

PAPER – 6: INFORMATION SYSTEMS CONTROL AND AUDIT

QUESTIONS

Multiple Choice Questions

Fair Cosmetics Global India Limited is a brand manufacturer in the field of fast-moving consumer goods cosmetics. In the recent times, the company intended to adopt a new business model to fully automate its existing business processes throughout all departments of the company. This new methodology was required to be adopted so that timely, accurate and reliable information is readily available to all the users and stakeholders. The company required to have such a system in place that could provide direct access to management reports to extract summary data and support the senior level management in their long-term planning.

The Company further needed a clean backup system having fastest data recovery time irrespective of the cost involved and not containing old and obsolete files to avoid any discrepancy.

A System Analyst Mr. Ashok was engaged to conduct requirement analysis and investigation of the present system of company. He advised the management of company to implement Enterprise Resource Planning (ERP) package with customization done as per the requirement and the ideal solution for the backup system that the company shall adopt.

As advised by Mr. Ashok, the management decided to implement ERP package to equip the company with necessary capabilities to integrate and synchronize the isolated functions into streamlined business processes to gain a competitive edge in the volatile business environment. With due course of time, company successfully launched ERP and started the process of implementation of COBIT 5 framework for resolving various business related issues.

Human Resource Department requested managers and senior managers of company to use their own computing devices like smart phones and laptops for official work to make working atmosphere more flexible and empowered employees to work beyond their required hours at any place. In light of the same, an employee Mr. Bansi got caught right-handed in performing unfair practices against the company. He extracted and copied confidential data related to marketing strategy of the company from company's data backup files and shared the same with company's rival. The management of company initiated the necessary legal actions against Mr. Bansi.

Read the above carefully and answer the following question no(s). 1 to 5:

1. Based on the requirement of the management of Fair Cosmetics Global India Limited regarding data backup facility, identify the backup system that Mr. Ashok would have suggested the management to adopt.
 - (A) Incremental Backup
 - (B) Differential Backup
 - (C) Mirror Backup

- (D) Full Backup
2. In purview of above case scenario, the company had required direct access to management reports to extract summary data and support the senior level management in their long-term planning. Keeping this in mind, what do you think is the best fit Information System from the following that Mr. Ashok suggested to the management?
- (A) Office Automation System
(B) Expert System
(C) Executive Support System
(D) Transaction Processing System
3. Mr. Banshi copied information related to marketing strategy of company from company systems and disclosed the same to rival company. Under which section of Information Technology Act 2000, Mr. Banshi shall be punishable and what will be the quantum of punishment?
- (A) Section 66 with imprisonment for a term which may extend to three years or with fine which may extend to five lakh rupees or with both.
(B) Section 66 with imprisonment for a term which may extend to five years or with fine which may extend to five lakh rupees or with both.
(C) Section 66 with imprisonment for a term which may extend to five years or with fine which may extend to three lakh rupees or with both.
(D) Section 66 with imprisonment for a term which may extend to three years or with fine which may extend to three lakh rupees or with both.
4. Fair Cosmetics Global India Limited is under the process of implementing COBIT 5 framework for resolving its business-related issues. Which of the following business benefit will not be delivered to company by using COBIT 5 framework?
- (A) Policy development and good practice for IT Management.
(B) Increased enterprise wide involvement in IT solutions and services.
(C) User satisfaction related to the product manufactured by the Company.
(D) Increased value creation from user of IT.
5. In purview of above case scenario, while designing and implementing fully digitized system, the company may not be able to implement appropriate controls because of administrative and operational constraints. From following controls, identify the control which may not be as efficient as the appropriate control but can reduce the probability of threats to the company's assets.
- (A) Preventive Control
(B) Detective Control

- (C) Compensatory Control
- (D) Corrective Control

Question No(s). 6 to 8 are independent questions.

6. During the pandemic Covid 19 globally, there arises an emergent need for development and launch of various software applications related to online shopping portals, payment mechanisms, temperature sensors, health related status applications, awareness programmes etc. with no time for face-to-face conversation with users to gather the requirements. The software methodology adopted for the development of such applications is fast and delivery of a high-quality system is at relatively low investment cost. Identify the suitable methodology amongst the following.
 - (A) Waterfall Model
 - (B) Incremental Model
 - (C) Rapid Application Development Model
 - (D) Prototyping Model
7. Mr. Sunil is a member of IS audit team appointed by BNC India Ltd. to carry out its' IS Audit process. Determine the phase in IS Audit Process, wherein he is gathering evidence by interviewing staff members and managers, reviewing documents, and observing processes.
 - (A) Analysis
 - (B) Organizing
 - (C) Fieldwork
 - (D) Pre-audit survey
8. ABC Limited, one of the renowned FMCG company of India has adopted cloud computing technology in its working environment. Through this most secure cloud, the access has been provided to all its employees and to the customers and vendors of the company, whose KYC (Know Your Client) has been successfully validated. At a later stage, the company required some additional resources for which cloud computing environment was scaled up by compromising on the security. Which type of cloud has ABC Limited used?
 - (A) Public Cloud
 - (B) Private Cloud
 - (C) Hybrid Cloud
 - (D) Community Cloud

Descriptive Questions

Chapter 1: Concepts of Governance and Management of Information Systems

9. RR Ltd. is a lead manufacturer in the field of carpets and curtains. Its management headed by Ms. Neha decides to follow certain management practices to align IT strategy with its enterprise strategy. Determine these key management practices to be followed to carry out this task.
10. Ms. Rashi is an internal auditor of the ABC Ltd. To carry out the task of evaluating several components under IT Governance structure and practices in ABC Ltd., Ms. Rashi refers to the guidance issued by IIA (The institute of Internal Auditors). Determine the activities (as suggested by IIA) followed by her in evaluating following components of IT Governance.
 - (i) Organizational structure
 - (ii) Risks
 - (iii) Controls

Chapter 2: Information System Concepts

11. During the technical round of interview, Mr. Ajay is asked to elaborate the knowledge points that a business manager should possess to operate Information systems effectively and efficiently. What do you think shall be the answer given by him?
12. Office Automation system is growing at very fast pace as computer-based information systems are providing paramount support in businesses. What are the various office activities that can be performed under Office Automation system?

Chapter 3: Protection of Information Systems

13. In a telecommunication network, asynchronous attacks occur during the data transmission which are hard to detect as these are usually very small pin like insertions. Explain various types of asynchronous attacks that an organization may suffer across its telecommunication line with respect to Logical Access Controls.
14. In an organization, the controls at the managerial level are required to be well implemented to provide a stable infrastructure in which requisite information system can be built, operated and maintained on a day-to-day basis. Describe various types of management subsystem to ensure the implementation of afore-stated objectives.

Chapter 4: Business Continuity Planning and Disaster Recovery Planning

15. MNV Pvt. Ltd. is an IT based company having its clients worldwide. The company has huge database of its clientele and has access to confidential data of its clients due to nature of services the company provides to its clients. The management of MNV Pvt. Ltd. decides to develop its Business Continuity Plan (BCP) to minimize its loss by minimizing the cost associated with disruptions and enable it to survive a disaster. For backup and recovery purposes, the management decided to hire a third-party site. Explain the issues that the

system administrator of MNV Pvt. Ltd. should consider while drafting the contract with the third-party.

16. The company PQR Ltd. decides to carry out self-assessment of its Business Continuity Maintenance (BCM) program. Discuss the key factors that should be verified to carry out this task.

Chapter 5: Acquisition, Development and Implementation of Information Systems

17. Sometimes organizations fail to achieve their system development objectives due to many issues related to user, developer, management, or new technologies. List out various issues related to developer and management that may lead to bottleneck situation in achieving the desired goals.
18. A software developer team with six members are involved in the development of an application software with each being allocated the development of single program unit of software. Explain the types of test that each one of the programmers shall perform on their respective program units.

Chapter 6: Auditing of Information Systems

19. In an organization, effect of computers on audit are evaluated by examining the changes in terms of two factors - evidence collection and evidence evaluation. In this light, determine the issues that an auditor shall consider while evaluating the performance of evidence collection in an organization.
20. While performing Information Systems Audit in an organization, an IS Auditor considers various critical factors during his/her preliminary review. Discuss the aspects that he/she would consider regarding knowledge of the business, legal consideration and audit standards.

Chapter 7: Information Technology Regulatory Issues

21. Ms. Smiley is a Database Administrator in BNH hospital responsible for computer installation and configuration, database design and maintenance, security, troubleshooting as well as backup and data recovery. Because of her profile, she has secured access to data pertaining to patient's history, clinical findings, diagnostic test results, and daily notes of a patient's progress and medications etc. With no consent from the competent authorities, she deliberately shares the electronic record of almost 1000 patients to a newly opened Diagnostic Lab SriMed in order to help them in their promotional activities. Do you think Ms. Smiley's deed is punishable or not under Information Technology Act, 2000? If yes, identify the section and also explain it.
22. Securities and Exchange Board of India (SEBI) has mandated various norms for the organizations to follow while selecting the auditors. Discuss them.

Chapter 8: Emerging Technologies

23. Mobile Computing has been widely used in the field of education, health industry, banking industry, airlines industry and other businesses etc. However, the technology has its own limitations. Elaborate them.
24. During the pandemic, ABC Ltd. granted work from home to all its employees. Now, after reopening of the office, the management of company decided to allow the employees to bring their own devices at workplace. Discuss the advantages that company may appreciate using this policy.

SUGGESTED ANSWERS**Multiple Choice Questions**

1. (C) Mirror Backup
2. (C) Executive Support System
3. (A) Section 66 with imprisonment for a term which may extend to three years or with fine which may extend to five lakh rupees or with both.
4. (C) User satisfaction related to the product manufactured by the Company.
5. (C) Compensatory Control
6. (C) Rapid Application Development Model
7. (C) Fieldwork
8. (C) Hybrid Cloud

Descriptive Answers

9. The key management practices required to align IT strategy with enterprise strategy are as follows:
 - **Understand enterprise direction:** Consider the current enterprise environment and business processes, as well as the enterprise strategy and future objectives. Consider also the external environment of the enterprise (industry drivers, relevant regulations, basis for competition).
 - **Assess the current environment, capabilities and performance:** Assess the performance of current internal business and IT capabilities and external IT services and develop an understanding of the enterprise architecture in relation to IT. Identify issues currently being experienced and develop recommendations in areas that could benefit from improvement. Consider service provider differentiators and options and the financial impact and potential costs and benefits of using external services.

- **Define the target IT capabilities:** Define the target business and IT capabilities and required IT services. This should be based on the understanding of the enterprise environment and requirements; the assessment of the current business process and IT environment and issues; and consideration of reference standards, best practices and validated emerging technologies or innovation proposals.
 - **Conduct a gap analysis:** Identify the gaps between the current and target environments and consider the alignment of assets (the capabilities that support services) with business outcomes to optimize investment in and utilization of the internal and external asset base. Consider the critical success factors to support strategy execution.
 - **Define the strategic plan and road map:** Create a strategic plan that defines, in co-operation with relevant stakeholders, how IT- related goals will contribute to the enterprise's strategic goals. Include how IT will support IT-enabled investment programs, business processes, IT services and IT assets. IT should define the initiatives that will be required to close the gaps, the sourcing strategy, and the measurements to be used to monitor achievement of goals, then prioritize the initiatives and combine them in a high-level road map.
 - **Communicate the IT strategy and direction:** Create awareness and understanding of the business and IT objectives and direction, as captured in the IT strategy, through communication to appropriate stakeholders and users throughout the enterprise.
10. The Internal audit activities in evaluating the IT governance structure and practices within an enterprise for the following activities are as follows:
- (i) **Organizational Structure:** The following aspects need to be assessed by the auditor:
- Review how organization management and IT personnel are interacting and communicating current and future needs across the organization.
 - This should include the existence of necessary roles and reporting relationships to allow IT to meet the needs of the organization, while providing the opportunity to have requirements addressed via formal evaluation and prioritization. In addition, how IT mirrors the organization structure in its enterprise architecture should also be included.
- (ii) **Risks:** The following aspects need to be reviewed by the auditor:
- Review the processes used by the IT organization to identify, assess, and monitor/mitigate risks within the IT environment.
 - Additionally, determine the accountability that personnel have within risk management and how well these expectations are being met.

(iii) **Controls:** The following aspects need to be verified by the auditor:

- Assess key controls that are defined by IT to manage its activities and the support of the overall organization.
- Ownership, documentation, and reporting of self-validation aspects should be reviewed by the internal audit activity.
- Additionally, the control set should be robust enough to address identified risks based on the organization's risk appetite and tolerance levels, as well as any compliance requirements.

11. To operate Information Systems (IS) effectively and efficiently, a business manager should have knowledge on following points:

- **Foundation Concepts** – It includes fundamental business, and managerial concepts e.g. 'what are components of a system and their functions', or 'what competitive strategies are required'.
- **Information Technologies (IT)** – It includes operation, development and management of hardware, software, data management, networks, and other technologies.
- **Business Applications** – It includes major uses of IT in business steps i.e. processes, operations, decision making, and strategic/competitive advantage.
- **Development Processes** – It comprise how end users and IS specialists develop and execute business/IT solutions to problems.
- **Management Challenges** – It includes 'how the function and IT resources are maintained' and utilized to attain top performance and build the business strategies.

12. Various office activities that can be performed under Office Automation System are as follows:

- **Document Capture** – Documents originating from outside sources like incoming mails, notes, handouts, charts, graphs etc. need to be preserved.
- **Document Creation** – This consists of preparation of documents, dictation, editing of texts etc. and takes up major part of the secretary's time.
- **Receipts and Distribution** – This basically includes distribution of correspondence to designated recipients.
- **Filing, Search, Retrieval and Follow up** – This is related to filing, indexing, searching of documents, which takes up significant time.
- **Calculations** – These include the usual calculator functions like routine arithmetic, operations for bill passing, interest calculations, working out the percentages and the like.

- **Recording Utilization of Resources** – This includes, where necessary, record keeping in respect to specific resources utilized by office personnel.
13. Various types of asynchronous attacks that an organization may suffer across its telecommunication line with respect to Logical Access Controls are as follows:
- **Data Leakage:** Data is a critical resource for an organization to function effectively. Data leakage involves leaking information out of the computer by means of dumping files to paper or stealing computer reports and tape.
 - **Subversive Threats:** An intruder attempts to violate the integrity of some components in the sub-system. Subversive attacks can provide intruders with important information about messages being transmitted and the intruder can manipulate these messages in many ways. An intruder attempts to violate the integrity of some components in the sub-system by:
 - **Invasive tap:** By installing it on communication line, s/he may read and modify data.
 - **Inductive tap:** It monitors electromagnetic transmissions and allows the data to be read only.
 - **Wire-tapping:** This involves spying on information being transmitted over telecommunication network.
 - **Piggybacking:** This is the act of following an authorized person through a secured door or electronically attaching to an authorized telecommunication link that intercepts and alters transmissions. This involves intercepting communication between the operating system and the user and modifying them or substituting new messages.
 - **Shutting Down of the Computer/Denial of Service:** This is initiated through terminals or microcomputers that are directly or indirectly connected to the computer. When a user establishes a connection on the Internet through TCP/IP, a three way handshake takes place between Synchronize (SYN) packets, SYN ACK (Acknowledgement) packets and ACK packets. Computer hacker transmits hundreds of SYN packets to the receiver but never responds with an ACK to complete the connection. As a result, the ports of the receiver's server are clogged with incomplete communication requests and legitimate requests are prevented from access. When overloading happens, some systems have been proved to be vulnerable to shutting themselves.
14. Various types of management subsystem wherein managerial controls can be performed to ensure the development, implementation, operation and maintenance are as follows:
- **Top Management:** Top management must ensure that information systems function is well managed. It is responsible primarily for long-run policy decisions on how Information Systems will be used in the organization.

- **Information Systems Management:** IS management has overall responsibility for the planning and control of all information system activities. It also provides advice to top management in relation to long-run policy decision making and translates long-run policies into short-run goals and objectives.
 - **Systems Development Management:** It is responsible for the design, implementation, and maintenance of application systems.
 - **Programming Management:** It is responsible for programming new system; maintain old systems and providing general systems support software.
 - **Data Administration:** It is responsible for addressing planning and control issues in relation to use of an organization's data.
 - **Quality Assurance Management:** It is responsible for ensuring information systems development, implementation, operation, and maintenance conform to established quality standards.
 - **Security Administration:** It is responsible for access controls and physical security over the **information** systems function.
 - **Operations:** It is responsible for planning and control of the day-to-day.
15. For backup and recovery purposes, the system administrator of the company should consider following points while drafting the contract with the third party:
- How soon the site will be made available subsequent to a disaster;
 - The number of organizations that will be allowed to use the site concurrently in the event of a disaster;
 - The priority to be given to concurrent users of the site in the event of a common disaster;
 - The period during which the site can be used;
 - The conditions under which the site can be used;
 - The facilities and services the site provider agrees to make available; and
 - What controls will be in place and working at the off-site facility.
16. An audit or self-assessment of the enterprise's BCM program involves the verification of the following factors:
- All key products and services and their supporting critical activities and resources have been identified and included in the enterprise's BCM strategy;
 - The enterprise's BCM policy, strategies, framework and plans accurately reflect its priorities and requirements (the enterprise's objectives);

- The enterprise's BCM competence and its BCM capability are effective and fit-for-purpose and will permit management, command, control and coordination of an incident;
 - The enterprise's BCM solutions are effective, up-to-date and fit-for-purpose, and appropriate to the level of risk faced by the enterprise;
 - The enterprise's BCM maintenance and exercising programs have been effectively implemented;
 - BCM strategies and plans incorporate improvements identified during incidents and exercises and in the maintenance program;
 - The enterprise has an ongoing program for BCM training and awareness;
 - BCM procedures have been effectively communicated to relevant staff and that those staff understand their roles and responsibilities; and
 - Change control processes are in place and operate effectively.
17. The issues related to management that makes any business organization failing to achieve its system development objectives are as follows:

Developer Related Issues: It refers to the issues and challenges with regard to the developers. Some of the critical bottlenecks are mentioned below:

- **Lack of Standard Project Management and System Development Methodologies:** Some organizations do not formalize their project management and system development methodologies, thereby making it very difficult to consistently complete projects on time or within budget.
- **Overworked or Under-Trained Development Staff:** In many cases, system developers often lack sufficient educational background and requisite state of the art skills. Furthermore, many companies do a little to help their development personnel stay technically sound, and more so a training plan and training budget do not exist.

Management Related issues: It refers to the bottlenecks with regard to organizational set up, administrative and overall management to accomplish the system development goals. Some of such bottlenecks are mentioned as follows:

- **Lack of Senior Management Support and Involvement:** Developers and users of information systems watch senior management to determine 'which systems development projects are important' and act accordingly by shifting their efforts away from any project, which is not receiving management attention. In addition, management can see that adequate resources, as well as budgetary control over use of those resources, are dedicated to the project.

- **Development of Strategic Systems:** Because strategic decision making is unstructured, the requirements, specifications, and objectives for such development projects are difficult to define.
18. The types of test that a programmer typically performs on the program unit are as follows:
- **Functional Tests:** Functional Tests check 'whether programs do, what they are supposed to do or not'. The test plan specifies operating conditions, input values, and expected results, and as per this plan, programmer checks by inputting the values to see whether the actual result and expected result match.
 - **Performance Tests:** Performance Tests should be designed to verify the response time, the execution time, the throughput, primary and secondary memory utilization and the traffic rates on data channels and communication links.
 - **Stress Tests:** Stress testing is a form of testing that is used to determine the stability of a given system or entity. It involves testing beyond normal operational capacity, often to a breaking point, in order to observe the results. These tests are designed to overload a program in various ways. The purpose of a stress test is to determine the limitations of the program. For example, during a sort operation, the available memory can be reduced to find out whether the program is able to handle the situation.
 - **Structural Tests:** Structural Tests are concerned with examining the internal processing logic of a software system. For example, if a function is responsible for tax calculation, the verification of the logic is a structural test.
 - **Parallel Tests:** In Parallel Tests, the same test data is used in the new and old system and the output results are then compared.
19. To evaluate the performance of evidence collection and understanding the reliability of controls, an auditor shall consider the following issues:
- **Data retention and storage:** A client's storage capabilities may restrict the amount of historical data that can be retained "on-line" and readily accessible to the auditor. If the client has insufficient data retention capacities, the auditor may not be able to review a whole reporting period transaction on the computer system. For example, the client's computer system may save data on detachable storage device by summarizing transactions into monthly, weekly or period end balances.
 - **Absence of input documents:** Transaction data may be entered into the computer directly without the presence of supporting documentation e.g. input of telephone orders into a tele-sales system. The increasing use of Electronic Data Interchange (EDI) will result in less paperwork being available for audit examination.
 - **Non-availability of audit trail:** The audit trails in some computer systems may exist for only a short period of time. The absence of an audit trail will make the auditor's job very difficult and may call for an audit approach which involves auditing around

the computer system by seeking other sources of evidence to provide assurance that the computer input has been correctly processed and output.

- **Lack of availability of printed output:** The results of transaction processing may not produce a hard copy form of output, i.e. a printed record. In the absence of physical output, it may be necessary for an auditor to directly access the electronic data retained on the client's computer. This is normally achieved by having the client provide a computer terminal and being granted "read" access to the required data files.
 - **Audit evidence:** Certain transactions may be generated automatically by the computer system. For example, a fixed asset system may automatically calculate depreciation on assets at the end of each calendar month. The depreciation charge may be automatically transferred from the fixed assets register to the depreciation account and hence to the client's income and expenditure account.
 - **Legal issues:** The use of computers to carry out trading activities is also increasing. More organizations in both the public and private sector intend to make use of EDI and electronic trading over the Internet. This can create problems with contracts, e.g. when is the contract made, where is it made, what are the terms of the contract and are the parties to the contract.
20. The auditor should consider the following points during his/her preliminary view regarding following aspects.

Knowledge of the business

- General economic factors and industry conditions affecting the entity's business,
- Nature of Business, its products & services,
- General exposure to business,
- Its clientele, vendors and most importantly, strategic business partners/associates to whom critical processes have been outsourced,
- Level of competence of the Top management and IT Management, and
- Finally, Set up and organization of IT department.

Legal consideration and audit standards

- The auditor should carefully evaluate the legal as well as statutory implications on his/her audit work.

- The Information Systems audit work could be required as part of a statutory requirement in which case he should take into consideration the related stipulations, regulations and guidelines for conduct of his audit.
 - The statutes or regulatory framework may impose stipulations as regards minimum set of control objectives to be achieved by the subject organization. Sometimes, this may also include restrictions on the use of certain types of technologies e.g. freeware, shareware etc.
 - The IS Auditor should also consider the Audit Standards applicable to his conduct and performance of audit work. Non-compliance with the mandatory audit standards would not only impact on the violation of the code of professional ethics but also have an adverse impact on the auditor's work.
21. Yes, Ms. Smiley's deed is punishable under the Section 72 of Information Technology Act, 2000.

[Section 72] Penalty for breach of confidentiality and privacy

Save as otherwise provided in this Act or any other law for the time being in force, any person who, in pursuance of any of the powers conferred under this Act, rules or regulations made thereunder, has secured access to any electronic record, book, register, correspondence, information, document or other material without the consent of the person concerned discloses such electronic record, book, register, correspondence, information, document or other material to any other person shall be punished with imprisonment for a term which may extend to two years, or with fine which may extend to one lakh rupees, or with both.

22. As mandated by SEBI, various norms for selection of Auditors are as follows:
- Auditor must have minimum 3 years of experience in IT audit of Securities Industry participants e.g. stock exchanges, clearing houses, depositories etc. The audit experience should have covered all the Major Areas mentioned under SEBI's Audit Terms of Reference (TOR).
 - The Auditor must have experience in/direct access to experienced resources in the areas covered under TOR. It is recommended that resources employed shall have relevant industry recognized certifications e.g. CISA (Certified Information Systems Auditor) from ISACA, CISM (Certified Information Securities Manager) from ISACA, GSNA (GIAC Systems and Network Auditor), CISSP (Certified Information Systems Security Professional) from International Information Systems Security Certification Consortium, commonly known as (ISC)².

- The Auditor should have IT audit/governance frameworks and processes conforming to industry leading practices like CoBIT.
 - The Auditor must not have any conflict of interest in conducting fair, objective and independent audit of the Exchange/Depository. It should not have been engaged over the last three years in any consulting engagement with any departments/units of the entity being audited.
 - The Auditor may not have any cases pending against its previous auditees, which fall under SEBI's jurisdiction, which point to its incompetence and/or unsuitability to perform the audit task.
23. The limitations of Mobile Computing are as follows:
- **Insufficient Bandwidth:** Mobile Internet access is generally slower than direct cable connections using technologies such as General Packet Radio Service (GPRS) and Enhanced Data for GSM (Global System for Mobile Communication) Evolution (EDGE), and more recently 3G networks. These networks are usually available within range of commercial cell phone towers. Higher speed wireless LANs are inexpensive but have very limited range.
 - **Security Standards:** When working mobile, one is dependent on public networks, requiring careful use of Virtual Private Network (VPN). Security is a major concern while concerning the mobile computing standards on the fleet. One can easily attack the VPN through a huge number of networks interconnected through the line.
 - **Power consumption:** When a power outlet or portable generator is not available, mobile computers must rely entirely on battery power. Combined with the compact size of many mobile devices, this often means unusually expensive batteries must be used to obtain the necessary battery life. Mobile computing should also look into Greener IT in such a way that it saves the power or increases the battery life.
 - **Transmission interferences:** Weather, terrain, and the range from the nearest signal point can all interfere with signal reception. Reception in tunnels, some buildings, and rural areas is often poor.
 - **Potential health hazards:** People who use mobile devices while driving are often distracted from driving and are thus assumed more likely to be involved in traffic accidents. Cell phones may interfere with sensitive medical devices. There are allegations that cell phone signals may cause health problems.
 - **Human interface with device:** Screens and keyboards tend to be small, which may make them hard to use. Alternate input methods such as speech or handwriting recognition require training.

24. The advantages of Bring Your Own Device (BYOD) are as follows:

- **Happy Employees:** Employees love to use their own devices when at work. This also reduces the number of devices an employee has to carry, otherwise he would be carrying his personal as well as organization provided devices.
- **Lower IT budgets:** The employees could involve financial savings to the organization since employees would be using the devices they already possess, thus reducing the outlay of the organization in providing devices to them.
- **IT reduces support requirement:** IT department does not have to provide end user support and maintenance for all these devices resulting in cost savings.
- **Early adoption of new Technologies:** Employees are generally proactive in adoption of new technologies that result in enhanced productivity of employees leading to overall growth of business.
- **Increased employee efficiency:** The efficiency of employees is more when the employee works on his/her own device. In an organization provided devices, employees have to learn and there is a learning curve involved in it.