

PAPER – 6 : INFORMATION TECHNOLOGY

QUESTIONS

1. Define the following terms briefly with reference to a computer system and data processing:

(i) Control Unit	(ii) BUS
(iii) Flash Memory	(iv) Voice recognition
(v) WORM disks	(vi) Image Database
(vii) CAD/CAM	(viii) Uniform Resource Locators (URLs)
(ix) CD ROM Disk	(x) Light pen
(xi) Joystick	(xii) Graph Plotter
(xiii) Computer Network	(xiv) Electronic mail
(xv) Database	(xvi) Data Redundancy
2. Define the following terms with reference to computer system and data processing:

(i) Digitize	(ii) Distributed Data Processing	(iii) Check Digit
(iv) Spooling	(v) Multiplexer	(vi) Job Scheduler
(vii) File server	(viii) Tele-conferencing	
3. State whether the statements given below are true or false. Give reason to support your answer in two to three lines:
 - (a) A single primary storage location in the processor unit is identified by a number that varies with the contents in the location.
 - (b) The storage capacity of each numbered address in the processor unit is always able to hold a word consisting of four characters.
 - (c) ASCII is a 8-bit BCD code used in IBM main-frames.
 - (d) Distributed data entry is a term used to describe placement of data entry function at the scattered locations where the transactions occur.
 - (e) The most popular input device used today for interactive processing and for on-line entry of data for batch processing is the mouse.
 - (f) User programmable terminals that combine VDT (Visual Display Terminal) hardware with built-in microprocessor is called a dumb terminal.
 - (g) The number of characters that can be stored in a given physical space is referred to as data density.
 - (h) The screen pointing device which rolls on a small bearing and has one or more buttons on the top is called a light pen.
 - (i) The seek time of the storage element is the time it takes to locate and retrieve stored data in response to program instruction.
 - (j) Data stored on disk can be accessed only in sequential way.
 - (k) The use of spooling program and / or buffer hardware allows personal computer operators to do other processing work at the same time a printing operation is in progress.
 - (l) High speed impact line printers typically use rapidly moving chains or bands of print characters or some form of a print drum to print lines of information on paper.
4. Write short notes on the following:

(a) Client server technology	(b) Desk top publishing	(c) EDI
(d) Multimedia	(e) B2B	(f) Public key
(g) Private key	(h) Digital certificate	(i) Wallet

5. Convert the following from one number system to another number system along with the working notes:
- (i) $(10101.10101)_2 = (\quad)_{10}$
 - (ii) $(123.625)_{10} = (\quad)_2$
 - (iii) $(2345.25)_{10} = (\quad)_8$
 - (iv) $(43.21)_8 = (\quad)_2$
 - (v) $(AB.FED)_{16} = (\quad)_8$
 - (vi) $(BABA)_{\text{hexadecimal}} = (\quad)_{\text{decimal}}$
 - (vii) $(1357)_{\text{octal}} = (\quad)_{\text{hexadecimal}}$
 - (viii) $(344.25)_{10} = (\quad)_2$
 - (ix) $(1001110.01)_2 = (\quad)_{10}$
 - (x) $(CDEF)_{16} = (\quad)_2$
 - (xi) $(572)_8 = (\quad)_{16}$
 - (xii) $(1489)_{10} = (\quad)_8$
6. Distinguish between the following:
- (a) Third generation and fourth generation of computers.
 - (b) Sequential file organisation and random file organisation.
 - (c) On line system and real time system.
 - (d) Impact printers and non–impact printers
 - (e) Flow–chart and Decision table
 - (f) Local area and Wide area network
7. (a) What are Ports and Connectors? Explain the different types of ports and connectors.
(b) Explain the various components of a decision support system.
8. Explain the different types of Data Transmission Techniques.
9. (a) Explain the features of a local area networks.
(b) Explain the basic features and usage of wide area networks.
10. What are the risks and security considerations of Internet's use by business houses for electronic commerce? What would be the general management concerns?
11. (a) What do you understand by the term "Data centre"?
(b) Data Centres can be classified into types and tiers according to varied computing needs they serve. Discuss them briefly.
12. (a) Discuss various value added services provided by Data Centres.
(b) What challenges are faced by the management of a business organisation for operating a data centre?
13. Draw a flow-chart for computing the income tax payable on the income of an individual as per the following rates:
- | | |
|------------------|-----|
| First Rs. 50,000 | NIL |
| Next Rs. 10,000 | 10% |
| Next Rs. 90,000 | 20% |
| Balance amount | 30% |
- A surcharge is payable on the tax computed @ 10% if the income exceeds Rs. 1,50,000/-.
14. A University has the following criteria for deciding whether or not to admit a student for its graduate school:

Admit a student who has undergraduates of B or better, has test scores on the admission tests of over 550 and has a grade average of B or better for the past two years. Also admit a student who has test scores of over 550 and the last two years grade average B or better but the overall grade average is less than B.

Admit on probation if the overall grade average is B or better and admission test score over 550 but the grade average for the past two years is less than B. Admit on probation if the overall grade average and 2 years grade average are B or better and test scores is 550 or less.

Admit on probation if overall grades are B or better and test score is above 550 but last 2 years grade average is below B. Also, admit on probation if overall grades are less than B and test score is 550 or less, but grades for past two years are B or better. Refuse to admit all others.

Prepare a decision table for the above criteria.

15. (a) Describe the scope of Information Technology Act, 2000
(b) Explain the concept of Digital Signature. Can a digital Signature be forged? Discuss, in brief, the Chapter VII of the Information Technology Act, regarding the Digital Signature Certification.
16. (a) What is a macro? When would you use one?
(b) What is a function? Explain the meaning of some of the important financial arguments.
17. (a) Briefly explain the concept of Mail merge.
(b) Discuss the important features of MS-POWER POINT.
18. (a) Describe the various types of charts which can be created through MS-EXCEL
(b) Define the following functions used in MS-EXCEL :
(i) DMAX
(ii) RATE
(iii) ABS
(iv) PPMT
(v) VAR.
19. 'While performing an Information System Audit, the auditor should consider an appropriate combination of manual techniques and computer-assisted audit techniques.' Discuss, keeping in mind the given statement, the factors to be considered while using the CAATs.
20. Write short notes on:
(a) Handling Missing Data in Data Integrity Control
(b) The Final Step/Touch in Power Point Presentation
(c) Factors in Determining the Best File Organisation
(d) Types of Electronic Payment Systems

SUGGESTED ANSWERS/HINTS

1. (i) **Control unit:** It supervises the operations of the entire computer. It selects the program statement from the storage unit, interprets statement and sends the appropriate electronic impulses to the arithmetic / logic and storage units for carrying out the operations.
(ii) **BUS:** It is the system's expressway – it transmits data between the various components on the motherboard of a PC.
(iii) **Flash Memory:** Flash memory chips are a form of static RAM chips but they are faster. They are also non-volatile and they may eventually replace the present hard disk drives.
(iv) **Voice Recognition:** It is the capability of translating voice to text. With it, one can speak to

the computer rather than having to type. The user can also control the computer with oral commands.

- (v) **WORM disks:** It stands for Write Once, Read Many optical laser disks. These are used by end-user companies to store their own proprietary information. It is a feasible alternative to magnetic tape for archival storage.
 - (vi) **Image Database:** It is a database in which a wide variety of images can be stored electronically. The job of an image database is to store images in such a way that they can be quickly found, easily accessed, and if needed, easily converted to the format needed.
 - (vii) **CAD/CAM:** They stand for Computer-Aided Design and Computer-Aided Manufacturing. These techniques have made it possible to shorten the time greatly and to improve procedure for developing and building sophisticated new products.
 - (viii) **Uniform Resource Locators [URLs]:** They are used to address and access individual Web pages and Internet resources. The format of a URL is: protocol/ Internet address/ web page address.
 - (ix) **CD ROM Disk:** It stands for compact-disk-read-only memory. It is created as a mastering facility. The data on the disk are fixed, and cannot be altered. It gives the presenter instant random access to any sequence of images on the disk.
 - (x) **Light pen:** It is a pointing device which can be used to select an option by simply pointing at it, or draw figures directly on the screen and move the figures around.
 - (xi) **Joystick:** It is a screen pointing input device. It is a vertical level usually placed in a ball socket, which can be fitted in any direction to control cursor movements for computer games and for some professional applications.
 - (xii) **Graph plotter:** It is a device capable of tracing out graphs, designs and maps into paper and even into plastic or metal plates.
 - (xiii) **Computer Network:** It is a collection of computers and terminal devices connected together by a communication system.
 - (xiv) **Electronic Mail:** Through E-mail messages can be sent from one person to another via computer. It can also be sent automatically to a large number of addresses.
 - (xv) **Database:** It is an integrated file of data used by many processing applications. It consists of data items that must be stored in order to meet the information processing and retrieval needs of an organisation.
 - (xvi) **Data Redundancy:** It concerns the problems of inefficient data storage and wastage of storage space. This means, data that should be stored in only one storage location occupies two or more storage locations.
2. (i) **Digitize:** It is a computer processing method which is used in CAD/CAM. Under this method, computers are programmed to assign digital values to graphic information and to process and store these values.
- (ii) **Distributed Data Processing:** It is the converse of the centralized data processing and uses the philosophy of providing computer power where it is needed. There may be a large, central computer with a series of small computers, even mini-computers or micro-computers or there may simply be a number of computers of equal size scattered geographically. Each remote system is a fully independent computer that maintains its own local database in addition to communication with the host computer. These individual computers are tied together through a high-speed data communication network.
- (iii) **Check digit:** It is a digit associated with a word or part of word for the purpose of checking the existence of certain class of errors. It is a software control used by a programmer to ensure accuracy of the data fed in the computer. The check digit then becomes a part of the code, and the same arithmetic procedure is used to check the correctness of the code in all subsequent processing operations. Modulo-11 is the most foolproof check digit.

- (iv) **Spooling (simultaneous peripheral operation on-line)** is a technique used for dynamic job processing. It allows input and output operations to occur simultaneously with processing operations. Input data from low-speed devices is stored temporarily on high speed secondary storage units to form a queue which can be quickly accessed by the CPU. Output data is also written at high speed onto tape or disk units and forms another queue waiting to use slow-speed devices such as a printer. The jobs are transferred to these output devices when these units are available. The operating system supplies a special written program to control the spooling process. Hence, with the aid of spooling technique, the CPU does not have to wait for the slow input/output devices and hence it can work at its maximum speed.
 - (v) **Multiplexer:** It is a device that enables several devices to share communication line. The multiplexer scans each device to collect and transmit data on a single line to the CPU. It also communicates transmission from the CPU to the appropriate terminal linked to the multiplexer. The devices are poled and periodically asked whether there is any data to transmit
 - (vi) **Job Scheduler:** It refers to a person within a computer installation who monitors computer work loads and makes sure that all resources and material necessary for running jobs are available to people who need them.
 - (vii) **File Server:** A file server is a dedicated microcomputer with high capacity disks for storing data and programs shared by the local area network users. For example, the master client file, word processing software, spreadsheet software and so on would be stored on the server disk. When a user wants to use a spreadsheet software, it is to be loaded from the file server to the user's RAM.
 - (viii) **Tele-Conferencing:** It refers to the inter connection of a number of end users through a telephone and / or data network, so that information can be shared in real time. Tele conferencing enables people in different locations to see and talk to each other and share charts and other visual meeting materials. The telephone network supports the voice and video of teleconferencing. People who are geographically scattered can meet without the need for time consuming and expensive travel.
3. (a) **False:** A single primary storage location in the processor unit is identified by a built in an unique number called an address.
- (b) **False:** Since the storage capacity of each numbered address in the processor unit depends on the storage design approach built into the processor. For example, it can be 16 bits, 32 bits or 64 bit etc.
- (c) **False:** Since ASCII is a 7 bit code used by personal and mini computers.
- (d) **True**
- (e) **False:** The most popular input device used for interactive processing and the on-line entry of data for batch processing now a days is a visual display terminal.
- (f) **False:** The dumb terminal has not built-in microprocessor but an intelligent terminal is user programmable with a built-in microprocessor.
- (g) **True**
- (h) **False:** Such a device is called a mouse.
- (i) **False:** Since the time it takes to locate and retrieve stored data in response to the program instruction is called the access time.
- (j) **False:** Since the data stored in the disk can be accessed in a direct as well as sequential way.
- (k) **True**
- (l) **True**
4. (a) **Client server technology:** Describing a network as a LAN or WAN gives a sense of the

physical area the network covers. The way in which individual computers (called nodes) on a network interact with other computers on the network depends on how they are organised. One approach for organising networks is called client-server strategy in which one particular computer serves the storage needs and sometimes the processing needs of all the network nodes.

The most common types of client server arrangement is a LAN composed of microcomputers connected to a network server which serves to all the clients (users) of the LAN.

A client program running on one of the microcomputers can request specific data from the server. The server program retrieves the requested data from its databases and returns it to the client. This way a LAN permits all the computers connected to it to share hardware, software and data. The most commonly shared resources are disk-storage devices and printers. A file server is a principal computer with large disk storage on a network that stores files and provides network nodes with access to these files. When a program running on a node needs data in a database, the file server grants access to the database files to the program running on the node. Any sort of querying of the database is done by the program on the node.

- (b) **Desk Top Publishing:** The use of desk-top publishing systems is growing rapidly in businesses these days. Desktop publishing systems combine computers and suitable peripherals with software that can produce attractive page layouts complete with pictures and text printed in a variety of type faces or fonts. With latest developments, even general purpose PC can be used to run off-the-shelf desktop publishing packages. These packages give PCs many of the general capabilities found in the aforesaid dedicated publishing systems. However, both types of systems accept digitized text and picture input, both accept data imported from word processors, page formatting and graphics files; both allow users to create, edit, format and enter text and graphics into documents. A clip-art library file or ready-to-use picture is included in many publishing packages. After final decision on text, pictures, headings, borders and other document features have been reached, the output of a publishing package can be sent to a laser or other graphics printers or to phototype-setting or other output machines that can communicate with the package. Often a page description language is used to permit communication between the package and output device.

- (c) **EDI or Electronic Data Interchange** uses computers and data communication equipments to transmit data electronically between companies. Invoices, sales orders, and many other transaction documents can be transmitted from one computer to another thereby enhancing electronic exchange of information.

EDI is helping many businesses to cut the costs associated with shipping, receiving, and maintaining parts and supplies. It is a set of standards that define the way paper forms should be rendered electronically. Software on each company's computers translates the items into standard codes. Electronic documents exchanged in EDI format also include such standard information as the balance due, the quantity ordered, the date on which items are needed and similar elements. Together, they create a data stream to the computer. Since no paper is ever used, the data flows straight from one computer into another, saving the tedious process of creating forms and then entering them into another computer.

The merits of EDI are as indicated below:

- reduction of paper processing cost
- reduction of errors and correction costs
- reduction of delays
- minimization of receivables and inventory conflicts
- improved relations between trading partners.

- (d) **Multimedia:** To make powerful presentation of information using various audio and visual means has been a dream come true with the help of this technology. Using computers and

various peripheral devices like graphic devices, video cameras, Video players, CD players, voice or music record & playback systems, the text and graphics can be combined and presented in audio and video ways. One multimedia presentation could, for example, include full-motion video, freeze frames from a video source such as a video camera or video disk player, voice, music or other sounds, text and graphics which can be animated. Animation or continuous movement graphics, can be as simple as a bar chart that grows before the viewer's eyes or a complicated walkthrough of how cold drink is made.

The hardware and software collected to create multimedia presentations often includes:

- A Pentium processor based or better microcomputer
- A colour monitor
- An erasable disk drive
- A multimedia controller board for digital sound, graphics, and motion video
- an authoring system, such as IBM's Audio Visual Connection (AVC) which is software for creating multimedia presentation

A multitasking operating system, such as Windows

The list reflects only the minimum requirements. The disparate components of multimedia come from many sources and getting them into one computer requires a correspondingly wide variety of equipments. Initial implementations of multimedia have been for training, education, and business meeting purposes, as well as monitoring and controlling operations. Most industry observers expect the potential of multimedia to be much more far-reaching.

- (e) **B2B (business-to-business)** :On the Internet, B2B (business-to-business), also known as e-biz, is the exchange of products, services, or information between businesses rather than between businesses and consumers. Although early interest centered on the growth of retailing on the Internet (sometimes called e-tailing), forecasts are that B2B revenue will far exceed business-to-consumers (B2C) revenue in the near future. According to studies published in early 2000, the money volume of B2B exceeds that of e-tailing by 10 to 1. Over the next five years, B2B is expected to have a compound annual growth of 41%. The Gartner Group estimates B2B revenue worldwide to be \$7.29 trillion dollars by 2004. In early 2000, the volume of investment in B2B by venture capitalists was reported to be accelerating sharply although profitable B2B sites were not yet easy to find.

B2B Web sites can be sorted into following categories::

Company Web sites, since the target audience for many company Web sites is other companies and their employees. Company sites can be thought of as round-the-clock mini-trade exhibits. Sometimes a company Web site serves as the entrance to an exclusive extranet available only to customers or registered site users. Some company Web sites sell directly from the site, effectively e-tailing to other businesses.

Product supply and procurement exchanges, where a company purchasing agent can shop for supplies from vendors, request proposals, and, in some cases, bid to make a purchase at a desired price. Sometimes referred to as e-procurement sites, some serve a range of industries and others focus on a niche market.

Specialized or vertical industry portals which provide a "subWeb" of information, product listings, discussion groups, and other features. These vertical portal sites have a broader purpose than the procurement sites (although they may also support buying and selling).

Brokering sites that act as an intermediary between someone wanting a product or service and potential providers. Equipment leasing is an example.

Information sites (sometimes known as infomediary), which provide information about a particular industry for its companies and their employees. These include specialized search sites and trade and industry standards organization sites.

Many B2B sites may seem to fall into more than one of these groups. Models for B2B sites are still evolving. In short, B2B is e-commerce between businesses. An earlier and much more limited kind of online B2B prior to the Internet was Electronic Data Interchange.

- (f) **Public key:** A public key is a value provided by some designated authority as a key that, combined with a private key derived from the public key, can be used effectively for encryption of messages and digital signature.

The use of combined public and private keys is known as *asymmetric* cryptography. A system for using public keys is called a public key infrastructure.

- (g) **Private key:** In cryptography, a private or secret key is an encryption/decryption key known only to the party or parties that exchange secret messages. In traditional secret key cryptography, a key would be shared by the communicators so that each could encryption and decrypt messages. The risk in this system is that if either party loses the key or it is stolen, the system is broken. A more recent alternative is to use a combination of public and private keys. In this system, a public key is used together with a private key.

- (h) **Digital certificate:** A digital certificate is an electronic "credit card" that establishes your credentials when doing business or other transactions on the Web. It is issued by a certification authority (CA). It contains your name, a serial number, expiration dates, a copy of the certificate holder's public key (used for encryption of messages and digital signature), and the digital signature of the certificate-issuing authority so that a recipient can verify that the certificate is real. Some digital certificates conform to a standard, X.509. Digital certificates can be kept in registries so that authenticate user can look up other users' public keys.

- (i) **Wallet :** A wallet is a small software program and data that is used for online purchase transactions. Currently, CyberCash allows the consumer to get free Wallet software that allows several methods of payment to be defined within the wallet (for example, several different credit cards). Here's how it works:

When you order something, the order is sent to the merchant. The merchant (actually, the merchant's server) sends back an invoice and asks the consumer to launch the Wallet in his computer (or to download it quickly if the consumer doesn't have it yet).

When the consumer selects "Pay," the CyberCash software on the merchant server sends a message back to the consumer's PC that activates the "Wallet" software. The consumer selects one of the cards defined in the Wallet and clicks. The transaction includes real-time credit card authorization.

5 (i) $(10101.10101)_2 = (\quad)_{10}$

$$(10101.10101)_2 = 1 \times 2^4 + 0 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0 + 1 \times 2^{-1} + 0 \times 2^{-2} + 1 \times 2^{-3} + 0 \times 2^{-4} + 1 \times 2^{-5}$$

$$= 16 + 4 + 1 + 0.5 + 0.125 + 0.03125$$

$$= 21 + 0.65625$$

$$= (21.65625)_{10}$$

(ii) $(123.625)_{10} = (\quad)_2$

2	123	Remainder	Fractional part
2	61	1	.625 × 2 = 1.25
2	30	1	.25 × 2 = 0.5
2	15	0	.5 × 2 = 1.0
2	7	1	
2	3	1	
	1	1	

$$(123.625)_{10} = (1111\ 011.101)_2$$

(iii) $(2345.25)_{10} = (\quad)_8$

8	2345	Remainder	Fractional part
8	293	1	.25×8=2.0
8	36	5	
	4	4	

$(2345.25)_{10} = (4451.2)_8$

(iv) $(43.21)_8 = (\quad)_2$

To convert the given number from Octal number system to Binary system, each digit of the number will be represented in Binary form using a group of three bits.

$(43.21)_8 = (100011.010001)_2$

(v) $(AB.FED)_{16} = (\quad)_8$

$(AB.FED) = 1\ 0\ 1\ 0\ 1\ 0\ 11.1111\ 1110\ 1101$

$= 010\ 101\ 011.111\ 111\ 101\ 101$

$= (253.7755)_8$

(vi) $(BABA)_{\text{hexadecimal}} = (\quad)_{\text{decimal}}$

$(BABA)_{16} = 11 \times 16^3 + 10 \times 16^2 + 11 \times 16^1 + 10 \times 16^0$

$= 11 \times 4096 + 10 \times 256 + 11 \times 16 + 10$

$= 45056 + 2560 + 176 + 10$

$= 47802$

Hence $(BABA)_{\text{hexadecimal}} = (47802)_{\text{decimal}}$

(vii) $(1357)_{\text{octal}} = (\quad)_{\text{hexadecimal}}$

To convert the given number from octal to hexadecimal, let us first represent each digit by a group of three binary bits. Thereafter, we combine these bits in groups of four, starting from right to left and adding significant zeros if required.

$(1357)_{\text{octal}} = \begin{array}{cccc} 001 & 011 & 101 & 111 \end{array}$

$= \begin{array}{ccc} 0010 & 1110 & 1111 \end{array}$

$= (2\ E\ F)$

$(1357)_{\text{octal}} = (2EF)_{\text{hexadecimal}}$

(viii) $(344.25)_{10} = (\quad)_2$

2	344	Remainder		
2	172	0		
2	86	0		
2	43	0		
2	21	1	.25	
2	10	1	×2	Integral part
2	5	0	-----	
2	2	1	.50	0
2	1	0	×2	
0	1		----	
			.00	1

Hence, $(344.25)_{10} = (101011000.01)_2$

$$\begin{aligned}
 \text{(ix)} \quad (1001110.01)_2 &= (\quad)_{10} \\
 (1001110.01)_2 &= 1 \times 2^6 + 0 \times 2^5 + 0 \times 2^4 + 1 \times 2^3 + 1 \times 2^2 + 1 \times 2^1 + 0 \times 2^0 + 0 \times 2^{-1} + 1 \times 2^{-2} \\
 &= 64 + 8 + 4 + 2 + (1/4) \\
 &= 78 + 0.25 \\
 &= (78.25) \\
 (1001110.01)_2 &= (78.25)_{10}
 \end{aligned}$$

$$\text{(x)} \quad (CDEF)_{16} = (\quad)_2$$

To convert the given number from hexadecimal system to binary system, each digit of the number is represented by its binary equivalent using a group of four bits.

$$\begin{aligned}
 \text{So } (CDEF)_{16} &= 1100 \quad 1101 \quad 1110 \quad 1111 \\
 &= (1100110111101111)_2
 \end{aligned}$$

$$\text{(xi)} \quad (572)_8 = (\quad)_{16}$$

To convert a number from octal number system to hexadecimal system, each digit of the octal number is represented by its binary equivalent using a group of three bits. These bits are then grouped from right to left by grouping four bits at a time and adding leading zeros if required. Each group of these four bits is then represented by its hexadecimal equivalent.

$$\begin{aligned}
 \text{So } (572)_8 &= 101 \quad 111 \quad 010 \\
 &= 0001 \quad 0111 \quad 1010 \\
 &= 1 \quad 7 \quad A \\
 (572)_8 &= (17A)_{16}
 \end{aligned}$$

$$\text{(xii)} \quad (1489)_{10} = (\quad)_8$$

8	1489	Remainder
8	186	1
8	23	2
8	2	7
	0	2

$$(1489)_{10} = (2721)_8$$

6. (a) **Third generation and fourth generation of computers:** Third generation computers are based on integrated circuit technology and are much faster, compact and consume less power than previous generation computers. Fourth generation computer systems are characterized by further miniaturisation and refinement of the semi-conductor technology. Computers of this generation use large scale integration (LSI) and very large scale integrated (VLSI) circuits. Micro computer systems were developed using this technology.

Third generation computers offered many salient features such as better operating systems, multiprogramming and support of secondary storage tapes and disks. Extensive use of higher level languages and introduction of the data base software are another important features of these computers.

On the other hand, fourth generation computers are characterised by the use of micro electronic technology which allowed computer manufacturers to place into hardware what was formerly in the form of software. User oriented software, concept of virtual storage which expands main storage capacity to millions of characters, introduction of office information systems, word processing and electronic mail etc are other significant developments in fourth generation computers. These systems have several other features like compatibility, standardisation, networking and communication facilities, introduction of fourth generation languages and generalised application software for personal computers.

Unlike third generation computers which were confined to only very large companies, fourth generation computers are accessible by small organisations and even individuals due to their compact size and low cost.

- (b) **Sequential file organisation and random file organisation:** In sequential file organisation, records are written in the same sequence in which they are collected, but they are organised into certain order. Ordering of records within the file is according to a specific data field, which is known as key field. Records appear in sequential file one after another, in key sequence. Sequential files can be read and processed only in the order in which they are recorded. Thus, to process records in sequential files, it is necessary to read the entire file, from beginning to end, selecting and handling records as they are encountered. Thus, if the particular record required for processing happens to be the two hundred and first record in the file, the preceding two hundred records must be read first. Sequential organisation can be used on all storage media but it is a dominant method for magnetic tape.

Random file organisation, on the other hand, is used with direct access storage devices such as magnetic disk. Records can be written or accessed at random. The transactions can be processed in any order and written at many locations throughout the stored file. To access a record, prior records need not be examined first. The CPU can go directly to the desired record without searching all the other in the file. In other words, this scheme permits immediate access to records for inquiring and updating purposes.

- (c) **Online system and real time system:** The terms online processing and real time processing are used interchangeably but there is a basic difference between the two. Online processing refers to processing of individual transactions as they occur from their point of origin. This processing mode utilizes direct access devices such as magnetic disk and number of terminals connected to and controlled by a central processor. It provides multi-access to information files by terminal users and also enables them to update files with transaction data. Aside from transaction processing and file updating, inquiries are also handled by the online processing system. It also ensures that the records are in updated status at any time.

The term real time processing, on the other hand, refers to the technique of updating files with transaction data immediately after the event to which it relates occurs. Real time processing is basically on line processing with one specialty in inquiry processing. Online updating in real time usually leads to transactions as a by product. The response of the system for the inquiry itself is used to control the activity. It would normally differ from one activity to another. The response of a real time system is one type of feedback control system. An online production data collection system that simply accepts input and utilizes it for payroll and costing purposes cannot be termed real time, but if, on the other hand, the system is designed to provide immediate information to monitor the production process, it is real time processing.

- (d) **Impact Printers and Non–impact Printers:** Impact printers operate with revolving print chains, rotatory printwheels or wire–matrix printers. Non–impact printers use technology such as xerography or laser to produce output. Impact printers form images when electronic pulses activate printing elements that are pressed against an inked–ribbon and form an image on paper. Non–impact printers use thermal, chemical, electrical or optical technique to form images. Non–impact printers are much faster than impact printers because they involve less physical movements of parts. A speed of 3800 lpm (lines per minute) is very fast for an impact printer but speeds of upto 21,000 lpm are offered with some non–impact printers. Non–impact printers are capable of a wide range of fonts and quality approaching that of book printing compared to impact printers. Non–impact printers are generally too expensive and give high–speed high quality printing in comparison with impact printers.
- (e) **Flow chart and decision table:** Flow charts are diagrams that represent the logical organization of decisions, the steps in a computer program, the flow of data or information through a system, or the flow of documents through a system. These blue prints are

constructed with a standard set of symbols, and some general guidelines are to be followed while preparing these flowcharts. On the other hand, decision tables are used by systems analysts to communicate with programmers about actions to be taken when certain specified conditions are encountered. Decision tables offer a means of standardizing communication about decisions and allow all possible combinations to be considered. No special training is necessary to understand them.

Decision tables are used in conjunction with or in place of flowcharts for problem definition and documentation. Using flowcharts for the analysis and design of complex systems and programs involving many specified conditions and decision paths becomes an extremely difficult process. The flow of data and the logical sequence of the program or system become hard to follow, and errors or omissions may result. Decision tables are used in such cases as a powerful tool for the analysis and design of programs and systems involving complex conditional decision logic.

- (f) **Local and Wide Area Network:** LANs or Local Area Networks are communication systems that are used to link the terminal, computers, word processing station and other devices that are located within a compact area such as an office building, or a campus. LANs typically use a star, bus or ring configuration. LANs can be classified into high, medium and low speed categories. Regardless of the type of LAN used at a local site, it must be coordinated with the communication elements that link geographically dispersed processing centres.

WANs or Wide Area Networks are characterized by using modems and the established telephone system to communicate over greater distances than are possible with local area networks. Organizations often lease communication lines from companies like AT & T to make wide area network. Thus, wide area networks include all the networks that are involved in transporting information from one geographic location to another. The scale is much greater than in local network. The basic components in a common wide area network include a host computer, which is linked by various interconnected communications lines to subordinate computers. The host computer is comparable to any public service computer that provides users with electronic mail, online data bases or other services. Wide area networks, also known as global networks, make judicious use of data communication's common carriers throughout the world and/or private microwave links to connect its computers.

Hence main points of differences between LAN and WAN are as stated below:

1. A LAN is restricted to a limited geographical coverage of a few kilometers but WAN spans greater distances.
 2. Fewer data transmission errors occur in case of a LAN as compared to a WAN.
 3. Data transmission speed is much higher in LAN than in WAN.
 4. In LAN, computers, terminals and peripheral devices are usually physically connected with wires and coaxial cables, whereas in a WAN, there may not be a direct physical connection between various computers.
 5. The cost to transmit data in a LAN is negligible. However, in WAN, this cost may be very high because transmission medium used is leased lines or public system such as telephone lines, microwave and satellite links.
7. (a) Port is a hardware device that allows a series of bits to be transferred to a bus for the data input, or inversely the transfer of data from a bus to the port for data input.

Ports and Connectors help the users to connect external devices like printers, key boards or scanners and interface them with the PC.

The physical interfaces for the ports and connectors are located on the outside i.e. at the back of the PC, but they are directly / indirectly (by using a connecting cord) connected to the mother board.

There are various types of ports or connectors, each providing different data transfer speeds

to connect various external peripherals:

- (i) **Parallel Ports:** These are uni-directional and faster than serial ports. They are often used to provide data transmission to a printer.
- (ii) **Serial Ports:** These are bi-directional and slower than parallel ports. They are used to provide data transmission to a modem.
- (iii) **IDE Drive Connector:** It is a connector used to connect devices like CD-ROM drive or hard disk drives to the mother board.
- (iv) **Floppy Drive Connector:** It is used to connect the floppy drive to the mother board.
- (v) **USB Connector:** USB stands for 'Universal Serial Bus'. It is used to connect devices with high data transfer speeds like keyboards, scanners, digital cameras, etc.
- (vi) **PS/2 Connectors:** PS/2 stands for personal system /2. It is used to connect PS/2 based input devices like key board and mouse etc.

(b) **Components of Decision Support Systems** A decision support system has four basic components: (1) the user, (2) one or more databases, (3) a planning language, and (4) the model base. These are briefly discussed below:

- (i) **The user:** The user of a decision support system is usually a manager with an unstructured or semi-structured problem to solve. The manager may be at any level of authority in the organisation (e.g., either top management or operating management). Typically, users do not need a computer background to use a decision support system for problem solving. The most important knowledge is a thorough understanding of the problem and the factors to be considered in finding a solution. A user does not need extensive education in computer programming since he has to concentrate on what should be accomplished rather than on how the computer should perform each step.
- (ii) **Databases:** Decision support systems include one or more databases. These databases contain both routine and non-routine data from both internal and external sources. The data from external sources include data about the operating environment surrounding an organisation – for example, data about economic conditions, market demand for the organisation's goods or services, and industry competition.

Decision support system users may construct additional databases themselves. Some of the data may come from internal sources. An organisation often generates this type of data in the normal course of operations. The database may also capture data from other subsystems such as marketing, production, and personnel.

- (iii) **Planning languages:** Two types of planning languages that are commonly used in decision support systems are: (1) general –purpose planning languages and (2) special-purpose planning languages. General-purpose planning languages e.g. languages in most electronic spreadsheets allow users to perform many routine tasks such as retrieving various data from a database or performing statistical analyses. Special-purpose planning languages are more limited in what they can do, but they usually do certain jobs better than the general-purpose planning languages. Some statistical languages, such as SAS, SPSS, and Minitab, are examples of special purpose planning languages.
- (iv) **Model base :** The planning language in a decision support system allows the user to maintain a dialogue with the model base. **The model base** is the "brain" of the decision support system because it performs data manipulations and computations with the data provided to it by the user and the database. The analysis provided by the routines in the model base is the key to supporting the user's decision. The model base may dictate the type of data included in the database and the type of data provided by the user. Even where the quantitative analysis is simple, a system that requires users to concentrate on certain kinds of data can improve the effectiveness of decision making.

8. Data Transmission means the transfer of data between the sender and the receiver. The senders

or receivers may be users of information within a department, among various departments, between the head office and branch or between a network.

There are various types of data transmission techniques. Some of them are discussed below:

- (i) **Serial Transmission:** In this type of transmission, the bits of each byte are sent along a single path one after another serially. It is cheap and suitable for transmission over long distances. However, it is slow as it transfers data in series. An example is the serial port for the mouse or modem.
- (ii) **Parallel Transmission:** In this transmission, the bits of a character are simultaneously transmitted in parallel paths as in the case of parallel ports for printers.
It is faster as compared to serial transmission but is not suitable for long distances as cross links may take place.
- (iii) **Synchronous Transmission:** In this transmission, the bits are transmitted at a fixed rate using the same clock signals between transmitter and receiver. It uses a group of synchronisation bits, which are placed at the beginning and at the end of each block to maintain synchronisation. It is very fast but expensive too.
- (iv) **Asynchronous Transmission:** It uses a set of start and stop bits before and after each byte of data is transmitted. If the line is idle, it is indicated by sending signals through the lines. It is reliable but is slow and not suitable for transmitting large volume of data.

9. (a) Features of a local area network are briefly discussed below:

- (i) **Compatibility:** A local area network operating system must provide a layer of compatibility at the software level so that software can be easily written and widely distributed. A LAN operating system be flexible, which means that it must support a large variety of hardware.
- (ii) **Internetworking:** Bridging of different LANs together is one of the most important requirements of any LAN. Users should be able to access resources from all workstations on the bridge network in a transparent way; no special commands should be required to cross the bridge. A network operating system must be hardware independent, providing the same user interface irrespective of the hardware.
- (iii) **Protected mode operation:** An important feature that a LAN operating system must have is the ability to operate in the protected mode of a processor. Protected mode, as opposed to a real mode, allows the processor to access up to 16 MB of RAM and to gain more power from the microprocessor.
- (iv) **Growth path and modularity:** One of the most important requirements of a LAN is its modularity. A set of PCs should get easily converted into a LAN which can grow in size simply by adding additional workstations. If more storage is required, one should be able to add another hard disk drive, or another server.
- (v) **System reliability and maintenance:** All computers are prone to system lockups, power failures and other catastrophes. If a centralized processing system goes down, all users connected to it are left without a machine to work on. Such a situation can arise even in a distributed or local area network system. However, a LAN operating system should be powerful enough to withstand accidents.

- (b) **Wide Area Networks on WAN** are characterized by using modems and the established telephone system to communicate over greater distances than are possible with local area networks. Organizations often lease communication lines from companies like AT & T to make wide area networks. Thus, wide area networks include all the networks that are involved in transporting information from one geographic location to another. The scale is much greater than in local network. The basic components in a common wide area distributed processing network include a host computer, which is linked by various interconnected communications lines to subordinate computer. The host computer is comparable to any public service computer that provides users with electronic mail, on-line

data bases or other services.

The goal of a wide area network is to allow users to send electronic messages, data, graphics, programs, documents and even video information rapidly and economically. Wide area networks also known as global networks make judicious use of data communications common carriers throughout the world and / or private microwave links to connect its computers. The network's computers accept transmissions, routine them to their destination via the other computer, and alert addresses to waiting messages and other transmission.

10. Some of the risks and security considerations of Internet use for electronic commerce are stated below:

- (i) Reliability
- (ii) Scalability
- (iii) Ease of use
- (iv) Payment Methods
- (v) Other risks and concerns include:
 - Risk inherent in electronic mail transactions
 - The threat of computer viruses
 - Existence of unprofessional employees.

The General Management Concerns can be as follows:

- (i) Loss of paper audit trail
- (ii) Business continuity
- (iii) Exposure of data to third parties
- (iv) Potential legal liability
- (v) Record retention and retrievability
- (vi) Segregation of duties.

For details, students may refer to Chapter 11, Section 11.8 of the study material.

11. (a) A **data centre** is a centralized repository for the storage, management and dissemination of data and information. Data centres can be defined as highly secure, fault-resistant facilities, hosting customer equipment that connects to telecommunications networks. Often referred to as an Internet hotel/ server farm, data farm, data warehouse, corporate data centre, Internet service provider (ISP) or wireless application service provider (WASP), the purpose of a data centre is to provide space and bandwidth connectivity for servers in a reliable, secure and scaleable environment. These data centres are also referred to as public data centres because they are open to customers. Captive, or enterprise data centres, are usually reserved for the sole and exclusive use of the parent company, but essentially serve the same purpose. These facilities can accommodate thousands of servers, switches, routers and racks, storage arrays and other associated telecom equipment.

A data center also provides certain facilities, like housing websites, providing data serving and other services for companies. This kind of data center may contain a network operations center (NOC), which is a restricted access area containing automated systems that constantly monitor server activity, Web traffic, network performance and report even slight irregularities to engineers, so that they can spot potential problems before they happen. Their primary 'goal' of a data center is to deploy the requisite state-of-the-art redundant infrastructure and systems so as to maximize availability and prevent or mitigate any potential downtime for customers.

- (b) **Types and Tiers** : According to the varied computing needs of the businesses they serve, data centers fall into following two main categories:

- (i) *Private Data Centre*: A private data center (also called enterprise data centers). is managed by the organization's own IT department, and it provides the applications, storage, web-hosting, and e-business functions needed to maintain full operations. If an organization prefers to outsource these IT functions, then it turns to a public data center.
- (ii) *Public data centers*: A public data center (also called internet data centers) provide services ranging from equipment colocation to managed web-hosting. Clients typically access their data and applications via the internet.

Typically, data centers can be classified in tiers, with tier 1 being the most basic and inexpensive, and tier 4 being the most robust and costly. The more 'mission critical' an application is, the more redundancy, robustness and security are required for the data center. A tier 1 data center does not necessarily need to have redundant power and cooling infrastructures. It only needs a lock for security and can tolerate upto 28.8 hours of downtime per year.

In contrast, a tier 4 data center must have redundant systems for power and cooling, with multiple distribution paths that are active and fault tolerant. Further, access should be controlled with biometric reader and single person entryways; gaseous fire suppression is required; the cabling infrastructure should have a redundant backbone; and the facility must permit no more than 0.4 hours of downtime per year.

Tier 1 or 2 is usually sufficient for enterprise data centers that primarily serve users within a corporation. Financial data centers are typically tier 3 or 4 because they are critical to our economic stability and, therefore must meet the higher standards set by the government. Public data centers that provide disaster recovery/backup services are also built to higher standards.

12. (a) Services provided by Data Centres : Some of the value added services that a data center provides are:

(i) Database monitoring

- This is done via a database agent, which enables the high availability of the database through comprehensive automated management.

(ii) Web monitoring

- This is to assess and monitor website performance, availability, integrity and the responsiveness from a site visitor's perspective.
- It also reports on HTTP, FTP service status, monitors URL availability and round-trip for using public keys is called a public key infrastructure response times, and verifies Web content accuracy and changes.

(iii) Backup and restore

- It provides centralized multi-system management capabilities.
- It is also a comprehensive integrated management solution for enterprise data storage using specialized backup agents for the operating system, database, open files and application.

(iv) Intrusion detection system (IDS)

ID stands for Intrusion Detection, which is the art of detecting inappropriate, incorrect, or anomalous activity. ID systems that operate on a host to detect malicious activity on that host are called host-based ID systems, and ID systems that operate on network data flows are called network-based ID systems. Sometimes, a distinction is made between misuse and intrusion detection. The term intrusion is used to describe attacks from the outside; whereas, misuse is used to describe an attack that originates from the internal network.

- The IDS is scalable so that the system grows with the organization, from smaller

networks to enterprise installation.

- It provides automated network-based security assessment and policy compliance evaluation.

(v) Storage on demand

- It provides the back-end infrastructure as well as the expertise, best practices and proven processes so as to give a robust, easily management and cost-effective storage strategy.
- It provides data storage infrastructure that supports your ability to access information at any given moments – one that gives the security, reliability and availability needed to meet company demands.

(b) Challenges faced by the management :

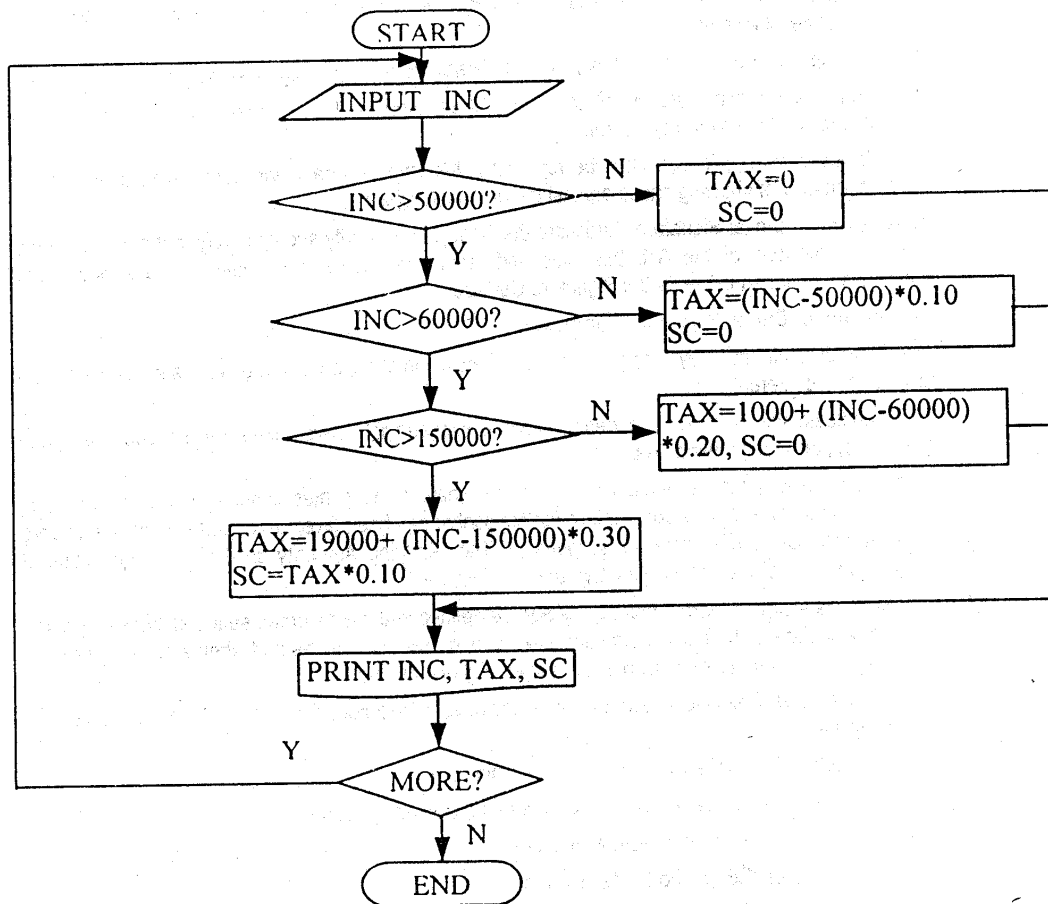
- (i) *Maintaining a skilled staff and the high infrastructure needed for daily data center operations:*. A company needs to have staff which is expert at network management and has software / OS skills and hardware skills. The company has to employ a large number of such people, as they have to work on rotational shifts. The company would also used additional cover in case a person leaves
- (ii) *Maximising uptime and performance* : While establishing sufficient redundancy and maintaining watertight security, data centers have to maintain maximum uptime and system performance.
- (iii) *Technology selection* : The other challenges that enterprise data centers face is technology selection, which is crucial to the operations of the facility keeping business objectives in mind. Another problem is compensating for obsolescence.
- (iv) *Resource balancing* : The enterprise chief technical officer today needs to strike a working balance between reduced operational budgets, increased demands on existing infrastructure, maximizing availability, ensuring round-the-clock monitoring and management, and the periodic upgrades that today's technology demands. This is why even some of the largest enterprises in the world choose to host their mission-critical and sensitive data with established data centers, where security concerns can be met and the technology and resources are already in place.

13. The flowchart is given on the next page.

14. Students are required to first give extended entry table, identify redundant rules and then give this limited entry table.

Limited Entry Decision Table:

ADMISSION		R1	R2	R3	R4	R5
C1	OVERALL UG GRADE AVERAGE B OR BETTER	–	Y	–	–	N
C2	ADMISSION TEST SCORE ABOVE 550	Y	Y	N	N	Y
C3	GRADE AVERAGE B OR BETTER FOR THE PAST TWO YEARS	Y	N	Y	N	N
A1	ADMIT	X				
A2	ADMIT ON PROBATION		X	X		
A3	REFUSE ADMISSION				X	X



15. (a) This Act is called the Information Technology Act, 2000. It shall extend to the whole of India and, unless otherwise provided in the Act, it applies also to any offence or contravention thereunder committed outside India by any person. The Act was enforced by the Central Government from October 17, 2000.

The Act shall not apply to the following:

- (i) a negotiable instrument as defined in section 13 of the Negotiable Instrument Act;
- (ii) a power-of-attorney as defined in section 1 A of the Powers of Attorney Act 1882;
- (iii) a will as defined in section (h) of section 2 of the Indian Succession Act, 1925 including any other testamentary disposition by whatever name called;
- (v) any contract for the sale or conveyance of immovable property, or any interest in such property;
- (vi) any such class of documents or transactions as may be notified by the Central Government in the Official Gazette.

- (b) **Digital Signature** means authentication of any electronic record by a subscriber by means of an electronic method or procedure in accordance with the provisions of Section 3 of Information Technology Act. The concept of Digital Signature is based on the technology of secured transmission of electronic documents over a computer network.

It is very unlikely that Digital Signature can be forged. Several layers of highly complex encryption protect it. A digital signature is more of a process than just affixing a signature. For example, when a document is "digitally signed", the digital software scans the document and creates a calculation which represents the document. This calculation becomes part of the "digital signature". When the recipient authenticates the signature, a similar process is carried out. The sender's and the receiver's calculations are then compared. If the results

are the same, the signature is valid; if they are different, the signature is not valid.

Digital Signature Certification – Chapter VII

Section 35 lays down the procedure for issuance of a Digital Signature Certificate. It provides that an application for such certificate shall be made in the prescribed form and shall be accompanied by a fee not exceeding Rs.25,000. The fee shall be prescribed by the Central Government, and different fees may be prescribed for different classes of applicants.

The section also provides that no Digital Signature Certificate shall be granted unless the Certifying Authority is satisfied that –

- (i) the applicant holds the private key corresponding to the public key to be listed in the Digital Signature Certificate;
- (ii) the applicant holds a private key, which is capable of creating a digital signature;
- (iii) the public key to be listed in the certificate can be used to verify a digital signature affixed by the private key held by the applicant:

However, no application shall be rejected unless the applicant has been given a reasonable opportunity of showing cause against the proposed rejection.

While issuing a Digital Signature Certificate the Certifying Authority should certify that it has complied with the provisions of the Act, the rules and regulations made thereunder and also with other conditions mentioned in the Digital Signature Certificate.

Suspension of Digital Signature Certificate

The Certifying Authority may suspend such certificate if it is of the opinion that such a step needs to be taken in public interest.

Such certificate shall not be suspended for a period exceeding 15 days unless the subscriber has been given an opportunity of being heard.

Section 38 provides for the revocation of Digital Signature Certificates under certain circumstances. Such revocation shall not be done unless the subscriber has been given an opportunity of being heard in the matter. Upon revocation or suspension. The certifying Authority shall publish the notice of suspension or revocation of a Digital Signature Certificate.

16. (a) **Macro** is a small program that carries out pre-defined and pre-recorded series of steps by giving a few keyboard shortcuts. It contains a series of commands. So, as and when a macro is called and run, the instructions given in it are executed one by one.

A macro is very easy to create. Certain steps have to be followed in order to create a macro. They are:

- (i) Select 'Tools/Macro' option from the main menu.
- (ii) Select 'Record New Macro' option from the cascading menu.
- (iii) Name the macro in 'Macro Name' box.
- (iv) Give a key board short cut to the macro.
- (v) Proceed to the 'Store macro in' box.
- (vi) Select the 'Description' box and give in some relevant and important details about the macro.
- (vii) Fill in the relevant details in the 'Record Macro' dialog box, and click OK.

For details., refer to Chapter 17, Section 17.11, pages 404-406.

- (b) Functions are predefined formulae present in Excel for the purpose of making different kinds of calculations. Functions use specific arguments in a particular order or structure. The arguments of functions can be anything from numbers, text, true or false values, or cell references.

Important Financial Arguments

Financial functions relate to the calculation of interest, depreciation, loan payment, IRR, NPV, etc.

Some of the important financial arguments are:

- Rate — Interest rate per period on a loan, or the discount or interest on an investment.
- Nper — Number of periods, i.e. the total number of payment periods either in years, months, days etc.
- Pmt — Payment made each period, it includes interest and principal amount.
- Pv — Present Value, that is the lump-sum value of an investment or loan today.
- Fv — Future Value, the value of an investment in the future assuming periodic, constant payments and constant interest.
- Type — Indicates when payments are due— whether end of period or at the beginning. Can either be 0 or 1. If type is omitted, it is assumed to be 0.

17. (a) Mail merge is an efficient and less time consuming way of preparing mass mailing for a list of addresses. It is a tool for producing repetitive documents. It gives the flexibility while sending letter and then personalizing each copy of it with information such as names, addresses, dates etc.

Mail merge is built around two sets of components- main document and the data source. The main document is a form letter. It contains merge fields where data would be merged. The field names would be replaced with the field contents coming from data source at the time of merging. The data source is a file that contains information to be merged with the main document to create a final product. The data source can be picked from Access database, Excel spread sheet or address book or one created in MS-Word. The following steps are used to create mail merge:

- (i) Setting up the main document
- (ii) Setting up the data source
- (iii) Editing the data source
- (iv) Addition of fields to the main document
- (v) Looking at the document before printing
- (vi) Printing the merged document.

(b) Important features of Power Point:

- (i) **Creating a presentation:** Microsoft Power Point offers four different ways of creating a presentation – using the auto content wizard, using a design template, using a blank slide or opening an existing presentation.
- (ii) **View a slide:** Power point 2000 offers five ways to view a slide viz., normal, outline, slide, slide sorter and slide views.
- (iii) **Modifying the impact of slides:** Power point offers you many different design options to suit various presentation needs. You can for instance add objects, graphical bullets and animation to your slides. You can also insert sound and video to play in your slide shows. You can modify the visual impact of a presentation by using transitions.
- (iv) **Adding objects:** Objects like clip arts, word art, tables and charts can be inserted on all slides or to selected slides. For instance, if you want to introduce your company logo in your presentation, you may like it to appear on all slides. You can insert objects to slides in the slide view or the normal view. The object you may want to introduce could be text, clip art, a table, chart, a video clip, a sound clip or some other object.

- (v) **Creating Graphical Bullets:** Apart from the regular bullets that are available in the bullets and numbering dialog box, you can also click the character button to view more bullet options. You can browse the option of bullets from the dropdown list of font sets displayed in the bullet dialog box. You can even change the color and size of the bullets.
 - (vi) **Adding transitions and animations:** PowerPoint offers several special effects and features that can enhance the work of an online presentation. You can use things such as slide transitions, movies, animation etc. You can set transitions by viewing the slide transitions dialog box in the slide show menu. You can activate the slide transition option only by selecting a slide in the slide sorter view.
18. (a) Various types of charts, which can be created through MS-Excel, are briefly discussed below:
- (i) **Pie chart:** It shows only a single data series. It shows the proportionate contribution of various items that make up the data series. That is to say when a data series is given, Excel sums up the individual values in the series and calculates the percentage contribution of each in the total. This will then determine the size of each data point's pie slice. Data labels can be used in a pie chart to display either the actual value of each point or the percentage.
 - (ii) **Line chart:** In many situations, we have more than one data series to represent. In line chart, data points of one data series are connected by lines, showing an upward or downward trend in value. Each data series is a line in the chart. A line chart is usually two –dimensional.
 - (iii) **Area charts:** A variation of the line chart is the area chart. It is similar to a line chart but the area below the line is filled thus marking out an area for each data series. Thus, an area chart plots each data series one on top of the other. The magnitude of change over time is clearly visible in this chart.
 - (iv) **Column and Bar Charts:** Column and bar charts are used to compare values across categories. In a bar chart the value axis is organized horizontally while the categories axis is arranged vertically. Column charts are similar to bar charts but have the categories axis at the bottom. Each bar represents a single data value in the data table. MS-Excel offers several variations in bar and column charts.
- (b) (i) **DMAX:** It is a data base function , which returns the largest number in the field of records in the database that matches the conditions you specify.
- (ii) **RATE:** It is a financial function, which returns the interest rate per period of a loan or an annuity.
- (iii) **ABS:** It is a mathematical function. It returns the absolute value of a number, a number without its sign.
- (iv) **PPMT:** It is a financial function, which returns the payment on the principal for a given investment based on periodic, constant payments and a constant interest rate.
- (v) **VAR:** It is a statistical function and it is used to estimates variance based on a sample.
19. Computer Assisted Audit Techniques (CAAT) provide a means for auditors to gather evidence, analyse data and report the findings independently for a predetermined audit objective. When planning the audit, the Information Systems Auditor should consider an appropriate combination of manual techniques and computer assisted audit techniques. In determining whether to use CAAT, the factors to be considered include:
- (i) Computer Knowledge, Expertise, and Experience of the Auditor
 - (ii) Availability of CAATs and Suitable Computer Facilities
 - (iii) Impracticability of Manual Tests
 - (iv) Effectiveness and Efficiency

(v) Timing.

Students are required to discuss these factors as per details given in study material, Chapter 19, Section 19.2.2, pages 441-442.

20. (a) Handling Missing Data in Data Integrity Control: When a field is null, simply entering no value may be sufficient. Two options for handling or preventing missing data are: using a default value and not permitting missing (null) values. Missing data are evitable. Other methods for handling missing data are:

- (i) Substitute an estimate of the missing value.
- (ii) Track missing data so that special reports and other system elements cause people to quickly resolve unknown values.
- (iii) Perform sensitivity testing so that missing data are ignored unless knowing a value might significantly change results.

For details, refer to Chapter 12, Section 12.2.1, page 223.

(b) The Final Step/Touch in PowerPoint Presentation: Powerpoint offers solutions for making a presentation complete and for setting up the actual slide show. Some of the solutions are:

- (i) *Setting the Slide Timings* – In case of an electronic presentation, the slides can be changed in two ways-either automatically or manually. Power point helps in setting the timings by using the Rehearse Timing button on the slide sorter toolbar.
- (ii) *Recording Narration* – To record speech along with a presentation, one can select Record Narration from the Slide Show menu.
- (iii) *Drawing on Slides* – Power Point helps in drawing on a slide on the screen, if one wants to emphasize a point during a presentation. Pen tool can be used to write on a slide during a presentation.
- (iv) *Customizing a Presentation* – Power Point offers a Customising feature, using which, certain slides can be omitted from a presentation and made relevant to a particular group of audience. This can be done by choosing Custom Shows from Slide Show menu.

(c) Factors in Determining the Best File Organisation – Several factors must be considered in determining the best file organization for a particular application. They are:

- (i) *File volatility* – It refers to the number of additions and deletions to the file in a given period of time.
- (ii) *File activity* – It is the proportion of master file records that are actually used or accessed in a given processing run.
- (iii) *File interrogation* – It refers to the retrieval of information from a file.

For details, refer to Chapter 7, Section 7.4, page 118.

(d) Types of Electronic Payment Systems – These are number of electronic payment systems and they can be grouped into three based on what information is being transferred online.

- (i) *Trusted Third Party* – It maintains all sensitive information for its clients, which include both buyers and sellers.
- (ii) The second type is an extension of the conventional notational fund transfer.
- (iii) The third type includes variations of digital cash, electronic money and coins.

For details, refer to Chapter 11, Section 11.7, page 211.