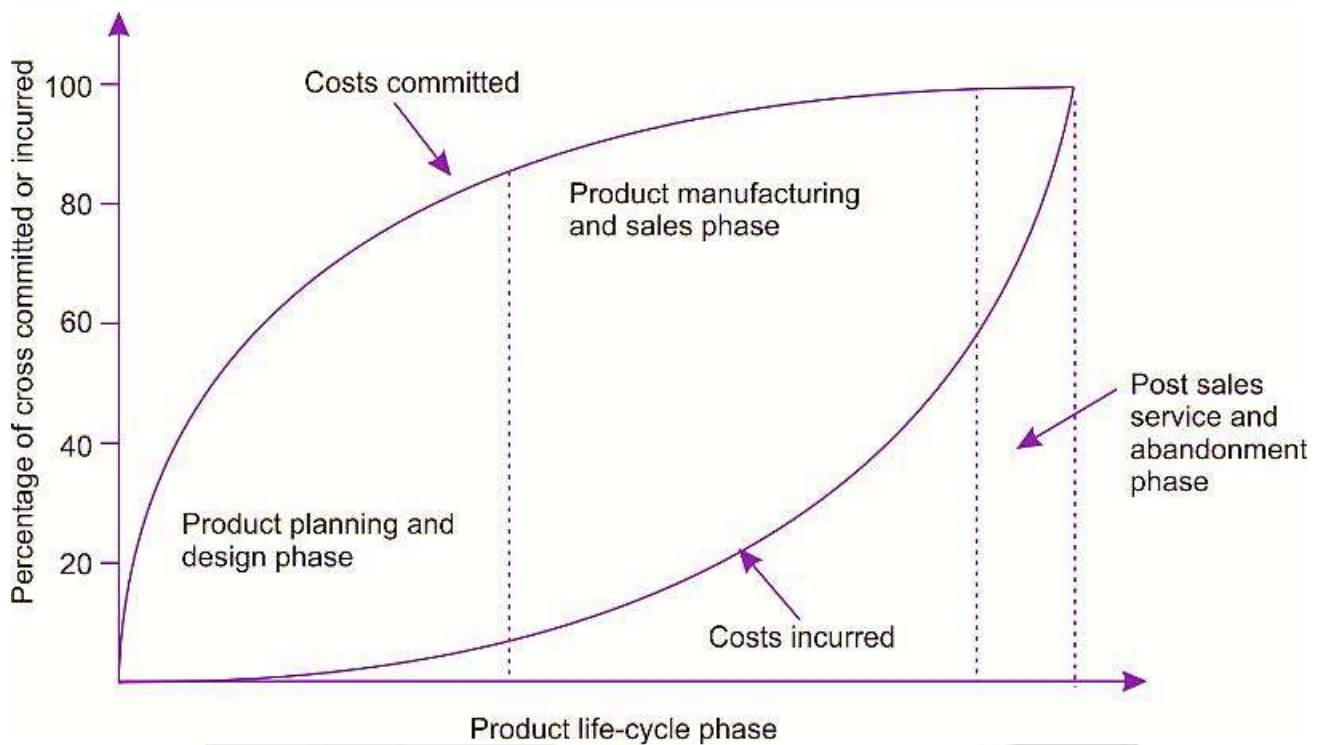
The pattern of cost commitment and incurrence will differ based on the industry and specific product introduced. For developing a watch, Tt Co. Ltd. needs to incur only `80 lacs for its R&D and design Cost. So, Cost Management of Tt Co. Ltd can be most effectively exercised during the planning and design stage of its new watch and not at the manufacturing stage when the product design and processes have already been determined and costs have been committed. At manufacturing stage only cost containment is possible rather than on cost management. An understanding of life-cycle costs and how they are committed and incurred at different stages throughout a product's life cycle of the watch will also led to the emergence of target costing, a technique that focuses on managing costs during a product's planning and design phase.

QUESTION 19

Mould & Dies (M&D) was established in 1980 and has enormous wealth of experience in the mould manufacturing industry and serves wide range of plastic moulds all over nation. Over the past decade, M&D has developed the reputation for quality products & services for customer focused approach. It deals in injection moulds, blow moulds, die sets, moulds base etc.

With a state-of-the-art infrastructure facility, M&D is able to meet the qualitative and quantitative demands of its clients. Its vision & mission is to provide high class manufactured products by using best quality raw materials.

M&D has developed a new product "M" which is about to be launched into the market and anticipates to sell 80,000 of these units at a sales price of ` 300 over the product's life cycle of four years. Data pertaining to product "M" are as follows

Costs of Design and Development of Molds, Dies, and Other Tools	` 8,25,000
Manufacturing Costs	` 125 per unit
Selling Costs	` 12,500 per year + ` 100 per unit
Administration Costs	` 50,000 per year
Warranty Expenses	5 Replacement Parts per 25 units at ` 10 per part; 1 Visit per 500 units (Cost ` 500 per visit)

Required
(i) COMPUTE the product "M"'s 'Life Cycle Cost'.
(ii) SUGGEST two ways to maximize "M"'s lifecycle return.
Note: Ignore time value of money (STUDY MATERIAL)
ANSWER:

(i) Statement Showing "M's Life Cycle Cost (80,000 units)"

Particulars	Amount (`)
Costs of Design and Development of Molds, Dies, and Other Tools	8,25,000
Manufacturing Costs (`125 × 80,000 units)	1,00,00,000
Selling Costs (`100 × 80,000 units + `12,500 × 4)	80,50,000
Administration Costs (`50,000 × 4)	2,00,000
Warranty (80,000 units / 25 units × 5 parts × `10) (80,000 units / 500 units × 1 visit × `500)	1,60,000 80,000
Total Cost	1,93,15,000

(ii) Following ways are suggested to maximize "M" lifecycle return:
R&D Costs
Often **significant part of cost (even above 80%) is committed at the R&D phase of new product**, hence M&D should carefully plan and design its new product "M" as it will determine the number of parts, production process to be used etc. M&D can apply *value engineering* here. It involves improving product quality, reducing product costs, fostering innovation, eliminating unnecessary and costly design elements, ensuring efficient investment in product, and developing implementation procedures. Value engineering is most successful when it is performed early in product development stage. A value engineering study should be performed within the first 25-30% of the design effort prior to selecting the final design alternative. Here, it is also important that R&D team should work as a part of cross functional team i.e. (participate in a group of people from different functional areas), to minimise lifecycle cost and the production cycle time in new development.
Speed up the Product Launch
In cut throat competitions, it is important for M&D to get new product 'M' launch into the market as soon as possible since this will give "M" a *long stay* in the market place *without competition* in the market. Competitor always try to launch a rival product as quickly as possible in order to gain 'competitive edge'. M&D may lose overall profitability if it delays in launching of Product 'M'. It is usually worthwhile incurring extra costs to keep the launch on schedule or to speed up the launch.

QUESTION 20
Following three independent situations pertaining to environmental management and sustainability are provided to you:
Situation I
Wasco Limited is a chemical company which uses chloro-fluorocarbons (CFC) in the production of chemical. As awareness of the environmental damage caused by CFC spread, Wasco Limited stopped using CFC in its production processes and analysed and redesigned its product range much before the legislation controlling use of CFC introduced by the Government.
Situation II
Energy drink manufacturer Cool Limited was ordered to submit a yearly report to the Ministry of Environment and Forests on activities, which contains information concerning collection, recovery and recycling of packaging waste, fulfilment of the targets, volume of recovered and recycled packaging waste by type of material and declaration that all compulsory contributions and taxes have been paid.
Situation III
KOA Limited has achieved a 25% reduction of energy consumption through its "Go Renewable" initiative. For, the company a 25% reduction represents a cost saving of about Rs. 30,00,000/-.
Required

Read the above three situations and EXPLAIN:

i   Why Wasco Limited stopped using CFC and redesigned its product range much before legislation introduced by Government?

ii   The risk exposure of Cool Limited.

How focusing on environmental sustainability provides opportunity to KOA Limited for reducing costs? (STUDY MATERIAL)

ANSWER:

(i) Ever increasing and demanding environmental regulation is forcing companies to change their practices. In many countries, numerous pieces of legislation cover areas such as air quality, climate change, hazardous substances, packaging, waste, and water quality.

The trend is very much in the direction of increased and more stringent legislation. Environment sustainability is not an issue that can be avoided by any organisation.

Organisations need to consider how environmental regulation will impact thei r operations and the cost of doing business.

By stopping the use of CFC much before the legislation, Wasco Limited gained advantages over its rivals. Wasco's actions were integral to its own strategic success, and instrumental in driving through the subsequent legislation from which the company later benefited. This will also help Wasco Limited to improve their brand image among the stakeholder as corporate citizen.

(ii) Organizations increasingly have to demonstrate that they are managing all of their risks systematically and responsibly. This includes environmental risks- risks that are a result of impacts of the organization on the environment. By assessing the environmental risks associated with their activities, processes, product, and services, organizations can identify their potential legal and business exposure. Non-compliances can cause enormous financial impacts, such as fines, penalties, legal costs, and damages.

Thus, Cool Ltd is exposed to environmental risks.

(iii) Focusing on environmental sustainability will often provide opportunities for reducing costs. For example, reducing carbon impacts often also saves energy costs. Similarly, programmes for reducing wastes improve environmental performance and reduce operating costs.

Reducing environmental impacts can also reduce or eliminate associated fines, levies, and other compliance costs.

Focusing on environmental sustainability thereby making investments in developing clean technologies and more energy-efficient products and processes will not only save the organization money, but could also be patented and/ or sold to other organizations, providing an additional source of income. KOA Limited may have carbon credit for efficiency in reducing energy and sell on the open market, thereby actually generating revenue.

Section B – Case Scenarios & Case Studies

Case Scenarios

Question 1

Classify the following items under the more appropriate category: Category (CC) – Cost Control Or Category (CR) – Cost Reduction:

(i)   **Costs exceeding budgets or standards are investigated.**

(ii)   **Preventive function**

(iii)   **Corrective function**

(iv)   **Measures to standardize for increasing productivity**

(v)   **Provision of proper storage facilities for materials.**

(vi)   Continuous comparison of actual with the standards set.

(vii) Challenges the standards set

(viii) Value analysis
(STUDY MATERIAL)

Answer(PM)

Classification of Items under Cost Reduction (CR)/ Cost Control (CC)

Sl. No.	Item	Category CC/ CR
(i)	Costs exceeding budgets or standards are investigated	CC
(ii)	Preventive function	CC
(iii)	Corrective function	CR
(iv)	Measures to standardize for increasing productivity	CR
(v)	Provision of proper storage facilities for materials	CC
(vi)	Continuous comparison of actual with the standards set	CC
(vii)	Challenges the standards set	CR
(viii)	Value analysis	CR

Question 2

Queenstown Wood Co. (QWC) began 20 years ago, as a small family-run business supplying custom-made school furniture. Now QWC has grown into a thriving hub of experts specializing in either custom-made, locally sourced or quality imported commercial grade furniture. The newly appointed CFO is concerned about the trends in dropping sales volumes, increasing costs, and hence falling profits over the last three years. He observed that the reason of these trends is increased cut-throat competition that has emerged over the last three years. For many years, QWC has been known for high quality but now this quality is being matched by the competitors. QWC's share of the market is declining due to equivalent products being sold by competitors at lower prices. It is considered that, to offer such low prices, the furniture's production costs of the competitors must be lower than QWC's.

Required

ADVISE how QWC can improve its sales volumes, costs and profits using Value Analysis and Functional Analysis. (Study Material)

Answer (MTP OCT.19)

Value Analysis is viewed as a reduction in cost and problem solving technique. Such technique analyses an existing product to identify and cutback or eliminate any cost which do not give any contribution to performance or value. It is a planned, scientific approach to c ost reduction which reviews the material composition of a product and production design so that modifications and improvements can be made which do not reduce the value of the product to the customer or to the user. (i.e. quality for purpose should not be compromised.)

Functional analysis is applied to the design of new products and breaks the product down into functional parts. For example, a new chair may have the moveable feature. The value that the customer places on each feature is considered and added to give a target cost. Thus, functional analysis aims to increase profits by reducing costs through elimination of unnecessary features and/or by adding cost-effective new

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features that are so attractive to customers that the product becomes more lucrative.

The result of the above analysis is to improve the value of the furniture while maintaining costs and/or cutback the costs of the furniture without compromising with value. It is clear from the scenario that QWC needs to cut back its selling prices to compete in the market. This selling price reduction can only be possible by a reduction in QWC's unit costs; however, such reduction must not be accomplished by compromising with quality. Both value analysis and functional cost analysis may be used for QWC; however, value analysis is likely to be a more useful technique because office tables and chairs are such items which are demanded more on the basis of their use value rather than their esteem value.

Question 3

Kaveri Ltd. (KL) is a manufacturer of bikes in India and it sells them in India and outside India. KL has just launched the World's smallest and most affordable bike called 'Zingaroo'. The bike is mounted with all-aluminium, single cylinder, air cooled, 99.2 cc engine. The engine makes just over 8 bhp power and 8 Nm of torque, but it stakes claim to be the fuel - efficient bike, with a claimed figure of 88 kmpl. It has been creating competition for two wheelers as none of the Indian companies as well as foreign companies, offer a bike for such a competitive price within the reach of middle class family.

KL has adopted target costing technique in manufacturing this bike. For KL, maintaining target- price was difficult. During the designing and production process of bike, input costs increased frequently. However, KL designed various components especially for bike to maintain the target price. Though, one curiosity how this can be done in the future when input costs are bound to increase further.

Many environmentalists have opposed the manufacture of this bike, because they believe that mass production of small bike (about 2.5 lakh bike every year) will create heavy pollution. Many people believe that this small bike is not up to the safety standards due to lightwe ight and use of aluminium and plastic frames. The design of this bike is entirely different from that of other bikes. This also causes a doubt that the existing bike mechanics would be able to repair or not. Durability of bike is another issue in the Indian environment. Further, performance of 'Zingaroo' more or less depends upon the condition of roads and traffic system.

After the launch of 'Zingaroo', many other national & international automobile companies are also planning to manufacture small bike which will create tough competition in near future.

Required

Now you being a strategic performance analyst of KL, answer the following questions:

(i)   IDENTIFY strategy which KL has adopted for 'Zingaroo' bike?

(ii)   After adopting target costing, IDENTIFY issues and challenges faced by KL and suggest the remedial action to be taken to solve these issues? (Study Material)

Answer

(i)   KL has adopted Low Cost Strategy for "Zingaroo" bike since the main purpose of manufacturing this bike was to make it cheapest and affordable.

(ii)   The issues and challenges faced by KL and their remedial action are as follows:

Maintaining of Target Price

'Zingaroo' bike is one of the world's cheapest and smallest bike. Maintaining target- price proved to be a

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big challenge for the KL since input cost of bike are bound to increase further in future. The initial value engineering may not uncover all possible cost savings. Thus, Kaizen Costing may be designed to repeat

many of the value engineering steps for as long as a bike is produced, constantly refining the process and thereby stripping out extra costs.

Environmental Issues

Many environmentalists have opposed the manufacture of bike as they believe that mass production of small bikes will create heavy pollution since automobile pollution is already a big problem for a country like India. For this issue, 'Zingaroo' bike can be prepared based on BS emission norms. These norms restrict the pollution created by any motor vehicle.

Safety Issues

Since 'Zingaroo' bike is made of aluminium and plastic frames so this may also create safety issues for the customers. For such issues, KL should meet safety standards. Further, KL should make people aware that 'Safety is Primary'/ 'Drive Safely'.

Servicing/ Repairing Facilities

The design of 'Zingaroo' bike is entirely different from that of other bikes. This causes a doubt that the existing bike mechanics would be able to repair or not. For such problem, creation of a good network of service center can be a solution i.e. repair center should be established on required places.

Durability

Durability of 'Zingaroo' bike is another issue in the Indian environment. The performance of bike more or less depends upon the condition of roads and traffic system. For such issues, tyre quality and hydraulic brake system should be compatible to the roads and traffic system.

Global Competition

After the launch of 'Zingaroo', many other national and international automobile companies are also planning to manufacture a small bike, which will be a big challenge for the KL in the near future. To face such competition, it may adopt Kaizen Costing technique. The cost reductions resulting from Kaizen Costing are much smaller than those achieved with Value Engineering but are still worth the effort since competitive pressures are likely to force down the price of 'Zingaroo' over time, and any possible cost savings allow KL to still attain its targeted profit margins while continuing to reduce cost.

Question 4

CNB Oil Ltd., an Indian oil company, is the leading manufacturer of all streams of oil and engaged in refining (processing capacity 50 MMTPA of crude oil), pipeline transportation and marketing of petroleum products to research & development, exploration & production, marketing of natural gas and petrochemicals. The company has high-caliber employees, sophisticated technologies and leading-edge R&D. By venturing itself into the renewables and the nuclear energy, CNB has grown and evolved itself from a pure petroleum re fining and marketing company to a full-fledged energy company. Due to government's new environmental policy, environmental report is mandatorily required to be submitted yearly for the prescribed industries polluting environment substantially otherwise would be penalized. Energy sector also falls in these prescribed industries. CNB has already taken initiatives to control air pollution and water pollution like use of low sulphur fuel oil in boilers and heaters & NOx burners to minimize gas emission, network of underground sewers for segregated collection of various wastewater streams for waste water management, however while preparing and analyzing environmental report, Mr. K V Sharma, CEO, is not happy with high environmental cost in terms of Waste (oily / chemical /

biological sludge, scrape batteries, e-waste, chemical containers, effluents etc.), Raw Material

Consumption, Water Consumption, Energy and Transportation. He raised his concern with Board of Directors and they have decided to appoint you as an environmental management accounting expert to manage environmental cost.

Required

APPLY Environmental Management Accounting in CNB to manage environmental costs.

Answer (MTP APRIL.18) (STUDY MATERIAL)

Environmental Management Accounting (EMA) is the process of collection and analysis of the information relating to environmental cost for internal decision making. EMA identifies and estimates the cost of environment related activities and seek to control theses cost.

In CNB, during refinery operations, waste water, fugitive emissions, flue gases and solid wastes are generated. Due to this excess waste and gas emission, environmental cost rises. Scarce natural resources should be used in such a way so that their consumption is sustainably optimized. In order to cutback environmental cost, EMA can be applied as follows:

Waste

CNB should measure, manage and monitor waste from operations in order to minimise impact on people and the environment. 'Mass balance' approach can be used to determine how much material is wasted in production, whereby the weight of materials bought is compared to the product yield. From this process, potential cost savings may be identified.

In CNB, wastes are oily / chemical / biological sludge, scrape batteries, e–waste, chemical containers, effluent etc. Waste generated in operations is either treated within the premise or disposed through approved waste treatment, storage, and disposal facility. To avoid the usage of chemical drums/ containers in large quantity, separate storage tanks can be created for bulk storage of additives to reduce the drum procurement and disposal.

Further, refineries in operation should be upgraded from time to time to minimize waste.

Water Management

Businesses pay for water twice – first, to buy it and second, to dispose of it. If savings are to be made in terms of reduced water bills, it is important for CNB to identify where water is used and how consumption can be decreased.

For water conservation, sustainable water management techniques should be adopted. In refining operation, water is mainly used in boilers and cooling units. Collective efforts should be made to optimize water consumption and maximum reuse of used water. Advanced treatment system like rain water harvesting, ultra-filtration, reverse osmosis etc. may be used for water purification for further use. This would lead to substantial reduction in intake of fresh water.

In addition, CNB staff should be alerted for water conservation through seminars, presentations, conference, awareness campaigns.

Energy

Often, energy costs can be reduced significantly at very little cost. Environmental Management Accounts may help to identify inefficiencies and wasteful practices and, therefore, opportunities for cost savings. Some of energy conservation initiatives may be taken by CNB like:

☐ Conducting periodic energy audits for identifying energy saving opportunities.

⬚ Phasing out conventional lights and replacement with LED lights/induction lights.

⬚ Power factor improvement by installation of capacitor banks.

⬚ Installation of 5 star rated energy equipment.

⬚ Prevention of idle running of equipment.

⬚ Installation of solar lights.

⬚ Use of Nano molecular thermal additives in ACs.

⬚ Installation of efficient energy monitoring system for energy intensive equipment.

⬚ Capacity improvement for batteries.

Consumables and Raw Material

Refineries 'refine' crude oil in massive quantities, to produce the fuels need. There should be continuously monitoring on optimum utilization of crude oil to improve gross refining margin. The gross refining margin is the difference between the total value of petroleum products coming out of an oil refinery (output) and the price of the raw material, (input) which is crude oil. Even not only crude oil there should also be optimum and sustainable utilization of resources like additives, chemicals etc. from procurement to production stages.

CNB may use recyclable technology for raw material and consumable wastages which provides sustainability in terms of environmental protection and reduction in carbon footprint. Periodic testing should be performed to assess the health of equipment and pipelines as to have better process of raw materials and consumables.

Transport

Again, EMA may be used to identify saving in terms of transport of goods and materials. At CNB, in order to cutback emission and fuel consumption due to transportation, route optimization activity may be used like allocation of customer on the basis of nearest depots and locations as to reduce distance, real time fleet tracking using GPS (to make sure that vehicles do not deviate from assigned shortest route) etc.

Question 5

JFE, is following Life Cycle Costing. Its four products P4, P3, P2 and P1 are in the market respectively in Introduction, Growth, Maturity, and Decline stages (phases). The Management wants to analyse the marketing challenges faced by the products to take strategical measures to stabilise the products in the market. For this purpose, the Board directed the Secretary to get a product-wise report from the marketing chief of each product. The chiefs were asked to give one characteristic possessed by the product because of which the product is being classified in the respective stage and two strategical measures to be taken to overcome the market challenges faced at that stage (phase). The Secretary received the report from all the chiefs and handed them over to the computer operator to get it printed in a tabulated form. But the operator, without understanding the significance

of the products, phases, characteristics, and strategies, mixed all the twelve items $[(1 + 2) × 4]$ and got it printed as a list as given below:

(1) Over capacity in the industry.

(2) The company can continue to offer the product to our loyal customers at a reduced price.

(3) Few competitors produce basic version of our product.

(4)   Product features may be improved or enhanced to differentiate our product from that of the competitors.

(5)   Attracting customers by raising awareness about our product through promotion activities.

(6)   High volume of business and increase in competition.

(7)   Use the present product as replacement product for launching another new product successfully in the market.

(8)   Value-based pricing strategies may be considered.

(9)   Profits start declining and at times become negative.

(10)   Maintain control over product quality to assure customer satisfaction.

(11)   Strengthening or expanding channel and supply chain relationships.

(12)   Prices may have to be reduced to attract the price-sensitive customers. The items are required to be tabulated as in the format given below:

Required

(i)   Complete the table given below by entering the twelve items under appropriate category columns. You need not rewrite the items. Write the serial numbers of the items only in columns (3) and (4).

Products (1)	Phases (Stages) (2)	Characteristics (3)	Strategies (4)
P4	Introduction		
P3	Growth		
P2	Maturity		
P1	Decline		

(ii)   List down the importance (any four) of Product Life Cycle Costing.

(iii)   State the benefits (any four) of Product Life-Cycle Costing. (Study Material)

Answer (PYQ NOV.18)

(i)   Statement Showing Product Life Cycle Characteristics and Strategies

Products (1)	Phases (Stages) (2)	Characteristics (3)	Strategies (4)
P4	Introduction	(3)	(5), (11)
P3	Growth	(6)	(10), (8)
P2	Maturity	(1)	(4), (12)
P1	Decline	(9)	(2), (7)

(ii)   **Importance of Product Life Cycle (PLC) Costing**

▪ As a Planning tool, it characterizes the marketing challenges in each stage and poses major alternative strategies, i.e. application of Kaizen.

▪ As a Control tool, the PLC concept allows the company to measure product performance against similar products launched in the past.

- As a Forecasting tool, it is very important because sales histories exhibit diverse patterns and the stages vary in duration.
- It leads to appropriate strategy formulation depending on the stages of the product life cycle.

(iii) Benefits of Product Life Cycle Costing

The benefits of product life cycle costing are summarized as follows:

- The product life cycle costing results in earlier actions to generate revenue or to lower costs than otherwise might be considered. There are a number of factors that need to the managed in order to maximize return on a product.

- Better decisions should follow from a more accurate and realistic assessment of revenues and costs, at least within a particular life cycle stage.

- Product life cycle thinking can promote long-term rewarding in contrast to short- term profitability rewarding.

- It provides an overall framework for considering total incremental costs over the entire life span of a product, which in turn facilitates analysis of parts of the whole where cost effectiveness might be improved.

- It is an approach used to provide a long-term picture of product line profitability, feedback on the effectiveness of life cycle planning and cost data to clarify the economic impact of alternatives chosen in the design, engineering phase etc.

- It is also considered as a way to enhance the control of manufacturing costs. The thrust of product life cycle costing is on the distribution of costs among categories changes over the life of the product, as does the potential profitability of a product. Hence it is important to track and measure costs during each stage of a product's life cycle.

- Product life cycle costing traces research and design and development costs etc., incurred to individual products over their entire life cycles, so that the total magnitude of these costs for each individual product can be reported and compared with product revenues generated in later periods.

Question 6
STATE the business situations in which you recommend to apply Pareto Analysis. (STUDY MATERIAL)

Answer

Pareto Analysis is generally applicable in the following business situations.

Pricing of a Product

a. In the case of a firm dealing with multi products, it would not be possible for it to analyse cost-profit- price -volume relationships for all of them. In practice, in case of such firm approximately 20% of products may account for about 80% of total sales revenue. Pareto Analysis is used for analysing the firm's estimated sales revenues from various products and it might indicate that approximately 80% of its total sales revenue is earned from about 20% of its products.

Customer Profitability Analysis

b.   Instead of analysing products, customers can be analysed for their relative profitability to the organisation. Again, it is often found that approximately 20% of customers generate 80% of the profit. There will always be some customers who are less profitable than others, just as some products are less profitable than others. Such an analysis is useful tool for evaluation of the portfolio of customer profile and decision making such as whether to continue serving a same customer group, what is the extent of promotion expenses to be incurred.

ABC Analysis- Stock Control

c.   Another application of Pareto analysis is in stock control where it may be found that only a few of the goods in stock make up most of the value. In practice, approximately 20% of the total quantity of stock may account for about 80% of its value. The outcome of such analysis is that by concentrating on small proportion of stock items that jointly accounts for 80% of the total value, a firm may well be able to control most of monetary investment in stocks.

Application in Activity Based Costing

d.   In Activity Based Costing it is often said that 20% of an organisation cost drivers are responsible for 80% of the total cost. By analysing, monitoring and controlling those cost drivers that cause most cost, a better control and understanding of overheads will be obtained.

Quality Control

e.   Pareto analysis seeks to discover from an analysis of defect report or customer complaints which "vital few" causes are responsible for most of the reported problems. Often, 80% of reported problems can usually be traced to 20% of the various underlying causes. By concentrating one's efforts on rectifying the vital 20%, one can have the greatest immediate impact on product quality.

Case Studies

Question 7

Shandaar Bangle Ltd (SBL) have been recognized as a manufacturers and exporters of high quality Bangles, designed, and manufactured using optimum quality raw material, sourced from trustworthy vendors of the market.

Manufacturing Process

The process of manufacture of glass bangles is highly skilled labour oriented one comprising of the following main operations:

Glass Melting Phase ------ > Parison Making Phase > Spiral /Coil Forming Phase

In first phase, glass batch materials like sand, soda ash, lime stone feldspar, borax etc. with other additives and colouring materials in a suitable proportion are mixed manually and fed into the pot places in pot furnace. The raw material is melted in the furnace at a temperature of about 1300 – 1400 (°C) to obtain molten glass.

In second phase, molten glass is drawn from the pot of the furnace with the help of the iron pipe and formed into gob to gather required quantity of glass for formation into parisons on iron plates. The parisons of different colours are joined together and reheated in an auxiliary furnace to obtain required designs.

In third phase, the reheated parison is then transferred to 'Belan Furnace' from which the glass is further drawn into spiral/ coil of bangles on the spindle counted and rotated manually at uniform rate of revaluation synchronizing with the manually at the other end of the furnace. Spiral are then taken out from the spindle and cut with the help of a pencil cutter to separate out the single pieces of bangles from spiral. These cut or un-joined bangles are then sent for joining of end, finishing cutting & polishing, decoration etc. The finished products are then neatly packed for sale.

Environmental Impact

But unfortunately, these processes have environmental impact at all stages of the process, including emissions of airborne pollution in the form of ashes, gases, noise and vibration.

Conditions of the Workplace

Due to limitations of maintaining appropriate temperature for melting and moulding of the glass, furnaces are kept burning. Therefore, workers have to work with such working conditions continuously without proper leisure time.

The above-mentioned factors become more harmful while working in immense heat and sound which is normally higher than permissible levels.

Health Impact

A recent study has revealed adverse impact of pollution over workers and people who are living in nearby area.

Management Initiatives

The management of company is worried about environmental impact and health impact and has taken certain initiatives in taking care of environment like- batch house cyclonic dust collector, noise absorbing device, natural gas fired furnace, better refractory materials, training for waste minimization, treatment of solid waste, research and development activities aimed at reducing pollution level, planting trees, treatment of nitrogen oxide and other harmful gases.

Management desires to adopt environmental management accounting as a part of strategic decision making process.

Required

(i) EXPLAIN the requirement to have environmental management accounting and IDENTIFY the SBL's environmental prevention, appraisal, and failure costs.

(ii) ANALYZE the appropriateness of SBL incorporating the following in implementing Environmental Management Accounting:
   - Activity Based Costing
   - Life Cycle Costing
   - Input Output Analysis

(iii) EXPLAIN the need of non-financial consideration in decision making and suggest safety measures that can be taken into consideration for workers.

Answer (STUDY MATERIAL)

Environmental management accounting (EMA) is the generation and analysis of both financial and non-financial information in order to support internal environmental management processes i.e. identification, prioritization, quantification and recording of environmental cost into business decision.

By adopting EMA, SBL will have following benefits:
- Product Pricing.
- Budgeting.
- Investment Appraisal.
- Calculating Investing Options.\
- Designing, Calculating Costs, Savings and Benefits of Environment Projects.
- Setting Quantified Performance Targets.
- Assessment of Annual Environmental Costs.
- Environmental Performance Evaluation, Indicators and Benchmarking.

- External Reporting- Disclosure of Environmental Expenditures, Investments and Liabilities

Environmental Costs of SBL

- **Environmental Prevention Cost:** These costs are basically incurred in relation to activities undertaken to prevent the production of waste that could harm the environment. Company's efforts to minimize the effect of its activities on the environment li ke installing batch house cyclonic dust collector, natural gas fired furnace, better refractory materials, training for waste minimization, research and development activities, noise absorbing device and planting trees can be classified as Environmental Preventive Cost.

- **Environmental Appraisal Costs:** It means costs incurred in relation to activities undertaken to determine whether product processes and other activities within firm are complying with environment standards.

   SBL may perform 'Contamination Test' to observe the environment compatibility of   its processes can be categorized under environmental appraisal cost.

- **Environmental Failure Cost:** It means cost incurred in relation to activities dealing with pollution arising from the activities of entity includes costs related to treatment harmful gases and treatment of solid waste.

Appropriateness of Techniques for Identification and Allocation Activity Based Costing

This costing technique would help the SBL to separate environmental costs from the general overheads and allocate them to glass bangles by identifying appropriate drivers of these environmental cost. Possible environment activities for environmental costs and their drivers are:

Activity	Cost Drivers
▪ Planting of trees	▪ Number of trees planted
Treatment of nitrogen oxide (in the same way, activity and related cost driver for other gases would be determined)	▪ Volume of nitrogen oxide treated
▪ Solid waste removal	▪ Volume of such waste
▪ Research and development activities	▪ Man hours worked for such activities

Life Cycle Costing

By using this costing in EMA, SBL would be able to identify, record and control the environmental costs relating to various stages in the life of glass bangles. At each of following stage environmental cost would be incurred:

- In raw material stage, some natural product would be purchased.
- In manufacturing stage, emission and treatment of nitrogen oxide & other gases and treatment of solid waste.

- In marketing and distribution stage, environmental cost relating to transportation of glass bangles to various customers.

Input /Output Analysis

Here detail analysis of input and output of a system is done for the purpose of assessment of ecological wellbeing of entity's products, processes and other activities. This technique is based on the fact that whatever goes into the system has to come out of it.

In case of SBL, it can evaluate the volume of sand, soda ash, lime stone feldspar, borax etc. and the resulting volume of output i.e. glass bangles. Through such evaluation, the SBL would be able to allocate and analyses environmental cost attributable to input and output of glass bangles.

Non-Financial Considerations

Entities generally give emphasis on financial measures such as earnings and accounting returns but little emphasis on drivers of value such as customer and employee satisfaction, innovation and quality. Due to which mostly companies could not continue in long term. So for the purpose of achieving long-term organizational strategies, non-financial consideration should be taken into account. Without this it may be that company achieve short term goal but would be difficult to achieve long term goal.

In SBL, it can be clearly seen that there is great impact on health of workers. By creating a safe and healthy environment for employees, SBL can improve productivity, business performance, staff morale and employee engagement. Further, SBL will also be able to reduce – accidents/ work related ill health/ sick

pay costs as well as insurance costs. A healthy workforce can demonstrate corporate responsibility. If SBL look after employees, business is likely to have a more positive public image.

To create safe and healthy environment following measures can be taken into consideration:
- Safety monitoring system.
- Workers must be trained.
- Recruitment of more workers.
- First aid kit should be available.
- Protective glasses, clothes, gloves should be provided.
- Regular health check-up camps and awareness programs.

CHAPTER-5 Cost Management for Specific Sector

Section B – Case Scenarios & Case Studies

CASE SCENARIOS

Question 1

Fresh Bazar was founded in 2014 as a Fresh Bazar Mart. It provides amazing place for fresh organic fruits and vegetables, after launching its operations in November 2014, it grew to about 150 stores within three years majorly in metro cities, but soon it found that it did not have the systems and infrastructure to support that expansion.

Fruits and Vegetables as a category of competitive market types, which offers these products, very low margins, "while the rental cost and other overheads are very high". Also, staff attrition, poor locations, supply-chain issues, and infrastructure problems prompted it to shut nearly 45 stores within two years of the launch. Since then, the company has standardized its operations and increased centralization of its supply chain.

Though they provide all types of fresh organic fruits and vegetables under one roof, instead in local mandis people have to go from one place to another to buy different fruits and vegetables, still they are unable to compete with local vendors.

It also faces huge opposition from politically powerful small vendors, farmers, and middlemen. Fresh bazar had major hurdles in 2016, when it chased out state Uttar Pradesh, Jharkhand, India's most populous region, after protest by small vendors, farmers, and intermediaries.

Mr. Kailash, manager of Fresh Bazar, purchases fruits and vegetables from wholesale mandis. Price of Fruits and Vegetables fluctuates in wholesale mandis daily basis which is directly depends on the supply of fruits and vegetables by farmers. In addition, supply also depends on transport facilities, rain, political factors etc.

Fresh Bazar sells these fruits and vegetables at the almost same price as of local vendors in local mandis. Though the quality of local vendors is not as good as Fresh Bazar but local public prefer to buy fruits and vegetables from local vendors on road sides.

Their business still requires a lot of investments, and there is no synergy to the activity of the company. Due to all these reasons, Fresh Bazar is incurring continuous losses.

Fresh Bazar wants to expand its business and wants to make money in every store that they set up, and that would be the way in which they scale up their business.

Required

ADVISE is there any scope to reduce losses and increase profitability. (RTP MAY.20)

Answer

Fresh Bazar sells these fruits and vegetables at the almost same price as of local vendors in local mandis. Though the quality of local vendors is not as good as Fresh Bazar but local public prefer to buy fruits and vegetables from local vendors on road sides. This is because of the bargaining power of the buyer is more from local vendor while Fresh Bazar sells at fixed price.

Fresh Bazar should try to <u>reduce the cost</u> by closely study of the organization's **value chain**. In agriculture sector, approximately 30% of total production lost every year before it reaches to the consumer. Fresh Bazar can reduce these losses by analyzing the various segments of value chain. In India, each segment of agriculture sector likeproduction, processing, marketing etc. work in an isolated manner and not in integrated manner, resulting in multiple losses in value chain. Fresh Bazar should attempt to integrate all the segments of value chain and try to remove all the intermediaries involved, benefiting both farmers and consumers. Moreover, contract farming participation could enhance the overall value chain performance in terms of increasing production, lowering transaction costs and boosting quality of the output product. Contract farming is an agreement between buyer and farmers based on which agriculture production being carried out, it also stipulates the quality required and the price at which the farmers agreeing to deliver at a future date.

At present, Fresh Bazar purchases fruits and vegetables from wholesale mandis. Instead of buying from wholesale mandis Fresh Bazar should participate in contract farming to reduce the input price risk i.e. price of fruits and vegetables which fluctuate every day in wholesale mandi. Through contract framing Fresh Bazar can also agree to support the farmers by supplying of inputs, assisting with preparation of land, information about latest technologies, effective use of power supply, providing production advice and transporting produce to its premises to maintain the <u>desired level of quality</u>.

In addition, Fresh Bazar can also use target costing to reduce their other operating costs.

Since the small road side vendors continue to coexist, therefore, Fresh Bazar should also supply their fruits and vegetables to them. In this way, they can avoid opposition from small vendors and farmers, it's a win-win situation benefiting everyone.
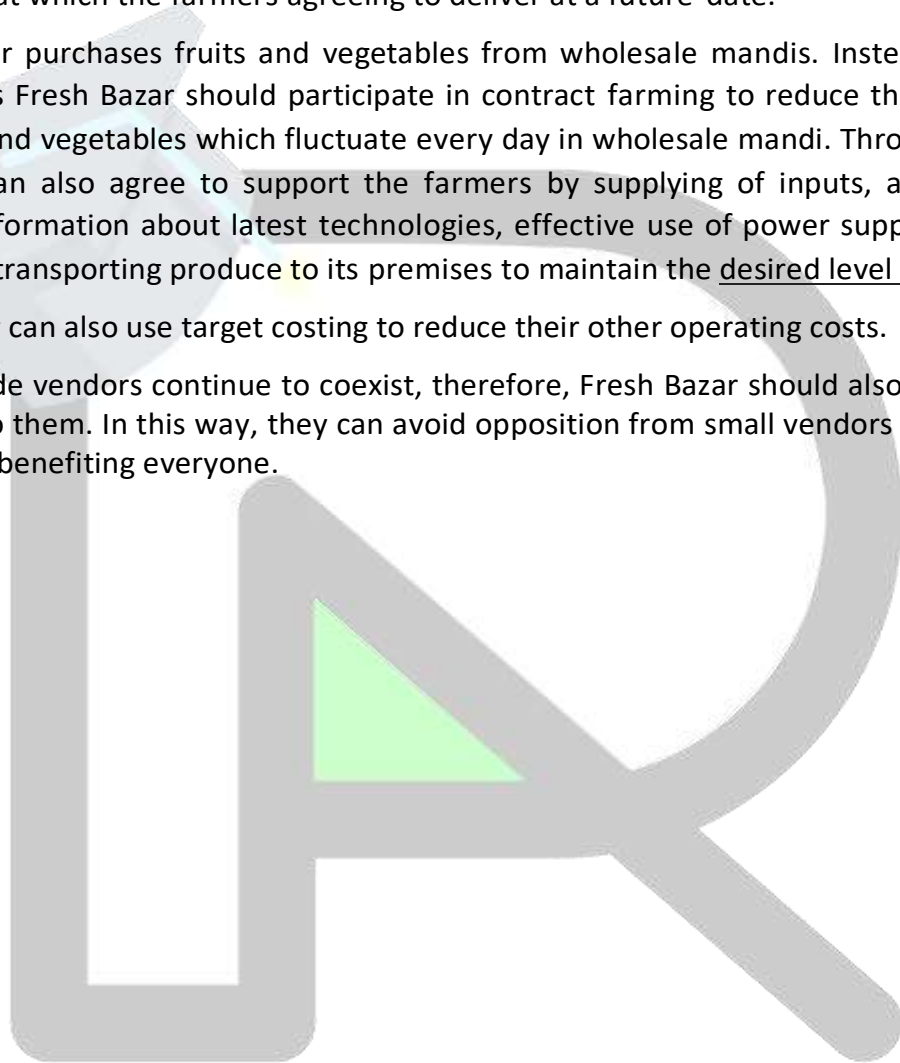
CHAPTER-6 Decision Making

Section A – Practical Questions

QUESTION 1

A company manufactures cycles for both adults and children. Given below is information about cycles made for children–

Particulars	Traditional CVP Analysis	Activity Based CVP Analysis
Monthly Demand and Production	10,000 units	10,000 units
Selling Price	₹8,000 per unit	₹8,000 per unit
Variable Cost per unit	₹7,500 per unit	₹7,500 per unit
Fixed Cost p.m. (as identified under each cost system)	₹ 10,00,000 p.m.	₹ 8,00,000 p.m.

Fixed costs of ₹10,00,000 per month under Traditional CVP analysis are those that do not vary with respect to volume. Following an Activity Based Costing study, fixed cost that do not vary as per volume or any other cost driver has been identified to be ₹8,00,000 per month. The study revealed a milling machine is used to cut metal into steer support. Production of these steer support takes place in batches of 25 units. Once a batch for children's cycle is finished, the next batch would be that for adult cycles. Therefore, after each batch there would be a set-up change. If 10,000 children's cycles have to be produced, number of set-ups required = 10,000 steer support / 25 per batch = 400 set-ups. Each set-up costs ₹500, comprising of material costs like change of oil, jig etc. This cost was previously pooled together with fixed cost under traditional CVP analysis.

Required

i   FIND the break-even point per month and profit per month under the traditional CVP method and the Activity Based CVP method.

ii   As a plant manager, you would like to keep the number of set-ups minimum since they reduce the capacity of the machine. Suppose that at any time the milling machine can be used to produce other type of cycles like adult cycles, sports cycles etc. Therefore, you propose to increase the batch size of children's steer support to 50 units in one batch. The number of set-ups will reduce from 400 (10,000 units / 25 units) to 200 (10,000 units / 50 units). Due to larger batch production, additional inventory storage area would be required to store that will cost the company ₹50,000 per month extra. ANALYSE the impact on BEP (units per month) and profits per month.

iii   When should labour cost be factored into the calculation of cost of a set-up? Explain.

How can the number of set-ups and cost of each set-up impact flexibility of the milling machine? Explain. (STUDY MATERIAL)
ANSWER:

i   (a) Break-even point (units per month) and profit per month under traditional CVP analysis:

Selling Price per unit	₹8,000
Variable Cost per unit	₹7,500
Contribution per unit	₹500
Fixed Cost per month	₹10,00,000
Break-even Point (per month in units) = Fixed Cost p.m. / Contribution p.u.= ₹10,00,000 / ₹500 per unit	2,000 units

Monthly Demand (units)	10,000 units
Profit per month = {Monthly demand (units) × Contribution per unit} – Fixed Cost per month = (10,000 × ₹500 per unit) - ₹10,00,000	₹40,00,000

(b) Break-even point (units per month) and profit per month under Activity Based CVP method. Number of units produced per batch is 25. Therefore, number of set-ups will be 10,000 units / 25 units = 400 per month.

Selling Price per unit	₹8,000
Variable Cost per unit	₹7,500
Contribution per unit	₹500
Fixed Cost per month (per Activity Based method)	₹8,00,000
Break-even Point (per month in units) = {Fixed Cost p.m. + (number of set-ups × cost per set-up)}/ Contribution p.u. = {₹8,00,000 + (400 × ₹500 per set-up)}/ ₹500 per unit = ₹10,00,000 / ₹500 per unit	2,000 units
Monthly Demand (units)	10,000 units
Profit per month = {Monthly demand (units) × Contribution per unit} – (Fixed Cost per month + Set-up cost per month) = (10,000 × ₹500 per unit) – (₹8,00,000+₹200,000) = ₹50,00,000 – ₹10,00,000	₹40,00,000

Although, the BEP units and the profit per month are the same under both methods, Activity Based method has brought forth the point that there are 400 set-ups being performed per month. This would give the management more information to work with in order to improve operations.

i   Break-even point (units per month) and profit per month under Activity Based CVP analysis: Batch size increased from 25 to 50 units, monthly set-ups reduce from 400 to 200 per month.

Selling Price per unit	₹8,000
Variable Cost per unit	₹7,500
Contribution per unit	₹500
Fixed Cost per month (per Activity Based method) Additional cost p.m. for inventory storage = ₹50,000	₹8,50,000
Break-even Point (per month in units) = {Fixed Cost p.m. + (number of set-ups × cost per set-up)}/ Contribution p.u. = {₹8,50,000 + (200 × ₹500 per set-up)}/ ₹500 per unit = ₹9,50,000 / ₹500 per unit	1,900 units
Monthly Demand (units)	10,000 units
Profit per month = {Monthly demand (units) × Contribution per unit} – (Fixed Cost per month + Set-up cost per month) = (10,000 × ₹500 per unit) – (₹8,50,000+₹1,00,000) = ₹50,00,000 – ₹9,50,000	₹40,50,000

Analysis

It can be concluded by increasing the batch-size, the capacity of the machine can be increased. The time freed by reducing set-ups from 400 per month to 200 per month can now be used to produce parts for other cycles. Since the number of set-ups would reduce, so will the monthly set-up costs. Even after off-setting the increase in storage cost, profits have increased by ₹50,000 per month (₹40,50,000 - ₹40,00,000 per month). Consequently, break-even point has reduced from 2,000 units per month to 1,900 units per month. This reduction is due to the savings in the overall set-up costs due to lower number of set-ups.

(iii) Inclusion of labor cost in the cost of set-up would depend on their *availability*:

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(a) Cost of temporary labour hired for particular set-up or cost of outsourcing of set-up activities would be included in set-up costs.

(b) Cost of permanent labour used for set-up, who are otherwise idle would not be included in set-up costs since the salaries paid to them has to be incurred anyway, it is a sunk cost.

(c) However, where permanent labour is used for set-up, who are otherwise fully engaged in the production process and additional labour supplies are unavailable in the short term, and where no further overtime working is possible, the opportunity cost of labour needs to be considered along with the hourly labour rate.

(iv) Set-ups reduces the production utility of a machine. Lower number of set-ups or lower set-up time can improve the utilization of the machine. This also gives the company flexibility to keep changing the batches produced at the milling machine to cater to children's cycles and adult cycles as per its requirement. The other factor that impacts flexibility of production would be the set-up costs. Lower the set-up costs, higher the flexibility to change batches produced at the milling machine to cater to each type of cycle.

Question 2

Catalyst Ltd. Makes a single product with the following details:

Description	Current Situation	Proposed Change
Selling Price (₹/unit)	10	
Direct Costs (₹/unit)	5	
Present number of setups per production period, (before each production run, setup is done)	42	
Cost per set up (₹)	450	Decrease by ₹90
Production units per run	960	1,008
Engineering hours for production period	500	422
Cost per engineering hour (₹)	10	

The company has begun Activity Based Costing of fixed costs and has presently identified two cost drivers, viz. production runs and engineering hours. Of the total fixed costs presently at ₹96,000, after the above, ₹72,100 remains to be analyzed. There are changes as proposed above for the next production period for the same volume of output.

Required

(i) COMPUTE units and production runs Catalyst Ltd. should produce in the changed scenario for break-even.

(ii) ADVISE whether Catalyst Ltd. should continue to break up the remaining fixed costs into activity based costs. (Study Material)

Answer

Workings

Statement Showing 'Non-unit Level Overhead Costs'

Particulars	Current Situation	Proposed Situation
No. of Production Runs/ Setups	42	40 960 runs x 42 setup (1,008 unit
Cost per Setup	₹450	₹360
Production Units per run	960 units	1,008 units
Production Units	40,320 (960 units × 42)	40,320
Engineering Hrs.	500	422
Engineering Cost per hour	₹10	₹10

Requirement of Question

(i) Break Even Point (Changed Scenario)

Break Even Point

= $\dfrac{\text{Fixed Cost}+(\text{Setup Cost} \times \text{No. of Setups})+(\text{Engineering Costs} \times \text{No. of Engineering Hrs.})}{(\text{Price - Unit Variable Cost})}$

$\dfrac{₹72,100+(₹360 \times 40\text{Setups})+(₹10 \times 422\text{hrs.})}{(₹10 - ₹5)}$

= 18,144 units

(ii) A company should adopt Activity Based Costing (ABC) system for accurate product costing, as traditional volume based costing system does not take into account the Non- unit Level Overhead Costs such as Setup Cost, Inspection Cost, and Material Handling Cost etc. Cost Analysis under ABC system showed that while these costs are largely fixed with respect to sales volume, but they are not fixed to other appropriate cost drivers. If break up the remaining ₹ 72,100 fixed costs consist of only a small portion of these costs, ABC need not be applied.

However, it may also be noted that the primary study has resulted in cost savings. If the savings in cost are expected to exceed the cost of study and implementing ABC, it may be justified. Further it is pertinent to mention that ABC offers no increase in product- costing accuracy for single-product setting.

Relevant Cost

Question 3

Color paints is a manufacturer of industrial dyes. It has received an order for 200 kgs of powder dye that needs to be customized to certain specifications. The job would require the following materials:

Material	Total units required	Units already in inventory	Book value of the units in inventory (₹per unit)	Realizable value (₹ per unit)	Replacement cost (₹ per unit)
A	2,000	0	NA	NA	8
B	3,000	1,200	7	8	10
C	2,000	1,400	12	9	14
D	500	500	9	12	15

I)   Material B is used regularly in production of all types of dyes that Color plaints produces. Therefore, any stock used towards this job order would need to be replaced to meet other production demands.

II)   Inventory of material C and D are from stock that was purchased in excess previously. Material C has no other use other than for this special order. Material D can be used as   a substitute for 700 units of material Z which currently costs ₹11 per unit. The company does not have any inventory of material Z currently.

Required

ANALYSE the relevant costs of material while deciding whether to accept the order or not? **(Study Material)**

Answer

Material A

The requirement of 2,000 units of Material A has to be purchased in entirety since there are no units in stock. Therefore, the relevant cost will be the replacement cost at ₹8 per unit, which for 2,000 units is ₹16,000 (2,000 units × ₹8 per unit).

Material B

There is a requirement of 3,000 units of Material B, of which 1,200 units are in stock. Material B used regularly in the production of all types of dyes. If the 1,200 units in stock are used, they need to be replenished (replaced) in order to meet production demands of other dyes. In addition, for the special order, additional 1,800 units of Material B is required to be procured from the market. Therefore, 3,000 units of Material B has to be procured if the special order is undertaken. The relevant cost will be the replacement cost at ₹10 per unit, which for 3,000 units is ₹30,000 (3,000 units × ₹10 per unit).

Material C

There is a requirement of 2,000 units of Material C, of which 1,4 00 units are in stock. The balance 600 units have to be procured at the replacement (market) price of ₹14 per unit, which would be ₹8,400. Material C has no other use, so if the special order is not undertaken the stock of 1,400 units can be sold at ₹9 per unit. So, the opportunity cost of undertaking this order is ₹12,600. Therefore, the relevant cost for Material C is procurement cost of 600 units plus the opportunity cost of not disposing the current stock of 1,400 units, which would be

₹8,400 + ₹12,600 = ₹21,000.

Material D

The entire requirement of 500 units of Material D is in stock. If the special order is not accepted, Color paints has two options (i) sell the excess material at ₹12 per unit or (ii) use it as a substitute for Material Z, which would otherwise need to be procured.

(i)   The realizable value of Material D is ₹6,000 (500 units × ₹12 per unit).

(ii)   Material D can be used as a substitute for 700 units of Material Z. Since there is no stock of Material Z currently, if the special order is accepted, the entire quantity would have to be procured at ₹11 per unit. This would cost the company ₹7,700 (700 units ×

₹11 per unit).

Both options (i) and (ii) represent opportunity cost if the special order is accepted. The relevant cost for Material D, if the special order is accepted would be higher of either of these two opportunity costs. The higher opportunity cost of that of procuring Material Z from the market at ₹7,700. Therefore, the relevant cost for Material D is ₹7,700.

Therefore, the relevant cost to accepting the special order would be the cumulative of the relevant cost for Materials A, B, C, and D. This works out to ₹74,700.

Question 3

Diezel, is engaged in manufacturing many chemical products. It is using many chemicals some of which are fast moving, some are slow moving and few are in non -moving category. The firm has a stock of 10 units of one non-moving toxic chemical. Its book value is ₹2,400, realizable value is ₹3,500 and replacement cost is ₹4,200.

One of the customers of the firm asks to supply 10 units of a product which needs all the 10 units of the non-moving chemical as an input. The other costs associated with the production of the product are:

Allocated overhead expenses ₹16 per unit Out of pocket expenses ₹50 per unit

Labour cost ₹40 per hour. For each unit two hours are required. Other material cost ₹80 per unit.

The labour force required for the production of the product will   be   deployed from   among the permanent employees of the firm. This temporary deployment will not lead to any loss   of contribution.

Required

(1)   RECOMMEND the minimum unit price to be charged to the customer without any loss to the firm.

(2)   ANALYSE with reasons for the inclusion or exclusion of each of the cost associated with the production of the product.

(3)   ADVICE a pricing policy to be followed by Diezel in perfect competition. (Study Material)

Answer (MTP APRIL.19) (MTP MARCH.18) (PYQ NOV.18)

(i) Diezel has the opportunity to utilize 10 units of non-moving chemical as input to produce 10 units of a product demanded by one of its customers. The minimum unit price to be charged to the customer would be–

Cost Component	Cost per unit of product (₹)
Cost of Material (Realizable value = ₹3,500 / 10 units of chemical)	350
Out of Pocket Expenses	50
Other Material Cost	80
Minimum Unit Price that can be charged	480

Therefore, the minimum unit price that can be charged to the customer, without incurring any loss is ₹480 per unit of product. As explained below in point (ii), allocated overhead expenses and labor cost are sunk costs that have been ignored while calculating the minimum unit price to be charged.

(ii) Analysis

(a) Cost of Material: Relevant and hence included at realizable value. Diezel has 10 units of non-moving chemical input that has a book value of ₹2,400, realizable value of ₹3,500 and replacement cost of ₹4,200. Realizable value of ₹3,500 would be the salvage value of the chemical had it been sold by Diezel instead of using it to meet the current order. This represents an opportunity cost for the firm and hence included while pricing the product. Book value would represent the cost at which the inventory has been recorded in the books, a sunk cost that has been ignored. Replacement cost of ₹4,200 would be the current market price to procure 10 units of the input chemical. This would be relevant only when the inventory has to be replenished after use. This chemical is from the non-moving category, that means that it is not used regularly in production process and hence need not be replenished after use. Therefore, replacement cost is also ignored for pricing.

(b) Labour Cost: Not relevant and hence excluded from pricing. It is given in the problem that this order would be met by permanent employees of the firm. Permanent employee cost is a fixed cost that Diezel would incur irrespective of whether this order is produced or not. No additional labour is being employed to meet this order. Therefore, this cost is a sunk cost, excluded from pricing.

(c) Allocated Overhead Expenses: These expenses have been incurred at another Cost Centre, typical example would be office and administration costs. Such costs are fixed in nature that would be incurred irrespective of whether this order is produced or not. Therefore, this cost is a sunk cost, excluded from pricing.

Question 4

About Aditya Group

Aditya Group was established in 1975, manufactures and sells electronic personal grooming and beauty products. The group has two 100% subsidiaries AUS Ltd. and ANZ Ltd. AUS Ltd. manufactures luxury products that cater to niche customers who prefer specialized personal grooming and beauty care. ANZ Ltd. caters to regular daily beauty and grooming requirements that has a wide reach within the market. Factories of both companies are located within India. The products are sold to wholesalers, who supply these products to the retail market.

Aditya Group purchases its raw material requirements from both domestic and overseas markets. Additionally, certain products manufactured by AUS Ltd. can be enhanced based on the products manufactured by ANZ Ltd. Therefore, as per production requirements, AUS Ltd. sources some product components from ANZ Ltd.

Aditya Group has a centralized decision making set-up. Basic policy decisions for functions such as production planning, sales and client relationship, finance and human resources are handled at the group level. Individual units AUS Ltd. and ANZ Ltd. concentrate on the manufacturing alone.

About You

You are an Assistant Manager in Finance and Accounts department of Aditya Group, headed by Director- Finance Ms. Elsea. You assist and report to Ms. Fiona, Manager of your department. Sometime you also assist Director Finance in analysing financial and non- financial information, drafting reports for board meetings, preparation of presentation and staff trainings.

Business Situation- 1

Yesterday, 5.15 P.M.

You got an email from Ms. Elsea, with Cc to Ms. Fiona. Ms. Elsea, asked you to prepare a cost statement for making a quotation to a new customer. She has also informed you that the customer can also maintain a long- term business relation with us. You have been requested to gather information related to the specification from Sales Manager.

Yesterday, 5.25 P.M.

You have been called by Ms. Fiona, and provided the product specification received from Sales- Manager for which quotation has to be quoted. Ms. Fiona has also requested you to gather relevant information to prepare cost statement. Due to the expected long term business relationship that AUS Ltd. wants to have with the customer, the sales manager wants to quote the lowest possible price. AUS Ltd. currently has some spare capacity that can be utilized to cater to this entire order. Therefore, only the relevant cost to AUS Ltd. has to be considered to arrive at the quote.

After meeting with your reporting officer, you mailed to various conc erned department and requested for data.

The following information has been obtained in relation to the contract:

Today, 10.05 A.M.

You got an e-mail from Production Manager, it has been informed that 40 tonnes of material Dx would be required. This material is in regular use by AUS and has a current purchase price of ₹380 per tonne. Currently, there are 5 tonnes in inventory which cost ₹350 per tonne. The resale value of the material in inventory is ₹240 per tonne.

Further, with regards to components, it has been informed that 4,000 components would be required. These could be bought externally for ₹15 each or alternatively they could be supplied by ANZ Ltd. The variable cost of the component if it were manufactured by ANZ Ltd. would be ₹8 per unit. ANZ Ltd. has sufficient capacity to produce 2,500 components without affecting its ability to satisfy its own external customers. However, in order to make the extra 1,500 components required by AUS Ltd., ANZ Ltd. would have to forgo other external sales of ₹50,000 which have a contribution to sales ratio of 40%. To have uniformity in the quality of the component, it is assumed that AUS Ltd. would procure its entire

requirement of 4,000 components either externally or from ANZ Ltd. The transfer pricing policy of Aditya Group for sales between units aims at goal congruence. The unit selling the goods would be allowed to charge any opportunity cost on account of catering to internal demand, while the purchasing unit should ensure that the company is not at a loss.

Today, 10.45 A.M.

You got an e-mail from Personnel Manager, it has been informed that 2,000 high skilled labour hours would be required. The grade of labour required is currently paid ₹5 per hour.

Highly skilled labour is in short supply and cannot be increased significantly in the short- term. This labour is presently engaged in meeting the, demand for product 'G', which requires 4 hours of highly skilled labour. The contribution from the sale of one unit of product L is ₹24.

It has also been informed that the contract would require a specialist machine. The machine could be hired for ₹15,000 or it could be bought for ₹50,000. At the end of the contract if the machine were bought, it could be sold for ₹30,000. Alternatively, it could be modified at a cost of ₹5,000 and then used on other contracts instead of buying another essential machine that would cost ₹45,000. The operating costs of the machine are payable by AUS whether it hires or buys the machine. These costs would total ₹12,000 in respect of the new contract.

Supervisor

The contract would be supervised by an existing manager who is paid an annual salary of ₹50,000 and has sufficient capacity to carry out this supervision. The manager would receive a bonus of ₹5,000 for the additional work.

Development Time

15 hours of development time at a cost of ₹30,000 have already been worked in determining the resource requirements of the contract.

Fixed Overhead Absorption Rate

AUS uses an absorption rate of ₹20 per direct labour hour to recover its general fixed overhead costs. This includes ₹5 per hour for depreciation.

Today, 11.15 A.M: Ms. Fiona called you in her place as asked you the following:

Required

(i)   CALCULATE the relevant cost of the contract to AUS. You   must present your answer in a schedule that clearly shows the relevant cost value for each of the items identified above. You should also EXPLAIN each relevant cost value you have included in your schedule and why any values you have excluded are not relevant. Ignore taxation and the time value of money.

(ii) DISCUSS two problems that can arise as a result of setting prices using relevant costing.

Business Situation- 2

Today, 5.26 P.M: A memo from Managing Director of the group has been circulated to all officers of the group which stated "My objective for the forthcoming year is to reduce our quality costs in each of the primary activities in our value chain". The company is keen to build a reputation for quality and gives a five-year guarantee with all of its products.

Today, 5.37 P.M: Ms. Fiona, called you in her place and asked the following:

Required

(iii)   EXPLAIN, by giving examples, how each of the four types of quality cost could be reduced. You should also IDENTIFY in which primary activity each one of your examples would occur in Aditya Group's value chain(Study Material)

Answer

1.   (i) Statement Showing Relevant Cost

Type of Cost	Explanation	Amount (₹)
Material Dx (40 tonnes × ₹380)	1	15,200
Components	2	52,000
Direct labour (2,000 hrs. × ₹11)	3	22,000
Specialist machine	4	10,000
Machine operating cost	5	12,000
Supervision	6	5,000
Development time	7	Nil
General fixed overhead	8	Nil
Total relevant cost		1,16,200

Explanation

1.   Material Dx is in regular use by AUS Ltd. and must be replaced. Consequently, its relevant value is its replacement cost. The historical cost is not relevant because it is a past cost and the resale value is not relevant because AUS Ltd. is not going to sell it because the material is in regular use.

2.   AUS Ltd. would like to procure 4,000 components either from ANZ Ltd. or external ly from the market. At the current production level, ANZ Ltd. (seller) has available capacity to accommodate part of AUS Ltd's request to the extent of 2,500 components. At this point, ANZ Ltd. would be operating at its maximum capacity.

To cater to the remaining demand of 1,500 units from AUS Ltd., ANZ Ltd. has to forego external sales of ₹50,000 to its own customers. Given that the contribution to sales ratio is 40%. Therefore, ANZ Ltd. has to forego contribution of ₹20,000 (40% of external sales foregone ₹50,000) in order to cater to AUS Ltd.'s request. Fixed cost at ANZ Ltd. is irrelevant, since it would be incurred irrespective of whether AUS Ltd.'s order to catered to or not.

Therefore, in spirit of goal congruence, the transfer price that ANZ Ltd. would charge AUS Ltd. would be the variable cost of ₹8 per unit and

₹20,000 towards lost contribution as explained above. Therefore, the transfer price

= (₹ 8 per unit × 4,000 components) + ₹ 20,000

= ₹ 32,000 + ₹ 20,000

= ₹ 52,000 for 4,000 components

Therefore, per component, the price charged would be ₹52,000 / 4,000 = ₹13 per component. This is lower than the external market price of ₹15 per unit. Therefore, in the interest of goal congruence the cheaper option is preferred. AUS Ltd. should source its components from ANZ Ltd, for a total procurement cost of ₹52,000.

3. Skilled labour is in short supply and can only be obtained by reducing the production of product 'G', resulting in a loss of contribution of ₹24 (given) or ₹6 per hour of skilled labour. Hence the relevant labour cost will be ₹6 (contribution lost per hour) + ₹5 (hourly rate of skilled labour) i.e. ₹11 per hour.

4. AUS Ltd. has a number of options: (a) If the machine were to be hired it would have a cost of ₹15,000; (b) if the machine were bought and then sold at the end of the work it would have a net cost of ₹20,000; or (c) if the machine were bought and then modified to avoid the need to buy the other machine it would have a net cost of ₹10,000 (₹50,000 plus ₹5,000 modifications less ₹45,000 cost of another machine). Thus, the most economic approach is buy the machine and then modify it so the relevant cost is ₹10,000.

5. The machine operating costs are future costs of doing the work and therefore are relevant.

6. The supervisor's salary is irrelevant, but the bonus needs to be included because it is dependent on this work and therefore is relevant.

7. The development time has already been incurred. Therefore, it is a past cost and not relevant.

8. General fixed overhead costs and their absorption are not relevant because they will be incurred whether the work goes ahead or not. Depreciation is also not relevant because it is an accounting entry based on the historical purchase of assets. It is not affected by the work being considered.

(ii) Two main issues arise when pricing work based on relevant costs:

- Profit reporting; and
- Pricing of future work.

With regard to profit reporting, the decision as to whether to proceed with the work will have been based on the use of relevant costs, but the routine reporting of the profit from the work will be based on the company's normal accounting system. Since this system will be based on total cost, it is probable that the costs of the work reported will be greater than its relevant cost. Consequently, the amount of profit reported to have been made on this order will be lower than expected and may even be a loss . This may cause difficulties for the manager who accepted the work as an explanation will be required of the reasons why there is such a difference in profit.

With regard to the pricing of future work the difficulty lies in increasing the price for similar items for the same customer in future. Once a price is set, customers tend to expect that any future items will be priced similarly. However, where a special price has been offered based on relevant cost because of the existence of spare capacity the supplier would not be able to continue to price on that basis as it does not recover its long term total costs. There may also be difficulties created by this method of pricing as other customers are being charged on a full cost basis and if they were to discover that a lower price was offered to a new customer they would feel that their loyalty was being penalised.

Prevention

Operations: Preventative maintenance and checking of the calibration of machinery. This would reduce the number of potentially faulty products being produced and therefore reduce guarantee claims.

Appraisal

Inbound Logistics: Reduce costs of incoming inspections by building close links with suppliers and getting them to adopt TQM. If suppliers can guarantee their quality, the n inbound inspections could be eliminated.

Internal Failure

Operations: Reduce costs of re-works by training employees on a continual basis
e.g. quality circles. This would reduce failure costs and also improve quality.

External Failure

Service: Design quality into the product to try to prevent guarantee claims and therefore the cost of servicing/repairing the product.

Question 5

BNZ Ltd. is engaged in the manufacture of plastic bottles of a standard size and produced by a joint process of machines. The factory has 5 machines and capable of producing 40 bottles per hour. The variable cost per bottle is ₹0.32 and the selling price is ₹0.80 each. The company has received an offer from another company for manufacture of 40,000 units of a plastic moulded toy. The price per toy is ₹30 and the variable, cost is ₹24 each. In case of the company takes up the job, it has to meet the expenses of making a special mould required for the manufacture of the toy. The cost of the mould is ₹1,00,000. The company's time study analysis shows that the machines can produce only 16 toys per hour. The company has a total capacity of 10,000 hours during the period in which the toy is required to be manufactured. The fixed costs excluding the cost of construction of the mould during the period will be ₹10 Lakh. The company has an order for the supply of 3,00,000 bottles during the period.

Required

(i) Do you ADVISE the company to take up the order for manufacturing plastic moulded toys during the time when it has an order in its book for the supply of 3,00,000 bottles.

(ii) If the order for the supply of bottles increases to 4,00,000 bottles, will you ADVISE the company to accept the order for the supply of plastic moulded toys? State the reasons.

(iii) An associate company of BNZ Ltd. has idle capacity and is willing to take up the whole or part of the manufacturing of the plastic moulded toys on sub-contracting basis. The subcontract price inclusive of the cost of construction of mould is ₹28 per toy. DETERMINE the minimum expected excess machine hour capacity needed to justify producing any portion of the toy order by the company itself rather than subcontracting. (Study Material)(MTP MARCH.19)(MTP OCT.19) (MTP MARCH.18)

Answer

Workings

Statement Showing "Contribution / Machine Hour"

	'Bottle'	'Toy'
Demand (units)	3,00,000	40,000
Sales (₹/u)	0.80	30.00
Less: Variable Cost (₹/u)	0.32	24.00
Less: Specific Fixed Cost (₹/u)	---	2.50
Contribution (₹/u)	0.48	3.50
Machine Hours Required per unit	0.025	0.0625
Contribution / Machine Hour	19.20	56.00

Advice on Supply of 3,00,000/ 4,00,000 Bottles

(i) BNZ Ltd. can accept plastic moulded toy's order as sufficient number of hrs. i.e. 2,500 hrs. (10,000 hrs.- 3,00,000 bottles × 0.025 hrs.) are available and would be able to generate additional benefit of ₹3.50 per unit on 40,000 units of toys i.e. ₹1,40,000.

(ii) If the order for the supply of bottles increases to 4,00,000 bottles, then 2,500 more hrs. will be required to produce the additional bottles. BNZ Ltd. has to decide whether to utilize 2,500 hrs. for existing bottle order or for toy Order.

Machine time is limiting factor. Therefore, contribution per machine hour from both the activities (i.e. bottles and toys) should be calculated to decide whether the order should be accepted. Contribution per hour is more in case of toys (refer workings). Therefore, BNZ Ltd. should utilize the remaining 2,500 hours for manufacturing toys rather than to fulfil the order for supply of additional bottles.

Prioritizing production based on contribution per machine hour would maximize profits. However, existing order fulfilment is necessary for building long term and sustainable customer relationship. Developing and maintaining long term and intimate relationships with the profitable customers provides valuable benefits to the company as the relationships between company and customers grow, a customer who is satisfied with the company's products and services, tends to commit the relationship, and buy more over time. Cost of keeping the existing customers is less expensive than the cost of acquiring new customers.

Hence, BNZ Ltd. should be taken into consideration long term supplier relation before accepting the toy order based on financial consideration as contribution per hour is more in case of toys. Further, company may also explore outsourcing opportunities for production of toys.

(iii) Minimum number of toys needed to be manufactured to justify the increase in fixed cost of ₹1,00,000 to make the mould is 25,000 toys {1,00,000/ (₹28 - ₹24}. Thus, as long as company has excess capacity available to manufacture more than 25,000 toys

Question 6

N2 Co. is the manufacturer and supplier of firefighting and safety equipment for industrial use and follows the international quality standards and uses the high grade raw material. It is a fast-growing brand that protects millions of people across the India, every single day. N2 has been offered a bid on a prospective export contract for 20,000 commercial fire extinguishers with following specification from USA buyer and the delivery terms is FOB.

"two-gallon cylinder holding 10 pounds of multi-purpose dry chemical at 380 PSI" N2 is exporting

first time. The price computation per fire extinguisher is as follows:

	₹	₹
Direct Material		
Circle Part Cost	620	
Necking Part	30	
Bottom Part	50	
Fire Extinguisher Powder	590	
Heat Process	50	
Nozzle	60	
Meter	20	
Pipe	50	
Nitrogen	30	1,500
Direct Labor (2 hrs. × ₹40)		80
Leakage Testing		50
Variable Overheads (including packing)		214
Export Clearance Charges on FOB term		36
Fixed Overhead		100
Total		1,980
Add: Markup @ 10%		198
Price		2,178
USD to INR		67
Price in USD		32.51

After quotation of USD 32.51, the buyer is negotiating the price and ready to pay only USD 28.50.

Required

ADVISE whether it is worth accepting at USD 28.50 considering other factors. (RTP NOV.19)

Answer

Workings

Statement Showing Benefit from Prospective Export Contract

	₹
Direct Material	1,500
Direct Labor (2 hrs. × ₹40)	80
Leakage Testing	50
Variable Overheads (including packing)	214
Export Clearance Charges on FOB term	36
Total Relevant Cost	1,880
USD to INR	₹67
Relevant Cost	$28.06
Price Offered by Customer	$28.50
Benefit per extinguisher	$0.44
No. of Extinguishers	20,000
Total Benefit	$8,800

Advise

From financial perspective, it will be profitable for N2 to accept the contract because of gain of $8,800 (₹5,89,600) along with export incentives of drawback. Besides this, following consideration should also be taken into consideration while exporting fire extinguishers:

Statutory Compliances

Before exporting to a foreign country or even agreeing to sell to a new customer in a foreign country, N2 should be aware of foreign laws that might affect the sale. Export documentation is important as it plays a significant role in regulating the flow and movement of goods in international markets. Each country has its own prescribed statutory documents to be complied by exporters and importers. Thus, N2 should consider about the documentation and inspection compliances part of new buyer. It may include third party audit, commercial invoice and packaging list requirements, certificate requirements like- no child labour certificate, inspection certificate, reach

Make or Buy/Outsourcing

Question 7

X is a multiple product manufacturer. One product line consists of motors and the company produces three different models. X is currently considering a proposal from a supplier who wants to sell the company blades for the motors line.

The company currently produces all the blades it requires. In order to meet customer's needs, X currently produces three different blades for each motor model (nine different blades).

The supplier would charge ₹ 25 per blade, regardless of blade type. For the next year X has projected the costs of its own blade production as follows (based on projected volume of 10,000 units):

Direct materials	₹ 75,000
Direct labour…	₹ 65,000
Variable overhead	₹ 55,000
Fixed overhead	
Factory supervision	₹ 35,000
Other fixed cost…	₹ 65,000
Total production costs…	₹ 2,95,000

Assume (1) the equipment utilized to produce the blades has no alternative use and no market value, (2) the space occupied by blade production will remain idle if the company purchases rather than makes the blades, and (3) factory supervision costs reflect the salary of a production supervisor who would be dismissed from the firm if blade production ceased.

Required

(i) Determine the net profit or loss of purchasing (rather than manufacturing), the blades required for motor production in the next year.

(ii) Determine the level of motor production where X would be indifferent between buying and producing the blades. If the future volume level were predicted to decrease, would that influence the decision?

(iii) For this part only, assume that the space presently occupied by blade production could be leased to another firm for ₹ 45,000 per year. How would this affect the make or buy decision?

Answer (STUDY MATERIAL)

(i) This is a make or buy decision so compare the incremental cost to make with the incremental cost buy.

Incremental Costs Per Unit (₹)	
Direct Materials (₹75,000 ÷ 10,000 units)	7.50
Direct Labour (₹65,000 ÷ 10,000 units)	6.50
Variable Overhead (₹55,000 ÷ 10,000 units)	5.50
Supervision (₹35,000 ÷ 10,000 units)	3.50
Total Cost	23.00

Compare the cost to make the blades for 10,000 motors. ₹23.00, with the cost to buy, ₹ 25.00 There is a net loss of ₹2.00 if 'X' chooses to buy the blades.

(ii) 'X' will be indifferent between buying and making the blades when the total costs for making and buying will be equal at the volume level where:

Variable Cost per unit × No. of units + Avoidable Fixed Cost = Cost of Buy Variable Cost per unit (DM + DL + VO) × No. of units + Factory Supervision Cost

$$= \text{Buying Cost per unit} \times \text{No. of units}$$

$$\text{Let No. of in units} = U$$

$$(₹7.50 + ₹6.50 + ₹5.50) \times U + ₹35,000 = ₹25.00\ U$$

$$₹19.50\ U + ₹35,000 = ₹25.00\ U$$

$$₹25.00\ U - ₹19.50\ U = ₹35,000$$

$$₹5.50\ U = ₹35,000$$

$$U = 6,364 \text{ units of blades}$$

As volume of production decreases, the average per unit cost of in house production increases. If the volume falls below 6,364 motors, then 'X' would prefer to buy the blades from the supplier.

(iii) If the space presently occupied by blade production could be leased to another firm for ₹45,000 per year, 'X' would face an opportunity cost associated with in house blade production for the 10,000 units of ₹4.50 per unit.

New Cost to Make = ₹23.00 + ₹4.50 = ₹27.50

Now 'X' should buy because the cost to make, ₹27.50, is higher than the cost to buy, ₹25.00.

Question 11

DBA, manufactures and sells 25,000 table fans annually. One of the components required for fans is purchased from an outside supplier at a price of ₹190 per unit. Annually it is purchasing 25,000 components for its usage. The Production Manager is of the opinion that if all the components are produced at own plant, it is possible to maintain better quality in the finished product. Further, he proposed that the in-house production of the component with other items will provide more flexibility to increase the annual production by another 5,000 units. He estimates the cost of making the component as follows:

	₹ per unit
Direct materials	80
Direct labour	75
Factory overhead (70% variable)	40
Total cost	195

The proposal of the Production Manager was referred to the Marketing Manager for his remarks.   He pointed out that to   market the additional units, the overall unit price should be reduced by 5% and additionally ₹1,00,000 p.m. should be incurred for advertising. Present selling price and contribution per fan are ₹2,500 and ₹600 respectively. No other increase or decrease in all other expenses as a result of this proposal will arise.

Required

Since the making cost of the component is more than the buying cost, the Management asks you to:
(i)   ANALYSE the make or buy decision on unit basis and total basis.
(ii)   RECOMMEND the most profitable alternative. (Study Material)

Answer

(i)   DBA purchases 25,000 units of components to manufacture 25,000 fans annually. The external purchase price per component is ₹190 per unit. It has the option of manufacturing these components in house. The cost structure of manufacturing these components would be as below:

Cost Structure	Cost per component unit (₹)
Direct Materials	80
Direct Labor	75
Variable Factory Overhead (70% of ₹40)	28
Total	183

Analysis

If DBA decides to manufacture the components in-house, the following would be the financial impact:
  (a) Production Capacity will increase from 25,000 fans to 30,000 fans.
  (b) Variable Cost of Production of fan would be ₹1,710 [(2,500 - 600) -190] per unit.
  (c) Fixed Factory Overhead of ₹12 per component would be incurred irrespective of whether component is produced or not. Therefore, this cost is not considered.

  (d) Increase in advertising expense would be ₹100,000 per month or ₹12,00,000 annually.
  (e) Overall selling price would reduce from the current rate of ₹2,500 per fan to ₹2,375 (95% of ₹2,500) per fan.
  (f) Current contribution considering a procurement price of ₹190 per component unit, is ₹600 per fan. As calculated above, if produced in house, the variable cost would be ₹183 per component unit. This would result in an increase in contribution by ₹7 per fan (procurement price of ₹190 per component unit less variable cost of ₹183 per component unit). In addition, there is an impact of ₹125 on account of reduction in selling price. Therefore, the contribution if component produced in house would be ₹482 per fan (₹600+₹7-₹125).

To summarize the above figures:

Particulars	Procurement 25,000 Components		Produce 30,000 Components	
	Per Fan ₹	Total ₹	Per Fan ₹	Total ₹
Selling price per fan	2,500	6,25,00,000	2,375	7,12,50,000
Contribution per fan	600	1,50,00,000	482	1,44,60,000

Therefore, incremental loss by switching to in house production (on a total basis) would be **₹17,40,000** (incremental loss ₹5,40,000 – additional advertising expenses
₹12,00,000). On a per unit basis, it would result in a **loss of ₹58 per fan**.

(ii)   Recommendation

As explained above, if production increases from 25,000 fans to 30,000 fans, it would not be profitable to make these components in house. Overall profit decreased by
₹17,40,000. However, DBA may prefer to make component, even though it could be financially beneficial to buy from outside supplier. Sometimes qualitative factors become very import ant and can override some financial benefit. This can be coupled with uncertainty about the supplier 's ability or intention to maintain the price, quality, delivery dates of the components etc.

Alternatively, DBA may continue with the sale of 25,000 units without any price reduction and advertising expenses. The component required for the 25,000 fans may be produced internally at a cost of ₹183 per unit. In this situation, the contribution shall be increased by
₹1,75,000 (₹7 ×25,000 units).

Thus, DBA may choice the alternative after due and careful consideration of the facts illustrated above.

Question 12

SEZ Limited produces three products S, Q and L which use the same resources but in varying quantities. Product S uses one unit of component P which is purchased from outside suppliers at, ₹ 120 per unit. Details of the three products are as follows :

	S	Q	L
Annual Demand (units)	9,000	5,700	7,800
	Per unit ₹	Per unit ₹	Per unit ₹
Selling Price	310	275	224
Component P	120	-	-
Direct materials (₹ 8 per kg.)	24	32	24
Skilled labour (₹ 40 per hour)	20	60	40
Unskilled labour (₹ 24 per hour)	18	24	36
Variable Overhead (₹ 6 per machine hour)	18	24	24
Annual fixed costs are ₹ 15,00,000			

Maximum availability of skilled labour is 16,200 hours. Other resources are sufficient to meet the annual demand/sales.

Engineering division of the company came forward with a proposal to make the component 'P' in house with the following costs break up :

Direct materials (₹ 8 per kg.)	**₹ 24**
Skilled labour (₹ 40 per hour)	**₹ 40**
Unskilled labour (₹ 24 per hour)	**₹ 8 Variable Overhead (₹ 6 per machine hour)**
	₹ 18
₹ 90	

For in-house making of the component 'P' there will not be any change in the annual fixed costs of the company. The company can either buy the component 'P' or make it in house.

Required

RECOMMEND the optimum production plan and profit for the year. Show calculation in support of your answer.

Answer (PYQ MAY.19)

Option-1

SEZ Ltd. produces 3 products Product S, Product Q and Product L. Each unit of Product S requires one unit of component P, which is currently procured from the external market at ₹120 per unit. There is a constraint in terms of skilled hours available for production, the maximum available is 16,200 hours. Given this constraint, the production plan should be based on the contribution derived per skilled labor hour spent on each product.

Calculation of skilled hour requirement for each of the products and component P

Skilled Hour Requirement

Sr. No.	Particulars	S	Component P	Q	L
1	Skilled Labour Cost per unit	20	40	60	40
2	Skilled Labour Rate per hour	40	40	40	40
3	Skilled Hours per unit (Step 1 / Step 2)	0.5	1	1.5	1

Note: When component P is manufactured, in-house Product S would require 1.5 hours of skilled labor hour per unit.

Contribution per unit and contribution per skilled hour (when component P is purchased)

Sr. No.	Particulars	S Per unit ₹	Q Per unit ₹	L Per unit ₹
1	Selling Price	310	275	224
	Variable Cost			
i	Component P (purchased)	120	0	0
ii	Direct Materials	24	32	24
iii	Skilled Labor	20	60	40
iv	Unskilled Labor	18	24	36
v	Variable Overhead	18	24	24
2	Total Variable Cost (Sum of steps i to v)	200	140	124
3	Contribution per unit (Step 1 - Step 2)	110	135	100

4	Skilled Hour per unit (refer skilled hour table - Step 3)	0.5	1.5	1
5	Contribution per skilled hour (Step 3 / Step 4)	220	90	100
	Ranking Based on Contribution per skilled hour	1	3	2

Based on this, SEZ Ltd. would first produce Product S, then Product L and then Product Q. The constraint of 16,200 hours of skilled labor has to be taken into account while drawing up the production plan. Production plan as per above ranking will be as below:

Product	Annual Demand (units)	Skilled Hour per unit (refer skilled hour table - Step 3)	Skilled hour utilized for production	Number of skilled hours remaining post production
	A	B	C = A × B	
S	9,000	0.5	4,500	11,700
L	7,800	1.0	7,800	3,900
Q	5,700	1.5	3,900	-

First, 9,000 units Product S is produced, this requires 4,500 hours of skilled labor. After production of Product S, 11,700 hours of skilled labor remain. (16,200 hours – 4,500 hours). Next 7,800 units of Product L can be produced, for which the skilled hours used are 7,800 hours. The remaining 3,900 hours would be used to produce Product Q.

Volume of Product Q that can be produced in 3,900 hours = **3,900 / 1.5 hours per unit = 2,600** units. Therefore, profitability of SEZ Ltd. when component P is purchased:

Sr. No	Particulars	S	Q	L	Total ₹
1	Production (units)	9,000	2,600	7,800	
2	Contribution per unit (refer to contribution table - Step 3)	₹110.00	₹135.00	₹100.00	
3	Total Contribution (Step 1 × Step 2)	9,90,000	3,51,000	7,80,000	21,21,000
4	Fixed Cost				15,00,000
5	Total Profit (Step 3 - Step 4)				6,21,000

Option-2

Contribution when component P is manufactured in-house.

Note that Product S requires 0.5 hours and component P would require 1 hour of skilled labor per unit. If component P, a part of Product S is manufactured in-house, then Product S would in all require 1.5 hours of skilled labor per unit.

Based on this, contribution per unit and contribution per skilled hour if component P is manufactured is:

Sr. No.	Particulars	S Per unit ₹	Q Per unit ₹	L Per unit ₹
1	Selling Price	310	275	224
	Variable Cost			
i	Component P (made in house) refer note 1	90	0	0
ii	Direct Materials	24	32	24

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iii	Skilled Labor	20	60	40
iv	Unskilled labor	18	24	36
v	Variable Overhead	18	24	24
2	Total Variable Cost (sum of steps i to v)	170	140	124
3	Contribution per unit (Step 1 - Step 2)	140	135	100
4	Skilled Hours per unit (refer skilled hour table-Step 3)	1.5	1.5	1
5	Contribution per skilled hour (Step 3 / Step 4)	93.33	90.00	100.00
6	Ranking Based on Contribution per skilled hour	2	3	1

Note 1

Component P has a variable cost, sum of direct material + skilled labor + unskilled labor + variable overhead, given to be ₹90 per unit

Each unit of Product S requires 1 more hour of skilled labor to manufacture component P. Skilled labor is a limited resource that costs ₹40 per hour. The savings SEZ Ltd. earns by manufacturing component P in-house is only ₹30 (external purchase cost is ₹120 per unit – cost of manufacturing component P in- house is ₹90 per unit). Therefore, it is profitable to purchase component P from the external market.

For further analysis, the impact of producing component P in-house would be:

Based on the revised ranking, SEZ Ltd. would first produce Product L, then Product S and

then Product Q. The production plan is component P is made in-house would be

Product	Annual Demand (units)	Skilled Hour per unit (refer skilled hour table - Step 3)	Skilled hour utilized for production	Number of Skilled hours remaining post production
	A	B	C = A × B	
L	7,800	1	7,800	8,400
S	9,000	1.5	8,400	0
Q	5,700	1.5	0	0

First, 7,800 units Product L is produced, this requires 7,800 hours of skilled labor. After production of Product L, 8,400 hours of skilled labor remain. (16,200 hours – 7,800 hours). The remaining 8,400 units would be used to produce Product S. Volume of Product S that can be produced in 8,400 hours = 8,400 / 1.5 hours per unit = 5,600 units. In this constraint, Product Q cannot be produced.

The profitability of SEZ Ltd. if component P is manufactured in-house:

Sr. No	Particulars	S	Q	L	Total ₹
1	Production (units)	**5,600**	-	**7,800**	
2	Contribution per unit (refer to contribution table - Step 3)	₹140.00	₹135.00	₹100.00	
3	Total Contribution (Step 1 × Step 2)	7,84,000	-	7,80,000	15,64,000
4	Fixed Cost				15,00,000
5	Total Profit (Step 3 - Step 4)				64,000

Recommendation

When component P is purchased, annual profits would be ₹6,21,000. When component P is manufactured in-house, annual profits would be ₹64,000, a reduction of ₹557,000 per year. Therefore, component P has to be bought externally. Optimum production plan would be

Product S – 9,000 units Product Q – 2,600 units Product L – 7,800 units

The decision to outsource make or buy decision might have strategic implications for the SEZ and should be formulated from strategic perspective with senior management's involvement.

Question 13

Rabi Ltd. is considering the discontinuance of Division C. The following information is given:

Particulars	visions A & B	Division C	Total
Sales (Maximum achievable)	41,40,000	5,17,500	46,57,500
Less: Variable cost	20,70,000	2,76,000	23,46,000
Contribution	20,70,000	2,41,500	23,11,500
Less: Specific avoidable fixed cost	14,49,000	4,14,000	18,63,000
Divisional Income	6,21,000	(1,72,500)	4,48,500

The rates of variable costs are 90% of the normal rates due to the current volume of operation. There is adequate market demand.

For any lower volume of operation, the rates would go back to the normal rates. Facilities released by discontinuing Division C cannot be used for any other purpose.

Required

Evaluate the decision to discontinue Division C using relevant cost approach. (Study Material)

Answer

As given in the problem Rabi Ltd. is considering to discontinue the Division C perhaps by seeing the Division C's income as it is a loss of ₹1,72,500. Discontinuance of Division C might be saving ₹4,14,000 on specific fixed costs to the company but due to this decision company will not only be losing ₹2,41,500 contribution from the Division C but also an additional burden of variable cost of ₹2,30,000 to Divisions A & B and Rabi Ltd. as a whole.

Let evaluate the decision of the Rabi Ltd. with the help of the Relevant Cost approach.

Particulars		Amount (₹)
Savings Due to Discontinuance		
Specific Fixed Cost		4,14,000
Total	..(A)	4,14,000
Loss/ Increase in Cost Due to Discontinuance		
Loss of Contribution		2,41,500
Increase in Variable Cost		2,30,000
Total	...(B)	4,71,500
Excess of Loss Over Savings	...(B) – (A)	57,500

In a nutshell considering the above analysis we can conclude that the decision of discontinuing Division C will not be beneficial for the Rabi Ltd and it should review its decision on the basis of relevant cost approach to reach at right decision.

Question 14

Golden Bird Airlines Ltd. operates its services under the brand 'Golden Bird'. The 'Golden Bird' route network spans prominent business metropolis as well as key leisure destinations across the Indian subcontinent. 'Golden Bird', a low-fare carrier launched with the objective of commoditizing air travel, offers airline seats at marginal premium to train fares across India.

Profits of the 'Golden Bird' have been decreasing for several years. In an effort to improve the company's performance, consideration is being given to dropping several flights that appear to be unprofitable.

Income statement for one such flight from 'New Delhi' to 'Leh' (GB - 022) is given below (per flight):

	₹	₹
Ticket Revenue (175 seats x 60% Occupancy x ₹ 7,000 ticket price)		7,35,000
Less: Variable Expenses (₹ 1,400 per person)		1,47,000
Contribution Margin		5,88,000
Less:Flight Expenses:		
Salaries, Flight Crew	1,70,000	
Salaries, Flight Assistants	31,500	
Baggage Loading and Flight Preparation	63,000	
Overnight Costs for Flight Crew and Assistants at destination	12,600	
Fuel for Aircraft	2,38,000	
Depreciation on Aircraft	49,000*	
Liability Insurance	1,47,000	
Flight Promotion	28,000	
Hanger Parking Fee for Aircraft at destination	7,000	7,46,100
Net Gain / (Loss)		(1,58,100)

* Based on obsolescence

The following additional information is available about flight GB-022.

1. Members of the flight crew are paid fixed annual salaries, whereas the flight assistants are paid by the flight.
2. The baggage loading and flight preparation expense is an allocation of ground crew's salaries and depreciation of ground equipment.
3. One third of the liability insurance is a special charge assessed against flight GB-022 because in the opinion of insurance company, the destination of the flight is in a "high- risk" area.
4. The hanger parking fee is a standard fee charged for aircraft at all airports.
5. If flight GB-022 is dropped, 'Golden Bird' Airlines has no authorization at present to replace it with another flight.

Required

Using the data available, prepare an analysis showing what impact dropping flight GB-022 would have on the airline's profit. (Study Material) (RTP NOV.18) (MTP AUG.18)

Answer

Statement Showing Impact on Airline's Profit if Flight GB-022 is Discontinued

Contribution Margin lost if the flight is discontinued	'	(5,88,000)
Less: Flight Costs which can be avoided if the flight is discontinued:	₹	
Flight Promotion	28,000	
Fuel for Aircraft	2,38,000	
Liability Insurance (1/3 x ₹ 1,47,000)	49,000	
Salaries, Flight Assistants	31,500	
Overnight Costs for Flight Crew and Assistants	12,600	3,59,100
		(2,28,900)

Following costs are not relevant to the decision:

–   Salaries, flight crew - Fixed annual salaries which will not change
- Baggage loading and flight preparation- This is an allocated cost, which will continue even if the flight is discontinued.
- Depreciation of aircraft -Sunk Cost
- Liability insurance (two third) - Sunk Cost
- Hanger parking fee- This cost will be incurred regardless of whether the flight is made.

CVP Analysis in Service Sector

Question 16

Expert Roadways Services Pvt. Ltd. is planning to run a fleet of 15 buses in Birpur City on a fixed route. Company has estimated a total of 2,51,85,000 passenger kilometers per annum. It is estimated buses to have 100% load factor. Buses are purchased at a price of ₹ 44,00,000 per unit whose scrape value at the end of 5 years life is ₹ 5,50,000. Seating capacity of a bus excluding a Driver's seat is 42. Each bus can give a mileage of 5 kmpl. Average cost of fuel is ₹ 66 per liter. Cost of Lubricants & Sundries per 1,000 km would be ₹ 3,300. Company will pay ₹ 27,500 per month to Driver and two attendants for each bus.

Other annual charges per bus: Insurance ₹ 55,000, Garage Charges ₹ 33,000, Repairs & Maintenance ₹ 55,000. Route Permit Charges upto 20,000 km is ₹ 5,500 and ₹ 2,200 for every additional 5,000 km or part thereof.

Required

(i)   Calculate a suggested fare per passenger/km taking into account markup on cost @20% to cover general overheads and sufficient profit.

(ii)   The Transport Sector of Birpur is highly regulated. The Government has fixed the fare @ ₹ 1.35 for next 2 years. Comment on the two year's profitability taking into consideration the inflation rate of 8%.

Note: Route permit charges is not subject to Inflation. (Study Material)

Answer

(i) Statement Suggesting "Fare per passenger – km (Each Bus)"

Particulars	Cost per annum (₹)
Fixed Expenses:	
Insurance	55,000.00
Garage Charges	33,000.00
Depreciation	7,70,000.00
Running Expenses:	
Repair and Maintenance	55,000.00
Cost of Lubricants and Sundries	1,38,517.50
Fuel Cost	5,54,070.00
Salary of Driver and Two Attendants	3,30,000.00
Route Permit Charges	16,500.00
Total Cost per annum	19,52,087.50
Add: Markup @ 20% of Total Cost or 16.67% of Total Revenue	3,90,417.50
Total Revenue	**23,42,505.00**

Rate per passenger- km equals to ₹1.395

Workings

Total Passenger Kms	=2,51,85,000
Total Buses	=15
Passenger Kmsper bus	=16,79,000 (2,51,85,000 Kms /
Total Passenger Capacity per bus	=15)
	42 – 2
	=40
Annual Distance Covered by a bus	=41,975 Kms. (16,79,000Kms/

(ii) Regulated Fare per passenger km is ₹1.35 Profitability Statement for Each Bus

Particulars	Year 1(₹)	Year 2(₹)
Fixed Expenses:		
Insurance	59,400.00	64,152.00
Garage Charges	35,640.00	38,491.20
Depreciation	7,70,000.00	7,70,000.00
Running Expenses:		
Repair and Maintenance	59,400.00	64,152.00

Cost of Lubricants and Sundries	1,49,598.90	1,61,566.81
Fuel Cost	5,98,395.60	6,46,267.25
Salary of Driver and Two Attendants	3,56,400.00	3,84,912.00
Route Permit Charges	16,500.00	16,500.00
Total Cost [A]	20,45,334.50	21,46,041.26
Total Revenue (Regulated) [B]	22,66,650.00	22,66,650.00
Profit [B] – [A]	2,21,315.50	1,20,608.74
Profit to Total Revenue	9.76%	5.32%

The gross margin is showing a downward trend because the cost components have taken into the effect of inflation hence increasing year by year but the total revenue has remained stagnant due to Government regulations which resulted in reduction in gross margin per bus.

The company's gross margin to total revenue ratio has come out to be 9.76% and 5.32% in first and second year respectively but initially the company's desired gross margin to total revenue ratio is 16.67% to cover general overheads and sufficient profit. Though the amount of general overheads is not given but we can safely assume that they may also subject to inflation i.e. increase year by year then in such case the company needs to maintain or increase its gross margin per bus to maintain its net profit after general overheads which is not possible in regulated environment. The information about regulated fare in the given case is regarding first two years only but if this regulated fare scenario persists for further years then the project may not be viable for the company.

Question 18

Hotel Nikko, Zeeland, an affordable leisure hotel resort is an ideal retreat to escape, unwind and enjoy peace of mind. Set amid expansive tropical greenery in the enclave of Zeeland, Hotel Nikko is designed for pleasure, where services reign supreme and Italian- style architecture of its 25 classic rooms harmonize with nature. Hotel Nikko, Zeeland is a beachfront resort that features a good choice of swim-up pool bar, gym, and variety of restaurants. A wide array of water sport activities like surfing, sailing, jet skiing etc. are available from beach operators at walking distance. The hotel is synonymous with enjoyment and value for money, with a large choice of very attractive "All Inclusive" packages.

Nikko charges guests ZD 2,700 per room per night, irrespective of single or double occupancy. The variable cost is ZD 900 per occupied room per night. The Nikko is available throughout 365 days a year and has a 75% budgeted occupancy rate. Fixed costs are budgeted at ZD 9 million and are incurred evenly during the year.

During the second quarter (Q2) of the year, usually the room occupancy rates remains substantially below the levels expected at other quarters of the year. Nikko is expecting to sell 900 occupied room nights during Q2. Management is considering strategy to improve profitability, including closing the Nikko for the duration of Q2 or adopting one possible option as follows –

There is scope to extend the Nikko by creating enough space to run a Rustic Chic, Italian Style restaurant to serve its guests. The annual revenues, costs and sales volumes for the combined operations are given in the following graph–
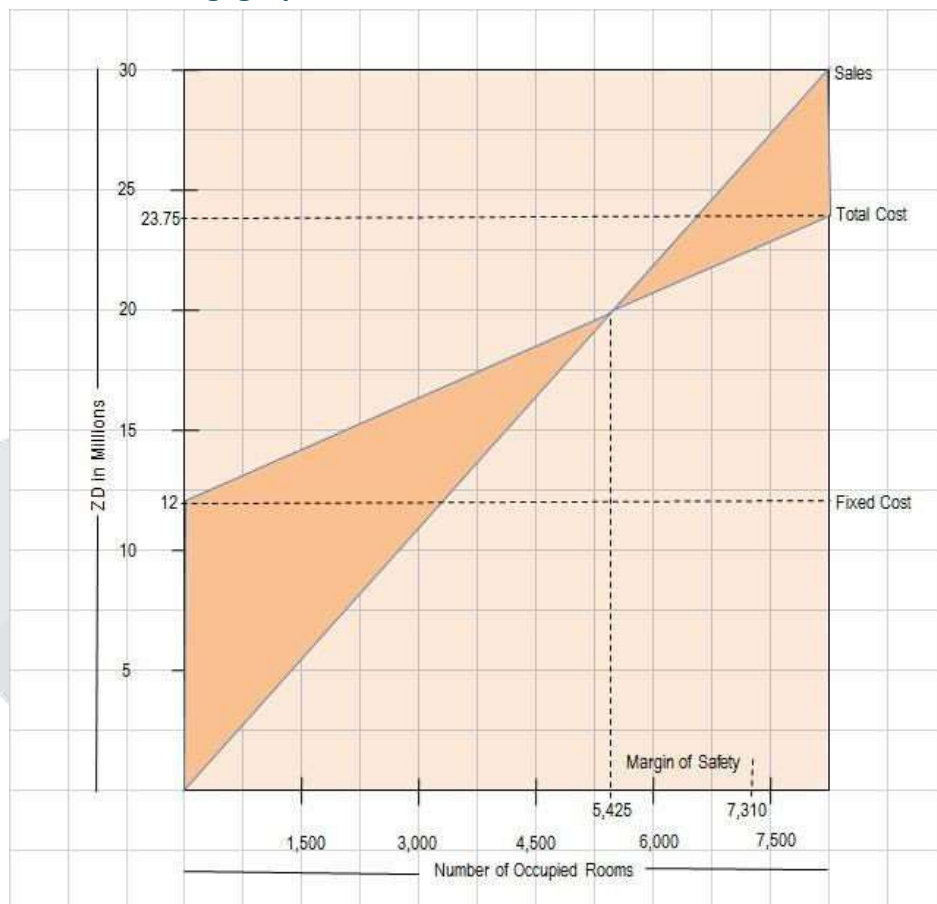
Note

Zeeland's home currency is the ZD.

Required

ANALYZE the profit improvement plan. (RTP NOV.19)

Answer

The Present Profit of Hotel Nikko

Total Room Days = 25 Rooms × 365 days × 75% = 6,844 Profit = Total Contribution – Fixed Cost

= 6, 844 room days × (ZD 2,700 – ZD 900) - ZD 90,00,000 = ZD 33,19,200

If Nikko is Shut Down during Q2

Loss of Contribution {900 Room Days × (ZD 2,700 - ZD900)} = ZD 16,20,000

Nikko should not close its hotel during Q2. The fixed costs will still be incurred and hotel closure would result in lost contribution of ZD16,20,000. This in turn would decrease annual profits by ZD16,20,000. In addition, Nikko could lose guests at other quarters of the year, particularly their regular business customers, who may perceive the Nikko as being non- reliable.

Proposal of Opening an Italian Restaurant

Opening a restaurant will increase the fixed costs of the Nikko from ZD 9 million p.a. to ZD 12 million

p.a. Thus, annual increment of ZD 3 million.

Average Revenue per occupied room will rise from ZD 2,700 to ZD 3,636.36... (ZD 30 Million/ 8,250 rooms) because increasing guest expenditure in Italian restaurant.

The total cost predicted at a level of 8,250 occupied rooms is ZD 23.75 million which means the variable costs must be ZD 11.75 million (ZD 23.75 million – ZD 12 million fixed costs). This is a variable cost per occupied room of ZD 1,424.24... which is an increase of ZD 524.24...

Consequently, the breakeven point has gone up from 5,000 to 5,425 (as shown in the diagram) occupied rooms so the Nikko is required to sell more room nights to cover costs. However, budgeted occupancy is now 7,310 occupied room nights which is 80.11% occupancy (7,310/ 9,125). This provides a margin of safety of 1,885 occupied room nights or 25.79%. At 7,310 occupied room nights, Nikko's budgeted profit would be ZD 41,70,597 {7,310 × (ZD 3,636.36 – ZD 1,424.24) – 12 million} which is more than present budgeted profit by ZD 8,51,397. So, it is better for Nikko to go for opening an Italian Restaurant.

Section B – Case Scenarios & Case Studies

Case Scenarios

Question 1

'S' manages the school canteen (approximately 1,600 students) at Noida. The current cash payment system requires three clerks (paid ₹90 per hour), employed for about 4 hours a day. The canteen operates approximately 240 days a year.
'S' is considering a Wireless Cash Management System (WCMS), where a student could just swipe an ID Card for payment. This system would cost ₹1,25,000 to setup and ₹36,000 per year to operate. 'S' believes that he could manage with one clerk if he were to implement the system.

Required

ADVISE 'S' on the choice of a plan, assuming working life of WCMS as 5 years. (Ignore the time vale of money) (Study Material)

Answer

For each day, 'S' spends ₹360 per clerk (₹90 per hr. × 4 hrs.). Therefore, 'S' spends ₹1,080 per day to employ three clerks. Annually, this outlay amounts to ₹2,59,200 (₹1,080 per day × 240 days).

Over five years, the outlay would be ₹12,96,000. If the WCMS is implemented, the initial cost is ₹1,25,000. If we add the annual cost of ₹36,000, the total cost over five years amounts to ₹3,05,000. Since one clerk will be needed as well, 'S' has to incur ₹4,32,000 over five years to pay clerk (₹4,32,000 = ₹90 × 4 hrs. × 1 clerk × 240 days × 5 years). Therefore, the total cost of this option is ₹7,37,000.

Accordingly, there is cost saving of ₹5,59,000 from WCMS implementation. Relevant Non-Financial

Considerations

The WCMS may be a lot more efficient, but more rigid. For instance, what if, a student forgets to bring his/ her card or transaction failure due to connectivity issue, and may not have enough cash to pay. Automated systems may be less able to handle these situations. Having clerks may add an aspect of flexibility and a human aspect that is hard to quantify.

Conclusion

Obviously, WCMS option is more cost effective for 'S' because there is a cost saving of ₹5,59,000. But, non-financial factors should also be taken into consideration.

Question 2

Aayla runs the Planetarium Station in New Delhi, India. The strength of the station lies in its live interactions and programs for visitors, students and amateur astronomers. The station is always active with programs for school and college students and for amateur astronomers. One of the station's key attractions is a big screen IMAX theatre. IMAX is a 70 mm motion picture film format which shows images of far greater size and resolution than traditional film systems. The IMAX cinema projection standards were developed in Canada in the late 1960s. Unlike traditional projectors, the film is run horizontally so that the image width is greater than the width of the film.

The average IMAX show at the station attracts 120 visitors (50 children and 70 adults) at a ticket price of ₹160 for children and ₹200 for adults. Aayla estimates that the running costs per IMAX show are ₹10,000. In addition, fixed costs of ₹7,500 are allocated to each show based on annual estimate of the number of IMAX shows.

The Hobart School has approached Aayla about scheduling an extra show for its class VIII students. One hundred students and five teachers are expected to join the special show on the 'Planets & Solar System', a feature that is currently showing. The school has asked Aayla for a price quote. The special show will take place at 08:30 AM when the IMAX is not usually open.

Required

RECOMMEND the minimum amount that Aayla should charge. (Study Material)

Answer (MTP AUG.18) (MTP APRIL.18)

The incremental cost associated with the IMAX show appears to be ₹10,000 i.e. cost of running the show. The allocated fixed cost per show is not relevant because the total amount of fixed costs for the year will not change as a result of the special show. Further, the stated ticket prices are not relevant because the show will take place at 08:30 AM when the IMAX is not usually open – thus, the students will not be displacing any regular visitors. Based on the financial data provided, the minimum price quote appears to be ₹10,000.

Aayla should consider the following factors:

▪ Does the station have a souvenir shop and/or cafeteria?

  If so, many students are likely to buy food and/or souvenir items, thereby increasing the station's contribution. In turn, this would reduce the minimum price quote.

▪ What is the impact on future revenue?

  After seeing the show, many students may return with their parents, thereby increasing future revenue.

▪ Are there costs linked with the special showing that are not included in the ₹10,000 variable cost number?

For example, will the station have to pay an overtime premium.

Aayla should also consider the educational mission of the Planetarium Station. Such shows directly contribute to this mission, the station, and, hopefully, the betterment of the students.

The special shows may be an excellent way to expose some students to earth science – these students may have never gone through the Planetarium Station if it were not for the school excursion.

Overall, the "best" price to charge is unclear and requires some judgment as Aayla needs to balance an array of financial and non-financial factors.

Question 3

Recently, Ministry of Health and Family Welfare along with Drug Control Department have come hard on health care centres for charging exorbitant fees from their patients. Human Health Care Ltd. (HHCL), a leading integrated healthcare delivery provider company is feeling pinch of measures taken by authorities and facing margin pressures due to this. HHCL is operating in a competitive environment so; it's difficult to increase patient numbers also. Management Consultant of the company has come out with some plan for cost control and reduction.

HHCL provides treatment under package system where fees is charged irrespective of days a patient stays in the hospital. Consultant has estimated 2.50 patient days per patient. He wants to reduce it to 2 days. By doing this, consultant has targeted the general variable cost of ₹ 500 per patient day. Annually 15,000 patients visit to the hospital for treatment.

Medical Superintendent has some concerns with that of Consultant's plan. According to him, reducing the patient stay would be detrimental to the full recovery of patient. They would come again for admission thereby increasing current readmission rate from 3% to 5%; it means readmitting 300 additional patients per year. Company has to spend ₹ 25,00,000 more to accommodate this increase in readmission. But Consultant has found bless in disguise in this. He said every readmission is treated as new admission so it would result in additional cash flow of ₹ 4,500 per patient in the form of admission fees.

Required

(i)   Calculate the impact of Management Consultant's plan on profit of the company.

Also comment on result and other factors that should be kept in mind before taking any decision. **(Study Material) (MTP APRIL.19) (MTP MARCH.18)**

Answer

Impact of Management Consultant's Plan on Profit of the HHCL
Human Health Care Ltd.
Statement Showing Cost Benefit Analysis

Particulars	₹
Cost:	
Incremental Cost due to Increased Readmission	25,00,000
Benefit:	
Saving in General Variable Cost due to Reduction in Patient Days [15,000 Patients × (2.5 Days – 2.0 Days) × ₹500)	37,50,000
Revenue from Increased Readmission (300 Patients × ₹4,500)	13,50,000
Incremental Benefit	26,00,000

(ii)   Comment

Primary goal of investor-owned firms is shareholder wealth maximization, which translates to stock price maximization. Management consultant's plan is looking good for the HHCL as there is a positive

impact on the profitability of the company (refer Cost Benefit Analysis).

Also HHCL operates in a competitive environment so for its survival, it has to work on plans like above.

But there is also the second side of a coin that cannot also be ignored i.e. humanity values and business ethics. Discharging patients before their full recovery will add discomfort and disruption in their lives which cannot be quantified into money. There could be other severe consequences as well because of this practice. For gaining extra benefits, HHCL cannot play with the life of patients. It would put a question mark on the business ethics of the HHCL.

May be HHCL would able to earn incremental profit due to this practice in short run but It will tarnish the image of the HHCL which would hurt profitability in the long run.

So, before taking any decision on this plan, HHCL should analyze both quantitative as well as qualitative factors.

Question 4

Identify the type of cost along with the reasons.

(i) An advertising program has been set and management has signed the non negotiable contract for a year with an agency. Under the terms of contract, agency will create 5 advertisements within the contract duration for the company and company will pay ₹12,00,000 for each advertisement.

(ii) A Company had paid ₹5,00,000 a Marketing Research company to find expected demand of the newly developed product of the company.

(iii) A company has invested ₹25 lacs in a project. Company could have earned ₹2 lacs by investing the amount in Government securities.

(iv) Accountant of a cloth factory paid ₹25,000 for water that has been used for washing clothes before they go for final drying process.

(STUDY MATERIAL)

ANSWER:

(i) Committed Cost
Reason: Company cannot negotiate the price of advertisement in future and it has to make payment as soon as advertisement is prepared.

(ii) Sunk Cost
Reason: Research expense has already been incurred and it will not affect any decision making in future.

(iii) Opportunity Cost
Reason: Income from government securities is the amount that company has forgone to earn income from its investment in the project.

(iv) Direct Cost
Reason: Amount paid for water can be directly attributed to the cost of finished product that is clothes.

Question 5

Buildico, a company that builds houses presents the following facts relating to a certain housing contract that it wishes to undertake:

The CEO's and Marketing Director's food and hotel expenses of ₹ 3,750 were incurred for a meeting with a prospective client.

1,200 kgs of raw material Z will be required for the house. Inventory of Z available is 550 kg. It was purchased at ₹ 580 per kg. It is used by Buildico in other projects. Its current market price is ₹ 650 per kg. Its resale value is ₹ 350 per kg.

The house will require 90 hours of engineer's time. The engineers are paid a fixed monthly salary of ₹ 47,500 per engineer who can work 150 hours a month. Spare time is not available now and an engineer has to be hired for this house for one month. He cannot be used in any other project once he does this contract.

Buildico will use a special earthquake proof foundation material. This was developed by Buildico at a cost of ₹ 30,000 for some other project that had to be abandoned. If it does not use it in this project, it can use it in some other project and charge the client ₹ 50,000 for it.

A list of items is given below:

S.No.	Item	Type of Cost	Relevant (R)/ Irrelevant (IR)
1	Food and hotel expenses ₹ 3,750		
2. (i)	Material Z : 550 kg × ₹ 580/kg		
(ii)	Material Z : 550 kg × ₹ 650 per kg		
3. (i)	Engineer's salary ₹ 47,500		
(ii)	Engineer's free time cost $\frac{60}{150}$ × ₹ 47,500		
4. (i)	Design cost ₹ 30,000		
(ii)	Design cost ₹ 50,000		

Required (STUDY MATERIAL)

Name the type of cost and state whether it is relevant or not in calculating the cost of the given housing project.

Sl. No.	Item	Type of Cost	Relevant / Irrelevant
1	Food and hotel expenses ₹3,750	Sunk Cost	Irrelevant
2(i)	Material Z: 550 kg × ₹580/kg	Historical Cost / Sunk Cost	Irrelevant
(ii)	Material Z: 550 kg × ₹650 per kg	Replacement Cost	Relevant
3(i)	Engineer's salary ₹47,500	Period Cost	Relevant
(ii)	Engineer's free time cost 60/ 150 × ₹47,500	Committed Cost / Unavoidable Cost	Irrelevant
4(i)	Design cost ₹30,000	Sunk Cost	Irrelevant
(ii)	Design cost ₹50,000	Opportunity Cost	Relevant

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Question 6

Some statements are given below. Identify name of the cost with examples and state whether it is relevant/non-relevant in decision making.

(i)   Costs are historical costs which have already been incurred and cannot change by any decision made in future.

(ii)   It is measure of benefits foregone by rejecting the second best alternative of resources in favour of the best.

(iii)   It is portioning of cost which involves payments to outsiders i.e., it gives rise to cash expenditure as opposed to such costs as depreciation.

Cost used in evaluation of a product to reflect the use of resources but that have no observable cost. (STUDY MATERIAL)

Answer

Relevant / Not Relevant

S.No.	Name of the Cost	Example	Relevant / Not Relevant
(i)	Sunk Cost	Written down value of machine already purchased.	Not Relevant in decision making.
(ii)	Opportunity Cost	Funds invested in business or deposited into bank.	Useful in decision making.
(iii)	Out of Pocket Cost	Commission to salesman on sales, Carriage inward.	Relevant for decision making.
(iv)	Notional Cost	Notional Rent for use of space.	Relevant, if company benefit by using resource alternatively.

Question 7

Nutty Bites produces many edible snacks that are very popular especially among children. Peanuts, Peanut oil are essential ingredients in many of its products. They are currently facing this ethical issue –

"Medical studies have indicated peanut allergic reactions are on the rise. The prevalence is more profound among children. Reactions can range from hives around the mouth to potentially life threatening reactions when exposed even to the slightest trace of peanuts. There is growing media campaign to force companies like Nutty Bites to make disclosure about the presence of peanut on its package labelling"

Nutty Bites is a mid-size company that has a growing market. Risk to peanut exposure can come not just from the presence of peanuts in its products. Some of its bought-in ingredients (raw material input) are cooked in peanut oil. There are risks of "cross- contamination" amongst products. Let us say, an equipment has been used produce cookies that has peanuts. Next, the equipment is used, without being cleaned, to produce chips that does not have peanuts as an ingredient. Some portion of the peanuts / peanut oil could contaminate that specific batch of chips produced. Since labels of chips would not mention "peanuts" as an ingredient, it poses a potential risk of causing allergic reaction to a customer unaware of this contamination.

Management of Nutty Bites has called for a meeting to discuss this issue. "The issue need not be addressed at all. After-all Nutty Bites is doing nothing against the law" is the opinion of many members on the board of the company.

Required

(i) EXPLAIN why Nutty Bites should attempt to address this issue.

(ii) STATE potential benefits that business can garner by addressing this issue.

(iii) RECOMMEND, with reasons, the avenues available to Nutty Bites to address this ethical issue.

(iv) EVALUATE the recommended solutions. (RTP NOV.19)

Answer

(i) Modern organizations have a moral duty of care to a wider range of stakeholders not just its owners / investors. In this case, it owes a duty of care to anybody who consumes its products. The presence of peanuts or peanut oil makes it a potential "health hazard" to some consumers. Food safety is a fiduciary duty that Nutty Bites owes to the society. Corporate Social Responsibility (CSR) is the duty an organization has towards a wider community.

(ii) Addressing this ethical issue will help Nutty Bites to become a morally responsible organization. The long- term benefits to its business could be as follows:

a. Avoid bad publicity that could potentially damage its reputation and brand image.

b. Avoid potential legal action for tort, committing a civil wrong.

c. Operating environment within the business is more ethical, giving a sense of well-being to its employees.

(iii) Following could be some of the responses that Nutty Bites could take to address the issue:

(a) A clear warning in the ingredients box that the factory uses peanuts while manufacturing some of its products. This should be included even in products that do not contain peanuts, to avoid any harm due to risk of cross- contamination. Customers who suffer this allergy, would then be aware of the potential risk of consuming products of Nutty Bites. Protection from potential lawsuits counters any loss of business for Nutty Bites.

(b) Segregate areas to have separate processing lines for products with peanuts / peanut oil and those without it. If possible, have segregated staff for the two production lines in order to avoid the risk of cross-contamination. If this is not possible, staff have to be well trained on the risks of cross- contamination. Gloves need to be provided while handling material during production of food products. This should be changed each time staff handle production changes from "peanut variety" to the "non-peanut variety".

(c) Equipment should be thoroughly cleaned while switching production from one variety to another. Fewer changeovers in the production cycle, that is producing products in larger batches, reduces the number of switches during production of different varieties of food products.

(d) Storage of peanut material should be well segregated and monitored to avoid contamination.

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(e) If Nutty Bites has the resources, it could invest in pharma companies that are finding a medical solution to this problem. The food industry could benefit from research and development of treatments to address this life- threatening allergy. A break-through would address a societal problem, while also having a positive impact for growth of Nutty Bites.

(iv) Risk of product safety is an important issue that needs constant review. Review would be of the production process, storage, material handling as well as ingredient of purchased raw materials. The benefit of constant review is that Nutty Bites can immediately identify danger of contamination. For example, is a supplier of raw material changes the production of the ingredients to include peanut / peanut oil, then Nutty Bites can be immediately aware of the change due to its review process. In case of any future litigation, Nutty Bites could defend itself by proving that it had a robust review process in place.

On the other hand, constant review requires time and money, with an ever-present possibility of contamination. It is not feasible to ensure complete safety. Reviewers
/ quality inspectors could become negligent once the process is well established. This could lead to instances of contamination, even with a review process in place.

To conclude, Nutty Bites is morally responsible to spread awareness that some of its products may contain allergy causing peanuts / peanut oil. It should streamline its storage and production process to avoid risk of cross-contamination.

Question 8

The President of Automation Limited, a 150 persons engineering company, decided it was time to fire the company's biggest client. Although the client provided close to 60% of the company's annual revenue, Automation Limited decided that dropping this client was necessary. The client was profitable.

The President of Automation Limited stated "We cannot be a great place to work without employees, and this client was bullying my employees. Its demands for turnaround were impossible to meet even with people working seven days a week. No client is worth losing my valued employees".

The initial impact on revenues was significant. However, Automation Limited was able to cut costs and obtain new customers to fill the void. Moreover, the dropped client later gave Automation Limited two projects on more equitable terms.

Required

(i) DISCUSS the reasons behind dropping of a profitable client by Automation Limited.

(ii) STATE three qualitative factors that management should consider in outsourcing and make or buy decisions.

(STUDY MATERIAL)

Answer

(i) Decision Making – Automation Ltd.

With increasing completion, dynamic market changes, changing needs of customers, non-financial and ethical considerations have gained relevance in the decision- making process. A company may

face the dilemma of meeting customers' needs while protecting employees' rights. While there are no clear-cut parameters to measure the impact of such decisions, they have a long-term impact on the company's operations that ensures profitability and sustainability of an organization.

In the given scenario, a customer who contributes close to 60% of Automation Ltd.'s profits has been making turnaround demands that are unreasonable for the company employees to meet. Automation Ltd. has to decide whether to continue doing business with the customer based on the current terms or protecting the work environment of its employees. In the current scenario, it is in Automation's long term interests to protect its employees' rights (a non-financial consideration). Keeping this approach in mind, Automation Ltd. decided to terminate business with the profitable client. While this had a significant impact on revenues in the short term, in the long run Automation Ltd. was able to get business from new clients. Also, realizing the value of service provided, the dropped client came back with projects on equitable terms. Therefore, even though it did not make financial sense in the short run, decisions based on non-financial metrics played an important role in ensuring Automation Ltd.'s long term sustainability.

(ii) Qualitative factors to consider while making the outsourcing and make or buy decisions:

(a) Quality of goods produced outside vs. in-house production of the component. Outsourcing or buying a component from the external market, should not impact the overall quality of product. Therefore, any component critical for a product would generally not be outsourced unless its supplier gives quality assurance.

(b) Reliability of suppliers in the outsourcing arrangement. Assurance must be given by the supplier in terms of both quality and timely delivery of components for the given price. Also, there must be a sufficient pool of suppliers from whom the company can buy the product. If one supplier closes shop, there must be alternate suppliers available.

(c) Availability of skilled labor and infrastructure to make the component in-house. If not available, then component may have to be bought from external market.

(d) Regularity of demand for the product – If made in-house, seasonal demand for a product may result in the risk of holding high inventories (including that of raw materials) or making high capital investments that will prove unproductive during off-season. Therefore, outsourcing or buying from external market may be more viable when the demand for the final product is seasonal.

(e) Risk of technological obsolescence for the component – when the risk is higher company may favor outsourcing.

(f) Confidentiality of process or patent of process – Confidential processes or critical components may not be outsourced.

(g) The shutting down of company's manufacturing facility might have a negative impact on the morale of remaining employees.

Case Studies

Question 9

Star Limited is in the business of manufacturing copper rods. The copper rods are sold to various cable wires manufacturers across the country. The growth in economy, especially the power sector, has led to a sharp increase in demand of cable wires and copper rods. The company is considering an opportunity to set up its own copper wire manufacturing plant and gain a share of cable wire's market. A detailed study was carried out to understand the market of cable wires, market growth, competitive landscape, financial feasibility etc. The Chairman has asked the Director of Finance to review the financial feasibility study and highlight concerns, if any.

The following paragraphs contain summarised information of financial study carried out:

- The project of setting up a new cable wire manufacturing plant is expected to yield a Net Present Value of ₹200 crores considering a project life of 20 years. The initial cost of setting up the plant is ₹500 crores which is readily available with the company. The project would yield an IRR of 17.5% which is higher than the IRR of other plants under operation.

- The plant would employ about 70% of labour on contractual basis. These labours would mostly comprise immigrants from neighbouring countries. The feasibility study has assumed that the immigrants labours would be paid 15% less wage than that paid to other workers. However, the wage paid to immigrants would still be higher than the minimum wage requirements. The contribution to retirement funds is also not considered in the project evaluation. The company feels that immigrant workers would not stay beyond a period of a year and thus there is no requirement to contribute to retirement funds.

- The existing plants of the company do not have free space available and hence the company will need to buy land adjacent to its existing plant. A part of the proposed land to be acquired falls under the forest reserve area where no commercial activity is allowed. The company officials are in liaison with the government officials to get the land parcel approved. A certain amount of the value of land would be paid to certain government officials through a consultant. This cost is not a part of the project evaluation report.

- The new plant would also produce certain chemically harmful waste which would be disposed off into a nearby river after treatment. The company however does not have any technology to treat the waste fully. A new treatment plant would cost about ₹100 crores.

The finance director has forwarded the entire report to you for comments.

Required

(i) LIST Various non-financial and ethical consideration in decision making.

(ii) EVALUATE the impact of the various issues in the financial study and give your RECOMMENDATION. (STUDY MATERIAL)

Answer

Issue

Star Limited manufactures copper rods and is considering commencing a new plant for manufacturing of cable wire. A financial evaluation has been carried out and the project appears to be financially viable. The project has a positive NPV of ₹200 crores and an IRR of 17.5%. Though the project is financial viable, there are certain concerns relating to the project.

Non-Financial and Ethical Consideration in Decision Making

Capital Budgeting or Investments decisions are generally made based on the various financial evaluation like Net Present Value, Internal Rate of Return, Payback Period etc. The financial considerations in capital budgeting decisions are important because the end objective of every for-profit business is maximisation of shareholder's wealth. However, an important aspect of capital budgeting is that investment decisions cannot be purely based on financial analysis; there are other soft non-financial aspects of the investment appraisal that need to be thoroughly looked into. Some of the non-financial considerations that a company factors for capital budgeting or investment decisions are listed below:

Environmental Factors

Environmental factors like pollution, deforestation, impact on climate and weather, greenhouse effects etc. must be considered by companies while selecting a project for implementation. Any project which adversely affects the environment is not taken positively by common public and environmentalists. A lot of projects have been stalled or delayed due to the protests by pro - environment groups leading to cost and time overrun. The government through ministry of environment could impose penalties on projects which are violating environmental norms or green norms.

Staff Motivation

Staff motivation and satisfaction is another important factor which companies might consider while choosing projects. If, for example, a company decides to implement automation in its plants for operations which would result in redundancy in labour, the overall staff motivation would come down. Staff and workers would resort to strikes and lockouts to protest against such decisions. The company should adopt a participative approach while taking such decisions considering the impact it would have on the labours.

Government Regulations

The companies must comply with relevant government regulations while implementing projects. Some projects might be profitable and yield excellent returns. However, if the profits and cashflows are generated by violating government regulations, it could be harmful in the longer run for the company and its brand. The companies must ensure that all relevant laws and regulations are complied with.

Availability of Resources

The evaluation of any project must also consider availability of key resources like raw material, manpower, logistics infrastructure, electricity etc. If there is any constraint on any of the key resources at a future date, a financially viable and excellent project could well turn into a failed project. It is thus important that the requirements and availability of key resources are analysed in advance.

Availability of Project Site

Site selection involves measuring the needs of a new project against the merits of potential locations. This indicates the practice of new facility location, keeping in mind project requirements. A wrong or unsuitable project location may mar the very benefits of a financially lucrative investment proposal.

Corporate Social Responsibility

Corporate social responsibility refers to "the ethical principle that an organisation should be responsible for how its behaviour might affect society and the environment". The companies do not function in silos but are a part of the larger society and environment. They have a responsibility towards the society and environment to use the various resources judiciously and ensure a sustainable development. Companies are expected to uplift the well being of the society at large and to not harm the environment through operations. The aspects of corporate soci al responsibility must also be considered while deciding the project to be implemented.

Ethics

Ethics are a set of guiding moral principles for individuals and corporates. Every company has a duty of care to various stakeholders (shareholders, employees, suppliers, customers etc.). A company is expected to act in a fair and transparent manner and be honest in all its dealings with stakeholders.

Issues in the Financial Study

As discussed earlier, the project is financial viable with a very good NPV and IRR. The amount required to build the plant is also available with the company. Financially, the project must be accepted. However, there are certain non-financial issues which must be addressed before a decision to build the plant is taken.

Payment to Labour and Ethics

As explained earlier, every company has a duty of care to all its stakeholders and the stakeholders must be treated fairly. Labours are a key stakeholder for the construction and running of the plant. The company has chosen to pay 15% lower wage to immigrant workers and not contribute anything towards their retirement benefits.

The company is paying a higher wage to the labours than required by law and hence there is nothing illegal in such payments. However, the company must not discriminate between workers who are doing same nature of work just because the workers are immigrants. The reputation of the company might be affected because of the lower wages paid to immigrants. There is a possibility that these labours go on protests and strikes or decide not to work for the company.

The company has also decided not to contribute to retirement funds for these workers. This could have a legal implication as well. The financial impact of paying wages at par with other workers and contributing to the retirement fund for immigrant workers is not known. However, the company should reconsider this decision and pay all the workers the same level of wages. The company should also contribute to the retirement fund of employees.

Availability of land and bribery

The existing plant does not have sufficient space to build a new plant and hence the company is planning to acquire additional land which falls under the forest reserve area where no commercial activity is allowed. The company is in liaison with government officials to get the land acquisi tion approved. The company would also be paying bribes indirectly to the government officials to get the land allotment approved.

The payment of bribes to government officials, whether directly or indirectly would be unethical. The company could face litigation for acquiring land by unfair means and in future, there is a possibility of such allotments being cancelled. The company's reputation would also be dented if news of bribery is published

by the media. The company also has a responsibility towards th e environment and must contribute towards a sustainable development. The society at large would not take acquisition of forest land by unfair means positively. This impact the overall goodwill and brand image of the company.

The company must evaluate if land at other sites can be acquired for construction of the plant. Such acquisition would be at a higher cost but would be beneficial to the company in the longer run.

Chemical waste and technology

The proposed plant is likely to emit chemically harmful waste which would pollute the environment. The technology available with the company can treat such waste partially. The company has to incur an additional cost of ₹100 crores to build a new treatment plant. This means that the NPV of the project would be reduced by ₹100 crores and IRR would also be lesser if the new treatment plant is built.

As discussed earlier, the company must operate in a socially responsible manner and consider implication of its action on the environment. The pollution caused by plants affects the surrounding environment and might lead to protests by local residents. Sometimes such protests are backed by NGOs as well. The commissioning of environmentally sensitive projects is difficult at times and can cause project delays as well.

The company should consider acquiring a new chemical waste treatment plant to ensure that there is no discharge of harmful waste from the company's plant. Though, there is an additional cost involved in building a new plant, it is important that the society at large perceives that the company is operating in a socially responsible manner. The company operates in a society and is an integral part of it and hence, it has certain responsibilities towards the society as well.

Conclusion

The ultimate objective of a company is to maximise shareholder's wealth. The company must, however, operate in a socially responsible manner in achieving the objective of wealth maximisation. The company has a duty of care to other stakeholders like employees, society at large etc. In some cases, there may be conflict between different stakeholder's objectives. For instance, a new waste treatment plant would be good for the environment and society at large but would be adverse for shareholders as an additional cost of ₹100 crores would be incurred. The company must definitely consider non-financial factors along with financial factors while deciding on whether to build a new plant or not.

CHAPTER-7 Pricing Decision

Section A – Practical Questions

Cost Plus Pricing

Question 1
Bosch Ltd. has developed a special product. Details are as follows: The product will have a life cycle of 5,000 units. It is estimated that market can absorb first 4,500 units at ` 64 per unit and then the product will enter the "decline" stage of its life cycle.
The company estimates the following cost structure:
Direct Labour…………………………….... ` 6 per hour
Other variable costs……………………….` 19 per unit
Fixed costs will be ` 40,000 over the life cycle of the product. The 'labour rate' and both of these costs will not change throughout the product's life cycle.
The first batch of 100 units will take 1,000 labour hours to produce. There will be an 80% learning curve that will continue until 2,500 units have been produced. Batches after this level will each take the same amount of time as the 25th batch. The batch size will always be 100 units.
Required
CALCULATE average selling price of the final 500 units that will allow the company to earn a total profit of ` 80,000 from the product if average time for 24 batches is 359.40 hours.
(Note: Learning coefficient is –0.322 for learning rate of 80%).
The values of Logs have been given for calculation purpose:
log 2 = 0.30103; log 3 = 0.47712; log 5 = 0.69897; antilog of 2.534678 = 342.51; antilog of 2.549863 = 354.70; antilog of 2.555572 = 359.40; antilog of 2.567698 = 369.57 (STUDY MATERIAL)

Solution

Average 'Selling Price' of the final 500 units

Particulars	Amount (`)
Direct Labour [(8,867.50 hrs. + 241.90 hrs. × 25 batches) × `6]	89,490
Add: Other Variable Costs (5,000 units × `19)	95,000
Add: Fixed Costs	40,000
Total Life Cycle Cost	2,24,490
Add: Desired Profit	80,000
Expected Sales Value	3,04,490
Less: Sales Value (4,500 units × `64)	2,88,000
Sales Value (Decline Stage) …(A)	16,490
Sales Units (Decline Stage) …(B)	500
Average Sales Price *per unit* …(A)/ (B)	32.98

Workings
(i) The cumulative average time *per batch* for the first 25 batches
The usual learning curve model is
y = axb
Where
y = Average time per batch (hours) for x batches
a = Time required for first batch (hours)
x = Cumulative number of batches produced
b = Learning coefficient
The Cumulative Average Time *per batch* for the first 25 batches
$y = 1{,}000 \times (25)^{-0.322}$
log y = log 1,000 − 0.322 × log 25
log y = log 1,000 − 0.322 × log (5 × 5)
log y = log 1,000 − 0.322 × [2 × log 5]
log y = 3 − 0.322 × [2 × 0.69897]

log y = 2.549863
y = antilog of 2.549863
y = 354.70 hours
(ii) The time taken for the 25th batch
Total Time for first 25 batches = 354.70 hours × 25 batches
= 8,867.50 hours
Total Time for first 24 batches = 359.40 hours × 24 batches
= 8,625.60 hours
Time taken for 25th batch = 8,867.50 hours − 8,625.60 hours

= 241.90 hours

QUESTION 2

The budgeted cost data of a product manufactured by Ayudhya Ltd. is furnished as below: Budgeted

units to be produced...	**2,00,000**
Variable cost (₹)	**32 per unit**
Fixed cost (₹)	**16 lacs**

It is proposed to adopt cost plus pricing approach with a mark-up of 25% on full budgeted cost basis.

However, research by the marketing department indicates that demand of the product in the market is price sensitive. The likely market responses are as follows:

Selling price (₹ per unit)	44	48	50	56	60
Annual Demand (units)	1,68,000	1,52,000	1,40,000	1,28,000	1,08,000

Required

Analyse the above situation and determine the best course of action.

Answer (MTP APRIL.18) (STUDY MATERIAL)

Analysis of Cost plus Pricing Approach

The company has a plan to produce 2,00,000 units and it proposed to adopt **Cost plus Pricing** approach with a markup of 25% on full budgeted cost. To achieve this pricing policy, the company has to sell its product at the price calculated below:

Qty.	2,00,000 units
Variable Cost (2,00,000 units × ₹ 32)	64,00,000
Add: Fixed Cost	16,00,000
Total Budgeted Cost	80,00,000
Add: Profit (25% of ₹ 80,00,000)	20,00,000
Revenue (need to earn)	1,00,00,000
Selling Price per unit	50 P.U

However, at selling price ₹ 50 per unit, the company can sell 1,40,000 units only, which is 60,000 units less than the budgeted production units.

After analyzing the price-demand pattern in the market (which is price sensitive), to sell all the budgeted units market price needs to be further lowered, which might be lower than the total cost of production.

Statement Showing "Profit at Different Demand & Price Levels"

	I	II	III	IV	V
Qty. (units)	1,68,000	1,52,000	1,40,000	1,28,000	1,08,000
	₹	₹	₹	₹	₹
Sales	73,92,000	72,96,000	70,00,000	71,68,000	64,80,000
Less: Variable Cost	53,76,000	48,64,000	44,80,000	40,96,000	34,56,000
Total Contribution	20,16,000	24,32,000	25,20,000	30,72,000	30,24,000
Less: Fixed Cost	16,00,000	16,00,000	16,00,000	16,00,000	16,00,000
Profit (₹)	4,16,000	8,32,000	9,20,000	**14,72,000**	14,24,000
Profit (% on total cost)	5.96%	12.87%	15.13%	**25.84%**	28.16%

Determination of the Best Course of Action

(i) Taking the above calculation and analysis into account, the company should produce and sell 1,28,000 units at ₹ 56. At this price company will not only be able to achieve its desired mark up of 25% on the total cost but can earn maximum contribution as compared to other even higher selling price.

(ii) If the company wants to uphold its proposed pricing approach with the budgeted quantity, it should try to reduce its variable cost per unit for example by asking its supplier to provide a quantity discount on the materials purchased.

Question 2

RK Ltd., which is producing a product, prepared a budget for the next year as follows : Fixed Cost

p.a .... ₹ 12,60,000

Variable Cost p.u ....₹ 25

Production... 1,80,000 units

Selling price - Cost plus 25% mark up on total budgeted cost

When these budgeted figures and the pricing approach were informed to the Marketing Manager, he came out with a remark that the demand for the product is more price sensitive and he expected the demand under various prices as given below:

Selling Price p.u. (₹)	36	38	40	42	44
Annual Demand (units)	1,74,000	1,62,000	1,50,000	1,38,000	1,25,000

The Marketing Manager further informed that a wholesale dealer is ready to buy the entire production of the company at a price of ₹ 32 p.u. In that situation he expected a savings of ₹ 2 p.u. in the selling expenses which are a part in the above stated variable cost.

Required

EVALUATE the situation and advice the most profitable course of action.
(STUDY MATERIAL)
Answer

The company has a plan to produce 1,80,000 units and it proposed to adopt Cost plus Pricing approach with a markup of 25% on full budgeted cost. To achieve this pricing policy, the company has to sell its product at the price calculated below:

Qty.	1,80,000 units
Variable Cost (1,80,000 units × ₹25)	45,00,000
Add: Fixed Cost	12,60,000
Total Budgeted Cost	57,60,000
Add: Profit (25% of ₹57,60,000)	14,40,000
Revenue (need to earn)	72,00,000
Selling Price per unit (72,00,000/1,80,000)	40 p.u.

However, at selling price ₹40 per unit, the company can sell 1,50,000 units only, which is 30,000 units less than the budgeted production units.

After analyzing the price-demand pattern in the market (which is price sensitive), to sell all the budgeted units market price needs to be further lowered, which might be lower than the total cost of production.

Statement Showing "Profit at Different Demand & Price Levels"

	I	II	III	IV	V	Dealer
Qty. (units)	1,74,000	1,62,000	1,50,000	1,38,000	1,25,000	1,80,000
	96.67%	90.00%	83.33%	76.67%	**69.44%**	100%
Selling Price p.u. (₹)	36	38	40	42	44	32
	₹	₹	₹	₹	₹	₹
Sales	62,64,000	61,56,000	60,00,000	57,96,000	55,00,000	57,60,000
Less: Variable Cost	43,50,000	40,50,000	37,50,000	34,50,000	31,25,000	41,40,000
Total Contribution	19,14,000	21,06,000	22,50,000	23,46,000	23,75,000	16,20,000
Less: Fixed Cost	12,60,000	12,60,000	12,60,000	12,60,000	12,60,000	12,60,000
Profit (₹)	6,54,000	8,46,000	9,90,000	10,86,000	11,15,000	3,60,000
Profit (% on total cost)	11.66%	15.93%	19.76%	23.06%	**25.43%**	6.67%

Advice

(i) Taking the above calculation and analysis into account, the company should produce and sell 1,25,000 units (i.e. near to 70% of budgeted production) at ₹44. At this price RK will not only be able to achieve its desired mark up of 25% on the total cost but can earn maximum contribution as compared to other even higher selling price.

(ii) Sell to wholesale dealer is not a financially viable option. RK will get only 6.67% margin on cost which is substantially lower than the desired level of mark up. However, this option will utilize the entire production. Instead RK may explore other opportunities to utilize additional capacity i.e.30%, for example, international expansion through e – commerce website or outsource the unutilized capacity to others to earn additional revenue.

QUESTION 3

Baithway India Ltd. (BIL) is an ISO 9001:2008, a premier multi-discipline company. BIL manufactures a diverse range of products viz. Pressure Vessels, Wagons, Steel Castings etc. To manufacture Wagons, BIL undertake structural fabrication jobs and manufacturing, retrofitting of EOT crane. It is presently the flagship company of the Baithway Group comprising of renowned companies such as Krishna Agriculture, Chiang Phosphate etc. The Group was launched with the idea of one virtual company with diversified businesses, and is based on four fundamental principles - Collaboration, Sustainability, Inclusiveness and being Global.

Baithway India Ltd. has two Divisions namely, Bogie Division (BD) and Wagon Division (WD) for manufacturing of Wagon. 'BD' manufactures Bogies and 'WD' manufactures various type of Wagons like Freight Wagon, Tank Wagon, Special Wagon etc. To manufacture a Wagon, 'WD' needs 4 Bogies. 'BD' is the only manufacturer of the Bogies and supplies both 'WD' and outside customers. Details of 'BD' and 'WD' for the coming financial year 2019-20 are as follows:

	BD	WD
Fixed Costs (₹)	9,20,20,000	16,45,36,000
Variable Cost per unit (₹)	2,20,000	4,80,000*
Capacity per month (units)	320	12

excluding transfer costs

Market research has indicated that the demands in the market for Baithway India Ltd.'s products at different quotations are as follows-

For Bogies: Quotation price of `3,20,000 no tender will be awarded, but demand will increase by 30 Bogies with every `10,000 reduction in the unit quotation price below `3,20,000.

For Wagons: Quotation price of `17,10,000 no tender will be awarded, but the demand for Wagons will be increased by 2 Wagons with every `50,000 reduction in the unit quotation price below `17,10,000.

Further, 'BD' is the only manufacturer of Bogies but due to increased demand, competitors are entering the market. The division is reviewing its pricing policy and carrying out some market research. After the market research, the division 'BD' has decided to introduce new type of "E" Class Bogies in the market and to obtain the patent right for such unique Bogies. High growth in future characterizes this Class.

Required

(i) CALCULATE the unit quotation price of the Wagon that will maximise Baithway India Ltd.'s profit for the financial year 2019-20.

(ii) CALCULATE the unit quotation price of the Wagon that is likely to emerge if the divisional managers of 'BD' and 'WD' both set quotation prices calculated to maximise divisional profit from sales to outside customers and the transfer price is set at market selling (quotation) price.

[Note: If P = a – bQ then MR = a – 2bQ]

(iii) RECOMMEND appropriate pricing strategy while introducing the "E" Class Bogies.

(STUDY MATERIAL)

ANSWER:

(i) Assumed Quotation Price 'P', Quantity 'Q'

The Marginal Cost of a 'Wagon' is `13,60,000

(`2,20,000 × 4 Bogies + `4,80,000)

Demand Function for a 'Wagon'

P = `17,10,000 – (`50,000 / 2) × Q

Revenue (R) = Q × [17,10,000 – 25,000 × Q]

= 17,10,000 Q – 25,000 Q2

Marginal Revenue (MR) = 17,10,000 – 50,000 Q

Marginal Cost (MC) = 13,60,000

Profit is Maximum where Marginal Revenue (MR) equals to Marginal Cost (MC)

17,10,000 – 50,000 Q = 13,60,000

Q = 7.00 units

By putting the value of 'Q' in *Demand Function*, value of 'P' is obtained.
P = 17,10,000 – (50,000/ 2) × Q
= 17,10,000 – 25,000 × 7.00
= `15,35,000
At `15,35,000 unit Quotation Price of a Wagon, the Baithway Company Ltd.'s Profit will be Maximum.

(ii) At 'BD' the Divisional Manager would ensure that Divisional Marginal Revenue should be *equal to* Division's Marginal Cost so that Profit can be Maximum.
MR of a Bogies = MC of Manufacturing a Bogies
3,20,000 – 2(10,000/ 30) × Q = 2,20,000
Q = 150 units
Selling Price of a Bogie i.e 'P' is
P = 3,20,000 – (10,000/ 30) × 150
= `2,70,000

'BD' will earn Maximum Profit when it will Quote `2,70,000 to the Outside Market. Since, Outside Market Quotation is *Transfer Price* as well, so Transfer Price to WD will be `2,70,000 and it forms part of WD's Marginal Cost.

At 'WD', Division Manager would ensure that Divisional Marginal Revenue should be *equal to* Division's Marginal Cost so that Profit can be Maximum.
MR of a Wagon = MC of Manufacturing a Wagon
17,10,000 – 50,000 × Q = (2,70,000 × 4 Bogies) + `4,80,000
Q = 3.00 units
Quotation Price of a Wagon 'P' should be:
P = `17,10,000 – 25,000 × 3.00
= `16,35,000
The unit Quotation Price of Wagon that emerges as a result of Market Based Transfer Pricing is `16,35,000.

(iii) Whenever a new product is launched into the market, management can adopt either Skimming or Penetration strategy.
The idea behind Skimming Strategy is to intentionally keep a price high to recover the high R&D and marketing expenses associated with developing a new product. For Price Skimming to work, the product must be perceived as having unique advantage over its competing products, very difficult to copy or protected by patents.
Division 'BD' may follow Skimming Strategy by taking advantage of the distinctive features of Bogie "E". High prices in the early stages of a Bogies' life cycle are expected to generate high initial cash flows, this will help the division to recover the high development costs it would incur. Further, this new Bogie "E" is protected from competition through entry barrier. Such barrier is patent.
With Penetration Strategy, a low price is initially charged for the product rather than high prices. The idea behind this is that the price will make the product accessible to many buyers and therefore the high sales will compensate for the lower prices being charged. This penetration pricing is adopted for rapid market acceptance, maximum sales and discouraging competition from the market, however this strategy is not for all companies since it requires a cost structure and scale economics that remain unaffected by narrow profits margin.
The circumstances which may favor a penetration pricing policy are:
– Highly elastic demand for the product, i.e. the lower the price, the higher the demand. This situation is not mentioned in this case for Bogies "E".
– If significant economies of scale could be achieved so that higher sales volumes would result in reductions in costs. However, in this case, it cannot be ascertained.
– Where entry barriers are low, however in this case, new competitors cannot enter the market as Bogies "E" is protected by patent.
– If company desires to shorten the initial period of the product's life-cycle to enter the growth and maturity stages quickly, however, there is no evidence the division 'BD' wish to do this.
Overall, Due to the uniqueness, heavy R&D cost, and barrier to entry for competitor, a market skimming pricing strategy is appeared to be the more appropriate pricing strategy for Bogie "E".

Question 3

Eastern Company Ltd. has two Divisions namely Casnub Bogie Division (CBD) and Wagon Division (WD). CBD manufactures Casnub Bogies and WD manufactures BOBN type of Wagons. To manufacture a Wagon WD needs four Casnub Bogies. CBD is the only manufacturer of the Casnub Bogies and supplies both WD and outside customers. Details of CBD and WD for the coming financial year 2014-15 are as follows:

CBD		WD
Fixed Costs (₹)	9,20,20,000	16,45,36,000
Variable Cost per unit (₹)	2,20,000	4,80,000*
Capacity per month (units)	320	12

* excluding transfer costs

Market research has indicated that the demands in the market for Eastern Company Ltd.'s products at different quotations are as follows-

For Casnub Bogies: Quotation price of ₹3,20,000 no tender will be awarded, but demand will increase by 30 Casnub Bogies with every ₹10,000 reduction in the unit quotation price below ₹3,20,000.

For Wagons: Quotation price of ₹17,10,000 no tender will be awarded, but the demand for Wagons will be increased by two Wagons with every ₹50,000 reduction in the unit quotation price below ₹17,10,000.

Required

(i)   Calculate the unit quotation price of the Wagon that will maximise Eastern Company Ltd.'s profit for the financial year 2014-15.

(ii) Calculate the unit quotation price of the Wagon that is likely to emerge if the divisional managers of CBD and WD both set quotation prices calculated to maximise divisional profit from sales to outside customers and the transfer price is set at market selling (quotation) price. (Study Material)

[Note: If P = a − bQ then MR = a − 2bQ]
(STUDY MATERIAL)

Answer

(i)   Assumed Quotation Price 'P', Quantity 'Q'

The Marginal Cost of a 'Wagon' is

₹13,60,000 (₹2,20,000 × 4 Casnub Bogies + ₹4,80,000) Demand Function for a 'Wagon'

P	$= ₹17,10,000 − (₹50,000 / 2) × Q$
Revenue (R)	$= Q × [17,10,000 − 25,000 × Q]$
	$= 17,10,000\, Q − 25,000\, Q^2$
Marginal Revenue (MR)	$= 17,10,000 − 50,000\, Q$
Marginal Cost (MC)	$= 13,60,000$

Profit is Maximum where Marginal Revenue(MR) equals to Marginal Cost(MC)

$17,10,000 − 50,000\, Q$	$= 13,60,000$
Q	$= 7.00$ units

By putting the value of 'Q' in Demand Function, value of 'P' is obtained. P

=	17,10,000 – (50,000/ 2) × Q
=	17,10,000 – 25,000 × 7.00
=	₹15,35,000

At ₹15,35,000 unit Quotation Price of a Wagon the Eastern Company Ltd.'s Profit will be Maximum.

(ii) At CBD the Divisional Manager would ensure that Divisional Marginal Revenue should be equal to Division's Marginal Cost so that Profit can be Maximum.

MR of a Casnub Bogies	=	MC of Manufacturing a Casnub Bogies
3,20,000 – 2(10,000/ 30) × Q	=	2,20,000
Q	=	150 units
Selling Price of a Casnub Bogie 'P' is		
P	=	3,20,000 – (10,000/ 30) × 150
= ₹2,70,000		

CBD will earn Maximum Profit when it will Quote ₹2,70,000 to the Outside Market. Since, Outside Market Quotation is Transfer Price as well, **so Transfer Price to WD will be ₹2,70,000 and it forms part of WD's Marginal Cost.**

At WD, Division Manager would ensure that Divisional Marginal Revenue should be equal to Division's Marginal Cost so that Profit can be Maximum.

MR of a Wagon	=	MC of Manufacturing a Wagon
17,10,000 – 50,000 × Q	=	(₹2,70,000 × 4 Casnub Bogies) + ₹4,80,000
Q	=	3.00 units

Quotation Price of a Wagon 'P' should be:

P	= ₹17,10,000 – 25,000 × 3.00
=	₹16,35,000

The unit Quotation Price of Wagon that emerges as a result of Market Based Transfer Pricing is ₹16,35,000.

Question 4

Amber Ltd. is a leading company in the Footwear Industry. The company has four factories in different locations with state of the art equipments. Due to competition in the market, company is continually reviewing its product range and enhancing its existing products by developing new models to satisfy the demands of its customers.

The company currently has a production facility which has a capacity of 3,500 standard hours per week.

Product 'Comfort' was introduced to the market six months ago and is now about to enter the

maturity stage of its life cycle.

However, research by the marketing department indicates that demand of the product 'Comfort' in the market is price sensitive. The likely market responses are as follows:

Selling price per unit (₹)	1,750	1,600	1,525	1,450	1,300
Sales demand per week (units)	550	725	1,000	1,150	1,200

The variable cost per unit of manufacturing 'Comfort' is ₹ 750. Standard hours used to manufacture one unit is 2 hours.

Product 'Sports' was introduced to the market two months ago using a penetration pricing policy and is now about to enter its growth stage. Each unit has a variable cost of ₹ 545 and takes 2.50 standard hours to produce. Market research has indicated that there is a linear relationship between its selling price and the number of units demanded, of the form P = a - bx. At a selling price of ₹ 1,000 per unit demand is expected to be 1,000 units per week. For every ₹ 100 increase in selling price the weekly demand will reduce by 200 units and for every ₹ 100 decrease in selling price the weekly demand will increase by 200 units.

Product 'Ethnic' is currently being developed and which is about to be launched in the market. This is a highly innovative designer product which the company believes that it will have a revolutionary impact on the market and consumer behaviour. The company has decided to use a market skimming approach to pricing this product during its introduction stage.

Required

(i) ADVISE which of the above five selling prices should be charged for product 'Comfort', in order to maximize its contribution during its maturity stage.

  (ii) CALCULATE the number of units to be produced of product 'Sports' in order to utilize all of the spare capacity from your answer to (i) above and the selling price per unit of product 'Sports' during its growth stage.

(b)   COMPARE penetration and skimming pricing strategies during the introduction stage, using product 'Ethnic' to illustrate your answer.

(c)   EXPLAIN with reasons, for each of the stages of 'Ethnic's product life cycle, the changes that would be expected in the

(i)   average unit production cost

(ii)   unit selling price(PYQ NOV.18)

Answer

(i)Selling Price for "Comfort" that would maximize its contribution at Maturity Stage

Contribution per unit of "Comfort" = Selling Price per unit – Variable Cost per unit Total Contribution =

Contribution per unit × Units sold

All figures in Rupees

Sales (units) per week	550	725	1,000	1,150	1,200
Selling Price per unit	1,750	1,600	1,525	1,450	1,300
Less: Variable Cost per unit	750	750	750	750	750
Contribution per unit	1,000	850	775	700	550
Total Contribution	5,50,000	6,16,250	7,75,000	8,05,000	6,60,000

Total contribution is maximum when sales are 1,150 units. Therefore, the selling price per unit of "Comfort" should be ₹ **1,450 per unit**.

(ii) Production Number of "Sports" and Selling Price per unit

Amber Ltd. has a production capacity of 3,500 hours per week. As explained in (i) above, it would manufacture 1,150 units of "Comfort" per week. Each unit of "Comfort" requires 2 hours of production. Therefore, total production hours for Comfort would be 1,150 units × 2 hours = 2,300 hours per week.

Production capacity remaining to manufacture "Sports" = 3,500 hours – 2,300 hours
= **1,200 hours per week**. Each unit of "Sports" requires 2.5 hours of production.

Therefore, the number of "Sports" units that can be produced = 1,200 hours /
2.5 hours **= 480 units per week.**

Linear relationship between Selling Price and Number of Units Demanded has been given to be P= a − bx.

P = Selling Price per unit

a = Selling Price when demand will be zero

b (slope) = Change in Price / Change in Quantity x = Quantity Demanded

Given, at a Selling Price of ₹1,000 per unit, Quantity Demanded will be 1,000 units per week. For every ₹100, per unit increase / decrease in Selling Price, the Quantity Demanded will decrease / increase by 200 units per week respectively. A ₹500 per unit increase in Selling Price will result in fall of 1,000 units of Sales per week. The Selling Price at which Sales will be Zero i.e. a =
₹1,500 per unit.
b (slope) = Change in Price / Change in Quantity = ₹100 / 200 = 0.50

Penetration pricing is most commonly associated with a marketing objective of increasing market share or sales volume, rather than short term profit maximization. Thus, substituting the values in the equation to find the Selling Price of "Sports" <u>when the Quantity Sold is 480 units</u>:

P = a − bx

= 1,500 − 0.50 × (480)

= 1,500 − 240

= ₹1,260

Sports should be sold at ₹1,260 per unit during the growth stage.

Alternative

Hours after production of Product 'Comfort' (3,500-1,150×2) =1,200 hours to be utilized to produce product 'Sports'.
1,200 hours/ 2.5 = 480 units
10% increase in selling price will lead to 20% decrease in demand of units of product "Sports". Here we can produce only 480 units which amounts to 52% decrease in units so the selling price should be increased by 26% as per given price demand function. So, the selling price per unit will be 1,260 for 480 units of product "Sports".

(b) "Ethnic" is given to be a highly innovative product that is about to be launched into the market. The product with unique features that will differentiate it from other products leading to a revolutionary impact on market and customer behavior. There seem to be no competitors

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providing similar products.

Skimming Price Strategy is adopted to charge high prices in the introduction stage in order to recover costs. Skimming Price will be suitable for "Ethnic" because:

- Market for the product is not yet established. Initially high promotional expense may have to be incurred to create customer awareness and build a market for the product.

- Due to its innovative feature, the customers would not mind paying a premium for the unique product offering. Demand would be inelastic.

- The market demand is unknown. Initial capital outlay to produce this product may be high, resulting in high cost of production.

- Production and promotional costs in the initial years is likely to be high. Therefore, a higher selling price would help Amber Ltd. to recover the costs. Since demand is likely to be inelastic, charging a premium may not be a problem.

- The price can be gradually reduced once the market for the product is established. Competitors may reverse engineer and offer similar products, due to which price may have to be lowered in the long run to retain customers.

Penetration Pricing is adopted to charge a low price in the initial stage for penetrating the market as quickly as possible. For a new product, this low-price strategy will popularize the product. Once the market is established, the price may be increased. Penetration pricing will be suitable when:

- Demand for the product is elastic, more demand when prices are low.

- Large scale production of the product yields economies of scale.

- Threat of competition requires prices to be set low. It serves as an entry barrier to prospective competitors as well.

Product "Ethnic" is an innovative product that the manufacturer believes will change the whole market once it is launched. A strategy of penetration pricing could be effective in discouraging potential new entrants to the market. However, the product is believed to be unique and as such demand is likely to be fairly inelastic. In this instance a policy of penetration pricing could significantly reduce revenue without a corresponding increase in sales. Thus, this strategy is not suitable for "Ethnic".

(c) **Impact on Unit Selling Price and Average Cost of Production per unit at each stage of "Ethnic" Product Lifecycle**

Introduction Stage

As explained in (b) above, at the Introduction Stage of Lifecycle, due to high cost of production and initial promotion expenditure, the <u>unit cost of production will be high</u>. Using Skimming Price Policy, the <u>unit selling price will also be high</u>.

Growth Stage

This is the second phase of the Life-Cycle, product awareness among customers would result in increased demand. Therefore, scale of production likely to increase. The new market segment would attract competitors, who are like to reverse engineer and offer similar products in the market. Promotional activities and marketing activities need to continue to maintain and gain market share.

Accordingly, the <u>unit selling price would reduce</u> from the introduction stage on account of the following reasons:

- Competitors offering similar product would take away the uniqueness feature of "Ethnic".
- Again, to gain market share, the unit selling price may have to be lowered to make it attractive to a larger segment of customers.

  The <u>unit cost of production is also likely to reduce</u> due to the following reasons:
- Increased production would result in increased material procurement from suppliers.
- Bulk purchasing discounts can be negotiated with them to lower cost of production.
- Learning curve and experience would enable the labor force to become more efficient. This leads to higher production with the same level of resources leading to cost savings.
- Larger production batches due to increase in scale of operations will reduce the unit variable overhead cost.
- Economies of scale would result due to fixed overhead cost being spread over larger number of units.

Maturity Stage

The third phase of Product Life-Cycle that is characterized by an established market for "Ethnic". After rapid growth in sale volume in the previous stages, growth of sales for the product will saturate. Competition would be high due to large number of rivals in the market, this may lead to decreasing market share.

It is likely that the price of the product will be lowered further at the maturity stage in a bid to preserve sales volumes. The company may attempt to preserve sales volumes by employing an <u>extension strategy rather than reducing the selling price</u>. For example, they may introduce product add-ons to the market that are compatible with "Ethnic".

<u>Unit production cost will remain constant</u>
- Direct material cost will remain constant. If procurement is lower than the growth phase, it might even lead to slightly higher prices since supplier may not extend bulk discounts.
- The benefits of efficient production due to the effect of learning and experience may also have waned. Therefore, unit labour cost is also likely to remain constant.
- Since scale of production is no longer increasing, the unit variable overhead costs are also likely to remain constant.

Decline Stage

This last stage in the product cycle is characterized by saturated market, declining sales, change in customer's tastes etc. Profitability may slowly start decreasing with fall in sales.

At the decline stage, Product "Ethnic" is likely to have been surpassed by more advanced products in the market and consequently will become obsolete. The company will not want to incur inventory holding costs for an obsolete product and is likely to <u>sell "Ethnic" at marginal cost or perhaps lower</u>.
Sales volumes at the decline stage are likely to be low as the product is surpassed by new exciting products that have been introduced to the market. Furthermore, the workforce may be less interested in manufacturing a declining product and may be looking to learn new skills. For both of these reasons, <u>unit production costs</u> <u>are likely to increase</u> at the decline stage.

Section B – Case Scenarios & Case Studies

Case Scenarios

Question 1

Rapid Heal Tech Ltd. (RHTL) is a leading IT security solutions and ISO 9001 certified company. The solutions are well integrated systems that simplify IT security management across the length and depth of devices and on multiple platforms. RHTL has recently developed an Antivirus Software and company expects to have life cycle of less than one year. It was decided that it would be appropriate to adopt a market skimmingS pricing policy for the launch of the product. This Software is currently in the Introduction stage of its life cycle and is generating significant unit profits.

Required

(i)   Explain, with reasons, the changes, if any, to the unit selling price that could occur when the Software moves from the Introduction stage to Growth stage of its life cycle.

(ii)   Also suggest necessary strategies at this stage. (Study Material)

Answer

Following acceptance by early innovators, conventional consumers start following their lead. New competitors are likely to now enter the market attracted by the opportunities for large scale production and profit. RHTL may wish to discourage competitors from entering the market by lowering the price and thereby lowering the unit profitability. The price needs to be lowered so that the product becomes attractive to different market segments thus increasing demand to achieve the growth in sales volume. Strategies at this stage may include the following

(i)   Improving quality and adding new features such as Data Theft Protection, Parental Control, Web Protection, Improved Scan Engine, Anti Spyware, Anti Malware etc.

(ii)   Sourcing new market segments/ distribution channels.

(iii)   Changing marketing strategy to increase demand.

(iv)   Lowering price to attract price-sensitive buyers.

Question 2

State the appropriate pricing policy in each of the following independent situations:

(i)   'A' is a new product for the company and the market and meant for large scale production and long term survival in the market. Demand is expected to be elastic.

(ii)   'B' is a new product for the company, but not for the market. B's success is crucial for   the company's survival in the long term.

(iii)   'C' is a new product to the company and the market. It has an inelastic market. There needs to be an assured profit to cover high initial costs and the usual sources of capital have uncertainties blocking them.

(iv)   'D' is a perishable item, with more than 80% of its shelf life over. (STUDY MATERIAL)

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Answer

	Situation	Appropriate Pricing Policy
(i)	'A' is a new product for the company and the market and meant for large scale production and long term survival in the market. Demand is expected to be elastic.	Penetration Pricing
(ii)	'B' is a new product for the company, but not for the market. B's success is crucial for the company's survival in the long term.	Market Price or Price Just Below Market Price
(iii)	'C' is a new product to the company and the market. It has an inelastic market. There needs to be an assured profit to cover high initial costs and the unusual sources of capital have uncertainties blocking them.	Skimming Pricing
(iv)	'D' is a perishable item, with more than 80% of its shelf life over.	Any Cash Realizable Value*

(*) this amount decreases every passing day.

Question 3

State the most appropriate pricing policy to be adopted in the following independent situations:
(i)   Modern patented drug entering the market.
(ii) The latest version of a mobile phone is being launched by an established, financially strong company.
(iii) An established company has recently entered the stationery market segment and launched good quality paper for printing at home and office.
(iv) A car manufacturer is launching an innovative, technologically advanced car in the highly priced segment.   (STUDY MATERIAL)

Answer

	Situation	Appropriate Pricing Policy
(i)	Modern patented drug entering the market.	Skimming Pricing
(ii)	The latest version of a mobile phone is being launched by an established, financially strong company.	Penetration Pricing
(iii)	An established company has recently entered the stationery market segment and launched good quality paper for printing at home and office.	Market Price
(iv)	A car manufacturer is launching an innovative, technologically advanced car in the highly priced segment.	Skimming Pricing

Question 4

RECOMMEND the Pricing Strategy to be adopted with reference to the following situations. You are not required to explain the reasons for your answer.

a. Star Coffee Shop follows the practice of keeping the price of its coffee or service artificially high in order to encourage favourable perceptions among buyers, based solely on the price.

b. Sky TV gave away their satellite dishes for free in order to set up a market for them.

c. Princeton Hotels Ltd. follows a competitive pricing method under which it tries to keep its price at an average level charged by the Industry.

d. Eddisson Enterprises has piled up stocks in large quantities and the market price has fallen.

e. Acqua LLP follows a new product pricing strategy through which company makes profitable sales by selling out few units.

f. X Ltd. produces Product X a revolutionary product and as a reward for innovation and for taking first initiative which pricing strategy should X Ltd. adopt?

g. An established company has recently entered the stationery market segment and launched quality paper for printing at home and office.

h. D is a perishable item, with more than 80% of its shelf life is over. (PYQ MAY.19)

Answer

Premium Pricing

Penetration Pricing

Going Rate Pricing

Pricing Below Marginal Cost

Skimming Pricing

Premium Pricing

Market Price

Any Cash Realizable Value

Question 5

Netcom Ltd. manufactures and sells a number of products. All of its products have a life cycle of less than one year. Netcom Ltd. uses a four stage life cycle model (Introduction, Growth, Maturity and Decline).

Netcom Ltd. has recently developed an innovative product. It was decided that it would be appropriate to adopt a market skimming pricing policy for the launch of the product.

However, Netcom Ltd. expects that other companies will try to join the market very soon.

This product is currently in the Introduction stage of its life cycle and is generating significant unit profits. However, there are concerns that these current unit profits will not continue during the other stages of the product's life cycle.

Required **(STUDY MATERIAL)**

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EXPLAIN, with reasons, the changes, if any, to the unit selling price and the unit production cost that could occur when the products move from the previous stage into each of the following stages of its life cycle:
  (i) **Growth**
  (ii) **Maturity(Study Material)**

Answer

Growth Stage

Compared to the introduction stage the likely changes are as follows:

Unit Selling Prices:
These are likely to be reducing for a number of reasons:
  ▪ The product will become less unique as competitors use reverse engineering to introduce their versions of the product.
  ▪ Netcom may wish to discourage competitors from entering the market by lowering the price and thereby lowering the unit profitability.
  ▪ The price needs to be lowered so that the product becomes attractive to different market segments thus increasing demand to achieve the growth in sales volume.
    Unit Production Costs:
    These are likely to reduce for a number of reasons:
  ▪ Direct materials are being bought in larger quantities and therefore Netcom may be able to negotiate better prices from its suppliers thus causing unit material costs to reduce.
  ▪ Direct labour costs may be reducing if the product is labour intensive due to the effects of the learning and experience curves.
  ▪ Other variable overhead costs may be reducing as larger batch sizes reduce the cost of each unit.
  ▪ Fixed production costs are being shared by a greater number of units.

Maturity Stage

Compared to the growth stage the likely changes are as follows: Unit Selling Prices:
These are unlikely to be reducing any longer as the product has become established in the market place. This is a time for consolidation and whilst there may be occasional offers to tempt customers to buy the product the selling price is likely to be fairly constant during this period.
Unit Production Costs:
Direct material costs are likely to be fairly constant in this phase and may even rise as the quantities required diminish compared to those required in the growth stage with the consequential loss of negotiating power.

Direct labour costs are unlikely to be reducing any longer as the effects of the learning and experience curves have ended. Indeed the workers may have started working on the next product so that their attention towards this product has diminished with the result that these costs may increase.
Overhead costs are likely to be similar to those of the end of the growth phase as optimum batch sizes have been established and are more likely to be used in this maturity stage of the product life cycle where demand is more easily predicted.

CHAPTER-8 Performance Measurement and Evaluation

Section A – Practical Questions

Question 1

BYD Alloy Ltd. first opened its door in 1990 for business and now it is a major supplier of metals supporting over a dozen different industries and employs experts to support each industry. These include Wood & Panel Products Manufacturing, Hearth Products , Site Furnishings, Commercial and Residential Construction etc. It has grown through devotion to its customers, dedication to customer service and commitment to quality products. The company has two divisions: Division 'Y' and Division 'D'. Each division work as an investment centre separately. Salary of each divisional manager is ₹720,000 per annum with the addition of an annual performance related bonus based on divisional return on investment (ROI). A minimum ROI of 12% p.a. is expected to be achieved by each divisional manager. If a manager only achieves the 12% target, he will not be rewarded a bonus. However, for every whole 1% point above 12% which the division achieves for the year, a bonus equal to 3% of annual salary will be paid subject to a maximum bonus of 20% of annual salary. The figures belonging to the year ended 31 March 2019 are given below:

Division 'Y' ('000)		Division 'D' ('000)
Revenue	29,000	17,400
Profit	5,290	3,940
Less: Head Office Cost	(2,530)	(1,368)
Net Profit	2,760	2,572
Non- Current Assets	19,520	29,960
Cash, Inventory, and Trade Receivable	4,960	6,520
Trade Payable	5,920	2,800
Manager Responsible	HAI	FAI

During the financial year 2018-19, FAI manager of Division 'D' invested ₹13.6 million in new equipment including an advanced cutting machine, which will increase productivity by 10% per annum. HAI, manager of Division 'Y', has made no investment during the year, even its computer system needs updation. Division 'Y''s manager has already delayed payments of its suppliers due to limited cash & bank balance although the cash balance at Division 'Y' is still better than that of Division 'D'.

Required

(i)   For each division, COMPUTE, ROI for the year ending 31 March 2019. Justify the figures used in your calculation.

(ii)   COMPUTE bonus of each manager for the year ended 31 March 201 9.

(iii)   DISCUSS whether ROI provides justifiable basis for computing the bonuses of managers and the problems arising from its use at BYD for the year ended 31 March 2019. (RTP NOV.18) (Study Material)(MTP AUG.18)

Answer

(i)   **ROI Division 'Y'**
        Controllable Profit = ₹5,290K
        Net Assets = ₹19,520k + ₹4,960K – ₹5,920K = ₹18,560K ROI = 28.5%
        Division 'D'
        Controllable profit = ₹3,940K
        Net Assets = ₹29,960K + ₹6,520K – ₹2,800K = ₹33,680K ROI = 11.7%

In computation of ROI of both division, controllable profit has been taken into consideration. The reason behind this is that the Head Office costs are not controllable and responsibility accounting considers that managers should only be held responsible for costs over which they have control. The assets figures being used also depend on the same principal. Figures of current assets and the current liabilities have been taken into consideration as they are such items over which managers have complete control.

(ii) Bonus

Bonus to be paid for each percentage point = ₹7,20,000 × 3% = ₹21,600 Maximum Bonus = ₹7,20,000 × 20% = ₹1,44,000

Division 'Y'

ROI = 28.5% (16 whole percentage points above minimum ROI) 16 × ₹21,600 = ₹3,45,600
Therefore, manager will be paid the bonus of ₹1,44,000 (max.)

Division 'D'

ROI = 11.7% (Zero, percentage point above minimum)
Therefore Bonus = NIL

(iii) Discussion

FAI will not receive any bonus since he has not earned any point above minimum percentage. This is due to the large asset base on which the ROI figure has been computed. Total assets of Division 'D' are almost double the total assets of Division 'Y'. The major reason behind this is that Division 'D' invested ₹13.6 million in new equipment during the year. If this investment were not made, net assets would have been only ₹20.08 million and the ROI for Division 'D' would have been 19.62% resulting in payment of a bonus ₹1,44,000 (7 × ₹21, 600 = ₹ 1,51,200; subject to maximum of ₹1,44,000) rather than the nothing. FAI is being penalized for making decisions which are in the best interests of his division. It is very surprising that he decided to invest where he knew that he would receive lesser bonus subsequently. He acted in the best interests of the BYD altogether. On the other hand, HAI has taken benefit from the fact that he has not invested anything even though it was needed for computer system updation. This is an example of sub-optimal decision making.

Further, Division 'Y''s trade payables are over double those of Division 'D'. In part, one would expect this due to higher sales (almost 66% more than Division 'D') and low cash levels at Division 'Y'. Higher trade payable leads to reduction in net assets figures. The fact that BYD is rewarding HAI with bonus, even though relationships with suppliers may be badly affected, is again a case of sub-optimal decision making.

If the profit margin (excluding head office cost) as percentage of sales is calculated, it comes to 18.24% for Division 'Y' and 22.64% for Division 'D'. Therefore it can be seen that Division 'D' is performing better if capital employed is ignored. ROI is simply making the division 'D''s performance worse.

FAI might feel extremely disappointed by getting nothing and in the future, he may opt to postpone the investment to increase the bonus. Non- investing in new technology and equipment will mean that the BYD will not be kept updated with industry changes and its overall future competitiveness will be affected.

Briefly, the use of ROI is resulting in sub-optimal decision making and a lack of goal congruence i.e. what is good for the managers is not good for the company and vice versa. Fortunately, Division 'D''s manager still seems to be acting for the benefit of the BYD but the other manager is not. The fact that one manager is receiving a much bigger bonus than the other is not justifiable here and may result in conflict in long run. This is disappointing for the company especially in the situation when the divisions need to work in unison.

Question 2

XYZ Ltd. provides you with the following financial information as at 31st March 2020.

	(₹ in lakhs)
Share Capital	981.46
Reserves and Surplus	1,313.62
Long Term Debt	144.44
Trade Payables	20.38

Additional information provided is as follows:
(i)   Profit before interest and tax is ₹ 2,202.84 lakhs
(ii)   Interest paid is ₹13.48 lakhs.
(iii)   Tax rate is 30%
(iv)   Cost of equity = 12.42% and cost of debt = 6.53%.

Required

CALCULATE Economic Value Added of XYZ Ltd.(Study Material)

Answer

NOPAT = [PBIT- Interest - Tax] + Interest (net of tax)

₹ in lakhs	
PBIT	2,202.84
Less: Interest	(13.48)
PBT	2,189.36
Less: Tax @ 30%	(656.81)
PAT	1,532.55
Add: Interest (net of tax) [13.48 × (1 - 0.30)]	9.44
NOPAT	1,541.99

EVA   = NOPAT – WACC × Capital Employed

= ₹1,541.99 L– 12.07% × ₹2,439.52 L

= ₹1,247.54 L

Question 3

X Greetings is a Korean company based in Seoul committed to supplying the highest quality stationery, greeting cards, gifts, and children's products, which are sourced from all over the world. Company also distributes Sunday Paper – Korean made eco-friendly stationery designed and manufactured in Seoul. X's home currency is the KRW. It is also listed on the KRX for last 20 years and its current share price is KRW 23.25.

You are a Management Accountant of the X Greetings and directors have asked you to study X on value-based management which is a different approach to the performance management. The directors have heard about this method considering it a way of focusing on shareholder's interests and in the present economic scenario, they think it to be useful for the growth of X.
Conventionally earnings per share (EPS) and share price were being used to assess performance. The proposed changes are important and the directors require you to have the implications of the new

analysis and also want to convince the major investors for the future benefits.

Financial data for X Greetings

Particular	2018-19	2017-18
	KRW in million	KRW in million
Profit after interest and tax	55.55	65.38
Interest	15.60	8.00
Opening capital employed	273.58	198.40
Closing capital employed	329.13	273.58
	Debt to Equity	Debt to Equity
Capital structure	40:60	40:60
	%	%
Costs of capital		
Equity	14.20	11.50
Debt (pre-tax rate)	8.00	6.00
Tax rate	30	30
Stock market information:		
Average number of shares in issue	3.2 million	3.2 million
Stock market all-share index	1,985	2,561
Retailing sector index	1,155	1,408
X Greetings (share price)	KRW 22.50	KRW 24.40

Required

ASSESS the performance of X Greetings using Economic Value Added and ANALYSE the result relative to those of earnings per share (EPS) and share price. Assumptions, if any, should be clearly stated. (Study Material)

Answer

The performance of X Greetings has gone down since earnings per share is down by 15.03% (W2) from last year. This indicates the company being not in the favor of investors. However, the share price seems up with a decline of only 7.79% relative to fall in retailing sector of 17.97% and the stock market down by 22.49% (W3). The sector comparison is more material for the performance of X as stock market all-share index (KOSPI) is composed of data from financial, manufacturing and other industries whereas retailing sector comparison is specific. This implies that the market views X as one of the better prospects within the retailing sector that will encourage the shareholders to continue to hold their shares in the company .

In addition, X Greetings has generated positive EVA for 2018-19 KRW 37.03 m (W1). EVA of FY 2018-19 has fallen from 2017-18 but still it is remained positive and so the company continues to create value for its shareholders even in the bearish market. It is therefore a good investment option even in a falling market.

Working Note-1

EVA calculations for the periods given are:

Particulars	2018-19 KRW in million	2017-18 KRW in million
Profit after interest and tax	55.55	65.38
Add Back: Interest (net of tax at 30%)	10.92	5.60
Net operating profit after tax (NOPAT)	66.47	70.98
Opening Capital employed	273.58	198.40

Assumptions
There are no non-cash expenses to adjust the profit.
Economic depreciation and Accounting depreciation are equal.
No lease exists for capitalisation.

Cost of Capital

WACC 2018-19 $= 0.60 \times 14.20\% + 0.40 \times 5.60\%$

$= 10.76\%$

WACC 2017-18 $= 0.60 \times 11.50\% + 0.40 \times 4.20\%$

$= 8.58\%$

EVA $=$ NOPAT – Capital Employed × WACC

EVA 2018-19 $= 66.47\ m - 273.58\ m \times 10.76\%$

$=$ KRW 37.03 m

EVA 2017-18 $=$ $70.98\ m - 198.40\ m \times 8.58\%$

$=$ KRW 53.96 m

Working Note-2

Particulars	2018-19	2017-18	Change
EPS	KRW 17.36	KRW 20.43	-15.03%

Working Note-3

Particulars	2018-19	2017-18	Change
KOSPI (capitalization-weighted index of all common shares)	1,985	2,561	-22.49%
Retailing sector index	1,155	1,408	-17.97%
X share price	KRW 22.50	KRW 24.40	-7.79%

Question 4

Water Utilities Services (WUS) is a parastatal company established with an aim for supply and distribution of water in Mumbai as well as supply of water to the various local authorities for distribution to villages and other small cities adjacent to Mumbai. This involved planning, operating, treating, maintaining, and distributing water resources in the country's urban centres and other areas mandated by Maharashtra Government. Its mission is "To provide sustainable water in a cost effective and environmentally friendly manner to the economy".

The government ensures that WUS does not take advantage of its monopoly position in the regional area by increasing prices. The government controls majority of services through its water regulatory body which determines an acceptable margin level (ROCE) and ensures that the pricing of WUS within these areas does not break this level. The remaining work i.e. a water bottle operation (WBO) is not regulated by government and WUS charges a market rate for water supply in bottle. The regulator compute return on capital employed (ROCE) of WUS based on its own valuation of the capital assets which are used in operation and the profit from those services.

Acceptable level of ROCE set by the regulator is 7.00%. If WUS breach this level, then the company would be penalized. WUS board is trying to improve the performance for the benefit of the shareholders. In order to communicate the objective of maximizing shareholders' wealth, the directors have decided to consider economic value added (EVA) as the key performance indicator.

Compute EVA of WUS based on the following information for the year ending 31 March 2019:

Particulars	Water Distribution Operation (WDO)	Water Bottle Operation (WBO)	Total
	₹ in Crore	₹ in Crore	₹ in Crore
Revenue	555.00	186.00	741.00
Less: Operating Cost	460.00	119.00	579.00
Operating Profit	95.00	67.00	162.00
Less: Finance Charges			46.00
Profit Before Tax			116.00
Less: Tax at 30%			34.80
Profit After Tax			81.20
Capital Employed	2018-19	2017-18	
	₹ in Crore	₹ in Crore	
Audited Accounts	1,616.20	1,495.00	
Determined by the Regulator (for WDO Only)	1,558.00	1,422.00	

Notes

1. Operating Costs includes:

Particular	2018-19	2017-18
	₹ in Crore	₹ in Crore
Depreciation	118	114
Provision for doubtful debts	4	1
Research and Development	24	–
Other non-cash items	14	12

Economic depreciation is ₹166 Crore in 2018-19. In FY 2017-18, economic and accounting depreciation were assumed to be the same.

2. Current year tax paid is (₹18crore) and deferred tax provisions of ₹1.50 crore has been adjusted. There was no deferred tax balance before 2018-19. The provision for doubtful debts was ₹9 crore in the 2018-19 balance sheet.

3. Research and development has been non-capitalized. It belongs to a new project that will be developed over five years and is expected to be of long-term benefit to the company. 2018-19 is the first year of this project.

4. Cost of Capital

Equity	14%
Debt (Pre-Tax)	6%

5. Gearing of WUS

Equity	45%
Debt	55%

Required

(i)   EVALUATE the financial performance of WUS using EVA.

(ii) ASSESS whether WUS comply with its acceptable ROCE level

Advise on how to improve profitability. (RTP MAY.19) (Study Material) (MTP APRIL.19)

Answer

(i)   **Computation of NOPAT**

Particulars	₹ in Crore
Operating Profit	162.00
Add:	
Non-Cash Items	14.00
Accounting Depreciation	118.00
Doubtful Debts	4.00
Research and Development	24.00
Less:	
Economic Depreciation	166.00
Tax Paid	18.00
Tax Saving on Interest (₹46 × 30%)	13.80
NOPAT	124.20

Computation of Capital Employed

Particulars	₹ in Crore
Capital Employed as on 31.03.2018	1,495.00
Add:	
Provision for Doubtful Debt as on 31.03.2018	5.00
Other Non-Cash Items (incurred in 2017-18)	12.00
Adjusted Opening Capital Employed	1,512.00

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WACC = 0.45 × 14% + 0.55 × 6% × (1 – 30%)) = 8.61%

EVA = NOPAT – (WACC × Capital Employed) = – 5.98 Crores

Evaluation

Presently, WUS is distorting value as it is not able to meet the economic cost of its own capital. This put the company into the question of perpetual succession and lead the company against shareholder's interest. The reason could be a higher cost of equity for WUS. The investing risk should be low since 75% of the services that the company renders are important for the economy and demand is guaranteed in future. Optionally, WUS needs to either increase its NOPAT enough for break even on economic value added or slash its capital employed by selling unutilized or under-utilized assets.

(ii)   Regulatory ROCE: Target 7.00%

$$ROCE = \left(\frac{Operating\,Profit}{Capital\,Empolyed}\right) \times 100.00\%$$

$$= \left(\frac{95}{1,422}\right) \times 100.00\%$$

= 6.68%

The ROCE is within the acceptable ROCE of 7.00%.

(iii)   Operating Margins

Water Distribution Operation = 17.12% Water Bottle Operation = 36.02% Advise

Operating margin from WBO is 36.02% compared to 17.12% (WDO). WUS may use the WDO activities as a trusted source of cash profit to reinvest in expansion of the WBO. Expansion through acquisition of appropriate non-regulated businesses using the cash generated by the regulated activities might be a good decision.

Further, WUS may improve profitability by controlling costs within WDO activities through performance measurement. The regulatory body cannot argue that the company is overcharging its customers to increase profit margin. This is possible through strict observance of expenses and using cost savings techniques through efficiency improvements. In order to control cost within WDO, targets should be based on minimal variances and adopting cost cutting methods.

Overall, In WDO, there is only a limited scope for increase in the operating profit since the maximum operating profit allowed is ₹99.54 crore i.e. 7.00% of ₹1,422 crore of capital employed. Thus, WUS should go to expand its WBO as this is producing higher operating profit margins.

Question 5

Beta Control (BC) is a global leader in manufacturing of commercial building control systems with over 250 distributors and many thousands of installations in more than 50 countries. Control systems involve air conditioning systems, facility management, energy and water management, access control and security controls etc. At BC, manufacturing is done at a number of factory sites where some products are easy and largely produced and have a long life while other products are intricated and have a short life due to changing technologies. BC's mission statement is 'to keep you ahead through control systems

that improve productivity and save energy'.

A Newly appointed chief executive officer (CEO) is anxious about declining share price of BC in the last two years. She identified that the business has grown through acquisition and senior management have focused on making corporate deals but not on making control systems. She announced that the BC's focus must be on optimization and upgradation of its value generation rather than just getting bigger through acquisitions.

Assuming yourself as a performance management expert of BC, the CEO has asked you to aid her in her improvement programme. Firstly, she wants your views on the use of EVA as the key performance metric at BC. You are given the current EVA computation (Annexure1) but there is some suspicion about whether the assistant who has done this work is sufficiently well trained about this method. So, she requires you to examine his accuracy and the assumptions forming part of the calculation.

Required

Write a report to the chief executive officer to EVALUATE the accuracy of the EVA calculation and the assumptions.

Annexure 1

NOPAT

Particulars	Year ended 31st March 2019	
	₹ in Lacs (L)	Notes
Operating Profit	1,102.80	
Add:		
Non-Cash Expenses	30.20	
Marketing Expenditure Capitalised	46.20	7
Less:		
Tax	269.60	9
Lost Tax Relief on Interest	48.96	
Net Operating Profit After Tax (NOPAT)	860.64	

Capital Employed

Particulars	Year ended 31st March 2019	
	₹ in Lacs (L)	Notes
From the Statement of Financial Position	4,802.00	10
Add:		
Marketing Expenditure Capitalized	46.20	7
Adjusted Capital Employed	4,848.20	

$$WACC = (1/2 \times 15\%) + (1/2 \times 7{\cdot}8\%)$$
$$= 11.40\%$$
$$EVA = NOPAT - (WACC \times Capital\ Employed)$$
$$= ₹860.64\ L - ₹4,848.20\ L \times 11.40\%$$
$$= ₹860.64\ L - ₹552.69\ L$$
$$= ₹307.95\ L$$

Assumptions and Notes

1. **Debt/Equity 1:1**

2. **Cost of Equity is 15.00%**

3. **Cost of Debt (pre-tax) is 7.80%**

4. **Tax Rate is 30.00%**

5. **Interest charged in the period was ₹163.20 L.**

6. **In current fiscal year, BC spend ₹80.00 L in Training and Development by leveraging the latest digital technologies including virtual classrooms to deliver highly relevant training to staff at the point of need.**

7. **Marketing Expenditure has been ₹46.20 L each year for the last two years to build the long- term brand.**

8. **The total R & D spending was ₹20 L during this year for in- depth study of the TCP/IP protocols. The TCP/IP based products have not been launched yet.**

9. **BC has paid Tax of ₹260 L while the tax charged per the accounts was ₹269.60 L.**

10. **Capital employed during the Period (from the statement of financial position):**

Opening	**4,564.00 L**
Closing	**4,802.00 L**

Answer(Study Material) (MTP MARCH.19)

Report

To: CEO, Beta Control

From: Performance Management Expert Date: 31st May 2019

Subject: Evaluation of EVA at Beta Control

EVA provides a link between decisions, performance measures and rewards, which focuses managers on performing better. Incentive schemes based on EVA provide better quality information and motivation in making decision which in turn maximise shareholder's wealth. In other words, EVA links the operating returns to the assets that were used to generate those returns. The learning which flows from EVA analyses can be perceptive and can allow the manager not only to identify areas of weakness in performance but also to easily find solutions. BC is a multiproduct company having number of factory sites. EVA can help to appraise divisional contributors to, or detractors from, overall profitability. Thus, managers may be educated through EVA and pursue such objectives that improve operating profits

investing more capital.

In addition, this report deals with evaluation of the accuracy and assumptions used in the calculation of BC's EVA. There are many errors in the present calculation of EVA. These have been discussed below and revised calculations are enclosed.

▢ Non-Cash Expenses have been correctly added back to the profit as these are expenses which do not affect the cash flow of a given period.

▢ Addition back of Marketing Expenditure is also correct as spending contributes to future value-creation. For the same reason, the prior year spending is also added in to capital employed.

▢ Training and Development Expenses should be capitalised. Training and Development Expenses have been treated as an expense in the income statement, they should be added back to profit, and added to capital employed (at the end of the year).

▢ Research and Development (R & D) Expenses should be treated as marketing expenditure for long period.

▢ The tax expenses in the EVA calculation should be the tax paid with adjustment for lost tax relief on interest and not the adjusted amount of tax charged in the accounts.

▢ The WACC is incorrect because it should be based on post-tax cost of debt.

▢ Generally, a company takes, at least, a year's time to earn a return on investment. Thus, the capital employed figure should be based on the beginning numbers.

NOPAT

Particulars	Year ended 31st March 2019
	₹ in Lacs
Operating Profit	1,102.80
Add:	
Non-Cash Expenses	30.20
Marketing Expenditure Capitalised	46.20
Training & Development Expenses	80.00
R & D Expenses	20.00
Less:	
Tax	260.00
Lost Tax Relief on Interest	48.96
Net Operating Profit After Tax (NOPAT)	970.24

Capital Employed

Particulars	₹ in Lacs
From the Statement of Financial Position (Starting)	4,564.00
Marketing Expenditure Capitalized	46.20
Adjusted Capital Employed	4,610.20

WACC   =(1/2 × 15%) + (1/2 × 7·8% × 70%)

=10.23%

EVA   =NOPAT – (WACC × Capital Employed)

=   ₹970.24 L – ₹4,610.20 L × 10.23%

=   ₹498.62 L

The recomputed EVA has increased from ₹307.95 Lacs to ₹498.62 Lacs which shows a positive position for BC as it adds up the shareholder's wealth.

Question 6

AKG Limited has three autonomous divisions. The divisions are evaluated on the basis of ROI, with year end bonuses given to divisional managers who have the highest ROI. Operating results of Division II for the last year are given below:

	₹
Sales	2,10,00,000
Less: Variable Expenses	1,26,00,000
Contribution margin	84,00,000
Less: Fixed Expenses	67,20,000
Net Operating Income	16,80,000
Divisional Operating Assets	52,50,000

The company's overall ROI for the last year was 18% (considering all divisions). Division II has an opportunity to add a new product line that would require an investment of ₹ 30,00,000. Other details of the new product line are as follows:

	₹
Sales	₹ 90,00,000 per annum
Variable Expenses	65% of sales
Fixed Expenses	₹ 25,20,000 per annum
Life cycle of the product line	5 years

Though Division II is performing well, but many a times, the customers complained that they had to wait for long after placing the orders. The company is interested in cutting the amount of time between when a customer places an order and when the order is completed. For the last year, the following data were reported in respect of Division II:

Inspection time   = 0.5 days per batch Process time   = 2.8 days per batch
Wait time   = 16.0 days per batch
Queue time   =   4.0 days per batch

Move time	= 0.7 days per batch

In addition to financial performance measures, the company wishes to introduce a variety of non-financial performance measures.

The company has set aggressive targets in both sales growth and ROI for the coming year. The company's strategy for achieving these goals includes a campaign aimed at building brand recognition, customer retention, improvement in product quality, on time delivery to customers, expansion of eco-friendly product line and introduction of limited edition items.

Required:

(i)   CALCULATE last year's ROI of Division II.

(ii)   DISCUSS whether the manager of Division II would accept or reject the new product line, if he takes his decision based solely on divisional ROI.

(iii) ADVISE how residual income approach can be used as an alternative financial measure for evaluation of managerial performance in the best interest of the company.

(iv)   CALCULATE Manufacturing Cycle Efficiency (MCE) and interpret the result.

(v)   STATE what percentage of the production time is spent in non-value added activities.

(vi)   CALCULATE the delivery cycle time.

(vii) CALCULATE the new MCE if by using Lean Production all queue time can be eliminated.

(viii) Based on the above information and using a Strategy Map TABULATE two objectives and two measures for each perspective across the four dimensions of a balanced scorecard in the following format :

Perspective	Strategic Objective	Measure

Answer(PYQ MAY.19)

(i)   Calculation of last year ROI of Division II

=	Controllable Profit/ Controllable Net Asset
=	₹16,80,000/ ₹52,50,000
=	**32%**

(ii)   Calculation of ROI of New Product Line

Particulars	Amount (₹)
Sales	90,00,000
Less: Variable Cost	58,50,000
Controllable Contribution	31,50,000
Less: Fixed Cost	25,20,000
Controllable Profit	6,30,000
Investment Available	30,00,000
Return on the Proposed Line (ROI)	**21%**

The manager of Division II would be unwilling to invest the additional ₹30 lacs because this would decrease the Division II's ROI of 32% to 28%. [₹16,80,000+₹6,30,000/ (₹52,50,000+₹30,00,000)]

(iii) Generally, a manager who is evaluated based on ROI will reject any project whose rate of return is below the Division's current ROI even if the rate of return of the project is above the company's minimum required rate of return. In contrast, managers who are evaluated using residual income will pursue any project whose rate of return is above the minimum required rate of return, because it will increase their residual income. So, in the best interest of the company as a whole, residual income approach can be used for evaluation of managerial performance.

Alternative

To overcome some of the dysfunctional consequences of ROI, the residual income approach can be used. For the investment decision for Divisions II, the residual income calculations are as follows:

Proposed Investment	₹ 30,00,000
Controllable Profit	₹6,30,000
Cost of Capital (18%)	₹5,40,000
Residual Income(RI)	90,000

Advise

This calculation indicates that the residual income of Division II will increase if manager accept the project. However, it is important to note that Residual Income does not always point to the right decision, because notional interest on accounting capital employed is not the same as IRR on cash investment. This Project has 1.65% IRR.

Overall, Residual Income is more likely than ROI to improve when managers make correct investment decisions, and so is probably a 'safer' basis than ROI on which to measure performance.

(iv) Manufacturing Cycle Efficiency (MCE)

$$= \frac{\text{Processing Time}}{\text{Inspection Time + Process Time + Queue Time + Move Time + Wait Time}}$$

$$= \frac{2.8 \text{ days}}{0.5 \text{ days} + 2.8 \text{ days} + 4.0 \text{ days} + 0.7 \text{ days} + 16.0 \text{ days}}$$

= 11.67%

Interpretation

In AKG, the MCE is 11.67%, which means that 88.33% of the time a unit is in process is spent on the activities that do not add value to the product. Monitoring the MCE helps companies to reduce non - value added activities and thus get products into the hands of customers more quickly and at a lower cost.

(v) Percentage of Time Spent on Non- Value Added Activities
=   100% -11.67%
=   88.33%

(vi) Delivery Cycle Time
=   0.5 days + 2.8 days + 4.0 days + 0.7 days + 16 days
=   24 days

(vii) Revised MCE

$$= \frac{2.8 \text{ days}}{0.5 \text{ days} + 2.8 \text{ days} + 0 \text{ days} + 0.7 \text{ days} + 16 \text{ days}}$$

=   14%

(viii)

Perspective	Strategic Objective	Measure
Financial	Improve ROI Increase Sales	% increase in ROI % increase in sales
Customer Perspective	Improve brand recognition Customer retention	% of target audience who recognize brand %of complaints responded % increase in repeat customers
Internal Perspective	Improve in product quality Improve on time delivery to customers Reduction in time spent in non-value added activities	% reduction in defect rate % of orders on time % increase in MCE
Learning & Innovation	Expansionof eco-friendly product line Introduction of limited edition items	No of eco-friendly products developed. No of limited editions introduced.

Section B – Case Scenarios & Case Studies

QUESTION 1
Lite automobile limited (LAL) is one of leading automobile assembly part manufactures of the country. In order to manage the performance of LAL, the CMD in latest board meeting shown his willingness to apply non-financial performance indicators (NFPI) in addition to financial performance indicators.
CEO conducts meeting thereafter with functional heads. Some of the functional heads are concerned with the scope of the NFPI as part of performance management system. During the meeting Chief HR Lead of company raise his concern over the utility of NFPI to monitor and control the human resource. Chief Operating Officer also raise his concern on the manner how NFPI can ensure quality in the products and services. Chief Public Relation Officer also concerned how NFPI will improve the brand equity.
Required
Office of CEO hired you as management consultant, for designing and effective implementation of performance management system which also consider NFPI. CEO asked you to briefly EXPLAIN the scope of non-financial performance indicators in regard to only 3 functions whose functional heads raised the concern.
(STUDY MATERIAL)
Solution

The performances management system, which also consider non-financial performance indicators in addition to financial performance indicators; capable to ensure *sustainable performance* in all functional areas; hence its scope is organisation wide. In regard to three functional areas specifically mentioned in the case scope shall be–
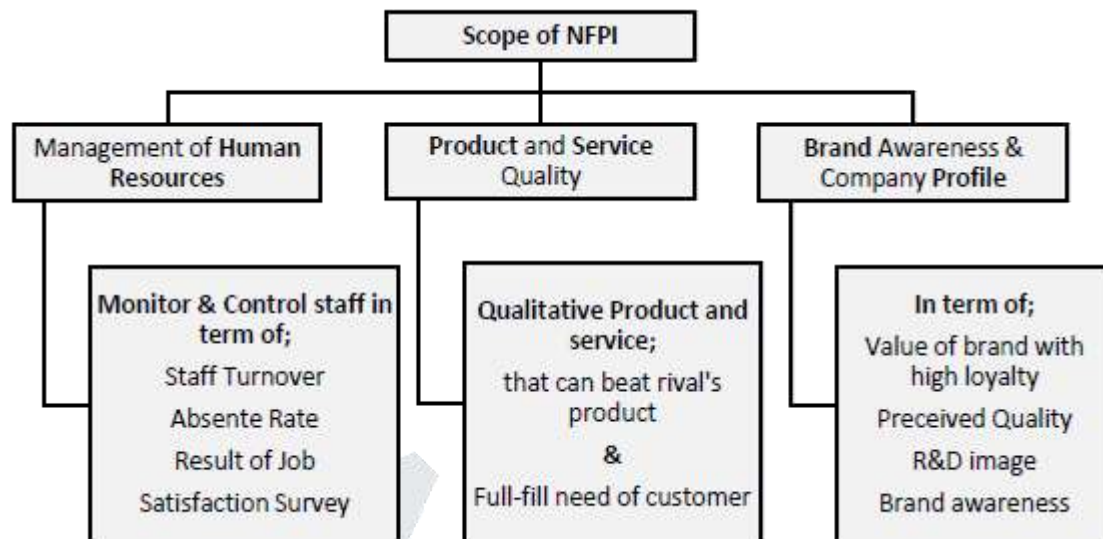
Human resources It is the people who actually create the organisation through processes, hence human resources are a significant element of any organisation. If they performance well, the entire organisation automatically performs well; hence measures such as staff turnover, absenteeism, job satisfaction, and offer letter accepted shall be part of.

Quality of product and service

What make any business distinct from others, it is largely the value which it's products or services capable to create for the consumers; quality is important determinant of value. Hence, the following performance measures (owning to quality) can be part of performance metrics- ▪ How much value the product is creating currently? ▪ Where do product offer in comparison that of competitor? ▪ Is product capable to generate further superior performance and scope of innovation?

Brand equity

Non-financial performance measures consider the brand equity (value of the brand) as one of the significant performance measures. Brand value is largely based upon factors like customer's awareness & loyalty which includes consumer behaviour also perceived quality, stakeholders' expectation and organisation ability to meet them, and factors like patents and trademarks etc.

Question 2

Your Bank Ltd., was established on the 30th September, 1940 under the provisions of Co- operative Societies Act by the eminent professionals to encourage self-help, thrift, cooperation among members. Bank was issued Banking License under Banking Regulation Act, 1949 on October 25, 1986 to carry out the Banking Business within the national capital and since then the Bank has been growing continuously. At present, Bank has large number of membership of individuals from different sections. The Bank has 12 branches in the NCT of Delhi. Bank offers 'traditional counter service'. Opening hours are designed to coincide with local market days.

Board of Directors were worried from growing popularity of new style banks. These banks offer diverse range of services such as direct access to executive management, a single point of contact to coordinate all banking needs, appointment banking to save time, free online banking services 24/7, free unlimited ATM access etc.

It has now been decided that the bank will focus on "What Customers Want" and will use a balanced scorecard to achieve this goal.

Required

PRODUCE, for each of the three non-financial perspectives of a 'Balanced Scorecard', an objective and a performance measure that the bank could use with appropriate reason.

Answer(Study Material)

Internal Business Process Perspective Objective: Cross-sell Products
Measure: Products Purchased per customer

Reason: Cross-selling, or encouragement customers to purchase additional products e.g. insurance, forex etc. is a measure of customer satisfaction. Only if a service is perceived as highly satisfactory the service would be repeated/ additional products or services would be accepted.

Learning and Growth Perspective
Objective: Increase the Number of New Products or Services Sold
Measure: Number of Customers Buying the New Products/ New Services

Reason: Long term financial success requires bank to create new products / services (e.g. internet banking, ATM access) that will meet emerging needs of current / future customers such as 24/7 banking.

Customer Perspective
Objective: Increase Customer Loyalty
Measure: Number of Accounts Closed or Closure Request Received

Reason: Customer loyalty describes the extent to which bank maintains durable relations to its customers. The share of existing customers should have a high importance as it indicates about image and reputation. Closure request is not a good sign for bank. Bank should investigate reasons for the same and take appropriate actions to improve services offered to retain customers.

Other **Objectives** and **Measures** are also possible but they must relate to the bank's **Goal**. **Question 2**

3.Standard Telecom Ltd. is a leading cellular service provider having a global presence. It aims to be the most innovative and trusted telecom company in the world. To achieve this aim, it is constantly working on its overall functioning. It is trying to adopt best managements practices in the world. Following are some information related to the company's performance for a particular period:

Particulars	Current Year	Base Year	Target
Operating Ratio	60%	54%	Reduce it to 50%
Average Revenue per user	₹225	₹210	Increase it to ₹250
Unresolved Consumer Complaints	27,500	25,000	Reduce it by 20%
Customer Relationship Centres	280	200	Take the total to 250
Employee Coverage under Training Programme	10%	8%	At least 15%

Required

Analyse the performance of the company using Balance Scorecard approach. (Study Material)

Answer

The balanced scorecard is a method which displays organisation's performance into four dimensions namely financial, customer, internal and innovation. The four dimensions acknowledge the interest of shareholders, customers and employees taking into account of both long-term and short-term goals. The detailed analysis of performance of the company using Balance Scorecard approach as follows:

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(i) **Financial Perspective:** Operating ratio and average revenue will be covered in this prospective.

Company is unable to achieve its target of reducing operating ratio to 50% instead it has increased to 60%. Company is required to take appropriate steps to control and manage its operating expenses. Average revenue per user has increased from ₹210 to

₹225 but remains short of targeted ₹250. This is also one of the reasons of swelled operating ratio. Company can boost up its average revenue per user either by increasing the price of its services or by providing more paid value added services.

(ii) **Customer Perspective:** Service complaints will be covered under this perspective. The company had set a target of reducing unresolved complaints by 20% instead unresolved complaints have risen by 10% [(27,500-25,000)/ (25,000) × 100]. It shows dissatisfaction is increasing among the consumers which would adversely impact the consumer's general perception about the company and company may lose its consumers in long run.

(iii) **Internal Business Perspective:** Establishing customer relationship centres will be covered under this perspective. Company has established 80 relationship centres in the current period exceeding its target of 50 (250-200) to cater to the needs of existing consumers as well as soliciting new consumers. This shows the seriousness of the company towards the consumer satisfaction and would help them in the long run.

(iv) **Learning and Growth Perspective:** Employee training programmes are covered under this perspective.

Company had set a target to cover at least 15% employee under its training programmes but covered only 10%. This could hurt capabilities of the employees which are needed for long term growth of the organisation necessary to achieve the objectives set in the previous three perspectives. People or the human resource of the company is one of the three principle sources where organisational learning and growth comes.

Question 3

Healthcare hospital provides medical care to patients to all strata of the society at nominal cost. Hospital has been operating for the last 15 years. It gets grant from the government that helps it sustain its operations. Each year an annual report is submitted to the officials in the health ministry that is in charge of giving out grants to hospitals. Each year over the last 15 years, grants given to the hospital has been increasing. This increment was found necessary to meet the increase in operational costs due to inflation. While operations have been moderately successful in the recent years, the grants committee is of the opinion that the hospital can manage its funds better.

To benchmark performance, performance of Healthcare hospital is being compared with the performance of another government funded hospital within the same city, Lifeline hospital. Both hospitals have similar scale of operations and get the same amount of grant. Given below are some of the parameters that are tracked at both hospitals:

Operational Parameters	Healthcare Hospital		Lifeline Hospital
	Budget	Actual	Actual
Total inpatients	1,10,000	96,000	1,00,000
Delay in admission due to unavailability of beds			
Number of inpatients waiting for more than 1 week	1,100	2,880	500
Number of inpatients waiting for more than 2 weeks	-	960	-
Total outpatients	90,000	95,000	93,000

Delay in appointment due to unavailability of medical staff			
Number of outpatients waiting for more than 1 week	900	1,900	465
Number of outpatients waiting for more than 2 weeks	-	475	-
Number of emergency admissions	400	600	500
Delay in providing medical care to emergency admissions	-	5	-
Number of medical staff shortages (positions not filled for more than one month)	3	5	1
Cancelled or delayed operations (due to non-clinical reasons)	5	20	6
Number of complaints received related to medical care	500	1,350	600
Number of complaints resolved within 15 days	500	1,080	550
Number of deaths post operation (all inpatients)	4,400	2,880	2,000
Number of medical negligence case that the hospital lost	2	5	-
Number of errors in prescription of drugs	15	45	10
Number of infection outbreaks within the hospital	-	2	-
Bed occupancy rate	90%	85%	94%
Average patient stay (days)	4	6	5
Operating theatre utilization rate	95%	90%	95%
Revenue including government grant (in crores)	15	13	16
Operating expenses (in crores)	12	12	12
ROI	8%	5%	9%
Staff Training sessions (hours)	500	500	600
Research publications	5	3	6

- Both hospitals have 50 wards with 10 beds in each ward.
- Each hospital has 50 doctors from various specialties and 75 nurses.
- Both hospitals were open all days of the year.

Required

The grants committee wants to ANALYZE performance of both hospitals with respect to:
- Access to services
- Clinical performance
- Efficiency of operations
- Financial management
- Innovations

(ii) While preparing the balanced scorecard, how will you CATEGORIZE the above performance measures? (Study Material)

Answer

(i) **Analysis of Performance with respect to: Access to Services**

Access to services is an indicator of whether patients are able to get medical care when they need it. Better access to medical service will improve chances of recovery for the patients. Given the information in the problem, this can be assessed using the following parameters:

(a) Delay in admission to inpatients due to unavailability of beds.

(b) Delay in appointments to outpatients due to unavailability of medical staff.

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(c)   Delay in providing medical care for emergency admission.

(d)   Number of medical staff shortages.

(e)   Cancelled or delayed operations.

The hospital should aim at reducing the delay and shortages in order to provide patients with better access to medical services.

(a)   Delay in admission to inpatients due to unavailability of beds :

As per the hospitals' policy, patients who need admission have to be accommodated within 1 week to get access to services. Any delay beyond this period is tracked by their information system. For delays, due to unavailability of beds, the hospitals are tracking two time lags, delay by more than a week and delay by more than 2 weeks. Unavailability of beds shows that there are constraints in the capacity of patients to whom the hospital can provide service.

Operational Parameters	Healthcare Hospital		Lifeline Hospital
	Budget	Actual	Actual
Total inpatients	1,10,000	96,000	1,00,000
Delay in admission due to unavailability of beds			
Number of inpatients waiting for more than 1 week	1,100	2,880	500
Number of inpatients waiting for more than 2 weeks	-	960	-
Percentage of inpatients denied access to service			
by more than 1 week	1.00%	3.00%	0.50%
by more than 2 weeks	0.00%	1.00%	0.00%

As can be seen, Healthcare hospital has a target to provide admission within a week to 99% of inpatients, delay beyond a week may happen only in 1% of cases. Delay beyond 2 weeks should not occur. However, actual performance indicates that Healthcare hospital could provide admission within a week only to 96% of inpatients. There has been a time lag of more than a week in providing admission to 3% of the inpatients. This is already 2% more than the target. Further, time lag beyond 2 weeks in providing admission has occurred in 1% of inpatients.

Therefore, 4% of the inpatients had to wait for more than a week, in some cases more than 2 weeks, to get admission. In contrast at Lifeline hospital, only 0.5% of inpatient faced time lag of more than a week in getting admission to the hospital. There were no instances where patients requiring admission had to wait more than 2 weeks.

This shows that Lifeline hospital provides better access to services as compared to Healthcare hospital.

(b)   Delay in getting appointment due to unavailability of medical staff :

Operational Parameters	Healthcare Hospital		Lifeline Hospital
	Budget	Actual	Actual
Total outpatients	90,000	95,000	93,000
Delay in appointment due to unavailability of medical staff			
Number of outpatients waiting for more than 1 week	900	1,900	465
Number of outpatients waiting for more than 2 weeks	-	475	-
Percentage of inpatients denied access to service			
by more than 1 week	1.00%	2.00%	0.50%
by more than 2 weeks	0.00%	0.50%	0.00%

As per the hospitals' policy, outpatients should be able to get appointment within a week to meet the medical staff. Delay beyond a week is tracked by the hospital 's information system as delay beyond a week and delay beyond two weeks. Healthcare hospital targets to provide appointments to meet medical staff within 1 week to 99% of the outpatients. Delays due to unavailability of medical staff can occur only in 1% of the cases. However, actual appointment schedule indicates that 2% of the outpatients had to wait for more than 1 week and 0.5% of the outpatients had to wait for more than 2 weeks to meet the doctor. This, indicates that Healthcare hospital has not been able to meet its target. To improve performance, the reason for unavailability of medical staff has to be understood. It might indicate that more hiring is needed or high medical staff turnover.

In comparison, Lifeline hospital has provided better services to outpatients, only 0.5% of the patients had to wait beyond a week to get appointment with the doctor This shows that Lifeline hospital provides better access to services as compared to Healthcare hospital.

(c)   Delay in providing medical care to emergency admission patients :

In the case of Healthcare hospital, there were 5 instances when medical car e could not be provided to emergency admission patients immediately. The hospital aims never to have such instances however this target has not been met. In case of emergencies, medical care is required urgently, any delay may impact recovery of the patient. Reasons for the delay in providing medical care to such patients ha ve to be investigated. Lifeline hospital has been able to provide medical care immediately to all its emergency admission patients.

This shows that Lifeline hospital provides better access to services as compared to Healthcare hospital.

(d)   Medical staff shortages:

The hospital should have enough doctors and nursing staff at any point in time to be able to provide good quality of medical care to patients. If there are vacancies, the existing staff have to bear extra patient load. This could lead to delays, some   of which have been outline above. This results in patients getting lesser access to medical services when they need it. Healthcare hospital has 5 medical staff vacancies that have been vacant for more than a month, as compared to the target of 3. There are lesser resources available to provide patient care. In comparison, Lifeline hospital has only 1 position that was vacant for more than a month.

This shows that Lifeline hospital provides better access to services as compared to Healthcare hospital.

(e)   Cancelled or delayed operations due to non-clinical reasons:

When operations are cancelled or delayed are cancelled due to non-clinical reasons,   it indicates that there are administrative issues that deny patients access to medical care. Possible reasons could be unavailability of operation theaters, unavailability of medical staff or unavailability of required instruments or medicines. Compared to an expected 5 such instances, the actual cancellations or delays have been 20 in the case of Healthcare hospital. This is a huge variation that needs to be investigated. Given in the problem that operation theaters are used only to 90% of their availability. Possibly cancellations are not due to unavailability of operation theaters. It could be due to medical staff shortage or unavailability of instruments.

Reasons have to be investigated to take appropriate action. Comparatively, such instances are fewer in the case of Lifeline hospital.

Clinical Performance

Clinical performance can be evaluated by looking at the quality of actual work performed.

The parameters to look at are:

Operational Parameters	ealthcare Hospital		Lifeline Hospital
	Budget	Actual	Actual
Number of complaints received related to medical care	500	1,350	600
Number of complaints resolved within 15 days	500	1,080	550
Number of deaths post operation (all inpatients)	4,400	2,880	2,000
Number of medical negligence case that the hospital lost	2	5	-
Number of errors in prescription of drugs	15	45	10
Number of infection outbreaks within the hospital	-	2	-

(a)   Number of complaints received related to medical care:

As can be seen from the table, the number of complaints received by Healthcare hospital is more than twice the expected volume. Only 80% of these have been resolved within the time frame of 15 days. Comparatively, Lifeline hospital gets fewer complaints also the complaint resolution rate within the given framework is much higher at 92%.

(b)   Number of deaths post operation:

The actual deaths post operation are much lesser. While this is a good indication of quality, the objective of the hospital should be to keep this as low as possible. Lifeline hospital has a lower mortality than Healthcare. Good quality medical care can contribute towards preventing deaths post operation.

(c)   Number of medical negligence case that the hospital has lost:

The fact that the hospital has lost a case of medical negligence shows that the quality of clinical care provided is questionable. In this case of Healthcare hospital, the number of such cases lost is 5. This is in excess of an expected loss of 2 cases. This indicates that quality of clinical care is found wanting at Healthcare hospital. Lifeline hospital has not lost any case of medical negligence implying that quality of medical care is better than Healthcare.

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(d)   Errors in prescription of drugs:

Prescription of drugs to cure an aliment should always be accurate. Any errors could be disastrous to the patient's health. Compared to the expectation, Healthcare has three times the number of prescription errors. This shows that medical staff have been negligent in providing their service. Again, Lifeline hospital has a better record comparatively.

(e)   Infection outbreak in hospital premises:

Outbreak of infection within hospital premises indicates that proper standards of hygiene are not being maintained at Healthcare hospital.

Efficiency of Operations
Operating efficiency can be assessed using the following parameters:

Operational Parameters	Healthcare Hospital		Lifeline Hospital
	Budget	Actual	Actual
Bed occupancy rate	90%	85%	94%
Average patient stay (days)	4	6	5
Operating theatre utilization rate	95%	90%	95%

(a)   Bed occupancy rate:

Bed occupancy is a factor that is dependent on the number of inpatient admissions. While this factor cannot be controlled by Healthcare, it is important to track this ratio to look at capacity utilization. The bed occupancy rate is lower than the expected rate. If this persists over a longer period, the hospital may want to explore the option of scaling down the number of wards and beds. The space freed up can be utilized for some other productive purpose.

However, as explained in point (a) above, 4% of the inpatients at Healthcare hospital are being denied admission due to unavailability of beds. This is a contradiction that needs to be investigated. Possible reasons could be administrative ones like inability to get the room and bed on time once the previous patient vacates. Else there may be mis-communication between the department discharging patients and the department admitting patients. Bed occupancy may not be tracked on real time basis due to which these delays in admission have occurred.

Lifeline hospital has an occupancy of 94% that shows that it has just the sufficient number of beds to meet demand.

(b)   Average patient stay (days) in the hospital:
On an average a patient is staying in the hospital for 2 days more than the target of 4 days. While this factor is dependent on the type of ailment, lower the patient stay the higher can be the bed occupancy rate. That means more patients can utilize the same resources if patient stay is shorter. This may be needed when there is a constraint on the beds available, which is not the scenario in the current case.

However, before taking action to improve bed occupancy rate, a hospital should ensure that quality of medical care given is not compromised.

In the given problem, bed occupancy is only 90% at Healthcare hospital. Therefore, the hospital can afford to have longer patient stay. Lifeline hospital has 1 lesser patient stay day, only marginally different from Healthcare's record. In both cases, since there is no constraint on bed occupancy, higher average patient stay can be managed without any constraint.

(c)   Operating theater utilization rate:

Utilization of operating theater is subject to the nature of treatment, something that cannot be controlled by a hospital. However, it is necessary to track this parameter since it shows whether the facilities that are currently in place are sufficient and are utilized properly. Again, at 90% Healthcare hospital has a lower operating theater utilization rate compared to the expected usage. If this continues in the long run, the number of operating theaters can be reduced to make resources available for other uses.

Lifeline hospital has a higher utilization rate at 95%, indicating more efficient use of resource.

(d)   Medical staff shortage:

Medical staff is the most important resource at a hospital. Higher vacancies could imply higher staff turnover. A possible reason could be dis-satisfaction with the employer. Healthcare should understand the reason for have 5 positions that it has not been able to fill in within 30 days. Since this reduces the number of staff available, efficiency of the hospital will suffer. Comparatively, Lifeline makes better use of its medical staff since only one position was vacant for more than a month.

Financial Management

Healthcare hospital has an actual surplus of ₹1 crore compared to a budget of ₹3 crores. (Surplus = Revenue – Operating expense). ROI of 5% is below the target of 8%. The grants committee feels that there is a wastage of funds at the hospital. Therefore, areas of wastage should be identified such that operating expenses can be controlled better. Lifeline hospital has a surplus of ₹4 crores. Since there are other hospitals like Lifeline that are vying for grant, Healthcare has to make itself competitive in this respect. Therefore, it has to be more efficient, effective and economical in its operations.

Innovations

Research publications indicate that newer discoveries have been made in fields that can further the horizons of knowledge. Therefore, research publications are an important indicator of innovation.

While staff training is not directly related to innovations, they do keep the experts up to date in their subject area of expertise.

(ii) Performance Measures Categorized into the Balance Scorecard

- Customer Perspective would include availability of service measures and clinical performance measures.
- Internal Processes Perspective would include measures used to determine efficiency of operations.
- Financial Perspective would include details of the surplus generated and ROI.
- Learning and Growth Perspective would include staff trainings and research publications.

    Combined with other parameters that the grant committee finds important the balanced scorecard can benchmark the hospital's performance with its own targets and the performance of Lifeline hospital. Decision to extend grants and its quantum can be decided on this basis.

Question 4

B. Steels is a leading manufacturer of flat and long products and have state-of the-art plants. These plants manufacture value added products covering entire steel value chain right from coal mining to manufacturing Pig Iron, Billets, HR Coils, Black Pipe/GI Pipe, Cable Tapes etc. conforming to international standards. The rock-solid foundation combined with nonstop upgradation and innovation has enabled the B. Steels to surpass its goals constantly. Its vision and values for sustainable growth is balancing economic prosperity and social equality while caring for the planet. It is preparing its balanced scorecard for the year 2018-19. It has identified the following specific objectives for the four perspectives.

Improve post-sales service	Improve employee morale	Improve employee job satisfaction
Increase gross margin	Increase number of customers	Increase profitability of core product line
Increase plant safety	Increase customer retention	

B. Steels has collected Key Performance Indicators (KPIs) to measure progress towards achieving its specific objectives. The KPIs and corresponding data collected for the year 2018-19 are as follows:

Key Performance Indicator	Goal	Actual
Average replacement time (number of days)	2	1.5
Gross margin growth percentage	15%	16%
Number of customers	15,000	15,600
Number of plant accidents	0	2
Percentage of repeat customers	83%	81%
Core product line profit as a percentage of core-product line sales	5%	4.4%
Employee turnover rate (number of employees leaving/ Average number of total employees)	2%	3%
Employees satisfaction rating (1-5, with 1 being the most satisfied)	1	1.2

For preparation of Balanced Scorecard report, the following format has been developed:

B. Steels Balanced Scorecard Report For the year ended March 31, 2019					
Perspective	Objective	KPI	Goal	Actual	oal Achieved (Yes or No)
Financial	×	×	×	×	×
Customer	×	×	×	×	×
Internal Business Process	×	×	×	×	×
Learning and Growth	×	×	×	×	×

Required

(i) PREPARE a balanced scorecard report using the above-mentioned format. Place objective under the appropriate perspective heading in the report. Select a KPI from the list of KPIs that would be appropriate to measure progress towards each objective.

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(ii) **B. Steels desires to integrate sustainability and corporate social responsibility related KPIs in their balance scorecard to adhere vision and values. ADVISE B. Steels, using TBL framework. (RTP NOV.19)**

Answer

(i) B. Steels Balanced Scorecard Report For the year ended March 31, 2019

Perspective	Objective	KPI	Goal	Actual	Goal Achieved (Yes or No)
Financial	Increase Gross Margin	Gross margin growth percentage	15%	16%	Yes
	Increase Profitability of Core Product Line	Core product line profit as a percentage of core product line sales	5%	4.4%	No
Customer	Increase number of customers	Number of Customers	15,000	15,600	Yes
	Increase customer retention	Percentage of repeat customers	83%	81%	No
Internal Business Process	Improve post sales service	Average replacement time (number of days)	2.0	1.5	Yes
	Increase plant safety	Number of plant accidents	0	2	No
Learning and Growth	Improve employee job satisfaction	Employees satisfaction rating (1-5, with 1 being the most satisfied)	1	1.2	No
	Improve employee morale	Employee turnover rate (Number of employees leaving/ Average number of total employees)	2%	3%	No

(ii) "**Triple Bottom Line**" concept encourages companies to measure not only their financial profits, but also the impact that its operations have on the society and environment. Therefore, this framework measures the full cost of doing business by measuring the following bottom lines (i) Profit (ii) People and (iii) Planet.

Diminishing non-renewable resources have forced businesses to focus on sustainable manufacturing. This term refers to managing manufacturing processes such that they minimize any negative impact on the environment by conserving energy and natural resources. In many instances, improved operational efficiency not only reduces waste (thereby costs) but also improves product safety, it strengthens the brand's reputation and builds public's trust about the company. As a long- term strategy, this improves business viability and provides a competitive edge to the company. This concept is the "**Planet Bottom Line**" within the Triple Bottom Line framework. Metrics on the following aspects may be investigated to find out the environment impact of business operations:

a. Material consumption

b. Energy consumption

c. Water utilization

d. Emissions, treatment of effluents and waste (include emissions affecting air, water, and land)

e. Fuel consumption by tracking freight and transportation costs

f. Land utilization

g. Recyclability and disposal of product

"Corporate Social Responsibility" enables the company to become conscious of the impact its operations has on the society. CSR programs, through philanthropy and volunteer efforts can forge a stronger bond between itself, its employees, and the wider community. Again, this improves both the brand image as well as builds public's trust about the company. This concept is the **"People Bottom Line"** of the Triple Bottom Line framework. Metrics on the following aspects maybe investigated to find out the social impact of business operations:

h. Work place environment and labour relations

i. Occupational health and safety, accident rates

j. Human rights practices – child labour, employee work-place security policies

k. Training and education

l. Equal opportunity employer – diversity of workforce and opportunities available for employees' growth

m. Suppliers – local sourcing versus sourcing from external markets

n. Philanthropy and volunteer programs organized

o. Product safety in terms of customer health and safety

p. Pricing of essential products to enable wider reach within the society

q. Transparent and ethical business practices

B. Steels can study these aspects, determine the relevant metrics, and prepare periodic KPI reports that can help in measuring responsibilities towards sustainability and social impact.

Question 5

History

In 2009, Luxo had monopoly in the eyewear market of America, but the problem with the company was that it was selling variety of eyewear, by putting a big price on it. At present, there is almost nothing that you can't buy online, but at that time there were limited things that you could order online. In 2009, Arby Signer Inc. launched a website to sell eyeglasses online. Selling eyewear online and competing with Luxo was a challenge for Arby. Within just 4 years Arby break the monopoly of Luxo and capture the major market of America. People find it really convenient to buy sunglasses and glasses online and get delivery at doorstep. Following the footstep of Luxo, Arby eliminated the middleman from the manufacturing process, launched its own optical lab to have its own manufacturing process. The range of products/services offered by Arby which make different from Luxo include easy buying process, delivery at door step, stylish glasses, customize eyewear glasses, products was sold on the site at very affordable, with a starting range of just $95 etc.

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Mission, Vision & Objectives

Mission	Improving people's lives with our health care products in a socially cognizant way
Vision	"To be a trusted health care partner"
Objective	"To offer people designer eyewear at a revolutionary price"

As a mission- based brand, Arby needed a way to instill their team of employees with a passion for the mission. Arby let their employee know 'what they value' and 'what the employee should value' in 'who they are'. This is important to setting up 'what they do' and 'why they do it' as a core foundation of their brand story. Arby also contributes in the philanthropic work, it inspires the people with its mission. For every pair of glasses customer pay, Arby donates a pair of glasses to needy person. In December 2019, Arby reported the donation of 9,60,000 pairs of eyeglasses. The company also claims to be 90% carbon neutral.

Extracts from the Balanced Scorecard

Performance Measure	2019 Actual	2019 Target
Financial perspective		
Return on capital employed (ROCE)	13%	14%
Net income	$95 Millions	$89 Millions
Customer perspective		
Number of first-time buyers	1,20,000	1,00,000
Customer retention ratio	78%	75%
Number of complaints (per 1,000 customers)	1.5	2
Number of glasses donated to needy people	9,60,000	9,00,000
Internal processes		
Number of business processes re-engineered	110	100
Number of new services made available through online application	2	4
Incidences of fraud on customers' accounts (per 1,000 customers)	3	10
Total CO_2 emissions (tons)	850	1,100
Learning and growth		
Number of employees trained to instruct retailers	1,000	1,050
Number of hours (paid for) used to support social plans	10,200	10,000
Number of trainee positions from rural areas	189	200

Other Information

Arby Signer has recently invested heavily in IT security to prevent fraud.

Required

EXAMINE the performance of The Arby Signer in 2019. (RTP MAY.20)

Answer

The balanced scorecard approach looks both financial performance and non-financial performance. In order to gain competitive advantage, organizations have to be conscious of the needs and convenience of their customers. The Arby signer has a vision and strategy which goes far beyond just making money. They want to help the community and give something back to customers also. Hence, performance measures which address whether the Arby is being successful in pursuing their vision has been incorporated in Balanced Scorecard. The performance of the Arby will be considered under each of the titles used in the balanced scorecard:

Financial Perspective

The Arby has had a year of diverse achievements when looking at the extent to which it has met its financial targets. Its ROCE shows how efficiently it has used its assets to generate profit for the business. The target of ROCE for the year was 14% but it has only achieved 13% return. The Arby's Net Income, however, was in fact $6 million higher than its target, which is good. The most likely reason for the under target ROCE is possibly the investment which Arby has made in IT security. Whilst this may have reduced ROCE, this investment is essentially a good idea as it helps Arby to pursue its mission and will keep customers happy.

Customer Perspective

Regarding its customers, Arby's performance is better in the current year. It has not just exceeded its target sale to first time buyers by 20,000 but also improved its customer retention ratio, which is good for company to pursue its vision of being a trusted healthcare partner.

Customers complaints has reduced from 2 complaints to 1.5 complaints for every 1,000 customers, the exact reason is not clear but it might be because of improved processes and team efforts of employees.

Also, the number of glasses donated exceeded the target. It shows that company has exceeded its target of helping people which is good for the company's reputation.

Internal Processes

Number of business processes within Arby re-engineered has exceeded the target, which is very good and the impact of which may be reflected in the lowering of level of customer complaints. Likewise, the investment to improve IT security has been a great success, with only three incidences of fraud per 1,000 customers reported compared to the target of 10. However, only two new services have been made available via online application, instead of the target of four, which is unsatisfactory. But fortunately, its CO_2 emission is below to the target level.

Learning and Growth

The Arby has succeeded to train its employees to instruct retailers. However, the number of employees trained to instruct retailers are comparatively lesser than targeted, shortfall in training of employees to give instruction to retailers may have an impact on the Arby's failure to meet its target of market expansion.

Number of hours (paid for) used to support social plans are comparatively higher, it results in additional costs which could have contributed to the fact that the Arby did not quite meet its target for ROCE. Further, company has not met aim for helping the rural area as targeted. This may be because the number of candidates applying from these areas was not as high as planned and this situation is beyond companies control.

In general, the Arby Signer had a successful year, meeting many of its targets.

Question 6

You are a paid assistant working in SBC LLP – an accounts consultancy firm. You have received the following email from one of SBC's senior partner:

To: DG

From: SB

Date: 22/06/20XX

Subject: PEL meeting this afternoon

As you are probably aware, we are meeting with the managers of PEL later this afternoon to discuss several key issues, and I need you to do some research for me. I need a report that covers the following:

Analysis of the new proposal for the period 2017 to 2019 based on

-   external effectiveness and

-   internal efficiency

To help you with this, I've attached a copy of our forecast of PEL's financial and non-financial data for the period 2017 to 2019. Please read it carefully and email me back as soon as possible so I have time to prepare before the meeting.

Thanks SB

------------------------Attachment------------------------
Background to PEL

Precision Engineering Ltd (PEL) specialises in engineering design and manufacture in the automotive and motorsport industry. PEL's design team has many years' experience in the design and development of engine components for the market and high performance engines. PEL has identified a number of key competitors and intends to emphasis on close co-operation with its customers in providing products to meet their specific engineering design and quality requirements. Efforts will be made to improve the effectiveness of all aspects of the cycle, from product design to after-sales service to customers. This will require data from a number of departments in the achievement of the specific goals of the new proposal. Efforts will be made to improve productivity in conjunction with increased flexibility of methods.

Forecast of PEL's Financial and Non-Financial Data

Particulars	2017	2018	2019
Total Market Size (₹lacs)	110	115	120
PEL Sales (₹lacs)	18	21	23
PEL Total Costs (₹lacs)	14.10	12.72	12.55
Production Achieving Design Quality Standards	95.5%	98.0%	98.5%
Returns from Customers (% of Deliveries)	2.0%	1.0%	0.5%
Cost of After-Sales Service (₹lacs)	1.3	1.1	1.0
Sales Meeting Planned Delivery Dates	85%	90%	95%
Average Cycle Time (Customer Enquiry to Delivery) (weeks)	5.0	4.5	4.0
Components Scrapped in Production (%)	6.5%	4.0%	1.5%
Idle Machine Capacity (%)	9%	5%	1%

Required

Draft the email as requested by the partner.

Answer

To: SB

From: DG

Date: 22/06/20XX

Subject: Re: PEL Meeting this afternoon

Please find below my analysis of the points you wished me to examine for PEL. Please let me know if you wish to discuss any of these points in more detail.

Kind regards DG

External Effectiveness- The marketing success of the proposal is associated with the achievement of customer satisfaction. The success will need an efficient business operating system for all aspects of the cycle from product design to after-sales service to customers. Customer satisfaction is linked with Improved quality and delivery.

Quantitative measures of these factors are as follows:

- Quality is expected to improve. The percentage of production achieving design quality standards is expected to increase from 95.5% to 98.5% between 2017 and 2019. In the same period, returns from customers for replacement or rectification should drop from 2% to 0.5% and the cost of after-sales service should drop from ₹1.3lacs to ₹1.0lacs.

- Delivery efficiency improvement that is expected may be measured in terms of the rise in the percentage of goods achieving the planned delivery date. This percentage rises from 85% in 2017 to 95% in 2019.

Internal Efficiency- The financial success of the proposal is linked to the achievement of high productivity. This should be helped through reduced cycle time and decreased levels of waste. Quantitative measures of these factors are as follows:

- The average total cycle time from customer enquiry to delivery should drop from 5 weeks in 2017 to 4 weeks in 2019.

- Waste in the form of idle machine capacity is expected to drop from 9% to 1% between 2017 and 2019. Also, component production scrap is expected to drop from 6.5% in 2017 to 1.5% in 2019.

Question 7

Learning Horizons is an educational institute that conducts courses for students in accounting, law and economics. The institute is partially funded by the government. The institute aims to provide quality education to students of all backgrounds. The institute admits students who can fund their education privately as well as those who get sponsorship from the government. Knowledgebase is another educational institute in the same city providing courses similar to Learning Horizons. It is entirely private funded college where students arrange to pay for their own fees. It can be taken as a peer institution for comparison purposes.

Information about their operations for the year ended March 31, 2019 are as follows:

(1) Both Learning Horizons and Knowledgebase offer their courses that last the entire year. All of them are regular classroom lectures conducted through the week.

(2) Budget and actual fee rate structure for the year are the same. Information about the fees for each course are as follows:

Budget and Actual Fees in ₹

Course Type	Learning Horizons		Knowledgebase Privately Funded
	Privately Funded	Government Funded	
Accounting	1,20,000	75,000	1,00,000
Law	1,20,000	90,000	1,50,000
Economics	80,000	60,000	1,00,000

(3) Salary details for lecturers and administrative staff are as follows:

Salaries in ₹

Staff Type	Learning Horizons		Knowledgebase
	Budget	Actual	Actual
Lecturers	5,00,000	5,50,000	6,00,000
Administrative staff	3,00,000	3,00,000	4,00,000

(4) Budgeted costs for the year based on 8,500 students per annum for Learning Horizons are as below:

Costs	Amount ₹	Variable Cost %	Fixed Cost %
Tuition Material	40,00,00,000	100%	---
Catering	10,00,00,000	75%	25%
Cleaning	1,00,00,000	25%	75%
Other operating costs*	5,00,00,000	25%	75%
Depreciation	1,00,00,000	---	100%

* includes cost of freelance staff

(5) Actual costs (other than salary costs) incurred during the year:

Costs	Learning Horizon	Knowledgebase
Tuition Material	42,00,00,000	40,00,00,000
Catering	10,00,00,000	13,00,00,000
Cleaning	1,00,00,000	1,50,00,000
Other Operating Costs*	6,00,00,000	5,00,00,000
Depreciation	1,00,00,000	1,50,00,000

* includes cost of freelance staff

(6) Keeping in line with latest technological developments, the management of Knowledgebase is introducing on-line tuition support by its lecturing staff. Learning Horizons on the other hand offers distance learning course. A general feedback from prospective students has revealed that some

students would like weekend courses since during the week they focus on their regular jobs. Also, some students have requested for intermediate qualification, in the event that they discontinue the course halfway due to inability to complete the course or for other personal reasons.

(7) Both Learning Horizon and Knowledgebase have a policy to have a lecture staff of 50 throughout the year. When there is a shortfall in teaching staff available, instead of recruiting a fulltime lecturer, Knowledgebase substitutes the requirement with freelance staff for lectures. The cost of freelance staff is much lower than regular staff.

(8) Appendix with further details:

Sundry Statistics
For the year ended 31st March 2019

Particulars	Learning Horizons		Knowledgebase
	Budget	Actual	Actual
Number of students:			
Accounting	4,000	3,800	4,100
Law	2,500	2,550	2,500
Economics	2,000	1,500	1,200
Total students	8,500	7,850	7,800
Student mix (%) for each course:			
Privately funded	80%	70%	100%
Government funded	20%	30%	0%
Number of enquiries received:			
Accounting	4,500	4,500	4,600
Law	2,800	2,700	3,050
Economics	2,200	1,600	1,225
Total enquiries	9,500	8,800	8,875
Number of lecturers employed during the year	50	50	50
Number of lecturers recruited during the year:			
Accounting	2	4	1
Law	1	3	-
Economics	1	3	-
Total recruitment	4	10	1
Number of administrative staff	12	12	9
Pass Rate:			

Accounting	95%	99%	93%
Law	95%	98%	90%
Economics	95%	95%	95%
Overall Pass rates for the courses	95%	97%	93%
Days in a year when freelance lecturers were used	-	-	30
Number of new courses under development	-	-	6

You are the management accountant of Learning Horizons. The results for the year are to be reviewed next week by the management. To assess performance, you want to prepare the report as per the Fitzgerald and Moon model.

Required

(i) Using the "Results" dimension of performance as per the Fitzgerald Moon model prepare a variance ANALYSIS of Learning Horizons actual and budgeted financial performance. Also, based on the information given in the problem, collate the actual financial figures for Knowledgebase, use it as a basis to prepare ANALYSIS of competitiveness of Learning Horizons and Knowledgebase.

(ii) Using the "Determinants" dimension of performance as per the Fitzgerald Moon model EXPLAIN
 (a) Quality of service
 (b) Flexibility
 (c) Resource utilization
 (d) Innovation

(iii) Course fees set by the government for various subjects cannot be increased beyond an average of ₹75,000 per student. If the costs are maintained within this budget, the government can provide more sponsorship or grants in future. ADVISE a method that the management of Learning Horizons can use to resolve this. (RTP NOV.18)

Answer (Study Material)

(i) <u>**Analysis of the "Results"**</u> dimension of performance as per the Fitzgerald and Moon model

Financial Performance of Learning Horizons and Knowledgebase

The original budget had been prepared for 8,500 students, while actual enrollments are 7,850 students. At the very onset, reasons for lower enrollments have to be found and analyzed. For comparison of actual and budget, the budget of Learning Horizons has to be flexed to scale. Hence the budget needs to be scaled down to 7,850 for preparing a variance analysis.

Particulars	Learning Horizons				Knowledgebase	
	Budget		Actual		Actual	
	Number	Amount ₹	Number	Amount ₹	Number	Amount ₹
Revenue						
(a) Private Funded						
Accounting	2,955	35,46,00,000	2,660	31,92,00,000	4,100	41,00,00,000
Law	1,847	22,16,40,000	1,785	21,42,00,000	2,500	37,50,00,000
Economics	1,478	11,82,40,000	1,050	8,40,00,000	1,200	12,00,00,000

subtotal (a)	6,280	69,44,80,000	5,495	61,74,00,000	7,800	90,50,00,000
(b) Government Funded						
Accounting	739	5,54,25,000	1,140	8,55,00,000	---	---
Law	462	4,15,80,000	765	6,88,50,000	---	---
Economics	369	2,21,40,000	450	2,70,00,000	---	---
Subtotal (b)	1,570	11,91,45,000	2,355	18,13,50,000	---	---
Total Revenue (a)+(b)	**7,850**	**81,36,25,000**	**7,850**	**79,87,50,000**	**7,800**	**90,50,00,000**
Expenditure						
Salaries						
Lecturers	50	2,50,00,000	50	2,75,00,000	50	3,00,00,000
Administrative staff	12	36,00,000	12	36,00,000	9	36,00,000
subtotal of salaries	62	2,86,00,000	62	3,11,00,000	59	3,36,00,000
Tuition Material		36,94,11,765		42,00,00,000		40,00,00,000
Catering		9,42,64,706		10,00,00,000		13,00,00,000
Cleaning		98,08,824		1,00,00,000		1,50,00,000
Other Operating Costs		4,90,44,118		6,00,00,000		5,00,00,000
Depreciation		1,00,00,000		1,00,00,000		1,50,00,000
Total Expenditure		56,11,29,413		63,11,00,000		64,36,00,000
Net Profit		**25,24,95,587**		**16,76,50,000**		**26,14,00,000**

(1) Original revenue budget is for 8,500 students. Actual enrolments are 7,850 students. For comparison, the budgeted revenue has also been adjusted to 7,850 students. The mix between private and government funded students is 80:20 as per the budget. The adjusted student strength is allocated between the courses based on the original budget student strength.

For example, out of the total strength of 7,850 students, based on the budget ratio, 80% are taken to be privately funded. This works out to 6,280 students. The strength for flexible budget for accounting course will be = (6,280 × 4,000/8,500) = 2,955 students. Likewise, the strength for flexible budget for other courses is calculated in a similar manner.

(2) The budgeted expenses are for 8,500 students. Actual students are 7,850. For comparison, variable costs in the budget have been adjusted for 7,850 students. Fixed costs remain the same. For example, tuition material has a budget of ₹40 crore for 8,500 students. This is 100% variable, therefore adjusted budget for 7,850 students would be
₹40 crore /8,500 × 7,850 students. The total budgeted cost for 7,850 students is therefore 37 crore.

Semi-variable costs in the budget, are separated as fixed portion and variable portion for the purpose of recalculation. For example, catering cost is ₹ 10 crore for 8,500 students, of which ₹2.5 crore is fixed. The balance ₹7.5 crore is for 8,500 students are is variable. The budgeted cost per student is therefore ₹8,823. For 7,850 students, the variable cost works out to ₹6.93 crore. Adding the fixed cost, the total budget for catering for 7,850 students is ₹9.43 crore.

Likewise, the budgeted cost for cleaning and other operating expenses is calculated in a similar manner.

Analysis of Actual Financial Performance with respect to Budget

(a) Originally the student strength was expected to be 8,500 in comparison to an actual number of 7,850. The reason for this shortfall in enrollment should be analyzed by looking into non-financial performance measures.

(b) On the revenue side, actual revenue of ₹80 crore is marginally lower than the adjusted budget of ₹81.4 crore. Since the budget and actual course fee rates are the same, the reason for this difference is on account of the mix between the private and government funded students. Actual enrollments had a greater ratio of government funded students, for which the fees are lower. As per the flexed budget, government funded students were expected to be 1,570 versus an actual of 2,355, higher by 50%. Reasons for the change in student mix from a budget of 80:20 to actual mix of 70:30 has to be analyzed.

(c) On the expenditure side, actual costs of ₹63 crore is 12% more than the corresponding budget of ₹56 crore. The increase for salaries over budget is because a higher market rate that has to be paid for a lecturer. Given that Knowledgebase also pays a higher rate, the budget may need to be amended to reflect a more realistic salary rate. The other major variance is on account of the tuition materials procured for the students. While the budget for 7,850 students is only ₹37 crore, the actual expenditure is ₹42 crore. Reasons for this large variation has to be analyzed. Reasons could reflect the quality of education imparted. If in reality better quality study materials costs more, the management has to decide whether they would be willing to incur this additional cost. This might have a further impact on the fees charged to privately funded students and the management may also want to ask for increase in the government sponsored fee rate.

(d) Overspend is noticed in other operating costs as well, actual cost is ₹6 crore versus ₹4.9 crore budget. As mentioned in the problem, 75% of this cost is fixed in nature, amounting to ₹3.75 crore (75% of ₹5 crore original budget). This portion of the cost should remain the same irrespective of variation in student enrollments. The remaining portion of the budget ₹1.15 crore is variable. The actual spend is ₹6 crore, of which ideally ₹3.75 crore would be fixed. If there is any variation in fixed cost, it should be looked into. If justified, future budgets need to be adjusted to reflect the higher cost. The remaining variable portion should also be analyzed to understand the reason for the higher spend.

(e) Overall, the impact of lower revenue and higher cost, has resulted in a shortfall of ₹8.48 crore (34% shortfall) as compared to the adjusted budget for 7,850 students. Action should be taken by further studying other parameters like competitor's performance and other non-financial factors like quality of education, pass rate, innovation.

Competitive Performance of Learning Horizons and Knowledgebase

The average revenue and cost per student for Learning Horizons and Knowledgebase are as below:

Average Revenue and Cost per student

Particulars	Learning Horizons		Knowledgebase
	Budget	Actual	Actual
Total revenue (₹)	81,36,25,000	79,87,50,000	90,50,00,000
Number of students	7,850	7,850	7,800
Revenue per student (₹)	1,03,646	1,01,752	1,16,026
Total cost (₹)	56,11,29,413	63,11,00,000	64,36,00,000
Number of students	7,850	7,850	7,800
Cost per student (₹)	71,481	80,395	82,513

The cost per student at Learning Horizons is marginally lower than Knowledgebase. However, the revenue per student at Knowledgebase is much higher. Analyzing the components further:

(a) **Student Mix:** Knowledgebase has higher revenue by more than 10 crore, almost 13.3% higher compared to Learning Horizons. Reasons could be on account a higher fee rate structure at Knowledgebase as compared to Learning Horizons, where part of the fee structure is government funded at a lower rate.

(b) **Course Rate:** Learning Horizons charges ₹1,20,000 per year for its accountancy course which is higher compared to Knowledgebase's rate of ₹100,000 per year. This might be a reason for a higher enrollment at Knowledgebase of 4,100 students compared to Learning Horizons enrollment of 3,800 for the same course. The management has to verify if this higher ra te is sustainable.

(c) **Course Rate:** Learning Horizons charges ₹120,000 for its law course compared to ₹150,000 at Knowledgebase. However, despite being lower, the enrollment for the course is almost the same. The management has to look at non-financial parameters related to quality, in order to improve enrollments for this course.

(d) **Course Rate:** Learning Horizons charges ₹80,000 for its economics course compared to ₹100,000 at Knowledgebase. Consequently, it is able to have higher enrollment for its economics course.

(e) Compared to Learning Horizons, Knowledgebase is incurring ₹2 crore lesser on tuition materials. As pointed out earlier, Learning Horizons must try to find out reasons for its higher cost and try to economize on this expense, if required .

(f) Knowledgebase has been using freelance staff for 30 days in a year to keep its expenses lower. Therefore, although it has a higher pay scale for its lecturers, it uses a lower cost resource to meet its teaching staff requirements. Compared to 1 new recruitment by Knowledgebase, Learning horizons has 10 new recruitments during the year. Knowledgebase has substituted any shortfall in teaching staff by hiring freelancers during the year. At the same time, non-financial aspects like quality of education need to be assessed while using the service of freelancers.

(g) The other indicator of competitive performance, the take up rate, the rate of conversion of enquiries from prospective students into enrollments for the course. Reference to the budget here is the original budget prepared for 8,500 students, which represents the capacity that Learning Horizons wants to achieve.

Particulars	Learning Horizons		Knowledge.
	Budget	Actual	Actual
Accounting - number of students	4,000	3,800	4,100
Number of enquiries	4,500	4,500	4,600
Take up rate	**89%**	**84%**	**89%**
Law - number of students	2,500	2,550	2,500
Number of enquiries	2,800	2,700	3,050
Take up rate	**89%**	**94%**	**82%**
Economics - number of students	2,000	1,500	1,200
Number of enquiries	2,200	1,600	1,225
Take up rate	**91%**	**94%**	**98%**
Overall - number of students	8,500	7,850	7,800
Number of enquiries	9,500	8,800	8,875
Take up rate	**89%**	**89%**	**88%**

The take up rate is lower for accounting course at Learning Horizons as compared to Knowledgebase. As explained in point (b), this may be attributed to the higher rate that Learning Horizons charges privately funded students. The higher rate should be justifiable.

The take up rate for law is higher compared to Knowledgebase. As explained in point (c) this could be due to the lower fee rate. Higher enrollment could indicate the popularity of the course. At the same time the comparative pass rate may have to be looked into to judge the quality of the course. The take up rate for economics is marginally lower than Knowledgebase. However, overall enrollment for this course is much higher compared to Knowledgebase, possibly to the substantially lower rate offered for the course. The management could look at better publicity to improve the take up rate.

(ii) <u>**Analysis of the "Determinants"**</u> dimension of performance as per the Fitzgerald and Moon model

Quality of Service

The pass rate for each course indicates the quality of course offered. Summarizing from the problem:

Pass rate

	Learning Horizons		Knowledgebase
	Budget	Actual	Actual
Accounting	95%	99%	93%
Law	95%	98%	90%
Economics	95%	95%	95%
Overall Pass rates for the courses	95%	97%	93%

The targeted pass rate of 95% has been met in all courses, thereby it indicates that a satisfactory level of education is being imparted. In comparison with Knowledgebase the pass rate for all courses is higher, which is a good indicator. This could be a reason to justify the use of full time staff instead of substituting it with freelancer staff.

In the case of accountancy, the management can use the higher pass rate to justify the higher course rate, which may lead to better enrollments for the course. In the case of law, it has the potential of becoming a very popular course, lower course fee with higher pass rate. This can be used to improve enrollments. In the case of economics, the pass rates are at par. The management may use the lower course fee to attract

students else may find other ways to make the course more attractive to have higher enrollments. Feedback from current students and the institute's alumni also provide value information about the quality of the courses and opportunities to improve.

Flexibility

The management of Learning Horizons has to consider the feedback from current and prospective students in order to bring in flexibility to their services. While long distance learning offers some flexibility, the management has to look at alternate channels of delivery like online lecture support by faculty similar to the model that Knowledgebase has developed. Also, offering weekend courses could help improve enrollments. Providing the option to get an intermediate degree gives flexibility to students who are not able to cope up with the course. While this cannot be a main objective of the institute, it still can maintain its motto of imparting quality education for students of all backgrounds.

Resource Utilization

The main resource of an educational institute is its staff. Management of Learning Horizon has to look at the teacher student ratio and compare it to benchmarks of peer institutes. Learning Horizons is having a higher recruitment of 10 lecturer s for the year as compared to a budget of 4 recruitments for the year. Reasons for the same need to be looked into. One reason could be a higher turnover ratio among lecturers due to lower salary paid in comparison to the market rate. In comparison, Knowledgebase has a more stable staff, having a recruitment of only 1 lecturer during the entire year. This might be due to the use of freelance teaching staff. Learning Horizon can explore options of using freelance teaching staff to meet its teaching needs, without compromising quality of education.

Innovation

From the information provided, Learning Horizons has a better quality of service in terms of pass rates. However, Knowledgebase planning to offer 6 new courses in the future. Learning Horizons has to explore options to improve on its current course offerings in order to maintain its market share.

(iii) There is a limit to fees sponsored by the government. Currently, government funded revenue is ₹18 crore, almost 23% of the total revenue of 80 crore. Average actual cost per student, referring to the table above, is ₹80,395. Since, the government is unwilling to spend more than ₹75,000 per student, the management could look at target costing methods to resolve this issue. This reduction of ₹5,395 per student can be achieved by identifying opportunities to economize on costs. If feasible, the cost per student can be calculated for each of the courses, to identify where these economies can be achieved. This drive should encompass the administration and support services too. Thus, using target costing approach, the cost can be reduced below
₹75,000 to make government funded education profitable, within reasonable limits.

Question 8

Caregiver Ltd. is a multi-specialty hospital in a mid-sized town. A 300+ bedded facility offers treatment across all medical disciplines of Cardiac, Oncology (Medical, Surgical and Radiotherapy), Neurosciences, Urology, Nephrology, Kidney Transplant, Aesthetics and Reconstructive Surgery, and other ancillary services. Most of the community members have their livelihood linked with the hospital. Many of them are directly employed at the hospital as doctors, nursing staff, lab technicians or as other support staff. While, others are indirectly related as suppliers of medical devices or drugs to the hospital, catering or housekeeping contractors etc. for the hospital. Hence, existence of the hospital is vital to the community. Growing awareness about sustainable business prompted the management to identify areas that can help the hospital operate in a sustainable manner that would be mutually beneficial to the

organization as well as the town that depends on it. Therefore, it has identified the initiatives that have been put in place to create a sustainable business. Information captured from various departments are being considered to prepare the Triple Bottom Line (TBL) report that is for the consumption both to internal and external stakeholders.

Required

IDENTIFY, which of the following aspects need to be reported in the TBL report and under which of the three categories. Provide reasons for classifying the aspect under a specific category, if applicable.

(i) Medical staff conduct charity camps every month. Open to all members of the community, who are provided with consultation free of charge.

(ii) Prompt and accurate tax payments based on records maintained without errors or fraud.

(iii) Caregiver, with the help of traffic police, has implemented a "green corridor" for ambulances that carry donor organs for transplantation. Organs harvested from the donor at one hospital can reach another hospital with the recipient patient at the earliest.

(iv) Medical waste is discarded at a landfill in a nearby dumpsite. Some of the waste are not bio-degradable.

(v) During review of the supplier for housekeeping service, it was observed that the service provider resorted to child labor to keep cost of operations lower.

(vi) Training and professional development programs doctors and nurses.

(vii) Lab reports are being made available online within the hospital computer system. This would reduce printing costs and storage space needed to maintain older records.

(viii) Caregiver has a good track record of having no medical negligence litigation cases filed against it.

(ix) The hospital is planning to market medical check-up packages so that facilities in its out- patient department can be utilized better.

(x) The number of inpatient hospital deaths decreased 8%, from 776 in 2017 to 715 in 2018. Assume all aspects are material enough to be reported in the TBL report.

Answer (Study Material)

Aspects that need to be reported in the TBL report:

S.N.	Aspect	Category on the TBL Report
(i)	Medical staff conduct charity camps every month. Open to all members of the community, who are provided with consultation free of charge.	**Social bottom line**, as it benefits the local community.
(ii)	Prompt and accurate tax payments based on records maintained without errors or fraud.	**Economic bottom line**, since tax payments impact an organization's bottom line and money flow.

(iii)	Caregiver, with the help of traffic police, has implemented a "green corridor" for ambulances that carry donor organs for transplantation. Organs harvested from the donor at one hospital can reach another hospital with the recipient patient at the earliest.	**Social bottom line,** since green corridor would unable the ambulance to transport harvested organs between the hospitals at the earliest this would be beneficial for patients in need of critical care.
(iv)	Medical waste is discarded at a landfill in a nearby dumpsite. Some of the waste are not bio-degradable.	**Environmental bottom line**, as it affects the ecological surroundings of the town.
(v)	During review of the supplier for housekeeping service, it was observed that the service provider resorted to child labor to keep cost of operations lower.	**Social bottom line**, since employing child labor leads to exploitation of children within the community.
(vi)	Training and professional development programs doctors and nurses.	**Social bottom line**, since it contributes towards employee development.
(vii)	Lab reports are being made available online within the hospital computer system. This would reduce printing costs and storage space needed to maintain older records.	**Environmental bottom line**, since paper, cartridge and storage requirement would be lower. This preserve environmental resources.
(viii)	Caregiver has a good track record of having no medical negligence litigation cases filed against it.	**Social bottom line**, since this is an indicator of the quality of services provided to patients.
(ix)	The hospital is planning to market 'medical check-up packages' so that facilities in its outpatient department can be utilized better.	Not relevant to TBL report. This is a marketing strategy to improve profitability.
(x)	The number of inpatient hospital deaths decreased 8%, from 776 in 2017 to 715 in 2018.	**Social bottom line**, since hospital mortality rate measures the clinical quality.

Question 9

The triple bottom line recognises that a company's performance should not only be viewed in terms of its ability to generate economic profits for its owners, but also by its impact on people and the planet for its long term economic and social viability. XYZ Limited has recently undertaken initiatives towards sustainability as below :

- (i) Reduced the amount of plastic usage in the peanut butter jars.
- (ii) Provided financial support to hospital run by local authority in the vicinity of the factory.
- (iii) Constructed solar powered warehouse.
- (iv) Generate profit for the company's shareholders.
- (v) Started child care unit for the benefit of women employees as well as for the neighborhood community.

Required
IDENTIFY whether this initiative would primarily impact people, planet or profit.

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(STUDY MATERIAL)

Answer

Triple Bottom Line

Identification of initiatives undertaken by XYZ Ltd. into categories it would impact based on the Triple Bottom Line Model – People, Planet or Profit.

Reduced the amount of plastic usage in peanut butter jars.	Planet
Provided financial support to hospital run by local authority in the vicinity of the factory	People
Constructed solar powered warehouse	Planet
Generated profit for the company's shareholders	Profit
Started child care unit for the benefit of women employees as well as for the neighboring community	People

Question 10

PHL, South Asia's premier express air and integrated transportation & distribution firm, offers a wide range of innovative supply chain services including Express Distribution, 3PL and Consulting. PHL offers innovative logistics solutions to its customers, enabling them to focus on their core competencies. The firm adds maximum value to businesses at every level, right from providing world-class warehousing support to ensuring time-definite deliveries of goods anywhere in Country 'X'. The following information is available:

(1)   Each warehouse of PHL is solely responsible for all customers within a specified area.   It collects couriers from customers residing within ambit of its own area for delivery both within the specific area covered by the warehouse and elsewhere in India.

(2)   After collections of couriers, a warehouse forward them for delivery outside its own area to the warehouses from which the deliveries are to be made to the customers.Therefore, each warehouse must integrate its deliveries to customers to include:
  (i)   couriers that it has collected within its own area; and
  (ii) couriers that are transferred to it from other warehouses for delivery to customers in its area.

(3)   Each warehouse's revenue is based on the invoice value of all couriers collected from customers in its area, irrespective of the location of the ultimate distribution warehouse.

(4)   Each warehouse costs consist its own operating costs plus some allocated proportion including centralised administration services (i.e. salary, legal & professional fees etc.) and distribution centre costs.

(5)   The management team and all employees of each warehouse are paid incentives which remains payable quarterly. The bonus is based on the achievement of a series of target values by each warehouse.

(6)   Internal benchmarking is used at PHL as to provide sets of absolute standards that all warehouses are expected to achieve.

(7)   The Annexure exhibit the target values and the actual values achieved for each of a sample group of four warehouses situated in City SG, City HK, City NY, and City NZ. The target values consist of:
  a. Warehouse revenue and profitability;
  b. Courier delivery services and customer care; and
  c. Credit period control and administrative efficiency.

Incentives are based on a points system. It is also used as a stimulus for each warehouse improving the operational effectiveness. One point is awarded in case where the target value for each item in the Annexure is either achieved/ exceeded, and a zero point where the target is not achieved.

Annexure
Revenue and Profitability

Particulars	Revenue		Profit	
	Target ₹million	Actual ₹million	Target ₹million	Actual ₹million
Company Overall	300	360	45	48
Warehouse				
City SG	24.00	22.50	3.60	3.45
City HK	21.00	27.00	3.15	3.60
City NY	18.00	21.00	2.70	3.30
City NZ	27.00	33.00	4.05	4.20

In order to calculate points of each warehouse, actual profit as a % of actual revenue must exceed the target profit as a % of target revenue.

Courier Delivery Services and Customer Care

Particulars	Target %	Actual			
		SG %	HK %	NY %	NZ %
Measure (% of total):					
Late collection of couriers	3.00	2.85	3.15	2.70	3.60
Misdirected couriers	6.00	6.30	5.85	4.95	7.65
Delayed response to complaints	1.50	1.05	1.35	1.20	1.80
Delays due to vehicle breakdown	1.50	1.65	2.10	0.45	3.00
Measure (% of revenue):					
Lost items	1.50	0.90	1.35	1.20	2.85
Damaged items	3.00	2.25	3.60	2.25	2.70

Credit Control and Administration Efficiency

Particulars	Target %	Actual			
		SG %	HK %	NY %	NZ %
Average debtor weeks	5.50	5.80	4.90	5.10	6.20
Debtors more than 60 days (% of total)	5.00	?	?	?	?
Invoice queries (% of total)	5.00	1.50	1.40	0.80	2.70
Credit notes as a % of revenue	0.50	?	?	?	?

Other Information

Particulars	SG	HK	NY	NZ
Debtor Aging Analysis (extract)				
Less than 30 days	1,950.00	2,250.00	1,770.00	3,000.00
31–60 days	481.50	199.50	229.50	828.00
Value of Credit Notes raised during the period	67.50	54.00	42.00	198.00

Note: PHL operates all year round.

Required

Prepare a report for the directors of PHL.

(i)   ANALYSE the comparative performance of the four warehouses.

(ii) ASSESSE PHL from perspective of financial performance, service quality, resource utilisation, flexibility, innovation, and competitiveness; and

(iii) EVALUATE the performance measurement system at PHL (RTP MAY.19) (Study Material)

Answer

Report

To: The Directors of PHL

From: Management Accountant Subject: Warehouse Performance Date: 11th May 2019

(i) NY has achieved the best performance with (12) points. SG and HK have given a reasonable level of performance with (8) points each. NZ is under performed earning only (4) out of the twelve points.

NY is the only warehouse which has achieved both increased revenue and increased profit over targets. In the courier delivery services and customer care, NY has achieved all (6) of the target standards, SG (4); HK (3). The data of NZ indicates, the need for investigation due to achievement of only (1) out of six targets.

In respect of the credit control and administrative efficiency, HK and NY have achieved all (4) standards and SG has achieved (3) of the four standards. Once again, NZ is the 'bad performer' and achieved only (2) of the four standards.

(Refer points table)

(ii) The terms mentioned in the question might be seen as representative of the dimensions of performance. The analysis of dimensions may be translated into results and determinants.

Results are the outcome of decisions and actions taken by management in the past. Measurement of the results may be done by focusing on financial performance and competitiveness. Financial performance may be measured in terms of revenue and profit as shown in the points table. The points system shows which warehouses have achieved or exceeded the target. Besides, liquidity is another criterion for the measurement of financial performance. The total points in table showed that HK and NY warehouses appear to be the best performer in aspects of credit control. Competitiveness may be assessed in terms of sales growth or in terms of market share or increase in customers etc.

The determinants are the factors which may be seen to contribute to the achievement of the results. In other words, Determinants refer to the forward-looking dimensions of Fitzgerald and Moon model, for example- what areas of future performance are most important for PHL to achieve positive financial and competitive results? Quality, resource utilization, flexibility and innovation are the determinants of future success and they are also the contributors to the achievement of competitiveness and financial performance.

In PHL a main quality issue seems to be courier delivery services and customer care. Points table shows that the NZ warehouse has a major problem in this area and achieved only (1) point out of the six available.

Resource utilisation for PHL is critical to its financial success and may be measured by effective and efficient use of drivers, vehicles, and financial resources. To some extent, such measurement can be seen in the data relating to courier delivery services and customer care. For example, the reason of late collection of couriers from customers may be a shortage of vehicles and/or drivers. Such shortages might be due to sickness, staff shortage, problems of vehicle availability, vehicle maintenance etc.

Flexibility may be an issue like varied range of service as to meet different segment of customer is unavailable. Possibly, a short-term sub-contracting of vehicles or collections or deliveries may help in overcoming late collection problems.

The points table i.e. 'target vs actual' may be considered as an example of innovation by PHL. This gives a comprehensive set of measures providing an incentive for improvement at all warehouses. The points table may demonstrate the extent of achievement or non-achievement of PHL strategies for success. For instance – the firm may have a customer care commitment policy which identifies factors that should be achieved on a continual basis. For example, timely collection of couriers, misdirected couriers re-delivered at no extra charge, prompt responses to customer claims and compensation for customers.

(iii) The performance measurement system used by PHL is simple to use. However, it may be looked upon measuring the right things since the specific measures used in point s table encompass a range of dimensions designed to focus the organization on factors essential for PHL's success and not restricted to traditional financial measures.

At PHL, internal benchmarking has been used to provide sets of absolute standards that all warehouses are expected to achieve. This will help to ensure a continuous focus upon the adoption of 'best practice' at all warehouses. Benchmarks on delivery performance give importance to quality of service whereas benchmarks on profitability
i.e. target profits focus solely upon profitability.
Incentive schemes have been used at PHL, linking the achievement of firm targets with rewards. It might happen that the profit incentive would act as a booster to each warehouse management team. However, what is required for the prosperity of PHL is a focus of management on the determinants of success rather than the results of success.

Workings

Warehouse – Points Table
for the year ended 31 March 2019

		SG	HK	NY	NZ
Revenue and Profit					
Revenue		0	1	1	1
Profit (see note below)		1	0	1	0
Total Points earned	…(A)	1	1	2	1
Ranking		II	II	I	II
Courier Delivery Services and Customer Care					
Late collection of couriers		1	0	1	0
Misdirected couriers		0	1	1	0
Delayed response to complaints		1	1	1	0
Vehicle breakdown delays		0	0	1	0
Lost items		1	1	1	0
Damaged items		1	0	1	1
Total Points earned	…(B)	4	3	6	1
Ranking		II	III	I	IV
Credit Control and Administrative Efficiency					
Average Debtor weeks		0	1	1	0
Debtors more than 60 days		1	1	1	1
Invoice queries (% of total)		1	1	1	1
Credit notes (% of revenue)		1	1	1	0
Total Points earned	…(C)	3	4	4	2
Ranking		II	I	I	III
Total Points	**…(A)+(B)+(C)**	**8**	**8**	**12**	**4**

(a) Profit Points Calculation
Actual Results e.g. SG = 3.45/22.50 = 15·3% (1 point); HK = 3.60/ 27.00 = 13·3% (0 point)

(b) Debtors more than 60 days (% of total)

Particulars		SG	HK	NY	NZ
Revenue ('000)		22,500	27,000	21,000	33,000
Debtor weeks		5.80	4.90	5.10	6.20
∴ Debtors	…(A)	2,510	2,544	2,060	3,935
Less than 30 days	…(B)	(1,950)	(2,250)	(1,770)	(3,000)
31–60 Days	…(C)	(481.50)	(199.50)	(229.50)	(828.00)
More than 60 days	…(A) - (B) - (C)	78.50	94.50	60.50	107.00
Debtors in more than 60 days (% of total)		3.13	3·71	2·94	2·72

(c) Value of credit notes raised as a % of revenue e.g. SG = ₹67,500/ ₹2,25,00,000 = 0·30%

Question 11

West Coast community operates Homelessness Services (HS) on a not-for-profit basis as a local solution to local housing needs. The primary objective is to meet the accommodation needs of persons within its locality targeting those living in the low/middle income groups and senior citizens. Accommodation is basically furnished; it consists of a small house, with kitchen, bathroom, bedroom/(s), and a sitting room. HS manages 450 such houses across various localities. Exclusive Services (ES) is a profit-seeking organisation which provides rented accommodation to the public. ES manages 200 such houses across localities similar to HS' operations.

Income and Expenditure accounts for the year ended 31st March 2019 were as follows:

	HS (₹)	ES (₹)
Rent Received	1,02,98,600	1,09,98,000
Less:		
Employee Costs	24,00,000	38,00,000
Planned Maintenance and Substantial Repairs	34,19,500	10,41,000
Running Repairs	23,91,600	6,38,000
Miscellaneous Operating Costs	15,27,500	11,75,000
Insurance, Property Taxes, and Interest etc.	13,15,500	18,75,000
Operating (Deficit)/ Surplus	(7,55,500)	24,69,000

Operating Information in respect of the year ended 31st March 2019 was as follows:
House and rental information:

Size of House	Number of Houses		Rent per Week (₹)	
	HS	ES	HS	ES
1 Bedroom +	40	20	400	750
2 Bedrooms +	80	40	450	800
3 Bedrooms +	250	140	500	1,175
4 Bedrooms +	80	Nil	700	N.A.

HS had certain houses that were unoccupied during part of the year. The rents lost as a consequence of unoccupied properties amounted to ₹18,17,400. ES did not have any unoccupied houses at any time during the year.

Employees were paid as follows:

Number of Staff		Salary per Staff Member (₹) per annum	
HS	ES	HS	ES
1	2	3,00,000	5,00,000
2	2	2,50,000	3,00,000
4	11	2,00,000	2,00,000
8	-	1,00,000	-

Planned maintenance and substantial repairs undertaken:

Nature of Work	Number of Houses		Cost per House (₹)	
	HS	ES	HS	ES
Miscellaneous Building Work	10	-	12,500	-
Sanitary Fittings (Kitchen + Bathroom) [all are the same size]	45	5	26,100	52,200
AC Upgrades/ Replacements	8	-	15,000	-
Replacement of Wooden Structure for 3-Bedroomed Houses	50	13	40,000	60,000

Running Repairs Information:

Classification of Repair	Number of Repair Undertaken		Total Cost (₹)
	HS	ES	HS
Emergency	480	160	6,72,000
Urgent	990	376	11,28,000
Non-urgent	560	102	5,91,600

Each repair undertaken by ES costs the same irrespective of the classification of repair.

Required

(i) Critically EVALUATE how the management of Homelessness Services could measure the 'Value for Money' of its service provision during the year ended 31 March 201 9.

(ii) IDENTIFY, 2 performance measures in relation to Flexibility and Service Quality (dimensions of performance measurement).

(iii) ANALYSE, 3 performance measures relating to 'Cost and Efficiency' that could be utilised by the management of Homelessness Services when comparing its operating performance against that achieved by Exclusive Services.

Answer (MTP MARCH.18) (STUDY MATERIAL)

(i) For commercial enterprises, generating profits is a very important objective. Likewise, not-for-profit enterprises have certain cultural, social or educational objectives for which they are created. Regardless of the type of organization, it is important to know whether the internal operations meet certain performance benchmarks, that will ensure that the organization achieves its objectives in a better manner. Moreover, even if the organization does not operate for profits, it is important for it to be "cost effective". Resources (including money) should be used optimally to achieve intended outcomes. For example, HS can use this benchmarking tool to look into the following questions:

(a) Does the organization function in an efficient and cost effective manner?

(b) Does the estate management make best use of the buildings to achieve the objectives of the organization?

(c) Does the estate management function manage upkeep of buildings in terms of repairs and improvements in an effective manner?

(d) Are the tenants satisfied with the service provided by the estate management and the suitability of the accommodation for their needs?

"Value for Money (VFM)" is an assessment made based on the criteria of economy, efficiency and effectiveness.

Economy involves minimising resource consumption while meeting specified requirements of quality and quantity. Minimize the cost of resources / required inputs (implies to spend less) while ensuring that the desired quality of service is achieved. For HS, inputs could be purchases made for maintenance and repair work like sanitary fittings, AC, wooden structure for the houses etc., while resources could be the labour employed to carry out these services. HS should aim at purchasing required quality of inputs at the least possible price. Skilled labour needed for this job should be procured at the lowest pay scale possible. Procuring these at lower cost leads to savings for HS. At the same time, HS should ensure that cost cutting / saving does not come at the cost of quality. Lower quality, implies inferior service levels, which ultimately will compromise HS' social commitment to provide quality housing to needy members of its community.

Efficiency involves maximising the ratio between resources (input) and the output of goods, services or other results.

The focus of efficiency is on the process of rendering service. The objective of efficient operations is to maximize output using minimum resources. Improved productivity means that resources procured are used in an optimal way (implies spending well).

In the case of HS, one of the resources is the labour employed for repair and maintenance work. Efficiency (productivity) measured would be the relationship between the employees available and the repair work performed by them. If the pool of employees do more repair work than the benchmark set, productivity is higher. This also closely ties up with economy (cost) of operations.

If the given pool of employees (resources), who are paid optimum salary (cost), cater to more repair and maintenance work, economy of operations is achieved due to higher productivity of operations. In case these activities are outsourced, efficiency and economy can be achieved by calling for tenders. Select the tender that provides maximum work for least cost.

In addition, HS may explore options for efficiencies from business process improvements, shared services as well as further efficiencies with in assets management.

Effectiveness involves ensuring that the outcome achieves the desired policy aims and objectives. Have the objectives been achieved, how does the impact of the actual output / service compare with its intended impact? (implies to spend money wisely to achieve desired objectives). In the case of HS, effectiveness could be assessed based on the following questions

(a) Are the housing needs of the targeted community members met?

(b) Are the tenants satisfied with the accommodation?

(c) Given its social cause, are the staff friendly, courteous and hospitable to the customers?

(d) Do the housing accommodations comply with safety standards and other legal requirements?

Each measure is inter linked with the other. For example, HS has replaced sanitary fittings in the kitchen and bathroom in 45 houses for ₹26,100 each, costing a total of ₹11,74,500. Compared to ES that has spent ₹52,200 on each house for sanitary fitting replacement. For the cost of ₹11,74,500 ES could have replaced fittings in only 22 houses (₹11,74,500 / 52,000) as compared to HS' ability to replace fittings in 45 houses.

Therefore, HS' decision has been economical, getting more work done for same cost. At the same time, this does not indicate whether the fittings replaced by HS are of similar or better quality as compared to

ES. ES could have used better quality fittings that last longer, enhance customer experience, safety etc. The spending by ES could have been more effective than HS because it helps achieve the desired objective of customer satisfaction, safety and lesser running cost for maintenance. Therefore, to achieve economy, HS may have compromised on effectiveness.

Benchmarking is a good method of measuring performance it enables a comparison of the process, costs etc. with those of a close competitor. Services will be expected to use benchmarking information to learn from best practice, change procedures and processes to achieve enhanced methods of working, and reduce unnecessary expenditure.

However, benchmarking of performance against ES is not ideal. The performance of HS can be better measured by adopting benchmarking against similar charities whose primary objective is the provision of accommodation to the communities in which they operate.

Thus, HS must have permanent membership of the House Benchmarking Organisations, which helps social housing property-owners to compare the costs of service delivery, resources, and key performance indicators across all areas of the business. For example, the management of HS can enquire about a norm in respect of the repair charges, sanitary charges or wood structure replacement charges etc. of similar non- profit seeking organisations.

Further, benchmarking should be conducted annually to analyse all areas of the business and is used to identify high performing, low cost services. Using the annual benchmarking exercise results, the HS can plan to target those areas that are low performing and high cost.

Overall, HS should have strong commitment to value for money, which needs to be reflected in the business plan and in service-delivery plans. By applying these principles HS would be able to achieve the optimum utilisation of resources, which will in turn lead to extra capacity and allow HS to provide better services.

(ii) The Building Block Model proposed by Fitzgerald and Moon, gives six dimensions of performance measurement including service quality and flexibility.

Service Quality

Service quality is the measurement of how well a delivered service conforms to the customer's expectations. As a not for profit organization, HS provides housing services to cater to the needs of lower and middle income groups as well as senior citizens in the local community. Although service is provided at a concessional rate compared to its commercial peer ES, quality of HS' service needs to be judged based on certain parameters that were promised by the organization to its tenants. These could be used as parameters to assess service quality. Some of them could be:
- Behaviour, attitude, proactivity of staff employed by HS.
- Quality of basic amenities provided.
- Availability of on-site service for the residents
- Safety within and around the residential unit

Data for assessment of quality can be collected from feedback of tenants, analysing the number and nature of complaints made by tenants, tenant retention rate/loyalty etc. Feedback form tenants can be taken on specific issues or could be general in nature.

Flexibility

Flexibility is the ability of the organization to adapt to customers' requirements. This can be measured through service delivery time, promptness in responding to customer requests, ability rof employees to perform different kinds of work etc. In the case of HS, the following performance measures can be used to assess the flexibility:

- The average waiting time for a tenant for a house to become available. Lower the wait time better the flexibility as it indicates that there are sufficient housing units available for rental

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accommodation.

- ▪ Following change in requirements, ability to meet the tenant's request for another house of a different size. This indicates whether the range of housing units offered is sufficient (flexible) to cater to the tenants' changing demand.

  - ▪ Waiting time for undertaking repairs of an emergency nature, once notified by a tenant. Lower the waiting time during emergencies indicates the availability of appropriate personnel to carry of the repairs on short notice.

Students are only required to provide two performance measures. These others have been given for completeness.

(iii) The management of HS could use the following performance measures

An organization should aim at achieving results with maximum efficiency at the least possible cost. Efficiency measures the relationship between the input resources utilized and the output service achieved. Few of the measures that HS could use to compare performance with ES are:

The Average Employee Cost per week per house

Here, the resource (input) are the employees, which is 15 in case of both HS and ES. The employees at HS cater to 450 houses as compared to 200 houses catered by ES. Therefore, HS is more efficient as compared to ES.

Likewise, cost of resources to HS is the employee cost, for which the pay structure and remuneration policies are different in both the organizations. HS has the ability to hire most of its resource at an annual salary of ₹100,000, which is the least level in the pay structure. Comparatively, ES also hires cheaper labour but at a slightly higher pay level of ₹200,000 annual salary. Therefore, the total cost of labour is higher by ₹14,00,000 (58%) for ES as compared to HS.

To compare the figures on a common factor, the employee cost can be calculated per week per house.

	HS	ES
The Average Employee Cost per week per house [₹24,00,000^/ (450@ × 52)] and [₹38,00,000^/ (200@ × 52)] ^ Employee cost from the income and expenditure table @ Number of houses (given): HS = 450; ES = 200	₹102.56	₹365.38

The average employee cost per week per house of ES is ₹365.38 (2.46 times) more than of HS. It can be concluded that HS is both efficient, in terms of being able to cater more houses with same number of employees, as well as cost effective due to the use of cheaper labour.

The Average Day to Day Repair Cost per week per house

Here, the resource (input) is measured in terms of the cost spent on repairs to maintain the rental houses. Running repairs are generally do not add much value to the rental houses. Therefore, lesser the repairs, higher the efficiency. From the income and expenditure table, it can be seen that HS has spent ₹23,91,600 as running repair cost for 450 houses versus ES that has spent ₹6,38,000 for 200 houses. To compare them on a common factor, the average repair cost per week per house has been calculated.

	HS	ES
The Average Day-to-Day Repair Cost per week per house [₹23,91,600^/ (450@ × 52)] and [₹6,38,000^/ (200@ × 52)] ^ Running repair cost from the income and expenditure table @ Number of houses (given): HS = 450; ES = 200	₹102.21	₹61.35

The average day to day repair cost per week per house for ES is ₹40.86 less than that of HS (-40%). This may be due to the fewer repairs required and the fact that there is no extra cost required for emergency and urgent repairs. The cost of repairs whether emergency, urgent or non-urgent to ES is the same, ₹1,000 [₹6,38,000/ (160 + 376 + 102)] whereas the cost of emergency repairs to HS is ₹1,400 (₹6,72,000/480), urgent
₹1,139 (₹11,28,000/990) and for non-urgent repairs it is ₹1,056 (₹5,91,600/560).

ES's low cost of repairs (which is identical for all types of repairs – emergency, urgent and non-urgent) may have been achieved through entering into a contractual agreement for repairs. HS should also think of entering into such contracts in order to save money.

Percentage of Rent Lost

Occupancy of rental houses indicate whether the capacity (in terms of houses rented) is being optimally utilized. Lesser the vacancy better the efficiency in terms of capacity utilization. This represents

	HS	ES
Percentage of Rent Lost (= Rent Lost / Gross Rent) [(₹18,17,400/ ₹1,21,16,000] Gross Rent = Rent Earned + Rent Lost = ₹1,02,98,600 + ₹18,17,400 = ₹1,21,16,000	15%	---

opportunity cost of not letting out the property.

ES did not have any unoccupied properties at any time during the year; it has 100% occupancy. This shows that ES's properties are in high demand. On the other hand, HS has lost rent worth ₹18,17,400 through un occupied properties; this is about 15% of the gross rent receivable.
The management of HS should identify the reasons why the houses remained unoccupied when the occupancy rate is 100% for an organisation like ES, a peer organisation should be used to benchmark the performance.

Question 12

Fair Limited manufactures and sells motor vehicles in India and different parts of the world. The company has its head office in New Delhi and three regional offices. The manufacturing plants are situated in Pune and Bhubaneshwar. The company has over 10,000 employees who are paid a fixed salary and a performance related pay (PRP).

The PRP is determined using the financial performance as a measure. The performance of departments which are profit centers is based upon the revenues and profits the departments generate. The performance of cost centers is based upon the cost savings against the budget.

Of late, the company has identified critical issues with the motor vehicles manufactured and sold in the market. In the last one year, itself, the company has recalled mor e than 2 lakh vehicles owing to quality issues like faulty gearbox, issues with axle, braking systems etc. The company was also penalized for selling vehicles which does not meet the emission norms.

The board of directors carried out an internal review of these frequent recalls and issues with the vehicles. In most of the cases, it appeared that the recall of vehicles was on account of lower quality of material and parts used. A couple of critical quality and emission checks were ignored to dispatch more vehicles in the limited time, leading to higher sales and profits.

The board is concerned with the reputational risk with the issue related with recalls. The company was consumer's most trusted brand for last three years in a row. It is unlikely to win the award this year due to negative feedback from customers. The board wants to win the trust of the customers back and be profitable as well.

Required

You are the advisor to the board. The board seeks your advice on the following aspects:

(i)   STATE advantages and disadvantages of using financial measure as a performance measure.

(ii) ADVISE an alternative performance measure which includes non-financial measures as well.

(iii) IDENTIFY 2 critical success factors and 2 Key Performance Indicators for the performance measure chosen in (ii). (STUDY MATERIAL)

Answer

What is the issue?

Fair limited is into manufacturing of motor vehicles. The company has used financial measures for performance. Of late, the company has faced quality related issues leading to vehicle recalls. The company has also been penalized for violating emission norms. Since the company has been using financial measures only, it appears that non-financial aspects related to quality have been ignored. The company has adopted the principle of profit at any cost which can be seen from use of low quality materials and parts as well as skipping key quality checks.

Financial Performance Measure

Financial performance measures focus on financial results or aspects. These measures focus on the profits made by a business or a unit of business. They also include costs saved against budgets. Various financial performance indicators include – growth in revenue, profitability, variance from budget, Return on Capital Employed etc.

In the case of Fair limited, the performance of employees is done on the basis of financial performance indicator. When performance is evaluated on financial parameters, the employees and managers tend to focus only on profitability in anticipation of higher bonuses and pays.

The problems related to quality issues in vehicles produced by Fair limited might be linked to the use of financial performance measure. Low quality parts are used to save costs and improve profitability. The quality checks prior to sales were also skipped to sell more vehicles with limited resources. This is an apparent case of compromise in quality for seeking higher profits and revenues. In light of above, the advantages and disadvantages of financial performance measures are given below.

Advantages

- Focus on financial objectives and is linked to the overall objective of wealth creation of shareholders.
- Such measures are objective.
- Quantification of results is possible.
- The measures are comparable across companies of a particular industry.
- The framework to measure financial performance is established in most of the cases.

Disadvantages

- Focus on short term profits and Ignores long term sustainable growth. As can be seen in the case of fair limited, the company has compromised quality for short term profits. This is harmful to the company in the longer run.

- This measure can be distorted by inflation. A 5% growth in sales might be good but if the inflation is 6%, the real growth is negative.
- Financial information might be manipulated to show a better performance.

Non-financial performance measures use measures other than financial to measure performance of employees and departments. The advantages of non-financial measures are

- Non-financial measures help business to measures every area whether financial or non- financial. Financial measure would not be able to suitably measure areas like performance of IT department.
- It focuses on qualitative aspects as well.
- These measures take a long-term view unlike financial measures where employees tend to take a short term view.

  The disadvantages of Non-Financial measures are:
- These require huge amount of information to measure each area of performance and might lead to shift of focus from core goals and values.
- These can be subjective as non-financial measures cannot be generally quantified.
- Non-financial measures like measures of quality are difficult to measure.

Balanced Scorecard

An alternative performance measure which focuses on both financial and non -financial measures is the Balanced Scorecard. It outlines four key areas in which company and divisional performance should be measured to focus on both the short and long term needs of the organisation. The key idea is that managers are to be appraised on a variety of measures which include non-financial measures so that their focus is both long and short term.

As discussed earlier, it appears that managers at Fair limited have ignored long term sustainable growth and qualitative factors and focused on short term profits and sales. This is one of the key disadvantages of a financial measure of performance. The company can start measuring performance both on financial as well as non-financial aspects. This would ensure that employees are not short sighted on profits alone.

The four areas or perspectives in a Balanced Scorecard are –

- **Financial Perspective**
Financial perspective focuses on financial performance of the business and divisions. The various financial measures used by companies are profitability, revenue growth, cost control etc. This is currently being used in Fair limited to measure performance.

- **Customer Perspective**
This perspective views organizational performance from the point of view the customer or other key stakeholders that the organization is designed to serve. These could include measures like customer satisfaction index, percentage of returns, percentage of goods delivered on time etc.

- **Internal Business Perspective**
This perspective views organizational performance through the lenses of the quality and efficiency related to product or services or other key business processes. The measures under internal business perspective could be number of defective products produced, production performance per unit of time etc.

    - **Training and Development/ Learning and Growth Perspective**
This perspective views organizational performance through the lenses of human capital, infrastructure, technology, culture and other capacities that are key to breakthrough performance. The key measures could be number of new products produced, amount invested in training and development etc.

In each category/Perspective, the organisation must follow through from the business strategy, to ensure they are focused on the long-term direction of the business. Clear objectives should be set under each category according the SMART criteria (Specific, Measurable, Achievable, Relevant and Time-bound), measured at the end of the period, and lessons learnt from actual results to help to improve performance in future periods and keep the organisation on track to achieve its strategic goals.

Applying Balanced Scorecard to Fair Limited

The issues related to quality have arisen at Fair Limited as the managers and divisions focused on profits at the cost of quality. The recall of vehicles was primarily on account of use of sub- standard parts. The company should consider using non-financial measures as well as a performance measure. Balance scorecard can be effective tool to apply financial and non- financial measure.

The company must take steps to put focus on quality related aspects as well as financial aspects. A proper application of various Key Performance Indicators under the respective Critical Success Factors can help the company overcome the current issue.

Critical success factor (CSF) is a management term for an element that is necessary for an organization or project to achieve its mission. It is a critical factor or activity required for ensuring the success of a company or an organization. These are the key areas in which the organisation has to do well if they are to remain competitive and profitable. The critical success factors have to be linked with the overall strategy of the organisation.

Key Performance Indicators (KPIs) are the ways in which the organisation's performance for the CSF can be measured. It is a measurable value that demonstrates how effectively a company is achieving key business objectives. Organizations use KPIs to evaluate their success at reaching targets.

The Critical Success Factors and Corresponding KPIs for Fair limited for each of the perspective in the balanced scorecard is given below:

Perspective	Critical Success Factors	Key Performance Indicator
Financial	Be the Most Profitable Company in Motor Vehicle Industry.	Profitability ratios. Revenue growth.
	Become the No.1 Company by in terms of Market Share in five years.	Variance to budget. Number of vehicles sold.
Customer	Be No.1 Choice of Customers. Implement Zero Recall Policy.	Number of vehicles sold vis-à-vis those sold by competitors. Number of recalls of vehicles. On time delivery of vehicles.
Internal Business	Total Quality Management. Zero Idle Time at Factory.	Number of defective cars produced. Number of cars returned by customers as faulty. Number of hours spent in waiting by labours at assembly line.
Training and Development	Upto Date Technology used in Manufacturing Facilities. Skill Development for Labour and Supervisors.	Amount spent in research and development year on year. Number of training hours undergone by workers and supervisor. Number of new model of vehicles launched.

Question 13

Grab and Go is a fast food joint operating in a very competitive business environment. It is a profitable business with very good prospects for growth. A strategy development meeting is underway to chalk out a plan to improve business growth in a very systematic measurable manner.

The following information is given to you:

Grab and Go has the following mission statement "Derive strength to grow in scale using our passion for the craft of cooking and service that will satisfy our customers, employees and other stakeholders." Grab and Go is a closely held partnership firm with five partners. It started at a scale of operations that catered to the local demand within a locality. Reputation for good quality food and service has help it scale up its operations in the recent years. Most of the key decisions relating to operations like decision about the menu and its method of preparation, product pricing, finance, marketing, administration etc. are centralized. Skilled chefs, managers for various functions and the firm's partners are part of this core team.

A general survey published in a food trade magazine highlighted people's perception about fast food diet. Predominant opinion was that the current food platter available in food joints across the town were not healthy option. People want healthier choices in the menu when they dine out. At the same time, they do not want to compromise on taste or presentation of the food item. The other focal point for improvement was the order taking system. In most food joints, the current system is manual where the order taking staff note down a customer's order on paper, send it to the kitchen and then delivers the order on intimation from the kitchen, which is also done manually by the kitchen staff. This system has problems like errors in taking down orders, most times delivery staff are unaware of the content in an item or its availability, delays in delivery leading to customers complaining about food served cold etc. This problem takes away the pleasure of dining out and is leaving customers dissatisfied. Another scope for improvement is that customers want more payment options other than cash to settle their bills. With the advent of plastic money and mobile e wallet payments carrying cash around has become cumbersome for most of them. The partners have decided to use this as an opportunity to develop Grab and Go as the niche food joint addressing the customer's concerns, while managing to remain profitable. Consequently, Grab and Go plans to expand by providing more choices along with its regular menu to health-conscious customers. Also, revamping its ordering, delivery and payment system would improve customer experience. A reasonable return at the overall firm level would be a return on equity (Net Income / Total Partnership Capital) of 25% each year. Capital structure will remain unchanged. The partners are not interested in diluting their share by bringing in new partners or take external funding with ownership stake. They may however utilize bank financing for expansion, but only if required.

Expansion of business will entail opening new branches in other localities as well as forging franchise with other stakeholders. However, Grab and Go is not clear how to measure market share since the fast food industry market is not entirely an or ganized sector. There is no clear information about the overall revenue of the whole sector.

In the past, it was quality of its products that drove growth. The management wishes to maintain high quality standards across branches and franchisee. Therefore, an internal quality control department may be established to look into the same. External certifications from government food inspectors and other recognized agencies would also be required to be met. Quality refers to both product quality and service quality, in this case, service being an inherent part of customer experience.

The staff at Grab and Go are also excited at this opportunity. Expansion of the food joint would present a more dynamic work culture. Chefs would have the opportunity to enhance the ir skill by trying out various ways to cater to the consumer's palate. Ordering and delivery staff would have the opportunity to enhance their people management skills. This learning opportunity would definitely be an impetus for their career growth. With expansion chances of promotion within the organization increase. Financially, better business leads to the expectation of better pay and reward system.

Consequently, the management is intent on developing a performance management system that tracks performance across the organization. Among the different models, the Building Block Model is being considered.

Required

ADVISE the partners how the Building Block Model at Grab and Go could be implemented.

Answer (STUDY MATERIAL) (MTP MARCH.18) (MTP MARCH.18)

Performance management using the Building Block Model poses three questions based on which the performance measurement system is developed:

What dimensions of performance should the company measure?

Dimensions are the goals that the company wants to achieve based on its overall strategy, those goals that define its success.

How to set the standards (benchmarks) for those measures?

What are the rewards needed to motivate employees to achieve these standards?

Dimensions

Dimensions (goals) include financial and non-financial goals. Dimensions are further categorized as into results and determinants. Results are tracked as (a) financial performance and (b) competitive performance. Determinants are tracked as (a) quality, (b) flexibility, (c) innovation, and (d) resource utilization. Determinants influence results.

Results

(a) Financial Performance: Grab and Go is a closely held partnership with 5 partners. Partners are interested in earning profits that have been benchmarked at an overall return on equity of 25% each year. This can be derived from periodic financial statements that get prepared as part of the accounting function. Partners want to retain the current capital structure. This implies that they do not have any plans to go public or have other external funding with ownership stake. They may take loans from banks for funding their expansion.

Consequently, if they want to expand, the firm has to make sufficient profits that will yield ample cash reserves. Therefore, Grab and Go's financial performance dimensions should also include profitability ratios like gross profit ratio, net profit ratio, operating margin, return of capital employed (if bank loans are taken) etc. Cash profit and changes in cash reserves may also be included as dimensions of performance. These measures should be tracked at the firm's overall level as well at the individual branch/franchisee level.

(b) Competitive Performance: Grab and Go was to be a niche joint in a highly competitive segment. However, to measure how it compares with its peers there is a limitation in terms of availability of information due to the unorganized nature of the fast food industry. All the same, one of the measures that can be helpful are the number of branches / franchisees the firm is able to open.

Grab and Go is also likely to have a competitive edge because it is foraying into providing healthier food choices along with its regular menu. Since this is unique among its segment, it will retain a

competitive edge until its peers start replicating the same. Therefore, one other measure for competitive performance could be the spread and uniqueness of Grab and Go's menu as compared to its peers. Information for this could be gathered from published / researched sources like trade magazines as well as informal sources like customer feedback / word of mouth

Determinants

(a) **Quality:** Quality drove past performance and it will continue to drive performance even after expansion. For product quality, the management should track if internal quality checks and external certifications are met periodically. Quality control should cover all branches and franchisees. Non-compliance may require immediate attention of the management. For service quality, periodic training programs can be initiated to educate the staff with people management skills. Therefore, Grab and Go should determine parameters that the management would be interested in ensuring that quality standards are met and how non- compliance should be reviewed.

(b) **Innovation:** Innovation involves experimenting with the appropriate inputs which make them healthy. At the same time, the healthier option should satisfy the taste and presentation preference of customers. This requires innovative efforts from qualified and skilled chefs. This will give the competitive edge to Grab and Go. Innovation has to be constant and not a onetime exercise. Therefore, management may review the number of new variants that have been introduced in the menu, regularity of these introductions and customer feedback of the same.

(c) **Flexibility:** Growth in scale of operations combined with a competitive business environment implies that Grab and Go should have some flexibility in its operations. This could mean ability to hire staff quickly, cater to seasonal surges in customer's demand etc.

(d) **Resource utilization:** Better utilization of resources help business function efficiently. Revamping the order, delivery and payment system would improve the way resources (kitchen, ordering and delivery staff) operate. Lesser errors and delays would increasecapacity utilization, freeing up time to cater to more customers. Consequently, pressure on resources decreases. Therefore, some indicators to be tracked can be overtime / idle time of kitchen, ordering and delivery staff, turnaround time in these functions, table occupancy rate, breakage, or wastage of material etc. Again here, the management should chart out the appropriate dimensions that will help them track resource utilization.

Standards

Standards are the benchmarks or targets related to the performance metric that is being tracked under each dimension. To be useful, standards should have the following characteristics:

(a) **Ownership:** It is important to establish who in the organization structure is responsible for achievement which performance metric. Grab and Go has to consider this very carefully. As explained in the problem, many key management functions like decisions about the menu and its preparation are determined by a core team. Similarly, the centralized core team is handling finance and marketing. However, at the branch level, managers of various operational functions can be held accountable for performance of that specific process. For example, the chief at a particular branch can be held accountable for the quality of food prepared in that branch (Dimension: Quality). Similarly, the head of the order taking staff at a particular branch can be held accountable for the overtime that the staff at putting in at that branch (Dimension: Resource utilization).

(b) **Achievability:** Benchmarks and targets will be useful only if they are achievable. The managers who have ownership for the achievement of performance metric have to be involved in setting benchmarks or targets. They should be clearly defined, preferably quantifiable. At the same time, they should be in line with the firm's overall strategy. If the target is set very high staff can get de-motivated. If set too low, will not raise the bar for performance. If not in line with the firm's overall strategy, there will be discord or gap between the firm's performance and what it wants to achieve.

(c) **Equity:** Benchmarks should be equally challenging for all parts of the business. Grab and Go should customize its performance measure for each function like kitchen staff, order and delivery staff, finance staff, advertising staff etc. For example, while turnaround time to meet a customer's order would be relevant metric to the kitchen, ordering and delivery staff, popularity of the advertisement jingle for Grab and Go would be the relevant metric for the advertisement department. The rigor of the target should be uniform across departments. Otherwise the staff would view the benchmark system as being biased towards select functions within the firm.

Rewards

This relates to the reward structure within the firm that includes compensation package, bonus, rewards, awards, facilities provided to employees etc. Proper reward system is required for achievement of standards while maintaining costs at optimum levels. Grab and Go should have a well-defined HR policy for compensation, bonus, promotion, and reward. A good system should have the following characteristics:

(a) **Motivation:** Does the reward system drive the people to achieve targets and standards? A low reward system would not induce staff to work towards the goal. Goal clarity and participation in target/benchmark setting can motivate staff to achieve standards.

While some part of compensation may be fixed, other parts can be made variable. For example, bonus of the advertising staff can be aligned to the sales generated, Chefs can be rewarded bonus based on sales as well quality measures etc. Better job prospects in a growing environment would also be a good motivator. Grab and Go's management should track various metric in this regard. Some of them could be percentage of bonus paid to the overall compensation package categorized staff cadre, attrition rate, internal promotions, cross training programs etc.

(b) **Clarity:** The reward package should be clearly communicated to the staff. It should be understood by the staff concerned. They should be told what kind of performance will be rewarded and how their performance will be measured. Grab and Go may consider having a dedicated HR team for this purpose.

(c) **Controllability:** Unlike the traditional understanding, rewards need not be based only on the financial element that the staff can control. There may be other non -financial elements for which rewards can be given. Both aspects however need to be controllable by the staff concerned. For example, the chef can come up with a popular menu. If the pricing of the product, managed by the central core team, is such that it results in a loss to Grab and Go, the chef may not get the much-deserved bonus. This is not a good reward system and might lead to attrition.

Question 14

Galaxy Limited is in the business of logistics and distribution. In 2002, Galaxy limited had implemented Balance Scorecard as a performance measurement & management system. The balanced scorecard measures performance across Financial, Customer, Business and Innovation perspective. The implementation of Balanced Scorecard had the following impact -
- The company's financial performance improved substantially.
- The complaints from customers regarding poor service reduced.
  - The company has pioneered in innovation in the field of door to door delivery of goods. All these led to improvement in profitability of the company. The share prices are trading at life time highs. Since the ultimate objective of a commercial organisation is to maximise shareholder's wealth, the CEO of the company is extremely pleased with the affairs at the company.

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Of late, the company has witnessed high employee turnover ratio. Though the company has a formal exit interview process for the resigning employees, the inputs received from these interview is rarely considered in improving the HR practices. One of the common feedback from employees who left the company was that there is too much pressure to perform and improve customer service without adequate support of systems and processes.

Also, the truck drivers who move consignment from one city to another have been on strike thrice in the last one year demanding better pay and working conditions. These drivers are generally hired on contractual basis. They are not entitled to any retirement benefits. The drivers have been insisting that they be taken as permanent employee and are given benefits applicable to employees of the company.

The above two issues were discussed in one of the board meetings. The directors wondered if they had the right performance measurement mechanism to address the issues. The company is doing great financially but must also ensure that the employees and other stakeholders are taken care of apart from shareholders. The board is also concerned that they have too much of data and reports to look at on performance management as the current measurement is done on a monthly basis. However, the alignment of such reports to the overall strategy of the company is missing.

Required

RECOMMEND an alternative performance measurement mechanism which considers all stakeholders instead of just shareholders and employees. (STUDY MATERIAL)

Answer

Issue

Galaxy limited use Balance Scorecard to measure performance. Balance scorecard focusses on the financial, customer, business and innovation perspectives. The company has been doing great on financial parameters and customer satisfaction parameters. However, of late the company has been facing issues related to high employee turnover and dissatisfaction of the truck drivers.

The board of directors is also concerned about the volume of performance measurement data and alignment of performance measurement with the strategy of the company. An alternate performance measurement mechanism is Performance Prism.

Performance Prism

Performance Prism is considered to be a second-generation performance management framework conceptualized by Andy Neely and Chris Adams. The following are the factors which make Performance prism should replace the models like Balanced Scorecard -

- Organisations cannot afford to focus on just two stakeholder group - Investors and Customers. Other stakeholders group like employees, suppliers, government etc. should not be forgotten. This is important for sustainable growth of companies both profit oriented and non-profit oriented.
- Most of the performance measurement models do not focus on changes that could be made to the strategies and processes. The underlying assumption is that if right things are measured, the rest will fall into place automatically.
- Stakeholders expect somethings from the organisation. The organisation also must expect contribution from the stakeholders. There is a 'Quid Pro Quo' relationship between the stakeholders and organisation.

Another problem highlighted by Andy Neely and Chris Adams was that management are measuring too many things. They believe that in doing so they are controlling the organisations well. The problem with increased measurement is that the management starts micro-managing things and lose sight of the strategic direction. This negatively impacts the organisation in the longer run.

The performance Prism aims to measure performance of an organisation from five different facets listed below:
- Stakeholder Satisfaction
- Stakeholder's Contribution
- Strategies
- Processes
- Capabilities

Stakeholder Satisfaction

The first facet of prism focusses on stakeholder's satisfaction. Though balanced scorecard also focusses on stakeholder's satisfaction, it is primarily concerned with the shareholders and customers and ignores other stakeholders. This is precisely the issue at Galaxy limited where the shareholders and customers are happy with the company, other stakeholders are not.

The company must identify all stakeholders and determine relative importance of each of the stakeholders. The company can use Mendelow's matrix to identify key shareholders in terms of power and interest of stakeholders. A stakeholder group which has high power and high interest (say a trade union) must be kept satisfied. The key stakeholders for a company are:
- **Investors** - They want return on investment.
- **Customers** - They want good quality products at cheap prices.
- **Suppliers** - They want better price for products.
- **Government** - They want revenues and development.
- **Society at large** - They want employment opportunities.

Each of the stakeholders group exercise different level of power/influence on the company. The interest of each stakeholder group in the company also differs. Based on the power and interest of the stakeholders, the company must appropriately perform activities for stakeholder's satisfaction.

After identification of the stakeholders, the company must identify the requirements of each of the stakeholders group. What must the company do to ensure stakeholder satisfaction?

Galaxy limited must ensure satisfaction of the two stakeholders highlighted above. The company must take steps to improve employee satisfaction and reduce the employee turnover. The company must also address the issues related to truck drivers and involve them in a dialogue. The impact of not keeping these stakeholders group satisfied is that the company might suffer financially in the longer run.

Performance measure - Employee Turnover Ratio, Average employment duration of employees, Number of strikes by truck drivers etc.

Stakeholders Contribution

In the second facet of Performance Prism, the organisations identify the contribution required from the stakeholders. The organisations must then define ways to measure the contribution of stakeholders. This aspect is different from traditional measures where the organisations were just concerned with what they could contribute to the stakeholders.

The company would take steps to provide better service to its customers. In return the customers must contribute in terms of profits and revenues to the company. There is a 'Quid Pro Quo' relationship as described earlier.

In case of Galaxy limited, the company could improve the employee satisfaction with better pay, training

and growth opportunities. In turn, the employees must perform better to contribute to the company as a whole. Similarly, the drivers must be given better working conditions and in turn, they should contribute towards improving efficiency and on-time deliveries.

Performance Measure -Efficiency of Employees, Productivity, On Time deliveries by Truck drivers.

Strategies

In the strategies facet of the Prism, the organisation should identify those strategies which the organisation would adopt to ensure that -

– The wants and needs of the stakeholders are satisfied
– The organisation own requirements are satisfied by the stakeholders.

After the company identifies strategies, the performance measures must be put in place to confirm that the strategies are working. The various aspects to be considered appropriate communication of strategies, implementation of strategies by managers and continuous evaluation of appropriateness of strategies.

Galaxy limited might come out with a strategy of to retain employees by means of better pay and growth opportunities within the company. This strategy can be called successful if the higher pay ensures that employees turnover is reduced. As a strategy, the company can start to hire drivers on the payrolls of the company.

Performance Measure - Number of employees leaving the organisation after getting pay hike, Efficiency of deliveries after Truck drivers are put on employment of company.

Processes

After identifying the strategies, organisations need to find out if they have the correct business processes to support the strategy. The various business processes can have sub- processes. Each process will have a process owner who is responsible for functioning of the process.

The organisations must develop measures to evaluate the how well the processes are working. The management must be careful to evaluate most important processes instead of evaluating all the processes. Porter's Value Chain analysis can be used to identify and evaluate various processes in the organisation.

Galaxy limited could devise a recruitment process which results in transparency in hiring and pay of employees. The process could be owned by the Human Resources Manager. The working condition of drivers can be improved by providing structured training and working conditions.

Capabilities

Capabilities refers to the resources, practices, technology and infrastructure required for a particular process to work. The company must have right capabilities in order to support the processes. The company must identify performance measures to set how well the capabilities are being performed.

While Galaxy limited might choose to increase the salaries of employees, an important question to answer is whether the company has financial capability to do so.

Conclusion

The facets of Performance Prism are interlinked and must support each other. The company must first identify the stakeholder wants and what the company wants from those stakeholders. The required strategies for these are identified and the processes to achieve the strategy followed by identifying the capabilities to perform these processes.

Question 15

Paper Solutions Ltd. (PSL) is a paper mill producing excellent quality writing and printing paper. It is located in a small town where eucalyptus, acacia and casuarina trees grow in plenty, which are required in the paper production process. It sources its raw material from pulp-wood plantations that grow the above-mentioned trees. These plantations are located in degraded agrarian land surrounding the factory site, which was previously wasteland. Their owners are subsistence farmers, who have been encouraged to grow these trees to source raw material for the paper mill. The mill's local procurement policy has thus provided a source of livelihood for this community. Moreover, almost 40% of the staff working at the mill are from the local community. Most of the mill's labour force lives in residential areas near the factory site. Catering to the mill employees' livelihood needs like food, clothing, education etc. has given the town alternate sources of income and thus has benefited the town. The plant managers at the mill have been working on various projects in order to build a sustainable business. This includes, reducing waste during the manufacturing process, imparting knowledge to local farmers at the pulp-wood plantations to improve the quality of wood through breeding and seed improvement techniques. Operations at the mill have yielded substantial profits over the last 15 years since inception.

You are the chief accounting officer of PSL taking care of all the reporting (internal and external) needs of the company. Recently, you read about the Triple Bottom Line (TBL) reporting that many other companies are following. You feel the need to introduce TBL reporting because:

The vital role played by the mill towards the development of the town. This can be highlight ed in the TBL report. This will enhance the company's goodwill. At the same time, you feel the need for transparency of operations and balancing the need of various stakeholders involved. All this can be addressed by publishing the TBL report periodically.

The mill's operations are driven by the resources available in the environment. What the mill takes should be returned in equal if not in a higher measure. TBL reporting can help identify opportunities of giving back to the environment.

You have an appointment with the Chief Executive Officer to discuss this reporting framework. During a preliminary discussion, the CEO was sceptical of the need for additional reporting. "We are here to do business, profit should be the sole parameter for measuring our success. Shareholders are our only stakeholders. Annual reports would provide sufficient information to others who are interested in our operations."

Required

To convince the CEO, you need bring out the differences traditional accounting framework and the triple bottom line framework. Draft an e-mail on this subject that you need to send to the CEO for discussion at the meeting. **(STUDY MATERIAL)(MTP APRIL.19)**

Answer

To: CEO

From: Chief Accounting Officer Date: 22/06/20XX

Subject: Traditional Accounting Framework vs. Triple Bottom Line Framework

Please find below comprehensive study on both frameworks in context of the PSL.

Best Regards,

Chief Accounting Officer

------------------------Attachment----------------------------

Difference between traditional accounting framework and triple bottom line framework.

(i) Traditional accounting framework has a "single bottom line" that focuses on the profit that our company has made during the financial year. This is calculated by reducing costs, including the cost of capital, from revenues earned during the period, to arrive at the net profit that is available to the shareholders. This reporting framework has its focus on meeting the informational needs of mainly one category of stakeholder within the company, namely its shareholders. It satisfies the information needs of those interested in the financial aspects of business. It does not provide much insight on the social, environmental and economic implications of its operations.

Albeit, some information about its operations is available in various parts of its annual report, like the management discussion and analysis section or the chairman's letter to shareholders. However, this is generally not sufficient to satisfy the information needs of other stakeholders, some of whom can be our company's employees, customers, suppliers, communities living near our factory site or even the government. Transactions that do not directly impact our company are ignored. Recognition of an expense partly depends on utilization of assets. For example, costs incurred to operate machines used in the pulping process would include labor expense, repairs, depreciation, utility etc. These get captured as part of cost of goods manufactured in our financial reports. Therefore, assets and their related expense, that are owned and within the control of the company will be reported in the financial reports.

However, certain assets are neither owned nor controlled by the organization, yet it utilizes these resources in its operations. For example, the waste water from our company is discharged in the river nearby. The waste water contains solids, chemicals and metal compounds that were used during production. This pollutes the river water, which is the primary source of water for our town. This poses both an environmental and health risk to the citizens. Although we have taken sustainability initiatives to reduce this waste, we do not pay to clean up the river water. It is the government that undertakes the onerous task of cleaning up the river water and also bears the clean-up cost. This aspect of our company's operations and the associated cost will not get captured in our financial reports. Hence, the true cost of operations of our company is greater than the costs reported in the financial reports. Moreover, the market price that we charge our customer for our paper product does not factor this cost. Consequently, both our company and our customers who use our product end up under-pricing the cost to the environment and society.

It can be concluded that under traditional financial reporting, sustainability and our company's performance are mutually exclusive. At the same time, information about sustainability is extremely important to other stakeholders like the community living next to the factory site since it affects their lifestyle, the local government that may be incurring substantial expense to nurture back the environment or environmentalists that seek to protect the habitat of other species. It might be critical for our company. Healthy environment and society are key drivers to sustain our operations. "Can we do business in a world fraught with sickness due to pollution?"

On the other hand, triple bottom line reporting framework focuses on a more broader view of the company addressing the interests of various other stakeholders. These stakeholders could our company's employees, creditors, customers, communities near the factory site, government etc. The objective is to force ourselves to identify areas within our operations to create sustainable initiatives that would, in the long run, be beneficial to its current and future stakeholders as well as to our company itself. It focuses on

the impact of the decisions and operations of our company on the society, environment, and economy. Known as 3Ps, people, planet and profit, hence the name "triple bottom line". Triple bottom line goes beyond the financial aspects of an organization's performance. This helps stakeholders make more informed assessments of the opportunities and risks that the company faces.

(ii) Traditional accounting framework uses the reporting currency as the unit of measurement.   It   follows the accounting and reporting principles generally accepted in the country it operates.

Materiality under this framework, is measured in monetary terms, that could impact the decisions of a rational investor. On the other hand, there is no uniform standard or measure for the TBL framework. Measurement of an aspect, therefore its materiality, could either be financial or non-financial. Organizations could follow the metrics suggested in the Global Reporting Initiative (GRI) framework. In India, efforts are underway to align the GRI with the Business Responsibility Report (BRR) mandated by SEBI for some of the public companies. The TBL report focuses on both the positive and negative impact of the organization's performance on the society, environment and economy. TBL reporting may be (i) core reporting, report selective metrics or (ii) comprehensive reporting, a detailed report based on the GRI standards.

In summary, while financial reports provide information about the profitability of our company, TBL enhances the information available to various stakeholders who may hold different perspectives of the company's business operations. TBL will work well to supplement information in the financial statements. Overall business strategy should be linked to the TBL reporting to work towards a sustainable future. Our company has already been working sustainability initiatives. Waste generation is being tackled by our plant managers. Metrics for this report has to come from various departments. Awareness about sustainability and its impact may open up opportunities that are currently being overlooked. Our company has been a lifeline for this town for the past 15 years. Why not use the TBL to highlight these positive aspects and garner goodwill for our company? TBL reporting need not remain another administrative task requiring just data gathering. It might vitalize our company to achieve greater heights of success.

Question 16

The town of Silver Sands is located along the coast of the Caribbean Sea. Known for its beautiful coastline and pleasant weather, the town attracts a lot of tourists from all around the world. The town has two beaches that are maintained by the local government and can   be used by the general public. In order to preserve the natural ecosystem, other beaches on the coastline are not accessible to the general public. Tourism is the main source of livelihood for its residents. Consequently, cleanliness of beaches is of paramount importance in order to sustain and develop this industry.

The local government has recently employed a contractor to clean up the beaches using beach cleaning machines. The contractor has been selected through a competitive tendering / bidding process. The contractor uses sand cleaning machines that are pulled by tractors. Sand is scooped onto a conveyor or screening belt. It is either raked through (combed using prongs) or sifted through (filtered), in order to separate the waste from the sand. The cleaned sand is left behind on the beach while the waste is removed. Majority of the litter comprises of plastic waste (bags, bottles etc.) while some portion also includes sea weed, glass, aluminum cans, paper, timber, and cardboard. A detailed log is kept by the contractor about the stretch of beach that has been cleaned, time taken for the clean-up, number of tractors used etc. This log is also checked and signed by a local government official. This record is used to proces s payments at the end of the month.

In addition to contracting with the vendor to clean machines, the local government has also placed bins at various locations on the beach for the public to dispose their waste. The town's municipality

workers clean these bins every morning. Again, detailed logs of the man power and other resources employed is kept by the responsible department. In addition, the government has opened a mobile messaging system, whereby the public can message the government department if they find litter

anywhere in the beach. Depending on whether it is from overflowing bins or buried debris in the sand, the municipality workers or the contractor will take action to clear it within 24 hours. A detailed log of these operations is also maintained. Patrons can also suggest measures for improving cleanliness on the beaches.

Due to its importance to the economy, the local government has allotted substantial budget for these operations. At the same time, it is essential to know if this is sufficient for the purpose of keeping the beaches clean. Therefore, the government wants to assess whether the town is getting "good value for money" from this expenditure. The "value for money" concept can be looked at from three perspectives: (i) economy, (ii) efficiency and (iii) effectiveness. The Internal Audit (IA) department that has been requested to undertake this study, has requested for guidelines on whether the audit should focus on economy and efficiency of the beach cleaning operations or on effectiveness of the same. Economy and efficiency audit assess whether the same level of service can be procured at lower cost or resources while effectiveness audit assess whether better service can be procured at same cost.

Depending on the outcome of the audits, if required, policy decisions like requesting for additional funding from the state government, alternate policy measures like levying penalty for littering etc. can be taken.

Required

Prepare a letter addressed to the IA department.

(i)   RECOMMEND guidelines to assess economy and efficiency of beach cleaning operations.

(ii)   RECOMMEND guidelines to assess effectiveness of beach cleaning operations.

(iii)   IDENTIFY challenges involved in assessment of effectiveness?

(iv)   RECOMMEND general guidelines, how the audit team may conclude the audit based on the combined outcomes of economy, efficiency, and effectiveness?

Answer (STUDY MATERIAL) (RTP NOV.18) (RTP MAY.19)(MTP OCT.19)

Date 30- July -2018

Dear Sirs,

Re: The economy, efficiency and effectiveness of beach cleaning activities

(i)   Economy and efficiency audit of an operation focuses on the consumption of resources and the output achieved. Economy assesses the financial aspects of the activity i.e. are the objectives of the activity being achieved at reasonable cost? Efficiency assesses the volume of input consumed to derive the desired output i.e. are the resources and funds being consumed to get maximum output?

To look at **Economy of Operations**, cleaning expenses need to be bifurcated into payments made to the contractor and the expenses of emptying waste from bins. Any further subcategories of these expenses, like labour, material, disposal van expenses etc. also need to be collated from the accounting or cost records. These then have to be compared to the budgets that were approved by the government of Silver Sands. The competitive tendering process can be reviewed to ensure that the contractor getting the order is offering the required quality of service at the lowest price. If the quality of cleaning has been achieved, by staying within budget, the operatio*n is economical. However, if the actuals exceed the budget, the government has to compare them with cost of similar cleaning activities carried by neighbouring towns.

On comparison, if Silver Sands operations are expensive compared to other towns, it indicates that not only are the operations uneconomical they may not be efficient either.

Efficiency of Operations can be determined by checking the log records maintained for beach cleaning by the contractor and municipality workers. These would have detailed of activities carried out and the resources utilized for each of them. For each of these services (beach cleaning and emptying out bins), the cost drivers can be identified and certain metrics can be developed for analysis. For example, the cost of running the tractors can be divided by the total number of tractors operated to get the cost of operations per tractor or alternatively, by the kilometres of beach cleaned to arrive at a tractor-kilometre rate. While analysing these activities, certain operational considerations have to be given. For example, certain stretches of the beaches may take more time or resources to clean due to issues like rocks or soft sand. Therefore, if resources for operations disproportionate for certain parts of the beaches, the cost of maintaining those stretches need to be worked out. Data to get this information will depend on the extent of detailed maintained i n the logs. This information has to be tracked over some period of time in order to understand trends in operations and related expenses.

The data collected from the mobile messaging system should also be investigated. How often and in what stretches of the beach are complaints frequent or maximum? Reasons for these lapses need to be taken from the contractor (for beach cleaning operation) and the concerned department (for emptying bins) in order to find out whether resources are being employed properly.

On this basis, deviations and exceptions should be investigated. The local government can then decide if there can be alternate sites along the coastline that may be more economical and efficient to operate.

(ii) An audit about Effectiveness of Operations would focus how the actual cleanliness of beaches compares with the desired level as laid out in the policy initiative. To assess whether performance has been met, clear guidelines and metrics have to be defined during policy implementation.

To begin with, it should be clear as to what constitutes litter. From an operational angle, it would be difficult to clean out every bit of paper lying on the beach. However, it is possible to pick up every soft drink aluminum can. Hence, the government authorities must be clear on what constitutes litter? Which are the refuse that must be cleared within exception (example food refuse, animal droppings, glass bottles, tin cans, trash bins etc.) and tolerance level for certain other types of litter (e.g. Paper, seawee d etc.) that may get left behind even after cleaning. Quantity of waste collected would be the indicator to make the above assessment.

Certain other parameters like safety standards can also be defined. Safety problems could be cuts from sharp objects like glass, incidents of vector borne diseases in the area or health problems from polluted sea water. Assessment has to be made whether these standards have been met.

For this, the primary source of information about cleanliness would be feedback from the beach patrons. These could be in the form of complaints received directly or those through the mobile messaging system would provide data to work out the metrics. This would be an indicator of "customer satisfaction". Other inputs could also be the suggestions given by the patrons about ways to improve cleanliness on the beach.

Observation by making surprise visits to inspect the beaches immediately after the cleaning operations would also provide sufficient evidence about the effectiveness of operations .

(iii) Challenges Involved in assessment of effectiveness would be:

(a) Defining standards about what constitutes litter and acceptable level of cleanliness? These are subjective guidelines, the perception of which may differ from person to person.

(b) Beach patrons also play an important role in making this initiative effective. There has to be a conscious civic sense of duty not to litter, failing which this initiative will most likely be ineffective.

Therefore, while measuring performance for effectiveness, collection of more litter does not necessarily indicate effective operations . More litter requires more cleaning and more resources, therefore is actually not a positive indicator of effectiveness. On the contrary, in the long run, lesser litter collected to maintain desired level of cleanliness would be a good indicator of effectiveness.

(iv) The outcome of the audits can indicate achievement any or none of the three parameters of economy, efficiency and effectiveness of the beach cleaning operation. To form an **integrated conclusion** based on the different outcomes of individual audits, the audit team may consider the following guidelines:

a. Has the objective of the cleaning operation been achieved as per the guidelines in the relevant policy? i.e. have the operations been effective?

b. If the answer to (a) is yes, are the expenses within budget. If so, then the operations are economical and efficient. Given that the operations have been effective at the same time economy and efficiency have been achieved, the team can conclude that the cleaning operations policy has been a success.

   A cost-over run can also be justified if the operations have been effective. In that case, the audit team has to conclude whether all expenses incurred are indeed justified and that the resources have been put to the best possible use. If not, can the operations be made more economical or efficient?

c. If the answer to (a) is no, the operation has not been effective, then is the difference from the target marginal or huge? If the operations have not been entirely effective, but only by a marginal gap say 95% success, then analysis of expenses can be made similar to the point (b) mentioned above. However, if the operations have been ineffective to a larger extent, then the cleaning drive initiative has been ineffective. The government has to look at alternate solutions of tackling the problem. These could include imposing heavy penalty for littering, requesting for more funding from the state government to employ better resources etc.

Therefore, it can be seen that achievement of one objective does not automatically lead to achievement of other objectives. A holistic approach would be needed to draw conclusions about the performance of the cleaning operations.

Should you have any further queries, please do not hesitate to ask.

Yours Faithfully Management Accountant

Question 17

Cure Hospital is running under private-public-partnership (PPP) model - providing treatment for non-communicable diseases. ABCO Hospitals Limited is the private partner which runs a chain of hospitals on profit basis in major cities in India. The public partner is the State Government. Cure Hospital is a "not- for-profit" hospital.

Private partner is to invest in Upgrading and equipping the facility and responsible for operational management and service delivery. Government to provide physical space and other infrastructure in "as is where is" condition, provide support facilities and hospital amenities. Private partner assumes the entire responsibility, for a full range of investment operation and maintenance functions. Private partner has the authority to make daily management decisions.

The hospital is funded to a great extent by the State Government and a fixed level of funding is received from the government each year out of the State budgetary allocation. It is up to the hospital to allocate this fund to different areas such as doctors' and other staff salaries, medicines and all other costs required to run a hospital.

Cure Hospital's objectives are:

- to give prompt access to high quality medical treatment for patients.
- to provide free treatment to poor patients in line with government policy of inclusive development.
- to provide value for money for the taxpayer-measured by the 3 Es framework of Economy, Efficiency and Effectiveness.
- to contribute to medical science by developing innovative ways to deliver treatment to patients.

Except select surgeries, all services are free for poor patients that are below poverty line (BPL) card holders. 40% beds are reserved for poor patients. Free out patient department (OPD) services to poor. CT Scan and MRI diagnostics are free for poor patients, subsidised rates for others. Cure Hospital also runs a generic medicine shop inside the hospital premises which sells medicines to all patients at discount ranging from 40% to 56% - the only shop of this kind in the city.

WHO has agreed to provide financial and technical support to the neonatal care unit. The hospital enabled it to obtain five accreditation certificates from various leading authorities on different aspects of hospital management.

Feedback is taken from each in-patient about the quality of service provided by the hospital and the satisfaction level is taken in 1 to 10 point scale. 1 being the least satisfied and 10 represents totally satisfied.

In a recent meeting of the managing committee of the hospital, discussions were held about inadequate performance measurement systems in place to assess whether the hospital is achieving its objectives and that insufficient attention is given to the importance of non-financial performance indicators.

A four member team consisting of a performance management expert and three senior doctors was created to give their advice in these aspects.

The four member team met with doctors, staff and other stakeholders at length and breadth. Some of the conversations were as below:

Doctor A: I think the hospital always deliver value for money. We have always achieved our total financial budgets.

Doctor B: We work here much longer hours than doctors in other hospitals, often without being paid for working overtime.

Doctor C: There is not enough government and private partner funding to recruit more doctors and paramedic staff.

Doctor D: Number of out-patients has increased considerably. Earlier an out-patient had to wait for an average period of 2 hours 20 minutes and now the same has increased to 3 hours.

Senior Doctor K: I do not know how much time we spend developing innovative ways to deliver treatment to patients though, as most of the performance data we doctors receive relates to financial targets.

In-patient H: Incompetent paramedic staff, poor quality of food and bed linen. Staff M:

Management undermines our role in running the hospital.

Recent performance data of the hospital vis-a-vis national average are as follows:

	Cure Hospital	National average of other PPP run hospitals
Number of doctors	80	76
Average doctors' salaries per month including overtime	₹ 1,20,000	₹ 1,60,000
Average doctors' salaries including overtime as per budget	₹ 1,20,000	₹ 1,25 000
Number of in-patients treated	8,360	6,369
Average satisfaction rating of in- patients	6	9
Number of patients readmitted for treatment of the same ailment within short period of time after discharge from the hospital	627	128
Average staff satisfaction rating (0% represents totally dissatisfied and 100% represents totally satisfied)	16%	86%
Number of out-patients treated	76,212	63,318

Required

(a) EXPLAIN why non-financial performance indicators are particularly important to measure the performance of "not-for-profit" organisations such as Cure Hospitals.

(b) EVALUATE whether Cure Hospital is delivering value for money for each of the components of the value for money framework.

(c) The CEO of the hospital intends to introduce a nominal fee for out-patient treatment given to poor patients and remove subsidised rate of CT Scan and MRI diagnostic for other patients in order to achieve its objectives in a better way. EVALUATE the proposal of the CEO.(PYQ NOV.19)

Answer

(a) Cure Hospital has been formed in a public-private partnership to provide quality healthcare to the public, with focus on the poorer sections of the society. Healthcare service is provided for free, except for select surgeries. A sufficient portion of its capacity (hospital beds) is reserved entirely for Below Poverty Line (BPL) patients. Generic medicines are provided at a discounted price, to make them more affordable. World Health Organization (WHO) has decided to fund its neo-natal unit. With all this information, it can be summarized that Cure Hospital has been formed "not-for-profit" objective, attending to a social cause of providing quality healthcare to the economically poorer sections of the society.

Cure Hospital has been formed in partnership with ABCO Hospitals Ltd. and the State Government. The State Government has provided physical space, infrastructure, other support facilities and hospital amenities. ABCO Hospital, the private partner has the entire responsibility of taking care of allocation of funds, investment, operations, and maintenance functions. Daily management decisions are also handled by the private partner.

Since the Government has provided substantial funding and facilities to Cure Hospital, it owes a fiduciary responsibility of reporting the financial measures to its stakeholders, the government in

this case. At the same time, financial measures alone are not enough to assess the performance of not-for-profit organizations. Due to its objective of public service, measurement of appropriate non-financial metrics are equally important. The reasons are:

(i) **Benefits cannot be quantified:** Cure Hospital essentially provides public healthcare service to the economically weaker sections of the society. Due to political, legal, and social reasons, not-for-profit organizations like Cure Hospital cannot be shut down merely for not being economically / financially viable. Therefore, financial measures are less relevant. Due to its non-financial objective, appropriate non-financial measures become more important. For example, the benefits of saving lives cannot be quantified in financial terms.

(ii) **Benefits may accrue over long term:** The expenditure incurred in one year may yield benefits over several years. For example, the investment in an Intensive Care Unit (ICU) facility may accrue of multiple years. Neonatal care unit have been given financial and technical support from WHO which will give long term benefits to hospital.

(iii) **Measurement of utilization of funds and expenditure:** In the case of Cure Hospitals, many hospital services are free, allocation of capacity is aimed at providing free service to the BPL section of the society, medicines are provided at discounted rates. Therefore, Cure Hospital does not have a substantial revenue stream to earn from its patients. It gets a fixed budget allocation from the State Government, while ADCO Hospital allocates these funds for various investments and expenditures. The assessment whether the spending have been appropriate is a key challenge. Defining cost per unit would be subjective since it could be cost of patients arriving at the hospital or cost of patients successfully treated at the hospital. Either figure could be tweaked to make it seem that the objectives are being met. The management may resort to rampant spending simply to meet the expenditure targets. Therefore, non-financial measure need to be put in place help stakeholders scrutinize whether the objectives for which funds have been given are being met.

(iv) **Multiple objectives:** Not-for-profit organizations have multiple objectives. It may be unclear which are the most important. Cure Hospital aims at providing high quality treatment to its patients while also developing innovative ways to deliver treatment to its patients. Both objectives are equally important and inter-related. Non-financial measures provide better information about how each of these objectives have been met.

The benefits of organizations like Cure Hospital are non-financial in nature. Except for providing fiduciary information to the stakeholders, all other objectives of Cure Hospital can be measure only using non-financial measures.

(b) Value for money for Cure Hospital would comprise of the 3Es: Economy, Efficiency and Effectiveness.

(i) Economy: Has the desired output (and quality of service) been achieved at the lowest cost?
     The medical resource at Cure Hospital in terms of doctors is 80, higher than the national average of 76 at other centers. Doctor's salaries would be a significant expenditure for Cure Hospital. **The average doctor's salary at Cure Hospital (including overtime) is ₹120,000 per month, this is within the budget figure as pointed out by Doctor A. The salary is lower than the national average at other PPP run hospitals, where doctors earn ₹160,000 per month.** Therefore, economy of money is being achieved at Cure Hospital.

     The relatively lower levels of salary could be due to differences in levels of experience or that the doctors at Cure Hospital work overtime without getting paid (as pointed out by Doctor B). **This**

may be one of the reasons why staff satisfaction is only 16% compared to 86% in other centers.

(ii)   Efficiency: Has maximum output been achieved with the minimum resources?

Treating patients is the key objective of Cure Hospitals, while doctors are the main resource to deliver it. The number of patients treated per year is a good measure of efficiency achieved.

Cure Hospital treats 84,572 patients (in house patient 8,360 + outpatient 76,212) while the national average at other centers is only 69,687 (in house patient 6,369 + outpatient 63,318). Cure Hospital has 80 doctors as compared to 76 national average. Therefore, each doctor at Cure Hospital **treats 1,057 patients (84,572 patients/ 80 doctors) as compared to 917 patients** (69,687 patients / 67 doctors) at other centers. Resource utilization of its pool of doctors is higher in Cure Hospital.

Doctor C mentions that there is not enough funding to hire more doctors and para- medic staff. Therefore, there is a constraint on the limited resources of doctors and support staff. This might be the reason, why each doctor at Cure Hospital works longer than colleagues at other centers.

Therefore, while efficiency in terms of number of patients treated by each doctor is high, there are other hidden costs that need to be taken into account. **Few such costs could be low employee morale, higher waiting time of patients to receive treatment.** This impacts the effectiveness of service provided.

(iii)   Effectiveness: Has Cure Hospital achieved its mission or objective?

Cure Hospital has the objective of providing high quality medical service to its patients. Better quality of treatment would ensure that re-admission for treatment of the same ailment within a short span of time would be minimal. **Number of such re- admitted patients in much higher at 627 at Cure Hospital as compared to 128 at other centers.** Assuming all such re- admissions to be in-house patients, this return of patients for medical care for the same ailment within a short span of time is **7.50%** compared to the national average of **2.01%**.

Prompt medical treatment can also be questioned since the **waiting time of** patients to receive treatment has increased from 2 hours 20 minutes to 3 hours.

Senior Doctor K points out the time spent on delivering innovative care to patients may be limited due to financial constraints and overwork staff.

All this would have resulted in dissatisfaction among patients, whose **survey indicates a score of 6 against a national average of 9.** This shows that objective of Cure Hospital is not being met effectively.

To summarize, Cure Hospital is achieving economy by maintaining lower salaries for doctors. Out-reach to patients is also high as compared to national average. However, due to limited availability of resources, doctors and staff are **overworked**. While it does well on the efficiency aspect, it comes with a hidden cost in terms of **dissatisfaction among patients and employees and low quality of medical care.** Therefore, medical treatment is not effective, which is an important aspect in the value for money framework.

(c)   Proposal to introduce nominal fee for out-patient treatment given to poor people and remove subsidized rate of CT scan and MRI for other patients.

Cure Hospital is a not-for-profit organization that aims at providing quality health care to the economically weaker sections of the society. It gets its primary funding from the State Government. It does not generate and is not aimed at generating substantial revenue from its patients. The CEO has proposed to introduce nominal fee for out-patient treatment given to poor people and remove subsidized rate of CT scan and MRI for other patients. However, this would not help Cure Hospital achieve its objective.

The given problem seems to suggest severe constraint in the resources available to meet its objectives thus impacting effectiveness of treatment. Each doctor treats 1,057 patients in a month as compared to the national average of 917 in a month. Number of patients, especially the out-patients is much more than national average. **Overworked doctors combined with limited staff resources is the main hurdle that Cure Hospital faces in effectively achieving its objectives.**

Cure Hospital is a not-for-profit organization. **Therefore, generating nominal fees to achieve its objectives would not help its purpose. Instead, it can apply for higher budget allocation from the government.** This can help it procure good quality resources such as experienced doctors by paying them higher salaries including overtime. Better qualified doctors can help provide not just better treatment but also innovative ways of treatment to patients. Improved / enhanced facilities could reduce the waiting time for medical care, enabling prompt medical service.

Improved service would result in better treatment, lowering the cases for re- admissions for same ailment within a short span of time. This improves the effectiveness of medical care provided at Cure Hospital. Better service would improve patient satisfaction. Quality medical care would provide a better case for Cure Hospital to sustain its operations in the long- run. The State Government may also more favorably consider any justifiable future budgetary increments.

Overall, the management of the hospital seems to be indifferent to the opinions and needs of the staff. **The CEO's decision has a very short term outlook that does not co-relate with the organization's objectives.** By trying to off-set a limited revenue stream to achieve its objectives shows that the management's style of working needs improvement.

Question 18

Spicy is one of the top Engineering coaching institute, it operates a chain of 157 centres across the country of Mayaland. Spicy is equipped with the team of top most faculties for preparation of JEE who are known for giving best results year after year. Students willing to join Spicy have to appear for admission test/(s). These tests help the students in understanding their potential and also provide them with the opportunity for scholarships that help them rewards academically and monetarily. In addition, Spicy provides comfortable class rooms, libraries, and ambience for overall

development of students. Spicy delivers quality coaching for JEE by providing innovative ways and therefore prepares students for all challenges. Spicy prides itself on their results and level of educational service it offers to its students.

It has previously been successful in attracting students across the nation. However, in recent years, the number of enrolment of students has started to decline as a result of introduction of online platform. Several recent surveys have painted a disappointing picture for market conditions in 2020. A survey by the "My Education Outlook" over the month to 31st December found that only one in five respondents believes their business will be better off in 2020 compared with 2019.

Spicy has a policy to set the standard fees based on the location of a particular coaching centre. It

also takes into account fees charged by the competitors. However, the institute's managers have the right to offer discount to underprivileged students or scholarship to merit students, and to reduce fees structure when student hiring ratio (SHR) in their class rooms are expected to be low. The average standard fees per student, across all the centers of institute, was M$ 15,000 in 2019, compared to M$12,000 in 2018.

Spicy also generates revenue from the additional services available to students, such as selling books, providing test series etc. The series of periodic tests are identical to the pattern of various competitive engineering examinations and give sufficient practice to the aspirants for the same. Every test attempted by the students gives them a clear idea of their understanding of the concept, timeliness, strengths, weaknesses, and ranking amongst the aspirants across Mayaland.

Summary from Spicy's Management Accounts

	Year ended 31 Dec. 2019 M$'000	Year ended 31 Dec. 2018 M$'000
Gross Fees	1,11,980	1,05,977
Less: Fees Discount/Scholarship	(18,783)	(13,900)
Net Fees	93,197	92,077
Add: Other Revenue (selling books, tests etc.)	27,250	25,895
Total Revenue	120,447	117,972
Less: Operating Costs	(97,685)	(93,758)
Operating Profit	22,762	24,214

Other Performance Information

	Year ended 31 Dec. 2019	Year ended 31 Dec. 2018
Capital Employed	M$ 3,77,50,000	M$ 3,77,10,000
Average SHR	78%	73%
Average SSR (Students Satisfaction Rating)	8	9.5

At the end of the course, or at the end of the unit within the course, students are asked to complete a questionnaire rating based on a scale of 1–10 where '10' represents 'Excellent' with various aspects of course, for example, the knowledge level of faculty, the quality of support material, and the approachability of faculty to ask them questions.

Two issues are becoming increasingly frequent in the students' comments alongside the scores:

 Students complaint that faculties in the institute were full of attitude not taking the doubts of students, instead of encouraging students to solve their doubts in the class, they insulted the students who raise their doubt during class. So, their standard of education has not been as good as in previous sessions.

 Students in classes need special individual attention, there is need of smart classes, doubt solving sessions etc. to improve the result of students.

 Spicy had planned to start a remedial programme for average students for all the centres at the beginning of 2018. However, this programme has been put on hold to reduce expenditure.

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Required

ANALYZE Spicy's performance for the year ended 31 December 2019. (RTP MAY.20)

Answer

Performance of Spice for the year ended 31 March 2019 Revenue

Gross Fees of Spicy has increased by 5.66% in 2019, which reflects the higher SHR (78% vs. 73%) and the increase in average standard fees per student (M$ 15,000 vs. M$ 12,000 per student). However, this information is not enough to conclude how well institute have performed in the year to 2019.

Net Fees has only increased 1.22%, this reflects the significant 35.13% increase in the discounts or scholarships offered.

It is observed that even though % change in the SHR is +6.85% (from the budgeted level of 73% to 78%), revenue from fees, net of discount/ scholarship, only increased by 1.22%. This means that average fees collection per student in 2019 was lower than in 2018, despite the higher average standard rate (M$15,000 vs M$12,000).

It is also important to mention that in tough market conditions, managers have managed SHR, higher than budgeted figure by offering/ awarding the discount or scholarship.

With the increase in SHR, one of the best possible benefit is that, even if students are paying less fees, they will generate additional revenue from sale of books and test series. For example, in the given case additional revenue has increased by approximately 5.23% from M$ 25,895 to M$27,250.

In total, revenue has increased 2.1% in 2019 v 2018.

Overall, given the tough market conditions, any increase in revenues can be viewed as positive, VK however, the revenue achieved from per student should be greater than the variable cost of providing it.

Operating Profit

Notwithstanding the increase in revenue, operating profits have fallen by M$ 14,52,000 (6.00%) between 2019 and 2018, due to a sizeable increase in operating costs. There is no detail about Spicy's operating costs, for example, the split between fixed and variable costs. However, in tough market conditions, cost control is likely to be very important. As such, increase in operating costs M$ 39,27,000 (4.19%) between 2018 and 2019 is potentially a cause for concern and the reasons for the increase should be investigated. However, when looking to reduce costs, it will be very important to do so in a way which does not compromise student's satisfaction. More generally, Spicy needs to avoid cutting expenditure in areas which will have a detrimental impact on student satisfaction ratings, for example, not providing enough time by faculty to students for doubt solving.

The increase in costs has also led to a fall in operating profit margin. The margin falls from 18.36% to 16.35%. This reduced profitability is also reflected in the institute's return on capital employed which has fallen slightly from 64.21% to 60.30%. This suggests that the value which Spicy is generating from its assets is falling.

Students Satisfaction Rate (SSR)

Although the reduction in profitability should be a concern for Spicy, the reduction in student satisfaction rate should potentially be seen as a greater cause for concern. The rating suggests that, in the space of one year, it has lost 1.5 points in the scale of 1-10, being the top Engineering Coaching Institute, Spicy cannot afford to lose the points.

Spicy Institute pride itself on their results and level of educational service it offers to its students. Both factors are important considerations for students when considering whether or not to join Spicy Institute.

Therefore, Spicy needs to ensure that student satisfaction levels are maintained as high as possible and it is also important to know that how its students feel about the services it offers.

Moreover, the decision to defer the remedial programme is likely to have a detrimental impact on the future performance.

CHAPTER-9 Divisional Transfer Pricing

Section A – Practical Questions

Question 1

A manufacturer of cornflakes has two divisions, one producing the cornflakes and another packaging division that manufactures cartons. The production division purchases all the cartons from the packaging division. Cost of cartons from outside vendors would be:

Number of Cartons	(₹)
5,000	77,000
8,000	95,000

Production cost incurred by the packaging division for similar volume of cartons:

Number of Cartons	(₹)
5,000	75,000
8,000	80,000

The production and sale of the final product, cornflakes are as below:

Volume (Number of cartons of Cornflakes sold)	Total Cost (Excluding Cost of Cartons) ₹	Sales Value (Packed in Cartons) ₹
5,000	120,000	200,000
8,000	180,000	300,000

An appropriate transfer pricing policy is being framed. As the corporate management accountant, Calculate-

(i) The transfer pricing based on (1) shared profit relative to cost method and (2) market method. Show the profitability of each division under both methods.

(ii) Discuss the effect of both methods on the profitability of the divisions. (Study Material)

Answer

(i) Calculation of Profitability under both methods

Method 1: Shared Profit Relative to Cost Method

Methodology: Calculate the profit for both volume of cartons 5,000 units and 8,000 units. Information about sales and costs are given in the problem and tabulated as below.

Statement of Profitability - Shared Profit Relative to Cost Method

Volume (Number of Cartons)		5,000	8,000
		Figures in ₹	
Sales	...(a)	2,00,000	3,00,000
Less: Costs			
Production Division		1,20,000	1,80,000
Packaging Division		75,000	80,000
Total Costs	...(b)	1,95,000	2,60,000
Profit	...(a) - (b)	5,000	40,000

The next step is to distribute this profit between the divisions based on the cost incurred. This is done for both levels of production.

Distribution of Profit Based on Relative Cost

Volume (Number of Cartons)	5,000	8,000
	Figures in ₹	
Share of Production Division		
(5,000 × 1,20,000 / 1,95,000)	3,077	×××
(40,000 × 1,80,000 / 2,60,000)	×××	27,692
Share of Packaging Division		
(5,000 × 75,000 / 1,95,000)	1,923	×××
(40,000 × 80,000 / 2,60,000)	×××	12,308
Total Profit	**5,000**	**40,000**

The last step is to calculate transfer price of cartons that packing division will charge the production division = manufacturing cost of cartons + profit that is allocable to it under the shared profit method (refer workings above).

Transfer Prices of Cartons under the Shared Profit Relative to Cost Method

Volume (Number of Cartons)	5,000	8,000
	Figures in ₹	
Manufacturing Cost of Cartons	75,000	80,000
Profit Allocated as per working above	1,923	12,308
Transfer Price	76,923	92,308
Transfer Price p.u.	15.38	11.54

Method 2: Market Price Method

Methodology: Transfer price for the cartons is already given. It is the external market price of the cartons. This is viewed as an unbiased price, that the packaging division will charge the production division. The profitability statement will be as below:

Statement of Profitability - Market Price Method

Volume (Number of Cartons)	5,000	8,000
	Figures in ₹	
Packaging Division		
Market Price (transfer price basis)	77,000	95,000
Less: Manufacturing Cost	75,000	80,000
Profit of Packaging Division ...(a)	2,000	15,000
Production Division		
Sales	2,00,000	3,00,000
Less:		
Transfer-in Price	77,000	95,000
Product Cost	1,20,000	1,80,000
Profit of Production Division ...(b)	3,000	25,000
Total Company Profit ...(a+b)	5,000	40,000

Transfer price per unit will be based on the external market price given in the problem.

Transfer Prices of Cartons under Market Price Method

Volume (number of cartons)	5,000	8,000
Market Price of Cartons	77,000	95,000
Transfer Price per carton p.u. based on Market Price = Market Price/ Number of Carton	15.40	11.88

(ii) Analysis of Results

Overall company profits are the same under both methods. It is the distribution between the divisions that is different, depending on the method followed. Consequently, the transfer price per unit that the packaging division charges the production division will also be different.

When production volume is 5,000 cartons, transfer price per unit is approximately the same under both methods ₹15.38 and ₹15.40 shared profit and market price method respectively. This is because the cost of production for this volume is approximately the same as the outside procurement price. Similarly, when production volume is 8,000 cartons, transfer price per unit under the shared profit method has a slightly lower transfer price because lower profit has been allocated to packaging department.

When the volume increases to 8,000 cartons, in-house production has benefitted from economies of scale. The cost of manufacturing one carton is ₹15 p.u. for 5,000 carton (₹75,000/ 5,000 cartons) while it reduces to ₹10 p.u. when volume increases to 8,000 cartons (₹80,000 / 8,000 cartons). Cost reduction is almost 33% due to economies of scale.

On the other hand, at 8,000 carton volume, the production department has not benefitted much from economies of scale. Cost of manufacturing a carton of cornflakes excluding packing cost is ₹24 for 5,000 cartons (₹120,000/5,000 cartons) and is marginally lower at ₹22.50 p.u. for 8,000 cartons (₹180,000/8000 units). Cost reduction is only 6% due to economies of scale.

Therefore, when production volume is 8,000 units, out of the total production cost of ₹260,000, major portion of the cost pertains to production department. Consequently, when profit gets allocated based on cost, more profit has been allocated to the production division and lesser percentage to packaging department. Hence the transfer price base is lower at ₹92,308 under the shared profit method as compared to the market price method which is at ₹95,000.

Opportunity Cost Method

Question 3

Division A transfers goods to Division B. Division A incurs marginal cost of ₹10 p.u. and Division B incurs marginal cost of ₹5 p.u to process it further. Division B sells finished product externally at ₹20 p.u.
To promote goal congruence:

(i)   What should be the minimum transfer price that Division A should charge? Assume there is no external market for this intermediate product.

(ii)   If Division B can buy the intermediate part externally for (i) ₹14 p.u. (ii) ₹18 p.u what should be the maximum price that Division A can charge to remain competitive with the external vendor?

(iii) Assume that intermediate goods of Division A can be sold externally at ₹12 p.u. How does opportunity cost affect the transfer price range when Division B can procure the part externally at ₹14 p.u.? (Study Material)

Answer

Tabulating the information

Sr. No.	Particulars	Division A	Division B	
1	Transfer-in Price	?	?	Net Marginal Revenue = ₹20 (MR) - ₹5 (MC) = ₹15 p.u. Higher Transfer Price will result in loss
2	Marginal Cost	-10	-5	
3 = 1+2	Total Cost	-10	-5	
4	Selling Price		20	

Min. Recovery needed for Div. A

Range of transfer price that promotes goal congruence:

(i)   Minimum Transfer Price

= Marginal Cost p.u. to Division A

= ₹10 p.u.

Note there is no opportunity cost here. Hence, the minimum that Division A will wish to recover will be the marginal cost (or variable cost) p.u. that it incurs, which here is ₹10p.u.

(ii)   Calculation of maximum transfer price when Division B can procure extern ally. Maximum Transfer Price

=   Lower of Net Marginal Revenue and the External Buy-in Price

Net Marginal Revenue

=   Marginal Revenue – Marginal Cost to Division B

=   ₹20 - ₹5

=   ₹15 p.u.

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This is the maximum price that Division B will pay for the intermediate good, whether it purchases from Division A or procures from outside. Any higher is a loss to Division B.

Case 1: When procurement price is ₹14 p.u. Maximum Transfer Price

= Lower of Net Marginal Revenue ₹15, the External Buy-in Price ₹14

Maximum transfer price in this case will be external buy-in price ₹14 p.u. While, Division B can afford to pay upto ₹15 p.u. to break even, it will prefer to buy at a lower rate from the external vendor as that would yield a profit of ₹1 p.u. (Selling price ₹20 – MC ₹5 – purchase price ₹14). Hence, for Division A to remain competitive, it can charge no more than ₹14p.u. Since MC of Division A is only ₹10 p.u. with no opportunity cost, a maximum price of ₹14 p.u. should be acceptable to Division A as well.

To conclude transfer price range between ₹10 and ₹14p.u. will promote goal congruence.

Case 2: When procurement price is ₹18 p.u. Maximum Transfer Price

= Lower of Net Marginal Revenue ₹15, the External Buy-in Price ₹18

Maximum transfer price in this case will be the net marginal revenue ₹15 p.u. External buy-in price of ₹18 p.u. will result in losses for Division B. Hence, Division A here can charge upto ₹15 per unit. With no other opportunity cost, Division A can have a reasonable margin, while Division B can procure the intermediate product at a price lower than market.

To conclude transfer price range between ₹10 and ₹15 p.u. will promote goal congruence.

(iii)   Range when opportunity costs exists for Division A and Division B has buy-in price

₹14p.u. When Division A can sell externally at ₹12 p.u. Minimum Transfer Price

= Marginal Cost per unit + Opportunity Cost per unit. Opportunity Cost per unit

= External Sale Price – Marginal Cost

= ₹12 - ₹10

  = ₹2, this represents the contribution per unit when external sales are made by Division A.

For the internal transfer to Division B to be equally profitable, Division A will demand a minimum price of ₹12 = marginal cost ₹10 + opportunity cost ₹2.

As explained in sub-question (ii), Case 1, Division B will be ready to pay maximum ₹14 p.u. which is the buy-in price. Hence, subject to negotiating skills of manager of Division B, the transfer price can be set between ₹12 p.u. - ₹14 p.u. The ideal transfer price would be ₹12p.u. Division A is able to achieve profitability at par with its external sales, while Division B can procure its material at a much lower cost.

Question 4

Centurion Co. operates a Pulp Division that manufactures Wood Pulp for use in production of various paper goods. The following information are available:

₹	
Selling Price	210
Less: Variable Expenses	126
Contribution	84
Less: Fixed Expenses (based on a capacity of 1,00,000 kgs per year)	54
Net Income	30

Centurion Co. has just acquired a small company that manufacturers paper cartons. This company will be treated as a division of Centurion with full profit responsibility. The newly formed Carton Division is currently purchasing 10,000 kgs of pulp per year from supplier at a cost of ₹210 per kg less a 10% quantity discount. Centurion's President is anxious that the Carton Division begins purchasing its pulp from the Pulp Division if an acceptable transfer price can be worked out.

Situation I

If the Pulp Division is in a position to sell all of its pulp to outside customers at the normal price of ₹210 per kg, will the Managers of the Carton and Pulp Division agree to transfer 10,000 kgs of pulp next year at a determined price? EXPLAIN with reasons.

Situation II

Assuming that the Pulp Division is currently, selling only 60,000 kgs of pulp each year to outside customers at the stated price of ₹210 per kg will the Managers agree to a mutually acceptable transfer price for 10,000 kgs of pulp in next year? EXPLAIN with reasons.

Situation III

If the outside supplier of the Carton Division reduces its price to ₹177 per kg, will the Pulp Division meet this price? EXPLAIN. If the Pulp Division does not meet the price of ₹177 per kg, what will be the effects on profits of the company as a whole? (Study Material)

Answer (PYQ NOV.18)

Situation I

he Pulp Division will refuse to transfer at a price less than ₹210 per kg.

The Carton Division can buy pulp from an outside supplier for ₹210 per kg, less a 10% quantity discount of ₹21, or ₹189 per kg. Therefore, the Division would be unwilling to pay more than ₹189 per kg.

Transfer Price ≤ Cost of Buying from Outside Supplier = ₹189

The requirements of the two divisions are incompatible. The Carton Division won't pay more than ₹189 and the Pulp Division will not accept less than ₹210. Thus, there can be **no mutually agreeable transfer price and no transfer will take place**.

Situation II

The Pulp Division has idle capacity, so transfers from the Pulp Division to the Carton Division do not cut into normal sales of pulp to outsiders. In this case, the minimum price as far as the Carton Division is concerned is the variable cost per kg of ₹126. This is confirmed in the following calculation:

and are cooperative, they should agree to a transfer and should settle on a transfer price within the range:

₹126 £ Transfer price £ ₹189

Situation III

Yes, ₹177 is a bona fide outside price. Even though ₹177 is less than the Pulp Division's
₹180 "full   cost" per unit,   it   is   within the   range and therefore will provide some contribu
If the Pulp Division does not meet the ₹177 price, it will lose ₹5,10,000 in potential profits.

Price per kg	₹177
Less: Variable Costs	₹126
Contribution margin per kg	₹51

10,000 kgs × ₹51 per kg = ₹5,10,000 potential increased profits.
This ₹5,10,000 in potential profits applies to the Pulp Division and to the company as a whole.

For situation III also considered that "the Pulp Division is currently selling only 60,000 kgs of pulp

each year to outside customers".

Question 5

GL Ltd. is a multiproduct manufacturing concern functioning with four divisions. The   Electrical Division of the company is producing many electrical products including electrical switches. This division functioning at its maximum capacity sells its switches in the open market at ₹25 each. The variable cost per switch to the division is ₹16.

The Household Division, another division of GL Ltd., functioning at 70% capacity asked the Electrical Division to supply 5,000 switches per month at the rate of ₹18 each to fit in night lamps produced by it. The total cost per night lamp is being estimated as detailed below;

	₹
Components purchased from outside suppliers	50.00
Switch if purchased internally	18.00
Other variable costs	40.00
Fixed overheads	21.00
Total cost per night lamp	129.00

The Household Division is marketing night lamps at a price of ₹130 each, with a very small margin, as it is doing business in a very competitive environment. Any increase in price made by the division will push out the division from the market. Therefore, the division cannot pay anything more to switches if they the Electrical Division. Further, the manager of the division informed that it is very much essential to keep on the market share for night lamps by the Household Division to retain the experienced workers of the division. The company is using return on investments (ROI) as a scale to measure the divisional performances and also marginal costing approach for decision making.

Required

(i) Would you RECOMMEND the supply of switches to Household Division by Electrical Division at a price of ₹18 each? Substantiate your recommendation with suitable reasons.

(ii) ANALYZE whether it would be beneficial to the company as a whole the supply of switches to Household Division at a unit price of ₹18 by Electrical Division.

(iii) Do you feel that- the Divisional Managers should accept the inter-divisional transfers in principle? If yes, what should be the range of transfer price?

(iv) SUGGEST the steps to be taken by the chief executive of the company to change the attitude of divisional heads if they are against the inter-divisional transfers.

Answer (PYQ MAY.18) (STUDY MATERIAL)

(i) Electrical Division is operating at full capacity and selling its switches in the open market at ₹25 each. Therefore, it can transfer its production internally by giving up equal number of units saleable in the open market. In this situation, transfer price should be based on variable cost plus opportunity cost {₹16 + (₹25 - ₹16)} = ₹25/-.

As the price quoted by Household Division ₹18 is less than the transfer price based on opportunity cost, the Electrical Division should not accept internal transfer. Further, the company is measuring divisional performances based on ROI. Therefore, transferring for a price which is less than the minimum price would affect the return on investments and divisional performance severely.

(ii) In the total cost per night lamp, the Fixed Overheads being a fixed cost is not relevant for decision making. Similarly, the variable cost of switch (₹16 p.u.) included in the cost of night lamp is also irrelevant as it is common for both internal and external transfers. The only relevant cost is the loss of revenue when units are transferred internally.

Accordingly, the benefit from internal transfer would be {₹130 - (₹50 + ₹40) - ₹25)=₹15/- on each unit sale on night lamp. Therefore, it is beneficial to the company as a whole to the extent of ₹15 per unit of night lamp sold.

Hence, internal transfer is profitable to the company as a whole. Further, Household Division is operating at 70% capacity and has experienced workers which may be utilized for other divisions requirements if any and based on contribution earned fixed cost could be minimized due to large scale of production.

(iii) Internal transfer pricing develops a competitive setting for managers of each division, it is possible that they may operate in the best interest of their individual performance. This can lead to sub-optimal utilization of resources. In such cases, transfer pricing policy may be established to promote goal congruence. The market price of ₹25 per switch leaves Electrical Division in an identical position to sale outside. Thus, ₹25 is top of the price range. Division Household will not pay to Electrical Division anything above (₹130 - ₹50 - ₹40) = ₹40/-. The net benefit from each unit of night lamp sold internally is ₹15. Thus, any transfer price within the range of ₹25 to ₹40 per unit will benefit both divisions. Divisional Managers should accept the inter divisional transfers in principle when the transfer price is within the above range.

(iv) Transfer at marginal cost are unsuitable for performance evaluation since they do not provide an incentive for the supplying division to transfer goods and services internally. This is because they do not contain a profit margin for the supplying division. Chief Executive's intervention may be necessary to instruct the supplying division to meet the receiving division's demand at the marginal cost of the transfers. Thus, divisional autonomy will be undermined. Transferring at cost plus a mark-up creates the opposite conflict. Here the transfer price meets the performance evaluation requirement but will not induce managers to make optimal decisions.

Dual Rate Transfer Pricing System

The supplying division records transfer price by including a normal profit margin thereby showing reasonable revenue. The purchasing division records transfer price at marginal cost thereby recording purchases at minimum cost. This allows for better evaluation of each division's performance. It also improves co-operation between divisions, promoting goal congruence and reduction of sub-optimization of resources.

Two Part Transfer Pricing System

This pricing system is again aimed at resolving problems related to distortions caused by the full cost based transfer price. Here, transfer price = marginal cost of production + a lump-sum charge (two part to pricing).

While marginal cost ensures recovery of additional cost of production related to the goods transferred, lump-sum charge enables the recovery of some portion of the fixed cost of the supplying division. Therefore, while the supplying division can show better profitability, the purchasing division can purchase the goods at lower r ate compared to the market price.

Question 6

Great Vision manufactures a wide range of optical products including lenses and surveillance cameras. Division 'A' manufactures the lenses while Division 'B' manufactures surveillance cameras. The lenses that Division 'A' manufactures is of standard quality that has a number of applications. Due to huge demand in the market for its products Division 'A' is operating at full capacity. It sells its lenses in the open market for ₹140 per lens, the variable cost of production for each lens is ₹110, while the total cost of production is ₹125 per lens.

The total production cost of a camera by Division 'B' is ₹400 each. Currently Division 'B' procures lens from foreign vendors, the cost per lens would be ₹170 each. The management of Great vision has proposed that to take advantage of in-house production capabilities and consequently the procurement cost of the lens would reduce. It is proposed that Division 'B' should buy an average of 5,000 lenses each month from Division 'A' at ₹120 per lens. The estimate cost of a surveillance camera is as below:

Other components purchased from external vendors	150
Cost of lens purchased from Division 'A'	120
Other variable costs	30
Fixed overheads	50
Total cost of a camera	350

Each surveillance camera is sold for ₹410. The margin for each camera is low since competition in the market is high. Any increase in the price of a camera would reduce the market share. Therefore, Division 'B' cannot pay Division 'A' beyond ₹120 per lens procured.

Great vision's management uses Return on investments (ROI) as a scale to measure the divisional performance and marginal costing approach for decision making.

Required

(i) ANALYZE the behavioral consequences of each division when Division 'A' supplies lenses to Division 'B' at ₹120 per lens? Substantiate your answer based on the information given in the

problem.

(ii) ANALYZE if it would be beneficial to the company as a whole for Division 'A' to supply the lenses to Division 'B' at ₹120 per lens.

(iii) Do you feel that the divisional managers should accept the inter-divisional transfers in principle? If yes, CALCULATE the range of transfer price?

(iv) ADVISE alternate transfer pricing models that the chief executive of the company can consider in order to change the attitude of the divisional heads if they are against the transfer pricing policy.

(v) CALCULATE the range of transfer price, if Division 'A' has excess capacity and can accommodate the internal requirement of 5,000 lens per month within the current operations. (Study Material) (RTP NOV.18)

Answer

(i) Analysis of Behavioral Consequences

Division 'A' has huge demand for its lenses enabling it to operate at full capacity. External sales yield a contribution of ₹30 per lens sold (selling price of ₹140 less variable cost of ₹110 per lens). Likewise, each sale yields a profit ₹15 per lens (selling price of ₹140 less cost of production ₹125 per lens). This yields an ROI of 12% (profit of

₹15 per lens over a cost investment of ₹125 per lens).

If Division 'A' sells lens to Division 'B' at ₹120 per lens, it contribution reduces to ₹10 per lens (transfer price ₹120 less variable cost ₹110) while overall it shows a loss of ₹5 per lens (transfer price ₹120 less total cost of production is ₹125 per lens). The loss of ₹5 per lens is on account of (i) only partial recovery of fixed cost of production and (ii) opportunity cost in the form of loss of profit from external sales. This would therefore result in lower divisional profit for Division 'A'.

Consequently, the manager of Division 'A' would not accept the transfer price of ₹120 per lens. Lower profitability due to internal sales may demotivate the division. Due to the benefits of internal procurement, the management of Great vision may want to increase the capacity of Division 'A' or infuse more investment to expand its operations. However, due to inability to recover fixed costs in its entirety from internal sales the ROI of the division is impacted, therefore divisional performance would be perceived to be lower. Therefore, it may oppose decisions as this would lead to higher fixed costs. At an overall level, such opposition may be detrimental to the company, leading to sub optimization of resources.

The current total cost of production for Division 'B' is ₹400 per camera. Each sale yields a profit of ₹10 per camera (Selling price ₹410 less total cost of production ₹400 per camera). Therefore, the current ROI is 2.50% (profit of ₹10 over cost investment of ₹400 per camera). If the lens is procured from Division 'A' at ₹120 per lens, Division 'B' can get a benefit of ₹50 per camera due to lower procurement cost. If lenses are procured from Division 'A', referring to the cost estimate given in the problem, Division 'B' can earn a contribution of ₹110 per lens sold (sale price of ₹410 per camera less variable cost of ₹300 per camera) and a profit of ₹60 per camera (sale price of ₹410 per camera less total cost of production of ₹350 per camera). Therefore, ROI improves to 17.14% (profit of ₹60 over cost investment of ₹350 per camera). By procuring the lenses internally, the profit of the division improves substantially. Consequently, the manager of Division 'B' would accept the transfer price of ₹120 per camera.

(ii) Analysis of Overall Benefit to the Company (from internal transfer)

While calculating the benefit to the company, the fixed cost of each division is ignored. It is also given in the problem, that only marginal cost (variable cost) is considered for decision making.

As explained above, each external sale yields a contribution of ₹30 to Division 'A'. The lost contribution

each month from diversion of external sales of Division 'A' towards internal transfer to Division 'B' = 5,000 units × ₹30 per lens = ₹150,000 per month. This is an opportunity cost to the company.

The current procurement price for Division 'B' is ₹170 per lens. The same lens can be manufactured at ₹110 (variable cost) by Division 'A'. Therefore, cost of production reduces by ₹60 for the company. Savings in procurement cost = 5,000 units × ₹60 per lens = ₹300,000 per month. This is a savings to the company.

Therefore, the net benefit to the company at an overall level = ₹150,000 per month. Please note that the internal transfer price affects profitability of individual division but does not affect the company's overall profitability.

(iii) Range of Transfer Price

As explained above, the company gets a net benefit of ₹150,000 per month by procuring the lenses internally. Therefore, the divisional managers should accept the transfer pricing model. At the same time, neither division should be at a loss due to this arrangement. When the transfer price is ₹120 per lens, Division 'A' bears the loss, which will impact assessment of the division's performance. Therefore, an acceptable range for transfer price should be worked out. This can be done as below:

When the supplying division operates at full capacity, the range for transfer pricing would be-

(a) Minimum transfer price = marginal cost p.u. + opportunity cost p.u.

Since the supplying division is operating at full capacity, it has no incentive to sell the goods to the purchasing division at a price lower than the market price. If the internal order is accepted, capacity is diverted towards this sale. Hence the supplying division would additionally charge the lost contribution from external sales that had to be curtailed. By doing so, the division will be indifferent whether the sale is an external or internal one.

(b) Maximum transfer price = Lower of net marginal revenue and the external buy-in price.

Therefore, the minimum transfer price (which would be set by Division 'A', the supplier) = marginal cost per lens + opportunity cost per lens = ₹110 + ₹30 per lens = ₹140 per lens. In other words, the minimum transfer price would be the external sale price of each lens.

The maximum transfer price (which would be determined by Division 'B', the procurer) = lower of net marginal revenue and the external buy-in price.

Net marginal revenue would be the revenue per one additional sale. Net marginal revenue per camera = marginal revenue – marginal cost (i.e. variable cost excluding the cost of the lens) to Division 'B' = ₹410 - ₹(150+30) = ₹410 - ₹180 =

₹230 per camera. This is the maximum price that Division 'B' can pay for the lens, without incurring any loss. As mentioned before, fixed cost is ignored for this analysis.

The current external procurement price is ₹170 per lens.

Therefore, the maximum price that Division 'B' would be willing to pay = lower of net marginal revenue (₹230 per camera) or external procurement cost (₹170 per lens). Therefore, Division 'B' would pay a maximum price, equivalent to the current external price of ₹170 per lens. It will not pay Division 'A', price more than the external market price for a lens.

Therefore, the acceptable range for transfer price would range from a minimum of
₹140 per lens and maximum of ₹170 per lens. The managers may be given autonomy to negotiate a mutually acceptable transfer price between this range.

(iv) Advise on Alternative to Current Transfer Pricing System
Other alternative transfer pricing models that can be considered are:

Dual Pricing

The supplying division, Division 'A', records transfer price by including a normal profit margin thereby showing reasonable revenue. At the current market price per lens, transfer price for Division A would be ₹140 per lens. The purchasing division, Division 'B', records transfer price at marginal cost thereby recording purchases at minimum cost. As per the current production cost, the transfer price for Division 'B' would the variable cost incurred by Division 'A' to manufacture one lens, that is ₹110 per lens. This allows for better evaluation of each division's performance. It also improves co-operation between divisions, promoting goal congruence and reduction   of sub-optimization of resources.

Drawbacks of dual pricing include:

(a) It can complicate the records, thereby may result in errors in the company's overall records.

(b) Profits shown by the divisions are artificial and need to be used only for internal evaluations.

Two Part Pricing System

Here, transfer price = marginal cost of production + a lump-sum charge (two part to pricing). While marginal cost ensures recovery of additional cost of production related to the goods transferred, lump-sum charge enables the recovery of some portion of the fixed cost of the supplying division. Therefore, while the supplying division can show better profitability, the purchasing division can purchase the goods a lower rate compared to the market price.

The proposed transfer price of ₹120, is a two-part price that enables Division 'A' to recover the marginal cost of production of a lens as well as portion of the fixed cost. However, as explained in part (i) above, this price is insufficient to provide a reasonable return to Division 'A'. Therefore, the management of Great vision along with the divisional managers have to negotiate a price that is reasonable to Division 'A' while not exceeding the current procurement price of ₹170 per lens for Division 'B'. As explained in part (iii) of the solution, in the given case, the range of ₹140 to
₹170 per lens, would help resolve this conflict.

(v) Range of Transfer Price where Division 'A' has excess capacity
When the supplying division has excess capacity, the range for transfer pricing would be
(a) Minimum transfer price (determined by Division 'A') = marginal cost per lens =
₹110 per lens. This ensures that the Division 'A' is able to recoup at least its additional outlay of ₹110 per lens incurred on account of the transfer. Fixed cost is a sunk cost hence ignored. Since capacity can be utilized further, it would be optimum for Division 'A' to charge only the marginal cost for internal transfer. Division 'B' gets the advantage getting the goods at a lower cost than market price.
(b) Maximum transfer price (determined by Division 'B') = Lower of net marginal revenue and the external buy-in price. As explained in part (iii) above, this would be lower of net marginal revenue of ₹230 per camera or external buy-in price of ₹170 per lens, Therefore, the maximum transfer price would be ₹170, the external market price beyond which Division 'B' will be unwilling a higher price to Division 'A'.

Hence, when Division 'A' has excess capacity, <u>the minimum transfer price would be ₹110 per</u> <u>lens while the maximum transfer price would be ₹170 per lens</u>.

Question 7

Bright Furniture Company has two divisions Division' FXR' and Division 'FQR'. Both divisions are independent. Each division serves a different market in the furniture industry.

Division 'FXR' manufactures furniture that is used by the canteens/ coffee bars. The division plans to

introduce cushioned seat for the counter chairs. A cushioned seat currently made by the Division 'FQR' for use on its stylish stool could be modified for use on the new counter chair. Division 'FQR' can make the necessary modifications to the cushioned seat easily.

The raw materials used in Division 'FXR' seat are slightly different and should cost about 20 percent more than those used in Division 'FQR' stylish stool. However, the labour time should be the same because the seat fabrication operation is basically the same.

Division 'FQR' is operating at full capacity. By making the cushion seats for Division 'FXR', Division 'FQR' have to cut its production of stylish stools. However, Division 'FQR' can increase its production of normal stools. The labour time freed by not having to fabricate the frame or assemble the stylish stool can be shifted to the frame fabrication and assembly of the normal stool. Division 'FQR' can switch its labour force between these two models of stools without any loss of efficiency. Labour hours cannot be increase. Division 'FQR' has excess demand for both products. Following are Division 'FQR''s standard costs for the two stools and a schedule of Division 'FQR''s manufacturing overhead.

'FQR' DIVISION
Standard Selling Price and Cost

	Stylish Stool		Normal Stool	
	(₹)	(₹)	(₹)	(₹)
Selling Price		225.00		160.00
Less: Raw Materials				
Framing	32.60		39.04	
Cushioned Seat				
- Padding	9.60		---	
- Vinyl	16.00		---	
Moulded Seat (Purchased)	---	58.20	24.00	63.04
Less: Direct Labour				
Frame Fabrication				
- (0.5 × ₹ 30.00/DLH#)	15.00		---	
- (0.5 × ₹ 30.00/DLH)	---		15.00	
Cushion Fabrication				
- (0.5 × ₹ 30.00/DLH)	15.00		---	
Assembly*				
- (0.5 × ₹ 30.00/DLH)	15.00		---	
- (0.3 × ₹ 30.00/DLH)	---	45.00	9.00	24.00
Less: Manufacturing Overhead				
- (1.5 DLH × ₹ 51.20/DLH)		76.80		---
- (0.8 DLH × ₹ 51.20/DLH)		---		40.96
Profit / (Loss)		45.00		32.00

(*)Attaching seats to frames and attaching rubber feet (#) DLH refers to Direct Labour Hour

'FQR' DIVISION
Manufacturing Overhead Budget

Overhead Item	(₹)
Indirect Material (Variable - at Current Market Prices)	16,80,000
Indirect Labour (Variable)	15,00,000
Supervision (Non Variable)	10,00,000

Power (Use Varies with Activity; Rates are Fixed)	**7,20,000**
Heat and Light (Non Variable - Same Regardless of Production)	**5,60,000**
Miscellaneous Overheads **(Non Variable - Any Change in Amounts or Rates is Independent of Production)**	**8,00,000**
Depreciation (Fixed)	**68,00,000**
Employee Benefits (20% of Supervision, Direct and Indirect Labour)	**23,00,000**
Total Overhead	**1,53,60,000**
Capacity in DLH	**3,00,000**
Overhead Rate / DLH	**₹ 51.20**

Required

Assume that you are the corporate controller. What transfer price would you recommend for a 200 unit lot of seats?

(STUDY MATERIAL)

Answer

Working Note

(1) Statement Showing Variable Cost per 200-unit lot

	(₹)	(₹)
Cushion Material:		
- Padding	9.60	
- Vinyl	16.00	
Total Cushion Material	25.60	
Cost Increase by 20%	5.12	
Cost of Cushioned Seat		30.72
Cushion Fabrication Labour (₹30 × 0.5)		15.00
Variable Overhead (W.N.-2) (₹20 × 0.5)		10.00
Variable Cost per Cushioned Seat		55.72
Total Variable Cost per 200-unit lot (₹55.72 × 200)		11,144

(2) Statement Showing Fixed Overhead & Variable Overhead Rate per Direct Labour Hour

	Variable Amount		Fixed Amount	
	(₹)	(₹)	(₹)	(₹)
	Total	Per DLH	Total	Per DLH
Indirect Material	16,80,000	5.60	---	---
Indirect Labour	15,00,000	5.00	---	---
Supervision	---	---	10,00,000	3.33
Power	7,20,000	2.40	---	---
Heat and Light	---	---	5,60,000	1.87
Miscellaneous Overheads	---	---	8,00,000	2.67
Depreciation	---	---	68,00,000	22.67
Employee Benefits:				

- 20% Direct Labour*	18,00,000	6.00	---	---
- 20% Supervision	---	---	2,00,000	0.66
- 20% Indirect Labour	3,00,000	1.00	---	---
	60,00,000	**20.00**	**93,60,000**	**31.20**

Variable Overhead Rate	=	₹60,00,000 ÷ 3,00,000	
	=	₹20.00 / DLH	
Fixed Overhead Rate	=	₹93,60,000 ÷ 3,00,000	
	=	₹31.20 / DLH	

* Direct Labour Cost
0.2 (₹ 10,00,000 + DL + ₹15,00,000)   =   ₹23,00,000

0.2 DL=   ₹18,00,000

DL=   ₹90,00,000

(3) Statement Showing "Loss of Contribution Margin from Outside Sales"

	Stylish Stool	Normal Stool
	(₹)	(₹)
Selling Price	225.00	160.00
Less: Material	58.20	63.04
Less: Labour	45.00 (₹30.00 × 1.5)	24.00 (₹30.00 × 0.8)
Less: Variable Overhead	30.00 (₹20.00 × 1.5)	16.00 (₹20.00 × 0.8)
Contribution Margin per unit	91.80	56.96
Units Produced (units)	200	250 (W.N.- 4)
	18,360	14,240

Amount of Contribution Margin Lost as a result of shifting production to the Normal Stool ₹4,120 (₹18,360 – ₹14,240).

(4)   Number of Economy Office Stools that can be produced
Labour Hours to make a 200-unit lot of Stylish Stools (1.50 × 200)   300 Hrs
Less: Labour Hours to make a 200-unit lot of Cushioned Seats (0.50 × 200) 100 Hrs
Labour Hours available for Normal Stool   200Hrs
Labour hours required to make one Normal Stool   0.8 Hrs / Stool

Use of Extra Labour devoted to Normal Stool Production (200 / 0.8) 250 Stools

Since the 'FQR' Division is operating at Full Capacity, the Transfer Price must consider the Division's Variable Costs of Manufacturing the Seat plus the Lost Contribution Margin that will result from losing outside sales. Thus, the Transfer Price (W.N.-1 & 3) equals to ₹15,264 (₹11,144 + ₹4,120).

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Question 8

Division Z is a profit center which produces four products A, B, C and D. Each product is sold in the external market also. Data for the period is:

	A	B	C	D
Market price per unit (₹)	150	146	140	130
Variable cost of production per unit (₹)	130	100	90	85
Labour hours required per unit	3	4	2	3

Product D can be transferred to Division Y, but the maximum quantity that may be required for transfer is 2,500 units of D.

The maximum sales in the external market are: A……………………………..   2,800 units
B……………………………….   2,500 units
C……………………………….   2,300 units
D……………………………….   1,600 units

Division Y can purchase the same product at a price of ₹ 125 per unit from outside instead of receiving transfer of product D from Division Z.

Required

What should be the transfer price for each unit for 2,500 units of D, if the total labour hours available in Division Z are 20,000 hours? (STUDY MATERIAL)

Answer

Ranking of Products When Availability of Time is the Key Factor

Products	A	B	C	D
Market Price (₹)	150	146	140	130
Less:Variable Cost (₹)	130	100	90	85
Contribution per unit (₹)	20	46	50	45
Labour Hours per unit	3 hrs.	4 hrs.	2 hrs.	3 hrs.
Contribution per Labour Hour	6.67	11.50	25.00	15.00
Ranking	IV	III	I	II
Maximum Demand (units)	2,800	2,500	2,300	1,600
Total No. of Hours	8,400	10,000	4,600	4,800
Allocation of 20,000 Hours on the Basis of Ranking	600*	10,000	4,600	4,800

(*) Balancing Figure Note

Time required to meeting the demand of 2,500 units of Product D for Division Y is 7,500 hrs. This requirement of time viz. 7,500 hrs for providing 2,500 units of Product D for Division Y can be met by sacrificing 600 hours of Product A (200 units) and 6,900 hours of Product B (1,725 units).

Question 9

Division A is a profit centre, which produces four products P, Q, R and S. Each product is sold in the external market also. Data for the period is as follows:

	P	Q	R	S
Market Price per unit (₹)	350	345	280	230
Variable Cost of Production per unit	330	310	180	185
Labour Hours Required per unit	3	4	2	3

Product S can be transferred to Division B but the maximum quantity that might be required for transfer is 2,000 units of S.

The maximum sales in the external market are: P… .... 3,000 units

Q…... 3,500 units

R… .... 2,800 units

S… .... 1,800 units

Division B can purchase the same product at a slightly cheaper price of ₹ 225 per unit instead of receiving transfers of product S from Division A.

Required

What should be transfer price for each unit for 2,000 units of S, if the total labour hours available in Division A are:

(i) **24,000 hours?**

32,000 hours? (STUDY MATERIAL)

Answer

Working Note

Ranking of Products When Availability of Time is the Key Factor

Product	P	Q	R	S
Market Price per unit (₹)	350	345	280	230
Less: Variable Cost of Production per unit (₹)	330	310	180	185
Contribution per unit (₹)	20	35	100	45
Labour Hours Required per Unit	3 hrs.	4 hrs.	2 hrs.	3 hrs.
Contribution per hour (₹)	6.67 (₹20 ÷ 3hrs)	8.75 (₹35 ÷ 4hrs)	50 (₹100 ÷ 2hrs)	15 (₹45 ÷ 3hrs)
Ranking	IV	III	I	II

Requirement (i)

Product (Refer to W.N.)	Maximum Demand (units)	urs per unit	Units Produced	Hours Used	Balance Hours
(a)	(b)	(c)	(d)	(e)=(b)×(c)	(f)
R	2,800	2	2,800	5,600	18,400 (24,000 – 5,600)
S	1,800	3	1,800	5,400	13,000 (18,400 – 5,400)
Q	3,500	4	3,250	13,000	0 (13,000 – 13,000)
P	3,000	3	0	0	0

Note

Time required to meet the demand of 2,000 units of Product S for Division B is 6,000 hrs. This requirement of time viz., 6,000 hours for providing 2,000 units of Product S for Division B can be met by sacrificing the production of 1,500 units of Product Q (1,500 units × 4 hrs.).

Statement Showing "Transfer Price for each unit for 2,000 units of S"

Transfer Price	2,000 units of Product	Per unit of Product S
Variable Cost	3,70,000	185.00
Opportunity Cost of the Contribution Foregone by not producing 1,500 units of Q (1500 units × ₹35)	52,500	26.25
Transfer Price	4,22,500	211.25

(ii) Statement of Product Mix (When Total Available Hours in Division A are 32,000)

Product (Refer to W.N.)	Maximum Demand (units)	Hours per unit	Units Produced	Hours Used	Balance Hours
(a)	(b)	(c)	(d)	(e)=(b)×(c)	(f)
R	2,800	2	2,800	5,600	26,400 (32,000 – 5,600)
S	1,800	3	1,800	5,400	21,000 (26,400 – 5,400)

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Q	3,500	4	3,500	14,000	7,000 (21,000 –14,000)
P	3,000	3	2,333	7,000	0 (7,000 – 7,000)

Note

The required time for producing 2,000 units of Product S for Division B is 6,000 hrs. This requirement can be met by sacrificing the output of 2,000 units of Product P.

Statement of Transfer Price for each unit for 2,000 units of S

Transfer Price	2,000 units of Product	Per unit of Product S (₹)
Variable Cost	3,70,000	185.00
Opportunity Cost of the Contribution Foregone by not producing 2,000 units of P (2,000 units × ₹20)	40,000	20.00
Transfer Price	4,10,000	205.00

Question 10

A company has a division A producing three products called X, Y, Z. Each product can be sold in the open market in the following manner.

Maximum external sales are X 800 units, Y 500 units, Z 300 units. All figures in ₹

Particulars	X	Y	Z
Selling Price per unit	96	92	80
Variable Cost of Production in Division A	33	24	28
Labour Hours Required per unit in Division A	6	8	4

Product Y can be transferred to Division B, but the maximum quantity that might be required for transfer is 300 units of Y.

Division B could buy similar product in the open market at a price of ₹45 p.u.

(i) What should be the transfer price per unit for 300 units of Y, if the total labor hours available with Division A are:

  (a) 13,000 hours (b) 8,000 hours and (c) 12,000 hours.

(ii) Indicate the transfer pricing range that can promote goal congruence. (Study Material) (STUDY MATERIAL)

Answer

Division A has two type of clientele, external customers and Division B. Capacity in Division A is defined by the number of labor hours available for production.

The total hours needed to meet external demand is 10,000 hours as explained below:

Statement of Hours Needed for External Sales

External Sales	Qty	Hours p.u.	Total Hours Needed
X	800	6	4,800
Y	500	8	4,000
Z	300	4	1,200
Hours Needed for External Sales			10,000

Case 1: When 13,000 hours are available, after meeting the external demand requiring 10,000 hours, Division A will have surplus capacity of 3,000 hours.

Hours needed to produce 300 units of Y = 300 × 8 hours = 2,400 hours. Since Division A has surplus capacity, it can meet the demand of Division B also without curtailing its external sales. Hence, there is no opportunity cost on account of lost contribution.

Transfer price range:

Minimum Transfer Price p.u.

= Marginal Cost of Production p.u. of Y = ₹24.

Maximum Transfer Price

= Lower of Net Marginal Revenue and the External Buy-in Price

The Maximum Transfer Price would be the External Procurement Pri=ce for Division B

= ₹45 p.u.

Note: Additional cost information related to Division B would be needed to calculate net marginal revenue.

Case 2: When 8,000 hours are available, Division A has limited capacity as explained below.

The total hours needed for external sales is 10,000 and those need for internal transfer is 2,400 hours. In all, 12,400 hours are needed, when only 8,000 hours are available. There is a shortfall of 4,400 hours. Capacity is hence limited.

Therefore, labor hours have to be utilized optimally. This is determined by calculating the contribution per hour from sale each product that is sold externally. It determines how valuable each hour is product wise.

Statement of Product Wise Contribution per hour

Sr. No.	Particulars	X	Y	Z
1	Selling Price p.u.	96	92	80
2	Less: Variable Cost p.u.	33	24	28
3 = 1 - 2	Contribution p.u.	63	68	52
4	Labour hours needed p.u.	6	8	4
5 = 3 / 4	Contribution per hour	10.50	8.50	13.00
6	Ranking high to low	II	III	I

Product Z gives the maximum contribution per hour, hence ranked 1. Product X and Y follow at rank 2 and 3 respectively. This is the basis to allocate limited hours for optimal production in Division A.

The entire demand of Product Z will be produced first. This requires 1,200 hours. Out of the balance 6,800 hours, Product X will require 4,800 hours. This leaves a balance of 2,000 hours for Product Y. Product Y requires 8 hours p.u. Hence maximum production of product Y = 2,000 hours / 8 = 250 units.

Statement of Optimum Mix

Total Hours Available 8,000					
Priority	External Sales	Qty	Hours p.u.	Total Hours Needed	Remaining Hours
1	Z	300	4	1,200	6,800
2	X	800	6	4,800	2,000
3	Y	250	8	2,000	-
Total Hours Needed for External Sales				8,000	

If Division A accepts to produce 300 units of Y for Division B, the total hours required for internal sales would be 2,400 hours. This can be catered to by curtailing its external sales. 2,000 hours from production of external sales of Product Y is first diverted and the balance 400 hours are diverted from production of Product X. Hence this results in lost contribution, an opportunity cost that has to be included in transfer pricing.

Contribution Lost from Reduced External Sales

= Product Y (2000 hours × contribution per hour of ₹8.5) + Product X (400 hours × contribution per hour of ₹10.5)

= ₹17,000 + ₹4,200

= ₹21,200

On a per unit basis, lost contribution works out to 21,200 / 300 units = ₹70.66

Therefore, Transfer Price

= Marginal Cost p.u. + Contribution Lost from Reduced External Sales

= ₹24 + ₹70.66

= ₹94.66

Since Division B can source at ₹45, it would be cheaper to purchase the component from outside

Case 3: When 12,000 hours are available, Division A has limited capacity as explained below.

The total hours needed for external sales is 10,000 and those need for internal transfer is 2,400 hours. In all, 12,400 hours are needed, when only 12,000 hours are available. There is a shortfall of 400 hours. Capacity is hence limited.

Therefore, labor hours have to be utilized optimally. Again, as explained in Case 2 , this is determined by calculating the contribution per hour from sale each product that is sold externally. Referring to the table above, Contribution per hour is X: ₹10.5; Y: ₹8.5 and Z: ₹13. Accordingly, production wise Z will be given first priority, followed by X and then Y.

The entire demand of Product Z will be produced first. This requires 1,200 hours. Out of the balance 10,800 hours, Product X will require 4,800 hours. This leaves a balance of 6,000 hours for Product Y. Product Y requires 8 hours p.u. External sales of product require 4,000 hours (500 units × 8 hours p.u.).

Statement of Optimum Mix

Priority	External Sales	Qty	Hours p.u.	Total Hours Needed	Remaining Hours
Total Hours Available 8,000
1	Z	300	4	1,200	10,800
2	X	800	6	4,800	6,000
3	Y	500	8	4,000	2,000
Total Hours Needed for External Sales				10,000	

This leaves 2,000 hours available for production of 300 units of Y to be sold to Division B. These 300 units will require 2,400 hours (300 units × 8 hours p.u.). Hence, there is a shortfall of 400 hours to meet this internal demand. This shortfall of 400 hours will be made up with diverting hours earmarked for external sale of Product Y (Rank 3 as explained in the table above). Loss of contribution on account of curtailed sales would then be built into the transfer price.

Contribution Lost by Diverting 400 hours from Product Y for External Sales

= 400 hours × contribution per hour

= 400 hours × ₹8.5

= ₹3,400.

On a per unit basis,

= 3,400 / 300 units

= ₹11.33

Therefore, Transfer Price

= Marginal Cost p.u. + Contribution Lost from Reduced External Sales

= ₹24 + ₹11.33

= ₹35.33

Division B can source this at ₹45 p.u. from outside. Hence transfer price can be in the range ₹35.33 to ₹45.

Miscellaneous

Question 11

A company has two divisions A and B, making products A and B respectively. One unit of A   is an input for each unit of B. B has a production capacity of 45,000 units and ready market. Other information available regarding Division A are:

Capacity (production units)	50,000
Maximum External Sales	30,000
Fixed Cost upto 30,000 units. Beyond 30,000 units- It increases by 50,000 for every additional 10,000 units	430,000
Variable Manufacturing Cost p.u.	55
Variable Selling Cost p.u. (external sales)	10
Variable Selling Cost p.u. (special order/ transfer to B)	5
Selling Price p.u. (external market)	80
Selling Price (special sales)	70

B can buy the input A from outside at a slightly incomplete stage at ₹45 p.u. and will incur subcontracting charges of ₹30 p.u. to match it to the stage at which it receives goods from Division A. Division B is willing to pay a maximum of ₹75 p.u. if Division A supplies its entire demand of 45,000 units. If Division A supplies lesser quantity, Division B is willing to pay only ₹70 p.u.

Division A has also received a special order for 15,000 units which it needs to either accept in full or reject. Division A may choose to avoid variable selling cost of ₹5 p.u. on transfer to B or special order, by incurring a fixed overhead of ₹50,000 p.a. instead.

(i) What is the best strategy for Division A? Show the profitability of that option.

(ii) What will the range of transfer price be under if the best strategy is chosen? (Study Material)

Answer

(i)   What is the best strategy for Division A?

With a production capacity of 50,000 units, Division A has to find an optimum mix of sales between external sales, internal transfer to Division B and special order. Division B requires 45,000 units. Division A can supply the entire 45,000 units to Division B for which transfer price is ₹75 p.u. or can supply lower quantity for which transfer price is ₹70 p.u.

As production increases, certain cost components would also change. Changes to cost of production and selling expenses are discussed below.

(1)   Selling expenses: It is given that for special orders or internal transfers, Division A can either bear a variable selling cost of ₹5 p.u. or choose to incur a fixed cost of ₹50,000 p.a.

Working out the indifference point, the selling cost will be the same at 10,000 units (at what point will No. of units × ₹5 = ₹50,000; No. of units = 10,000). For any transfer or sale below 10,000 units, it makes sense to bear the variable cost of ₹5 p.u. Over 10,000 units it makes sense to bear the fixed cost of ₹50,000.

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Even If Division A chooses to cater entirely to external sales of 30,000 units, the balance 20,000 units will be used to cater to either the special order or as internal transfer to Division B or can even be both (special order 15,000 units and internal transfer 5,000 units). Since in any case sale will be more than 10,000 units, Division A can opt to bear the fixed cost of ₹50,000.

(2)   Since A is working at full capacity i.e. 30,000 units are produced. Fixed cost is ₹430,000 that would increase by ₹50,000 for every extra 10,000 units produced over 30,000 units. Hence total fixed cost will be 530,000.

To arrive at the optimum mix, Division A will calculate the contribution received per unit under the various options.

Statement of Contribution per unit

Particulars		External Sale Upto 30,000 units	Special Order 15,000 units	Transfer to B < 45,000 units	Transfer to B 45,000 units
Selling Price	...(a)	80	70	70	75
Less: Variable Cost	...(b)				
(i) Manufacturing		55	55	55	55
(ii) Selling & Dist.		10	0	0	0
Contribution	...(a) – (b)	15	15	15	20

Hence, transfer to division B of 45,000 units yields the highest contribution. This leaves a balance capacity of 5,000 units with Division A, whose maximum capacity is given to be 50,000 units. This is insufficient to meet the special order of 15,000 units

Hence, Division A will utilize the balance 5,000 units to cater to external sales. Therefore, the optimum production mix would be:

Transfer to Division B 45,000 units and external sales 5,000 units.

Profitability Statement of Division A

Particulars		Figures in ₹
Contribution from		
(a) Transfer to Division B (45,000 units × ₹20)		9,00,000
(b) External Sales (net of selling expense) (5,000 units × ₹15)		75,000
Total Contribution from Sales	...(i)	9,75,000
Manufacturing Fixed Cost		5,30,000
Selling Fixed Cost		50,000
Total Fixed Costs	...(ii)	5,80,000
Profit Earned	...(i) – (ii)	3,95,000

(ii) Range of transfer price under the best strategy.

As explained above, the best strategy for Division A would be to sell 45,000 units to Division B and 5,000 units externally.

Minimum Transfer Price

= Marginal Cost per unit + Additional Outlay per unit + Opportunity Cost per unit

Minimum Transfer Price that Division A will Demand

Next Best Alternative (based on Short Term Decision Making)

External Sales (30,000 units)

Particulars	Amount (Rs.)
Sales (30,000 units @ 80)	24,00,000
Less: Variable Manufacturing Cost (30,000 units @ 55)	16,50,000
Less: Variable Selling Costs (30,000 units @ 10)	3,00,000
Contribution	4,50,000
Less: Fixed Costs (30,000 units)	4,30,000
Profit	**20,000**

Special Order (15,000 units)

Particulars	Amount (Rs.)
Sales (15,000 units @ 70)	10,50,000
Less: Variable Manufacturing Cost (15,000 units @ 55)	8,25,000
Contribution	2,25,000
Less: Additional Fixed Costs	1,00,000
Less: Selling Costs (Fixed)	50,000
Profit	**75,000**

Total Profit Rs. 95,000/-

Computation of Minimum Transfer Price

Particulars	Amount Rs.
Contribution Lost External Sales (25,000 units @15)	3,75,000
Contribution Lost Special Order (15,000 units @15)	2,25,000
Add: Variable Cost (45,000 units @ 55)	24,75,000
Total Transfer Price	30,75,000
Units	45,000
Minimum Transfer Price for One Unit	**68.33...**

<u>**Verification**</u>

Transfer of 45,000 units @ 68.33...

Particulars	Amount Rs.
External Sales (5,000 units @ 80)	4,00,000
Internal Transfer (45,000 units @ 68.33...)	30,75,000
Less: Variable Manufacturing Cost (50,000 units @ 80)	27,50,000
Less: Variable Selling Costs (5,000 units @ 10)	50,000
Contribution	6,75,000
Less: Fixed Costs	4,30,000
Less: Additional Fixed Costs	1,00,000
Less: Selling Costs (Fixed)	50,000
Profit	**95,000**

Maximum Transfer Price Division B is willing to pay (given) = ₹75. This would be range in which Transfer Price will be negotiated.

Question 12

B Ltd. makes three products X, Y and Z in Divisions X, Y and Z respectively. The following information is given:

X	Y	Z
Direct Material (₹/ Unit) (excluding material X for Divisions Y and Z)	8	22	40
Direct Labour ₹/ Unit)	4	6	8
Variable Overhead (₹/ Unit)	2	2	2
Selling price to outside customers (₹/ Unit)	25	65	90
Existing capacity (no. of units)	6,000	3,000	3,000
Maximum external Market demand (no of units)	5,000	5,500	5,000
Additional fixed cost that would be incurred to install additional capacity (₹)	45,000	9,000	23,100
Maximum additional units that can be produced by additional capacity	6,000	2,000	2,250

Y and Z need material X as their input. Material X is available in the market at ₹23 per unit. Defectives can be returned to suppliers at their cost. Division X supplies the material free from defects and hence is able to sell at ₹25 per unit. Each unit of Y and Z require one unit of X as input with slight modification.

If Y purchases from outside at ₹23 per unit, it has to incur ₹3 per unit as modification and inspection cost. If Y purchases from Division X, it has to incur, in addition to the transfer price, ₹2 per unit to modify it.

If Z gets the material from Division X, it can use it after incurring a modification cost, of ₹1 per unit. If Z buys material X from outside, it has to either inspect and modify it at its own shop floor at ₹5 per unit or use idle labour from Division X at ₹3 per unit. Division X will lend its idle labour as per Z's requirement even if Z purchases the material from outside.

The transfer prices are at the discretion of the Divisional Managers and will remain confidential. Assume no restriction on quantities of inter-division transfers or purchases.

Required

DISCUSS with relevant figures the best strategy for each division and for the company as a whole. (Study Material)

Answer

Statement Showing "Contribution per unit"

Particulars	Division X			Division Y		Division Z
	Sale to	Internal Transfer to		Purchase from	Transfer from	Transfer from
	Outside	Y	Z	Outside	X	X
Selling Price	25.00	---	---	65.00	65.00	90.00
Transfer Price	---	24.00*	25.00#	---	---	---
Direct Material (Excluding Material 'X')	8.00	8.00	8.00	22.00	22.00	40.00
Direct Labour	4.00	4.00	4.00	6.00	6.00	8.00
Variable Overhead	2.00	2.00	2.00	2.00	2.00	2.00
Purchase Price 'X'	---	---	---	23.00	---	---
Transfer Price 'X'	---	---	---	---	24.00	25.00
Modification Cost	---	---	---	3.00	2.00	1.00
Contribution	11.00	10.00	11.00	9.00	9.00	14.00

(*) Division 'Y' will not pay Division 'X' anything more than ₹24, because at ₹24, it will incur additional cost of ₹2 per unit to modify it, ₹23 + ₹3 = ₹26, the outside cost.

(#) To **purchase** material X from outside is costly for Division 'Z' as after modification at own shop floor, cost of the same comes to Division 'Z' is ₹ 28 (₹23 + ₹5).

If Division 'X' goes to utilize its full capacity in that case labour would not be available for modification to Department 'Z'.

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Accordingly Division 'Z' may purchase material X at ₹25 from Division 'X' i.e. market price to outsiders.

Statement Showing "Internal Transfer Decision (units)"

Particulars		X	Y	Z
Existing Capacity	…(A)	6,000 units	3,000 units	3,000 units
Maximum Capacity that can be added …(B)		6,000 units	2,000 units	2,250 units
Total Maximum that can be produced …(C)=(A)+(B)		12,000 units	5,000 units	5,250 units
Maximum External Demand	…(D)	5,000 units	5,500 units	5,000 units
Balance	…(C) – (D)	7,000 units	---	250 units

		X	Y	Z
Internal Transfer to Other Divisions		5,000 units to Z* 2,000 units to Y	N.A.	N.A.
Internal Transfer from Other Divisions		N.A.	2,000 units transfer from X (material X)	5,000 units transfer from X (material X)

(*) Division 'X' will supply its production to Division 'Z' first (after meeting its external requirement) as contribution from product Z is high.

Statement Showing "Decision Whether to Expand or Not" (₹)

Particulars	X	Y	Z
Additional Fixed Cost on Expansion	45,000	9,000	23,100
Contribution that can be earned by Expansion	64,000 (4,000 units × ₹11 + 2,000 units × ₹10)	18,000 (2,000 units × ₹9)	28,000 (2,000* units × ₹14)
Net Benefit from Expansion	19,000	9,000	4,900
Decision	Expansion	Expansion	Expansion

(*) As maximum demand of product Z is 5,000 units which Division 'Z' first complete with existing capacity of 3,000 units. Balance 2,000 units from expansion.

Statement Showing "Net Revenue Addition" (₹)

Particulars	X	Y	Z	Total
Contribution – External Sales	55,000 (5,000 units × ₹11)	45,000 (5,000 units × ₹9)	70,000 (5,000 units × ₹14)	1,70,000
Contribution – Internal Transfer	75,000 (2,000 units × ₹10 + 5,000 units × ₹11)	---	---	75,000
Additional Fixed Cost	45,000	9,000	23,100	77,100
Net Revenue Addition				1,67,900

Strategy for Company & Divisions

(i)   Division 'X' will transfer maximum possible material to Division 'Z' as Division 'Z' is offering maximum transfer price to Division 'X'. At the same time Division 'Z' is fetching maximum contribution for the organisation so it is beneficial for both the Divisions as well as organisation as a whole.

(ii)   As shown above all the three Divisions are getting net benefit when they are taking decision to expand and hence, all the three Divisions should expand their activity by incurring additional fixed cost on expansion.

Question 13

LNG Limited has three divisions. Its desired rate of return is 14%.
The operating assets and income for each division are as follows:

Divisions	Operating Assets (₹)	Operating Income (₹)
L	19,20,000	3,45,600
N	10,50,000	1,73,250
G	12,30,000	1,67,280
Total	42,00,000	6,86,130

LNG Limited has ₹ 8,00,000 of additional cash to invest in one of its divisions.
The divisional managers have identified investment opportunities that are expected to yield the following ROIs–

Divisions	Expected ROIs for additional investment
L	16%
N	12%
G	15%

Required

i   (CALCULATE ROIs at present for each division and STATE which division manager is currently providing the highest ROI.

ii   Based on ROI, IDENTIFY the division manager who would be the most eager to accept the additional investment funds.

iii   Based on ROI, IDENTIFY the division manager who would be least eager to accept the additional investment funds.

iv   STATE the division that offers the best investment opportunity for LNG limited.

v   DISCUSS the conflict between requirements (ii) and (iv) above.

vi   ADVISE how the residual income performance measure could be used to motivate the managers to act in the best interest of the company.

(STUDY MATERIAL)
Solution

(i) Present ROI of each division

Divisions	Operating Assets (₹)	Operating Income (₹)	ROI
L	19,20,000	3,45,600	18%
N	10,50,000	1,73,250	16.5%
G	12,30,000	1,67,280	13.6%

The division manager of L division is currently providing the highest ROI of 18% among the three divisions.
i   The manager of division G would be most eager to accept the additional fund of ₹ 8,00,000 because of ROI of the proposed investment is more than the present ROI of 13.6% and the acceptance of the proposal would increase the division's ROI.

ii   The managers of division L and N, both would be reluctant to invest the additional fund of ₹ 8,00,000. Because the return on the proposed project is 16% for L and 12% for N against their existing ROI of 18% and 16.5% respectively.

However, the manager of division N would be least likely to accept the additional investment because the proposed ROI of the project is 4.5% less than present ROI.
i   Division L offers the best investment opportunity of 16% for LNG limited.

ii   Lack of goal congruence between divisions and organisation as a whole is the reason. The divisional managers are forced to choose between the best interests of their division (because their individual performance is linked to division performance) and the best interests of the company as a whole. In requirement (ii) decision of mangers of division G is in the best interest of the division but at the expense of their company, resulting sub optimisation; whereas in requirement (iv) decision is taken from the perspective of LNG limited as a whole.
(vi) To avoid sub optimisation, the divisional performance can be measured using Residual Income (RI). Since under RI divisional managers don't reject the proposed projects with lower returns than existing rate of return of division, hence in the interest of organisation as a whole division is ready to accept the investment projects with the returns equal to or greater than the predetermined required rate of return (i.e. 14%). RI being absolute measures have shortcoming too that performance of divisions with different sizes can't be compared.

Question 14

Hardware Ltd. manufactures computer hardware products in different divisions which operate as profit centers. Printer Division makes and sells printers. The Printer Division's budgeted income statement, based on a sales volume of 15,000 units is given below. The Printer Division's Manager believes that sales can be increased by 2,400 units, if the selling price is reduced by ₹ 20 per unit from the present price of ₹ 400 per unit, and that, for this additional volume, no additional fixed costs will be incurred.

Printer Division presently uses a component purchased from an outside supplier at ₹ 70 per unit. A similar component is being produced by the Components Division of Hardware Ltd. and sold outside at a price of ₹ 100 per unit. Components Division can make this component for the Printer Division with a small modification in the specification, which would mean a reduction in the Direct Material cost for the Components Division by ₹ 1.5 per unit. Further, the Component Division will not incur variable selling cost on units transferred to the Printer Division. The Printer Division's Manager has offered the Component Division's Manager a price of ₹ 50 per unit of the component. Component Division has the capacity to produce 75,000 units, of which only 64,000 units can be absorbed by the outside market.
The current budgeted income statement for Components Division is based on a volume of 64,000 units considering all of it as sold outside.

	Printer Division (₹ '000)	Component Division (₹ '000)
Sales Revenue	6,000	6,400
Manufacturing Cost		
Component	1,050	-
Other Direct Materials, Direct Labour & Variable	1,680	1,920
Fixed Overhead	480	704
Variable Marketing Costs	270	384
Fixed Marketing and Administration Overhead	855	704
Operating Profit	1,665	2,688

Required (RTP MAY 18)

(i) Should the Printer Division reduce the price by ₹ 20 per unit even if it is not able to procure the components from the Component Division at ₹ 50 per unit?

(ii) Without prejudice to your answer to part (i) above, assume that Printer Division needs 17,400 units and that, either it takes all its requirements from Component Division or all of it from outside source. Should the Component Division be willing to supply the Printer Division at ₹ 50 per unit?

(iii) Without prejudice to your answer to part (i) above, assume that Printer Division needs 17,400 units. Would it be in the best interest of Hardware Ltd. for the Components Division to supply the components to the Printer Division at ₹ 50?

Answer

Particulars	Printer Division			Component Division	
	Existing Price	Reduction in Selling Price	If Component is Purchased Internally	Existing	If Transfer Effected
Selling Price	400	380	380	100	50
Less: Component Cost	70	70	50	-	-
Less: Other Direct Materials, Direct Labour & Variable Overhead	112	112	112	30	28.50
Less: Variable Marketing Cost	18	18	18	6	-
Contribution	200	180	200	64	21.50
Volume (units)	15,000	17,400	17,400	64,000	17,400
Total Contribution	30,00,00	31,32,000	34,80,000	40,96,000	3,74,100

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Volume Lost in the Market (units)	6,400*
Contribution Lost (6,400 units × ₹64)	**4,09,600**

(*) 17,400 units – Spare Capacity i.e. 11,000 units (75,000 units – 64,000 units)

(i) Yes, Printer Division should reduce price of its Printer by ₹20, as there is an increment in net income by ₹1,32,000 (₹31,32,000 – ₹30,00,000). Incremental operating profit can be found in the as below: (₹)

Contribution Margin of Sales increase (₹180 × 2,400 units)	4,32,000
Less: Loss in Contribution Margin on Original Volume arising from decrease in Selling Price (15,000 units × ₹20)	3,00,000
Increase in Operating Profit	**1,32,000**

(ii) **No,** The Component Division should not sell all 17,400 units to Printer Division for ₹50. If the Component Division does sell all 17,400 units to Printer Division, Component Division will only be able to sell 57,600 units to outside customers instead of 64,000 units due to the capacity restrictions. This would decrease Component Division's profit by ₹35,500. Supporting calculations are as follows:

	(₹)
Contribution from Sales to Printer (₹21.50 × 17,400 units)	3,74,100
Less: Loss in Contribution from Loss of Sales to outsiders (₹64 × 6,400 units)	4,09,600
Decrease in Operating Profit	**35,500**

(iii) Yes, it would be in the best interest of Hardware Ltd. for the Component Division to sell the units to the Printer Division at ₹50 each. The net advantage to the Hardware Ltd. is ₹3,12,500 as shown below. The net advantage is the result of the cost savings from purchasing the Component unit internally and the contribution margin lost from 6,400 units that the Component Division otherwise would sell to outsiders.

Total Company	(₹ '000)
Incremental Contribution- If the component is transferred within ₹ (3,480 – 3,132)	348.00
Contribution to the Component Division	374.10
Total incremental Contribution	722.10
Less: Contribution Lost by the Component Division	409.60
Net Contribution Gain	312.50

Question 14

A manufacturer has two divisions, Division A and Division B. Division B produces components that are used by both Division A as well as external customers. Division A gets its entire requirement for the component from Division B.

The annual production capacity of Division B is 100,000 units. The division operates at full capacity, with no inventory at the beginning and end of the year. It sells its components to external customers at ₹4,000 per unit. Variable cost of production for the component is ₹2,750. Internally, it transfers it components to Division A factoring any opportunity cost in the form of lost sales. Total sales of Division B were ₹36 crores, of which sales to external customers was ₹20 crores.

As per company policy, demand from Division A has priority over external customers. This year, there was an additional demand from external customers for 18,000 components. However, since Division B operated at full capacity, this demand was not catered to.

Required

(i)   ANALYZE the Sales in terms of ₹ and units made by Division B to both external and internal customers.

(ii)   RECOMMEND the transfer pricing range that would promote goal congruence between Divisions A and B.

(iii) DISCUSS the effect of changes in external demand on the transfer price for the company, assuming the current policy continues. **(RTP NOV.19)**

Answer

(i)   Sales Analysis of Division B

Total annual capacity and actual production of Division B is 100,000 units of components. Zero inventory implies that sales for the year was also 100,000 units of components. Sales to external customers was ₹20 crores, at ₹4,000 per unit. Therefore, units sold to external customers would be 50,000 units this year (₹20 crores sales /
₹4,000 per unit sale price).

Therefore, internal sales can be derived to be 50,000 units for the year (annual sales 100,000 units less external sales 50,000 units). For the year, value of sales made to Division A is ₹16 crore (Division B's total sales of ₹36 crore less external sales of ₹20 crores).

Had there been no extra demand, opportunity cost for Division B would have been nil. Therefore, transfer price would only be the variable cost of ₹2,750 per unit of component, However, given in the problem, that there was excess demand for 18,000 units of components from external customers, that could not be met since Division B had to give priority to internal demand. Had these sales been made Division B would have earned ₹1,250 per unit contribution (Sale price ₹4,000 per unit less variable cost
₹2,750 per unit). This lost contribution of ₹1,250 per unit is the opportunity cost per unit for Division B. Due to company's policy of giving priority to internal demand, Division B lost a profit of ₹2.25 crore during the year. (18,000 units × contribution of
₹1,250 per unit).

Therefore, internal sales comprises of two parts:

32,000 units of components transferred at variable cost of ₹2,750. This amounts to ₹8.8 crores.

18,000 units of components transferred factoring any opportunity cost = variable cost + contribution per unit = external sale price = ₹4,000 per unit. This amounts to₹7.2 crores.

Therefore, internal sales = ₹8.8 crores + ₹7.2 crores = ₹16 crores. Summarizing

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External sales are 50,000 units amounting to ₹20 crores annual sales value. Internal sales are 50,000 units amounting to ₹16 crores annual sales value. Transfer price for 32,000 units is at variable cost of ₹2,750 per unit while for 18,000 units is at external sales price of ₹4,000 per unit.

(ii)   Transfer Price Range for Divisions A and B

Division A procures its entire demand of 50,000 units from Division B. Out of this,

18,000 units at market price of ₹4,000 per unit while 32,000 units are procured at a lower rate of ₹2,750 per unit. Had Division A procured 32,000 units from the market, the additional cost of procurement would be ₹4 crores {(External price of ₹4,000 per unit less internal transfer price at variable cost of ₹2,750 per unit) ×32,000 units}. Only Division A currently enjoys this benefit of lower procurement cost. Financials of Division B show no profit from such internal transfers. This may skew the performance assessment of the divisions, if it is based primarily on financial metrics of each division. In order, promote goal congruence, some portion of this benefit can be shared with Division B.

Division B will at the minimum want to recover its variable cost of ₹2,750 per unit, while Division A will be ready to pay only up to external market price of ₹4,000 per unit. Therefore, transfer price range can be set between ₹2,750 - ₹4,000 per unit. Division A enjoys lower procurement rate while Division B financial reflect some benefit of transferring components internally to Division A.

(iii)   Impact of External Demand on Transfer Price

As the company's transfer pricing policy, Division B gives priority to demand from Division A. The division has a production capacity of 100,000 units annually. If there is no external market for Division B's components, then transfer price for the entire internal transfer would be the variable cost of ₹2,750 per unit plus portion of the fixed cost (if any). This is the minimum cost that Division B would like to recover from Division A.

When there is an external market, transfer price would depend on whether Division B had to incur any opportunity in the form of lost sales. When total demand (internal and external) is within production capacity of 100,000 units, the entire demand can be met. There would be no lost sales for Division B, no opportunity cost. Therefore, transfer price for the entire internal transfer would be the variable cost of ₹2,750 per unit. This is the minimum cost that Division B would like to recover from Division A.

When there is an external market, such that total demand (internal and external) is more than production capacity of 100,000 units, due to priority given to internal transfer, some portion of the external demand might not be met. This would be lost sales for Division B, opportunity cost would be the contribution lost from such sales at ₹1,250 per unit. This opportunity cost would be passed onto Division A. As explained in part (ii) above, transfer price range will be from ₹2,750 - ₹4,000 per unit. More lost sales for Division B would keep the average transfer price higher towards ₹4,000 per unit. Lesser lost sales for Division B would keep the average transfer price towards the lower bound of ₹2,750 per unit. Therefore, the proportion of external demand that could not be catered to, would determine the average transfer price. Higher the demand from external customers would drive up the average transfer price within the company.

Question 15

APC Ltd. has two divisions- Division X and Division Y with full profit responsibility. Division X produces components 'Gex' which is supplied to·both division Y and external customers.

Division Y produces a product called 'Gextin' which incorporates component 'Gex'. For one unit of 'Gextin' two units of component 'Gex' and other materials are used.

Till date, Division Y has always bought component 'Gex' from division X at ₹ 50 per unit since the lowest price at which the component 'Gex' could have been bought by Division Y was ₹ 52 per unit. Division X charges the same price for component 'Gex' to both division Y and external customers. However, it does not incur selling and distribution costs when transferring internally.

Division Y has received a proposal from a new supplier who has offered to supply component 'Gex' for ₹ 47 per unit at least for the next three years.

Manager of Division Y requests the manager of Division X to supply component 'Gex' at or below, ₹ 47 per unit. Manager of Division X is. not ready to reduce· the transfer price since the divisional performance evaluation is done based on profit margin ratio of the division.

The following additional information is made available to you :

	Component 'Gex'₹	Product 'Gextin'₹
Selling Price per unit	50	180
Less: Variable Costs		
Direct Materials		
Component 'Gex'	-	100
Other materials	12	22
Direct labour	16	13
Manufacturing Overhead	2	5
Selling and Distribution Costs	4	2
Contribution per unit	16	38
Annual fixed costs	₹ 40,00,000	₹ 20,00,000
Annual external demand (units)	3,00,000	1,20,000
Capacity of plant (units)	5,00,000	1,50,000

Required

(i) CALCULATE the present profit of each division and the company as a whole.

(ii) ANALYSE the impact on the total annual profits of each division and the company as a whole if Division Y accepts the offer of the new supplier.

(iii) In the changed scenario, DISCUSS why the top management should intervene and advise a suitable transfer price for component 'Gex' for resolving transfer pricing conflict which promotes goal congruence through efficient performance of the concerned division.

(STUDY MATERIAL)

Answer

APC Ltd. Transfer Pricing

(i)   Profitability of each division and the company as a whole when Division X supplies 240,000 units of Gex annually to Division Y.

Division Y produces 1,20,000 units of Gextin. Each component of Gextin requires 2 components of Gex that it currently procures from Division X. Therefore, it procures 2,40,000 units of Gex from Division X annually.

Division X has an overall capacity of 5,00,000 units annually to produce Gex. Of this it produces

2,40,000 units for Division Y, which it must first cater to. The remaining 2,60,000 units of Gex is sold to external customers.

Divisional and Overall Profitability of APC Ltd.

Sr. No.	Particulars	Division X				Division Y		Total APC Ltd
		Per unit of Gex	External Sales	Internal Sales	Total Division X	Per unit of Gextin	External Sales	
			2,60,000 units	2,40,000 Units	5,00,000 Units		1,20,000 units	
1	Selling Price	50	1,30,00,000	1,20,00,000	2,50,00,000	180	2,16,00,000	4,66,00,000
2	Less: Variable Cost							
a	Direct Material							
b	Component Gex	---	---	---	---	100	1,20,00,000	1,20,00,000
c	Other materials	12	31,20,000	28,80,000	60,00,000	22	26,40,000	86,40,000
d	Direct Labour	16	41,60,000	38,40,000	80,00,000	13	15,60,000	95,60,000
e	Manufacturing Over-head	2	5,20,000	4,80,000	10,00,000	5	6,00,000	16,00,000
f	Selling and Distribution Costs	4	10,40,000	----	10,40,000	2	2,40,000	12,80,000
	Total	34	88,40,000	72,00,000	1,60,40,000	142	1,70,40,000	3,30,80,000
3	Contribution (Step 1 - 2)	16	41,60,000	48,00,000	89,60,000	38	45,60,000	1,35,20,000
4	Annual Fixed Cost				40,00,000		20,00,000	60,00,000
5	Annual Profit (Step 3-4)				49,60,000		25,60,000	75,20,000

Note

Division X does not incur marketing costs on internal sales. Therefore, cost not incurred on transfer of 240,000 units to Division Y.

(ii) Impact if Division Y accepts to buy 240,000 units of Gex annually from the external supplier at ₹47 per unit of Gex.

Sr. No.	Particulars	Division X				Division Y		Total
		Per unit of Gex	External Sales	Internal Sales	Total Division X	Per unit of Gextin	External Sales	
			3,00,000 units	0 Units	3,00,000 units		1,20,000 units	
1	Selling Price	50	1,50,00,000	-	1,50,00,000	180	2,16,00,000	3,66,00,000
2	Less: Variable Cost							
a	Direct Material							
b	Component Gex	-	-	-	-	94	1,12,80,000	1,12,80,000
c	Other Materials	12	36,00,000	-	36,00,000	22	26,40,000	62,40,000
d	Direct Labour	16	48,00,000	-	48,00,000	13	15,60,000	63,60,000
e	Manufacturing Overhead	2	6,00,000	-	6,00,000	5	6,00,000	12,00,000
f	Selling and Distribution Costs	4	12,00,000	-	12,00,000	2	2,40,000	14,40,000
	Total	34	1,02,00,000	-	1,02,00,000	136	1,63,20,000	2,65,20,000
3	Contribution (Step 1 - 2)	16	48,00,000	-	48,00,000	44	52,80,000	1,00,80,000
4	Annual Fixed Cost				40,00,000		20,00,000	60,00,000
5	Annual Profit (Step 3-4)				8,00,000		32,80,000	40,80,000

Analysis APC Ltd

Overall profitability of APC Ltd. reduces from ₹75,20,000 per annum to ₹40,80,000 per annum. The reduction in profit is therefore ₹34,40,000 per annum. Reasons are:

(a) The cost of manufacturing Gex is only ₹30 per unit while Division Y is procuring this at ₹47 per unit from an external supplier. Annually this results in a loss of ₹40,80,000 (240,000 units of Gex×₹17 per unit).

(b) Since Division X no longer makes Gex for internal sales, it can ramp up its external sales to meet the full annual demand of 300,000 units. This results in extra external sales of 40,000 units annually. Each unit gives a contribution of ₹16 per unit. Therefore, additional contribution from sale of 40,000 units of Gex to external customers is ₹640,000 per annum.

(c) Therefore, netting both (a) and (b) above, the net loss to the company is ₹**34,40,000** per annum.

Division Y

Impact on profit of Division Y, increase from ₹25,60,000 per annum to ₹32,80,000 per annum that is ₹**7,20,000** per annum increase. This is due to the savings in procurement cost of Gex for Division Y. Instead of procuring Gex at ₹50 per unit Division Y proposes to buy it at ₹47 per unit externally. For its annual demand of 2,40,000 units of Gex, **it translates to savings of ₹7,20,000 annually in procurement cost for Division Y.**

Division X

Impact on profit of Division X, reduction from ₹49,60,000 per annum to ₹8,00,000 per annum. A substantial reduction of ₹**41,60,000** in its divisional profit per year. Division X earns a contribution of ₹20 per unit of Gex from its internal transfer to Division Y. (Selling price ₹50 per unit less variable cost of manufacturing ₹30 per unit). If Division Y procures Gex externally, this would result in an annual loss of ₹48,00,000 in contribution for Division X (240,000 units ×₹20 per unit). However, due to additional external sales of 40,000 units of Gex, Division X can earn an additional contribution of ₹6,40,000 per year (40,000 units of Gex × ₹16 contribution per unit of external sale). Offsetting, this results in a lower contribution **of ₹41,60,000 per annum for Division X.**

This also results in excess capacity of 2,00,000 units per annum in Division X.

(iii) APC Ltd. can suffer a loss of ₹34,40,000 per annum if Division Y decides to procure Gex from the external supplier. It costs on ₹30 per unit to manufacture Gex internally as compared to ₹47 per unit that Division Y is willing to pay to the external supplier. However, Division X is unwilling to reduce the price from ₹50 per unit since divisional performance is done based on the profit margin ratio of the division. Therefore, the management of the company has to step in to promote goal congruence. If Division Y buys GEX from the external supplier, not only is it costly for the company, it also results in a lot of unused capacity lying idle in Division X.

In the current scenario, one possible way of arriving at an acceptable transfer price range could be:

Division X is currently working at full capacity of 5,00,000 units per annum. Of this production, 2,40,000 units is supplied internally to Division Y while the balance is supplied to external market. The marginal cost of production of Gex is ₹30 per unit. If this were sold externally,

it would earn a contribution of ₹16 per unit. **Therefore, the minimum transfer price the Division X would demand = marginal cost of production per unit + opportunity cost per unit = ₹30+₹16 = ₹46 per unit of Gex.**

(The other way of looking at this could also be that Division X does not incur any selling and distribution costs on internal transfers. To outside clients it needs to spend ₹4 per unit towards the same. Therefore, to make its price more competitive with the external market, Division X can reduce the price by ₹4 per unit, which it has been recovering from Division Y for a cost it does not incur in internal transfers. Thus, based on its cost structure and the competitive profit margin it earns from external sales, it can price its internal transfers at ₹46 per unit.)

Division Y will be willing to pay the lower of net marginal revenue or the external buy- in price.

The Net Marginal Revenue per unit of Gextin = Selling price per Gextin – (marginal cost for Division Y other than the cost of Gex) = ₹180 - ₹42 = ₹138 per unit of Gextin. This translates that Division Y will be willing to pay upto ₹69 per unit of Gex, that it can incur without incurring a divisional loss. Meanwhile, the external buy-in price is
₹47 per unit.

Therefore, the maximum price Division Y will be willing to pay = lower of Net Marginal Revenue or external buy-in price = lower of ₹69 or ₹47 per unit of Gex. Therefore, Division Y will be willing to pay maximum ₹47 per unit of Gex to Division X.

Therefore, the transfer price range can be set between **₹46 - ₹47** per unit of Gex. Division X would then have to compete with the external supplier to retain its internal sales. This would promote more efficient working between Division X and

Y. **By selling it at ₹46 per unit, the contribution of Division X would be maintained at ₹16 per unit. For Division Y. the procurement of Gex at ₹46 per unit would be beneficial since it is lower than the external market price. If transfer price set at external market rate ₹47 per unit, Division Y would still be able to improve its profit margin as compared to the original transfer price of ₹50 per unit.**

Given that the marginal cost of manufacturing Gex is only ₹30 per unit, the management has to ensure that production of Gex is made in-house. Performance measure at a divisional level should then not be restricted to financial performance alone (full profit responsibility) and should be accordingly modified to include non- financial / operational measures as well.

Multinational Transfer Pricing

Question 16

A car manufacturing company has two manufacturing divisions in different countries. Division A in India manufactures engines for the cars. It has a capacity to manufacture 10,000 units each year. The variable cost of production is ₹8,000 p.u. and the division can sell 8,000 engines externally to customers within India at ₹11,000 p.u. The other division, Division B is in Italy that requires 5,000 engines every year to assemble them further into cars. It purchases these engines from a vendor in Italy at a price that is equivalent to
₹9,000 p.u.. If Division B were to purchase these units from Division A, the transfer price would be ₹10,000 p.u. Since no selling expenses need to be incurred on internal sales, variable cost of such transfers would be ₹7,000 p.u. If Division A accepts the internal order from Division B, it will have to curtail some of its external sales.
Given that the tax rate is 30% in India and 40% in Italy. Determine if the company will benefit overall if

Division B purchases from Division A. (STUDY MATERIAL)

Answer

Problem Definition: If Division B buys from Division A, will it benefit the company as a whole? Key Considerations: Contribution p.u. under external and internal sale options and the tax impact. Methodology:

Part 1: Benefit to Division A

Currently external sales are 8,000 units. If Division A accepts to cater to Division B's requirements, external sales have to be curtailed by 3,000 units. The sales mix would be external sales 5,000 units and internal transfer 5,000 units. (refer working note 1).

Division A was previous producing 8,000 units. On accepting Division B's order, it is operating at full capacity of 10,000 units, an additional 2,000 units are being produced. As per working note 2, contribution from each option is the same at ₹3,000 p.u.

Additional Contribution
= 2,000 units × ₹3,000 p.u.

= ₹6,000,000.

Division A pays tax in India at 30%. Hence the Net Tax Contribution

= ₹6,000,000 × (100% - 30%)

= ₹4,200,000.

Part 2: Net Additional Cost to Division B

Division B is currently purchasing the engine within Italy at ₹9,000 p.u. (₹ equivalent value).

If it purchases from Division A, it will pay ₹10,000 p.u. Additional Purchase Cost

= 5,000 units × (₹10,000 - ₹9,000)

= ₹5,000,000.

However, this extra cost is tax deductible at a rate of 40%, the tax rate in Italy. Hence Additional Cost (net of tax)

= ₹5,000,000 × (100% - 40%)

= ₹3,000,000.

Part 3: Overall benefit (after tax) to the company

As explained above, Division A benefits by ₹4,200,000 while Division B incurs an extra cost of ₹3,000,000. Hence, the net after tax benefit to the company is ₹1,200,000.

Therefore, Division B should purchase engines internally from Division A.

Working Notes

1. Statement of Capacity Utilization of Division A

Sr. No.	Particulars	Number of units
1	Maximum Capacity	10,000
2	External Sales	8,000
3 = 1 - 2	Spare Capacity	2,000
4	Division B's Requirement	5,000
5 = 4 - 3	External Sales Curtailed to meet B's Demand = B's Requirement - Spare Capacity Available = 5,000 units - 2,000 units	3,000

From the above table it can be seen that Division A has a spare capacity of 2,000 units currently. However, if it has to cater to Division B's requirements, external sales have to be curtailed by 3,000 units.

2. Statement of Contribution p.u

Sr. No.	Options	External Sale	Internal Sale
1	Selling Price p.u.	11,000	10,000
2	Less: Variable Cost p.u.	8,000	7,000
3 = 1 – 2	Contribution p.u.	3,000	3,000

Question 17

ABC miners operates two divisions, one in Japan and other in United Kingdom (U.K.). Mining Division is operated in Japan which is rich in raw emerald.

The other division is United Kingdom Processing Division. It processes the raw emerald into polished stone fit for human wearing.

The cost details of these divisions are as follows:

Division	Japan Mining Division	United Kingdom Processing Division
	Per carat of raw emerald	Per carat of polished emerald
Variable Cost	2,500 Yen	150 Pound
Fixed Cost	5,000 Yen	350 Pound

Several polishing companies in Japan buy raw emerald from other local Mining Companies at 9,000 Yen per carat. Current Foreign Exchange Rate is 50 yen = 1 Pound. Income Tax rates are 20% and 30% in Japan and the United Kingdom respectively.

It takes 2 carats of Raw Yellow emerald to yield 1 carat of Polished Stone. Polished emerald sell for 3,000 Pounds per carat.

Required

(i) COMPUTE the transfer price for 1 carat of raw emerald transferred from Mining Division to the Processing Division under two methods - (a) 200% of Full Costs and

(b) Market Price.

(ii) **1,000 carats of raw emerald are mined by the Japan Mining Division and then processed and sold by the U.K. Processing Division. COMPUTE the after tax operating income for each division under both the Transfer Pricing Methods stated above in (i). (Study Material)**

Answer

(i) Transfer Price: 200% of Full Cost Basis

= 200% of (¥ 2,500 + ¥ 5,000)

= ¥ 15,000 or £300 (¥ 15,000/ 50)

Transfer Price: Market Price Basis

= ¥ 9,000 or £180 (¥ 9,000/ 50)

(ii) Statement Showing "Operating Income"

Particulars	Japan Mining Division		UK Processing Division	
	Transfer Price		Transfer Price	
	¥15,000	¥9,000	£300	£180
Selling Price (Polished Stone)	---	---	£3,000	£3,000
Transfer Price (Raw Emerald)	¥ 15,000	¥ 9,000	---	---
Raw Emerald	---	---	£600 (£300 × 2)	£360 (£180 × 2)
Variable Cost	¥ 2,500	¥ 2,500	£150	£150
Fixed Cost	¥ 5,000	¥ 5,000	£350	£350
Profit Before Tax	¥ 7,500	¥ 1,500	£1,900	£2,140
Less: Tax 20%/ 30%	¥ 1,500	¥ 300	£570	£642
Profit After Tax per Carat of Raw Emerald	¥ 6,000	¥ 1,200	£1,330	£1,498
Raw Emerald	1,000 Carats	1,000 Carats	500 Carats	500 Carats
Total Profit	¥ 60,00,000	¥ 12,00,000	£6,65,000	£7,49,000
	Or	Or		
Total Profit (£)	£1,20,000	£24,000	£6,65,000	£7,49,000

Question 18

Standard Corporation Inc. (SCI) is a US based multinational company engaged in manufacturing and marketing of Printers and Scanners. It has subsidiaries spreading across the world which either manufactures or sales Printers and Scanners using the brand name of SCI.

The Indian subsidiary of the SCI buys an important component for the Printers and Scanners from the Chinese subsidiary of the same MNC group. The Indian subsidiary buys 1,50,000 units of components per annum from the Chinese subsidiary at CNY (¥) 30 per unit and pays a total custom duty of 29.5% of value of the components purchased.

A Japanese MNC which manufactures the same component which is used in the Printer and Scanners of SCI, has a manufacturing unit in India and is ready to supply the same component to the Indian subsidiary of SCI at ₹320 per unit.

The SCI is examining the proposal of the Japanese manufacturer and asked its Chines subsidiary to presents its views on this issue. The Chinese subsidiary of the SCI has informed that it will be able to sell 1,20,000 units of the components to the local Chinese manufactures at the same price i.e. ¥ 30 per unit but it will incur inland taxes @ 10% on sales value. Variable cost per unit of manufacturing the component is ¥ 20 per unit. The Fixed Costs of the subsidiaries will remain unchanged.

The Corporation tax rates and currency exchange rates are as follows:

Corporation Tax Rates		Currency Exchange Rates	
China	25%	1 US Dollar ($)	= ₹ 61.50
India	34%	1 US Dollar ($)	= ¥ 6.25
USA	40%	1 CNY (¥)	= ₹ 9.80

Required

(i) PREPARE a financial appraisal for the impact of the proposal by the Japanese manufacturer to supply components for Printers and Scanners to Indian subsidiary of SCI. [Present your solution in Indian Currency and its equivalent.]

(ii) IDENTIFY other issues that would be considered by the SCI in relation to this proposal.

(Note: While doing this problem use the only information provided in the problem itself and ignore the actual taxation rules or treaties prevails in the above mentioned countries) (Study Material)

Answer

(i) Impact of the Proposal by the Japanese Manufacturer to Supply Components for Printers and Scanners to the Indian Subsidiary of the SCI.

(ii) On Indian Subsidiary of SCI

Particulars	Amount (₹)
Cost of Purchase from the Chinese Manufacturer :	
Invoiced Amount {(1,50,000 units × ¥ 30) × ₹9.80}	4,41,00,000
Add: Total Custom Duty (₹ 4,41,00,000 × 29.5%)	1,30,09,500
Total Cost of Purchase from the Chinese Manufacturer…(A)	5,71,09,500
Cost of Purchase from Japanese Manufacturer in India:	
Invoice Amount (1,50,000 units × ₹320)	4,80,00,000
Total Cost of Purchase from Japanese Manufacturer in India …(B)	4,80,00,000
Savings on Purchase Cost Before Corporate Taxes …(A) – (B)	91,09,500
Less: Corporate Tax @34%	30,97,230
Savings after Corporate Taxes	60,12,270

On Chinese Subsidiary of SCI

Particulars	Amount (₹)
Loss of Contribution [{(1,50,000 – 1,20,000 units) × ¥ (30 – 20)} × ₹9.80]	29,40,000
Add: Inland taxes on Local Sale - Chinese Manufacturer [{(1,20,000 units × ¥ 30) × 10%} × ₹9.80]	35,28,000
Total Loss Before Corporate Taxes	64,68,000
Less: Tax Savings on the Losses (₹64,68,000 × 25%)	16,17,000
Net Loss after Corporate taxes	48,51,000

On SCI Group

Particulars	Amount (₹)
Saving from Indian Subsidiary	60,12,270
Loss from Chinese Subsidiary	48,51,000
Net Benefit to SCI Group	11,61,270

From the above analysis, it can be seen that the proposal from the Japanese manufacturer in India is beneficial for the SCI as it give a net benefit of ₹11,61,270.

(iii) The SCI need to consider various other issues before reaching at a final decision of accepting the proposal of the Japanese manufacturer in India. The few suggestive issues that should be considered are as follows:

- The longevity of the proposal of the Japanese manufacturer: Whether Japanese manufacturer will supply the components in the future also. For this purpose, a long term agreement between the Indian Subsidiary of SCI and Japanese manufacturer in India needs to be entered.

- Certainty of the fiscal policy in India: The Japanese manufacturer will not be able to supply the component at the present price if the fiscal policy of India will change in the future.

- Repatriation of Profit earned in India: Though the Indian subsidiary is making profit but it depends on the Government policy on the repatriation of profit from India to USA.

- Operating Conditions in China: The SCI has to make sure that the Chinese subsidiary is operating profitably and able to use the spare capacity in the future as well.

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The fiscal policy in China: If the Government of China liberalize its fiscal policies in China in future then the manufacturing cost will be cheaper than the today's cost.

Apart from above suggestive points the foreign relations and other tax treaties and accords should also be kept in consideration.

Section B – Case Scenarios & Case Studies

Case Scenarios

Question 1

G is the transferring division and R, the receiving division in a company. R has a demand for 20% of G's production capacity which has to be first met as per the company's policy. STATE with reason, which division, G or R enjoys more advantage in each of the following independent situations, assuming no inventory build -up.

Sl. No.	G Transfers to R at Transfer Price equal to	G's Production level	External Demand	Division having more advantage	Reason
(i)	Full cost: No mark up	60%	40%		
(ii)	Market Price	80%	60%		
(iii)	Marginal Cost	100%	80%		
(iv)	Market Price	100%	90%		

Answer (Study Material)

Sl. No.	Division Having More Advantage	Reason
(i)	G	G is utilizing only 40% of production capacity by selling to 'External Market' which implies that G might have not been able to recover its full fixed costs. By transferring 20% of its production capacity to division R at full cost, G will be able to recover fixed costs components.
(ii)	G	G will not be losing any external market demand as it is within its production capacity. By transferring 20% of production capacity to division R at market price, G will earn extra contribution towards the fixed costs and profit.
(iii)	R	Here G is operating at 100% capacity level and external market demand is 80% only i.e. G is not losing any external market demand. But by transferring 20% of production capacity to R at marginal cost i.e. at variable cost, G may not be able to recover fixed cost part of total cost. On the other hand R will be able to get these units at marginal cost only.

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(iv)	G	Though G is losing its 10% of external market demand but it would be able to earn the same revenue by transferring the goods to division R at market price. Moreover, G will be able to utilize 100% of its production capacity.

Question 2

Global Multinational Ltd. (GML) has two Divisions 'Dx' and 'Dz' with full profit responsibility. The Division 'Dx' produces Component 'X' which it sells to 'outside' customers only. The Division 'Dz' produces a product called the 'Z' which incorporates Component 'X' in its design. 'Dz' Division is currently purchasing required units of Component 'X' per year from an outside supplier at market price.

New CEO for Indian Operations has explored that 'Dx' Division has enough capacity to meet entire requirements of Division 'Dz' and accordingly he requires internal transfer between the divisions at marginal cost from the overall company's perspective.

Manager of Division 'Dx' claims that transfer at marginal cost are unsuitable for performance evaluation since they don't provide an incentive to the division to transfer goods internally. He stressed that transfer price should be 'Cost plus a Mark-Up'.

New CEO worries that transfer price suggested by the manager of Division 'Dx' will not induce managers of both Divisions to make optimum decisions.

Required

DISCUSS transfer pricing methods to overcome performance evaluation conflicts. (Study Material)

Answer

To overcome the **optimum decision making** and **performance evaluation conflicts** that can occur with **marginal cost-based transfer pricing** following methods has been proposed:

Dual Rate Transfer Pricing System

"With a 'Dual Rate Transfer Pricing System' the 'Receiving Division' is charged with marginal cost of the intermediate product and 'Supplying Division' is credited with full cost per unit plus a profit margin".

Accordingly Division 'Dx' should be allowed to record the transactions at full cost per unit plus a profit margin. On the other hand Division 'Dz' may be charged only marginal cost. Any inter divisional profits can be eliminated by accounting adjustment.

Impact:

- Division 'Dx' will earn a profit on inter-division transfers.
- Division 'Dz' can chose the output level at which the marginal cost of the component 'X' is equal to the net marginal revenue of the product 'Z'.

Two Part Transfer Pricing System

"The 'Two Part Transfer Pricing System' involves transfers being made at the marginal cost per unit of output of the 'Supplying Division' plus a lump-sum fixed fee charged by the 'Supplying Division' to the 'Receiving Division' for the use of the capacity allocated to the intermediate product."

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Accordingly Division 'Dx' can transfer its products to Division 'Dz' at marginal cost per unit and a lump-sum fixed fee.

Impact:

– 'Two Part Transfer Pricing System' will inspire the Division 'Dz' to choose the optimal output level.
– This pricing system also enable the Division 'Dx' to obtain a profit on inter-division transfer.

Question 3

Rest Easy Company is a rapidly growing start-up in the technology sector. It develops customized ERP packages for clients across various business sectors. The business comprises primarily of two departments (1) consultant and (2) customer support. Consultant department has highly qualified professionals from management, accounting, and technology background, who approach clients as a team and work out solutions that meet their needs.

Customer support personnel are in charge of IT implementation and provide support th rough telephone, e-mail or on-site. Currently, the strength of the consultant's department is 200 while that of customer support is 150.

Yash, the founder and CEO of the company, is very passionate about this business model. To deliver high-quality product solutions, he believes that his staff should be well-trained and up- to-date with developments in their professional fields. Therefore, Rest Easy provides periodic training to its staff in-house. All employees are expected to undergo 2 weeks of training annually. A training department has been set up with qualified trainers in various fields, who provide periodic training sessions to both Consultant and Customer Service departments. The training department has 5 trainers. Training sessions are aimed at providing skills that the executives need to provide better service to their clients. This in - house focus of high-quality delivery, is the key factor that Yash believes would set apart Rest Easy from its competitors.

In addition to delivering training sessions, trainers are responsible for developing training material for routine, on-going as well as specialized training sessions. They attend conferences, train the trainer sessions and subscribe to journals to keep themselves up-to- date with various developments that consultants and customer support executives need to be aware of.

At the beginning of each year, heads of consultant and customer service departments advise the training department on the expected number of training sessions that their staff would undertake. In special situations, where developments need to be communicated rapidly, extra sessions can also be conducted. Training department budgets are prepared based on these needs.

Transfer Pricing - Training Cost Allocation

Cost incurred by the training department is allocated to the consultant and customer service department based on the training sessions availed by both departments. A standard quote (transfer price) based on budgets is provided at the beginning of the year. At the end of the year, actual cost is allocated based on actual training sessions of each department.

Each of the user departments use the transfer price to prepare their individual budgets, that further gets built into their pricing models used for billing clients. One of the metric for manager appraisal is also the financial performance of their individual departments. Hence, managers of both consultant and customer service departments are very cost conscious.

Figures for budget and actual costs for 2018 of the training department are as follows:

Cost Particulars	Budget	Actual
Salaries	25,00,000	30,00,000
Depreciation on Office Equipment	2,00,000	5,00,000
Software Licenses for Training Packages	80,000	1,05,000
Conference Travel for Train the Trainer Sessions	10,000	15,000
Telephone	20,000	25,000
Training Supplies	50,000	60,000
Trainee Lunch	100,000	120,000
Total Expenses	29,60,000	38,25,000

Consultant and Customer service departments are charged based on the number of training sessions actually availed. Details of training sessions for each department are:

Department	Budget	Actual
Consultant	100	100
Customer Service	100	80
Total	200	180

Problem of Goal Congruence

In accordance with the above explanation, the training department quoted a rate of ₹14,800 per session based on the budgeted cost and budgeted training sessions. (Budgeted cost ₹29,60,000 for 200 training sessions). Actual cost per session is ₹21,250 (Actual cost ₹38,25,000 for 180 training sessions). Cost overrun of ₹6,450 per session, a jump of 44% from the original quote.

Consequently, a meeting was called that was attended by the managers of consultant, customer service and training departments, along with the CEO Yash.

The user departments were unhappy with the higher charge. Manager of the consultant department raised the following concerns:

(a) The market rate for similar trainings provided by external vendors was only ₹12,000 per session. He has accepted a higher transfer price of ₹14,800 per session only because the in-house training program was more customized towards Rest Easy's end- user- clients. However, if the department is actually going to be charged ₹ 21,250 per session, he would rather source the training to the outside vendor.

(b) Further, he pointed out that while his department had adhered to its commitment of 100 training sessions, the customer service department has availed of 20 lesser sessions than its commitment. Reviewing the cost structure of the training department, most of the expenses are fixed in nature. Therefore, when the transfer price is based on the actual cost and actual training sessions, the per session cost has increased because the customer service department did not undergo the entire 100 sessions. He questions, why he should bear a higher allocation of cost due to variance in actual and budgeted usage of training resources of the customer service department?

Manager of the customer service department explained that the variance of 20 training session is on account of the executives handling high-priority work pressure that did not allow them enough time to

complete some of the training sessions. At the same time, she contended that she should not be charged for those 20 sessions for which no training was availed.

Manager of the training department explained that the ₹500,000 cost overrun on salary due to new hire of a trainer. The trainer's experience is very valuable to the company and hence to get her on board, the company had to offer a higher pay scale. Depreciation on office equipment was higher by ₹300,000 due to higher replacement cost of ageing equipment. A specialized software license resulted in an excess spend of ₹25,000. The manager argued that the rest of the expenses were normal increases which were not controllable.

Yash, the CEO, was understandably not happy with the cost over-run. Higher internal transfer price to the end user departments would affect employee morale. However, even though a cheaper option was available from an outside vendor, he could still foresee the value of investing in in-house training programs. Intangible benefits from these customized sessions, would definitely help the company's growth.

To conclude, he was not willing to shut down the training department. At the same time, he had to resolve the dispute resulting from internal transfer pricing in an amicable way. Like profits, teamwork is critical to success.

Required

(i) IDENTIFY the threats to goal congruence due to internal transfer pricing.

During the meeting, an alternate transfer pricing methodology based on two-part pricing system was formulated. Costs would be segregated into fixed and variable categories. A transfer price for each category would be arrived based on budgeted costs and budgeted usage. The standard rate for fixed cost will be applied to the budgeted training sessions and charged to the user departments. The standard rate for variable cost will be applied to the actual training sessions and charged to the user departments. Fixed cost would be defined as those that are not directly impacted by the number of training sessions.

(ii) CALCULATE the transfer price to be charged to each department under this method.

(iii) EVALUATE how the two-part pricing price method of transfer pricing address the threats to goal congruence as identified in question 1? (Study Material)

Answer

(i) Threats to goals congruence due to internal transfer pricing are:

(a) User groups, consulting and customer service department are concerned that training department is not controlling its costs. Since the entire actual costs gets allocated to the users, training department may not be managing its costs efficiently. Since the financials of user departments are affected, it may lead to conflict between the departments.

(b) Yash, the CEO is a firm believer of in-house training and its benefits. However, there are outside vendors that provide similar service at substantially reduced costs. Performance assessment of managers of consulting and customer service are based on their department's financial metrics. Higher internal transfer price for training would affect employee morale since they have no control over these allocated costs. However, their performance is being evaluated based on uncontrollable factors. This could lead to discontent among the managers. Alternatively, Yash may want to re-consider his strategy of in-house training. When suitable, training can be sourced to cheaper options available in the market, without compromising on quality.

(c) Most costs of the training department are fixed in nature, as they need to be incurred irrespective of the number of training sessions. These costs are being allocated to the users based on actual training

sessions. The budgeted target price is used by the user departments, to determine their billing model to Rest Easy's end user clients. Hence it is important that the budget transfer price is not very different from the actual transfer price charged at the end of the year.

In the given problem, internal transfer price has been based on a budget of 200 sessions. Here the customer service department does not adhere to its commitment of 100 training sessions, training sessions actually availed are only

80. Since costs are mostly fixed in nature, the actual cost per training session increases. This is then charged out to the consultant and customer service departments. Consequently, despite meeting its commitment, the consultant department bears a higher cost allocation due to variance in the usage of training resources. This can lead to friction between the user departments.

(ii) By segregating the costs into fixed and variable components, Rest Easy is working out two-part pricing system for transfer price.

Two-Part Pricing System = Lump-Sum Charge + Marginal Cost

To segregate the costs into fixed and variable categories, the criteria is whether the costs change per additional training session. Accordingly, the classification of costs will be as below:

Cost Particulars	Budget (₹)	Classification
Salaries	25,00,000	Fixed
Depreciation on Office Equipment	2,00,000	Fixed
Software Licenses for Training Packages	80,000	Fixed
Conference Travel for Train the Trainer Sessions	10,000	Fixed
Telephone	20,000	Fixed
Training Supplies	50,000	Variable
Trainee Lunch	100,000	Variable
Total Expenses	**29,60,000**	

The lump-sum charge would be based on the fixed cost budget. Marginal cost would be based on the variable cost budget.

Total budget fixed expenses = ₹28,10,000 and total budget variable expenses = ₹150,000. Number of training sessions is 200, that is 100 each for consultant and customer service departments. Hence the fixed cost allocation rate would be ₹14,050 per session and variable cost allocation rate is ₹750 per session.

Transfer price to the consulting department = lump-sum charge + marginal cost

= (Standard Fixed Cost per session × Budgeted Training Sessions) + (Standard Variable Cost per Session × Actual Training Sessions)

= (₹14,050×100) + (₹750×100)

= ₹14,05,000 + 75,000

= ₹14,80,000.

Transfer price to the customer service department = lump-sum charge + marginal cost

= (Standard Fixed Cost per session × Budgeted Training Sessions) + (Standard Variable Cost per session × Actual Training Sessions)

= (₹14,050 × 100) + (₹750 × 80)

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=	₹14,05,000 + ₹60,000
=	₹14,65,000.

Total transfer price allocation is ₹29,45,000 versus actual expenses of ₹38,25,000. Unallocated expenses are ₹880,000.

(iii) Evaluate how the two-part transfer pricing model would address the goal congruence issues listed in question 1?

(a) Since transfer prices are based on budgets, the training department would become more cost-conscious. As explained above, as per this transfer pricing method, unallocated expenses of ₹880,000 would have to be borne by the training department. As given in the problem, this variance is mainly on account of extra cost for the newly hired trainer and the higher depreciation expense. The department will be more cautious while taking future decisions. However, Yash the CEO must ensure that the quality of training is not compromised and remains in line with the company's strategic policy.

(b) Internal transfer price of ₹14,800 per session is still higher than the outside rate of ₹12,000 per session. Further decisions would be based on the company's strategic objective. At the same time, if the number of training sessions are expected to increase beyond the budget, this transfer pricing method charges the user department only a marginal cost of ₹750 per session. This is definitely lower that the external rate.

(c) Under this method, fixed expenses that form majority of the cost are allocated based on budgeted cost and budgeted usage. Variable expense are allocated based on actual training sessions. Hence, any variance in the utilization of training resources, does not impact the other user department.

Therefore, most of the goal congruence issues can be addressed through this methodology.

CHAPTER – 10 Strategic Analysis of Operating Income

Section A – Practical Questions

Strategic Profitability Analysis

Question 1

Y Limited is a manufacturer of Cardboard boxes. An analysis of its operating income between 2017 and 2018 shows the following:

	Income Statement (amount in 2017)	Revenue & Cost Effect of Growth Component in 2018	Revenue & Cost Effect of Price Recovery Component in 2018	Cost Effect of Productivity Component in 2018	Income Statement (amount in 2018)
Revenue (₹)	40,00,000	2,00,000(F)	4,20,000(F)	-	46,20,000
Cost (₹)	29,20,000	60,000 (A)	2,56,000(A)	58,000(F)	31,78,000
Operating Income (₹)	10,80,000	1,40,000(F)	1,64,000(F)	58,000(F)	14,42,000

Y limited sold 4,00,000 boxes and 4,20,000 boxes in 2017 and 2018 respectively. During 2018 the market for cardboard boxes grew 3% in terms of number of units and all other changes are due to company's differentiation strategy and productivity.

Required

COMPUTE how much of the change in operating income from 2017 to 2018 is due to the industry market size factor, productivity and product differentiation and also reconcile the profit of both years due to these factors. (Study Material)

Answer

Reconciliation of Operating Income

Particulars	Amount (₹)
Operating Income in 2017	10,80,000
Add: Change Due to Industry Market Size Factor (W.N.-1)	84,000
Changes Due to Productivity (W.N.-2)	58,000
Changes Due to Product Differentiation (W.N.-3)	2,20,000
Operating Income in 2018	**14,42,000**

Workings

Total Increase in Sale of Cardboard Boxes 20,000 Boxes (4,20,000 Boxes – 4,00,000 Boxes). Out of this increase in Sales of 20,000 Boxes, 12,000 Boxes (3% of 4,00,000) is due to growth in market size, and the remaining 8,000 Boxes (20,000 Boxes – 12,000 Boxes) are due to an increase in market share.

Effect of Productivity on operating income:

=	Cost Effect of Productivity Component in 2018
=	₹ 58,000 (F)

Effect of Product Differentiation on operating income:

Particulars	Amount (₹)
Increase in the Selling Price (Revenue Effect of the Price Recovery Component)	4,20,000 (F)
Increase in Prices of Inputs (Cost Effect of the Price Recovery Component)	2,56,000 (A)
Growth in Market Share Due to Product Differentiation* ₹ 1,40,000 x $\dfrac{8,000 \text{ Boxes}}{20,000 \text{ Boxes}}$	56,000 (F)
Total	2,20,000 (F)

Question 2

ABC Airlines has two divisions organised as profit centre, the Passenger Division and the Cargo Division. The following divisional information were given for the year ended 31st March 2019:

Particulars	Cargo Division	Passenger Division	Total
Number of personnel trained	200	800	1,000
Number of flights	350	250	600
Number of reservations requested	Nil	7,000	7,000
Revenue	₹42,00,000	₹42,00,000	₹84,00,000
Operating Expenses (excluding service department charges)	₹36,00,000	₹28,50,000	₹64,50,000
Service Department Charges			
Training	₹3,20,000	₹3,20,000	₹6,40,000
Flight Scheduling	₹1,50,000	₹1,50,000	₹3,00,000
Reservation	₹1,05,000	₹1,05,000	₹2,10,000

The service department charge rate for the service department costs was based on revenue. Since the revenue of both the divisions were the same, the service department charges to each division were also the same.

Required

(i) Comment on whether the income from operations for the two divisions accurately measures performance.

(ii) Prepare the divisional income statement using the activity bases provided above in revising the service department charges.(Study Material) (MTP OCT.19)

Answer

(i) The reported income from operations does not accurately measure performance because the service department charges are based on revenue. Revenue is not associated with the profit centre manager's use of the service department services. For example, the Reservations Department serves only the Passenger Division and number of reservation requested by Cargo Division is NIL. Thus, by charging this cost based on revenue, these costs are incorrectly charged to the Cargo Division. Further, the Passenger Division requires additional personnel. Since these personnel must be trained, the training costs assigned to the Passenger Division should be greater than the Cargo Division.

(ii) ABC Airlines Divisional Income Statement For the Year Ended March 31, 2019

Particulars	Cargo Division (₹)	Passenger Division (₹)	Total (₹)
Revenue	42,00,000	42,00,000	84,00,000
Less: Operating Expenses (excluding service department charges)	36,00,000	28,50,000	64,50,000
Gross Margin	6,00,000	13,50,000	19,50,000
Less: Service Department Charges			
Training	1,28,000	5,12,000	6,40,000
Flight Scheduling	1,75,000 $(\frac{350}{600} \times 3,00,000)$	1,25,000 $(\frac{250}{600} \times 3,00,000)$	3,00,000
Reservation	Nil	2,10,000 $(\frac{7,000}{7,000} \times 2,10,000)$	2,10,000
Operating Income	**2,97,000**	**5,03,000**	**8,00,000**

Direct Product Profitability

Question 3

Jigyasa India Ltd. (JIL) has 30 retail stores of uniform sizes 'Fruity & Sweety Retails' across the country. Mainly three products namely 'Butter Jelly', 'Fruits & Nuts' and 'Icy Cool' are sold through these retail stores. JIL maintains stocks for all retail stores in a centralised warehouse. Goods are released from the warehouse to the retail stores as per requisition raised by the stores. Goods are transported to the stores through two types of vans i.e. normal and refrigerated. These vans are to be hired by the JIL.

Costs per month of JIL are as follows:

	(₹)	
Warehouse Costs:		
Labour & Staff Costs	27,000	
Refrigeration Costs	1,52,000	
Material Handling Costs	28,000	
Total	2,07,000	
Head Office Cost:		
Salary & Wages to Head Office Staff	50,000	
Office Administration Costs	1,27,000	
Total	1,77,000	
Retail Stores Costs:		
Labour Related Costs	33,000	
Refrigeration Costs	1,09,000	
Other Costs	47,000	
Total	1,89,000	

Average transportation cost of JIL per trip to any retail stores are as follows:

Normal Van	₹3,200
Refrigerated Van	₹4,900

The Chief Financial Manager asked his Finance managers to calculate profitability based on three products sold through Fruity & Sweety retail stores rather than traditional method of calculating profitability.

The following information regarding retail stores are gathered:

Butter Jelly		Fruits & Nuts	Icy Cool
No. of Cartons per cubic metre (m^3)	42	28	40
No. of Items per cartons (units)	300	144	72
Sales per month (units)	18,000	4,608	1,152
Time in Warehouse (in months)	1	1.5	0.5
Time in Retail Stores (in months)	1	2	1
Selling Price per unit (₹)	84	42	26
Purchase Price per unit (₹)	76	34	22

Butter Jelly and Icy-Cool are required to be kept under refrigerated conditions. Additional information:

Total Volume of All Goods Sold per month	40,000 m^3
Total Volume of Refrigerated Goods Sold per month	25,000 m^3
Carrying Volume of each van	64 m^3

Required

CALCULATE the Profit per unit using Direct Product Profitability (DPP) method. (Study Material)

Answer

Direct Product Profitability (DPP) Statement   (Amount in ₹)

	Butter Jelly	Fruits & Nuts	Icy Cool
Selling Price per unit	84.00	42.00	26.00
Less: Purchase Price per unit	76.00	34.00	22.00
Gross Profit ...(A)	**8.00**	**8.00**	**4.00**
Direct Product Costs:			

Warehouse Costs per m^3 [W.N.-1]	7.46	2.07	3.73
Retail Stores Costs per m^3 [W.N.-2]	6.36	4.00	6.36
Transportation Costs [W.N.-3]	76.56	50.00	76.56
Total DPP costs per m^3	90.38	56.07	86.65
Items per m^3 [W.N.-4]	12,600	4,032	2,880
Cost per item ...(B)	**0.007**	**0.014**	**0.030**
Direct Product Profit ...(A) – (B)	**7.993**	**7.986**	**3.97**

Working Notes

(i) **Warehouse Related Costs**

	General Costs (₹)	Cost Related with Refrigerated Goods (₹)
Labour & Staff Costs	27,000	---
Refrigeration Costs	---	1,52,000
Material Handling Costs	28,000	---
Total	55,000	1,52,000
Volume of Goods Sold	40,000 m^3	25,000 m^3
Cost per m^3 per month	1.38	6.08

Products	Time in Warehouse	st per m^3 per month (₹)	al Cost (₹)
Butter Jelly	1 Month	7.46 (1.38 + 6.08)	7.46
Fruits & Nuts	1.5 Months	1.38	2.07
Icy-cool	0.5 Months	7.46 (1.38 + 6.08)	3.73

(ii) **Retail Stores Related Costs**

	ral Costs (₹)	Cost Related with Refrigerated Goods (₹)
Labour Related Costs	33,000	---
Refrigeration Costs	---	1,09,000
Other Costs	47,000	---
Total	80,000	1,09,000
Volume of Goods Sold	40,000 m^3	25,000 m^3
Cost per m^3 per month	2.00	4.36

Products	e in Retail Store	st per m^3 per month (₹)	al Cost (₹)
Butter Jelly	1 Month	6.36 (2.00 + 4.36)	6.36
Fruits & Nuts	2 Months	2.00	4.00
Icy-cool	1 Month	6.36 (2.00 + 4.36)	6.36

(iii)   Transportation Costs

	Normal Van Costs	Refrigerated Van Costs
Cost per trip	₹3,200	₹4,900
Volume of Van	64 m^3	64 m^3
Cost per m^3 per trip	₹50.00	₹76.56

(iv)   No. of Items per m^3

Products	of Cartons (m^3)	No. of Items per Cartons (units)	No. of Items per m^3
Butter Jelly	42	300	12,600 (42 × 300)
Fruits & Nuts	28	144	4,032 (28 × 144)
Icy - Cool	40	72	2,880 (40 × 72)

Question 4

XYZ Ornamental Company has been a name to count on for quality and service. It has been designing wide range of ornamental products for more than two decades using the highest - quality standard. Such quality is achieved through years of experience and the integrity that is maintained by its employees. They are known for their perfection. VGG approached XYZ to make inquiry of two products. The two products are indoor fountain known as 'The Star' and a large gnome known as 'Dwarfs' for garden. Mr. Bob, the management accountant of XYZ, has estimated the variable costs per unit of 'The Star' and 'Dwarfs' as being ₹622.50 and ₹103.75 respectively. He estimated his calculations based on the following information:

(1)   Products Data

	The Star	Dwarfs	Other Products
Production/ Sales (units)	10,000	20,000	80,000
Total Direct Material Costs	₹22,50,000	₹7,50,000	₹60,00,000
Total Direct Labour Cost	₹15,00,000	₹5,00,000	₹60,00,000

(1) Total variable overheads for XYZ are ₹120,00,000 out of which 30% belong to the procurement, warehousing and use of direct materials. While all other variable overheads are related to direct labour

(2) XYZ presently allocate variable overheads into products units using percentage of total direct material cost and total direct labour cost.

(3) VGG is willing to purchase 'The Star' at ₹740 per unit and 'Dwarfs' at ₹151 per unit.

(4) XYZ will not accept any work yielding an estimated contribution to sales ratio less than 28%.

The directors of XYZ are considering switching to an activity-based costing system and recently appointed a management consultants firm to undertake an in-depth review of existing operations. As result of that review, the consultants concluded that estimated relevant cost drivers for material and labour related overhead costs attributable to 'The Star' and 'Dwarfs' are as follows:

350

	The Star	Dwarfs	Other Products
Direct Material Related Overheads: (The volume of raw materials held to facilitate production of each product is the cost driver.)			
Material Ratio per product unit	5	8	5
Direct Labour related overheads: (The number of labour operations performed is the cost driver.)			
Labour Operations per product unit	7	6	5

Required

(i) Give a financial Analysis of the decision strategy which XYZ may implement about the manufacture of each product using the unit cost information available.

(ii) Discuss whether activity-based management should be adopted in companies like XYZ. (Study Material)

Answer

(i) **Analysis**

The product costs per unit along with the respective contribution per unit may be calculated either by employing an ABC approach or alternatively by using the existing basis for the allocation of variable overhead cost.

The current scenario of product costing suggests that 'Dwarfs' should be produced as per the request of VGG because the contribution to sales ratio is 31 .29%. However, the current scenario of product costing also suggests that XYZ should not undertake production of 'The Star' at a selling price of ₹740 per unit since the estimated contribution to sales ratio is 15.88% is lower than the desired contribution to sales ratio of 28%.

Activity based costing approach ensures greater accuracy by using multiple cost drivers and determines areas generating the greatest profit or loss. Table [(d)] shows how much the contribution to sales (%) for each product changes when the overhead allocation method changes to ABC. As shown in Table, contribution to sales ratio on 'The Star' increased to 31.87% from 15.88% while contribution to sales ratio on 'Dwarfs' reduced from 31.87% to - 29.23%.

Thus, XYZ should opt to produce 'The Star' for VGG as contribution to sales ratio is 31.87 which is higher than the desired one.

(ii) The term Activity based management (ABM) is used to describe the cost management application of ABC. The use of ABC as a costing tool to manage costs at activity level is known as Activity Based Cost Management (ABM). ABM is a discipline that focuses on the efficient and effective management of activities as the route to continuously improving the value received by customers and to improve strategic and operational decisions in an organisation. Kaplan and Cooper divide ABM into Operational and Strategic.

Operational ABM covers the actions that increase efficiency, lower cost (i.e. reduce the cost driver rate of activities) and lead to higher revenue through better resources utilisation- in short, the action required to do things right. In other words, it is all about 'doing things right', using ABC information to improve efficiency. It also helps in identifying and improving value added activities and removing non -value added activities as to reduce cost without distorting product value.

Strategic ABM is about 'doing the right things'. It uses ABC information to determine which products is to be manufactured and which activities is to be used. XYZ can also use this for customer profitability analysis, identifying that which customers are the most profitable and focusing on them more.

A risk with ABM is that some activities have an implicit value are not reflected in a financial value added to any product. For example, a good and pleasant working environment can attract and retain the best human resources, but might not be identified as value added activities in operational ABM.

ABM provides managers an understanding of costs and helps teams to make certain decisions that benefit the whole organizations and not just their own activities .

Therefore, some companies like XYZ may adopt ABM to improve their operations and obtain useful activity information.

Workings

(a) Direct Material Cost per unit

The Star		Dwarfs
Total Costs (₹)	22,50,000	750,000
Production units	10,000	20,000
Cost per unit (₹)	225·00	37.50

(b) Direct Labour Cost per unit

The Star		Dwarfs
Total Costs (₹)	15,00,000	5,00,000
Production units	10,000	20,000
Cost per unit (₹)	150·00	25·00

(c) Variable Overheads

Material Related
Overhead Cost = 30% × ₹120,00,000 = ₹36,00,000 Total Volume Factor

Particulars	Units	Required per unit	Total Volume
The Star	10,000	5	50,000
Dwarfs	20,000	8	1,60,000
Other	80,000	5	4.00,000
Total Volume Factor			**6,10,000**

Overhead per unit of volume = ₹36,00,000/ 6,10,000 = ₹5.90. Therefore, Overhead Cost per product unit

will be as follows:

The Star	5	₹5.90	29.50
Dwarfs	8	₹5.90	47.20

Labour Related

Overhead Cost = 70% × ₹120,00,000 = ₹84,00,000 Total Operations Factor

Particulars	Units	Required per unit	Total Volume
The Star	10,000	7	70,000
Dwarfs	20,000	6	1,20,000
Other	80,000	5	4.00,000
Total Operations Factor			**5,90,000**

Overhead per operation = ₹84,00,000/ 5,90,000 = ₹14.24. Therefore, Overhead Cost per product unit will be as follows:

The Star	7	₹14.24	99.68
Dwarfs	6	₹14.24	85.44

(a) **Product Information** (by unit) is as follows:

Particulars	The Star		Dwarfs	
	Current Scenario	ABC Basis	Current Scenario	ABC Basis
Selling Price …(A)	**740.00**	**740.00**	**151.00**	**151.00**
Direct Material Cost	225.00	225.00	37.50	37.50
Direct Labour Cost	150.00	150.00	25.00	25.00
Variable Overhead Cost:				
Material Related	90.00	29.50	15.00	47.20
Labour Related	157.50	99.68	26.25	85.44
Total Variable Cost …(B)	**622.50**	**504.18**	**103.75**	**195.14**
Contribution …(A) - (B)	**117.50**	**235.82**	**47.25**	**(44.14)**
Contribution to Sales (%)	15.88	31.87	31.29	(29.23)

Customer Profitability Analysis

Question 5

A and B are two customers of XYZ Electronics Ltd., a manufacturer of audio players. Selling price per unit is ₹5,400. Its cost of production per unit is ₹4,420.

Additional costs are:

Order Processing Cost .... ₹2,000 per order
Delivery Costs .... ₹3,500 per delivery
Details of customers A and B for the period are given below:

Customer A		Customer B
Audio Players purchased (nos.)	350	500
No. of orders	5 (each of 70 units)	10 (each of 50 units)
No. of deliveries	5	0

The company's policy is to give a discount of 5% on the selling price on orders for 50 units or more, and to further give 8% discount on the undiscounted selling price if a customer uses his own transport of collect the order. Assume that production levels are not altered by these orders.

Required

(i)   Analyse the profitability by comparing profit per unit for each customer.
(ii)   Comment on the discount policy on delivery(Study Material)

Answer

Customer's Profitability Statement

Particulars	Customer- A	Customer- B
Sales (units)	**350**	**500**
	(₹)	(₹)
Selling Price per unit	5,400	5,400
Less: Discount (Quantity)	270 (₹5,400 × 5%)	270 (₹5,400 × 5%)
Less: Discount (Delivery)	---	432 (₹5,400 × 8%)
Selling Price (Net of Discounts) per unit	5,130	4,698
Less: Variable Cost per unit	4,420	4,420
Contribution per unit	710	278
Total Contribution	2,48,500 (₹710 × 350 units)	1,39,000 (₹278 × 500 units)
Less: Additional Overheads		
Delivery Cost	17,500 (5 × ₹3,500)	---
Order Processing Cost	10,000 (5 × ₹2,000)	20,000 (10 × ₹2,000)
Profit per customer*	2,21,000	1,19,000
Profit per customer per unit	631.43	238.00

(i)   **Analysis**

Even though A has lower sales volume (30% lesser from B), it is contributing almost double profit that is being contributed by B as overall discount offered to customer A is quite less.

(ii) Comments on the "Discount Policy on Delivery"

Discount on delivery offered to customer B is ₹432 per unit. If transport for delivery is provided to customer B then the cost would have been ₹70 per unit (10 deliveries × ₹ 3,500 / 500 units), which is lesser by ₹362. It may also be noted that delivery cost in case of customer A is only ₹50 per unit (₹17,500 ÷ 350 units). Hence, company needs to review discount policy on delivery but significance of profitability of customer B should also be kept in mind while doing so.

Question 6

ANCA Limited has decided to analyse the profitability of its four retail customers. It buys product 'Bio-aqua' at ₹218 per case and sells to them at list price less discount. The data pertaining to four customers are:

Particulars	Customer			
	A	**B**	**C**	**D**
No. of cases sold	7,580	38,350	78,520	15,560
List selling price	₹250	₹250	₹250	₹250
Actual selling price	₹245	₹236	₹228	₹232
No. of sale visits	6	12	16	10
No. of purchase orders	12	18	35	24
No. of delivery kilometers	280	350	450	400

It's four activities and cost drivers are:

Activity	Cost Driver Rate
Sale visits	₹750 per sale unit
Order taking	₹800 per purchase order
Deliveries	₹10.50 per delivery km travelled
Product handling cost	₹2.50 per case sold

Required

(i) Compute the customer level operating income.

(ii) Analyze the profitability for each customer. (RTP NOV.18) (Study Material)

Answer

Customer's Profitability Statement

Particulars	Customer- A	Customer- B	Customer- C	Customer- D
Sales (cases)	7,580	38,350	78,520	15,560
	(₹)	(₹)	(₹)	(₹)
List Price per case	250	250	250	250
Less: Discount	5 (₹250 × 2%)	14 (₹250 × 5.6%)	22 (₹250 × 8.8%)	18 (₹250 × 7.2%)
Actual Selling Price (Net of Discounts) per case	245	236	228	232
Less: Variable Cost per unit	218	218	218	218
Contribution per unit	27	18	10	14
Total Contribution	2,04,660 (₹27 × 7,580 units)	6,90,300 (₹18 × 38,350 units)	7,85,200 (₹10 ×78,520 units)	2,17,840 (₹14 ×15,560 units)
Less: Additional Overheads				
Visit Cost	4,500 (6 × ₹750)	9,000 (12 × ₹750)	12,000 (16 × ₹750)	7,500 (10 × ₹750)
Order Processing Cost	9,600 (12 × ₹800)	14,400 (18 × ₹800)	28,000 (35 × ₹800)	19,200 (24 × ₹800)
Delivery Cost	2,940 (280 × ₹10.50)	3,675 (350 × ₹10.50)	4,725 (450 × ₹10.50)	4,200 (400 × ₹10.50)
Product Handling Cost	18,950 (7,580×2.50)	95,875 (38,350 × ₹2.50)	1,96,300 (78,520 × ₹2.50)	38,900 (15,560 × ₹2.50)
Profit per customer	1,68,670 (11.81% of total)	5,67,350 (39.72% of total)	5,44,175 (38.10% of total)	1,48,040 (10.37% of total)
Profit per customer per Case	**22.25**	**14.79**	**6.93**	**9.51**

(ii) Going by volume of cases sold, customer C is the biggest customer accounting for 56% of total sales volume, followed by customer B (27%), customer D (11%) and customer A (6%). However, in terms of profit per customer, Customer B is the most profitable accounting for 39.72% of the cumulative customer profits of ₹14,28,235. Customer C contributes to 38.10% of the same. Comparing customers B and C, customer B is more profitable despite accounting for sales volume that is less than half of customer B (customer C's 56% of sale volume versus customer B's 27%). The primary reason for this is because the discount given to customer C (8.8%) is higher than that given to customer B (5.6%). The difference is terms of sale could be due to the fact that customer C is the biggest customer and hence is able to negotiate for a higher discount. Consequently, for each case sold, customer C gets an additional discount of ₹8 as compared to customer B. This is reflected in the contribution generated per case. Sale of one case to customer C generates ₹10 contribution versus sale of one case to customer B generates ₹18 contribution. This has a huge impact on profitability. In terms of profit generated per case sold, customer C has the lowest contribution at

₹6.93 per case. The company may review whether this difference in terms of sale to each of its customers is justified. If the discount to customer C at 8.8% was initially extended to promote sales, negotiations can be made to reduce this to mutually acceptable rates. However, care must be taken not to lose customer C to competitors.

Customer D is the least profitable accounting for just 10.37% of the total customer profits. In terms of sale volume, the customer ranks third providing 11% volume. However, the customer is not profitable because of the following reasons:

(a) A discount rate of 7.2% is provided to the customer. Each case sold after a discount of ₹18 per case, generates a contribution per case of only ₹14 per case. This is much lower compared to the contribution per case of customer A (₹27 per case) and customer B (₹18 per case). This discount policy may need to be reviewed. One scenario where such a high discount may be justified would be where customer D supplies the products that it manufactures at a discounted rate to a sister concern of the company. Therefore, at a parent company / overall level, the higher discount rate for a low volume customer D may be justified.

(b) For a customer that provides 11% of volume, the number of site visits during the year were 10. Customer C giving 56% of volume had only 16 visits and customer B giving 27% of volume had only 12 visits. This indicates that customer D, although a smaller customer, requires more visits than regular customers. Therefore, site visit costs are higher for this customer. The reason for a higher handholding by the company for this customer has to be analyzed. For example, one possible reason could be that customer D requires the cases customized to its production requirement. This may require more site visits by the company's personnel. To resolve this, due to the extra work involved, the company may wish to charge a higher sale price for the cases customized for customer D. In another other scenario, it may choose to charge the customer a fixed rate for each site visit.

(c) For a customer that provides 11% of volume, the number of orders placed in a year are 24. Customer C giving 56% of volume placed 35 orders in a year and customer B giving 27% of volume placed 18 orders in a year. This indicates that customer D, although a small customer, places orders more frequently than other larger customers. Therefore, order processing costs are higher for customer D. The company may revise ordering schedule for this customer or find out the reason for higher proportion of purchase orders, in order to pass on some of the cost to the customer. For example, let us say, customer D has an agreement with the company to provide cases "just in time" resulting in more frequent orders as compared to other customers. Therefore, the company is providing flexibility in procurement to customer D. For this convenience, it may pass on some of the ordering cost to customer D by way of a higher selling price or a lower discount.

(d) Again, given the volume, the number of deliveries to customer D (400) is at a higher proportion compared to the larger customers C (450) and B (350). The company may revise delivery schedule for this customer or find out the reason for higher proportion of deliveries, in order to pass on some of the cost to the customer. For example, let us say, customer D has an agreement with the company to provide cases "just in time" resulting in more frequent deliveries as compared to other customers. Therefore, the company is providing flexibility in procurement to customer D. For this convenience, it may pass on some of the delivery cost to customer D by way of a higher selling price or a lower discount. Customer A is the smallest customer providing only 6% of total sale volume. However, with a contribution per case at ₹27 per case and a profit per case at ₹22.25 per case, it is the most profitable of all customers. The primary reason for this is the discount of 2% offered is much lower than other customers. Each case sold to customer A yields a contribution of ₹27 as compared to a contribution of ₹10 from customer C, the biggest customer. Possible reason for a lower discount maybe customer A, being a smaller player, may have lesser bargaining power compared to other customers. If the company wishes to have a longer business relationship with customer A, it may wish to provide more favorable discount terms to this party. However, since customers B and C are much

larger customers, any benefit passed onto customer A should not impact the company adversely in the long run. For example, in order get more orders from customer A, the company gives a 10% discount to the party. Consequently, the profitability of customer A will decrease. Let us say customer A places huge orders due to which there are capacity constraints within the company. Sales to customers B and C, the current larger customers, may be impacted. This could affect the company adversely in terms of lost sales to customers B and C and loss of business relationships with these parties.

Therefore, careful consideration should be given before extending discounts to improve sales from customer A.

As regards product handling cost, each customer is currently charged ₹ 2.5 per case sold. The company, if feasible, apply Activity Based Costing technique to find out if this can be allocated based on the cost driver for each customer. Let us say, packing cost before shipment is part of product handling cost. If customer B requires special packing to ship the goods, then customer B needs to be allocated a higher packaging cost as compared to the others. This cost can be recouped from customer B through a higher selling price.

Question 7

Bookmark LLP is a publishing firm that started operations very recently. The firm has published "Advanced Learner's Dictionary" this first year, that have been sold to 3 distributors PER, MGH and WLY. The firm's financials reflect profits in its first year of operations. The management is pleased with the results. However, they are interested in finding out how profitable each customer is. This would help them formulate their sales strategy.

Particulars	PER	MGH	WLY
Sales units p.a.	1,000	950	1,250
Sale price (gross)	250	250	250
Payment terms	3/10 net 30	net 30	3/10 net 30
Sales returns	0.5%	0%	10%
Delivery terms	FOB destination	FOB destination	FOB shipping point

In order to get market share, PER and WLY have been extended credit terms to avail discount if payment is made within 10 days. Customer MGH does not have much bargaining power and hence has been allowed only 30 days' credit period without any benefit of availing discount for early payment. Both PER and WLY have made payments within 10 days to avail of the discount extended.

On the cost front, variable cost of goods sold attributable to the net sales to customers PER, MGH and WLY are ₹1,50,000, ₹1,42,500, and ₹1,87,500 respectively. Key metrics of customer assignable marketing, administrative and distribution costs are as below:

Activity	Activity Driver	of Units of Activity Driver			Cost Driver Rate (₹)
		PER	MGH	WLY	
Order taking and processing	# of orders	4	2	15	300
Expedited / rush orders	# of orders	1	-	5	250
Delivery costs	# distance in km.	100	50	-	80
Sale return processing	# of returns	1	-	8	150
Billing cost	# of invoices	4	2	15	50

Customer visit	# of visits	1	-	5	800
Inventory carrying cost *	# 1 per unit	1,000	950	1,250	10

* Assume no opening and closing stock

Fixed cost that are not assignable to any customer is ₹1,00,000 p.a.

Required

(i)   Prepare the customer wise profitability statement as also the overall profitability statement of Bookmark LLP.

(ii) Recommend a strategy for Bookmark LLP regarding its customers.

Answer (MTP OCT.19) (MTP APRIL.18) (Study Material)

(i)   **Customer Wise Profitability Statement and Overall Profitability Statement**

SN.	Particulars	PER	MGH	WLY	Total ₹
A	Sales (net proceeds) –Table 1	241,288	237,500	272,812	751,600
B	Variable Cost of Goods Sold	1,50,000	1,42,500	1,87,500	4,80,000
C	Assignable- Marketing and Administration Cost - Table 2				
	• Order Taking and Processing	1,200	600	4,500	6,300
	• Sale Return Processing	150	-	1,200	1,350
	• Billing Cost	200	100	750	1,050
	• Customer Visit	800	-	4,000	4,800
	Total Assignable Marketing and Administration Cost	2,350	700	10,450	13,500
D	Assignable- Distribution Cost - Table 2				
	• Expedited / Rush Orders	250	-	1,250	1,500
	• Delivery Costs	8,000	4,000	-	12,000
	• Inventory Carrying Cost	10,000	9,500	12,500	32,000
	Total Assignable Distribution Cost	18,250	13,500	13,750	45,500
E	Non- Assignable Fixed Cost	-	-	-	100,000
F	Total Costs (B+C+D+E)	170,600	156,700	211,700	639,000
G	Net Profit (Step A - F)	70,688	80,800	61,112	112,600
H	Profit % of Sales (G / A)	29%	34%	22%	15%

Workings

Table 1: Customer Sales Analysis - Revenue Analysis

Particulars	PER	MGH	WLY	Total ₹
Sales {Sale Units × Sale Price (gross)}	2,50,000	2,37,500	3,12,500	8,00,000
Less: Sale Return (Step 1 × Return%)	1,250	-	31,250	32,500
Net Sales	2,48,750	2,37,500	2,81,250	7,67,500
Less: Cash Discount	7,462	-	8,438	15,900
Net Proceeds	2,41,288	2,37,500	2,72,812	7,51,600
Final Collections vs Original Sale	97%	100%	87%	94%

Table 2: Assignable Marketing, Administrative and Distribution Costs

All figures in ₹

Particulars	PER	MGH	WLY	Total
Order Taking and Processing (# of orders × cost per order)	1,200	600	4,500	6,300
Expedited / Rush Orders (# of orders × cost per order)	250	-	1,250	1,500
Delivery Costs (Distance in km. × cost per km)	8,000	4,000	-	12,000
Sale Return Processing (# of returns × cost per return)	150	-	1,200	1,350
Billing Cost (# of invoices × cost per invoice)	200	100	750	1,050
Customer Visit (#of customer visits × cost per visit)	800	-	4,000	4,800
Inventory Carrying Cost (# of units × inventory carrying cost p.u.)	10,000	9,500	12,500	32,000

(ii) Customer strategy: It can be seen that Bookmark LLP has an overall profit of ₹112,600 or 15% of sales. While the performance is good, the firm's management has to analyze customer wise profitability.

 (a) WLY is the largest customer in terms of units sold. However, Table 1 above shows that sale returns at 10%, which is unusually large compared to other customers.

 Bookmark LLP has to investigate why the returns are of such large quantity. Possibly, there could be communication gap between the firm and WLY. Possible non-conformity in goods delivered has resulted in returns. Only 87% of the original sale value is being collected. The root cause of the problem has to be identified and rectified. This will also reduce the sale return processing costs.

 (b) WLY has placed many rush orders, which requires Bookmark LLP to ship these orders immediately, using costlier means of transportation. Currently, there is no charge for shipping rush orders. In order to deter WLY from repeatedly placing rush orders, Bookmark LLP can charge the customer for shipping such orders beyond a threshold number of orders. Say rush orders beyond 2 orders will be charged to the customer.

 (c) WLY has placed 15 orders for 1,250 units. Comparatively, PER and MGH placed 4 and 2 orders for approximately 1,000 units each. WLY can be requested to place fewer orders with larger quantity per

order, in order to optimize ordering cost.

(d) Being the largest customer, WLY has 5 sale visits from Bookmark LLP, which is more than the other 2 customers. Priced at ₹800 per visit, this very costly. At the same time, WLY is yielding the least profit. Therefore, Bookmark LLP should reassess if resources can be reallocated to the other two more profitable customers. That may encourage more sales from higher yielding customers.

(e) Since WLY seems to need more hand-holding in terms of more sales visits as well as higher rush orders, Bookmark LLP may assess if it wants to discontinue or reduce business. Alternatively, it may reassign these resources towards existing or newer customers to get better profitability. However, if WLY can be migrated to a higher profitability, Bookmark LLP need not lose out its market share.

(f) Customer MGH is the most profitable yielding 34% return over sales, although in terms of 'Advanced Learner's Dictionary' ordered, it is the smallest of the three. Bookmark LLP can assess if it can extend some discount, in order to encourage more sales. Currently, Customer MGH does not get any discount.

Bookmark LLP can assign more sales visits to Customer PER and MGH to encourage them purchase more as well as provide high quality customer service

Question 8

Golden East Ltd., is a hob manufacturing company doing business through wholesalers and retailers. The company is following Activity Based Costing system. Average cost per hob is ₹600 and the listed price is ₹1,000. But hobs are sold at a discount of 25% on listed price on orders for above 200 units and at a discount of 20% on orders for 200 units or less. The company wants to analyze the profitability of two of its wholesale customers A and B and two of its retail customers X and Y on the basis of the business with them during last year. This is to explore the opportunities to increase the profitability from the customers. The relevant data pertaining to the last year are given below:

Customer	A	B	X	Y
No. of purchase orders	50	65	230	270
No. of hobs purchased per order	500	300	40	30
No. of visits to customer's place	10	15	25	22
No. of ordinary deliveries	45	50	175	200
No. of speed deliveries	5	15	50	65

The activity, cost driver and the rate are as follows:

Activity	Cost Driver	Cost per unit of Driver (₹)
Order processing	No. of purchase orders	1,300
Visiting customers	No. of customers visited	7,400
Ordinary delivery	No. of ordinary deliveries	2,000
Speed delivery	No. of speed deliveries	6,000

Required

(i) Evaluate the customer profitability by calculating the profit per hob from each customer.

(ii) Recommend steps to be taken to improve profitability from less profitable customers.

(iii) List down the service organizations for which customer profitability analysis is useful.

(iv) Explain the specific benefits of customer profitability analysis.(Study Material)

Answer(PYQ NOV.18)

Statement Showing Profit per Customer per unit

Sr. No.	Particulars	A (₹)	B (₹)	X (₹)	Y (₹)	Total (₹)
1	Net Sale Proceeds (Refer Table 1)	187,50,000	146,25,000	73,60,000	64,80,000	472,15,000
2	Cost of Sales (Refer Table 1)	150,00,000	117,00,000	55,20,000	48,60,000	370,80,000
	Assignable Marketing and Administration Cost (Refer Table 2)					
3a	Order Processing Cost	65,000	84,500	2,99,000	3,51,000	7,99,500
3b	Customer Visit Cost	74,000	1,11,000	1,85,000	1,62,800	5,32,800
3	Total Assignable Marketing and Administration Cost (Step 3a + 3b)	1,39,000	1,95,500	4,84,000	5,13,800	13,32,300
	Distribution Cost (Refer Table 2)					
4a	Ordinary Delivery Cost	90,000	1,00,000	3,50,000	4,00,000	9,40,000
4b	Speed Delivery Cost	30,000	90,000	3,00,000	3,90,000	8,10,000
4	Total Assignable Distribution Cost (Step 4a + 4b)	1,20,000	1,90,000	6,50,000	7,90,000	17,50,000
5	Total Cost (Step 2+3+4)	152,59,000	120,85,500	66,54,000	61,63,800	401,62,300

6	Net Profit (Step 1 - Step 5)	34,91,000	25,39,500	7,06,000	3,16,200	70,52,700
7	Profit per Hob per Customer (Step 6 / Step 3 of table 1)	139.64	130.23	76.74	39.04	114.12

Table 1: Customer Sales Analysis - Net Sale Proceeds and Cost of Sales

Sr. No.	Particulars	A	B	X	Y	Total
1	No. of Purchase Orders	50	65	230	270	615
2	No. of Hobs Purchased per order	500	300	40	30	870
3	Total Hobs Sold in the year (Step 1 × 2)	25,000	19,500	9,200	8,100	61,800
4	Listed Price per unit (₹)	1,000	1,000	1,000	1,000	

5	Discount as per Policy (refer note 1)	25%	25%	20%	20%	
6	Net Sale Price per unit (Step 4 × (1- discount rate per Step 5) (₹)	750	750	800	800	
7	Net Sale Proceeds (Step 3 × Step 6) (₹)	187,50,000	146,25,000	73,60,000	64,80,000	472,15,000
8	Cost of Sales (Cost per Hob ₹600 × Step 3) (₹)	150,00,000	117,00,000	55,20,000	48,60,000	370,80,000

Note 1

Golden East Ltd. has a policy of providing discount of 25% on listed price on orders above 200 units and 20% on orders less than 200 units. Each order of customers A and B is for more than 200 units while each order of X & Y is for less than 200 units. Therefore, A and B get a discount of 25% and X and Y get a discount of 20% on the listed price per order.

Table 2: Activity Based Costing Technique
(to allocate assignable marketing, administrative and distribution cost)

Particulars	Cost per Driver unit (₹)	A (₹)	B (₹)	X (₹)	Y (₹)	Total (₹)
Order processing cost (# of orders per customer × cost per order)	1,300	65,000	84,500	2,99,000	3,51,000	7,99,500
Customer visit cost (# of visits × cost per visit)	7,400	74,000	1,11,000	1,85,000	1,62,800	5,32,800
Ordinary delivery cost (# of ordinary deliveries × cost per delivery)	2,000	90,000	1,00,000	3,50,000	4,00,000	9,40,000
Speed delivery cost (# of speed deliveries × cost per delivery)	6,000	30,000	90,000	3,00,000	3,90,000	8,10,000

Evaluation of the Customer Profitability

From the above calculations, it can be concluded that the average profit per hob sold is ₹114.12. Sales to all the concerned customers are profitable. However, it can be observed that, sales to customers A and B, who are wholesale buyers, yie ld above average profit per hob ₹139.64 and ₹130.23 respectively. While sales to customers X and Y, who are retail buyers, yield below average profit per hob ₹76.74 and ₹39.04 respectively. Therefore, it can be concluded that sales to wholesale buyers are more profitable than sales to retail buyers. In terms of units of hob sold, sales to A and B account for nearly 72% of the sales (Customer A 25,000 units, Customer B 19,500 units from total sales of 61,800 units). Therefore, Golden East Ltd. seems to have a profitable business. However, analysis to improve the profitability from sales to retail customers like customers X and Y, would enable Golden East to improve its overall bottom-line.

(ii)   Recommendation

Steps to improve customer profitability of retail customers X and Y. Referring to Table 1, a major portion of the assignable marketing, administration and distribution cost can be traced to customers X and Y. Breaking this down into various cost heads:

(a) Order Processing Costs: A total 615 purchase orders relating to sale of 61,800 hobs have been raised by the four customers. Customer X has raised 37% of the orders to buy 9,200 (15%) hobs, Customer Y has raised 44% of the orders to buy (13%) of the hobs, while the balance 19% to buy 72% of the hobs have been raised by Customers A and B. Therefore, the retail customers X and Y are raising proportionally far more purchase orders as compared to wholesale customers. To process these orders, Golden East has to incur order processing charges on a higher scale. While the nature of sale to retail customers may entail sales in much smaller lots as compared to wholesale customers, Golden East Ltd. may require retail customers to place a threshold of minimum order quantity to be ordered in each purchase order. Fewer orders with larger quantity will reduce resources that would be needed for order processing, which will contribute towards lowering the processing cost for Golden East Ltd.

(b) Customer Visit Costs: These are marketing costs incurred by the company towards to provide support by understanding customer's needs and sorting operational issues. A total 72 visits relating to the four customers show that majority of visits have been made to customers X (25 visits) and Y (22 visits). However, sales to these customers account only for 28% of the hobs sold (Customer X 9,200 units Customer Y 8,100 of a total of 61,800 units sold). These retail customers are in need of a lot of hand-holding from the company. Golden East Ltd. needs to understand the reasons for so many visits to these two customers. Despite having so many visits, the sales are not as much as the wholesale customers. Therefore, Golden East has to analyze why so many visits are required to be made? This may indicate any improvements that can be made to business operations that can provide the required level of customer support, without so many customer visits. If this can be understood and implemented, resources required for customer visits would reduce, thereby reducing these costs.

(c) Ordinary Deliveries: Out of a total of 470 deliveries to the four customers, Customer X has 175 deliveries and Customer Y has 200 deliveries. Again, as explained above in point (a), retail customer orders lesser quantity as compared to wholesale customers. Therefore, the number of deliveries will be more. However, if Golden East Ltd. requires customers to order a minimum quantity each time, this can reduce the number of deliveries. This would reduce the resources required for making deliveries, thereby reducing the costs as well.

(d) Speed Deliveries: These are rush orders placed by customers to meet their urgent and immediate requirements. Since demand is required to be met in a short time span, Golden East may have to employ faster means of delivery. In the given problem, the cost of speed delivery is thrice the cost of an ordinary delivery. Out of a total of 135 deliveries, Customer X has 50 and Customer Y has 65 speed deliveries. At the same time, they account for only 28% of hob sales. Golden East Ltd. can require these customers to place of minimum order amount as part of their regular orders. This could reduce the need for speed deliveries. It could also make speed deliveries chargeable, if the number of such orders exceed a certain threshold say 10 orders in a year. This will enable Golden East Ltd. to recover some portion of the costs that it incurs to make these deliveries.

(iii)   List of service organizations using customer profitability analysis:
(a) Financial institutions like Banks and Insurance Companies.
(b) Hospitality services like Hotels, Travel Agents, and Tour Operators.

(c) Professional services like Audit and Accounting Firms, Law Firms, Consultancy Firms like IT Consultancy, Management Consultancy.
(d) Hospitals and Healthcare providers.
(e) Logistics and Freight Companies that transport goods to various destinations.

(iv) Benefits of Customer Profitability Analysis:
  (a) It helps the supplier to identify which customers are eroding overall profitability and which customers are contributing to it.
  (b) It can help to provide a basis for constructive dialogue between buyer and seller to improve margins.

Question 9

Edward Ltd. manufactures weighing machines of standard size and sells its products to two industrial customers namely MT Ltd. and KG Ltd. and to a dealer MG Bros. having shops in different cities. The maximum retail price per unit of weighing machine is ₹ 11,000 and per unit average cost of production is ₹ 5,500 (40% is general fixed overhead cost).

The Finance Officer has been asked to undertake a customer profitability analysis and calculate and compare the profit margin per customer (before deducting general fixed overhead) to know about the real customer profitability.
Following are the additional overhead information:

Delivery Costs	₹ 200 per Kilometer
Emergency Delivery Cost (in addition to Delivery Cost)	₹ 21,000 per Delivery
Order Processing Cost	₹ 6,000 per Order
Specific Discount and Sales Commission	As per Negotiation
Product Advertisement Cost	Actual Cost

The following data are available for each customer:

Particulars	MT Ltd.	KG Ltd.	MG Bros.
Sales (in units)	2,000	1,000	800
Total Delivery Kilometer Travelled	1,000	800	900
No. of Emergency Delivery	2	1	0
No. of Orders Processed	4	2	8
Specific Discount (Percentage of Sales Revenue)	25%	20%	15%
Sales Commission (Percentage of Sales Revenue)	15%	10%	5%
Advertisement Costs (₹)	8,75,000	6,15,000	4,30,000

(STUDY MATERIAL)

Required

Analyze the profitability for each customer, which customer is the most profitable.

Answer

Customer Profitability Statement

Particulars		MT Ltd.	KG Ltd.	MG Bros.
Sales (units)		2,000	1,000	800
		(₹)	(₹)	(₹)
Sales Revenue	...(A)	2,20,00,000	1,10,00,000	88,00,000
Average Variable Cost (₹5,500 × 60% = 3,300 p.u.)	...(B)	66,00,000	33,00,000	26,40,000
Contribution [70% of Sales] ...(A) - (B)		1,54,00,000	77,00,000	61,60,000
Less: Additional Overheads				
Delivery Cost (No. of K.M. × ₹200)		2,00,000	1,60,000	1,80,000
Emergency Delivery Cost (No. of Emergency Delivery × ₹21,000)		42,000	21,000	----
Order Processing Cost (No. of Orders × ₹6,000)		24,000	12,000	48,000
Specific Discount		55,00,000	22,00,000	13,20,000
Sales Commission		33,00,000	11,00,000	4,40,000
Advertisement Cost		8,75,000	6,15,000	4,30,000
Profit per customer*		54,59,000	35,92,000	37,42,000
Profit Margin per customer* (%)		24.81%	32.65%	42.52%
Rank		III	II	I

* Before Deducting General Fixed Overhead Cost

Analysis

The Contribution Margin is 70% for each Customer but when the other Overheads Costs per customer is included in the above Profitability Statement the Profitability of the three Customers become different. MG Bros. is the most Profitable Customer.

Question 10

Oxford Medical Care Co. (OMCC) is a pharmaceutical firm, operating its entire business through its four customers Ox1, Ox2, Ox3, and Ox4. Ox1 and Ox2 are small pharmaceutical stores while Ox3 and Ox4 are large discount stores with attached pharmacies. OMCC uses discount pricing strategy and prices its products at variable cost plus 25%.

Item	Small Pharmaceuticals		Large Pharmaceuticals		Activity Rate
	Ox1	Ox2	Ox3	Ox4	
Number of Orders	4	9	6	3	₹750
Order Size	₹40,000	₹20,000	₹4,25,000	₹4,00,000	n/a
Average Discount	4.50%	9.50%	17.50%	11.50%	n/a
Regular Deliveries	4	9	6	3	₹375
Expedited Deliveries	2	0	2	0	₹1,250
General Administration Cost	₹20,250		₹48,375		

Required

(i) Prepare a 'Customer Profitability Statement' that shows the profit from each customer and each customer channel.

(ii) Recommend some points to improve OMCC's profit.

(STUDY MATERIAL)

Answer

Statement Showing "Customer Profitability Analysis"

Particulars	Ox₁	Ox₂	Channel Total	Ox₃	Ox₄	Channel Total
	Small Stores			Large Stores		
Revenue	1,60,000	1,80,000	3,40,000	25,50,00	12,00,00	37,50,00
Discount	7,200	17,100	24,300	4,46,25	1,38,00	5,84,250
Net Revenue	1,52,800	1,62,900	3,15,700	21,03,75	10,62,00	31,65,75
Variable Costs	1,28,000	1,44,00	2,72,000	20,40,00	9,60,00	30,00,00
Contribution Margin	24,800	18,900	43,700	63,75	1,02,00	1,65,750
Order Processing	3,000	6,750	9,750	4,500	2,250	6,750
Regular Deliveries	1,500	3,375	4,875	2,250	1,125	3,375
Expedited Deliveries	2,500	---	2,500	2,500	---	2,500
Customer Profit	17,800	8,775	26,575	54,50	98,62	1,53,125
Channel Cost			20,250			48,375
Channel Profit			6,325			1,04,75

Recommendations Small Pharmaceuticals

Even though Ox1 has lower sales volume (11% lesser from Ox2), it is contributing around 67% of small store profit as its order is for larger quantities & discount offered is very less. OMCC is only just at breakeven point with small pharmaceuticals. To improve profit OMCC should:

(i) Coordinate with Ox2 to increase order size and try to negotiate a smaller discount.

(ii) Try to work with Ox1 to reduce expedited deliveries.

Large Pharmaceuticals

OMCC makes substantial profit from the large pharmaceuticals. Ox4 alone contributing around 55% of total customer's profit and its order is for larger quantities. Therefore, Ox4 is most favorable customer and may be given little extra attention. For Ox3, OMCC may have no options but to treat it as less profitable customer as Ox3 accounts more than 60% of sales.

Question 11

PQR Ltd. specializes in the distribution of pharmaceutical products. It buys from pharmaceutical companies and resells to each of the three different markets:

(i) General Supermarket Chains

(ii) Drug Store Chains

(iii) Chemist Shops

The company plans to use activity based costing for analyzing the profitability of its distribution channels. The following data for the quarter ending March 2014 is given

General Supermarket Chains		Drug Storehemist Chains	Shops
Average sales per delivery	₹ 96,500	₹ 32,450	₹ 6,225
Average cost of goods sold per delivery	₹ 94,650	₹ 1,800	₹ 5,950
Number of deliveries	960	2,470	8,570
Total number of orders	1,000	2,650	9,500
Average number of cartons shipped per delivery	250	75	12
Average number of hours of shelf stocking per delivery	2	0.5	0.1

The following information is available in respect of operating costs (other than cost of goods sold) for the quarter ending March 2014:

Activity Area	Cost Driver	Total Cost (₹)
Customer purchase order processing	Purchase order by	5,91,750
Customer store delivery	Number of deliveries	9,60,000
Cartons dispatched to customer stores	Number of Cartons dispatched to customer	7,92,135
Shelf stocking at customer store	Hours of shelf stocking	80,240

Required

Compute the operating income of each distribution channel for the quarter ending March 2014 using activity based costing. (STUDY MATERIAL)

Answer

Statement Showing "Operating Income of Distribution Channels of PQR Ltd."

Particulars	General Supermarket Chains (₹)	Drug Store Chains (₹)	Chemist Shops (₹)	Total (₹)
Sales (Number of Deliveries × Average Sales per delivery)	9,26,40,000 (960 × ₹ 96,500)	8,01,51,500 (2,470 × ₹ 32,450)	5,33,48,250 (8,570 × ₹ 6,225)	22,61,39,750
Less: Cost of Goods Sold (Number of Deliveries × Avg. COGS per delivery)	9,08,64,000 (960 × ₹ 94,650)	7,85,46,000 (2,470 × ₹ 31,800)	5,09,91,500 (8,570 × ₹ 5,950)	22,04,01,500
Gross Margin	17,76,000	16,05,500	23,56,750	57,38,250
Less: Operating Costs	5,20,200	6,19,425	12,84,500	24,24,125
Operating Income	**12,55,800**	**9,86,075**	**10,72,250**	**33,14,125**

Workings

Statement Showing "Operating Cost of Distribution Channels of PQR Ltd."

Particulars	General Supermarket Chains (₹)	Drug Store Chains (₹)	Chemist Shops (₹)	Total (₹)
Customer Purchase Processing	45,000 (₹45 × 1,000)	1,19,250 (₹45 × 2,650)	4,27,500 (₹45 × 9,500)	5,91,750
Customer Store Delivery	76,800 (₹80 × 960)	1,97,600 (₹80 × 2,470)	6,85,600 (₹80 × 8,570)	9,60,000
Cartons Dispatched to Customer Stores	3,60,000 (₹1.5 ×	2,77,875 (₹1.5 ×	1,54,260 (₹1.5 ×	7,92,135
Shelf Stocking at Store	38,400 (₹20 × 1,920)	24,700 (₹20 × 1,235)	17,140 (₹20 × 875)	80,240
	5,20,200	6,19,425	12,84,500	24,24,125

Question 12

Jawahar Stationary Mart (JSM) is located in centre of city "X" and popular for wide range of stationary products at competitive rate. Box files and cobra files are among the major product of JSM. JSM clients majorly, include medium and large corporate offices apart from reasonable base of retail clients. Mr. Ronit who done his masters in operations and marketing, recently join the family business (JSM). Mr. Ronit during first week itself, identify there are regular complaints from corporate clients regarding 'delivery of items, which are different from what is ordered' and 'for not meeting the requirements'. Mr. Ronit understands consumer behavior is very critical in nature, if understood well and used through-out the business operation; then can be key success factors. Hence with intent to establishing the integrated relations with customers at JSM, Mr. Ronit advise marketing team to start recording the date regarding customer in systemic manner and reporting of same.

Following is information regarding five major customers, who are regularly orders printed cobra files (Product code – J-Cobra 10) from JSM.

Particulars	A	B	C	D	E
No. of units sold	6,000	8,000	10,000	7,000	8,000
Margin per unit	6	7.5	7	8	10
No. of purchase order	10	30	25	20	10
No. of deliveries	3	4	6	4	5
Kilometers per delivery	100	185	50	250	50

Cost of processing the order is INRs 2,000 per order and cost of handling material is INR 0.15 per item, whereas transport cost is 3 per kilometer for delivery of goods. 3 rushed deliveries made to 'B', cost for rush delivery is INRs 800 per delivery.

Required

(i) ANALYZE customer profitability for JSM.

(ii) EXPLAIN three fundamental aspects of CRM to facilitate building relationship with profitable customer/(s). (RTP MAY.20)

Answer

(i) Statement of the Customer Profitability at JSM   **Amount in INRs**

Particulars	A	B	C	D	E
Margin (no. of units sold × margin per unit)...(A)	36,000	60,000	70,000	56,000	80,000
Customer Attributable Costs:					
Cost of Processing Purchase Orders (no. of purchase order × cost of processing order)	20,000	60,000	50,000	40,000	20,000
Product Handling Cost (no. of units sold × cost of handling per item)	900	1,200	1,500	1,050	1,200
Delivery Cost (no. of deliveries × km per delivery × cost per km)	900	2,220	900	3,000	750
Cost of Rush Deliveries (no. of rush deliveries × cost per rush delivery)	---	2,400	---	---	---
Total ...(B)	21,800	65,820	52,400	44,050	21,950
Profit (or Loss) ...(A) – (B)	14,200	–5,820	17,600	11,950	58,050
Profit/ Net Revenue (in % age)	39.44%	–9.7%	25.14 %	21.34 %	72.56 %

Analysis

From above, it can be concluded that customer A, C, and D are less profitable than customer E; whereas customer B is causing losses. Customer B provides a positive operating margin but is unprofitable when customer attributable costs are considered. This is because customer B requires more sales orders than the other customers. In addition, the customer has rush delivery costs.

This analysis can make sense, if interpreted, considering the 'Pareto Analysis'. Pareto Analysis named after economist Vilfredo Pareto, who specifies that 80% of consequences come from 20% of the causes i.e. 20% of customer provide 80% of the profit. Means input and output may not be balanced. (Curve of revenue, as shown in figure; represent that initially large amount of revenue comes from small portion of sales/customers only - such small proportion of customers is critical to success of entity).

Although here proportion of 80:20 don't hold truth, but for JSM; major portion of profit (around 60%) coming from customer E only, therefore, customer E is critical to JSM. Special attention can then be given to enhancing the relationships with the customer E to ensure that customer E cannot migrate to other competitors. In addition, greater emphasis can be given to attract new customers that have the same attributes as the most profitable customer E.

Further, there is no point in serving customer B, but instead of refusing to trade with customer B, if possible; it may be better to turn it into profitable customer. Customer B can be made profitable if action is taken to convince the customer B to place a smaller number of larger quantity orders and avoid rush deliveries. If customer B cannot be convinced to change its buying behavior, selling prices should be increased to cover the extra resources consumed.

(ii) Supply chain management is the technique to integrate the supplier, manufacturing, store, and distribution function efficiently; in order to procure, produce and distribute at/in right time, quantity and place respectively. For effective distribution, CRM can be enabling tool. CRM is an integrated approach to manage and coordinate customer interactions to identifying, acquiring, and retaining customers. CRM enables businesses to understand and retain customers (through better customer experience) apart from attracting new customer, in order to increase profitably and decrease customer management costs. CRM system, comprises following three fundamental aspects to facilitate building relationship with profitable customers –

- **Operative CRM** takes care of individual transactions and is used by operational team. Interactions by customers are kept in the data base and are used later by the service, sales, and marketing team for operational decisions. In JSM, the staff who is responsible to deal with customer must be given access to customer's details including all the information of activities performed earlier. This will enhance the JSMs' staff's efficiency to deal with customer-facing processes in a better way.

- **Analytical CRM** analyses the data created on the operational side of the CRM effort for evaluation and prediction of customer behavior. In JSM, analytical CRM can highlight the patterns in customers' behavior which will help sale team while pitching the product at JSM.

- **Collaborative CRM** ensures that information about customer must flow seamlessly throughout the supply chain, majorly distribution channel; in form of collaborative effort by all associated department of JSM to increase the quality of services provided to customers. Increase in utility at customer end will result in increased loyalty. Collaborative CRM comprises interactive technology like email, digital media to simplify the communications between customers and staff which would help in building relationships.

Activity Based Management

Question 13

Queenstown Furniture (QF) manufactures high-quality wooden doors within the forests of Queenstown since 1952. Management is having emphasize on creativity, engineering, innovation and experience to provide customers with the door they desire, whether it is a standard design or a one-of-a-kind custom door. The following information pertains to operations during April:

Processing time	9.0 hrs.*	Waiting time	6.0 hrs.*
Inspection time	1.5 hr.*	Move time	7.5 hrs.*
Units per batch	60 units		

(*) average time per batch

Required

Compute the following operational measures:
(i)   Average non-value-added time per batch
(ii) Average value added time per batch

(iii) Manufacturing cycle efficiency
(iv) Manufacturing cycle time**(Study Material)**

Answer

(i)   Average Non-Value Added Time per batch
= Inspection Time + Waiting Time + Move Time
= 1.5 hr. + 6.0 hrs. + 7.5 hrs.
= 15 hrs.

(ii) Average Value Added Time per batch
= Processing Time
= 9 hrs.

(iii) Manufacturing Cycle Efficiency

$$= \frac{\text{Processing Time}}{\text{Processing Time+Inspection Time+Waiting Time+Move Time}}$$

$$= \frac{9.0 \text{ Hrs}}{9.0 \text{ Hrs}+1.5 \text{ Hrs.}+6.0 \text{ Hrs}+7.5 \text{ Hrs}}$$

= 37.5%

(iv) Manufacturing Cycle Time

$$= \text{Total Production Time Unit per Batch}$$

$$= \frac{24 \text{ Krc}}{60 \text{ Unitc}}$$

= 0.40 hrs. per unit

Activity Based Budgeting

Question 14

6-Twelve is an Indian – Japanese international chain of convenience stores for food, snacks, hot and cold beverages is formulating its activity-based budget for January 2019. 6-Twelve has only three product types: Soft Drinks, Fresh Drinks, and Ready to Eat Food. The budgeted data relating to three products are as under:

Activity and Driver	Cost Driver Rates		Jan 2019 Budgeted		
	2018	Jan 2019	Amount of Driver Used		
	Actual Rate (₹)	udgeted Rate (₹)	Soft Drinks	Fresh Drinks	Ready to Eat Food
Ordering (per purchase order)	5,000	4,500	16	20	16
Delivery (per delivery)	4,000	4,100	13	60	20
Shelf-Stocking (per hour)	1,000	1,050	15	170	93
Customer Support (per item sold)	10	9	4,500	34,600	10,500

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6-Twelve has a continuous improvement system to budgeting monthly activity costs for each month of 2019. February's budgeted cost-driver rate is 0.996 times the budgeted January 2019 rate. March's budgeted cost-driver rate is 0.996 times the budgeted February 2019 rate and so on.

Required

(i) Compute total budgeted cost for each activity in January 2019.

(ii) Discuss advantages might 6-Twelve gain by using an activity-based budgeting approach over, say, an approach that allocates the cost of these activities to products as a percentage of the cost of goods sold.

(iii) Compute total budgeted cost for each activity in March 2019 if March 2019 has the same budgeted amount of cost-driver usage as January 2019.

(iv) State benefits of 6-Tweleve adopting a kaizen budgeting approach. Identify limitations? (Study Material)

Answer

(i) **Calculation of Total Budgeted Cost for Each Activity**
(₹)

Activity	Cost Hierarchy	Soft Drinks	Fresh Drinks	Ready to Eat Food	Total
Ordering (₹4,500 × 16; 20; 16)	Batch-Level	72,000	90,000	72,000	2,34,000
Delivery (₹4,100 × 13; 60; 20)	Batch-Level	53,300	2,46,000	82,000	3,81,300
Shelf stocking (₹1,050 × 15; 170; 93)	tput Unit Level	15,750	1,78,500	97,650	2,91,900
Customer support (₹9 × 4,500; 34,600; 10,500)	tput Unit Level	40,500	3,11,400	94,500	4,46,400
Total Budgeted Costs		**1,81,550**	**8,25,900**	**3,46,150**	**13,53,600**

(ii) An Activity Based Budgeting approach identifies how different products require different mixes of support activities. The relative percentage of how each product area uses the cost driver at each activity area is:

Activity	Cost Hierarchy	Drinks (%)	Drinks (%)	eady to Eat Food (%)	Total (%)
Ordering	Batch-Level	30.77	38.46	30.77	100.0
Delivery	Batch-Level	13.98	64.52	21.50	100.0
Shelf Stocking	Output Unit Level	5.40	61.15	33.45	100.0
Customer Support	Output Unit Level	9.07	69.76	21.17	100.0

By identifying these differences, 6-Tweleve managers are better able to budget for different unit sales levels and different mixes of individual product-line items sold. Using a single cost driver such as 'Cost of

Goods Sold' considers similarity in the use of indirect costs (support activities) across product lines which does not occur at 6- Twelve.

Other benefits cited by managers include:

(1) Better identification of resource needs.

(2) Clearer linking of costs with staff responsibilities, and

(3) Identification of budgetary slack.

(iii) March 2019 Rates (₹)

Activity	Cost Hierarchy	January	February	March
Ordering	Batch-Level	4,500.00	4,482	4,464.07
Delivery	Batch-Level	4,100.00	4,083.60	4,067.27
Shelf-stocking	Output Unit Level	1,050.00	1,045.80	1,041.61
Customer support	Output Unit Level	9.00	8.96	8.93

These March 2019 rates can be used to compute the total budgeted cost for each activity area: **(₹)**

Activity	Cost Hierarchy	Soft Drinks	Fresh Drinks	Ready to Eat Food	Total
Ordering (₹4,464.07 × 16; 20; 16)	Batch-Level	71,425	89,281	71,425	2,32,131
Delivery (₹4,067.27 × 13; 60;20)	Batch-Level	52,875	2,44,036	81,345	3,78,256
Shelf-Stocking (₹1,041.61 × 15; 170; 93)	Output Unit Level	15,624	1,77,073	96,870	2,89,567
Customer support (₹8.93 × 4,500; 34,600;10,500)	Output Unit Level	40,185	3,08,978	93,765	4,42,928
Total Budgeted Costs		1,80,109	8,19,368	3,43,405	13,42,882

(iv) A kaizen budgeting approach indicates management's commitment to organized cost reduction. Compare the budgeted costs from previous part.

	Ordering	Delivery	Shelf-Stocking	Customer Support
Part (i)	2,34,000	3,81,300	2,91,900	4,46,400
Part (iii)	2,32,131	3,78,256	2,89,567	4,42,928

QUESTION 15

"W" specialises in engineering design and manufacture in the automotive and motorsport industry. "W"'s design team has many years' experience in the design and development of engine components for the market and high performance engines. Though "W" is performing well, but many a times, the customers complained that they had to wait for long after placing the orders. "W" is interested in cutting the amount of time between when a customer places an order and when the order is completed. For the last year, the following data were reported in respect of Division "D":

Inspection time = 0.5 days per batch
Process time = 2.8 days per batch
Wait time = 16.0 days per batch
Queue time = 4.0 days per batch
Move time = 0.7 days per batch

Required

(i) CALCULATE Manufacturing Cycle Efficiency (MCE) and INTERPRET the result.
(ii) STATE what percentage of the production time is spent in non-value added activities.
(iii) CALCULATE the delivery cycle time.
(iv) CALCULATE the new MCE if by using Lean Production all queue time can be eliminated.

(STUDY MATERIAL)
ANSWER:

(i) Manufacturing Cycle Efficiency (MCE)

$$= \frac{\text{Processing Time}}{\text{Inspection Time} + \text{Process Time} + \text{Queue Time} + \text{Move Time} + \text{Wait Time}}$$

$$= \frac{2.8 \text{ days}}{0.5 \text{ days} + 2.8 \text{ days} + 4.0 \text{ days} + 0.7 \text{ days} + 16.0 \text{ days}} = 11.67\%$$

Interpretation

In AKG, the MCE is 11.67%, which means that 88.33% of the time a unit is in process is spent on the activities that do not add value to the product. Monitoring the MCE helps companies to reduce non-value added activities and thus get products into the hands of customers more quickly and at a lower cost.

(ii) Percentage of Time Spent on Non- Value Added Activities

= 100% -11.67%
= 88.33%

(iii) Delivery Cycle Time

= 0.5 days + 2.8 days + 4.0 days + 0.7 days + 16 days
= 24 days

(iv) Revised MCE

$$= \frac{2.8 \text{ days}}{0.5 \text{ days} + 2.8 \text{ days} + 0 \text{ days} + 0.7 \text{ days} + 16 \text{ days}}$$

$$= 14\%$$
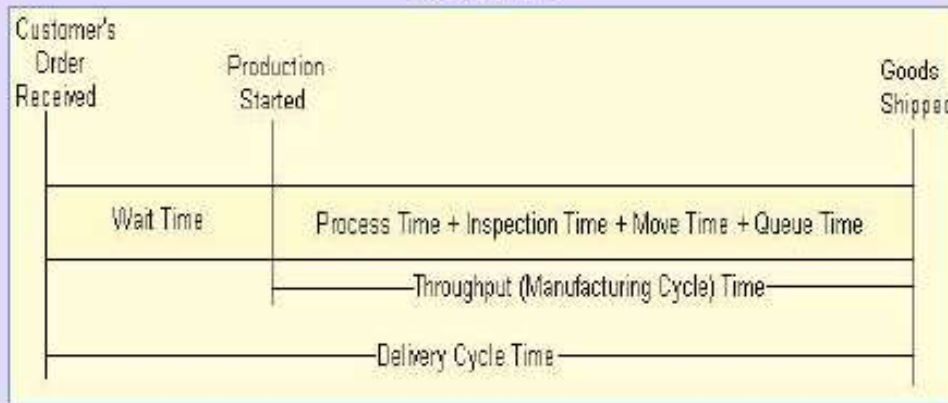
(i) Manufacturing Cycle Efficiency (MCE)

$$= \frac{\text{Value Added Time (Processing Time)}}{\text{Throughput (Manufacturing Cycle) Time}}$$

$$= \frac{2.8 \text{ days}}{0.5 \text{ days} + 2.8 \text{ days} + 4.0 \text{ days} + 0.7 \text{ days}}$$

$$= 35\%$$

Interpretation

In AKG, the MCE is 35%, which means that 65% of the time a unit is in process is spent on the activities that do not add value to the product. Monitoring the MCE helps companies to reduce non -value added activities and thus get products into the hands of customers more quickly and at a lower cost.

(ii) Percentage of Time Spent on Non- Value Added Activities

= 100% -35%

= 65%

(iii) Delivery Cycle Time

= 0.5 days + 2.8 days + 4.0 days + 0.7 days + 16 days

= 24 days

(iv) Revised MCE

$$= \frac{2.8 \text{ days}}{0.5 \text{ days} + 2.8 \text{ days} + 0 \text{ days} + 0.7 \text{ days}}$$

= 70%

Note that MCT does not include the *waiting time* before the "order is received by manufacturing" (**i.e. receipt time**).

Examples of non value added cycle time include the time the product spends waiting for parts or for next stage in the production process, being inspected or repaired or being moved.

This question has been solved in two different ways

Wait time: from start of production to completion

In first way, "Waiting Time" has been considered as the time product spends waiting for parts etc. from the start of production to completion i.e. in the *production process*. In this case "Waiting Time" is a non- value-added activity and part of MCT and will reduce MCE.

Wait time: from order being placed to start of production

In second way, "Waiting Time" has been considered as the time between 'customer places order' and 'order received by manufacturing department', in other words it is the time product spends *before the production process starts*. MCT does not include the *waiting time* before the 'order is received by manufacturing department'. Therefore, same has not been considered for the MCE calculations.

Section B – Case Scenarios & Case Studies

Question 1

Melody is a manufacturer of musical instruments. The company specializes in manufacture of Piano and Electronic Keyboard instruments. They are both labour-intensive products. Therefore, Melody follows absorbed its production overheads based on direct labour hours.

Piano

Melody's Pianos are of very high quality. Client patronage include professional Piano musicians. Some of these instruments are sold in its standard form. However, musicians particularly the concert players require their pianos to be customized to certain specifications. Customization primarily relates to the acoustic quality of the piano sound. Quality of sound is of paramount importance to musicians as it determines the power and warmth of tone. Each musician has a preference to achieve a special quality of sound. Therefore, no two customized Pianos can be the same. Due to its reputation, Melody receives numerous requests for customization from its customers. Ability to provide customization service sets Melody apart from its competitors.

Customization requires the services of professional craftsmen. They are hired as subcontractors for such work based on the need. These craftsmen perform their services within the factory premises. For this a special work, space is maintained by Melody. Melody charges its customers extra for sub- contracting cost plus 10%. This would cover the actual cost of subcontracting and any incidental overheads incurred. The Board of Melody accepts that this method of billing is very simplistic. It is unsure if the company is recovering the entire cost of providing this customization service.

Electronic Keyboard Instruments

These are instruments manufactured by Melody are home Keyboards that are targeted at young music enthusiasts who are beginning to learn music. They come in standard sizes, comprised of standard components. No customizations are done to Keyboards.

As a performance management expert, the Board wants your advice. The extract below provides the most recent management accounts for the Piano and Keyboard Division.

Sr. No.	Particulars	Piano	Keyboard	Total
1.	Number of items manufactured	1,000	10,000	
2.	Sale Price per unit	2,50,000	15,000	
3.	Revenue	25,00,00,000	15,00,00,000	40,00,00,000
4.	Materials	7,50,00,000	3,75,00,000	11,25,00,000

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5.	Direct Labour	8,00,00,000	6,75,00,000	14,75,00,000
6.	Subcontracting Cost	3,75,00,000	-	3,75,00,000
7.	Production Overheads	4,50,00,000	65,00,000	5,15,00,000
8.	Total Cost of Production (4+5+6+7)	23,75,00,000	11,15,00,000	34,90,00,000
9.	Gross Profit (3 - 8)	1,25,00,000	3,85,00,000	5,10,00,000

Production Overheads   Figures in ₹

Particulars	Amount
Inspection and Testing	3,45,00,000
Space Maintenance Cost for Subcontracting Work (rent, utilities, 2 support staff to maintain storage)	50,00,000
Other Production Overheads (rest of the utilities, rent, salary of support staff at storage)	1,20,00,000

Required

(i) DISCUSS the difference in treatment of production overheads under absorption costing and activity based costing.

(ii) LIST the steps to implement activity based costing within Melody.

(iii) ASSESS whether activity based costing would be suitable for the Piano and Keyboard Divisions.

(iv) ADVISE Melody about the activity based management and ways to improve business performance.

(STUDY MATERIAL)

Answer

(i) Product cost under absorption costing method includes all manufacturing costs that are incurred to produce a product {direct material, labour, and overheads (both fixed and variable)}. The allocation of overhead is determined by a single cost driver based on volume of production (popular ones are machine hours or direct labour hours). This driver is applied to the entire production overhead to arrive at the production overhead rate. For example, in the given problem, labour hours are being used to allocate overheads to Pianos and Keyboards. All production overheads are allocated to products based on this driver irrespective of whether this resource was used by the product or not. For example, production overheads include **maintenance cost relating to space for subcontracting work**. This cost is incurred for the manufacture of Piano alone. This portion of the maintenance cost gets clubbed with other production costs. Eventually, an overhead absorption rate is calculated using the ratio direct labour hours for each product. Absorption costing would ignore the fact that the manufacture of Keyboards does not utilize the space allocated for subcontracting work. This skews the product costing by erroneously inflating the cost of Keyboards, some portion of the cost of manufacturing Pianos passes onto the product cost for Keyboards. Application of a single cost driver may not be the most appropriate way of allocating costs between products. For example, in the given problem, **factory rent** that is clubbed with total overheads and applied to the product cost as part of the overhead rate. Absorption costing ignores that direct labour may not be the most appropriate basis to allocate factory rent overhead to the products.

Activity based costing identifies the cost of each activity and assigns costs to units produced based on the number of activities used by each unit. Instead of being clubbed as a single overhead cost, costs for each activity are captured in their respective cost pools. The most appropriate cost driver is selected. Cost drivers could be volume based (machine hours / direct labour) or transaction based (# of purchase orders).

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This cost driver is used as the basis to allocate costs to various products based on the utilization of the resource related to that activity. Overhead costs are assumed to be variable, determined (or driven) by the selected cost driver. Here, the **cost of maintaining space for subcontracting** relates entirely to the manufacture of Pianos. Using ABC method, this cost will be allocated only to Piano products since allocation is now based on utilization of the resource to manufacture the product. Again, under this method, **factory rent** could have space utilization as the cost driver. Therefore, using ABC method, the allocation of rent overhead to the products will be made on a more logical basis as compared to absorption costing.

To conclude, product costing using absorption costing is relatively simpler, a method regularly followed for financial accounting purpose. Product costing using ABC method results in more detailed yet accurate figures. It highlights the cost / benefit of various activities that helps management focus on eliminating non-value added activities.

    (ii)   **Implementation of ABC Method** within Melody would include the following steps: Activity Mapping: Production process has to be first broken down into various activities.Based on their nature, activities must then be clubbed to form activity pools. Activity pools must then tie in with the products or services.

Cost Pools: Overheads costs are then identified to each activity pools. This gives the cost pool for each category of activity.

Cost Driver: Identify the activity that bring about the cost. For example, space utilization would be a standard cost driver for factory rent. Cost drivers could be volume based or transaction based.

Overhead Rate: Once the cost pool and cost driver are identified, the cost per unit of cost driver (overhead rate) is determined.

Overhead Cost Allocation: Depending on how much of the resource (cost driver) the product utilizes, the cost is allocated accordingly to that product.

Product Cost: The allocated overhead cost is added to the cost of direct materials and labour to arrive at the full cost of production for the unit.

(iii) Appropriateness of ABC Method for the Keyboard and Piano Divisions

The Piano Division receives numerous requests for customization from its customers. While it produces only 1,000 Pianos in a year, no two customizations are the same. Therefore, the range of Pianos manufactured by Melody can be considered varied. Production overheads cost, including subcontracting work, form 35% of the total production cost. ((₹3,75,00,000 + ₹4,50,00,000)/ ₹23,75,00,000). Therefore, **overheads form a substantial portion of product cost**. Due to the variety in customization, it is important to price each customization at a rate that will yield an acceptable profit margin to Melody. To do this, manufacturing process has to be segregated into various activities and cost pools. Depending on utilization of resources related to each activity, each Piano can be sold at an appropriate price. If a Piano requires more of a resource from an activity, this can be included in the product cost and factored into the selling price, such that even with customization an acceptable profit margin can be earned. Thus, ABC method can help Melody arrive at a more accurate cost of production as compared to absorption costing.

While, overhead cost is one aspect of ABC analysis, the other information that an organization gets from this framework is that it can identify the activities that add value to the product. At the same time, non-value adding services can be identified (for example storage) and measures can be taken to minimize them. This helps it partner better with its customers and gain a competitive edge.

The Keyboard Division produces 10,000 Keyboards annually, all sold as a standard product with no customization. Activities are standardized, with no variation in the process between the Keyboards. Production overheads form only 6% of total cost of production. (₹65,00,000/₹11,15,00,000).

Implementation of ABC method is time consuming and complex. Here, due to the standardized nature of production and low quantum of production overheads, ABC method may not be justified for the time and effort involved. In this case, absorption costing may seem to be a more practical approach to arrive at product price.

(iv)   Activity Based Management to help Melody improve business performance

Activity based management can help Melody to meet the customer needs while using the lowest possible resource or cost. ABM can be used at an operational or strategic level.

Product Pricing

This would be especially in case of the Piano Division. As explained above, ABC method would enable Melody calculate a more accurate cost of production for each Piano. Currently, the **cost of subcontracting work** used for customizing Pianos is
₹3,75,00,000. This is being charged to the customers with a 10% mark-up to cover for any incidental overhead. However, this is very simplistic. As such the mark-up that can   be   earned   under   this method will be ₹37,50,000. However,   the   cost   of maintenance of the area for subcontracting work is higher at ₹50,00,000. Therefore, it can be concluded that Melody is not recovering the entire portion of the incidental overheads incurred by providing the subcontracting work.

By identifying the cost pools relating to the subcontracting work, Piano Division can determine that it is making a loss on the subcontract work as a whole. It could therefore adjust the price of customized Pianos such that it earns an acceptable margin on each sale. This is at an operational level. At a strategic level, Melody can determine which type of customizations are most profitable. Customizations that are not very frequent, too complex, and costly may be avoided as it takes away resources from Melody in terms of labour, space etc. At the same time, careful consideration should be given to such decisions since it is this customization service that gives Melody an edge over other competitors. Therefore, Melody should take decisions that help it balance the customer base, while keeping the costs low and processes as standardized as possible.

Analysis of Activities

Implementation of ABC method forces the company to take a more detailed look at its activities that comprise of its manufacturing process. It may be found that certain activities can be performed in more efficient manner. Also, activities can be identified as that that add value to the product and those that are not value adding. For example, in the given example, **storage** is not a value adding activity. Melody can work on a system where it optimizes the production process such that storage requirements are lower. The inventory turnover of Piano can also be improved, since quicker the Piano is shipped to the customer, lower the space requirement. **Inspection** is another non- value adding activity. For example, Melody switch to a standardized procurement system for its raw materials from reputed suppliers. While it may be a costlier option, this may lead to lower defects in the product, therefore requiring lesser need for inspection.

Performance Measurement

Employee resource should be used more towards value adding activities. Proper training would be required to ensure acceptable quality of work. This would automatically reduce non-value adding activities like rework, idle time, and inspection. There has to be proper information system in place that captures such data. This is facilitated through the implementation of ABC costing method and use of ABM. However, to have a successful system, senior management need to be committed to this model, proper communication and training has to be given to employees. To implement such a performance system the management has to commit sufficient time and effort. Cost benefit considerations of having such systems should also be taken into consideration. To conclude, implementing ABM should not take up productive time of employees and become a non- value activity in itself!

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CHAPTER-11 Budgetary Control

Section B – Case Scenarios & Case Studies

Case Scenarios

Question 1

Real Petroleum Corporation manufactures lubricant oils for motor vehicles (two wheelers, four wheelers and heavy vehicles). The company offers lubricant oils in various packages ranging from a 100 ml pouch to a 200 litres drum. About 70% of lubricant sales comprise are made in the form of 900 ml 'cans'. The process of manufacturing and packaging lubricant oils are given below:

- Base oil of required grade is imported from middle east.
- The base oil is blended with additives at the manufacturing plants at specified temperatures to produce lubricant oils.
- The oil is stored for a day to bring the temperature to normal.
- The plant has an automated bottling facility. The operator is required to pre-set the quantity and number of 'cans' to be filled in a computerised system. No manual intervention is required thereafter.
- The product is filled in 'cans' at the first stage of packaging with 900 ml of product.
- Caps are fixed on the 'cans' and sealed at the second stage of packaging.
- The product is weighed at third stage of packaging (a conversion factor is used to cover volume into weight) before the 'cans' are packed into a carton.

Any 'can' having lesser quantity of oil is removed before the 'cans' are packed into the cartons. The 'cans' which are short filled cannot be reused. Once the seal is broken, the 'can' is of no use. There is no process by which the oil in short filled 'can' could be reused. Hence the product is wasted.

The company is considering a proposal to add a component in its packaging unit to avoid losses arising out of quantity issues in packaging. The component will be installed after the first stage of packaging. The component will measure the volume of product and will forward the 'can' for capping and sealing only if the quantity in 'cans' is correct. In case the 'can' does not have required volume of product, the 'can' will be topped up with balance product before the capping and sealing process. The company will be able to achieve 0% wastage due to short filling after implementation of new system.

Required

Using the context of control systems, IDENTIFY and EXPLAIN the type of control which is existing in the company and the type of control which is proposed. (Study Material)

Answer

What is Control?

Control is a management function of establishing benchmarks and comparing actual performance against the benchmarks and taking corrective actions. Control is required at all levels of organisation to ensure that the organisation achieves its intended objective. There are two types of control systems - Feedback Control and Feed-forward Control.

Feedback Control

Feedback Control is a control activity that takes place after a process is complete. It is also known as post action control. If any problem is identified after a process i s complete, a corrective action is taken to rectify the problem. Feedback control provides information only after the process is complete and sometimes a significant time is lost to take corrective action. Feedback-based systems have the

advantage of being simple and easy to implement.

Real Petroleum currently has a feedback control mechanism in place. The actual volume of the product is measured at the end of the packaging process. The current control process is that any 'can' which is short filled is not packed in the carton. This ensures that a lower quantity of product is not supplied into the market. The current control system, however leads to product losses as identification of short-filled 'cans' at the end of process is not useful to the production process. In case, there is a huge variation in the final packaging, the packaging system can be reviewed to ensure that such problems do not acquire in the future.

Feed-forward Control

Feed-forward Control is also referred to as a preventive control. The rationale behind feed- forward control is to foresee potential problems and take corrective action to ensure that the final output is as expected. Feed-forward controls are desirable because they allow management to prevent problems rather than having to cure them later. Feed-forward control are costly to implement as it requires additional investment and resources. These are designed to detect deviation some standard or goal to allow correction to be made before a particular sequence of actions is completed

The proposed system in Real Petroleum is a Feed-forward control. In this case, any short filling is identified in the packaging process itself and corrective action is taken to ensure that the final packed 'can' has proper quantity of product. The new process is beneficial to the company as the wastage arising out of the packaging process can be avoided. The savings must be compared with the cost required to modify the packaging process before finalising on whether the new system should be implemented or not.

Question 2

EW Partners, a leading strategy and management consulting firm is preparing its budgets for the year to 31 March 2020. One of partner 'W' is concerned about liquidity, he argued, that a firm with adequate liquidity has less risk of being unable to meet their liabilities than an illiquid one. Where a firm has adequate liquidity, there is also the possibility of enriched profitability through reduced interest outlay or increased interest income, together with greater financial flexibility to negotiate enhanced terms with suppliers and financiers or participate in new business opportunities. Accordingly, he desires to reduce the firm's CC to zero by 30 September 2019 and to have a positive cash balance of ₹ 145,000 by the end of the year.

Required

COMPARE and CONTRAST, feed forward control and feedback control in context of the above information. (Study Material)

Answer

In feed-forward control instead of actual results being compared against desired results, forecasts are made of what results are expected to be at some future time . If these expectations differ from what is desired, control actions are taken that will minimize these gaps.
In the scenario, EW Partners has following 2 expectations–
the first of these is to reduce the CC to zero by 30 Sep 201 9 and
the second is to have a positive cash balance of ₹ 145,000 by 31 March 2020. Therefore, to achieve above expectations, a cash budget will be prepared based on various functional budgets showing cash inflows and outflows for each month so that the firm can
identify its anticipated monthly cash balance. This can then be compared with the firm's
expectations to see if their cash balance objectives are being achieved. However, if the objectives are not

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met by these budgets, these budgets may need to be revised by changing the levels of activities. It is the process of feedforward control.

Feedback control involves monitoring results achieved against desired results and taking whatever corrective action is necessary if a deviation exists.

Thus, in the case of EW Partners, a comparison of the actual monthly cash balance can be made against the budgeted cash balance for that month. As with any budget and actual comparison there may be an adverse or favorable variance. If this is substantial, then further analysis may be needed to determine its reason. It may be that costs above budgets, cash receipts lower than expected or receivables took less time to pay than expected, or payables were paid later than expected. This comparison process is feedback control.

Conclusion

Feed forward control attempts to take corrective action before an event, whereas feedback control takes corrective action after the event.

Question 3

SW & Co is a firm of Chartered Accountants having head office at Delhi and four branches in different parts of Northern region. They are providing wide range of services to their esteemed clients. Their core services include Taxation, Corporate Audits, Bank Audits, Management Audits and Project financing. The firm is preparing its budgets for the financial year 2019-2020.

The senior partners of the firm have stated that they would like to pay off the firm's loan taken from a public sector bank two years back for the renovation of their office premises this year and to have a positive cash reserve of ₹ 2,00,000 by the end of the year.

While comparing the actual cost with the budgeted data of last year, it was revealed that travelling costs were much higher than the budgeted costs. Fees receivable from some clients were so pending for more than three years thus distorting the expectations of cash budget.

DISCUSS the differences between feedforward control and feedback control using the above information about the cash budget of SW & Co. (STUDY MATERIAL)

Answer

Feed forward control systems are the comparison of draft plans with the objectives of the company.

In the scenario provided the consultancy firm has a number of objectives, two of which are related to their cash flow. The first of these is to pay off the loan by the year end and the second is to have a positive cash reserve of ₹ 2,00,000 by the year end.

An initial draft of the cash budget will be produced based on the expected receipts and payments and other costs of the firm. Cash budgets to be prepared showing the cash inflows and outflows for each month so that the firm can identify its expected monthly cash balance. This can be compared with the company's objectives to see if their cash balance objectives are being achieved. It is this comparison that is the process of feed forward control.

It is also referred to as a preventive control. The rationale behind feed forward control is to foresee potential problems and take corrective action to ensure that the final output is as expected. Feed forward controls are desirable because they allow management to prevent problems rather than having to cure them later. Feed forward controls are costly to implement as it requires additional resources and investments.

Feedback control systems are the comparison of actual results against the budget that has been approved. Thus, in the context of the SW & Co., actual travelling costs comparison made against the

budgeted costs and overdue fees receivables are also the process of feedback control.

As with any budget and actual comparison there may be an adverse or favorable variance. If this is significant then further analysis may be required to determine its cause. This comparison process is

 feedback control. It is also known as post action control. If any problem is identified after a process is complete, a corrective action is taken to rectify the problem. Feedback based system have the advantage of being simple and easy to implement.

Question 4

"It's frustrating working with Denial. He's very dominant and expects everything to be done his way. We have done more and better work to get up to budget, and the minute we make it he tightens the budget on us. We can't work any faster and still maintain quality. We always seem   to be interrupting the big jobs for all those small rush orders. The accountants seem to know everything that's happening in my department, sometimes even before I do. I thought all that budget and accounting stuff was supposed to help, but it just gets me into trouble. I'm trying to put out quality work; they're trying to save money. This is a dead-end job. I don't see much of a future here."– said Mr. Singh, manager of the machine shop of Global Mfg. Ltd. a UK based Company.

Mr. Singh had just attended the monthly performance evaluation meeting for plant department heads. These meetings had been held on the third Friday of each month since Mr. Denial, MBA from Manchester University, had joined the Indian operations a year earlier. Mr. Singh had just been given the worst evaluation he had ever received in his long career with Global Mfg. Ltd. He was the most respected of the experienced machinists in the company. Old Plant Manager had often stated that the company's success was due to the high quality of the work of machinists like Mr. Singh. He had been with Global Mfg. Ltd. for many years and was promoted to supervisor of the machine shop when the company expanded and moved to its present location. As supervisor, Mr. Singh stressed the importance of craftsmanship and told his workers that he wanted no careless work coming from his department.

When Mr. Denial became the plant manager, he directed that monthly performance comparisons be made between actual and budgeted costs for each department. The departmental budgets were intended to encourage the supervisors to reduce inefficiencies and   to seek cost reduction opportunities. The company controller was instructed to have   his staff 'tighten' the budget slightly whenever a department attained its budget in a given month; this was done to reinforce the plant supervisor's desire to reduce costs. Mr. Denial often stressed the importance of continued progress toward attaining the budget; he also made it known that he kept a file of these performance reports for future reference.

Required

IDENTIFY the problems which appear to exist in budgetary control system and explain how budgetary control system could be revised to improve the effectiveness. (Study Material)

Answer

The budgetary control system appears to have several very important shortcomings which reduce its effectiveness and may in fact cause it to interfere with good performance. Some   of the shortcomings are explained below.

Lack of Coordinated Goals: Mr. Singh had been led to believe high quality output is the goal; it now appears low cost is the goal. He does not know what the goals are and thus cannot make decisions which lead toward reaching the goals.

Influences of Uncontrollable Factors: The actual performance relative to budget is greatly influenced by uncontrollable factors i.e. rush orders. Thus, the variance reports serve little purpose for evaluation of performance.

The Short-Run Perspectives: The monthly evaluation and the budget tightening on a monthly basis result in a very short-run perspective. This will result in inappropriate decisions.

The improvements in the budgetary control system must correct the deficiencies described above. Accordingly:

Budgetary control system must more clearly define the company's objectives.

Budgetary control system must develop an accounting reporting system which better matches controllable factors with supervisor responsibility and authority.

Establish budget values for appropriate time periods which do not change monthly simply as a result of a change in the prior month's performance.

The entire company from top management down must be educated in sound budgetary procedures so that all parties will understand the total process and recognize the benefit to be gained.

Question 5

Established in the year 1997, Excellent Woodcraft Private Limited (EWPL) is one of the distinguished manufacturers and suppliers of an unlimited array of Wooden Furniture Items. Product compilation comprises of Modular Furniture, Workstations, and Cafeteria Furniture. Moreover, it is also engaged in presenting Furniture Services that include Interior Fit Out, Office Interiors and Corporate Interior Designing. Since inception, it has strived to proffer an excellent blend of optimum quality and price, and successfully established the company as the preferred choice of customers in the past years. This is the reason that its products and services are applauded in the industry for its flawlessness.

At EWPL, a world-class infrastructure is set up with different types of latest technology based machines and equipment, which provide great support in hassle-free production and storage of the proffered assortment. Besides the spacious workspace, it has recruited a team of skilled and experienced professionals, who are magnificently trained to understand and meet the diverse client requirements within the committed time period. It aims to attain complete client satisfaction and put in its best efforts to achieve the same by offering outstanding product range & feasible services.

EWPL's Budgeting Process for Sales

1) Each salesgirl makes a customer-wise listing of sales for the last few years. Based on this information and her knowledge about customer's requirements, she determines an overall sales goal.

2) The sale manager, W Robert, gathers all this information and modifies it a bit. Particularly, W looks at variance in sales growth and modifies low projections to be in line with the average. He, of course, discusses this correction with the concerned salesgirl. The usual approach is to hold up the other forecasts and attribute lack of sales growth to lower talent.

3) W then meets with J Donald, Managing Director. By this time, J already back out of his sales expectations for next year based on his desired profit. J discusses the overall target with the W. The usual result is a 7% to 10% increase in projected sales, which the W allocates among the salesgirls based on their past performance.

4) Of course, J desires that the W discuss and negotiate any alteration with the sales force. He believes that with appropriate logics, not high but attainable targets for his sales team can be met.

Required

(i) Discuss the participative nature of the sales budgeting process at EWPL.

(ii) Advise on best approach from EWPL's perspective that may be adopted. (Study Material)

Answer

(i) In participative budgeting, subordinate managers create their own budget and these budgets are reviewed by senior management. Such budget communicates a sense of responsibility to subordinate managers and fosters creativity. This is also called bottom up approach (sometime referred as participative approach).

As the subordinate manager creates the budget, it might be possible that the budget's goals become the manager's personal goal, resulting in greater goal congruence. In addition to the behavioural benefits, participative budgeting also has the advantage of involving individuals whose knowledge of local conditions may enhance the entire planning process.

The participative budget described here appears participative in name only. In virtually every instance, the participative input is subject to oversight and discussion by sales manager. Some amount of revision is also common. However, excessive and arbitrary review that substitutes a top-down target for a bottom-up estimate makes a deceit process. Such a gutting appears to be the case in EWPL. J's statement indicates a very autocratic style. The revision process also seems to be arbitrary and capricious. There is little incentive for the salesgirls to spend much time and effort in projecting the true expected sales because they know that the target would be revised again and J's estimate will prevail. This situation creates an interesting discussion about the costs and benefits of participative budgeting and gives rise to game playing and slack.

(ii) In top down approach, budget figures will be imposed on sales personnel by senior management and sales personnel will have a very little participation in the budget process. Such budget will not interest them since it ignores their involvement altogether. While in bottom up approach, each sales person will prepare their own budget. These budgets will be combined and reviewed by seniors with adjustment being made to coordinate the needs and goals of overall company. Proponents of this approach is that salespersons have the best information of customer's requirements, therefore they are in the best position in setting the sales goal of the company. More importantly, salespersons who have role in setting these goals are more motivated to achieve these goals. However, this approach is time-intensive and very costly when compared with top down approach. In order to achieve personal goals, participants may also engage in politics that create budgetary slack and other problems in the budget system.

Since both top down and bottom up approaches are legitimate approaches, so EWPL can use combination of both. Seniors know the strategic direction of the company and the important external factors that affect it, so they might prepare a set of planning guidelines for the salesgirls. These guidelines may include forecast of key economic variables and their potential impact on the EWPL, plans for introducing and advertising a new product and some broad sales targets etc. With these guidelines, salesgirls might prepare their individual budget. These budgets need to be reviewed to validate the uniformity with the EWPL's objectives. After review, if changes are to be made, the same should be discussed with salesgirls involved.

Question 6

SPM, a leading school of management in the heart of India's financial centre of Mumbai, preparing its budget for 2019. In previous years, the director of the school has prepared the budget without the participation of senior staff and presented it to the school board for approval.

Last year the SPM board blasted the director over the lack of participation of his senior staff in the budget process for 2018 and requested that for the 2019 budget the senior staff were to be involved.

Required

List the potential advantages and disadvantages to the SPM of involving the senior staff in the budget preparation process. (Study Material)

Answer

There are potential advantages and disadvantages of the involvement of staff in the preparation of the budget.

Potential advantages include:

▢ Senior staff may agree to accept the targets because they would take ownership of it as their budget.

▢ Senior staff may have a better understanding of what results can be achieved and at what costs. For example, they may have a better knowledge of individual courses and how they may be delivered more efficiently and cost effectively.

▢ Senior staff cannot blame unrealistic goals as an excuse for not achieving budget expectations.

▢ Senior staff would feel that they are being appreciated for the value that their experience brings to the running of the management school.

▢ Senior staff may get the opportunity to discuss organisational issues, in which an exchange of information and ideas can help to solve problems and agree future actions.

Potential disadvantages include:

▢ Senior staff may be excellent academically but could lack the practical knowledge required to formulate their budget.

▢ Senior staff may limit the benefits of participation due to personality traits of participants.

▢ Senior staff may consume a great deal of time arguing with each other (and with the school director). Senior staff may decide among themselves to artificially inflate the proposed budget so that it is easier for them to attain the cost targets they have set.

Question 7

History of the Company

Great Bus Tours Co. Ltd. (GBTCL) is an open top double-decker bus sightseeing company, particularly identified with its special red and cream-colored buses. It commenced operating in small town of Meghalaya in June 2014 with four buses and as of 2018 operated over 44 buses in north east region of India. GBTCL operates five routes with stops at tourist destinations. The company runs hop-on, hop-off bus tours of various hills, with one 24-hour ticket valid for unlimited journeys on the route.

Budget Process/ Incentive Plan

As a part of management performance control and incentive scheme it has been following participative budgeting approach. In GBTCL, budgeting is a joint process in which functional divisions develop their plans in conformity with corporate goals for the next financial year. Based on these plans, divisions prepare functional budgets and send to the appropriate management for review and approval. The budgets after the incorporation of the feedback and suggestions received from the said management, are finalised for the implementation. Then, finalised budgets are used as yardstick for performance

measurement. Comparing the actual performance with the yardstick, bonus and other performance related incentives are considered. The higher management believe that this performance control and incentive scheme is very helpful to measure the performance and fixing responsibilities for the responsibility centres.

Budgeted Income Statement (₹'000)

Revenue	1,13,800
Less:	
Variable Costs-	
Direct Material (Fuel, Lubricants and Sundries)	13,600
Direct Labour	40,500
Variable Overheads	7,700
Fixed Costs-	
Operating Overheads (Buses, Garage, Salaries)	18,100
Marketing and Administration	10,700
Profit/ (Loss) before taxes	23,200

Tabel-1

Current Year's Income Statement (₹'000)

Revenue	93,500
Less:	
Variable Costs:	
Direct Material (Fuel, Lubricants, and Sundries)	19,600
Direct Labour	37,700
Variable Overheads	6,200
Fixed Costs:	
Operating Overheads (Buses, Garage, Salaries)	20,150
Marketing and Administration	10,100
Profit/ (Loss) before taxes	(250)

Tabel-2

Other Information

Surprisingly above given current year's actual results were not up to the mark. Actual results were clearly showing adverse performance in comparison with budgeted figures.

Managers of GBTCL were upset because they did not receive the bonus. Ms. Maggie, Tour Manager of Route No. 3, said –

"We lost 2 month's revenue and fuel prices are almost doubled. We did our best but these circumstances were beyond our control and we should not penalize at all."

In support of her statement, Ms. Meggie provided following additional information –

(a) Rain is common in Northern Region. But, the past year set a record in numbers. In July, the expected average was 1,577 mm and received was 1,810 mm, In August the expected average rain was 990 mm and actual received was 1,535 mm. Heavy rain in these two months disrupted normal life of the region.

(b) The fuel prices have risen almost continuously since last year due to surge in global crude prices.

(c) Additional operational expenses ₹22,00,000 also incurred to remove the milky appearance and give the stainless a nice new look effected by heavy rain.

She claimed that –
"Revised budget with consideration of the above factors would give different results and lead to different conclusions"

Required

Analyse the tour manager's view. (Study Material) (MTP MARCH.18)

Answer

Analysis of Issue

It appears that GBTCL has been badly hit by the weather – high rain in July and August have led to a slump in business. Revenue have seen a fall of 18% over the budgeted figure. Direct Material (most of the fuel) is 21% of the Sales (compared to 12% of budgeted level) because of hike in fuel price. Variable Overheads are almost same. However, interestingly, there is a saving of ₹1,50,000 in Operating Overheads as compared to the budgeted figureafter catering additional Operational Expenses of ₹22,00,000 (for removal of milky appearance etc.). Furthermore, there is reduction in Marketing & Administration Cost. The ratio of Salary to Sales rose to 40% in 2018 from 36% (as budgeted). This appears to be atypical. Instead, there should be a cut in this ratio due to slump in business.

Award of bonus in case of losses is not justified and managers should be held accountable for their operations. However, they should not be held accountable for the events beyond their control. A manager cannot control movements in fuel price, yet he/ she is supposed to have the most information and he/ she is expected to correctly forecast movements in the prices of fuel. Managers shouldn't be penalized for the uncontrollable events.

Accordingly, in GBTCL, there should be revision in the budget to account uncontrollable events.

Refer Table-3.
Revised Budgeted Income Statement (₹'000)

Revenue*	94,833
Less:	
Variable Costs-	
Direct Material** (Fuel, Lubricants, and Sundries)	19,879
Direct Labour	33,750
Variable Overheads	6,417
Fixed Costs-	
Operating Overheads (Buses, Garage, Salaries)	20,300
Marketing and Administration	10,700
Profit/ (Loss) before taxes	3,787

*10 months revenue; ** at actual price levels

The Revised Profit Margin has come down to 4% as against the Target Profit Margin of 20%. This clearly indicates that the performance was benchmarked against the higher target. If original budget figure is used to measure the performance, it will punish employees for the reason which are beyond their control.

GBTCL is not too far away from Revised Profit Margin. Therefore, at least some bonus may be considered to be awarded to the employees which may create more employee loyalty and may be beneficial for long term.

Further, continuous monitoring of Budget Performance (achievement/ failure) in GBTCL is essential to overcome this situation. This helps to identify where revisions are required in the budget to account changing conditions, errors, modification to company's plan etc. Monitoring of Budget Performance should be the responsibility of the managers in GBTCL. The essence of the effective monitoring of Budget Performance is that the managers should provide accurate, relevant, actionable information on time to the

appropriate management level so that budget can give a realistic target to measure the performance.

It is also important to note that at the time of revising the budget, the primary budget as well as past information should not be ignored as they are the basis for preparing all budgets.

Question 8

The Board of Directors meeting of Kyoto Motors Ltd., a car manufacturing company is to be scheduled to be held in another ten days. One of the items, as per agenda, to be discussed in the meeting is the present budgeting system of the company. Your organisation is at present, using budgets for control which are prepared mostly on traditional basis. The CEO of your company wants to propose to the Board to use Beyond Budgeting instead of traditional budgeting in the company on experimental basis. Therefore, you, the Management Accountant has been asked by your CEO to explore the possibilities of introducing Beyond Budgeting (BB) system in the company.

Required

Specifically, you are required to PREPARE notes to your CEO to be used for his presentation at the meeting on:

(i) the major limitations of traditional budgets.
(ii) the advantages available in Beyond Budgeting.
(iii) the nature of Beyond Budgeting.
(iv) the benefits that can be enjoyed from Beyond Budgeting.
(v) the suitability of Beyond Budgeting to the company. (Study Material)

Answer

(i) Limitations of Traditional Budgets
- Time-consuming and costly to put together.
- Constrain responsiveness and flexibility.
- Often a barrier to change.
- Rarely strategically focused and are often contradictory.
- Add little value, especially given the time required to prepare.
- Concentrate on cost reduction and not on value creation.
- Developed and updated too infrequently, usually annually.
- Are based on unsupported assumptions and guesswork.
- Reinforce departmental barriers rather than encourage knowledge sharing.
- Make people feel undervalued.

(ii) Advantages of Beyond Budgeting (BB)
BB identifies its two main advantages.
- It is a more adaptive process than traditional budgeting.
- It is a decentralised process, unlike traditional budgeting where leaders plan and control organisations centrally.

(iii) Nature of 'Beyond Budgeting'
- Budgeting is evolving, rather than becoming obsolete- it depends on trust and transparency.
- Shift from the top-down, centralised process to a more participative, bottom-up exercise in many firms.
- It highlights the level of improvement that can be achieved even with relatively simple modifications and a great deal of trust.
- Budgeting has changed, the change has been neither dramatic nor radical. Instead, incremental

improvements, with traditional budgets being supplemented by new tools and techniques.
- Forecasting in fact is more important.

(iv) Benefits of the 'Beyond Budgeting' Model
- Beyond budgeting helps managers to work in coordination to beat the competition.
  Internal rivalry between managers is reduced as target shifts to competitors.
  Helps in motivating individuals by defining clear responsibilities and challenges.
- It eliminates some behavioural issues by making rewards team-based.
- Proper delegation of authority to operational managers who are close to the concerned action and can react quickly.
- Operational managers do not restrict themselves to budget limits and focus on achieving key ratios.
- It establishes customer-orientated teams.
- It creates information systems which provide fast and open information throughout the organization

(v) Suitability of Beyond Budgeting to the Company

Since Kyoto Motors Ltd. is a car manufacturing company and presently adopting Traditional Costing system. Moreover, Automobile industry goes through rapid changes in its business environment. So, the company can definitely use Beyond Budgeting to improve the control system and beat the competition. Beyond Budgeting lies an agile, holistic approach based on self-organisation. This will also help the managers to work in close coordination with each other with motivation which in turn will beat the competition.

Case Studies

Question 9
Wings International is a major airline operating from India. It is the biggest airline operator within the domestic airline segment and is a well-established player in the international airline segment. Except for a period of few years as outlined below, Wings International has been operating for the last 3 decades in a segment that caters primarily to the business and premium segment travellers. On its international routes and certain long distance, yet busy domestic routes, the airline offers full service on-board. The ticket price includes on board entertainment, transfer of baggage between flights, more leg room, option to upgrade from economy to business class seats, meals, and beverages etc. Baggage allowance is liberal with each flyer being allowed 2 checked in baggage and a cabin baggage. A tag line in its advertising goes "GRAB YOUR BAGS, THEY FLY FREE". In the domestic segment, the airline operates across major metro cities and certain other tier-2 cities. International flights operate only from these major metro cities.

Indian aviation industry has been growing exponentially in the recent years due to a thriving economy. Consequently, there have been many new entrants in the domestic segment, offering low-cost fares to customers. These airlines have been offering tickets at huge discounts, thereby attracting a sizable chunk of customers away from Wings International. To counter this and maintain its market share, Wings International also followed suit. For a period of five years, tickets on various domestic routes were offered at low competitive price. At the same time, low fares can be offered only if it is profitable to do so. Therefore, certain cost management measures were undertaken. Wings International converted to a "no-frills" airline on most of the domestic routes. Now a ticket covered only the cost of the seat and 1 checked in baggage and 1 cabin baggage. Going further, baggage allowance was reduced to economize on space and fuel requirements. To avail any other facility, the flyer wanted had to purchase extra.

Another measure taken was to offer last-minute deals of tickets at a heavy discount if the flight is not fully occupied. Vacant seats are "perishable", therefore instead of letting them go empty, the flight can be filled at cheaper rates. This yield management measure based on capacity utilization was expected to increase market share and subsequently the airline's revenue. Tickets could be booked online using the internet rather than through ticket kiosks maintained by the airline at various locations in selected cities.

In order to quickly respond to a competitor's move, the pricing and marketing staff were given sufficient autonomy to make this price war work. Therefore, in many situations, decisions could be taken even without the prior approval of the top management. Meanwhile adding to the stiff competition, fuel prices have been soaring in the last few years. Maintenance of aircrafts, staff compensation and other overheads have also been increasing. Landing fees in major airports have increased manifold due to congestion and limited slots on account of multiple airline operators vying for limited slots.

Given this scenario, after 5 years of operations, the management at Wings International found that they were not able to generate sufficient profits on many of the domestic routes. A price discount by a competitor had to be matched with a similar price discount by Wings International and vice versa. Offering last minute deals to fill up capacity did not generate additional revenue. The volume of last minute flyers was low. It was found that most flyers booking at the last minute were anyway "price indifferent". Had the deals not been offered, the

flyer would have been willing to pay more money anyway to use the airline. Therefore, neither did these deals generate extra customers nor extra revenue.

Wings International has always been perceived to cater the premium segment traveller, therefore participating in this price war had been contrary to its image of a premium quality airline. This left a section of the customers confused about the product offering. Therefore, the management of Wings International decided to discontinue its discount pricing strategy and exit the "low cost" airline business. The tickets are now being offered at its usual "full service" rates. This strategy is proposed to be followed for both current and prospective projects and operations.

The government has been formulating policies that are aimed at changing the landscape of the aviation sector. Airports are being built in smaller cities and towns that until date did not have one. This will improve connectivity within the country. It will increase air traffic as the public now has an alternate means to travel other than road and rail transport. Instead of flying between two small airports directly, Wings International proposes to develop a model where flyers from smaller towns are connected to one of the major metro cities which will serve as a main hub. For Wings International, the cost of operations will be lower as compared to flying point to point between the two small airports. For the passengers, better connectivity and more route options will be available. For example, a flyer from a smaller city, wanting to go to a destination abroad can now reach the nearest hub by flying with Wings. From the hub, Wings International can fly the passenger further to the desired destination abroad in its international fleet. For the flyer, this is a better alternative as compared to reaching the hub by say road transport. For Wings International, the proposition broadens its customer base. To this effect, Wings International is already scouting the market for smaller aircrafts that can be operated more economically on the hub-spoke route. Also, it is in talks with for partnership with other airlines, hotels, car rentals in order to offer attractive holiday packages to customers. Since most of the other airlines do not have the scale of operations to achieve the "hub-spoke" model or the ability to offer holiday packages, Wings International identifies this as a unique proposition that it can offer its customers. This time the proposed tag line for its advertisement would be "WINGS TO FLY ANYWHERE, ANYTIME". Also, Wings International proposed to increase the turnaround time of flights for better capacity utilization.

Ticket booking is still offered over the internet. In the past, customers like this option due to the convenience it offered. Dedicated customer service lines available 24 ×7 to resolve issues is proposed.

The management of Wings International wants to have a seamless implementation of this project. This could be a game changer for the company that will help it consolidate its position in the aviation industry. Therefore, a meeting has been called to discuss critical reporting that needs t o be in place that ensures a successful launch.

Required

  (i)   EVALUATE the strategy adopted by Wings International in becoming a "no frills" airline.

 (ii) IDENTIFY the strategy adopted by Wings International for the proposed project.

(iii) The entire strategy of Wings International for the proposed project depends on information available about the future outlook in the industry. RECOMMEND guidelines to the management to put in place a control reporting mechanism that can enable Wings International to take preventive measures to avoid errors in its strategy.

(iv) In its previous venture, it took 5 years for Wings International to decide to exit the "no frills" airline operations. To avoid a delay in taking such decisions, RECOMMEND guidelines to the management to put in place a control reporting mechanism that can enable Wings International to correct its errors and make changes in its operations in a more timely manner. (RTP MAY.19) (STUDY MATERIAL)

Answer

(i) Wings International is a premium segment airline charging "full service" rates for its ticket. However, due to intense competition in the domestic market, it adopted a "low- cost advantage" strategy. Low-cost advantage or cost leadership was achieved through following measures:

(a) Becoming a "no-frills" airline, where the ticket included only the seat and 1 each of cabin and checked in baggage. All other facilities had to be purchased extra.

(b) Baggage allowance reduced to economize of space within the flight and save on fuel costs.

(c) Online ticket booking facilitated so that the number of ticket kiosks maintained by the airline were reduced."

Cost leadership enabled it to offer "low cost" fares to the customers that was generated through (a) giving huge discounts on ticket prices and (b) yield management of ticket price based on capacity utilization of the flight. Although, due to its long-standing image as a premium airline, the transformation to a "no frills" airline could have caused confusion about the product offering in the minds of discerning traveller, who expect higher service quality. This could have eroded the customer base in this segment.

This "Low-cost advantage" strategy did not work due to the following reasons:

(a) Price war from competitors reduced the ticket prices to levels that were unviable to Wings International.

(b) Variable prices to fill up flight capacity worked against the airline, since it was found that these flyers, due to their immediate need, may have willing paid a higher price for the ticket than what was offered as part of the deal. These flyers were "price indifferent" which should have been used to Wings International's advantage and not against it.

(c) Costs of operations including fuel prices, aircraft maintenance, staff compensation, overheads such as landing fees had been rising in the recent years.

Due to the above reasons, Wings International's venture as a low-cost airline became unviable.

(ii) Wings International plans to foray into offering its service to flyer from smaller cities. This time it has adopted a "differentiation advantage" strategy. It is marketing in the following ways as being different from its competitors:

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(a) Offering a "full service" price where high quality facilities are provided to the traveller. Facilities offered ranging from on flight meals and entertainment, better seating options, liberal baggage allowance and transfer facility etc. differentiate Wings' airlines from its "low cost, no frills" competitors.

(b) Ability to offer more connectivity to flyers as compared to other airlines using its unique "hub-spoke" model. "Wings to fly anywhere, anytime" is a catchy line to present this concept to potential customers.

(c) Ability to offer vacation packages due to strategic tie-ups with other airlines and hospitality providers like hotels, car rentals etc.

(d) Product differentiation can also be made between the road and rail transport providers. It can be based on relative facilities offered and better connectivity, if not based on relative cost of travel.

(e) Dedicated customer service lines providing support to customers to resolve issues.

Superior quality, customer responsiveness and innovation will enable Wings International to consolidate its position in the industry in the long run.

(iii) Management Control Report – Feed-forward Control Report

Management control is required to set performance measure to determine if the

desired objectives of the company are being achieved or not. Control is required at every stage before the activity commences, while the activity is being performed and after the activity has been completed. Accordingly, control reports generated could be Feed-forward reports (prior), concurrent reports (during) and feedback reports (after).

When the management of Wings International wants to have a reporting system that enables to take preventive measures, it would need to have a "Feed-forward" control. This control will help measure the error before it actually takes places. Preventive measure can then be taken to change the operational variables to achieve the desired result. Guidelines to implement a "Feed-forward" control are as follows:

(a) Through planning and analysis is required. In the case of Wings International, the proposal should be planned and analysed at various levels. The strategy of selection of appropriate routes, "full service" pricing, strategic partnerships, financing the proposal need to be taken at a higher level of management. Decisions relating to flight operations, procurement of supplies like fuel, marketing, human resource planning etc. can be done by the management in charge of operations.

(b) Careful discrimination must be applied in selecting input variables. Planning and analysis should be done in an integrated fashion. There should be synergy in the thinking at an operational level and top management strategic level.

(c) Feed forward mechanism should be kept dynamic. Wings International should keep a close watch on the government policies and its implementation in the civil aviation sector. Reporting may be done in pre-determined intervals say a monthly feed forward reporting can be decided upon. Changes to plans should be made in a timely fashion to make them relevant.

(d) A model control system should be developed. Authority and responsibility for various functions need to be determined and clearly defined while developing this model.

(e) Data on input variables should be collected regularly. For example, Changes in fuel prices, which form a large share of expenses, have to be tracked continuously. If the prices are expected to fluctuate widely, hedging options or long term price agreements with suppliers can be considered.

(f) Feed-forward control requires action. At the time of implementation, the control model developed

should be followed in order to establish a systematic course of operations.

(iv) Management Control Report – Feedback Control Report

These are control reports that provide feedback about the operations. It tracks the actual results with the budgeted / forecasted results. These reports in themselves do not cause a change in performance. The management has to take timely action to correct the errors and change its operations, if required.

Guideline to implement this reporting system are as follows:

(a) Feedback report should disclose both accomplishment and responsibility. As discussed in the feed forward report, Wings International would have already put in place an organizational structure defining individual authority and responsibility. Performance should be tracked accordingly, so that individual performance can be assessed.

(b) Feedback reports should be extracted promptly. The management has to decide the interval at which these reports need to be generated. The interval should be such, that changes required can be assessed and action can be taken in a timely manner. In the previous instance, Wings International had given autonomy to the marketing and pricing division to take decisions to meet the competitor's actions. It took five years to determine that the project was unviable. However, a timely reporting mechanism such as a feedback report should have been in place to appraise the top management about the decisions taken. This information would have enabled the

top management to make an earlier assessment as to the viability of "no frills" airline.

(c) Feedback reports should disclose trends and relationships. Trends could be customer travelling preferences, deals offered by competitors or other changes in flight operations. Relationships could be supplier relationships, customer relationships, strategic partner relationships etc. Information generated from all these areas should be collated in order to provide proper feedback to the management.

(d) Feedback reports should disclose variations from standards. These standards could be from financial budgets or from non-financial metrics identified as key performance indicators. For example, delay in flight operations could be a non- financial metric that can be tracked against an expected standard set in the planning stage. The information metric for actual operations should be assessed in the same manner with which the standard was set. For example, a flight delay in operations could be a delay in arrival beyond 15 mins. This same standard should be used to assess actual performance

(e) Feedback reports should be in a standardized format. It should be easily understood and well presented to the management. Facts should be stated without ambiguity and in a standard manner.

Question 10

Magical Stay is a hotel chain that has properties in popular tourist destinations. Each hotel is at least a 50 rooms establishment that has standard, elite and luxury size suites. Currently, the chain has 9 properties spread across World. Magical Stay has its corporate headquarters in Singapore, from where the senior management operate. Operations management executives are based out of each specific property that they cater to. Magical Stay is a public listed company, with majority of its shareholders being institutional investors like mutual funds, banks and insurance companies. Since these investors had a high stake in the company, they had representatives of the board of directors to govern strategic decisions. One of the strategic goals of the company for 2018, was to earn a profit of ₹1,500 million and keep increasing this target by 10% each year. Due to recessionary conditions, business has been volatile. Consequently, senior management is under pressure to meet the targets. In order to have a defined plan for operations, Magical Stay prepares an annual bud get for each of the

properties as well as one master budget that consolidates at a company level. There is a separate financial and business analysis team that is in charge of this exercise. Key assumptions and future expected trends are discussed at with the operations management of each property. After incorporating the corporate headquarters numbers, the consolidated budget is presented to the senior management for approval. In order to have a uniform policy across locations, key metrics like room rent per day, material procurement for kitchen and rooms, employee hiring, capital investments at each property, advertising and promotional activities are handled directly by the corporate headquarters.

The management at each location is responsible to ensure smooth operations of the hotel chain by implementing these policies. The manager of each hotel property is given a target in terms of revenue to be generated, room occupancy and profit to be achieved. Therefore, the management at each location is also under pressure to perform and meet the target set by the senior management. In the past, if the target had not been met for couple of years, the senior management had closed down the hotel and exited the property. At the same time, best performers are given more liberal budgets to operate on. Hence, competition between various locations has always been fierce. There are constant negotiations for been given a "reasonable / practical target" that has to be achieved.

Monthly meetings are scheduled with the corporate office to explain variance of results from the budget. The recent monthly results have shown that 7 of the 9 properties have consistently not been able to meet the targets in the past six months. The situation is confounded because the tourism industry has been affected greatly by recessionary trends in the global economy. Therefore, the footfalls at the regular tourist places, where the hotel has properties, have reduced considerably. In some places occupancy during peak season has only been 60%. Therefore, operations are bleak and uncertain. At these meetings, the operations management argue that due to this dynamic scenario, the budgeted targets set become obscure since they are not based on the current circumstances.

The corporate office has met with the operations management at each of these properties in order to understand the situation better. Discussions have taken place about how the business can be improved. Few of the suggestions to improve performance are:

(1) When the hotel is not fully booked, especially during off-season, give manager at each property the authority to rent out rooms at an attractive discount. These opportunities have to encased quickly, therefore the decision about the rate would be better handled by the personnel at the hotel. A guideline on the discount policy can be worked out with the corporate office. This will ensure that room occupancy rates increase, while earning reasonable return.

(2) Allow for procurement of kitchen supplies locally, rather than buying it only from specified authorized vendors. Not only will this be cheaper, it also allows for moderate flexibility with the kitchen menu that can cater to customer demands based on current availability of supplies. Prior approvals can be taken by the management from the quality control department to ensure that customer satisfaction does not suffer.

(3) A monthly reward and recognition program for employees, based on their service record for the month. Recommendations can be from fellow employees or the location manager.

(4) Allow the location management autonomy, with a reasonable budget to cater to purchasing equipment. In order to address certain urgent requirements or repairs, quick response from the operations management is needed. The current process of getting approval the corporate office is cumbersome since it takes a longer time. Autonomy can help address these issues quickly without much damage done to customer satisfaction. Funding can be quickly procured from banks if required.

Based on these discussions, the senior management has decided to decentralize all of the above decisions. As a pilot project, they have decided against preparing a line-wise detailed budget (sales budgets, operations cost budgets, advertising etc.) for each location. Instead the operations management will be given clear targets at each of the locations regarding the key profitability ratios,

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liquidity ratios and leverage ratios, as also guidelines on market share, quality and customer satisfaction. These benchmarks have been finalized based on industry research of peer group companies. However, the managers have the autonomy to achieve the expected target based on their individual business scenarios at each location. The focus is therefore not on achieving budget numbers that have been finalized. Instead management gets growth targets to achieve. One year after implementing this decision, it was found that company was able to meet the shareholders' expectations, have a robust growth and an energetic employee morale.

Required

(i) Discuss the traditional budgeting process had a negative impact on Magical Stay's operations

(ii) Explain the philosophy behind "growth based targets" instead of "budget based targets"

Answer (STUDY MATERIAL) (RTP NOV.18)

(i) Magical Stay is operating in a business scenario that is highly competitive and dynamic. Focus of the traditional budget was driven towards achievement of the company's strategic goal, which was profit target of ₹1,500 million for the year 2018. Accordingly, the senior management followed a top-down approach to budgeting. Most important policy decisions like room rent per day, material procurement, employee hiring, capital investments at each property, advertising and promotional activities are handled directly by the corporate headquarters. Management in charge of operations at each location only implement it. In a changing business scenario, this budgeting methodology has the following shortcomings:

(a) Budgets based on these policies may not be flexible enough in a fast-changing business environment. Although it is based on assumptions and expectations of the management has made about the business growth, in a dynamic scenario, it is very difficult to predict the future accurately. Therefore, targets or benchmarks set by the traditional budgets may become outdated quickly.

(b) These budgets were based on business functions like sales, advertising, operations etc. While a strategy for these functions is important, they are based on internal benchmarks and assumptions made by the management. However, for the company to be flexible in a changing environment, the focus should also be on external factors.

(c) The management aims to make a yearly profit that is 10% more than the previous year's profit. If previous year profit alone is the benchmark for growth, certain decisions may be shelved because they may decrease current year's profits below target. However, had these decisions been implemented they may have generated value in the long term and ultimately may have been better for earning profits in future years. For example, certain capital expenditures that may need to be undertaken quickly in order to improve customer satisfaction, may not be incurred at all simply because there is no budget for it.

(d) Operations management did not have much autonomy since policies were controlled at the corporate headquarters. At the same time, they were responsible for achieving the targets set out as per the budget. Responsibility without authority creates a negative working environment. Consequently, it might be difficult to retain talented personnel.

(e) In order to meet budget targets, managers may try to negotiate for lower sales targets to achieve, more budget allocations to meet costs etc. This does not foster positive business growth. Managers are more intent in meeting targets rather than focusing on business growth. It leads to lower sales than can otherwise be achieved and leads to protection of costs rather than working towards lowering operational costs.

It can be concluded that the traditional budgeting process was more inward looking. Focus is on achieving budget target rather than implementing strategies that can create more value to the

company.

(ii) Following feedback from operations managers, the management given them targets based on growth instead those based on the budget alone. This is the philosophy of **"beyond budgeting"**. Below are features of this philosophy that has enabled Magical Stay to achieve better results:

(a) It is a more decentralized and participative way of operating a business. Rather than being made responsible for business decisions, which were not in their control, the employees delegated responsibility, combined with the necessary authority to execute decisions.

(b) Operations management and the personnel at each location are capable of quickly adapting to changing market scenarios. Likewise, since they interact with the customers directly, it enables them to make quicker decisions to ensure customer satisfaction or identify opportunities to generate more revenue.

(c) Targets are based on performance of peer group companies. Benchmarks based on peer group performance will be unbiased and reflects the current business scenario better. Due to this, customer's needs and satisfaction automatically gets priority. It is the customers who ultimately drive business growth. Therefore, rather than having an inward-looking outlook, focus is shifted to the external market conditions. Due to autonomy, managers at various locations need not compete with each other for budget allocation. This channelizes the operational focus to meet challenges from outside competitors rather than having detrimental competition within the organization. At the same time, the targets for the company are also based on guidelines from the corporate office. Therefore, there is congregation of goals with the shareholders' expectations.

(d) Employee morale is also boosted due to the monthly reward and recognition system. It fosters healthy competition among employees.

Since the focus is on growth, beyond budgeting can be a way of achieving better results in challenging business environment.

CHAPTER-12 Standard Costing

Section A – Practical Questions

Question 1

AGF is a chemical processing company that produces sprays used by farmers to protect their crops. One of these sprays 'Agrofresh' is made by using either chemical A or chemical B. To produce one litre of Agrofresh spray they have the option to use either 12 litres of chemical A or 12 litres of chemical B. During the financial year, the purchase department of AGF has planned to use chemical B as it appeared that it would be the cheaper of the two and their plans were based on a cost of chemical B of `15 per litre.

Due to subsequent market movement during the year the actual prices changed and if the concerned department had purchased efficiently, the cost would have been:

Chemical A	`15.40 per litre
Chemical B	`16.00 per litre

Production of Agrofresh spray was 1,000 litres and the usage of chemical B was 12,800 litres at a cost of `2,09,920.

You are the CEO of AGF and the management accountant has sent to you the following suggestions through e-mail:

"I feel that in our particular circumstances the traditional approach to variance analysis is of little use as for some of our products we can utilize one of several equally suitable chemicals and we always plan to use such chemical which will lead to cheapest production costs. However due to sharp market movements, we are frequently trapped by the sharp price changes which lead to the choice of expensive alternative at the end."

Required

To check the reality in the content of the mail, you asked, the management accountant of the company:

(i) to CALCULATE the material variances for Agrofresh by using
- Traditional Variance Analysis
- Planning and Operational Variances

(ii) to ANALYSE how planning and operational variances approached the variances.

(iii) to ANALYSE how the advanced variances are useful to your organisation.

(STUDY MATERIAL)

ANSWER:

(i) Traditional Variances

Usage Variance = (12,000 lt. – 12,800 lt.) × ` 15.00

= ` 12,000 (A)

Price Variance = (` 15.00 – ` 16.40) × 12,800 lt.

= ` 17,920 (A)

Total Variance = ` 12,000 (A) + ` 17,920 (A)

= ` 29,920 (A)

Operational Variances

Usage Variance = (12,000 lt. – 12,800 lt.) × ` *16.00*

= ` 12,800 (A)

Price Variance = (` 16.00 – ` 16.40) × 12,800 lt.

= ` 5,120 (A)

Total Variance = ` 12,800 (A) + `5,120 (A)

= ` 17,920 (A)

Planning Variances

Controllable Variance = (` 15.40 – ` 16.00) × *12,000 lt.*

= ` 7,200 (A)

Uncontrollable Variance = (` 15.00 – `15.40) × *12,000 lt.*

= ` 4,800 (A)

Total Variance = ` 7,200 (A) + ` 4, 800 (A)

= ` 12,000 (A)

Reconciliation = ` 17,920 (A) + ` 12,000 (A)

= ` 29,920 (A)

(ii) Traditional variance analysis is applied based on the assumption that whole of the variance is due to operational deficiencies and the planning associated with setting the original standard is perfectly correct. But this assumption is not practical. When the conditions are volatile and dynamic, traditional variances need to be analysed into planning and operational variances. Planning variances try to explain the extent to which the original standard needs to be adjusted to reflect changes in operating conditions between the current situation and that imagined when the standard was originally derived. Planning variances are generally *not controllable and may need to revise to cater the changes due to* environmental/ technological changes at a later stage*.* In certain situation planning variances can be considered *controllable* as well. Whereas operational variances explain the extent to which adjusted standards have been achieved. Operational variances are calculated after the planning variances have been established and are thus a realistic way of assessing performance. So, it indicates a reality check of traditional variance analysis. In AGF, as per traditional approach total variances are `29,920 (adverse), out of which `17,920 (adverse) accounts for total operational variance and `12,000 (adverse) is for total planning variance. It is necessary to analyse planning variances further. The planning variance of `12,000 (adverse) can be divided into an *uncontrollable* adverse variance of `4,800 and a *controllable* adverse variance of `7,200. Similarly, total operational variance can be sub classified as adverse price variance of `5,120 and adverse usage variance of `12,800. This analysis gives a clearer indication of the ineffi-ciency of the purchasing function by the concerned department. Performance of the staff of the purchasing department should be evaluated/ rewarded based on variances which are *controllable*. If an adverse *uncontrollable* variance of `4,800 is reported in the performance reports this is likely to lead to dysfunctional motivation effects to the purchase department.

(iii) **In today's cutthroat competition, managers must react quickly and accurately to the changes in technology, price fluctuation, consumer tastes, laws and regulations, economic conditions, political conditions, and international conditions etc. which are changing rapidly and dramatically. Accordingly, management accountant should be able to provide necessary inputs by a proper analysis of the things that pertains to his/her area like effect of changes in price. The unique features of advanced variance analysis are that, it considers *different market conditions* and *changes in the dynamic environment*.**

Moreover, advanced variances classify variances into *controllable* and *uncontrollable* variances and help the management to find out reasons for adverse variances so that corrective action can be taken. Similarly, if any adverse variances have arrived, because of changes in the market condition like inflation, it has to be differentiated from the other variances.

AGF is a type of organization where management of performance can be done only through advanced variance analysis. Advanced variance analysis of AGF shows that it has adverse planning variance as well as adverse operational variance. Further, the emergence of *controllable* and *uncontrollable* variances makes it a perfect case of advance variance analysis in AGF. In AGF, sharp price changes which lead to the choice of expensive alternative and efficiency of purchase department need to be analyzed, reported, and dealt separately by the joint effort of the management accountant and the top management. Hence, advanced variance analysis in AGF is an absolute necessity.

QUESTION 2

WDG Limited uses activity based costing to allocate variable manufacturing overhead costs to products. The company identified three activities with the following information for last quarter:

Activity	Standard Rate	Standard Quantity per unit produced	Actual Costs	Actual Quantity
Indirect Materials	`20 per kilogram	0.5 kilogram per unit	`9,40,000	48,000 kilogram
Product Testing	`3 per test minute	10 minutes per unit	`22,50,000	7,40,000 test minutes
Energy	`0.20 per minute of machine time	4 minutes ofmachine time per unit	`70,000	3,60,000 minutes of machine time

The company produced 80,000 units in the last quarter. Company policy is to investigate all variances above 5% of the flexible budget amount for each activity.

Required

(i) CALCULATE variable overhead expenditure variance and variable overhead efficiency variance for each of the activities using activity based costing. Clearly indicate each variance as favourable or unfavourable / adverse.

(ii) INTERPRET the results of variable overhead efficiency variance as calculated in (i) above in respect of indirect materials and product testing activity.

(iii) IDENTIFY the variances that should be investigated according to company policy. Show calculations to support your answer.

(STUDY MATERIAL)

ANSWER:

(i) Indirect Materials

Efficiency Variance = Cost Impact of *undertaking activities* more/ less than *standard*

= (0.50kg. × 80,000units − 48,000 kg.) × `20

= `1,60,000 (A)

Expenditure Variance = Cost impact of paying more/ less than standard for actual activities undertaken

= 48,000kg. × `20 − `9,40,000

= `20,000 (F)

Product Testing

Efficiency Variance = Cost Impact of *undertaking activities* more/ less than *standard*

= (10 mins. × 80,000 units − 7,40,000 mins.) × `3

= `1,80,000 (F)

Expenditure Variance = Cost impact of paying more/ less than standard for actual activities undertaken

= 7,40,000mins × `3 − `22,50,000

= `30,000 (A)

Energy

Efficiency Variance = Cost Impact of *undertaking activities* more/ less than *standard*

= (4 mins. × 80,000 units − 3,60,000 mins.) × `0.20

= `8,000 (A)

Expenditure Variance = Cost impact of paying more/ less than standard for actual activities undertaken

= 3,60,000mins × `0.20 − `70,000

= `2,000 (F)

(ii) Indirect Materials

WDG actually spent 48,000 kg. or 8,000 kg. more than the standard allows. At a predetermined rate of `20 per kg., efficiency variance is 1,60,000 (A). Since actual quantity was higher than the standard, the variance is unfavorable. This adverse variance, could have been caused by the inferior quality, result of carelessness handling of materials by production workers or could be as a result of change in methods of production, product specifications or the way in which quality of the product is checked or controlled.

Product Testing

Favorable efficiency variance amounting to `1,80,000 indicates that fewer testing minutes were expended during the quarter than the standard minutes required for the level of actual output. This may be due to employment of a higher skilled labor or improvement of skills of existing workforce through training and development leading to improved productivity etc.

(iii) Flexible Budget

Indirect Materials	= (0.50 kg. × 80,000 units) × `20 = `8,00,000	= `8,00,000× 5% = `40,000
Product Testing	= (10 mins. × 80,000 units) × `3 = `24,00,000	= `24,00,000 × 5% = `1,20,000
Energy	= (4 mins. × 80,000) × `0.20 = `64,000	= `64,000 × 5% = `3,200

Efficiency Variance for all the three activities are more than 5% of their flexible budget amount. So, according to the company policy, efficiency variances should be investigated.
Alternative

Statement Showing Identification of Variances to be investigated

	Calculation	Variance % of Flexible Budget	Criteria	Investigate Y or N
Indirect Materials				
Efficiency Variance	$\left(\dfrac{1,60,000}{8,00,000} \times 100\right)$	20%	5%	Y
Expenditure Variance	$\left(\dfrac{20,000}{8,00,000} \times 100\right)$	2.5%	5%	N
Product Testing				
Efficiency Variance	$\left(\dfrac{1,80,000}{24,00,000} \times 100\right)$	7.5%	5%	Y
Expenditure Variance	$\left(\dfrac{30,000}{24,00,000} \times 100\right)$	1.25%	5%	N
Energy				
Efficiency Variance	$\left(\dfrac{8,000}{64,000} \times 100\right)$	12.5%	5%	Y
Expenditure Variance	$\left(\dfrac{2,000}{64,000} \times 100\right)$	3.125%	5%	N

QUESTION 3

JPY Limited produces a single product. It has recently automated part of its manufacturing plant and adopted Total Quality Management (TQM) and Just-in- Time manufacturing system. No inventories are held for material as well as for finished product. The company currently uses standard absorption costing system. Following are related to fourth quarter of 2020-21:

	Budget	Actual
Production and Sales	1,00,000 units	1,10,000 units
Direct Materials	2,00,000 kg. @ ₹30/kg	2,50,000 kg. @ ₹31.20/kg.
Direct Labour Hours	25,000 hrs. @ ₹300/ hr	23,000 hrs. @ ₹300/ hr.
Fixed Production Overhead	₹3,20,000	₹3,60,000

Production overheads are absorbed on the basis of direct labour hours.

The CEO intends to introduce activity based costing system along with TQM and JIT for better cost management. A committee has been formed for this purpose. The committee has further analysed and classified the production overhead of fourth quarter as follows:

	Budget	Actual
Costs:		
Material Handling	₹96,000	₹1,24,000
Set Up	₹2,24,000	₹2,36,000
Activity:		
Material Handling (orders executed)	8,000	8,500
Set Up (production runs)	2,000	2,100

Revision of standards relating to fourth quarter were made as below:

	Original Standard	Revised Standard
Material Content per unit	2 kg	2.25 kg
Cost of Material	₹30 per kg	₹31 per kg
Direct Labour Hours	15 minutes	12 minutes

Required

i   CALCULATE Planning and Operational Variances relating to material price, material usage, labour efficiency, and labour rate.

ii   CALCULATE overhead expenditure and efficiency variance using Activity Based Costing principles.

(STUDY MATERIAL)

ANSWER:

(i) Workings

Factor	Original Standards (ex-ante)		Revised Standards (ex-post)		Actual (1,10,000 units)	
Material	1,10,000 units×2 kgs. ×₹30	₹66,00,000	1,10,000 units×2.25 kgs. ×₹31	₹76,72,500	2,50,000 kgs. ×₹31.20	₹78,00,000
Labour	1,10,000 × 15/60 hrs.× ₹300	₹82,50,000	1,10,000 × 12/60 hrs.× ₹300	₹66,00,000	23,000 hrs.× ₹300	₹69,00,000

Material

Traditional Variances
Usage Variance = (2,20,000 Kgs. – 2,50,000 Kgs.) × ₹30
= ₹9,00,000 (A)
Price Variance = (₹30.00 – ₹31.20) × 2,50,000 Kgs.
= ₹3,00,000 (A)
Total Variance = ₹9,00,000 (A) + ₹3,00,000 (A)
= ₹12,00,000 (A)

Planning Variances
Usage Variance = (2,20,0000 Kg. – 2,47,500 Kg.) × ₹30
= ₹8,25,000 (A)
Price Variance = (₹30 – ₹31) × **2,47,500 Kgs.**
= ₹2,47,500 (A)
Total Variance = ₹8,25,000 (A) + ₹2,47,5000 (A)
= ₹10,72,500 (A)

Operational Variances
Usage Variance = (2,47,500 Kg. – 2,50,000 Kg.) **× ₹31**
= ₹77,500 (A)
Price Variance = (₹31.00 – ₹31.20) × 2,50,000 Kg.
= ₹50,000 (A)
Total Variance = ₹77,500 (A) + ₹50,000 (A)

= ₹1,27,500 (A)

Labour
Traditional Variances
Efficiency Variance = (27,500 hrs. – 23,000 hrs.) × ₹300
= ₹13,50,000 (F)
Rate Variance = (₹300 – ₹300) × 23,000 hrs.
= NIL
Total Variance = ₹13,50,000 (F) + NIL
= ₹13,50,000 (F)

Planning Variances
Efficiency Variance = (27,500 hrs. – 22,000 hrs.) × ₹300
= ₹16,50,000 (F)
Rate Variance* = (₹300 – ₹300) × **22,000 hrs.**
= NIL
Total Variance = ₹16,50,000 (F) + 0
= ₹16,50,000 (F)

Operational Variances

Efficiency Variance = (22,000 hrs. – 23,000 hrs.) × **₹300**

= ₹3,00,000 (A)

Rate Variance = (₹300 – ₹300) × 23,000 hrs.

= NIL

Total Variance = ₹3,00,000 (A) + 0

= ₹3,00,000 (A)

(ii) Material Handling

Efficiency Variance

= Cost Impact of *undertaking activities* more/ less than *standard*

= (8,800 orders* – 8,500 orders) × ₹12

= ₹3,600 (F)

(*) 8,000 orders 1,10,000 units 1,00,000 units ⬜ ⬜⬜ ⬜ ⬜⬜ ⬜

Expenditure Variance

= Cost impact of paying more/ less than standard for actual activities undertaken

= 8,500 orders × ₹12 – ₹1,24,000

= ₹22,000 (A)

Setup

Efficiency Variance

= Cost Impact of *undertaking activities* more/ less than *standard*

= (2,200 runs* – 2,100 runs) × ₹112

= ₹11,200 (F)

(*) 2,000 runs 1,10,000 units 1,00,000 units ⬜ ⬜⬜ ⬜ ⬜⬜ ⬜

Expenditure Variance

= Cost impact of paying more/ less than standard for actual activities undertaken

= 2,100 runs × ₹112 – ₹2,36,000

= ₹800 (A)

QUESTION 4

Aquatic Feed (AF) is the leading manufacturer of fish and other sea animal feed. AF has made its credit pioneering effort and service for over one decade in development of culture, processing and exports with its state-of-art fish feed and processing plants. Hallmark of AF is constant upgradation of aquaculture technology bringing latest developments in the field to the doorstep of the Indian aquaculture farmer. It stands as a leading provider of high quality feed, best technical support to the farmer and caters to the quality standards of global customers.

One of its fish feed product is "B" which is produced by mixing and heating three ingredients: B_1, B_2 and B_3. It uses a standard costing system to monitor its costs.

The standard material cost for 100 Kg. of "B" is as follows:

Ingredients	Standard Qty. (Kg)	Cost per Kg. (₹)	Cost per 100 Kg. of "B" (₹)
B1	42	3	126
B2	62	6	372
B3	21	2	42
	125		540

Notes

✦ B_1, B_2 and B_3 are agricultural products. Their quality and price change significantly every year. Standard prices are determined at the average market price over the last three years. AF has a purchasing manager responsible for purchasing and pricing.

- The standard mix is decided by the Managing Partner having 15 years' rich experience in aquaculture field. The last time this was done at time of launching the "B" that was six years back. The standard mix has not been changed since.

- Mixing and heating process are subject to some evaporation loss.

In current month 4,605 Kg. of "B" was produced, using the following ingredients:

Ingredients	Actual Qty. (Kg)	Cost per Kg. (₹)	Total Cost of "B" (₹)
B1	2,202	2.8	6,165.60
B2	2,502	7	17,514
B3	921	2	1,842
	5625		25521.60

At every month end, the production manager receives a statement from the Managing Partner. This statement contains material price and usage variances for the month and no other feedback on the efficiency of the processes is provided.

Required

EVALUATE the performance measurement system in AF.

(STUDY MATERIAL)

ANSWER:

The statement reported, ₹2,062 adverse material price variance. The responsibility for controlling the materials price variance is usually the purchasing manager's. Undoubtedly, in current scenario, the price of materials is largely beyond his or her control; however, the price variance can be influenced by such factors as quality, quantity discounts, distance of supplier's location, and so on. These factors are often under the control of the purchase manager. The production manager is responsible for material usage and cannot be held responsible for the material price variance.

Since total usage variance reported, ₹1,406 favourable, production manager could assume good performance. However, if usage variance is considered in more detail, through the mix and yield calculations, it can be observed that variance was driven by a change in the mix **and by using a mix of ingredients which was different from standard, it has resulted in a saving of ₹840; Similarly, it has led to a favourable yield. It is worthwhile to note that changing the mix could impact the product quality and sales as well, however, no information has been given about this.**

Prices and quality of three agriculture ingredients are changing significantly every year. Using ex ante prices and usage standards can implicit an outdated view of variances. Failing to separate variances caused by uncontrollable factors and planning errors from variances caused by controllable factors can be demoralizing for the managers.

In addition, managers are not involved in setting the standard mix and the same has not been changed for six years despite continuous changes in the quality and prices of the ingredients. This can also mislead the managers i.e. to carryout control activities which are based on the outdated standards.

Furthermore, a true image is missing in relation to managers' performance as statement does not include any feedback or comments on the variances. Even no follow up is being taken on the same.

Overall, it appears that AF is not having comprehensive performance measurement system and this could adversely impact the firm in long run.

Workings

Price Variance

Input	Actual Qty. (Kg)	Std. Cost (₹)	Actual Cost (₹)	Difference (₹)	Variance (₹)
B1	2,202	3	2.8	0.20	440 (F)
B2	2,502	6	7	1 (A)	2,502 (A)
B3	921	2	2	-	-
	5625				2062(A)

Usage Variance

Input	Standard Qty. (Kg)	Actual Qty. (Kg)	Difference (Kg)	Std. Cost (₹)	Variance (₹)
B1	1,934	2,202	268 (A)	3	804 (A)
B2	2,855	2,502	353 (F)	6	2,118 (F)
B3	967	921	46 (F)	2	92 (F)
	5756	5625	131(F)		1406(F)

Mix Variance

Input	Rev. Actual Qty. (Kg)	Actual Qty. (Kg)	Difference (Kg)	Std. Cost (₹)	Variance (₹)
B1	1,890	2,202	312 (A)	3	936 (A)
B2	2,790	2,502	288 (F)	6	1,728 (F)
B3	945	921	24 (F)	2	48 (F)
	5625	5625	NIL		840(F)

Yield Variance

Input	Standard Qty. (Kg)	Rev. Actual Qty. (Kg)	Difference (Kg)	Std. Cost (₹)	Variance (₹)
B1	1,934	1,890	44 (F)	3	132 (F)
B2	2,855	2,790	65 (F)	6	390 (F)
B3	967	945	22 (F)	2	44 (F)
	5756	5625	131(F)		566(F)

QUESTION 5

ZM Inc. is a family run business based in Country Z. It is a manufacturer of two types of flooring rolls, one for industrial usage and the other for domestic residential use, throughout mainland of Country Z. The company started with the production of residential domestic flooring. It is now an established player in this market. In the recent years, the company pioneered into making flooring rolls for industrial usage. The management has the following information about the budgeted and actual data for 2021-

Particulars	Static Budget			Actual Result		
	Industrial	Domestic	Total	Industrial	Domestic	Total
Unit Sales in Rolls ('000)	200	600	800	270	570	840
Contribution Margin (Z$ in millions)	10.00	24.00	34.00	12.825	15.390	28.215

In late 2020, a marketing research estimated market volume for industrial and domestic flooring at 8 m Rolls. Actual market volume for 2021 was 7 m Rolls. Actual sales trend of ZM Inc. is indicative of the sales trends for individual products in the future years, it is likely that they might continue to sell a similar sales trajectory.

A newly appointed accountant has computed following variances from the above data:
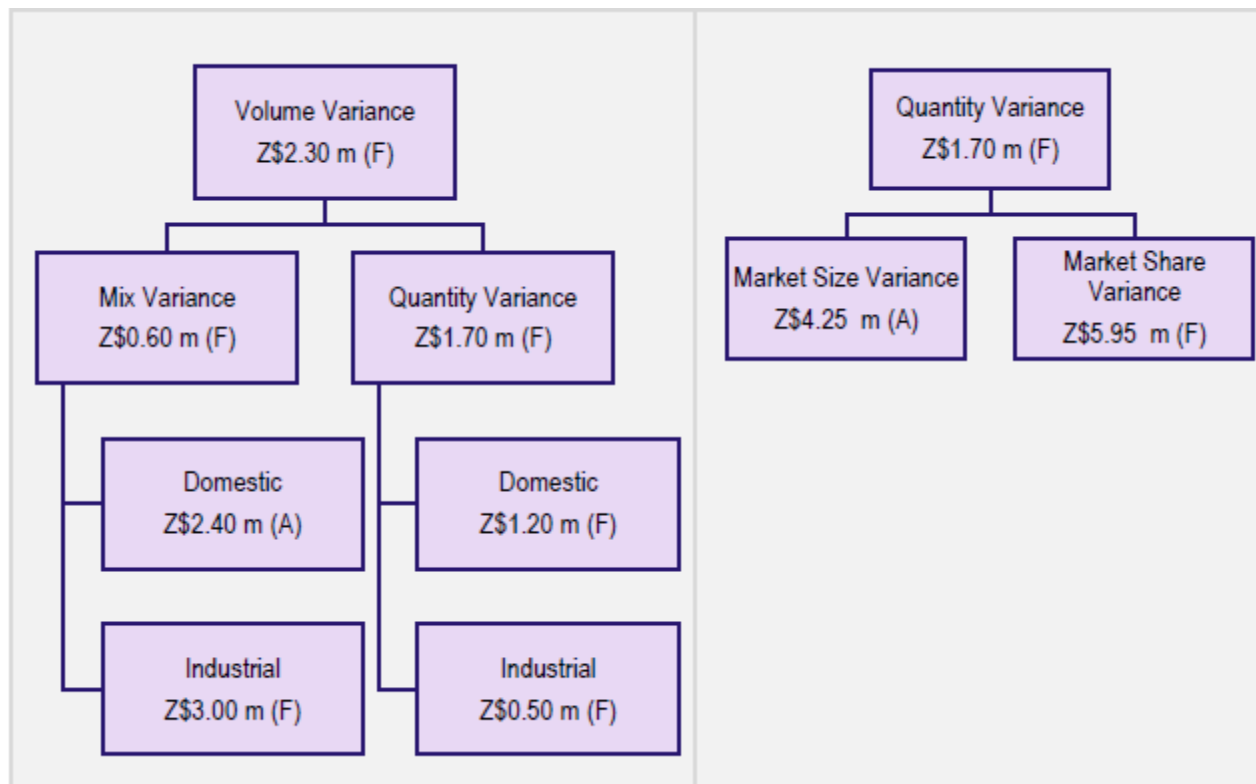
Required

Assuming yourself as a performance management expert of ZM, the CEO has asked you to:

i   **(i) ANALYSE the variances computed by the accountant;**

ii   **(ii) ADVISE strategic inputs on 'two types of flooring rolls' to help out her in strategic decision making (RTP-NOV 2020)**

ANSWER:

(i) Analysis of Variances

It can be seen that total unit sales increased by 40,000 rolls resulted in a favorable volume variance. Therefore, a potential increase of Z$2.3 m in contribution margin was achieved as a result of change in sales volume compared with budgeted volume. The volume variance is further divided into a mix and quantity variance. In the case of ZM, mix variance came out to be Z$0.60 m favorable and the quantity variance came out to be favorable Z$1.70 m. Favorable mix variance Z$0.60 m indicates that the sales mix shifts toward the industrial flooring rolls i.e. high contribution product. ZM sold 40,000 more rolls than were budgeted, resulting in Z$1.70 m favorable quantity variance. Therefore, it is necessary to identify the reasons behind the increase in sales. The reasons may be competitor's distribution issues, better customer services, or growth in overall market. Further insight into reasons of quantity variance can be gained by analyzing market share and size variances. ZM gain 2 market share percentage points from 10% budgeted share to the actual share of 12%. The Z$5.95 m favorable market share variance may be the effect of the decline in *contribution margin rate*. The impact of changing market size on contribution margin can be traced through market size variance. Market size variance is Z$4.25 m adverse as actual market size decreased 12.5% compared to budgeted market size. Further, it appears that accountant has missed to compute the *price variance* which is a substantial part of the analysis. If we look closely at the data given, the price variance for domestic as well as industrial roll can be computed without difficulty. The price variance for domestic flooring rolls as well as industrial flooring rolls is unfavorable; this indicates that the both varieties were sold a lower margin than standard. This throughout analysis shows a negative impact of Z$ 5.785 m on contribution margin for which price variance is the main contributor. Revised structures after the computation of price variance are as under:
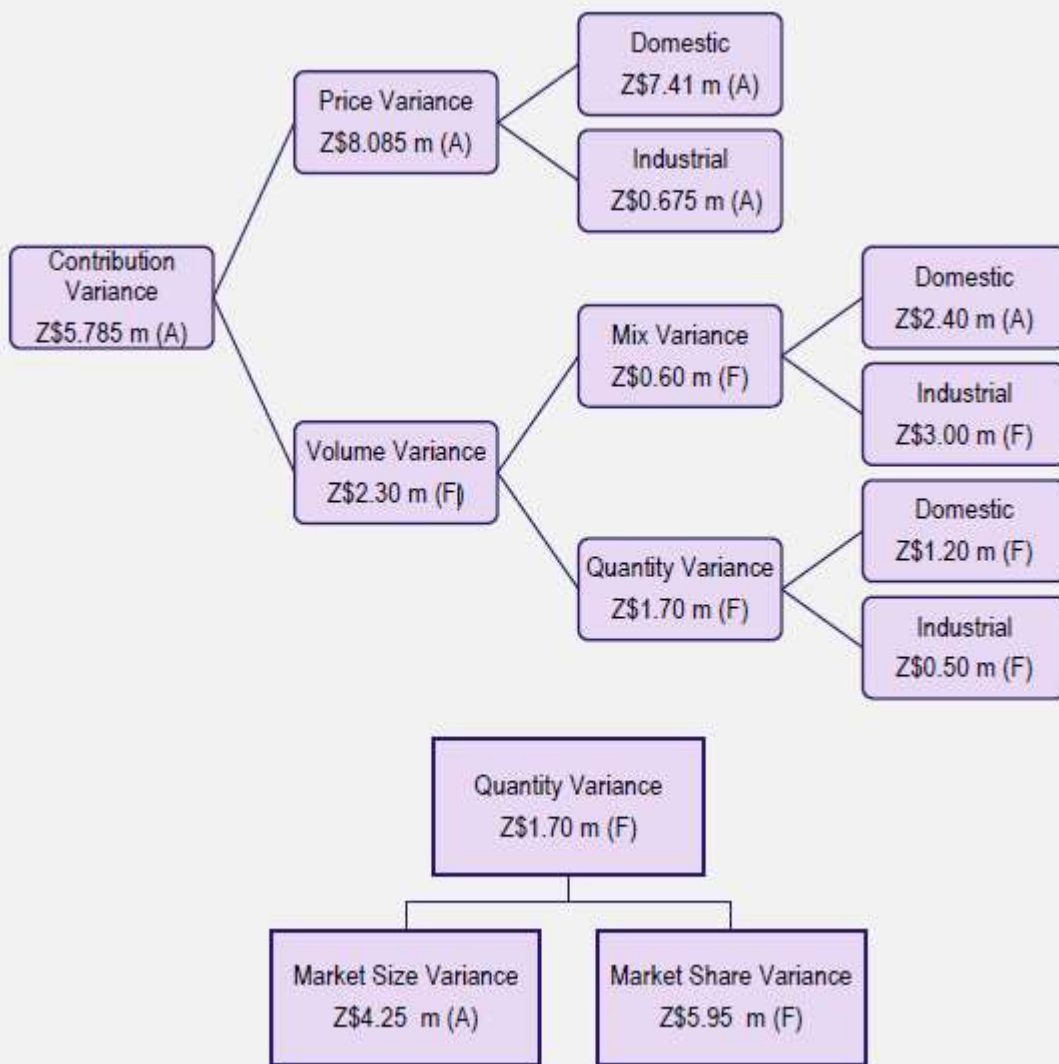
Workings

Contribution Price Variance

Product	Actual Qty. (units'000)	Actual Contribution per unit (Z$)	Standard Contribution per unit (Z$)	Difference (Z$)	Variance (Z$)
Domestic	570	27.00	40.00	-13.00	7.41 m (A)
Industrial	270	47.50	50.00	-2.50	0.675 m (A)
TOTAL	840				8085m(A)

(ii) Strategic Inputs

The actual sale of industrial flooring rolls is 35% higher than projections. However, actual contribution margin of Z$47.5 is *marginally lower* than standard contribution margin of Z$50 per unit. This indicates that ZM may have *cut its selling price to maintain or gain market share*. Therefore, industrial flooring rolls are in the **Growth Phase** of product life cycle. Due to increase in demand, there is a possibility of higher sales and profits to be made in future years.

Similarly, the actual sale of domestic flooring roll is 5% lower than the expectations. However, actual contribution margin is Z$27 per roll i.e. 32.5% lower than the standard contribution margin. This indicates

that ZM may have sold these at *substantially reduced price* to maintain the sales volume. Therefore, the domestic residential flooring rolls might be in the **Decline Stage** of product life cycle.

The market size for flooring rolls has reduced from an expectation of 80 lacs rolls to 70 lacs rolls. Therefore, the market size has shrunk significantly by 12.5% for the year 2021. This is a *threat to profitability* of business. The management has to understand the reasons behind this shrinkage. For example, dwindling demand maybe on account of cheaper substitutes available for flooring rolls. The management has to take cognizance of this threat to business. A positive for ZM is that its actual market share for flooring rolls was higher than expected at 12%. An increase in market share would have a beneficial impact on the company's profitability. Also, despite the shrinkage in market size, demand for industrial flooring rolls seems to be on the rise. This could be an *opportunity* for the management to consider.

As explained above, the industrial flooring rolls seem to be in the Growth Stage of product life cycle, while the domestic residential rolls are in the Decline Stage. Industrial flooring rolls have a higher contribution margin per roll as compared to domestic residential rolls. Accordingly, ZM may consider *phasing out domestic flooring rolls* and *concentrate on industrial flooring rolls*. In view of shrinking market conditions, it would be more profitable to phase out the weaker product and concentrate on the fast moving and profitable product. At the same time, since domestic flooring roll still has *significant demand*, the strategy to phase out this product may have to be done in a *phased* and *well-planned manner*. In view of the shrinking market size, ZM should not end up losing its market share due to phasing out domestic flooring rolls.

For Your Conceptual Understanding
"Budgeted Vs Actual Figures"

Product	Budgeted Qty. Rolls ('000)	Standard Cont. per Roll (Z$)	Budgeted Cont. (Z$' in millions)	Actual Qty. Rolls ('000)	Actual Cont. per Roll (Z$)	Actual Cont. (Z$ 'in millions)	Revised Actual Qty. ('000)
Dom.	600	40	24.00	570	27	15.390	630 (840×75%)
Ind.	200	50	10.00	270	47.5	12.825	210 (840×25%)
	800		34.00	840		28.215	840

Contribution Mix Variance

Product	Standard Contribution per unit (Z$)	Actual Qty. (units'000)	Revised Actual Quantity (units'000)	Difference ('000)	Variance (Z$)
Domestic	40	570	630	-60	2.40 m (A)
Industrial	50	270	210	+60	3.00 m (F)
Total		840			0.60 m (F)

Contribution Quantity Variance

Product	Standard Contribution per unit (Z$)	Revised Actual Quantity (units'000)	Budgeted Quantity (units'000)	Difference ('000)	Variance (Z$)
Domestic	40	630	600	+30	1.20 m (F)
Industrial	50	210	200	+10	0.50 m (F)
Total		840			1.70 m (F)

Market Size Variance

= Budgeted Market Share % × (Actual Industry Sales Quantity *in units* – Budgeted Industry Sales Quantity *in units*) × (Average Budgeted Contribution *per unit*)
= 10% × (70,00,000 Rolls – 80,00,000 Rolls) × Z$ 42.50
= Z$ 4.25 m (A)

Market Share Variance

= (Actual Market Share % – Budgeted Market Share %) × (Actual Industry Sales Quantity *in units*) × (Average Budgeted Contribution *per unit*)
= (12% – 10 %) × 70,00,000 Rolls × Z$ 42.50
= Z$ 5.95 m (F)

QUESTION 6

The Standard Cost Sheet per unit for the product produced by Style Manufacturers is worked out on this basis:—

Direct Materials 1.3 tons @ ₹ 4.00 per ton Direct Labour 2.9 hours @ ₹ 2.30 per hour Factory Overhead 2.9 hours @ ₹ 2.00 per hour

Normal Capacity is 2,00,000 direct labour hours per month.

The Factory Overhead rate is arrived at on the basis of a Fixed Overhead of ₹ 1,00,000 per month and a Variable Overhead of ₹ 1.50 per direct labour hour.

In the month of May, 50,000 units of the product was started and completed. An investigation of the raw material inventory account reveals that 78,000 tons of raw material were transferred into and used by the factory during May. These goods cost ₹

4.20 per ton. 1,50,000 hours of Direct Labour were spent during May at a cost of ₹ 2.50 per hour. Factory Overhead for the month amounted to ₹ 3,40,000 out of which ₹ 1,02,000 was fixed.

Required (RTP MAY 18)

(a) Compute and identify all variances under Material, Labour and overhead as favourable or adverse.

(b) Identify one or more departments in the company who might be held responsible for each variance.

Answer

COMPUTATION OF VARIANCES

(i) Material Price Variance	=	Standard Cost of Actual Quantity – Actual Cost
	=	(SP × AQ) – (AP × AQ)
	=	Or
	=	(SP – AP) × AQ
	=	78,000 tons × (₹ 4.00 – ₹ 4.20)
	=	₹15,600 (A)
(ii) Material Usage Variance	=	Standard Cost of Standard Quantity for Actual
	=	Production – Standard Cost of Actual Quantity
	=	(SQ × SP) – (AQ × SP)
	=	Production – Standard Cost of Actual Quantity
	=	Or
	=	(SQ – AQ) × SP
	=	₹4.00 × [(50,000 units × 1.3 tons) – 78,000 tons]
	=	₹52,000(A)
(iii) Total Material Cost Variance	=	Standard Cost – Actual Cost
	=	(SQ × SP) – (AQ × AP)
	=	65,000 tons × ₹4 – 78,000 tons × ₹4.2
	=	₹67,600 (A)
(iv) Labour Rate Variance	=	Standard Cost of Actual Time – Actual Cost

	=	(SR × AH) – (AR × AH)
	=	Or
	=	(SR – AR) × AH
	=	1,50,000 hrs. × (₹ 2.30 – ₹ 2.50)
	=	₹ 30,000 (A)
(v) Labour Efficiency Variance	=	Standard Cost of Standard Time for Actual
	=	Production – Standard Cost of Actual Time
	=	(SH × SR) – (AH × SR)
	=	Or
	=	(SH – AH) × SR
		Or
	=	₹2.30 × [(50,000 units × 2.9 hrs.) – 1,50,000 hrs.]
	=	₹11,500 (A)
(vi) Total Labour Cost Variance	=	Standard Cost – Actual Cost
	=	(SH × SR) – (AH × AR)
	=	(1,45,000 hrs. × ₹2.30) – (1,50,000 hrs. × ₹2.50)
	=	₹41,500 (A)
(vii) Variable Overhead Cost Variance	=	Standard Variable Overheads for Production –
	=	Actual Variable Overheads
	=	(50,000 units × 2.9 hrs. × ₹1.50) – ₹2,38,000
	=	₹20,500 (A)
(viii) Fixed Overhead Expenditure Variance	=	Budgeted Fixed Overheads – Actual Fixed Overhead
	=	₹1,00,000 – ₹1,02,000
	=	₹2,000 (A)
(xi) Fixed Overhead Volume variance	=	= Absorbed Fixed Overheads – Budgeted Fixed Overhead
	=	= 2.9 hrs. × ₹0.50 × 50,000 units – ₹1,00,000
	=	₹27,500
(x) Fixed Overhead Capacity Variance	=	Budgeted Fixed Overheads for Actual Hours – Budgeted Fixed Overheads
	=	(1,50,000 hrs. × ₹0.50) – ₹1,00,000
(xi) Fixed Efficiency Variance	=	₹ 25,000 (A)
	=	Absorbed Fixed Overheads – Budgeted Fixed Overheads for Actual Hours
	=	(2.9 hrs. × ₹0.50 × 50,000 units) – (1,50,000 hrs. × ₹0.50) = ₹ 2,500 (A)
Total Fixed Overhead Variance	=	Absorbed Fixed Overheads – Actual Fixed Overheads
	=	(2.9 hrs. × ₹0.50 × 50,000 units) – ₹1,02,000
	=	= ₹ 29,500 (A)

Question 2

Osaka Manufacturing Co. (OMC) is a leading consumer goods company. The budgeted and actual data of OMC for the year 2013-14 are as follows:-

Particulars	Budget	Actual	Variance
Sales / Production (units)	2,00,000	1,65,000	(35,000)
Sales (₹)	21,00,000	16,92,900	(4,07,100)
Less: Variable Costs (₹)	12,66,000	10,74,150	1,91,850
Less: Fixed Costs (₹)	3,15,000	3,30,000	(15,000)
Profit	5,19,000	2,88,750	(2,30,250)

The budgeted data shown in the table is based on the assumption that total market size would be 4,00,000 units but it turned out to be 3,75,000 units.

Required

Prepare a statement showing reconciliation of budget profit to actual profit through marginal costing approach for the year 2013-14 in as much detail as possible. (Study Material)

Answer

STATEMENT OF RECONCILIATION - BUDGETED VS ACTUAL PROFIT

Particulars	₹
Budgeted Profit	5,19,000
Less: Sales Volume Contribution Planning Variance (Adverse)	52,125
Less: Sales Volume Contribution Operational Variance (Adverse)	93,825
Less: Sales Price Variance (Adverse)	39,600
Less: Variable Cost Variance (Adverse)	29,700
Less: Fixed Cost Variance (Adverse)	15,000
Actual Profit	2,88,750

Sales Variances:……….

Volume Contribution Planning* =Budgeted Market Share % × (Actual Industry
Sales Quantity in units – Budgeted Industry

Sales =Quantity in units) × (Average Budgeted Contribution per unit)

=50% × (3,75,000 units – 4,00,000 units) × ₹4.17

=52,125(A) (*) Market Size Variance

Volume Contribution Operational** =(Actual Market Share % – Budgeted Market share%)×((Actual Industry Sales Quantity in units) × (Average Budgeted Contribution

per unit)

=(44% –50%) × 3,75,000 units × ₹4.17

=93,825 (A)

 (**) Market Share Variance

Price

=Actual Sales – Standard Sales

=Actual Sales Quantity × (Actual Price – Budgeted Price)

=1,65,000 Units ×(₹10.26–₹10.50) = 39,600(A)

Variance Cost Variance …………….

Cost

=Standard Cost for Production – Actual Cost

=Actual Production ×(Standard Cost per unit – Actual Cost per unit)

=1,65,000 units ×(6.33–₹6.51)=₹29,700 (A)

Fixed Cost Variance…………………

Expenditure

=Budgeted Fixed Cost – Actual Fixed Cost

=₹3,15,000 – ₹3,30,000 =₹15,000 (A)

Question 5

Managing Director of Petro-KL Ltd (PTKLL) thinks that Standard Costing has little to offer in the reporting of material variances due to frequently change in price of materials.

PTKLL can utilize one of two equally suitable raw materials and always plan to utilize the raw material which will lead to cheapest total production costs. However PTKLL is frequently trapped by price changes and the material actually used often provides, after the event, to have been more expensive than the alternative which was originally rejected.

During last accounting period, to produce a unit of 'P' PTKLL could use either 2.50 Kg of 'PG' or 2.50 kg of 'PD'. PTKLL planned to use 'PG' as it appeared it would be cheaper of the two and plans were based on a cost of 'PG' of ₹ 1.50 per Kg. Due to market movements the actual prices changed and if PTKLL had purchased efficiently the cost would have been:

'PG' ₹ 2.25 per Kg; 'PD' ₹ 2.00 per Kg

Production of 'P' was 1,000 units and usage of 'PG' amounted to 2,700 Kg at a total cost of ₹ 6,480/-

Required

Analyze the material variance for 'P' by:

(i)   Traditional Variance Analysis; and
(ii)   An approach which distinguishes between Planning and Operational Variances. (Study Material)

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Answer

COMPUTATION OF VARIANCES	=	
Traditional Variance (Actual Vs Original Budget)		
Usage Variance	=	(Standard Quantity – Actual Quantity) × Standard Price
	=	(2,500 Kg – 2,700 Kg) × ₹ 1.50
	=	₹300(A)
Price Variance	=	(Standard Price – Actual Price) × Actual Quantity
	=	(₹ 1.50 – ₹ 2.40) × 2,700 Kg
	=	₹ 2,430 (A)
Total Variance	=	₹ 300 (A) + ₹ 2,430 (A) = ₹ 2,730 (A)
Operational Variance (Actual Vs Revised)		
Price Variance	=	(₹ 2.25 – ₹ 2.40) × 2,700 Kg
	=	405(A)
Total Variance		
Planning Variance (Revised Vs Original Budget)		
Controllable Variance	=	(₹ 2.00 – ₹ 2.25) × 2,500 Kg
	=	₹625(A)
Uncontrollable Variance	=	(₹ 1.50 – ₹ 2.00) × 2,500 Kg
	=	₹1250(A)
Total Variance	=	₹ 625 (A) + ₹ 1,250 (A) = ₹ 1,875 (A)
Traditional Variance	=	Operational Variance + Planning Variance
	=	855 (A) + 1,875 (A) = 2,730 (A)

Question 6

HDR Ltd produces units and incurs labour costs. A change in technology after the preparation of the budget resulted in a 25% increase in standard labour efficiency, such that it is now possible to produce 10 units instead of 8 units using 8 hours of labour- giving a revised standard labour requirement of 0.80 hours per unit. Details of actuals and budgeted for period XII are:

Grade	nal Standards (ex-ante)		Revised Standards (ex-post)		Actual (1,100 units)	
X	1,100 units × 1 hrs. × ₹ 10	₹ 11,000	1,100 units × 0.80 hrs. × ₹ 10.00	₹ 8,800	1,200 hrs. × ₹ 8.50	₹ 10,200

Required

(i) **CALCULATE the variances for 'X' by**

(a) **Traditional Variance Analysis; and**

(b) **An approach which distinguishes between Planning and Operational Variances.**

(ii) **COMMENT on the results. (Study Material)**

Answer

(i) (a) Traditional Variances

Efficiency Variance = (1,100 hrs. − 1,200 hrs.) × ₹10

= ₹1,000 (A)

Rate Variance   = (₹10 − ₹8.50) × 1,200 hrs.

= ₹1,800 (F)

Total Variance   = ₹1,000 (A) + ₹1,800 (F) = ₹800 (F)

(b) Operational Variances

Efficiency Variance = (880 hrs. − 1,200 hrs.) × ₹10.00

= ₹3,200 (A)

Rate Variance   = (₹10.00 − ₹8.50) × 1,200 hrs.

= ₹1,800 (F)

Total Variance   = ₹3,200 (A) + ₹1,800 (F) = ₹1,400 (A)

Planning Variances

Efficiency Variance = (1,100 hrs. − 880 hrs.) × ₹10

= ₹2,200 (F)

Rate Variance   = (₹10 − ₹10) × 800 hrs.

= ₹0

Total Variance   = ₹2,200 (F) + ₹0 = ₹2,200 (F)

(ii) Comment

In this case, the separation of the labour cost variance into operational and planning components shows a large problem in the area of labour efficiency than might otherwise have been indicated. The operational variances are based on the revised (ex post) standard and this gives a more meaningful performance benchmark than the original (ex-ante) standard.

Question 7

Ski Slope had planned, when it originally designed its budget, to buy its artificial ice for ₹10/ per kg. However, due to subsequent innovations in technology, producers slashed their prices to ₹9.70 per kg. and this figure is now considered to be a general market price for the purpose of performance assessment for the budget period. The actual price paid was ₹9.50, as the Ski Slope procurement department negotiated strongly for a better price. The other information relating to that period were as follows:

Original Standards (ex-ante)		Revised Standards (ex-post)		Actual (5,500 units)	
5,500 units × 5 Kgs. × ₹10	₹2,75,000	5,500 units × 4.75 Kgs. × ₹9.70	₹2,53,412.50	27,225 Kgs. × ₹9.50	₹2,58,637.50

Required

(i) CALCULATE the variances for 'Ice' by

(a) Traditional Variance Analysis; and

(b) An approach which distinguishes between Planning and Operational Variances.

(ii) INTERPRET the results. (Study Material) (RTP MAY.19)

Answer

(i) (a) Traditional Variances

Usage Variance	=(27,500 Kgs. − 27,225 Kgs.) × ₹10
	=₹2,750 (F)
Price Variance	=(₹10 − ₹9.50) × 27,225 Kgs.
	=₹13,612.50 (F)
Total Variance	= ₹2,750 (F) + ₹13,612.50 (F)
	= ₹16,362.50 (F)

(b) Operational Variances

Usage Variance = (26,125 Kgs. − 27,225 Kgs.) × ₹9.70

= ₹10,670 (A)

Price Variance = (₹9.70 − ₹9.50) × 27,225 Kgs.

=₹5,445 (F)

Total Variance = ₹10,670 (A) + ₹5,445 (F)

= ₹5,225 (A)

Planning Variances

Usage Variance = (27,500 Kgs. − 26,125 Kgs.) × ₹10

= ₹13,750 (F)

Price Variance = (₹10 − ₹9.70) × 2

= ₹7,837.50 (F)

Total Variance = ₹13,750 (F) + ₹7,837.50 (F)

= ₹21,587.50 (F)

(ii) Interpretation

It is important to note that an innovation in technology is outside the control of Ski Slope and is, by nature, a planning 'error'. Equally, the better negotiation of a price should be recognised as an operational matter. Operational variances are self-evidently under the control of operational management, so operational efficiency must be assessed with only these figures in mind. The material procurement department has clearly done well by negotiating a price reduction beyond the market dip. One might

question the quality of the ice, as the usage variance is adverse (possibly the ice fails to cover the field and so more is required). Obviously, the favourable price variance is smaller than the adverse usage variance, thus, overall performance is quite poor. A supervisor cannot assess variances in isolation from each other.

Question 8

KONY Ltd., based in Kuala Lumpur, is the Malaysian subsidiary of Japan's NY corporation, headquartered in Tokyo. KONY's principal Malaysian businesses include marketing, sales, and after-sales service of electronic products & software exports products. KONY set up a new factory in Penang to manufacture and sell integrated circuit 'Q50X-N'. The first quarter's budgeted production and sales were 2,000 units. The budgeted sales price and standard costs for 'Q50X-N' were as follows:

	RM	RM
Standard Sales Price per unit		50
Standard Costs per unit		
Circuit X (10 units @ RM 2.5)	25	
Circuit Designers (6 hrs. @ RM 2)	12	(37)
Standard Contribution per unit		13

Actual results for the first quarter were as follows:

	RM '000	RM '000
Sales (2,000 units)		158
Production Costs (2,000 units)		
Circuit X (21,600 units)	97.20	
Circuit Designers (11,600 hours)	34.80	(132)
Actual Contribution (2,000 units)		26

The management accountant made the following observations on the actual results –

"In total, the performance agreed with budget; however, in every aspect other than volume, there were huge differences. Sales were made at what was supposed to be the highest feasible price, but we now feel that we could have sold for RM 82.50 with no adverse effect on volume. The Circuit X cost that was anticipated at the time the budget was prepared was RM 2.5 per unit. However, the general market price relating to efficient purchases of the Circuit X during the quarter was RM 4.25 per unit. Circuit designers have the responsibility   of designing electronic circuits that make up electrical systems. Circuit Designer's costs rose dramatically with increased demand for the specialist skills required to produce the 'Q50X- N', and the general market rate was RM 3.125 per hour - although KONY always paid below the normal market rate whenever possible. In my opinion, it is not necessary to measure the first quarter's performance through variance analysis. Further, our operations are fully efficient as the final contribution is equal to the original budget."

Required

COMMENT on management accountant's view. (Study Material) (RTP MAY.20)

Answer

Comment

As the management accountant states, and the analysis (W.N.1) presents, the overall variance for the KONI is nil. The cumulative adverse variances exactly offset the favourable variances i.e. sales price variance and circuit designer's efficiency variance. However, this traditional analysis does not clearly show the efficiency with which the KONI operated during the quarter, as it is difficult to say whether some of the variances arose from the use of incorrect standards, or whether they were due to efficient or inefficient application of those standards.

In order to determine this, a revised ex post plan should be required, setting out the standards that, with hindsight, should have been in operation during the quarter. These revised ex post standards are presented in W.N.2.

As seen from W.N.3, on the cost side, the circuit designer's rate variance has changed from adverse to favourable, and the price variance for component X, while remaining adverse, is significantly reduced in comparison to that calculated under the traditional analysis (W.N.1) on the sales side, sales price variance, which was particularly large and favourable in the traditional analysis (W.N.1), is changed into an adverse variance in the revised approach, reflecting the fact that the KONI failed to sell at prices that were actually available in the market.

Further, variances arose from changes in factors external to the business (W.N .4), which might not have been known or acknowledged by standard-setters at the time of planning are beyond the control of the operational managers. The distinction between variances is necessary to gain a realistic measure of operational efficiency.

W.N.1

KONY India Ltd.

Quarter-1

Operating Statement

Particulars	ourable RM	lverse RM	RM
Budgeted Contribution			26,000
Sales Price Variance [(RM 79 - RM 50) × 2,000 units]	58,000	---	
Circuit X Price Variance [(RM 2.50 – RM 4.50) × 21,600 units]		43,200	
Circuit X Usage Variance [(20,000 units - 21,600 units) × RM 2.50]		4,000	
Circuit Designer's Rate Variance [(RM 2 - RM 3) × 11,600 hrs.]		11,600	
Circuit Designer's Efficiency Variance [(12,000 hrs. - 11,600 hrs.) × RM 2.00]	800		NIL
Actual Contribution			26,000

W.N.2

Statement Showing Original Standards, Revised Standards, and Actual Results for Quarter 1

	Standards (ex- ante)		Standards (ex- post)		Actual	
Sales	2,000 units × RM 50.00	RM 1,00,000	2,000 units × RM 82.50	RM 1,65,000	2,000 units × RM 79.00	RM 1,58,000
Circuit X	20,000 units × RM 2.50	RM 50,000	20,000 units × RM 4.25	RM 85,000	21,600 units × RM 4.50	RM 97,200
Circuit Designer	12,000 hrs. × RM 2.00	RM 24,000	12,000 hrs. × RM 3.125	RM 37,500	11,600 hrs. × RM 3.00	RM 34,800

W.N.3

Statement Showing Operational Variances

Particulars	(₹)	(₹)
Operational Variances		
Sales Price [(RM 79.00 - RM 82.50) × 2,000 units]	7,000 (A)	
Circuit X Price [(RM 4.25 - RM 4.50) × 21,600 units]	5,400 (A)	
Circuit X Usage [(20,000 units – 21,600 units) × RM 4.25]	6,800 (A)	16,500 (A)
Circuit Designer Rate [(RM 3.125 - RM 3.00) × 11,600 hrs.]	1,450 (F)	
Circuit Designer Efficiency [(12,000 hrs.– 11,600 hrs.) × RM 3.125]	1,250 (F)	

W.N.4

Statement Showing Planning Variances

Particulars	(₹)	(₹)
Planning Variance		
Sales Price [(RM 82.50 - RM 50.00) × 2,000 units]	65,000 (F)	
Circuit X Price [(RM 2.50 - RM 4.25) × 20,000 units]	35,000 (A)	16,500 (F)
Circuit Designer Rate [(RM 2.00 - RM 3.125) × 12,000 hrs.]	13,500 (A)	

Question 9

Queensland Chemicals (QC) manufactures high-quality chemicals C-1, C-2 and C-3. Extracts from the budget for last year are given below:

	C-1	C-2	C-3
Sales Quantity (kg)	1,000	3,250	750
	₹/ kg	₹/ kg	₹/ kg
Average Selling Price	17,600	2,560	22,400
Direct Material (C_2H_6O) Cost	8,000	1,280	9,600
Direct Labour Cost	3,200	480	4,800
Variable Overhead Cost	320	48	480

The budgeted direct labour cost per hour was ₹160. Actual results for last year were as follows:

	C-1	C-2	C-3
Sales Quantity (units)	900	3,875	975
	₹/ kg	₹/ kg	₹/ kg
Average Selling Price	19,200	2,480	20,000
Direct Material(C2H6O) Cost	8,800	1,200	10,400
Direct Labour Cost	3,600	480	4,800
Variable Overhead Cost	480	64	640

The actual direct labour cost per hour was ₹150. Actual variable overhead cost per direct labour hour was ₹20. QC follows just in time system for purchasing and production and does not hold any inventory.

Required

INTERPRET the Sales Mix Variance and Sales Quantity variance in terms of contribution. (Study Material)

Answer

Variance Interpretation

The sales quantity variance and the sales mix variance describe how the sales volume contribution variance has been affected by a change in the total quantity of sales and a change in the relative mix of products sold.

From the figures arrived for the sales quantity contribution variance, we can observe that the increase in total quantity sold would have gained an additional contribution of
₹2,124,600, if the actual sales volume had been in the budgeted sales proportion.

The sales mix contribution variance shows that the variation in the sales mix resulted in a curtailment in profit by ₹570,600. The change in the sales mix has resulted in a relatively higher proportion of sales of C-2 which is the chemical that earns the lowest contribution and a lower proportion of C-1 which earn a contribution significantly higher. The relative increase in the sale of C-3 however, which has the highest unit contribution, has partially offset the switch in mix to C-2.

Workings

Statement Showing Standard Contribution

	C-1 ₹/ kg	C-2 ₹/ kg	C-3 ₹/ kg
Average Selling Price	17,600	2,560	22,400
Direct Material (C_2H_6O) Cost	8,000	1,280	9,600
Direct Labour Cost	3,200	480	4,800
Variable Overhead Cost	320	48	480
Contribution	6,080	752	7,520

Sales Contribution Mix Variance

Products	Actual Quantity [AQ]	Actual Sales at Budgeted Proportion [RAQ]	Difference [AQ – RAQ]	Contribution ₹ [SC]	Mix Variance (₹' 000) SC × [AQ – RAQ]
C-1	900	1,150	250 (A)	6,080	1,520 (A)
C-2	3,875	3,737.50	137.50 (F)	752	103.40 (F)
C-3	975	862.50	112.50 (F)	7,520	846 (F)
	5,750	5,750			570.60 (A)

Sales Contribution Quantity Variance

Products	Budget Sales Quantity [BQ]	Actual Sales at Budgeted Proportion [RAQ]	Difference [RAQ – BQ]	Contribution ₹ [SC]	y. Variance (₹' 000) SC × [RAQ – BQ]
C-1	1,000	1,150	150 (F)	6,080	912 (F)
C-2	3,250	3,737.50	487.50 (F)	752	366.60 (F)
C-3	750	862.50	112.50 (F)	7,520	846 (F)
	5,000	5,750			2,124.60 (F)

Question 10

T-tech is a Taiwan based firm, that designs, develops, and sells audio equipment. Founded in 1975 by Mr. Boss, firm sells its products throughout the world. T-tech is best known for its home audio systems and speakers, noise cancelling headphones, professional audio systems and automobile sound systems. Extracts from the budget are shown in the following table:

Home Audio System Division Jan'2019

System	Sales (units)	Selling Price ₹	Standard Cost (per System) ₹
3,000 W PMPO	1,500	18,750	12,500
5,000 W PMPO	500	50,000	26,250

The Managing Director has sent you a copy of an email he received from the Sales Manager 'K'. The content of the email was as follows:

"We have had an outstanding month. There was an adverse Sales Price Variance on the 3,000 W PMPO Systems of ₹22,50,000 but I compensated for that by raising the price of 5,000 W PMPO Systems. Unit sales of 3,000 W PMPO Systems were as expected but sales of the 5,000 W PMPOs were exceptional and gave a Sales Margin Volume Variance of ₹23,75,000. I think I deserve a bonus!"

The managing Director has asked for your opinion on these figures. You got the following information:

Actual results for Jan' 2019 were:

System	Sales (units)	Selling Price ₹
3,000 W PMPO	1,500	₹17,250
5,000 W PMPO	600	₹53,750

The total market demand for 3,000 W PMPO Systems was as budgeted but as a result of suppliers reducing the price of supporting UHD TV System the total market for 5,000 W PMPO Systems raised by 50% in Jan'2019.

The company had sufficient capacity to meet the revised market demand for 750 units of its 5,000 W PMPO Systems and therefore maintained its market share.

Required

(i) CALCULATE the following Operational Variances based on the revised market details:
- Sales Margin Mix Variance
- Sales Margin Volume Variance

(ii) COMMENT briefly on the measurement of the K's performance. (Study Material)

Answer (MTP MARCH.18)

(i) **Statement Showing Sales Margin Mix Variance**

System	Standard Margin per unit (₹)	Actual Qty. (units)	Revised Actual Quantity (units)	Difference (₹)	Variance (₹)
3,000 W PMPO	6,250	1,500	1,400	+100	+6,25,000 (F)
5,000 W PMPO	23,750	600	700	-100	23,75,000 (A)
Total		2,100			17,50,000 (A)

Statement Showing Sales Margin Volume Variance

System	Standard Margin per unit (₹)	Actual Qty. (units)	Budgeted Quantity (units)	erence (₹)	riance (₹)
3,000 W PMPO	6,250	1,500	1,500	0	-
5,000 W PMPO	23,750	600	750	-150	35,62,500 (A)
Total		2,100			35,62,500 (A)

(ii) A Planning Variance simply compares a revised standard (that should or would have been used if planners had known in advance what was going to happen) to the original standard. A planning variance is considered as not to be controllable by management.

The market size is not within the control of the sales manager and therefore variances caused by changes in the market size would be regarded as planning variances.

However, variances caused by changes in the selling prices and consequently the selling price variances and market shares would be within the control of the sales manager and treated as operating variances.

The market size variance compares the original and revised market sizes. This is unchanged for 3,000 W PMPO Systems so the only variance that occurs relates to the 5,000 W PMPO Systems and is ₹59,37,500 (F) [250 systems × ₹23,750].

It is vital to make this distinction because as can be seen from the scenario the measurement of the 'K''s performance is incomplete if the revised market size is ignored.

The favourable volume variance of ₹23,75,000 referred to in the 'K''s e-mail is made up of two elements, one of which, the market size, is a planning variance which is outside his control. It is this that has caused the overall volume variance to be favourable, and thus 'K' is not responsible for the overall favourable performance.

QUESTION 11

Well-known Footwear (WF) is a shop that focuses on shoes for various sports and activities like jogging, cricket, tennis, and hockey. Budgeted profit for the WF is calculated considering an average selling price of ` 500 per pair of shoes and an average cost of ` 350 per pair of shoes. The supervisor of the WF has discretion in staffing and in setting prices. Usually, the WF is staffed for 650 hrs. per month at a budgeted rate of ` 125 per hr. In addition to this base wages, sales staff gets a payment equal to 5.5% of takings. Moreover, staffing levels are not expected to change in response to "little" changes in shoe sales. For Sep'2020, the WF had budgeted sales of 2,250 pairs of shoes and 650 staffing hrs. Actual results for Sep'2020 were as follows

Pairs of shoes sold	2,500
Revenue	12,00,000
Less: Cost of shoes	8,25,000
Less: Staff – additional payment	66,000
Less: Staff – base wages @` 125 per hour	78,125
Profit	` 2,30,875

Note- "little" changes in shoe sales specified as ± 12%.
Required
PREPARE a reconciliation statement of budgeted profit to actual profit.

424

COMMENT on supervisor's performance.

(STUDY MATERIAL)

Solution

(i) Reconciliation Statement Budgeted and Actual Profit (Sep'2020)

Budgeted profit	1,94,375
Sales volume variance (F)	30,625
Sales price variance (A)	50,000
Shoe cost variance (F)	50,000
Staff cost variance - commission (F)	2,750
Staff cost variance -base wage (F)	3,125
Actual profit	`2,30,875

(ii) Comment

The performance seems good. It shows that the supervisor of the WF passed on a 5.7% decrease in shoe cost to customers (same is also revealed through the entirely offsetting of the shoe cost variance and price variance), i.e. shoe costs decreased by `20 per pair, from a standard cost of `350 per pair to an actual cost `330 per pair. Additionally, the selling price decreased by `20 per pair, from a standard price of `500 per pair to an actual price of `480 per pair. In turn, the reduction in the selling price appeared to produce a favourable sales volume variance and a reasonable increase in profit**.**   Since the reduction in the selling price, staff commissions also were lower than budgeted. Moreover, the `50,000 reduction in revenue led to 0.055 × `50,000 = `2,750 less in commission costs.

Lastly, staffing was 25 hours under budget, leading to a savings of 25 × `125 = `3,125. Therefore, the supervisor attained an increase in sales with lesser staff hours.

Overall, it appears that the manager has done a great job of making revenue and controlling costs.

Workings

Statement Showing Budgeted and Actual Profit (Sep'2020)

	Budgeted Data	Actual Data
Units (pairs of shoes)	2,250	2,500
Price per pair of shoes	₹500.00	₹480.00
Cost per pair of shoes	₹350.00	₹330.00
Commission rate	₹27.50 (5.5% of ₹500)	₹26.40 (5.5% ₹480)
Contribution	₹122.50	₹123.60
Revenue	₹11,25,000	₹12,00,000
Less: Cost of shoes	7,87,500	8,25,000
Less: Staff – additional payment (commission)	61,875	66,000
Less: Staff – base wages	81,250	78,125
Profit	₹1,94,375	₹2,30,875

Computation of variances

Total Profit Variance = `2,30,875 – `1,94,375 = `36,500 (F)

Sales Contribution Volume Variance = Standard Contribution – Budgeted Contribution

= `122.50 × 2,500 – `122.50 × 2,250

= `3,06,250 – `2,75,625 = `30,625 (F)

Sales Price Variance = Actual Revenue – Standard Revenue

= `480 × 2,500 – `500 × 2,500

= `12,00,000 – `12,50,000 = `50,000 (A)

Shoe Cost Variance * = `350 × 2,500 – `330 × 2,500

= `8,75,000 – `8,25,000 = `50,000 (F)

Staff Cost Variance-commission* = `27.50 × 2,500 – `26.40 × 2,500

= `68,750 – `66,000 = `2,750 (F)

Staff Cost Variance (base wage) = `81,250 – `78,125 = `3,125 (F).

Question 11

NZSCO Ltd. uses standard costing system for manufacturing its single product 'ANZ'. Standard Cost Card per unit is as follows:

	(₹)
Direct Material (1 kg per unit)	20
Direct Labour (6 hrs @ ₹8 per hour)	48
Variable Overheads	24

Actual and Budgeted Activity Levels in units for the month of Feb'19 are:

	Budget	Actual
Production	50,000	52,000

Actual Variable Costs for the month of Feb'19 are given as under:

Direct Material	10,65,600
Direct Labour (3,00,000 hrs)	24,42,000
Variable Overheads	12,28,000

Required

INTERPRET Direct Labour Rate and Efficiency Variances. (Study Material)

Answer

Interpretation

Direct Labour Rate Variance

Adverse Labour Rate Variance indicates that the labour rate per hour paid is more than the set standard. The reason may include among other things such as:

(1) While setting standard, the current/ future market conditions like pending labour negotiation/ cases, has not been considered (or predicted) correctly.

(2) The labour may have been told that their wage rate will be raised or bonus will be paid if they work efficiently.

Direct Labour Efficiency Variance

It indicates that the workers have produced actual production quantity in less time than the time allowed. The reason for favourable labour efficiency variance may include among the other things as follows:

(1) While setting standard, workers efficiency could not be estimated properly, this may happen due to non-observance of time and motion study.

(2) The workers may be new in the factory, hence, efficiency could not be predicated properly.

(3)   The foreman or personnel manager responsible for labour efficiency, while providing his/ her input at the time of budget/ standard, has adopted conservative approach.

(4)   The increase in the labour rate might have encouraged the labours to do work more efficiently.

In this particular case, it may have happened that since labour payment has been increased labour efficiency has also been increased. In a nutshell because of additional labour rate (Adverse), labour efficiency has gone up (Favourable)

Workings

Labour Rate Variance   = Standard Cost of Actual Time – Actual Cost

$$= (SR \times AH) - (AR \times AH)$$

Or

$= (SR - AR) \times AH$
$= (₹8.00 - ₹8.14^*) \times 3,00,000 \text{ hrs.}$
$= ₹42,000 \text{ (A)}$
$(^*)$

Actual Labour Rate per hour =

Actual Paid

Actual Hours

$$= \frac{24,42,000}{3,00,000 \text{ hrs}}$$

$= 8.14$

Labour Efficiency Variance
= Standard Cost of Standard Time for Actual Production– Standard Cost of Actual Time

$= (SH \times SR) - (AH \times SR)$

Or

$= (SH - AH) \times SR$
$= (3,12,000^{\$} \text{ hrs.} - 3,00,000 \text{ hrs.}) \times ₹8.00$
$= ₹96,000 \text{ (F)}$

($\$$)
Standard Hours   =   Actual Production × Std. hrs. per unit
=   52,000 units × 6 hrs.
=   3,12,000 hrs.

Question 12

N & S Co. (NSC) is a multiple product manufacturer. NSC produces the unit and all overheads are associated with the delivery of units to its customers.

Particulars	Budget	Actual
Overheads (₹)	4,000	3,900
Output (units)	2,000	2,100
Customer Deliveries (no.'s)	20	19

Required

Calculate Expenditure Variance by adopting ABC approach. (Study Material)

Answer

Expenditure Variance	=	Cost Impact of undertaking activities more/ less than standard
=		(21 deliveries* − 19 deliveries) × ₹200
=		₹400 F

$$(*)(\frac{20 \text{ Deliveries}}{2000 \text{ units}}) \times 2,100 \text{ units}$$

=		Cost impact of paying more/ less than standard for actual activities unde
=		19 deliveries × ₹200 − ₹3,900
=		₹100 (A)

Question 13

City International Co. is a multiproduct firm and operates standard costing and budgetary control system. During the month of June firm launched a new product. An extract from performance report prepared by Sr. Accountant is as follows:

Particulars	Budget	Actual
Output	30 units	25 units
Direct Labour Hours	180.74 hrs.	118.08 hrs.
Direct Labour Cost	₹1,19,288	₹ 79,704

Sr. Accountant prepared performance report for new product on certain assumptions but later on he realized that this new product has similarities with other existing product of the company. Accordingly, the rate of learning should be 80% and that the learning would cease after 15 units. Other budget assumptions for the new product remain valid.

The original budget figures are based on the assumption that the labour has learning rate of 90% and learning will cease after 20 units, and thereafter the time per unit will be the same as the time of the final unit during the learning period, i.e. the 20th unit. The time taken for 1st unit is 10 hours.

Required

Show the variances that reconcile the actual labour figures with revised budgeted figures (for actual output) in a

Note:

The learning index values for a 90% and a 80% learning curve are −0.152 and −0.322 respectively.

[log 2 = 0.3010, log 3 = 0.47712, log 5 = 0.69897, log 7 = 0.8451, antilog of 0.6213 = 4.181, antilog of 0.63096 = 4.275] (Study Material)

Time required for first 15 units based on revised learning curve of 80%
(when the time required for the first unit is 10 hours)

y	$= 10 \times (15)^{-0.322}$
log y	$= \log 10 - 0.322 \times \log 15$
log y	$= \log 10 - 0.322 \times \log (5 \times 3)$
log y	$= \log 10 - 0.322 \times [\log 5 + \log 3]$
log y	$= 1 - 0.322 \times [0.69897 + 0.47712]$
log y	$= 0.6213$
y	$=$ antilog of 0.6213 y $\qquad = 4.181$ hours

Total time for 15 units $\qquad = 15$ units $\times 4.181$ hours

$= 62.72$ hours

Time required for first 14 units based on revised learning curve of 80% (when the time required for the first unit is 10 hours)

y	$= 10 \times (14)^{-0.322}$
log y	$= \log 10 - 0.322 \times \log 14$
log y	$= \log 10 - 0.322 \times \log (2 \times 7)$ log y $= \log 10 - 0.322 \times [\log 2 +$
log 7] log y	$= 1 - 0.322 \times [0.3010 + 0.8451]$
log y	$= 0.63096$
y	$=$ antilog of 0.63096 y $\qquad = 4.275$ hrs

Total time for 14 units $\qquad = 14$ units $\times 4.275$ hrs

$= 59.85$ hrs

Time required for 25 units based on revised learning curve of 80% (when the time required for the first unit is 10 hours)

Total time for first 15 units $\qquad\qquad = 62.72$ hrs
Total time for next 10 units $\qquad\qquad = 28.70$ hrs [(62.72 – 59.85) hours $\times$ 10 units]

W.N.3

Computation of Variance

Labour Rate Variance $\qquad\qquad =$ Actual Hrs $\times$ (Std. Rate – Actual Rate)
= 118.08 hrs $\times$ (₹660.00 – ₹675.00)
= ₹1,771.20 (A)

Labour Efficiency Variance $\qquad\qquad =$ Std. Rate $\times$ (Std. Hrs – Actual Hrs)

= ₹660 $\times$ (91.42 hrs – 118.08 hrs)

= ₹17,595.60 (A)

Statement of Reconciliation (Actual Figures Vs Budgeted Figures)

Particulars	₹
Actual Cost	79,704.00
Less: Labour Rate Variance (Adverse)	1,771.20
Less: Labour Efficiency Variance (Adverse)	17,595.60
Budgeted Labour Cost (Revised)*	60,337.20

Budgeted Labour Cost (Revised)*

= Std. Hrs. × Std. Rate

= 91.42 hrs. × ₹660

= ₹60,337.20

Question 14

Trident Toys Ltd. manufactures a single product and the standard cost system is followed. Standard cost per unit is worked out as follows:

	₹
Materials (10 Kgs. @ ₹4 per Kg)	40
Labour (8 hours @ ₹8 per hour)	64
Variable overheads (8 hours @ ₹3 per hour)	24
Fixed overheads (8 hours @ ₹3 per hour)	24
Standard Profit	56

Overheads are allocated on the basis of direct labour hours. In the month of April 2019, there was no difference between the budgeted and actual selling price and there were no opening or closing stock during the period.

The other details for the month of April 2019 are as under

	Budgeted	Actual
Production and Sales	2,000 Units	1,800 Units
Direct Materials	20,000 Kgs. @ ₹4 per kg	20,000 Kgs.@ ₹4 per kg
Direct Labour	16,000 Hrs. @ ₹8 per Hr.	14,800 Hrs. @ ₹8 per Hr.
Variable Overheads	₹48,000	₹44,400
Fixed Overheads	₹48,000	₹48,000

Required

(i)   RECONCILE the budgeted and actual profit with the help of variances according to each of the following method:

  (A)   The conventional method

  (B)   The relevant cost method assuming that

(a)   Materials are scarce and are restricted to supply of 20,000 Kgs. for the period.

(b)   Labour hours are limited and available hours are only 16,000 hours for the period.

(c) There are no scarce inputs.

(ii) COMMENT on efficiency and responsibility of the Sales Manager for not using scarce resources. (Study Material)(PYQ MAY.18)

Answer

(i) Computation of Variances

Material Usage Variance = Standard Price × (Standard Quantity – Actual Quantity)

= ₹4.00 × (18,000* Kgs. – 20,000 Kgs.)

= ₹8,000 (A)

Labour Efficiency Variance = Standard Rate × (Standard Hours – Actual Hours)

= ₹8.00 × (14,400* hrs. – 14,800 hrs.)

= ₹3,200 (A)

Variable Overhead Efficiency Variance

= Standard Variable Overheads for Production – Budgeted Variable Overheads for Actual hours

= (14,400 hrs. × ₹3.00) – (₹3.00 × 14,800 hrs.)

= ₹1,200 (A)

Statement Showing "Reconciliation Between Budgeted Profit & Actual Profit"

Particulars	Conv. Method (₹)	Relevant Cost Method (₹)		
		Scarce Material	Scarce Labour	o Scarce Inputs
Budgeted Profit (2,000 units × ₹56)	1,12,000	1,12,000	1,12,000	1,12,000
Sales Volume Variance	11,200 (A)	NIL*	12,000$ (A)	16,000 (A)
Material Usage Variance	8,000 (A)	24,000 (A)	8,000 (A)	8,000 (A)

= Standard Contribution – Budgeted Contribution

= (1,800 units × ₹80.00) – (2,000 units × ₹80.00)

Labour Efficiency Variance	3,200 (A)	3,200 (A)	7,200 (A)	3,200 (A)
Variable Overhead Efficiency Variance	1,200 (A)	1,200 (A)	1,200 (A)	1,200 (A)
Fixed Overhead Volume Variance	4,800 (A)	N.A.#	N.A. #	N.A. #
Actual Profit	**83,600**	**83,600**	**83,600**	**83,600**

Notes

Scarce Material

Based on conventional method, direct material usage variance is ₹8,000 (A) i.e. 2,000 Kg. × ₹4. In this situation material is scarce, and, therefore, material cost variance based on relevant cost method should also include contribution lost per unit of material. Excess usage of 2,000 Kg. leads to lost contribution of ₹16,000 i.e. 2,000 Kgs. × ₹8. **Total material usage variance based on relevant cost method, when material is scarce will be: ₹8,000 (A) + ₹16,000 (A) = ₹24,000 (A).** Since labour is not scarce, labour variances are identical to conventional method.

Excess usage of 2,000 Kgs. leads to loss of contribution from 200 units i.e. ₹16,000 (200 units × ₹80). It is not the function of the sales manager to use material efficiently. Hence, loss of contribution from 200 units should be excluded while computing sales contribution volume variance.

(*)→

Therefore, sales contribution volume variance, when materials are scarce will be NIL i.e. ₹16,000 (A) - ₹16,000 (A).

Scarce Labour

Material is no longer scarce, and, therefore, the direct material variances are same as in conventional method. In conventional method, excess labour hours used are: 14,400 hrs. – 14,800 hrs. = 400 hrs. Contribution lost per hour = ₹10. Therefore, total contribution lost, when labour is scarce will be: 400 hrs. × ₹10 = ₹4,000. **Therefore, total labour efficiency variance, when labour hours are scarce will be ₹7,200 (A) i.e. ₹3,200 (A) + ₹4,000 (A).**

Excess usage of 400 hrs. leads to loss of contribution from 50 units i.e. ₹4,000 (50 units × ₹80). It is not the function of the sales manager to use labour hours efficiently. Hence, loss of contribution from 50 units should be excluded while computing sales contribution volume Variance.

($)→

Therefore, sales contribution volume variance, when labour hours are Scarce will be ₹12,000 (A) i.e. ₹16,000 (A) - ₹4,000 (A).

Fixed Overhead Volume Variance

(#) →

The fixed overhead volume variance does not arise in marginal costing system. In absorption costing system, it represents the value of the under or over absorbed fixed overheads due to change in production volume. When marginal costing is in use there is no overhead volume variance, because marginal costing does not absorb fixed overheads.

(ii) Comment on Efficiency and Responsibility of the Sales Manager
In general, Gross Profit (or contribution margin) is the joint responsibility of sales managers as well as of production managers. On one hand the sales manager is responsible for the sales revenue part, on the other hand the production manager is accountable for the cost-of-goods-sold component. However, it is the top management who needs to ensure that the target profit is achieved by the organization. The sales manager is accountable for prices, volume, and mix of the product, whereas the production manager must control the costs of materials, labour, factory overheads and quantities of production. The purchase manager must purchase materials at budgeted prices. The personnel manager must employ right people at the right place with appropriate wage rates. The internal audit manager must ensure that the budgetary figures for sales and costs are being adhered by all departments which are directly or indirectly involved in contribution of making profit. Thus, sales manager is not responsible for contribution lost due to excess usage or inefficient usage of resources in case of scarce resources. Hence, such contribution lost must be excluded from the sales contribution volume variance.

Question 15

Raju is Chief Financial Officer of Millets. com, an internet company that enables customer to order for delivery of different millets by accessing its website. Raju is concerned with the efficiency and effectiveness of the financial function. He collects the following information for three finance activities in 2018.
Rate per unit of Cost Driver

Activity	Activity level	Cost Driver	tatic Budget Amount (₹)	Actual Amount (₹)
Receivables	Output unit	Remittance	6.39	7.50
Payables	Batch	Invoices	29.00	28.00
Travel expenses	Batch	Travel claims	76.00	74.00

The output measure is the number of deliveries which is the same as the number of remittances. The following additional information are also given:

	Budgeted	Actual
Number of deliveries	10,00,000	9,48,000
Delivery Batch size	5	4.468
Travel expenses Batch size	500	501.587

Required

CALCULATE the flexible budget variances for 2018 to :

(i)   **Receivable Activities**

(ii)   **Payable Activities**

(iii)   **Travel expense Activities (Ignore fractions in all calculations)**

Answer (PYQ MAY.19)

Activity-based costing, flexible-budget variances for finance function activities.

(i)   Receivables

Receivables is an output unit level activity. Its flexible-budget variance can be calculated as follows:

Flexible Budget Variance

=   Flexible Budget Costs – Actual Costs

=   ₹ 6.39 × 9,48,000 – ₹ 7.50 × 9,48,000

=   ₹ 60,57,720 – ₹ 71,10,000

=   **₹ 10,52,280 (A)**

(ii)   Payables

Payables is a batch level activity.

Static-Budget Amounts		Actual Amounts
a. Number of deliveries	10,00,000	9,48,000
b. Batch size (units per batch)	5	4.468
c. Number of batches (a / b)	2,00,000	2,12,175
d. Cost per batch	₹29	₹28
e. Total payables activity cost (c×d)	₹58,00,000	₹59,40,900

Step 1: The number of batches in which payables should have been processed

=   9,48,000 actual units / 5 budgeted units per batch

=   **189,600 batches**

Step 2: The flexible-budget amount for payables

=   1,89,600 batches × ₹ 29 budgeted cost per batch

=   **₹ 54,98,400**

The flexible-budget variance can be computed as follows:

Flexible-Budget Variance

=   Flexible-Budget Costs – Actual Costs

=   1,89,600 × ₹ 29 – 2,12,175 × ₹ 28

=   ₹ 54,98,400 – ₹ 59,40,900

=   **₹ 4,42,500 (A)**

(iii) Travel Expenses

Travel expenses is a batch level activity.

Static-Budget Amount Actual Amount		
a. Number of deliveries	10,00,000	9,48,000
b. Batch size (units per batch)	500	501.587
c. Number of batches (a / b)	2,000	1,890
d. Cost per batch	₹76	₹74
e. Total travel expenses activity cost (c×d)	₹1,52,000	₹1,39,860

Step 1: The number of batches in which the travel expense should have been processed

=   948,000 actual units/ 500 budgeted units per batch

=   **1,896 batches**

Step 2: The flexible-budget amount for travel expenses

=   1,896 batches × ₹ 76 budgeted cost per batch

=   **₹ 1,44,096**

The flexible budget variance can be calculated as follows:

Flexible Budget Variance

=   Flexible-Budget Costs – Actual Costs

=   1,896 × ₹ 76 – 1,890 × ₹ 74

=   ₹ 1,44,096 – ₹ 1,39,860

=   **₹ 4,236 (F)**

Question 16

Established in the year 1999, FF Company is the pioneer of fast food in Southampton. It delivers a truly fresh, affordable, made to order sandwiches, burger, and other meal in a friendly and relaxed environment. The popularity of the sandwiches, burger etc. continued to grow over the decades but one thing remained the same and that was its core values and principles:

- **Always provide exceptional service to valued guests;**

- **Provide the highest quality menu items at a price everyone can afford and enjoy; and**

- **Keep operating costs low and ensure to have great systems in place and never stop improving.**

It provides a comfortable place for people to unwind over interesting conversations. From the beginning, as it continues to grow, it is guided by passion for delighting customers by serving fresh, delicious food right in front of customer.

The performance report* for FY 2018-19 was presented at the management committee meeting as follows:

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Particulars	Budget	Actual	Variance
Sales / Production (no. of burgers)	2,00,000	1,65,000	(35,000)
Sales (£)	10,50,000	8,46,450	(2,03,550)
Less: Variable Costs (£)	6,33,000	5,37,075	95,925
Less: Fixed Costs (£)	1,57,500	1,65,000	(7,500)
Profit	2,59,500	1,44,375	(1,15,125)

* burger segment

The Management Accountant of FF believed that the size of the fast-food market deriving the budget number of burgers to be sold is over-estimated. He has computed the value of the sales volume contribution planning variance to be 26,062.50 adverse.

Further, the report also included customer's feedback and the majority of comments were regarding delay in service time. One of feedback was as follows:

"I ordered two burgers at 2:10 pm. After half an hour (30 minutes) of waiting I called the waiter and asked him what happened? he told me that he will check with kitchen. I got the order after 45 minutes of waiting, this cafe is not good in delivery time"

The budgeted data shown in the table is based on the assumption that total market size would be 4,00,000 units.

Required

(i)   PREPARE a reconciliation statement of budgeted profit to actual profit through marginal costing approach in as much detail as possible.

(ii)   EXPLAIN the implications of the reconciliation statement.

(iii)   Management is worried about customer's feedback. ADVISE measures to improve delivery service time. (RTP NOV.19)

Answer

(i)   Statement of Reconciliation - Budgeted Vs Actual Profit

Particulars	£
Budgeted Profit	2,59,500
Less: Sales Volume Contribution - Planning Variance (Adverse)	26,062.50
Less: Sales Volume Contribution - Operational Variance (Adverse)	46,912.50
Less: Sales Price Variance (Adverse)	19,800
Less: Variable Cost Variance (Adverse)	14,850
Less: Fixed Cost Variance (Adverse)	7,500
Actual Profit	1,44,375

Workings

Basic Workings

$$\text{Budgeted Market Share (in \%)} = \frac{2,00,000 \text{ units}}{4,00,000 \text{ units}} = 50\%$$

Budgeted Contribution = £10,50,000 – £6,33,000 = £4,17,000 Average

Budgeted Contribution (per unit)

$$= \frac{£4,17,000}{2,00,000} = £2.085$$

Volume Contribution Planning = Budgeted Market Share % × (Actual Industry Sales Quantity in units – Budgeted Industry Sales Quantity in units) × (Average Budgeted Contribution per unit)

⇒ £26,062.50 (A) = 50% × (Actual Industry Sales Quantity in units – 4,00,000 units) × £2.085

⇒ Actual Industry Sales Quantity = 3,75,000 units

$$\text{Actual Market Share (in \%)} = \frac{1,65,000 \text{ units}}{3,75,000 \text{ units}} = 44\%$$

$$\text{Standard Sales Price per unit} = \frac{£10,50,000}{2,00,000} = £5.25$$

$$\text{Actual Sales Price per unit} = \frac{£8,46,450}{1,65,000} = £5.13$$

$$\text{Standard Variable Cost per unit} = \frac{£6,33,000}{2,00,000} = £3.165$$

$$\text{Actual Variable Cost per unit} = \frac{£5,37,075}{1,65,000} = £3.255$$

CALCULATION OF VARIANCES

Sales Variances

Volume Contribution Operational = (Actual Market Share % – Budgeted Market Share %) × (Actual Industry Sales Quantity in units) × (Average Budgeted Contribution per unit)

= (44% – 50 %) × 3,75,000 units × £2.085

= £46,912.50 (A)

Price = Actual Sales – Standard Sales

= Actual Sales Quantity × (Actual Price – Standard Price)

= 1,65,000 units × (£5.13 – £5.25)

= £19,800 (A)

Variable Cost Variances

Cost   =   Standard Cost for Production – Actual Cost

= Actual Production × (Standard Cost per unit– Actual Cost per unit)

=   1,65,000 units × (£3.165 − £3.255)

=   £14,850 (A)

Fixed Cost Variances

Expenditure   =   Budgeted Fixed Cost – Actual Fixed Cost

=   £1,57,500 − £1,65,000

=   £7,500 (A)

(ii)   Implications of Reconciliation Statement

In the revised statement, the sales volume variance has been detailed by the way of two variances i.e. planning and operational variances. This kind of detailed information assists the company to check, which kind of variances are under the management control and which are not. FF has adverse volume contribution planning variance and the reason of could be the environmental / market changes, that was not anticipated at the time of budget preparation, so they are not under management control and hence, no one is responsible for this. On the other hand, the sales volume contribution operational variance was under control of the managers and they should be held responsible for the same. The reason of adverse sales volume contribution operational variance could be unsuccessful direct selling efforts/marketing efforts. FF has adverse sales price variance as well. It indicates that the burgers were sold for lower price than standard. The reason of this could be unforeseen market competitive price, tapping new market etc.

Further, revised reconciliation statement delivers little information about the variable cost and fixed cost variances. They both are adverse. Fixed cost consists of many items such as salaries, annual maintenance cost, rent and insurance etc. Often fixed cost items are not affected in short run in response to change in the level of activity, but they might change in response to other factors such as price. This may cause increase expenditure on fixed overheads. A meaningful analysis of fixed cost variance requires a line to line comparison of budgeted cost with actual cost.

In case of FF, the variable cost may be made up of large individual different items such as vegetables, gas, indirect labor, regular maintenance cost etc. Control of variable cost also requires line by line analysis for each individual item. The adverse variable cost variance simply reveals that FF incurred more on variable cost than expected. However, it is necessary to take into consideration the causes of this adverse variance which is beyond the control of the management, for instance, the unusual price hike in vegetables in case of unseasonal rainfall.

(iii)   Measures to Improve Fast Food Delivery Service Time

Customers expect that their food order to be delivered quickly. From customer's feedback in the question, it is evident that FF has a problem in food delivery, due to which, customers go unsatisfied. The reason of late delivery could be non- availability of raw material on time or employees not working properly etc. The reason of employees not working properly could be job dissatisfaction which may be due to improper working conditions, low salary, or no reward for overtime etc.

In order to reduce delivery time, raw material should be made available in stock based on daily requirement. FF may follow quantitative approach to inventory problems, which lays down clear

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guidelines that when to re-order or alert the management in exceptional situations.

In addition, FF must also address the issues related to employee and involve them in a loop. FF could improve the employee satisfaction with proper working conditions, better pay, training, and growth opportunities.

Moreover, it is important that customers should be informed about approximate delivery time since this will reduce customer's anxiety and will proactively reduce any complaints over long waits for delivery of food. If unexpected delays occur, it is important to communicate with customers, apologies for the delay and inform them about the new approximate delivery time along with valid reason.

In addition to this, FF can also introduce rs or install electronic board displaying ticket number or self-serve kiosk allowing customers to roam around or order in advance so that they do not have long waiting time.

QUESTION 5

XL Polymers, located in Sahibabad Industrial Area, manufactures high quality industrial products. AT Industries has asked XL Polymers for a special job that must be completed within one week. Raw material R_1 (highly toxic) will be needed to complete the AT Industries' special job. XL Polymers purchased the R_1 two weeks ago for ` 7,500 for a job 'A' that recently was completed. The $R_1$ currently in stock is the excess from that job and XL Polymers had been planning to dispose of it. XL Polymers estimates that it would cost them ` 1,250 to dispose of the R_1. Current replacement cost of R_1 is ` 6,000.

Special job will require 250 hours of labour G_1 and 100 hours of labour G_2. XL Polymers pays their G_1 and G_2 employees ` 630 and ` 336 respectively for 42 hours of work per week.

XL Polymers anticipates having excess capacity of 150 [G_1] and 200 [G_2] labour hours in the coming week. XL Polymers can also hire additional G_1 and G_2 labour on an hourly basis; these part-time employees are paid an hourly wage based on the wages paid to current employees.

Suppose that material and labour comprise XL Polymers's only costs for completing the special job.

Required

CALCULATE the 'Minimum Price' that XL Polymers should bid on this job?

(STUDY MATERIAL)

Solution

Opportunity Cost of Labour - The G_2 labour has zero opportunity cost as there is no other use for the time already paid for and is available. However, XL Polymers needs to pay an additional amount for G_1 labour. This amount can be save if the special job were not there.

G1 labour:

Hours Required	250
Hours Available	150
Extra Hours Needed	100
Cost *per hour* (`630/42hrs)	`15
Opportunity Cost	`1,500

Thus, the 'Opportunity Cost of Labour' for completing the special job is `1,500.

Opportunity Cost of Material – XL Polymers has no alternative use for the R_1, they must dispose of it at a cost of `1,250. Thus, XL Polymers actually *saves* `1,250 by using the materials for the AT Industries' special job. Consequently, the 'Opportunity Cost of Material' is - `1,250 (i.e., the opportunity cost of this resource is negative).

The *minimum price* is the price at which XL Polymers just recovers its 'Opportunity Cost'. XL Polymers's 'Total Opportunity Cost' is `250 (`1,500 − `1,250). Accordingly, minimum Price for the Special Job is `250.

Question 6

BYD Alloy Ltd. first opened its door in 1991 for business and now it is a major supplier of metals supporting over a dozen different industries and employs experts to support each industry. These include Wood & Panel Products Manufacturing, Hearth Products, Site Furnishings, Commercial and Residential Construction etc. It has grown through devotion to its customers, dedication to customer service and commitment to quality products. The company has two divisions: Division 'Y' and Division 'D'. Each division work as an investment centre separately. Salary of each divisional manager is `7,20,000 per annum with the addition of an annual performance related bonus based on divisional return on investment (ROI). A minimum ROI of 12% p.a. is expected to be achieved by each divisional manager. If a manager only achieves the 12% target, he will not be rewarded a bonus. However, for every whole 1% point above 12% which the division achieves for the year, a bonus equal to 3% of annual salary will be paid subject to a maximum bonus of 20% of annual salary. The figures belonging to the year ended 31 March 2021 are given below:

	Division 'Y' ('000)	Division 'D' ('000)
Revenue	29,000	17,400
Profit	5,290	3,940
Less: Head Office Cost	(2,530)	(1,368)
Net Profit	2,760	2,572
Non- Current Assets	19,520	29,960
Cash, Inventory, and Trade Receivable	4,960	6,520
Trade Payable	5,920	2,800
Manager Responsible	HAI	FAI

During the financial year 2020-21, FAI manager of Division 'D' invested `13.6 million in new equipment including an advanced cutting machine, which will increase productivity by 10% per annum. HAI, manager of Division 'Y', has made no investment during the year, even its computer system needs updation. Division 'Y''s manager has already delayed payments of its suppliers due to limited cash & bank balance although the cash balance at Division 'Y' is still better than that of Division 'D'.

Required

(i) For each division, COMPUTE, ROI for the year ending 31 March 2021. JUSTIFY the figures used in your calculation.

(ii) COMPUTE bonus of each manager for the year ended 31 March 2021.

(iii) DISCUSS whether ROI provides justifiable basis for computing the bonuses of managers and the problems arising from its use at BYD for the year ended 31 March 2021.

(STUDY MATERIAL)

ANSWER:

(i) ROI

Division 'Y'

Controllable Profit = ₹5,290K

Net Assets = ₹19,520k + ₹4,960K − ₹5,920K = ₹18,560K

ROI = 28.50%

Division 'D'

Controllable profit = ₹3,940K

Net Assets = ₹29,960K + ₹6,520K – ₹2,800K = ₹33,680K

ROI = 11.70%

Responsibility accounting advocates that manager's performance shall be judged based upon how well he or she manages the items under his or her control, hence in computation of ROI of both division, *controllable profit* has been taken into consideration; because head office costs are not controllable by divisional managers. Figures of Non-current and current assets apart from the current liabilities have been taken into consideration as they are such items over which divisional managers have complete control.

(ii) Bonus

Bonus to be paid for *each whole percentage point* is ₹21,600 (₹7,20,000 × 3%), But there is ceiling limit as well, i.e. 20% of salary hence the maximum Bonus will be ₹1,44,000 (₹7,20,000 × 20%).

Division 'Y'

Divisional ROI is 28.5%, which result in 16 whole percentage points above the minimum required ROI of 12%. Hence the bonus according to each whole percent of excess ROI will be ₹3,45,600 (16 × ₹21,600). But there is upper cap of ₹1,44,000 Therefore HAI will be paid the bonus of ₹1,44,000.

Division 'D'

Divisional ROI is 11.7%, since same is less than the minimum required ROI of 12%, hence FAI will not be rewarded with bonus.

(iii) Discussion

FAI will not receive any bonus since he has not earned any point above minimum percentage. This is due to the larger investment base on which the ROI figure has been computed. Total investment of Division 'D' are almost 1.81 times to that of Division 'Y'. The major reason behind this is that Division 'D' invested ₹13.6 million (₹13,600K) in new equipment during the year. Ignoring this investment of division D is just 1.1. times to that of division Y and net Investments would have been only ₹20,080K and the ROI for Division 'D' would have been 19.62% resulting in payment of a bonus ₹1,44,000 (7 × ₹21, 600 i.e. ₹1,51,200 but subject to upper cap of ₹1,44,000) rather than the nothing. So, FAI is being penalized for making investment decisions which are in the best interests of his division and company, because new investment enhance productivity which will support customer loyalty, dedication to customer services and quality, the CSFs for BYD. It is very surprising that he decided to invest where he knew that he would receive lesser bonus subsequently. On the other hand, HAI has taken benefit from the fact that he has not invested anything even though it was needed for computer system updation. This is an example of sub-optimal decision making.

Further, Division 'Y''s trade payables are more than double those of Division 'D'. In part, one would expect this due to higher sales (almost 66% more than Division 'D') and low cash levels at Division 'Y'. Higher trade payable leads to reduction in net assets figures. The fact that BYD is rewarding HAI with bonus, even though relationships with suppliers may be badly affected, is again a case of sub-optimal decision making. If the profit margin (excluding head office cost) as percentage of sales is calculated, it comes to 18.24% (₹5,290 / ₹29,000) for division 'Y' and 22.64% (₹3,940 / ₹17,400) for division 'D'. Therefore, it can be seen that division 'D' is performing better if capital employed is ignored. ROI is simply distorting the division 'D''s performance.

FAI might feel extremely disappointed by getting nothing and in the future, he may opt to postpone the investment to increase the bonus. Non- investing in new technology and equipment will mean that the BYD will not be kept updated with industry changes and its overall future competitiveness will be affected.

Briefly, the use of ROI is resulting in sub-optimal decision making and a lack of goal congruence i.e. what is good for the managers is not necessarily good for the company too and vice versa. Hence ROI is not justifiable basis to for computing the bonuses of divisional managers and also cause problem for BYD.

QUESTION 7

Water Utilities Services (WUS) is established with an aim for supply and distribution of water in Mumbai as well as supply of water to the various local authorities for distribution to villages and other small cities adjacent to Mumbai. This involved planning, operating, treating, maintaining, and distributing water resources in the country's urban centres and other areas mandated by Maharashtra Government. Its mission is "To provide sustainable water in a cost effective and environmentally friendly manner to

the economy". The government ensures that WUS does not take advantage of its monopoly position in the regional area by increasing prices. The government controls majority of services through its water regulatory body which determines an acceptable margin level (ROCE) and ensures that the pricing of WUS within these areas does not break this level. The remaining work i.e. a water bottle operation (WBO) is not regulated by government and WUS charges a market rate for water supply in bottle. The regulator compute return on capital employed (ROCE) of WUS based on its own valuation of the capital assets which are used in operation and the profit from those services.

Acceptable level of ROCE set by the regulator is 7.00%. If WUS breach this level, then the company would be penalized. WUS board is trying to improve the performance for the benefit of the shareholders. In order to communicate the objective of maximizing shareholders' wealth, the directors have decided to consider economic value added (EVA) as the key performance indicator.

Compute EVA of WUS based on the following information for the year ending 31 March 2021:

Particulars	Water Distribution Operation (WDO)	Water Bottle Operation (WBO)	Total
	₹ in Crore	₹ in Crore	₹ in Crore
Revenue	555.00	186.00	741.00
Less: Operating Cost	460.00	119.00	579.00
Operating Profit	95.00	67.00	162.00
Less: Finance Charges			46.00
Profit Before Tax			116.00
Less: Tax at 30%			34.80
Profit After Tax			81.20
Capital Employed		2020-21	2019-20
		₹ in Crore	₹ in Crore
Audited Accounts		1,616.20	1,495.00
Determined by the Regulator (for WDO Only)		1,558.00	1,422.00

Notes

1. Operating Costs includes:

Particular	2020-21	2019-20
	₹ in Crore	₹ in Crore
Depreciation	118	114
Provision for doubtful debts	4	1
Research and Development	24	–
Other non-cash items	14	12

2. Economic depreciation is `166 Crore in 2020-21. In FY 2019-20, economic and accounting depreciation were assumed to be the same.

3. Current year tax paid is `18 Crore and deferred tax provisions of `16.80 Crore has been adjusted. There was no deferred tax balance before 2020-21. The provision for doubtful debts was `9 Crore in the 2020-21 balance sheet.

4. Research and development has been non-capitalized. It belongs to a new project that will be developed over five years and is expected to be of long-term benefit to the company. 2020-21 is the first year of this project.

5. Cost of Capital Equity	14%
Debt (Pre-Tax)	6%

6. Gearing of WUS Equity	45%
Debt	55%

Required

i   EVALUATE the financial performance of WUS using EVA.

ii   ASSESS whether WUS comply with its acceptable ROCE level

iii   Advise on how to improve profitability.

(STUDY MATERIAL)
ANSWER:
(i) Computation of NOPAT

Particulars	₹ in Crore
Operating Profit	162.00
Add:	
Non-Cash Items	14.00
Accounting Depreciation	118.00
Doubtful Debts	4.00
Research and Development	24.00
Less:	
Economic Depreciation	166.00
Tax Paid	18.00
Tax Saving on Interest (₹46 × 30%)	13.80
NOPAT	124.20

Computation of Capital Employed

Particulars	₹ in Crore
Capital Employed as on 31.03.2020	1,495.00
Add:	
Provision for Doubtful Debt as on 31.03.2020 (i.e. ₹9 - ₹4 crore)	5.00
Other Non-Cash Items (incurred in 2019-20)	12.00
Adjusted Opening Capital Employed	1,512.00

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WACC = 0.45 × 14% + 0.55 × 6% × (1 – 30%)
= 8.61%
EVA = NOPAT – (WACC × Capital Employed)
= ₹124.20 – (8.61% × ₹1,512)
= ₹124.20 – ₹130.18
= – ₹5.98 Crores

Evaluation

Presently, WUS is distorting value as it is not able to meet the economic cost of its own capital. This put the company into the question of perpetual succession and lead the company against shareholder's interest. The reason could be a higher cost of equity for WUS. The investing risk should be low since 75% of the services that the company renders are important for the economy and demand is guaranteed in future. Optionally, WUS needs to either increase its NOPAT enough for break even on economic value added or slash its capital employed by selling unutilized or under-utilized assets.

(ii) Regulatory ROCE: Target 7.00%

$$ROCE = \left(\frac{OperatingProfit}{CapitalEmployed}\right) \times 100.00\%$$

$$= \left(\frac{95}{1,422}\right) \times 100\%$$

$$= 6.68\%$$

The ROCE is within the acceptable ROCE of 7.00%.

(iii) *Operating Margins*

Water Distribution Operation = 17.12%

Water Bottle Operation = 36.02%

Advise

Operating margin from WBO is 36.02% compared to 17.12% (WDO). WUS may use the WDO activities as a trusted source of cash profit to reinvest in expansion of the WBO. Expansion through acquisition of appropriate non-regulated businesses using the cash generated by the regulated activities might be a good decision.

Further, WUS may improve profitability by controlling costs within WDO activities through performance measurement. The regulatory body cannot argue that the company is overcharging its customers to increase profit margin. This is possible through strict observance of expenses and using cost savings techniques through efficiency improvements. In order to control cost within WDO, targets should be based on minimal variances and adopting cost cutting methods.

Overall, In WDO, there is only a limited scope for increase in the operating profit since the maximum operating profit allowed is ` 99.54 crore i.e. 7.00% of ` 1,422 crore of capital employed. Thus, WUS should go to expand its WBO as this is producing higher operating profit margins.

QUESTION 8 . Beta Control (BC) is a global leader in manufacturing of commercial building control systems with over 250 distributors and many thousands of installations in more than 50 countries. Control systems involve air conditioning systems, facility management, energy and water management, access control and security controls etc. At BC, manufacturing is done at a number of factory sites where some products are easy and largely produced and have a long life while other products are intricated and have a short life due to changing technologies. BC's mission statement is 'to keep you ahead through control systems that improve productivity and save energy'.

A Newly appointed chief executive officer (CEO) is anxious about declining share price of BC in the last two years. She identified that the business has grown through acquisition and senior management have focused on making corporate deals but not on making control systems. She announced that the BC's focus must be on optimization and upgradation of its value generation rather than just getting bigger through acquisitions.

Assuming yourself as a performance management expert of BC, the CEO has asked you to aid her in her improvement programme. Firstly, she wants your views on the use of EVA as the key performance metric at BC. You are given the current EVA computation (Annexure1) but there is some suspicion about whether the assistant who has done this work is sufficiently well trained about this method. So, she requires you to examine his accuracy and the assumptions forming part of the calculation.

Required

Write a report to the chief executive officer to EVALUATE the usefulness of EVA as performance measure and accuracy of the calculation done by assistant apart the assumptions taken if any.

Annexure 1

NOPAT

Particulars	Year ended 31st March 2021	
	₹ in Lacs (L)	Notes
Operating Profit	1,102.80	
Add:		
Non-Cash Expenses	30.20	
Marketing Expenditure Capitalised	46.20	7
Less:		
Tax	269.60	9
Lost Tax Relief on Interest	48.96	
Net Operating Profit After Tax (NOPAT)	860.64	

Capital Employed

Particulars	Year ended 31st March 2021	
	₹ in Lacs (L)	Notes
From the Statement of Financial Position	4,802.00	10
Add:		
Marketing Expenditure Capitalized	46.20	7
Adjusted Capital Employed	4,848.20	

WACC $=$ (1/2 × 15%) + (1/2 × 7.8%)

$=$ 11.40%

EVA $=$ NOPAT – (WACC × Capital Employed)

$=$ ₹860.64 L – ₹4,848.20 L × 11.40%

$=$ ₹860.64 L – ₹552.69 L

$=$ ₹307.95 L

Assumptions and Notes

1. Debt/Equity 1:1

2. Cost of Equity is 15.00%

3. Cost of Debt (pre-tax) is 7.80%

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4. Tax Rate is 30.00%

5. Interest charged in the period was `163.20 L.

6. In current fiscal year, BC spend `80.00 L in Training and Development by leveraging the latest digital technologies including virtual classrooms to deliver highly relevant training to staff at the point of need.

7. Marketing Expenditure has been `46.20 L each year for the last two years to build the long- term brand.

8. The total R & D spending was `20 L during this year for in- depth study of the TCP/IP protocols. The TCP/IP based products have not been launched yet.

9. BC has paid Tax of `260 L while the tax charged per the accounts was `269.60 L.

10. Capital employed during the Period (from the statement of financial position):

Opening	`4,564.00 L
Closing	`4,802.00 L

(STUDY MATERIAL)

ANSWER:

Report

To: CEO, Beta Control

From: Performance Management Expert

Date: 31st May 2021

Subject: Evaluation of EVA at Beta Control

EVA provides a link between decisions, performance measures and rewards, which focuses managers on performing better. Incentive schemes based on EVA provide better quality information and motivation in making decision which in turn maximise shareholder's wealth. In other words, EVA links the operating returns to the assets that were used to generate those returns. The learning which flows from EVA analyses can be perceptive and can allow the manager not only to identify areas of weakness in performance but also to easily find solutions. BC is a multiproduct company having number of factory sites. EVA can help to appraise divisional contributors to, or detractors from, overall profitability. Thus, managers may be educated through EVA and pursue such objectives that improve operating profits investing more capital.

In addition, this report deals with evaluation of the accuracy and assumptions used in the calculation of BC's EVA. There are many errors in the present calculation of EVA. These have been discussed below and revised calculations are enclosed.

✦ Non-Cash Expenses have been correctly added back to the profit as these are expenses which do not affect the cash flow of a given period.

✦ Addition back of Marketing Expenditure is also correct as spending contributes to *future value-creation*. For the same reason, the *prior year spending* is also added in to capital employed.

✦ Training and Development Expenses should be capitalised. Training and Development Expenses have been treated as an expense in the income statement, they should be added back to profit, and added to capital employed (at the end of the year).

✦ Research and Development (R & D) Expenses should be treated as marketing expenditure for long period.

✦ The tax expenses in the EVA calculation should be the tax *paid* with adjustment for lost tax relief on interest and not the adjusted amount of tax *charged* in the accounts.

▪ The WACC is incorrect because it should be based on post-tax cost of debt.

▪ Generally, a company takes, at least, a year's time to earn a return on investment. Thus, the capital employed figure should be based on the beginning numbers.

NOPAT

Particulars	Year ended 31st March 2021
	₹ in Lacs
Operating Profit	1,102.80
Add:	
Non-Cash Expenses	30.20
Marketing Expenditure Capitalised	46.20
Training & Development Expenses	80.00
R & D Expenses	20.00
Less:	
Tax	260.00
Lost Tax Relief on Interest	48.96
Net Operating Profit After Tax (NOPAT)	970.24

Capital Employed

Particulars	₹ in Lacs
From the Statement of Financial Position (Starting)	4,564.00
Marketing Expenditure Capitalized	46.20
Adjusted Capital Employed	4,610.20

WACC = (1/2 × 15%) + (1/2 × 7.8% × 70%)
= 10.23%
EVA = NOPAT – (WACC × Capital Employed)
= ₹970.24 L – ₹4,610.20 L × 10.23%
= ₹498.62 L

The recomputed EVA has increased from ₹307.95 Lacs to ₹498.62 Lacs which shows a positive position for BC as it adds up the shareholder's wealth.

Section B – Case Scenarios & Case Studies

Case Scenarios

Question 1

Natural Spices manufactures and distributes high-quality spices to gourmet food shops and top quality restaurants. Gourmet and high-end restaurants pride themselves on using the freshest, highest-quality ingredients.

Natural Spices has set up five state of the art plants for meeting the ever- growing demand. The firm procures raw material directly from the centers of produce to maintain uniform taste and quality. The raw material is first cleaned, dried and tested with the help of special machines. It is then carefully grounded into the finished product passing through various stages and packaged at the firm's ultraclean factory before being dispatched to customers.

The following variances pertain to last week of operations, arose as a consequence of management's decision to lower prices to increase volume.

Sales Volume Variance	18,000 (F)
Sales Price Variance	14,000 (A)
Purchase Price Variance	10,000 (F)
Labour Efficiency Variance	11,200 (F)
Fixed Cost Expenditure Variance	4,400 (F)

Required

(i) IDENTIFY the 'Critical Success Factors' for Natural Spices.

(ii) EVALUATE the management's decision with the 'Overall Corporate Strategy' and 'Critical Success Factors'. (Study Material)

Answer

(i) Gourmet and high-end restaurants recognises Natural Spices on the basis of its high quality of spices. Therefore, quality is most critical success factor of Natural Spices. There are other factors which cannot be ignore such as price, delivery options, attractive packing etc. But all are secondary to the quality.

(ii) Deliberate action of cutting price to increase sales volume indicates that firm is intending to expand its market to retail market and street shops which is price sensitive.

Purchase Price Variance is clearly indicating that firm has purchased raw material at lower price which may be due to buying of lower quality of material. Similarly, positive Efficiency Variance is indicating cost cutting and stretching resources.

It appears that firm is intending to expand its market to retail market and street shops by not only reducing the price but also compromising its quality which is opposing its current strategy of high quality.

Management should monitor the trends of variances on regular basis and take appropriate action in case of evidence of permanent decline in quality. Here, customer feedback is also very important.

QUESTION 2

CONTROL THROUGH STANDARD COSTING SYSTEM

'HAL' is a manufacturer, retailer, and installer of Cassette Type Split AC for industrial buyers. It started business in 2001 and its market segment has been low to medium level groups. Until recently, its business model has been based on selling high volumes o f a standard AC, brand name 'Summer', with a very limited degree of customer choice, at low profit margins. 'HAL''s current control system is focused exclusively on the efficiency of its manufacturing process and it reports monthly on the following varianc es: material price, material usage and manufacturing labour efficiency. 'HAL' uses standard costing for its manufacturing operations. In 2020, 'HAL' employs 20 teams, each of which is required to install one of its 'Summer' AC per day for 350 days a year. The average revenue per 'Summer' AC installed is `36,000. 'HAL' would like to maintain this side of its business at the current level. The 'Summer' installation teams are paid a basic wage which is supplemented by a bonus for every AC they install over the yearly target of 350. The teams make their own arrangements for each installation and some teams work seven days a week, and up to 12 hours a day, to increase their earnings. 'HAL' usually receives one minor complaint each time a 'Summer' AC is installed and a major complaint for 10% of the 'Summer' AC installations.

In 2018, 'HAL' had launched a new AC, brand name 'Summer-Cool'. This AC is aimed at high level corporates and it offers a very large degree of choice for the customer and the use of the highes

t standards of materials, appliances, and installation. 'HAL' would like to grow this side of its business. A 'Summer-Cool' AC retails for a minimum of `

1,00,000 to a maximum of

`5,00,000. The retail price includes installation. In 2019 the average revenue for each

'Summer-Cool' AC installed was `3,00,000. Currently, 'HAL' has 7 teams of 'Summer-Cool' AC installers and they can install up to 240 AC a year per team. These teams are paid salaries without a bonus element. 'HAL' has never received a complaint a bout a 'Summer-Cool' AC installation. 'HAL''s business is generated from repeat orders, recommendations, and local press advertising. It employs three sales executives who earn an annual salary of `3,00,000 each. It offers a six-month money back guarantee and this has to be fulfilled for 1% of its installations. 'HAL' has always been in profits but was shocked to see that in its results in 201 9 it only earned 0.2% net profit on its turnover.

Required

(i) EVALUATE the appropriateness of 'HAL''s current control system.

(ii) RECOMMEND four Critical Success Factors (CSFs) which could assist 'HAL' in achieving future success.

(iii) ADVISE 'HAL' about the changes it could implement in its standard costing and

reporting system to achieve improved control.

(STUDY MATERIAL)

Solution

(i) HAL's Control System HAL's current control system is *'focused exclusively' on the manufacturing process* and its efficiency even though HAL is also a retailer and installer of industrial ACs. It is suitable for HAL's control system to monitor manufacturing efficiency with the help of the three variances: material usage, material price and manufacturing labour efficiency. No reasons have been given for focusing on these three variances and *there may be other variances* which can provide useful control information that are not currently computed for example, labour rate and material yield. Although HAL uses standard costing, it is *unclear whether it calculates product costs*. A lack of product costs computation may be the reason that it was shocked about its 2019 profit margin. Standard costing could be in criticism for misdirecting management's attention. Thus, in the case of a 'Summer-Cool' AC where the highest standards of materials are used, it is pertinent that the quality of the finished product is not compromised. Therefore, it might be proper to accept an *unfavorable material price variance* to maintain the product's standards. *Variance analysis should not be done in isolation but a holistic view needs to be taken* about HAL's operations and the current control system may not lead to this. HAL is not currently controlling and monitoring aspects which are important for competitive success. *HAL's Critical Success Factors have not been identified yet*. There is *monthly reporting of variances* but in addition to this, there should also be *follow-up actions* for outcome resulting from these reports. However, a month is not inevitably the relevant reporting period for all aspects of HAL's business. If there is a production problem leading to excessive materials wastages, a month is too long time to wait before remedial action are taken. Therefore, real-time or coexistent reporting may be more relevant for manufacturing operations. A major deficiency of HAL's control systems is that they do not extend to retailing and installation activities. The 'Summer' installation teams are incentivized to complete ACs which could be good for their productivity. However, there is a high level of complaints associated with their work. As there is *no evident means of monitoring the installation team's work*, the reasons of the complaints cannot be identified.

(ii) Critical Success Factors (CSF) are elements tied to the strategy of business and they represent objectives that business is trying to achieve, as a corporation, as a department or as a business unit. Critical success factors may vary over time and may include items like employee attitudes, manufacturing flexibility etc. There are a range of CSF's which could be appropriate for HAL. They include:

CSF: Installations Quality There are different quality expectations for the two ACs and there have been different levels of quality achieved, can be seen in the historic pattern of complaints. This strongly implies that the quality of installation should be tracked as a separate CSF for each AC. This CSF is important for HAL due to cost implications of rectifications and guarantee claims. It is also important to consider that because of the effect that poor quality will have on HAL's future business.

CSF: Customer Satisfaction Like quality, this CSF will need to be monitored separately for each AC. Customer satisfaction encompass the complete life of a transaction beginning with the initial enquiry about a purchase and continuing after installation for the life of the AC. Customer satisfaction will have an influence on HAL's future business which is dependent, in part, on repeat orders and recommendations. This CSF will also show the market's view of HAL's brand.

CSF: Brand Performance HAL has two distinct brands. They are directed at different market segments and have different associated attributes. 'Summer' ACs offer limited choice to the customer and retail, on average, for `36,000. HAL would like to maintain this business at its present level (7,000 ACs a year minimum) `252 million revenue. HAL needs to ascertain where this brand is situated in its life-cycle and what marketing activities may be required to support it. The 'Summer-Cool' brand is aimed at a different market segment and HAL would like to grow this aspect of its business which produces revenue of `504 million. The success of both brands is important for the continual success of HAL and this CSF indicate a complete view of performance.

CSF: Manufacturing Excellence HAL manufactures all the ACs which it sells and installs. Manufacturing must be a substantial part of HAL's total costs and a significant contributor to profitability. Currently, HAL monitors some limited aspects of manufacturing through its control system. However, there are many other aspects which have not been reported upon, for example- innovation, labour absenteeism, manufacturing flexibility and investment in technology. This CSF is much broader than the current control system. It also assists in searching for competitiveness.

(iii) Standard Costing and Reporting System HAL may be required to abandon or modify its standard costing and reporting system. The rationale behind this is that the current control system might lead to an inappropriate emphasis being placed on certain aspects of performance. It is noteworthy that the installations for 'Summer' AC is causing a substantial level of complaints whereas there has never been a complaint made about a 'Summer Cool' AC. It could be that the different remuneration arrangements for the ACs' installation teams have led to this and as the complaint level is an important aspect of the CSF i.e. Customer Satisfaction, HAL *may need to modify its remuneration arrangements*. It should also reckon whether it would be benefited from a broader range of variance reporting, for example, it may find reporting useful to report on labour rates and material yield. For all CSFs, HAL will need to determine the appropriate reporting intervals. Although it is useful to synchronize this with the accounting reporting cycle, CSFs and KPIs do not necessarily coexist with accounting period ends. *Some KPI's may require to be reported in real-time*, for example, material wastage, others may be of a longer duration like Customer Satisfaction. There is a strong argument for disassociation of the CSFs reporting from the financial reporting cycles.

QUESTION 3

PERFORMANCE PRISM
Audio Tech is a company that designs, develops and sells audio equipment. Audio Tech is best known for its home audio systems and speakers, noise cancelling headphones, professional audio systems and automobile audio systems.
Audio Tech sells audio equipment to consumers through its large network of retail outlets in its home country and via the company's website.

Audio Tech purchases the materials and components that it needs to manufacture audio equipment from a number of different suppliers. All of the purchases are delivered to a company's godown at its factory and are held there until they are needed for production and assembling.

Finished products are transported from the factory to Audio Tech's retail outlets by company's own trucks. The trucks follow the same schedule each week irrespective of the load they are carrying. Audio equipment that are required for sale via the company's website are transported to Audio Tech's distribution centre.

The company believes that it can attract more customers by offering quality products at reasonable prices. Each unit is tested for quality with a real time analyzer ipad app and a calibrated microphone to measure how consistently each sound system reproduced various frequencies. A bass-test sweep tone allows checking how well the subwoofer managed low-end frequencies.

Finally, they drive each in cars briefly to see how sound quality changes while on the move. The company aims to build customer loyalty also through high level of customer services and value chain analysis. The customers can return the product if quality specifications are not met. There is a separate department to handle such complaints.

Audio Tech had implemented Balanced Scorecard as a performance measurement and management system. Company has been doing great on financial parameters and customer satisfaction parameters. Market capitalization of the company has been increased considerably over the years.

Of late, the company has witnessed high employee turnover ratio. Though the company has a formal exit interview process for the resigning employees, the input received from these interviews is rarely considered in improving HR practices. One of the common feedbacks from employees was that working hours are too long and they have to frequently work on weekends also and there is so much pressure to improve customer service without adequate support of system and processes. Also the truck drivers have been on strike thrice in the last one year demanding better pay, retirement benefits and good working conditions.

Audio Tech is keen to address the above issues and recently held a meeting to discuss the performance of the company. The Management Accountant suggested to the Managing Director to use an alternative performance measurement mechanism which considers all the stakeholders instead of just shareholders and customers. The Managing Director is suspicious of the Management Accountant's suggestions and is unclear as to whether they are suitable for the company or not. Therefore, the company seeks your assistance.

Required

(i)

IDENTIFY and EXPLAIN the various primary activities of Audio Tech in its value chain. Also SUGGEST, if there is any scope for cost reduction in these activities.

(ii)

RECOMMEND an alternative performance measurement mechanism which considers all stakeholders instead of just shareholders and customers. Also INDICATE the performance measures as applicable to the situations of Audio Tech in the alternative mechanism suggested by you.

(STUDY MATERIAL)

Solution

(i) The Various Primary Activities of Audio Tech in its Value Chain Analysis

Michael Porter describes the value chain as "internal processes or activities a company performs to design, produce, market, deliver and support its product." Rather than looking at costs as per accounting cost pools, the value chain model focuses on the work flow of an organization in the form of discrete set of activities that are linked to each other. The value chain model is a generic model that examines activities as Primary Activities and Secondary Activities. Passing through each activity, the product or service gains some value. The idea is to *(a) eliminate non-value adding activities and (b) identify product differentiating or cost leadership opportunities among the value adding activities.*

Individual activities reflect the company's strategy, implementation of its strategy and underlying economics of the activities themselves.

Profit margin for the company = Value created less the cost of creating that value

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Primary activities are those activities that enable inputs (raw material) to be transformed into output (finished goods) or in the provision of service. Primary activities as per Porter's model are:

Inbound Logistics

Activities related to receiving, storing and distributing the inputs (raw materials) to the production process.

Audio Tech has its materials and components needed to manufacture audio equipment delivered to its godown at the factory premises. These materials are stored until needed for production and assembling at the factory. These are the inbound logistics related activities.

Operations

Activities involved in transforming raw materials into final products. These would include machining, packaging, testing and equipment maintenance.

Audio Tech's work flow activities related to manufacturing of the audio equipment and components need to be considered here. In addition, the testing of equipment using ipad application, bass sweep test as also sound quality check after assembly into the car, are operations related activities.

Outbound Logistics

Activities involved in collecting, storing and distributing the products from the assembly line to the end user customers. This includes finished goods warehousing, delivery vehicle operation, order processing and scheduling.

Some of the activities that would be classified here are:

(a) *Storage of Audio Tech's finished goods within factory premises and at its distribution centre.*

(b) *Scheduling and dispatch of goods using trucks to retail outlets and distribution centres.*

(c) *Activities related to order taking from retail outlets as well as direct orders on the company's website.*

Marketing and Sales

Activities such as advertising, promotion, distribution channel selection, sales force management, pricing policy and such other activities that make the customer aware of the product would be listed here.

All of Audio Tech's activities that relate to the above list of activities whereby it aims to spread customer awareness would be classified here. It aims to build customer loyalty by offering quality products.

Service

Activities related to after sales service such as installation, repair and part replacement would be classified here.

Audio Tech has a separate department to handle customer complaints. Customers can return the product if quality specifications are not met. Also, any activity relating to after sale service would be classified here.

Below are certain measures that Audio Tech can implement to Reduce Costs

(a) Just in Time raw material procurement system: Procure input materials and components only when needed for production and handling. This would *reduce inventory holding costs*. Less inventory on hand could also result in *savings in storage and material insurance costs*. Before implementation, the company needs to consider the risk of loss incurred on account of stock-outs. It needs to develop close relationships with its suppliers to ensure streamlined delivery of inputs. At the same time inputs should meet the required quality standards.

(b) Company's trucks deliver the finished goods to retail outlets as per a fixed schedule each week, irrespective of the load they carry. This indicates that there may be possibilities of dis-economies of cost. If there is a pile up of inventory due to lesser number of truck delivery runs, it could lead to high inventory holding cost. Conversely, if delivery runs are scheduled even if the trucks are not loaded to full capacity, dis-economies of delivery cost would creep in. Therefore, the *production and truck delivery schedule should be streamlined efficiently and economically*.

(c) Audio Tech lays importance in the quality of the product to ensure customer satisfaction. Lower the defects higher the customer satisfaction. It has extensive testing and inspection processes in place. This preventive step should be assessed to find out if it is effective in reducing the cost of poor quality – internal failure cost as well as external failure costs. Internal failure costs (repair, scrap, rework) are associated with defects found after the production but before delivery to the customer. This can be avoided, if quality inspection is done throughout the production work-flow rather than just at the end of production. External failure costs (repairs and servicing, sale returns, warranty claims, complaints) are incurred when the customer finds the product defective and returns it. External failure costs can severely impact customer loyalty and should be minimized.

Therefore, Audio Tech should *invest in preventive and appraisal costs to ensure good quality in order to balance out the cost of poor quality*. Preventive costs would include quality planning and assurance, error proofing quality improvements, education and training. Appraisal costs could be inspection, quality audits,

supplier rating etc. Total Quality Management (TQM) and Six Sigma could be effective tools to ensure efficient good quality production that would minimize cost of poor quality.

(ii) Alternate Performance Measurement Mechanism considering all Stakeholders

Audio Tech uses Balanced Scorecard to measure performance. Balanced Scorecard focuses on the financial, customer, business, and innovation perspectives. It is given that the company is doing well on financial and customer satisfaction parameters. Market capitalization has also increased over the years, the company is on a growth trajectory. However, the company is facing issues in the form of high employee turnover and dissatisfaction among truck drivers who deliver the goods.

An alternate performance measurement mechanism can be **Performance Prism**. This is a second-generation performance management framework conceptualized by *Andy Neely* and *Chris Adams*. The reasons why it would be an effective replacement for models like Balanced Scorecard are:

(a) Balanced scorecard focuses on *just two of the stakeholders* – Investors and Customers. Performance measurement of other stakeholders like employees, suppliers, government etc. have not been considered. The other stakeholders play an important role in the growth of the company's business. Hence, performance measures are needed to monitor both their contribution to the company as well as their overall satisfaction with the company.

(b) Most of the performance measurement models *do not focus on the changes that need to be made to strategies and processes*. Balanced Scorecard assumes that once the strategies are implemented, measuring a relevant set of metrics of performance will ensure that the rest of the business also functions properly. However, this is not true. In the case of Audio Tech, both customers and shareholders are happy with the company's performance. Yet even in a growing business, the drivers of growth, namely other stakeholders like employees and suppliers are not satisfied. Neither is their contribution nor their satisfaction is captured under the Balanced Scorecard performance measurement.

(c) A company has a *"Quid Pro Quo" relationship* with all its stakeholders. Stakeholders contribute to the company's business while they also derive benefits from it. For example, employees perform their functions well, this is their contribution to Audio Tech's growth. In return, employees would want good working condition and pay to remain motivated and loyal to the company.

Therefore, Performance Prism can be an alternate performance measurement mechanism that considers metrics related to a *broader set of stakeholders* of an organization, not limited to just customers and shareholders alone.

Five "Interrelated Facets" of the Performance Prism

Stakeholder Satisfaction

"Identify the organizations set of stakeholders and their needs"

Unlike a balanced scorecard, the performance prism focuses on all the stakeholders of a company. Audio Tech has satisfied investors and customers, but dissatisfied employees and truck operators. The company must likewise identify all its stakeholders and determine the relative importance of each of the stakeholders. It can use **Mendelow's Matrix** to identify key shareholders in terms of *power* and *interest* of stakeholders. A stakeholder group with higher power and high interest (say a trade union) must be *kept satisfied*.

The main stakeholders of a company are:

✦ Investors - They want return on investment.
✦ Customers - They want good quality products at reasonable prices.
✦ Suppliers - They want better price for procurements or service.
✦ Government - They want revenues and development.
✦ Society at large - They want employment opportunities.

After identification of the stakeholders, the company must identify the requirement of each of the stakeholder group. What must the company do to ensure stakeholder satisfaction?

Audio Tech has to ensure that it improves employee satisfaction in order to reduce its employee turnover. It should also address the issues faced by truck drivers and involve them in a dialogue. If they are not satisfied, the company might suffer financially in the longer run.

Performance Measure: Employee turnover ratio, average employment duration of employees, number of strikes by truck drivers etc.

Stakeholder Contribution

"What the organization expect the stakeholders to contribute and deliver?"

In this facet, the company has to identify the contribution required from each stakeholder group and must define ways to measure contribution of stakeholders. In turn the company will have something to offer the stakeholders. This is the "Quid Pro Quo" relationship. For example, Audio Tech provides quality products to its customers. The customers in turn contribute towards the profits of the company, they pay a price for the value Audio Tech offers.

Audio Tech should provide for better working conditions to its employees. Motivated employees will perform better and remain loyal to the company. They would drive the growth of the company. Similarly, dialogue with truck drivers would be needed to provide better pay, retirement benefits and good working conditions. Truck drivers in turn need to ensure timely and safe delivery of goods to retail outlets.

Performance Measure: Efficiency of employees, productivity, on time delivery by truck drivers.

Strategies

"What strategies should an organization adopt that derives stakeholder contribution while reciprocating by ensuring their satisfaction?"

The organization should identify strategies that ensure that:

▪ The wants and needs of the stakeholders are satisfied.

▪ Stakeholders contribute to the organization's objectives.

Performance measures must be put in place to confirm that the strategies are working. Effective implementation depends on appropriate communication of strategies, implementation by managers and continuous evaluation of appropriateness of strategies.

Audio Tech has to roll out strategies to retain employees by means of better pay, working conditions and growth opportunities within the company. The strategy will be effective when the employee turnover is reduced following these initiatives. Similarly, the issues faced by truck drivers need to be addressed by taking appropriate strategic decisions. The absence of strikes will indicate that these decisions have been effective.

Performance Measures: Employee turnover after implementation of new strategy, efficiency of deliveries after issues with truck drivers have been resolved.

Processes

"What are the necessary processes to satisfy the above strategies?"

Processes ensure successful implementation of strategies. Each process could have sub-process. Process owners have to be identified to assign responsibility of functioning of the process.

Processes require continuous evaluation. Instead of evaluating all at once, the company has to identify important processes that are critical to the business. Porter's Value Chain Analysis can be used to identify and evaluate various processes in the organization.

Audio Tech should have well defined processes to hire appropriately skilled personnel for the job, transparent pay structure etc. This process may be owned by the Human Resource Manager. The working condition of truck drivers can be improved by providing sufficient training and better working conditions.

Performance Measures: Number of personnel hired at various skill levels, average payout for each of these skilled groups, hours of employee training, maintenance log of trucks etc.

Capabilities

"What resources should an organization need to effectively operate these processes?"

The company must have the right capabilities in order to support the process. Capabilities could include resources, technology, and infrastructure for a particular process to work.

Audio Tech may decide to increase pay/salaries, however it should have sufficient financial resources to make these payments.

Performance Measures: Amount spent of new recruitments and training etc.

Conclusion

"Manage these *interlinked facets* to cater to all stakeholders"

While meeting targets as defined by performance measures should be emphasized, the performance measurement system should be dynamic and flexible to allow the stakeholders to voice their opinions and expectations as well. Taking their requirements into consideration, along with managing capabilities and processes, Audio Tech can implement effective strategies that will cater to the needs of all stakeholders.

APPENDIX

STANDARD NORMAL CUMULATIVE PROBABILITY TABLE
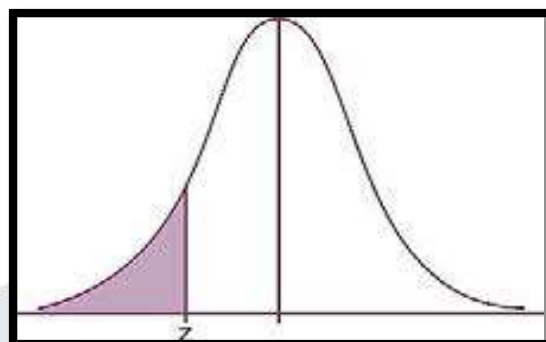
Cumulatively Probabilities for NEGATIVE z-Values

Z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
-3.4	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002
-3.3	0.0005	0.0005	0.0005	0.0004	0.0004	0.0004	0.0004	0.0004	00004	0.0003
-3.2	0.0007	0.0007	0.0006	0.0006	0.0006	0.0006	0.0006	0.0005	0.0005	0.0005
-3.1	0.0010	0.0009	0.0009	0.0009	0.0008	0.0008	0.0008	0.0008	0.0007	0.0007
-3.0	0.0013	0.0013	0.0013	0.0012	0.0012	0.0011	0.0011	0.0011	0.0010	0.0010
-2.9	0.0019	0.0018	0.0018	0.0017	0.0016	0.0016	0.0015	0.0015	0.0014	0.0014
-2.8	0.0026	0.0025	0.0024	0.0023	0.0023	0.0022	0.0021	0.0021	0.0020	0.0019
-2.7	0.0035	0.0034	0.0033	0.0032	0.0031	0.0030	0.0029	0.0028	0.0027	0.0026
-2.6	0.0047	0.0045	0.0044	0.0043	0.0041	0.0040	0.0039	0.0038	0.0037	0.0036
-2.5	0.0062	0.0060	0.0059	0.0057	0.0055	0.0054	0.0052	0.0051	0.0049	00048
-2.4	0.0082	0.0080	0.0078	0.0075	0.0073	0.0071	0.0069	0.0068	0.0066	0.0064
-2.3	0.0107	0.0104	0.0102	0.0099	0.0096	0.0094	0.0091	0.0089	0.0087	00084
-2.2	0.0139	0.0136	0.0132	0.0129	0.0125	0.0122	0.0119	0.0116	0.0113	0.0110
-2.1	0.0179	0.0174	0.0170	0.0166	0.0162	0.0158	0.0154	0.0150	0.0146	0.0143
-2.0	0.0228	0.0222	0.0217	0.0212	0.0207	0.0202	0.0197	0.0192	0.0188	0.0183
-1.9	0.0287	0.0281	0.0274	0.0268	0.0262	0.0256	0.0250	0.0244	0.0239	0.0233
-1.8	0.0359	0.0351	0.0344	0.0336	0.0329	0.0322	0.0314	0.0307	0.0301	0.0294
-1.7	0.0446	0.0436	0.0427	0.0418	0.0409	0.0401	0.0392	0.0384	0.0375	0.0367
-1.6	0.0548	0.0537	0.0526	0.0516	0.0505	0.0495	0.0485	0.0475	0.0465	0.0455
-1.5	0.0668	0.0655	0.0643	0.0630	0.0618	0.0606	0.0594	0.0582	0.0571	0.0559
-1.4	0.0808	0.0793	0.0778	0.0764	0.0749	0.0735	0.0721	0.0708	0.0694	0.0681
-1.3	0.0968	0.0951	0.0934	0.0918	0.0901	0.0885	0.0869	0.0853	0.0838	0.0823
-1.2	0.1151	0.1131	0.1112	0.1093	0.1075	0.1056	0.1038	0.1020	0.1003	0.0985
-1.1	0.1357	0.1335	0.1314	0.1292	0.1271	0.1251	0.1230	0.1210	0.1190	0.1170
-1.0	0.1587	0.1562	0.1539	0.1515	0.1492	0.1469	0.1446	01423	0.1401	0.1379
-0.9	0.1841	0.1814	0.1788	0,1762	0.1736	0.1711	0.1685	0.1660	0.1635	01611
-0.8	0.2119	0.2090	0.2061	0.2033	0.2005	0.1977	0.1949	0.1922	0.1894	0.1867
-0.7	0.2420	0.2389	0.2358	0.2327	0.2296	0.2266	0.2236	0.2206	0.2177	0.2148
-0.6	0.2743	0.2709	0.2676	0.2643	0.2611	0.2578	0.2546	0.2514	0.2483	0.2451
-0.5	0.3085	0.3050	0.3015	0.2981	0.2946	0.2912	0.2877	0.2843	0.2810	0.2776

-0.4	0.3446	0.3409	0.3372	0.3336	0.3300	0.3264	0.3228	0.3192	0.3156	0.3121
-0.3	0.3821	0.3783	0.3745	0.3707	0.3669	0.3632	0.3594	0.3557	0.3520	0.3483
-0.2	0.4207	0.4168	0.4129	0.4090	0.4052	0.4013	0.3974	0.3936	0.3897	0.3859
-0.1	0.4602	0.4562	0.4522	0.4483	0.4443	0.4404	0.4364	0.4325	0.4286	0.4247
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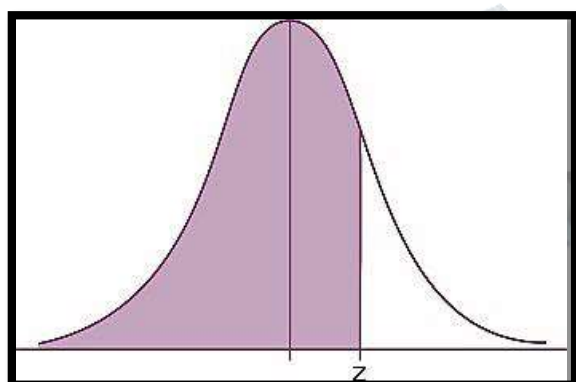
Cumulatively Probabilities for POSITIVE z-Values

Z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	08133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	08997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	09854	0.9857

456

2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	09938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990
3.1	0.9990	0.9991	0.9991	0.9991	0.9992	0.9992	0.9992	0.9992	0.9993	0.9993
3.2	0.9993	0.9993	0.9994	0.9994	0.9994	0.9994	0.9994	0.9995	0.9995	0.9995
3.3	0.9995	0.9995	0.9995	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9997
3.4	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9998

LOGARITHMS

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						0607	0645	0682	0719	0755	4	7	11	15	18	22	26	29	33
12	0792	0828	0864	0899	0934						3	7	11	14	18	21	25	28	32
						0969	1004	1038	1072	1106	3	7	10	14	17	20	24	27	31
13	1139	1173	1206	1239	1271						3	6	10	13	16	19	23	26	29
						1303	1335	1367	1399	1430	3	7	10	13	16	19	22	25	29
14	1461	1492	1523	1553	1584						3	6	9	12	15	19	22	25	28
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15	1751	1790	1818	1847	1875						3	6	9	11	14	17	20	23	26
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16	2041	2068	2095	2122	2148						3	6	8	11	14	16	19	22	24
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17	2304	2330	2355	2380	2405						3	5	8	10	13	15	18	20	23
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						2900	2923	2945	2967	2989	2	4	6	8	11	13	15	17	19
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22	3424	3444	3464	3483	3502	3522	3541	3560	3579	3598	2	4	6	8	10	12	14	15	17
23	3617	3636	3655	3674	3692	3711	3729	3747	3766	3784	2	4	6	7	9	11	13	15	17
24	3802	3820	3838	3856	3874	3892	3909	3927	3945	3962	2	4	5	7	9	11	12	14	16
25	3979	3997	4014	4031	4048	4065	4082	4099	4116	4133	2	3	5	7	9	10	12	14	15
26	4150	4166	4183	4200	4216	4232	4249	4265	4281	4298	2	3	5	7	8	10	11	13	15
27	4314	4330	4346	4362	4378	393	4409	4425	440	4456	2	3	5	6	8	9	11	13	14
28	4472	4487	4502	4518	4533	4548	4564	4579	4594	4609	2	3	5	6	8	9	11	12	14
29	4624	4639	4654	4669	4683	4698	4713	4728	4742	4757	1	3	4	6	7	9	10	12	13
30	4771	4786	4800	4814	4829	4843	4857	4871	4886	4900	1	3	4	6	7	9	10	11	12
31	4914	4928	4942	4955	4969	4983	4997	5011	5024	5038	1	3	4	6	7	8	10	11	12
32	5051	5065	5079	5092	5105	5119	5132	5145	5159	5172	1	3	4	5	7	8	9	11	12
33	5185	5198	5211	5224	5237	5250	5263	5276	5289	5302	1	3	4	5	6	8	9	10	12
34	5315	5328	5340	5353	5366	5378	5391	5403	5416	5428	1	3	4	5	6	8	9	10	11
35	5441	5453	5465	5478	5490	5502	5514	5527	5539	5551	1	2	4	5	6	7	9	10	11
36	5563	5575	5587	5599	5611	5623	5635	5647	5658	5670	1	2	4	5	6	7	8	10	11
37	5682	5694	5705	5717	5729	5740	5752	5763	5775	5786	1	2	3	5	6	7	8	9	10

38	5798	5809	5821	5832	5843	5855	5866	5877	5888	5899	1	2	3	5	6	7	8	9	10
39	5911	5922	5933	5944	5955	5966	5977	5988	5999	6010	1	2	3	4	5	7	8	9	10
40	6021	6031	6042	6053	6064	6075	6085	6096	6107	6117	1	2	3	4	5	6	8	9	10
41	6128	6138	6149	6160	6170	6180	6191	6201	6212	6222	1	2	3	4	5	6	7	8	9
42	6232	6243	6253	6263	6274	6284	6294	6304	6314	6325	1	2	3	4	5	6	7	8	9
43	6335	6345	6355	6365	6375	6385	6395	6405	6415	6425	1	2	3	4	5	6	7	8	9
44	6435	6444	6454	6464	6474	6484	6493	6503	6513	6522	1	2	3	4	5	6	7	8	9
45	6532	6542	6551	6561	6471	6580	6590	6599	6609	6618	1	2	3	4	5	6	7	8	9
46	6628	6637	6646	6656	6665	6675	6684	6693	6702	6712	1	2	3	4	5	6	7	7	8
47	6721	6730	6739	6749	6758	6767	6776	6785	6794	6803	1	2	3	4	5	5	6	7	8
48	6812	6821	6830	6839	6848	6857	6866	6875	6884	6893	1	2	3	4	4	5	6	7	8
49	6902	6911	6920	6928	6937	6946	6955	6964	6972	6981	1	2	3	4	4	5	6	7	8
50	6990	6998	7007	7016	7024	7033	7042	7050	7059	7067	1	2	3	3	4	5	6	7	8
51	7076	7084	7093	7101	7110	7118	7126	7135	7143	7152	1	2	3	3	4	5	6	7	8
52	7160	7168	7177	7185	7193	7202	7210	7218	7226	7235	1	2	2	3	4	5	6	7	7
53	7243	7251	7259	7267	7275	7284	7292	7300	7308	7316	1	2	2	3	4	5	6	6	7
54	7324	7332	7340	7348	7356	7364	7372	7380	7388	7396	1	2	2	3	4	5	6	6	7
55	7404	7412	7419	7427	7435	7443	7451	7459	7466	7474	1	2	2	3	4	5	5	6	7
56	7482	7490	7497	7505	7513	7520	7528	7536	7543	7551	1	2	2	3	4	5	5	6	7
57	7559	7566	7574	7582	7589	7597	7604	7612	7619	7627	1	2	2	3	4	5	5	6	7
58	7634	7642	7649	7657	7664	7672	7679	7686	7694	7701	1	1	2	3	4	4	5	6	7
59	7709	7716	7723	7731	7738	7745	7752	7760	7767	7774	1	1	2	3	4	4	5	6	7
60	7782	7789	7796	7803	7810	7818	7825	7832	7839	7846	1	1	2	3	4	4	5	6	6
61	7853	7860	7768	7875	7882	7889	7896	7903	7910	7917	1	1	2	3	4	4	5	6	6
62	7924	7931	7938	7945	7952	7959	7966	7973	7980	7987	1	1	2	3	3	4	5	6	6
63	7993	8000	8007	8014	8021	8028	8035	8041	8048	8055	1	1	2	3	3	4	5	5	6
64	8062	8069	8075	8082	8089	8096	8102	8109	8116	8122	1	1	2	3	3	4	5	5	6
65	8129	8136	8142	8149	8156	8162	8169	8176	8182	8169	1	1	2	3	3	4	5	5	6
66	8195	8202	8209	8215	8222	8228	8235	8241	8248	8254	1	1	2	3	3	4	5	5	6
67	8261	8267	8274	8280	8287	8293	8299	8306	8312	8319	1	1	2	3	3	4	5	5	6
68	8325	8331	8338	8344	8351	8357	8363	8370	8376	8382	1	1	2	3	3	4	4	5	6
69	8388	8395	8401	8407	8414	8420	8426	8432	8439	8445	1	1	2	2	3	4	4	5	6
70	8451	8457	8463	8470	8476	8482	8488	8494	8500	8506	1	1	2	2	3	4	4	5	6
71	8513	8519	8525	8531	8537	8543	8549	8555	8561	8567	1	1	2	2	3	4	4	5	5
72	8573	8579	8585	8591	8597	8603	8609	8615	8621	8627	1	1	2	2	3	4	4	5	5
73	8633	9639	8645	8651	8657	8663	8669	8675	8681	8686	1	1	2	2	3	4	4	5	5
74	8692	8639	8704	8710	8716	8722	8727	8733	8739	8745	1	1	2	2	3	4	4	5	5
75	8751	8756	8762	8768	8774	8779	8785	8791	8797	8802	1	1	2	2	3	3	4	5	5
76	8808	8814	8820	8825	8831	8837	8842	8848	8854	8859	1	1	2	2	3	3	4	5	5
77	8865	8871	8876	8882	8887	8893	8899	8904	8910	8915	1	1	2	2	3	3	4	4	5
78	8921	8927	8932	8938	8943	8949	8954	8960	8965	8971	1	1	2	2	3	3	4	4	5
79	8976	8982	8987	8993	8998	9004	9009	9015	9020	9025	1	1	2	2	3	3	4	4	5

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80	9031	9036	9042	9047	9053	9058	9063	9069	9074	9079	1	1	2	2	3	3	4	4	5
81	9085	9090	9096	9101	9106	9112	9117	9122	9128	9133	1	1	2	2	3	3	4	4	5
82	9138	9143	9149	9154	9159	9165	9170	9175	9180	9186	1	1	2	2	3	3	4	4	5
83	9191	9196	9201	9206	9212	9217	9222	9227	9232	9238	1	1	2	2	3	3	4	4	5
84	9243	9248	9253	9258	9263	9269	9274	9279	9284	9289	1	1	2	2	3	3	4	4	5
85	9294	9299	9304	9309	9315	9320	9325	9330	9335	9340	1	1	2	2	3	3	4	4	5
86	9345	9350	9355	9360	9365	9370	9375	9380	9385	9390	1	1	2	2	3	3	4	4	5
87	9395	9400	9405	9410	9415	9420	9425	9430	9435	9440	0	1	1	2	2	3	3	4	4
88	9445	9450	9455	9460	9465	9469	9474	9479	9484	9489	0	1	1	2	2	3	3	4	4
89	9494	9499	9504	9509	9513	9518	9523	9528	9533	9538	0	1	1	2	2	3	3	4	4
90	9542	9547	9552	9557	9562	9566	9571	9576	9581	9586	0	1	1	2	2	3	3	4	4
91	9590	9595	9600	9605	9609	9614	9619	9624	9628	9633	0	1	1	2	2	3	3	4	4
92	9638	9643	9647	9652	9657	9661	9666	9671	9675	9680	0	1	1	2	2	3	3	4	4
93	9685	9689	9694	9699	9703	9708	9713	9717	9722	9727	0	1	1	2	2	3	3	4	4
94	9731	9736	9741	9745	9750	9754	9759	9763	9768	9773	0	1	1	2	2	3	3	4	4
95	9777	9782	9786	9791	9795	9800	9805	9809	9814	9818	0	1	1	2	2	3	3	4	4
96	9823	9827	9832	9836	9841	9845	9850	9854	9859	9863	0	1	1	2	2	3	3	4	4
97	9868	9872	9877	9881	9886	9890	9894	9899	9903	9908	0	1	1	2	2	3	3	4	4
98	9912	9917	9921	9926	9930	9934	9939	9943	9948	9952	0	1	1	2	2	3	3	4	4
99	9956	9961	9965	9969	9974	9978	9983	9987	9997	9996	0	1	1	2	2	3	3	3	4

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N	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
.00	1000	1002	1005	1007	1009	1012	1014	1016	1019	1021	0	0	1	1	1	1	2	2	2
.01	1023	1026	1028	1030	1033	1035	1038	1040	1042	1045	0	0	1	1	1	1	2	2	2
.02	1047	1050	1052	1054	1057	1059	1062	1064	1067	1069	0	0	1	1	1	1	2	2	2
.03	1072	1074	1076	1079	1081	1084	1086	1089	1091	1094	0	0	1	1	1	1	2	2	2
.04	1096	1099	1102	1104	1107	1109	1112	1114	1117	1119	0	1	1	1	1	2	2	2	2
.05	1122	1125	1127	1130	1132	1135	1138	1140	1143	1146	0	1	1	1	1	2	2	2	2
.06	1148	1151	1153	1156	1159	1161	1164	1167	1119	1172	0	1	1	1	1	2	2	2	2
.07	1175	1178	1180	1183	1186	1189	1191	1194	1197	1199	0	1	1	1	1	2	2	2	2
.08	1202	1205	1208	1211	1213	1216	1219	1222	1225	1227	0	1	1	1	1	2	2	2	3
.09	1230	1233	1236	1239	1242	1245	1247	1250	1253	1256	0	1	1	1	1	2	2	2	3
.10	1259	1262	1265	1268	1271	1274	1276	1279	1282	1285	0	1	1	1	1	2	2	2	3
.11	1288	1291	1294	1297	1300	1303	1306	1309	1312	1315	0	1	1	1	2	2	2	2	3
.12	1318	1321	1324	1327	1330	1334	1337	1340	1343	1346	0	1	1	1	2	2	2	2	3
.13	1349	1352	1355	1358	1361	1365	1368	1371	1374	1377	0	1	1	1	2	2	2	3	3
.14	1380	1384	1387	1390	1393	1396	1400	1403	1406	1409	0	1	1	1	2	2	2	3	3
.15	1413	1416	1419	1422	1426	1429	1432	1435	1439	1442	0	1	1	1	2	2	2	3	3
.16	1445	1449	1452	1455	1459	1462	1466	1469	1472	1476	0	1	1	1	2	2	2	3	3
.17	1479	1483	1486	1489	1493	1496	1500	1503	1507	1510	0	1	1	1	2	2	2	3	3
.18	1514	1517	1521	1524	1528	1531	1535	1538	1542	1545	0	1	1	2	2	2	2	3	3
.19	1549	1552	1556	1560	1563	1567	1570	1574	1578	1581	0	1	1	1	2	2	3	3	3
.20	1585	1589	1592	1596	1600	1603	1607	1611	1614	1618	0	1	1	1	2	2	3	3	3
.21	1622	1626	1629	1633	1637	1641	1644	1648	1652	1656	0	1	1	2	2	2	3	3	3
.22	1660	1663	1667	1671	1675	1679	1683	1687	1690	1694	0	1	1	2	2	2	3	3	3
.23	1698	1702	1706	1710	1714	1718	1722	1726	1730	1734	0	1	1	2	2	2	3	3	4
.24	1738	1742	1746	1750	1754	1758	1762	1766	1770	1774	0	1	1	2	2	2	3	3	4
.25	1778	1782	1786	1791	1795	1799	1803	1807	1811	1816	0	1	1	2	2	2	3	3	4
.26	1820	1824	1828	1832	1837	1841	1845	1849	1854	1858	0	1	1	2	2	3	3	3	4
.27	1862	1866	1871	1875	1879	1884	1888	1892	1897	1901	0	1	1	2	2	3	3	3	4
.28	1905	1910	1914	1919	1923	1928	1932	1936	1941	1945	0	1	1	2	2	3	3	3	4
.29	1950	1954	1959	1963	1968	1972	1977	1982	1986	1991	0	1	1	2	2	3	3	4	4
.30	1995	2000	2004	2009	2014	2018	2023	2028	2032	2037	0	1	1	2	2	3	3	4	4
.31	2042	2046	2051	2056	2061	2065	2070	2075	2080	2084	0	1	1	2	2	3	3	4	4
.32	2089	2094	2099	2104	2109	2113	2118	2123	2128	2133	0	1	1	2	2	3	3	4	4
.33	2138	2143	2148	2153	2158	2163	2168	2173	2178	2183	0	1	1	2	2	3	3	4	4
.34	2188	2193	2198	2203	2208	2213	2218	2223	2228	2234	1	1	2	2	3	3	4	4	5
.35	2239	2244	2249	2254	2259	2265	2270	2275	2280	2286	1	1	2	2	3	3	4	4	5

.36	2291	2296	2301	2307	2312	2317	2323	2328	2333	2339	1	1	2	2	3	3	4	4	5
.37	2344	2350	2355	2360	2366	2371	2377	2382	2388	2393	1	1	2	2	3	3	4	4	5
.38	2399	2404	2410	2415	2421	2427	2432	2438	2443	2449	1	1	2	2	3	3	4	4	5
.39	2455	2460	2466	2472	2477	2483	2489	2495	2500	2506	1	1	2	2	3	3	4	5	5
.40	2512	2518	2523	2529	2535	2541	2547	2553	2559	2564	1	1	2	2	3	4	4	5	5
.41	2570	2576	2582	2588	2594	2600	2606	2612	2618	2624	1	1	2	2	3	4	4	5	5
.42	2630	2636	2642	2649	2655	2661	2667	2673	2679	2685	1	1	2	2	3	4	4	5	6
.43	2692	2698	2704	2710	2716	2723	2729	2735	2742	2748	1	1	2	3	3	4	4	5	6
.44	2754	2761	2767	2773	2780	2786	2793	2799	2805	2812	1	1	2	3	3	4	4	5	6
.45	2818	2825	2831	2838	2844	2851	2858	2864	2871	2877	1	1	2	3	3	4	5	5	6
.46	2884	2891	2897	2904	2911	2917	2924	2931	2938	2944	1	1	2	3	3	4	5	5	6
.47	2951	2958	2965	2972	2979	2985	2992	2999	3006	3013	1	1	2	3	3	4	5	5	6
.48	3020	3027	3034	3041	3048	3055	3062	3069	3076	3083	1	1	2	3	3	4	5	6	6
.49	3090	3097	3105	3112	3119	3126	3133	3141	3148	3155	1	1	2	3	3	4	5	6	6
.50	3162	3170	3177	3184	3192	3199	3206	3214	3221	3228	1	1	2	3	4	4	5	6	7
.51	3236	3243	3251	3258	3266	3273	3281	3289	3296	3304	1	2	2	3	4	5	5	6	7
.52	3311	3319	3327	3334	3342	3350	3357	3365	3373	3381	1	2	2	3	4	5	5	6	7
.53	3388	3396	3404	3412	3420	3428	3436	3443	3451	3459	1	2	2	3	4	5	6	6	7
.54	3467	3475	3483	3491	3499	3508	3516	3524	3532	3540	1	2	2	3	4	5	6	6	7
.55	3548	3556	3565	3573	3581	3589	3597	3606	3614	3622	1	2	2	3	4	5	6	7	7
.56	3631	3639	3648	3656	3664	3673	3681	3690	3698	3707	1	2	3	3	4	5	6	7	8
.57	3715	3724	3733	3741	3750	3758	3767	3776	3784	3793	1	2	3	3	4	5	6	7	8
.58	3802	3811	3819	3828	3837	3846	3855	3864	3873	3882	1	2	3	4	4	5	6	7	8
.59	3890	3899	3908	3917	3926	3936	3945	3954	3963	3972	1	2	3	4	5	5	6	7	8
.60	3981	3990	3999	4009	4018	4027	4036	4046	4055	4064	1	2	3	4	5	6	6	7	8
.61	4074	4083	4093	4102	4111	4121	4130	4140	4150	4159	1	2	3	4	5	6	7	8	9
.62	4169	4178	4188	4198	4207	4217	4227	4236	4246	4256	1	2	3	4	5	6	7	8	9
.63	4266	4276	4285	4295	4305	4315	4325	4335	4345	4355	1	2	3	4	5	6	7	8	9
.64	4365	4375	4385	4395	4406	4416	4426	4436	4446	4457	1	2	3	4	5	6	7	8	9
.65	4467	4477	4487	4498	4508	4519	4529	4539	4550	4560	1	2	3	4	5	6	7	8	9
.66	4571	4581	4592	4603	4613	4624	4634	4645	4656	4667	1	2	3	4	5	6	7	9	10
.67	4677	4588	4699	4710	4721	4732	4742	4753	4764	4775	1	2	3	4	5	7	8	9	10
.68	4786	4797	4808	4819	4831	4842	4853	4864	4875	4887	1	2	3	4	6	7	8	9	10
.69	4898	4909	4920	4932	4943	4955	4966	4977	4989	5000	1	2	3	5	6	7	8	9	10
.70	5012	5023	5035	5047	5058	5070	5082	5093	5105	5117	1	2	4	5	6	7	8	9	11
.71	5129	5140	5152	5164	5176	5188	5200	5212	5224	5236	1	2	4	5	6	7	8	10	11
.72	5248	5260	5272	5284	5297	5300	5321	5333	5346	5358	1	2	4	5	6	7	9	10	11
.73	5370	5383	5395	5408	5420	5433	5445	5458	5470	5483	1	3	4	5	6	8	9	10	11
.74	5495	5508	5521	5534	5546	5559	5572	5585	5598	5610	1	3	4	5	6	8	9	10	12

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.75	5623	5636	5649	5662	5675	5689	5702	5715	5728	5741	1	3	4	5	7	8	9	10	12
.76	5754	5768	5781	5794	5808	5821	5834	5848	5861	5875	1	3	4	5	7	8	9	11	12
.77	5888	5902	5916	5929	5943	5957	5970	5984	5998	6012	1	3	4	5	7	8	10	11	12
.78	6026	6039	6053	6067	6081	6095	6109	6124	6138	6152	1	3	4	6	7	8	10	11	13
.79	6166	6180	6194	6209	6223	6237	6252	6266	6281	6295	1	3	4	6	7	9	10	11	13
.80	6310	6324	6339	6353	6368	6383	6397	6412	6427	6442	1	3	4	6	7	9	10	12	13
.81	6457	6471	6486	6501	6516	6531	6546	6561	6577	6592	2	3	5	6	7	9	11	12	14
.82	6607	6622	6637	6653	6668	6683	6699	6714	6730	6745	2	3	5	6	8	9	11	12	14
.83	6761	6776	6792	6808	6823	6839	6855	6871	6887	6902	2	3	5	6	8	9	11	13	14
.84	6918	6934	6950	6966	6982	6998	7015	7031	7047	7063	2	3	5	6	8	10	11	13	15
.85	7079	7096	7112	7129	7145	7161	7178	7194	7211	7228	2	3	5	7	8	10	12	13	15
.86	7244	7261	7278	7295	7311	7328	7345	7362	7379	7396	2	3	5	7	8	10	12	13	15
.87	7413	7430	7447	7464	7482	7499	7516	7534	7551	7568	2	3	5	7	9	10	12	14	16
.88	7586	7603	7621	7638	7656	7674	7691	7709	7727	7745	2	4	5	7	9	11	12	14	16
.89	7762	7780	7798	7816	7834	7852	7870	7889	7907	7925	2	4	5	7	9	11	13	14	16
.90	7943	7962	7980	7998	8017	8035	8054	8072	8091	8110	2	4	6	7	9	11	13	15	17
.91	8128	8147	8166	8185	8204	8222	8241	8260	8279	8299	2	4	6	8	9	11	13	15	17
.92	8318	8337	8356	8375	8395	8414	8433	8453	8472	8492	2	4	6	8	10	12	13	15	17
.93	8511	8531	8551	8570	8590	8610	8630	8650	8670	8690	2	4	6	8	10	12	14	16	18
.94	8710	8730	8750	8770	8790	8810	8831	8851	8872	8892	2	4	6	8	10	12	14	16	18
.95	8913	8933	8954	8974	8995	9016	9036	9057	9078	9099	2	4	6	8	10	12	15	17	19
.96	9120	9141	9162	9183	9204	9226	9247	9268	9290	9311	2	4	6	8	11	13	15	17	19
.97	9333	9354	9376	9397	9419	9441	9462	9484	9506	9528	2	4	7	9	11	13	15	17	20
.98	9550	9572	9594	9616	9638	9661	9683	9705	9727	9750	2	4	7	9	11	13	16	18	20
.99	9772	9795	9817	9840	9863	9886	9908	9931	9954	9977	2	5	7	9	11	14	16	18	20

RTP- NOV 2020

Competitive Advantage

1. BA is the second largest airline in the Country "X". Aviation industry in the Country "X" is growing fast. In 2011, 45 million people travelled to/ from/ or within the Country "X". By 2020 that doubled to 100 million. This number is expected to treble to 300 million by 2030. Also, by 2025, Country "X" is expected to be the third largest air transport market in the world, behind the US and China.

Government is trying to meet the significant growth potential of aviation Industry. However, it will create challenges also for the airline industry and its industry partners.

Government also wants to ensure that broader business and policy environment should not place hurdles which inhibit growth and reduce the level of benefits that aviation can deliver to the nation. The industry, its supply chain partners, and the government and policy makers have a clear mandate to work in collaboration towards the common goal of ensuring that aviation's economic and social benefits are fulfilled.

Despite of operating in World's fastest growing market BA struggles for passengers. Also, BA is facing following problems:

▪ **Aviation Turbine Fuel (ATF) prices constitute about 40% of operational costs in Country "X" and are taxed higher here than anywhere else in the World. The Central government charges 14% duty on ATF. While the state government pile on their own local tax that can go as high as 29%.**

▪ **The currency depreciation is hitting Airline harder. About 25% to 30% of their costs, excluding ATF, are dollar denominated, from aircraft lease rents, maintenance costs to ground handling and parking charges abroad etc.**

▪ **With the entry of Low Budget Carriers, full-service carrier like BA that have higher overhead costs have been forced to offer discount to passengers looking for great bargain.**

▪ **Continuous improvements in tourism infrastructure, tourism policies, human resources development, airport infrastructure density are among the areas that could further enhance Country "X"'s competitiveness. Ease of doing business over the last five years has risen.**

▪ **The intense competition among domestic airlines carriers, the need to capture a slice of the ever-expanding market and passenger price sensitivity makes the airlines difficult to raise ticket prices.**

Together, these factors have now plunged Country "X"'s aviation industry to its most precarious phase in the last three years or so.

BA is facing huge competition as a "year of sharp U-turns" for "X"'s aviation industry from record profit in Financial Year 2019-20 to mega losses, resulting in direct need of recapitalisation. BA has been appealing to the government for a decade for a reduction in taxes on fuel, but all in vain. ATF is 35-40% more expensive in Country "X" than in the rest of the world, because of relatively high tax rates.

Required

ADVISE the strategy that BA should follow in order to gain superior performance and competitive advantage over its competitors

ANSWER:

In consideration to Michael Porter's theory about creating a superior performance and competitive advantage, a firm's overall competitive advantage derives from the difference between the *value it offers to customer* and its *cost of creating that customer value*. In order to survive and prosper in industry, firm must meet two criteria– they *must supply what customers want* to buy and they *must survive competition*. To attain superior performance and attain competitive advantage, firm must have *distinctive competencies*. Distinctive competencies can take any of the following two forms:

Relative low-Cost advantage– under which customers gain when a firm's total costs undercut those of its average competitor.

An offering or differentiation advantage– If customer perceive a product or service as superior, they become more willing to pay a premium price relative to the price they will have to pay for competing offerings.

Low Cost Advantage (Cost Leadership)

BA can enjoy relative cost advantage if its total costs are lower than those of its competitors. This relative cost advantage enables a business to do one of the following:

– Charge a lower price than its competitors for its services to gain market share and still maintain current profitability; or

– Match with the price of competing services and increase its profitability.

Cost reductions in BA can be achieved through yield management with variable pricing depending on capacity utilization with careful monitoring; application of computer and communication technology in cost effective way i.e. selling seats via the internet rather than through travel agents; trimming overhead costs by using lower cost out-of-town airports, no printed tickets, seat allocations, or free meals and drinks; efficient operations i.e. fast turnaround times for aircraft to improve utilization; and no exceptions policies to reduce the cost of handling exceptions (e.g. no flexibility for passengers who arrive late). Cost economies can also be realized from large scale operations. However, it is important to note that as soon as more firms strive to become the cost leader, rivalry become so fierce that the consequences for the profitability in the industry are disastrous.

Differentiation Advantage

It occurs when customers perceive that a business services offering is of higher quality, involves fewer risks and/or outperform services offered by competitors. In other words, customers perceive the service offered by a business to be superior. For example, differentiation may include a firm's ability to deliver services, and other factors that provide unique customer value. BA is a multinational passenger airline. It can adopt a differentiation approach by offering passengers a higher-quality experience than many of its rivals. This allows it to charge a premium for its flights compared to many other airlines.

A differentiation advantage can be achieved by offering enhanced features such as prime landing slots can be obtained at major airports around the world; using superior and advance technology; well-maintained, clean, and comfortable aircraft; training in customer care and the recruitment of high-quality staff; providing complementary services such as in-flight entertainment, high-quality food, and drink. Customer value can

also be increased by *subjective features* such as brand image, advertising based on quality of service provided. However, differentiator cannot ignore its cost position. If costs are too high the premium price are nullified.

On successfully differentiated its offering, management of BA may exploit the advantage in one of two ways viz., either increase price until it just offsets the cost of improvement in customer benefits, thus *maintaining* current market share; or price below the "full premium" level to *build* market share.

Alternatively, BA may focus on geographical region and short point to point flights to reduce costs. Michael Porter enlightens focus as attaining low cost or product differentiation for a *particular* buyer group, segment of product line, or geographic market rather than for the industry as a whole. The focuser can attain competitive advantage within a niche, because large firms are either not attracted to niche or have ignored the potential. The narrow focus in itself though is not adequate for a competitive advantage. The firms need to optimize the strategy on two variants: cost focus and differentiation focus. One risk of a 'focus strategy' is that broadly targeted competitors devastate the segment once it becomes economically attractive.

In addition, the currency depreciation is hitting Airlines harder and international overhead costs have risen, the BA should attempt to increase the number of internal domestic flights. Moreover, ATF cost can also be lowered by investment in fuel saving modern Airbuses, however, the reduction in operating costs may outweigh the capital equipment costs.

To gain competitive advantage BA may also assess Value Shop Model. Value Shop generates value by organizing resources (e.g. people, knowledge, and skills) and deploying them to solve specific problems, for example, delivering airline services to the passengers or delivering a solution to the business problem. Shops are organized around making executing decisions- identifying and assessing problems or opportunities, developing alternative solutions or approaches, choosing one, executing it and evaluating results.

In this way, the above discussed strategies may be more appropriate for helping BA in achieving superior performance and competitive advantage over its competitors.

Concept in Practice

Southwest Airlines (SA) targeted on a geographic region and short point-to- point flights to reduce costs. Even though it offered no-frills service (no-frills or no frills service is one for which the non-essential features like food, entertainment, printing of boarding pass etc. have been removed to keep the price low) and was based in secondary airports, SA improved quality relative to the *limited set of competing alter-natives* by offering direct flights rather than connecting flights requiring changing planes at large hub airports. The SA also offered better on-time performance and friendly amenities.

Supply Chain Management

2. An apparel manufacturing company has a factory in Ahmedabad, making denim clothing for customers of all ages. It sells its clothing from its factory outlet store located within the city. Until 6 months back, the company had a business model wherein the products manufactured at its factory would be sent to its factory outlet store. Customers would visit the store and choose apparel suiting their tastes. Production was based on prediction of customer demand. This "made to stock" model has been placed for many years.

Few months back, the store manager noticed many customers exiting without making any purchases. Tracking this and after obtaining feedback from customers over sometime, it was found that many products were unacceptable to the customers' tastes - either the shade or design of denim was not what they wanted or that the apparel was not of the correct fit for them. The management then decided to provide customers a choice of either choosing from their standard apparel range that has already been made ("made to stock" model) or to offer them a "made to order" option.

The company now displays its range of denim material at the factory outlet. Customers can go through the samples and choose the material of their choice. Company certified tailors would then take measurements based on the customers' preferences. A detailed order customized to the customers' needs would then be drawn up. The factory has set up a separate tailoring division that

would stich the apparel specifically for these "made to order" sales. For this new machines and production line resources have been put in place.

Customized products are manufactured and be made available to the customer within 3 working days' time from the date of placing the order. The customer comes to the store and picks up the apparel ordered. For delays beyond this timeline, the customer gets to pay 5% less on the order value. This is done to attract and maintain customers, who would otherwise choose to purchase apparel offered by rival competitors. Therefore, speed of delivery of the customized product is critical for the company. This is the main selling point for the company to operate the "made to order" business model.

If further modifications are needed due to errors on part of the company (quality / finishing issues), the apparel would need to be modified / re-stitched once again. The company will bear the cost of modification or replacement of garment.

This new "made-to-order" has been in place for the past 6 months. At the stage of project proposal, the management found it a lucrative option for the company because:

(i) Customers are willing to pay a higher price to have customized clothing as compared to the standard fitting.

(ii) It would attract more customers to the store

(iii) If the model works well, the dependence on the "made to stock" model can reduce. Savings in inventory stock, obsolescence and warehousing costs will benefit the company's bottom-line.

Customers have been very enthusiastic in availing this customization facility offered by the company. Sales have increased manifold in the last few months. Therefore, the management is interested to understand the metrics related to their "made to order" business mode to assess its success and risks. Some of the non-financial metrics are:

Metric	Month					
	1	2	3	4	5	6
Orders needing modification on account of errors in order taking or manufacturing process (% of sales orders made under "made to order" model)	15%	12%	10%	8%	5%	4%
Orders delivered beyond the 3 working days timeline (% of sales orders made under "made to order" model)	5%	4%	3%	6%	7%	5%
Production downtime (hours)	44	88	22	141	132	123
Labor idle time due to unavailability of material (hours)	25	22	17	13	24	22
Ratio of "made to order" to total sales from the factory outlet (Ratio of sales value)	16%	22%	25%	32%	34%	38%
Repeat orders by customers availing this facility (% of customers giving repeat order / total customers availing "made to order" facility)	4%	21%	33%	54%	60%	63%

Required

ANALYZE the non-financial measures of quality of the division over the six-month period. Focus on the production performance, delivery cycle performance and customer satisfaction.

ANSWER:

Analysis of the operating data of the "made to order" at the business store revealed the following:

Production Performance:

(i) Modifications to orders: This company has to bear the cost of modification / replacement of the garment incurred on account of error in its order taking or manufacturing process. Therefore, orders needing such modification should be kept at the minimum. Such instances were higher than 10% in the first three months. With experience, either in the order taking process or manufacturing process, these errors have reduced substantially in the later months. The managers of the order taking and manufacturing departments need to understand and constantly keep track of these errors in order to keep them at a bare minimum. Management may want to set a benchmark, financially in terms of the cost of modification and non-

financially in terms of the acceptable threshold for such instances. Monthly tracking of this metric will help detection of errors earlier.

(ii) Production downtime: Production downtime normally occurs either due to break down of machinery or plant maintenance. It is unproductive time, reducing the machine's capacity. It must be kept minimum. Downtime hours have been steadily increasing in the past 3 months, the overall monthly average being 91.67 hours. The production manager has to analyze and take corrective action at the earliest. Urgency of the issue can be compounded by the fact that sales orders under the "make to order" model have been increasing steadily over the last few months. In the latest month, 38% of the overall sales was from this model. Therefore, the production capacity should be utilized optimally to ensure ability to meet delivery deadlines.

(iii) Labor Idle time: Labor Idle time due to unavailability of material is another unproductive waste of resource. The procurement department can address unavailability of material. On an average 20.5 hours of labor time is idle due to unavailability of the appropriate material. Appropriate steps with suppliers can lead to agreements to ensure seamless supply of material when required. This will enable the company to meet delivery deadlines given to customers.

Delivery Cycle Performance:
(i) On-time delivery: The orders need to be delivered to the store within 3 working days of placing order. The customer picks up the order from the store. Speed of delivery is critical to the company. Any delay beyond this timeline, the customer benefits by a 5% reduced price on the order as compensation for delay. Prompt delivery is also the company's selling point to attract customers, who would otherwise patronize its rivals. On an average 5% of the orders are not delivered within time. Therefore, average delivery success rate is only 95%. The management has to take steps that this is kept to the minimum in order not to stem loss of revenue as also to build brand loyalty with the customer base.

Customer Satisfaction:
(i) Repeat orders by customers: Prompt, quality delivery of the customized order would ensure that customers return in future with further orders. Statistics shows that repeat orders have steadily increased, which is a very positive signal to the management. Initially, only 4% of the customers under this model placed repeat orders. This increased substantially. Now almost 63% of the customers who purchase under this model come back with more orders!

(ii) Sales mix: Popularity among customers for customized services is further validated by the steady increase in the ratio of such sales to the overall sales of the company from the factory outlet. Now, this model generates an average of 28% of the total sales from the outlet, with a likely projection of having a higher share in the overall sales mix. Therefore, the "make to order" model can be termed a success.

Workings

Metric	Month						Monthly Average
	1	2	3	4	5	6	
Production performance							
Orders needing modification on account of errors in order taking or manufacturing process (% of sales orders made under "made to order" model)	15%	12%	10%	8%	5%	4%	9%
Production downtime (hours)	44	88	22	141	132	123	91.67
Labor idle time due to unavailability of material (hours)	25	22	17	13	24	22	20.50
Delivery cycle time							
Orders delivered beyond the 3 working days timeline (% of sales orders made under "made to order" model)	5%	4%	3%	6%	7%	5%	5%
Customer satisfaction							
Repeat orders by customers availing this facility (% of customers giving repeat order / total customers availing "made to order" facility)	4%	21%	33%	54%	60%	63%	39.17%
Ratio of "made to order" to total sales from the factory outlet (Ratio of sales value)	16%	22%	25%	32%	34%	38%	28%

3. ABC Limited specializes in the manufacture of chemical intermediaries in a very competitive business environment. ABC is a public listed company, with majority of its shareholders being institutional investors like mutual funds, banks and insurance companies.

It is located in a water scarce zone in Tamil Nadu. There are restrictions on the tapping and usage of groundwater under the relevant laws. Penal provisions of the law will apply in case of violations. The production process requires water and the amount of water that the company can draw is limited to 19,000 kilo-litres (1 Kilo-litre is 1,000 litres). Purchase of water is not an option as availability is highly erratic and exorbitant on cost. The company manufactures two types of chemicals "A" and "B" and these are sold in kilograms. The company is in the process of making the business plan for the year 2021.

Based on the actual operating data for 2020 and taking into consideration the inflation and possible price increases that it can obtain from the market, the following product costing details have been arrived at:

Product	A	B
Capacity Volume kg. (not inter-changeable)	8,25,000	9,30,000
Selling Price per kg.	`2,000	`1,000
Variable Cost per kg.	`1,500	`650
Water (litre/ kg.)	12.5	10

Under the relevant income tax laws prevalent, companies with a turnover of `250 Cr. (Crores) or less are taxed at a lower rate of 25% as against the normal 30%. The company intends to keep its sales for 2021 equal to `250 Cr. or slightly lesser to avail this concessional income tax benefit.

With capacity constraints, the company has calculated that it would be still beneficial for the company to stick to `250 Cr. as only a marginal increase in turnover is possible over `250 Cr.; after a higher tax @30%, the PAT would be still lower than the PAT arrived at after doing just `250 Cr. and availing the lower income tax rate.

CFO asked management consultant to work out the volumes in kg. of products "A" and "B" which would give an optimal (maximum) contribution given the constraints on capacity, water usage and turnover to avail the concessional income tax benefit.

Consultant work out with the following product mix using Linear Programming. She also proposes another mix which does not meet the constraint on water usage where the company could end up drawing excess water than permitted by 113 kilo-litres but would result in an increase of `30 lacs in contribution. She says that it is easily possible to do this by managing reporting to the water authorities.

Product		Optimal	Suggested
A (Volume in kg.)		8,00,000	7,85,000
B (Volume in kg.)		9,00,000	9,30,000
Contribution in ₹Cr.		71.5	71.8
	Constraints		
Sales	<= 250 Cr.	250	250
Volume of "A" in kg.	<= 8,25,000	8,00,000	7,85,000
Volume of "B" in kg.	<= 9,30,000	9,00,000	9,30,000
Water usage (in KL)	<= 19,000	19,000	19,113

Required

The CFO is not satisfied with the calculations. He wants you (Sr. Finance Manager) to come up with a proper DISCUSSION.

ANSWER:

Primary goal of investor –owned firms is shareholder wealth maximisation, which translates to stock price maximisation. Management Consultant's plan is looking good for the ABC as there is a positive impact on the profitability (`30 lacs) of the company. Also, ABC operates in a competitive environment so for its survival, it has to work on plans like above.

There is second side of coin that cannot also be ignored i.e. **business ethics**. It is easily possible to manage drawing of excess water, but it is not an ethical practice as the company has *responsibilities towards* use of natural resources like water and protecting the environment.

Besides, a whistle-blower complaint to the water authorities can land the company into trouble in terms of penalties, *a financial impact* and also such penalties are disallowed for income tax purposes. It is possible that such a violation may be reported in the media causing *disrepute to the name* of the company. It can also make *investors* in the share market stay away from the company as it has ethical governance issues. The company will face challenges in obtaining other *government approvals* when it will plan expansion as this violation may have to be reported on the applications seeking approvals.

Overall

May be ABC would able to earn profit due to this plan in *short run* but it will tarnish the image of the ABC which would hurt profitability in *long run*. Therefore, before taking any decision on this plan, ABC should analyse both qualitative and qualitative factors.

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QUESTION 4

Quebec Ornamental Company (OOC) has been a name to count on for quality and service. It has been designing wide range of ornamental products for more than two decades using the highest-quality standard. Such quality is achieved through years of experience and the integrity that is maintained by its employees. They are known for their perfection. WIK approached OOC to make inquiry of two products. The two products are indoor fountain known as 'O-1' and a large gnome known as 'O-2' for garden. Mr. X, the management accountant of OOC, has estimated the variable costs per unit of 'O-1' and 'O-2' as being `622.50 and `103.75 respectively. He estimated his calculations based on the following information:

(1) Products Data

	O-1	O-2	Other Products
Production/ Sales (units)	10,000	20,000	80,000
Total Direct Material Costs	₹22,50,000	₹7,50,000	₹60,00,000
Total Direct Labour Cost	₹15,00,000	₹5,00,000	₹60,00,000

(2) Total variable overheads for OOC are `1,20,00,000 out of which 30% belong to the procurement, warehousing and use of direct materials. While all other variable overheads are related to direct labour

(3) OOC presently allocate variable overheads into products units using percentage of total direct material cost and total direct labour cost.

(4) WIK is willing to purchase 'O-1' at `740 per unit and 'O-2' at `151 per unit.

(5) OOC will not accept any work yielding an estimated contribution to sales ratio less than 28%.

The directors of OOC are considering switching to an activity-based costing system and recently appointed a management consultants firm to undertake an in-depth review of existing operations. As result of that review, the consultants concluded that estimated relevant cost drivers for material and labour related overhead costs attributable to 'O-1' and 'O-2' are as follows:

	O-1	O-2	Other Products
Direct Material Related Overheads: (The volume of raw materials held to facilitate production of each product is the cost driver.)			
Material Ratio *per product unit*	5	8	5
Direct Labour related overheads: (The number of labour operations performed is the cost driver.)			
Labour Operations *per product unit*	7	6	5

Required

(i) Give a financial ANALYSIS of the decision strategy which OOC may implement about the manufacture of each product using the unit cost information available.

(ii) DISCUSS whether activity-based management should be adopted in companies like OOC.

ANSWER:

(i) Analysis

The product costs per unit along with the respective contribution per unit may be calculated either by employing an ABC approach or alternatively by using the existing basis for the allocation of variable overhead cost.

The current scenario of product costing suggests that 'O-2' should be produced as per the request of WIK because the contribution to sales ratio is 31.29%. However, the current scenario of product costing also suggests that OOC should not undertake production of 'O-1' at a selling price of `740 per unit since the estimated contribution to sales ratio is 15.88% is lower than the desired contribution to sales ratio of 28%. Activity based costing approach ensures greater accuracy by using multiple cost drivers and determines areas generating the greatest profit or loss. Table [(d)] shows how much the contribution to sales (%) for each product changes when the overhead allocation method changes to ABC. As shown in Table,

contribution to sales ratio on 'O-1' increased to 31.87% from 15.88% while contribution to sales ratio on 'O-2' reduced from 31.87% to - 29.23%.

Thus, OOC should opt to produce 'O-1' for WIK as contribution to sales ratio is 31.87 which is higher than the desired one.

(ii) The term Activity based management (ABM) is used to describe the cost management application of ABC. The use of ABC as a costing tool to manage costs at activity level is known as Activity Based Cost Management (ABM). ABM is a discipline that focuses on the efficient and effective management of activities as the route to continuously improving the value received by customers and to improve strategic and operational decisions in an organisation. Kaplan and Cooper divide ABM into Operational and Strategic.

Operational ABM covers the actions that increase efficiency, lower cost (i.e. reduce the cost driver rate of activities) and lead to higher revenue through better resources utilisation- in short, the action required to do things right. In other words, it is all about *'doing things right'*, using ABC information to improve efficiency. It also helps in identifying and improving value added activities and removing non-value added activities as to reduce cost without distorting product value.

Strategic ABM is about *'doing the right things'*. It uses ABC information to determine which products is to be manufactured and which activities is to be used. OOC can also use this for customer profitability analysis, identifying that which customers are the most profitable and focusing on them more.

A risk with ABM is that some activities have an implicit value are not reflected in a financial value added to any product. For example, a good and pleasant working environment can attract and retain the best human resources, but might not be identified as value added activities in operational ABM.

ABM provides managers an understanding of costs and helps teams to make certain decisions that benefit the whole organizations and not just their own activities.

Therefore, some companies like OOC may adopt ABM to improve their operations and obtain useful activity information.

Workings

(a) Direct Material Cost per unit

	O-1	O-2
Total Costs (₹)	22,50,000	750,000
Production units	10,000	20,000
Cost per unit (₹)	225.00	37.50

(b) Direct Labour Cost per unit

	O-1	O-2
Total Costs (₹)	15,00,000	5,00,000
Production units	10,000	20,000
Cost per unit (₹)	150.00	25.00

(c) Variable Overheads
Material Related
Overhead Cost = 30% × `120,00,000 = `36,00,000
Total Volume Factor

Particulars	Units	Required per unit	Total Volume
O-1	10,000	5	50,000
O-2	20,000	8	1,60,000
Other	80,000	5	4.00,000
Total Volume Factor			6,10,000

Overhead *per unit of volume* = `36,00,000/ 6,10,000 = `5.90.

Therefore, Overhead Cost *per product unit* will be as follows:

| O-1 | 5 | `5.90 | 29.50 |
| O-2 | 8 | `5.90 | 47.20 |

Labour Related

Overhead Cost = 70% × `120,00,000 = `84,00,000

Total Operations Factor

Particulars	Units	Required per unit	Total Volume
O-1	10,000	7	70,000
O-2	20,000	6	1,20,000
Other	80,000	5	4,00,000
Total Operations Factor			5,90,000

Overhead *per operation* = ₹84,00,000/ 5,90,000 = ₹14.24.

Therefore, Overhead Cost *per product unit* will be as follows:

| O-1 | 7 | ₹14.24 | 99.68 |
| O-2 | 6 | ₹14.24 | 85.44 |

(d) Product Information (by unit) is as follows:

Particulars	O-1		O-2	
	Current Scenario	ABC Basis	Current Scenario	ABC Basis
Selling Price …(A)	740.00	740.00	151.00	151.00
Direct Material Cost	225.00	225.00	37.50	37.50
Direct Labour Cost	150.00	150.00	25.00	25.00
Variable Overhead Cost:				
Material Related	90.00	29.50	15.00	47.20
Labour Related	157.50	99.68	26.25	85.44
Total Variable Cost …(B)	622.50	504.18	103.75	195.14
Contribution …(A) - (B)	117.50	235.82	47.25	(44.14)
Contribution to Sales (%)	15.88	31.87	31.29	(29.23)

☞

Total Variable Overheads are 120L. Out of which 30% i.e. 36L relates to material and 70% i.e. 84L relates to Labour. Now allocate variable overheads into product units using % of total direct material cost and total direct labour cost.

VO Material Related   40% of Material Cost
₹{36L/ (22.5L + 7.5L + 60L)}

VO Labour Related   105% of Labour Cost
₹{84L/ (15L + 5L + 60L)}

O-1 & O-2

VO Material Related   ₹90 = 40% of ₹225;
₹15 = 40% of ₹37.5

VO Labour Related   ₹157.5 = 105% of ₹150;
₹26.25 = 105% of ₹25

QUESTION 6

Non- Financial Performance Measures 8. Kristin LLP sells wide range of household products. The firm has recently received few negative feedbacks about the product and customer services. CEO is not happy with this. As per the opinion of CEO –

"Nowadays when social media play such an important role in making decisions, its crucial to keep an eye on the quality of customer service you provide. If you don't care about customers' satisfaction, don't expect them to care about your services or products. When customer share their story, they're not just sharing their problems. They are actually teaching you how to make your product, service, and business better."

There has been considerable discussion at the corporate level as to improve 'Customer Satisfaction'. Convinced with this logic, firm has invested heavily in customer satisfaction and adopted the following plan of action–

- providing helpline 24/7 in order to develop personal relationship with customer;

- redesign its online platform in order to make it more customer friendly;

- rewarding loyal customers by giving them experience, they would not forget for life; and

- ease the return and refund policy, offering no questions- asked guarantee is a smart move over competitors.

The CEO was initially delighted to see that their efforts pay off in the form of higher customer satisfaction score index, however he is anxious to see the corresponding financial results.
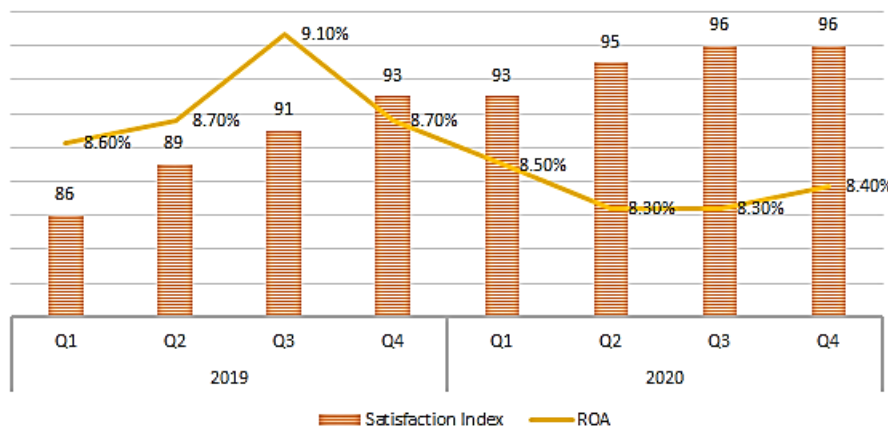
Required
Does the seeming lack of improvement in financial performance with customer satisfaction, Kristen LLP should stop investing a superior customer experience? DISCUSS.
Performance Measurement in Not for Profit Sector

ANSWER:
In this case we can see that there are two considerable sides of the question one is customer satisfaction and another one is profitability. By adopting the proposed plans firm manage to get higher customer satisfaction score card and it is expected that with high customer satisfaction, the firm's financial result will improve i.e. increase ROA. However, increasing the customer satisfaction is costly. Plans which are used to increase customer satisfaction will increase the cost of the firm. This additional cost will weaken the firm's ROA by lowing profit and increasing the asset base. The optimum level of customer satisfaction is where the incremental benefits are equal to incremental costs of increasing satisfaction.
While observing the pattern of data, the customer satisfaction has increased from 86 points to 91 points in first three quarters of 2019. At this level, the additional benefits seem to more significant than the additional cost. However, in subsequent quarters, additional cost has increased more rapidly than the additional

benefits. Therefore, there is decrease in ROA as we move forward on the index. However, toward the end of 2020, we see a marginal increase in ROA. This is due to the **lead-lag relation** between satisfaction and ROA. Increased satisfaction might take some more time, some more quarters to result in higher ROA and the relation might not be linear. However, toward the end of 2020, the customer satisfaction score stabilizes at current levels (93-96 points).

Overall, Kristin should not stop investing in superior customer experience, the lack of apparent pattern in customer satisfaction and profitability could stem from several causes as discussed above. Instead, firm should take decision considering current satisfaction levels, the cost to increased satisfaction, and perception of the increased benefit. Moreover, the firm should also consider the current sales, otherwise it might lose its share to competitor if they do nothing!

7. Olderhelp India is a leading charity working with and for the disadvantaged elderly for over 5 decades. Olderhelp advocates for their needs for universal pension, quality healthcare, action against elder abuse and many more. Olderhelp collects donations and funds and utilises them for the welfare of elders. The governing body of Olderhelp has setup four performance objectives for the three months to 30 Sep 2020:

- to achieve a level of donation of ₹30,00,000

- to keep advertisement cost not more than 3% of donation

- to keep welfare cost more than 85% of donation

- to achieve 90% of respite care requested from the community

Actual results were as follows:

	July	Aug	Sep
Donation (₹)	7,00,000	13,00,000	11,00,000
Advertisement Costs (₹)	17,500	52,000	33,000
Elder's welfare cost (₹)	5,74,000	10,92,000	979,000
Respite care requests (days)	1,120	1,140	1,200
Respite care provided (days)	896	1,003	1,104

The aim is to serve elder needs in a holistic manner, enabling them to live active, dignified and healthier lives.

Requirement

PREPARE a statement to assist the manager in evaluation performance against objectives and COMMENT on the performance.

ANSWER:

Statement Showing Performance

	July	Aug	Sep
Advertisement cost as a percentage of donation	2.5%	4%	3%
Target percentage of Advertisement cost of donation	3%	3%	3%
Welfare cost as a percentage of donation	82%	84%	89%
Target percentage of welfare cost as a percentage of donation	85%	85%	85%
Respite care provided	80%	87.98%	92%
Target percentage of respite care	90%	90%	90%

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Comment
Total donation received `31,00,000 (=`7,00,000+`13,00,000+`11,00,000) have exceeded the target
`30,00,000. Though there is no fix trend of receiving fund while it is noticeable that there were special
fundraising activities in Aug which generated highest receipt.
Advertisement costs have been within the target of 3% in July and Sep but exceeded the target in Aug,
more information is needed to establish why this occurred.
For the month of July and Aug the welfare cost are less than the target, while for the month of September
Olderhelp have exceeded the target of expenditure of cost.
        The improvement in the respite care provided by Olderhelp has been steady and for the month of
september the target has exceeded.