

PAPER – 6 : INFORMATION TECHNOLOGY

Question No. 1 is compulsory. Answer any four from the rest.

Question 1

- (a) Convert the following from one number system to another system alongwith the working notes:

(i) $(2363.75)_{10} = (\quad)_{16}$

(ii) $(23D.15)_{16} = (\quad)_8$

(iii) $(1E12.12)_{16} = (\quad)_2$

(iv) $(310.04)_8 = (\quad)_2$

(v) $(1111101111.11)_2 = (\quad)_{16}$ (1 x 5 = 5 Marks)

- (b) Describe briefly, the following terms with reference to Information Technology:

(i) Band width

(ii) Rotational delay time

(iii) File Allocation Table

(iv) BIOS

(v) Concurrent Processing. (1 x 5 = 5 Marks)

- (c) Give one or more reasons for each of the following:

(i) Need of auxiliary storage devices

(ii) Use of video RAM

(iii) Need of language translators

(iv) Use of operating system

(v) Use of intranet. (1 x 5 = 5 Marks)

- (d) Write True or False for each of the following:

(i) Bubble memory is a volatile memory.

(ii) Bridge is used to connect two similar networks.

(iii) Optical laser disks use mechanical Read/write head for the purpose of reading and writing the data.

(iv) Contents of PROM can be erased by ultra-violet rays.

(v) Financial accounting software is a system software. (1 x 5 = 5 Marks)

Answer

- (a) (i) $(93B.C)_{16}$
 (ii) $(1075.052)_8$
 (iii) $(1111000010010.0001001)_2$
 (iv) $(11001000.0001)_2$
 (v) $(3EF.C)_{16}$

Working Notes

- (a) (i) $(2363.75)_{10} = (\quad)_{16}$

16	2363	Remainder
16	147	11= B
16	9	3
	0	9

$$= 93 B$$

$$.75$$

$$\times 16$$

$$\underline{12.00} = C$$

$$\text{Hence, } (2363.75)_{10} = (93 B . C)_{16}$$

- (ii) $(23 D. 15)_{16} = (\quad)_8$

To convert the given number from hexadecimal number system to octal number system, each digit of the number will be represented in octal form.

$$(23D.15)_{16} = 0010 \ 0011 \ 1101 \ . \ 0001 \ 0101$$

$$= 001 \ 000 \ 111 \ 101.000 \ 101 \ 010$$

$$= 1 \ 0 \ 7 \ 5 \ . \ 0 \ 5 \ 2$$

$$\text{Hence, } (23D.15)_{16} = (1075.052)_8$$

- (iii) $(1 E12.12)_{16} = (\quad)_2$

To convert the given number from Hexadecimal number system to Binary number system, each digit of the number will be represented in binary form.

$$= 0001 \ 1110 \ 0001 \ 0010. \ 0001 \ 0010$$

$$\text{Hence, } (1E \ 12 \ .12)_{16} = (0001111000010010.0001001)_2$$

- (iv) $(310.04)_8 = (\quad)_2$

To convert the given number from Octal number system to Binary number system, each digit of the number will be represented in binary form.

$$= 011\ 001\ 000.000\ 100_2$$

$$(310.04)_8 = (11001000.0001)_2$$

$$(v) (111110\ 1111\ .\ 1100)_2 = (\quad)_{16}$$

To convert the given number from Binary number system to Hexadecimal number system, each digit of the number will be represented in binary form using a group of 4 digits.

$$= 0011\ 1110\ 1111\ .\ 1100$$

$$= 3\ \ \ E\ \ \ F\ \ .\ \ C$$

$$(1111101111\ .\ 1100)_2 = (3EF.C)_{16}$$

- (b) (i) **Bandwidth:** Bandwidth refers to information carrying capacity of the communication channel. Technically, bandwidth is the difference between highest and lowest frequencies used for transfer of data. It is measured in bps (bits per second). Higher the bandwidth, faster will be the data transfer speed. Higher bandwidth is required for audio and video applications.
- (ii) **Rotational delay Time:** After adjusting the Read/Write head of the disk on the desired track, it is the time taken by Read/Write head to find the desired sector. It is considered as half of the time required in one revolution of the platter.
- (iii) **File allocation Table:** It is a table which stores the physical address of all the files stored on the storage media. In order to access a file, this table is searched to find the physical address of that location, where the file is stored. This table is also searched to find the free area of the storage media at the time of storing a new file.
- (iv) **BIOS:** BIOS stands for Basic Input Output System. It is a small chip on the motherboard which loads the hardware settings of various I/O devices such as Keyboard, VDU and Hard disk into the memory of computer system. Now a days, computer is having flash BIOS in order to support new hardware devices.
- (v) **Concurrent processing:** It refers to the capability of a computer system to share memory among several programs and to execute the instructions, provided by each during the same time frame.
- (c) (i) **Need of Auxiliary storage devices:** When user enters the data/program using input device, those are stored in RAM. RAM is a Volatile memory which means that all the contents of RAM are erased when the power is switched-off. Therefore, in order to store the entered data permanently for future reference, auxiliary memory is required. Auxiliary storage devices like Floppy disk, Magnetic disk and Magnetic tape have auxiliary memory.
- (ii) **Use of video RAM:** Video RAM (VRAM) is used to accelerate the display of graphics on the screen. This RAM stores much of the data from main memory which is required to be displayed on VDU and transfers the same to the screen at faster rate to give the flicker free output.

- (iii) Need of language translator: Computer understands only binary language or machine language. Therefore, in order to convert assembly language program or source program to object program, language translator is required. Assembler, Interpreter and compiler are known as language translators.
 - (iv) Use of operating system: It is system software which acts as an interface between user and Computer System. It manages the System resources namely Memory, Processor, I/O Devices and file system. Operating system files are stored on the hard disk of the computer.
 - (v) Use of Intranet: Intranet is a means of intra-office communication. It facilitates communication within the organisation and connects people together with Internet-technology in a single view. Through the Intranet, access to all information, applications and data can be made available through the same browser.
- (d) (i) False
- (ii) True
- (iii) False
- (iv) False
- (v) False.

Question 2

Distinguish between the following:

- (i) Personal computing and Network computing.
- (ii) Online systems and Real time systems.
- (iii) Synchronous transmission and Asynchronous transmission.
- (iv) Intranet and Extranet.
- (v) Voice synthesizer and Voice recognition system. (4 x 5 = 20 Marks)

Answer

- (i) Personal Computing and Network computing:

Personal computing: The philosophy behind personal computing is that a computer should be readily available to an individual to perform his/her work at any time. Many tasks are individual by nature. Over the time, the range of tasks that a personal computer can accomplish has steadily increased largely because of the increasing availability of high-quality software. Some smaller businesses rely only on personal computers for all of their accounting, inventory management, customer database and transaction processing operations.

Network Computing: In network computing arrangement, individuals do their own work on personal computers, but are connected to other computers through a telecommunication network that allows them to share information and resources with others. Users in these environments may share databases, memos and other messages,

and work in progress. They can also share printers, fax machines and links to external data sources. Providing duplicates of these resources for each of the members of the work group can be very costly for many organisations. Sharing of resources saves lot of cost for the organisation.

- (ii) **Online Systems:** Online processing refers to processing of individual transactions as they occur from their point of origin as opposed to accumulating them into batches. This is made possible by such direct access devices as Magnetic disk and number of terminals connected to, and controlled by a central processor. In this way, various departments in a company can be connected to the processor by cables. If operating companies are a number of miles away from the processor then they are linked by means of telegraph, telephone lines or even through satellite. This type of processing provides multi access to information files by terminal users and also enables them to update files with transactions data.

Real-time systems: The term real time refers to the technique of updating files with transaction data immediately after the event to which it relates occurs. Real-time systems are basically on-line systems with one specialty in inquiry processing. The response of the system to the inquiry itself is used to control the activity. An on-line 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 processes, it is a real-time system.

- (iii) **Synchronous Transmission:** In this transmission, bits are transmitted at fixed rate. The transmitter and receiver both use the same clock signals for synchronization.

Synchronous transmission allows characters to be sent down the line without start-stop bits. It allows data to be sent as a multi-word blocks. It uses a group of synchronization bits, which is placed at the beginning and at the end of each block to maintain synchronisation. In transmission, timing is determined by a Modem.

Asynchronous Transmission: In this transmission, each data word is accompanied by stop (1) and start (0) bits that identify the beginning and ending of the word. When no information is being transmitted, the communication line is usually high (in binary 1), i.e., there is a continuous stream of 1's.

- (iv)
- | | Intranet | Extranet |
|----|---|--|
| 1. | It is the use of Internet technology like Web browsers and Web servers for effective communication and exchange of information within the employees of an organization. | It is the extension of intranet which makes the information of an organization accessible to outside companies and individuals with whom the company does business. It can also be defined as an Internet connection between business partners only. |
| 2. | Intranet employs less security mechanisms as compared to | Extranet provides the privacy and security of Intranet using cryptography and |

	mechanisms as compared to Extranet.	authorization procedures while retaining the global reach of Internet.
3.	Intranet extends among various branches and departments of the organization.	Extranet extends the Intranet from one location to another Intranet of a business partner across the Internet using controlled mechanisms.
4.	Data security is high with limited reach.	Data security is less with global reach.
5.	It results in reduced costs of printing, paper, telephone, easier and faster access of information from remote locations.	It results in better link with trading partners and faster exchange of information with them.

(v)

	Voice Synthesizer System	Voice Recognition System
1.	It is hardware device which is attached to the parallel port of the Computer.	It is software based approach of data entry into the computer by speaking using microphone attached with the computer.
2.	It is used to convert text to voice.	It is used to convert voice to text
3.	It is an output device.	It is an input technique of data entry.
4.	It is much helpful for blind persons who can not see the text on VDU.	It is helpful for those persons who find it difficult to use conventional devices like Keyboard, Mouse etc. for entry of data into the computer.
5.	It is a costly device.	The problem in the implementation of this system is that the persons are not uniform in their speech modulation which leads to error in data entry.

Question 3

- (a) Explain the various advantages and disadvantages of direct access storage.
- (b) Explain five components of Local Area Network (LAN).
- (c) A computer file contains the customer name, type, bill number, bill date, amount and date of payment. The bill is generated according to the following rules:

If a customer is a dealer and pays his bill within 15 days, 5% discount is allowed. If he pays the bill between 15 and 30 days, the discount allowed is 2%. If payment period is more than 30 days but upto 60 days, 5% surcharge is levied. For payment after 60 days, 10% surcharge has to be paid.

If a customer is a manufacturer, the corresponding percentages are 7%, 5%, 7% and 12% respectively.

Draw a program flowchart to calculate discount, surcharge and net amount for each of the 20 customers. Also print total discount and surcharge paid by all the customers.

(5 + 5 + 10 = 20 Marks)

Answer

(a) Advantages of direct access storage:

- (i) Magnetic rigid disk is a direct access storage (DAS) medium; therefore, individual records can be retrieved without searching through the entire file.
- (ii) The costs of DAS are steadily declining.
- (iii) For real-time systems where direct access is required, disks are currently the only practical means of file storage.
- (iv) Records can be readily updated by writing the new information over the area where the old information was stored.
- (v) With removable disk packs, a single disk drive can store large quantities of data, although all but one of the disks is offline at any given point in time.
- (vi) Interrelated files stored on magnetic disk can allow a single transaction to be processed against all of these files simultaneously.

Disadvantages: Updating a master file stored in DAS destroys the old information. Therefore, it does not provide an automatic audit trail. When disk is used, backup and audit trail require that each old master file records be copied to another medium prior to update.

(b) Components of a LAN: There are five components of a LAN:-

- (i) File Server: The server stores all the programs and data required by different users. It allows different users to share data and system resources namely hard disk, printer etc. There are two types of file servers:
 - (a) Dedicated Server: This server is only used to manage the data as well as programs and can not be used as a node, therefore, this server is called passive device.
 - (b) Non-dedicated server: This server can be used as a node for data entry and obtaining the results as well as server, therefore, it is called active device.
- (ii) Workstations or Nodes: These computers are used by different users for data entry and obtaining the results. Nodes are connected with file server using Network Interface card and network cabling. These terminals are usually intelligent terminals which process the data after accessing the data and programs from file server. After processing, files are stored on the server for sharing by the other workstations.

- (iii) Network Operating system: This operating system is used to manage different nodes as well as various I/O devices. Commonly used network operating systems are Novell Netware, Windows NT, Sun Solaris etc.
- (iv) Network Interface card: It is an electronic card which is installed in all the nodes and server to allow communication between them. Commonly used NIC in LAN is called Ethernet card which uses Linear bus topology.
- (v) Cabling: There are three types of cables which can be used in LAN:-
 - (a) Co-axial cable: This is the same cable which is used in domestic homes for watching satellite channels. It has a rigid aluminium wire having spiral wire around. It is not a reliable cable and breaks on the way. In addition to this, data can not travel to long distance due to high resistance. Data transfer speed is also not high.
 - (b) UTP (Unshielded twisted pair) cable: This cable is similar to telephone cable used in domestic phones but instead of having two wires, it has 4 pairs of different color wires. RJ 45 (Registered Jack) connector is attached in front of this cable for connecting the cable to the NIC. CAT5 and CAT6 are commonly used UTP cables. It is inexpensive and easy to install. These cables are more reliable and result in faster data transfer. These are used in structured cabling of Local area network (LAN).
 - (c) Optical Fiber cable (OFC): These cables are very reliable and are used for higher data transfer speed but are expensive. Data passed through these cables remain unaffected by electromagnetic interference. OFC uses rapidly turned on and off light to create on and off bits on the communication channel. Data is more secure in fiber optic network.
- (c) The required flow chart is given on next page.

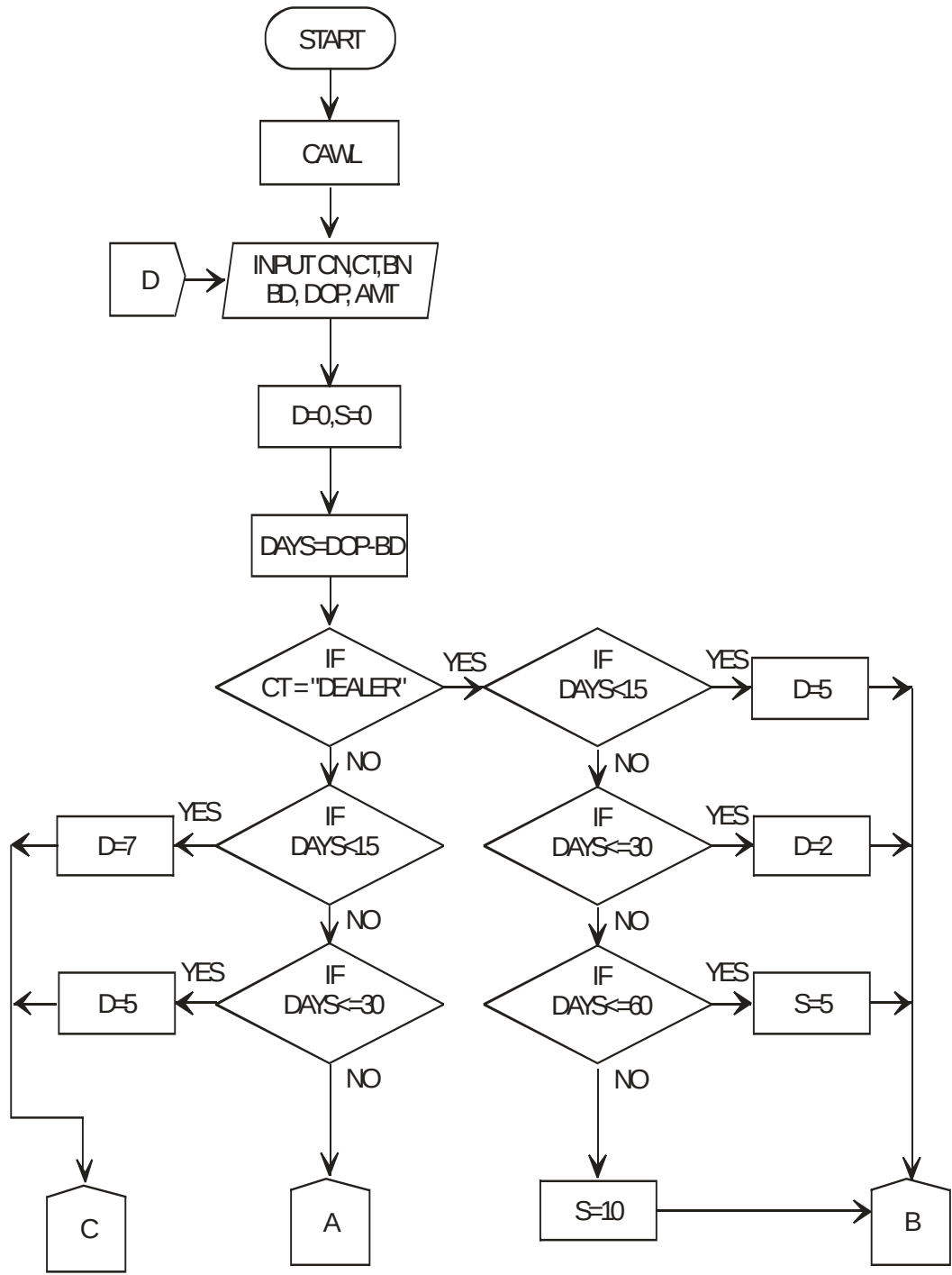
Question 4

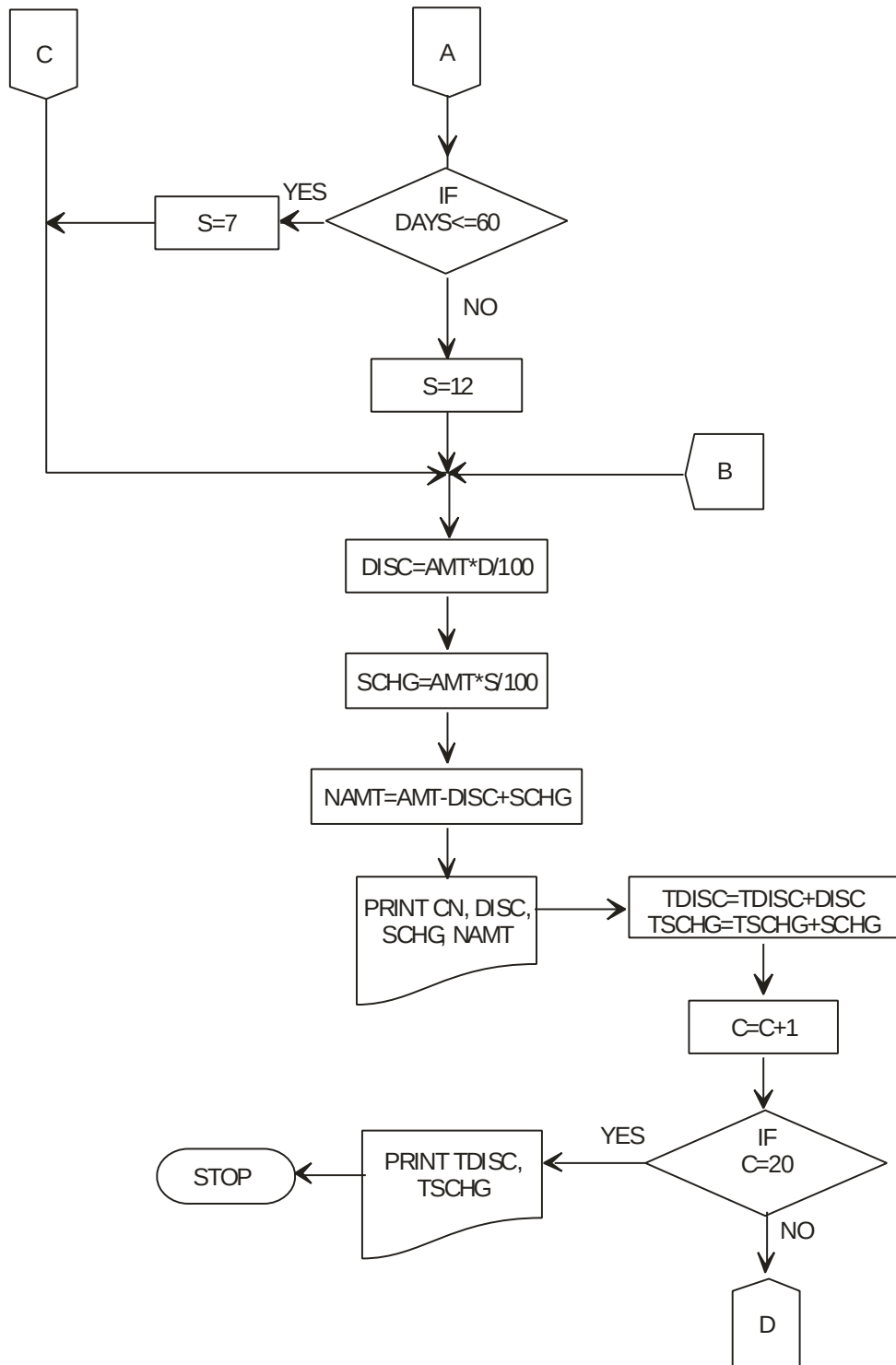
- (a) Discuss the services provided by Data Centres.
- (b) What is an expert system? Explain its various components.
- (c) What is Teleconferencing? Explain different types of teleconferencing.

(5 + 5 + 10 = 20 Marks)

Answer

- (a) Services provided by Data Centres: Data Centres provide the following services:-
 - (i) Database Monitoring: It provides the high availability of database through automated management.
 - (ii) Web Monitoring: It monitors website performance, availability and integrity.
 - (iii) Backup and restore: It provides centralized multi-system database and applications management for different organizations.





- (iv) Intrusion detection system (IDS): ID stands for Intrusion detection which is the art of detecting inappropriate and incorrect activity. Data Center provides automated network-based security features. Intrusion detection system (IDS) is scalable which can be implemented for smaller networks to large enterprise installation.
- (v) Storage on demand: It provides best back-end infrastructure to give robust, easily manageable and cost effective storage solutions. It also provides security, reliability and availability of data.
- (b) Expert System: Expert System (ES) is a computerized information system which allows the non-expert users to take decisions regarding unstructured problems which require experience and specialized knowledge like an expert. Expert system may work as an assistant for routine analysis or may work as a colleague for discussion of problem until both system and user agree on a solution. Expert system contains the following components:-
 - (a) Knowledge base: This includes the data, knowledge, relationships and decision rules used by experts to solve a particular problem.
 - (b) Inference engine: This program contains the logic to use the data from knowledge base and user to recommend a course of action.
 - (c) User interface: This program allows the user to design, create, update, use and communicate with the expert system.
 - (d) Explanation facility: This facility provides the user with explanation of decision recommended by the expert system. This facility helps the user in understanding how the expert system has recommended the action.
 - (e) Knowledge acquisition facility: Building a knowledge base known as knowledge engineering requires human expert and a knowledge engineer. The knowledge engineer is responsible of extracting the individual expertise into the knowledge base using knowledge acquisition facility.
- (c) Teleconferencing: It refers to the electronic meeting between people who are geographically scattered. Telecommunication technology allows the people to interact with each other without traveling to the same location which saves a lot of money and valuable time.

There are three types of teleconferencing:

1. Audio conferencing: It is the use of audio communication equipments which allows the user to communicate with geographically dispersed persons. Audio conferencing does not require a computer but requires a two way audio communication facility.

Guidelines to make Audio conferencing more efficient:

- (i) All the participants must have an opportunity to speak.
- (ii) Number of participants must be kept to manageable size.

- (iii) Copy of conferencing agenda must be sent to all the participants in advance through FAX.
 - (iv) Participants must identify themselves.
 - (v) Conferencing discussion must be recorded.
 - (vi) Hard copy of the discussion must be prepared and should be sent to all the participants for approval.
2. Video conferencing: In this conferencing, participants can see and hear each other. It uses the television and does not require a computer. Participants gather in specially equipped rooms having audio and video facility.
- There are three types of Video Conferencing:
- (i) One way Video and Audio: In this case, audio and video is traveled only in one direction e.g. Television.
 - (ii) One way Video and Two way Audio: In this case, audio is transferred in both the directions but video is transferred only in one direction e.g. discussion of news reader with field correspondent.
 - (iii) Two way video and Audio: In this case, audio and video is transferred in both the directions between sender and receiver e.g. discussion of persons between different studios of a news channel.
3. Computer Conferencing: It is the use of networked computer that allows participants with some common characteristics to exchange information concerning a particular topic. It is more disciplined form of E-Mail. It can be used within single geographic site which is not practical in case of Audio and Video conferencing.

Question 5

- (a) What is Electronic Data Interchange (EDI)? How it works?
- (b) Define the following terms related to MS-WORD:
 - (i) Text Wrap
 - (ii) Headers and Footers
 - (iii) Tab
 - (iv) Indenting
 - (v) Paragraph alignment.
- (c) Explain the following terms with reference to presentation package:
 - (i) Slide timings
 - (ii) Transition
 - (iii) Tri-pane view

- (iv) Handouts
 - (v) Notes.
 - (d) Define the following functions used in MS-EXCEL:
 - (i) TRUNC
 - (ii) MOD
 - (iii) PMT
 - (iv) DISCOUNT
 - (v) UPPER.
- (5 + 5 + 5 + 5 = 20 Marks)

Answer

- (a) Electronic Data Interchange (EDI): EDI is the transmission of business information in standard format between computers of independent organizations. There is no need to change the database structure by the companies for implementation of EDI. However, EDI software is required to be developed for translating the format used by one organisation to the format being used by another organizations. So EDI is computer-to-computer communication using a standard data format to exchange business information electronically between independent organizations.

EDI is a three step process :-

1. First of all, sender data is converted into standard format as defined by EDI translation software.
2. Data in standard format is transferred to the receiver using communication lines.
3. Finally, standard format data is converted according to the format of receiver data base files.

These three steps require following functions:-

1. Communications:- EDI requires communication software and EDI translation software. Communication software is responsible for transfer of data from source to destination, starting & termination of EDI transmission session and sending the acknowledgement of data on successful data transfer. EDI translation software converts the data fields of the sender according to the receiver format.
 2. Mapping:- For data transfer between trading partners, EDI standard is required to be selected and mapping of sender fields with the receiver fields will have to be defined in the EDI translator.
 3. Profiles:- In this step, it is defined in the system where to send the transactions and how to handle errors and exceptions during exchange of data among trading partners.
- (b) (i) Text Wrap: This feature of word processing package restricts the appearance of characters between left and right margins. When the words in a line exceed than the words which can be accommodated in one line, then remaining words are

automatically shifted to next line.

- (ii) **Headers & Footers:** Information like company name, report title is required to appear on every page of the document, and that information can be inserted on every page of the document using Header and Footer option. This kind of information appears either in the top or bottom margin. Headers are placed in the top margin and footers are placed in the bottom margin of a page.
 - (iii) **Tab:** In order to present the data in tabular form, space bar can be used. But this is very cumbersome and unreliable, particularly when the data to be tabulated is several lines long. All word processors have 'Tab' function similar to manual and electronic typewriter. Word allows the usage of 'Tab' according to the requirement. Depending upon the size of the text, the width of tab can be specified.
 - (iv) **Indenting:** It refers to the distance of text from the margin. By using indenting, the selected paragraph stands out from other text in the document. Word offers two types of Indents namely 'First-line' and 'Hanging' indents. In the case of 'First-line' option, the first line is indented more or less than the lines that follow it. 'Hanging' indent hangs the lines of paragraph to the right of left margin.
 - (v) **Paragraph alignment:** Word offers four types of alignment to text. They are Left, Right, Center and Justify. In Left alignment, text lines up with the left margin, leaving the right margin irregular. Right alignment means that the text lines up with the right margin, leaving the left margin irregular. Centered text is evenly placed between left and right margins. Justified text is fully aligned between left and right margin.
- (c) (i) **Slide timings:** In order to run the presentation on its own, like presentation at a trade show where slides automatically change from one to another, slide timings are required to be set up for each slide of the presentation. Slide timings are considered by keeping in mind that, perfect co-ordination between speech and slides is maintained. Slide timings can be set up using the Rehearse Timing button on the Slide Sorter toolbar.
- (ii) **Transitions:** Transitions are the way each slide appear on the screen like appearance of slide from the right, box in, box out or dissolve. For setting transitions, one can use 'Slide Transition' toolbar after selecting a slide in Slide sorter view. Speed of transition can be set as slow, medium or high. Slide transition can also be accompanied by special sound effects to enhance the presentation.
 - (iii) **Tri-Pane View:** It allows to view three different aspects of the presentation at the same time on the screen. These three views are Normal view, Outline view and Slide View.
 - (iv) **Handouts:** These are prints of slides or outline of the presentation which are given to the participants. On a handout, 2,3,4,6 or 9 slides can be printed. These are slides printed without any notes.

- (v) Notes: These are the points that are made regarding a slide to help in remembering about a presentation or to help the participants with details of background information regarding a slide. Notes are printed along with a small version of slide.
- (d) (i) TRUNC (number, num-digits): This mathematical function truncates a number to an integer by removing the fractional part of the number, if number of digits specified is zero otherwise number is truncated to specified number of digit e.g. = TRUNC (8.9,0) = 8 and = TRUNC (8.928,2) = 8.92.
- (ii) Mod (x,y): This mathematical function gives the remainder after dividing x by y. e.g. if x=7 and y=2, then value returned will be 1.
- (iii) PMT (rate, nper, pv): This financial function is used to calculate the payment for a loan at the given rate of interest and for particular time period where
 pv: Total present value to be paid
 rate: Rate of Interest
 nper: No. of periods
- (iv) DCOUNT(database, field, criteria): This database function is used to count the number of cells containing numbers in the field (column) of records in the database that match the conditions specified.
- (v) UPPER (text string): This text function converts a text string to all uppercase letters e.g. if the text string is 'exam', then this function will return 'EXAM'.

Question 6

- (a) Explain the concept of communication protocols.
- (b) Explain the powers of Central Government to make rules as defined in Section 87 of IT Act, 2000.
- (c) Explain "test data technique" of audit in a computerized environment with the help of test pack approach.
- (d) Explain the facilities provided by financial accounting package.

(5 + 5 + 5 + 5 = 20 Marks)

Answer

- (a) Communication Protocols: A protocol is a standard set of rules that govern the flow of data on a communication network. Communication protocol software performs a variety of actions necessary for data transmission between heterogeneous computers like PC to Mainframe. These standard sets of rules must be followed by both the communicating parties to ensure that the information exchanged between them is received and interpreted correctly.

Communication protocols consist of multiple layers, the first layer is a physical layer which defines the manner in which system components are interfaced with each other i.e.

the communication interface devices will be attached at Serial Port/Parallel Port/USB Port and at which voltage level, communication will take place. Middle layer of communication protocol define the establishment and termination of sessions and higher level layer defines the various encryption and compression techniques used during data transfer so that data is transferred properly. Both the communication software and Network Interface Card must follow the same set of protocols.

A protocol defines the following three aspects:

- (a) Syntax: It refers to the format of the data being exchanged and various encryption/cryptography techniques. Format means whether data will be transferred in ASCII/EBCDIC/BCD form.
- (b) Semantics: It means the type (Audio/video/Text) and order of messages to ensure reliable & error free data transfer.
- (c) Timing: It defines the data transfer rate.

Commonly used communication protocols are TCP/IP, SMTP, HTTP, FTP, PPP etc.

- (b) Section 87: This Section has been discussed in Chapter 13 – Miscellaneous of IT Act, 2000. According to this section, Central government has powers to make rules regarding the following:-
 - 1. The manner in which any information may be authenticated by digital signature.
 - 2. The electronic form in which filings, issue, grant or payment shall be effected.
 - 3. The matter relating to the type of digital signature, manner and format in which it may be affixed.
 - 4. Security procedure for creating secure electronic record.
 - 5. Qualifications and experience of Controller, Deputy Controller & Assistant Controller.
 - 6. Requirements for applying for a license to issue Digital Signature Certificate.
 - 7. The format of application form for license, period of validity of license and amount of fees payable.
 - 8. The form and fee for renewal of license.
 - 9. The fee to be paid to the Certifying Authority for issue of a Digital Signature Certificate.
 - 10 The qualification and experience of the adjudicating officer.
 - 11. The salary, allowances and other terms and conditions of service of Presiding Officer.
- (c) Test data techniques are used to conduct audit by way of entering sample of transactions into client's computer system and comparing the output with predetermined output to make sure that the output being generated by client's computer system is correct. Test

data may be dummy data or the transactions selected from the previously processed transactions.

Test packs: The use of test packs is the application of auditors test data (live or dummy) to clients application programs. A small sample of data is processed through the computer and output is compared with manually generated output using the same data. This audit approach requires little computer expertise but designing of test data which will represent all the possible combinations is a time consuming and difficult process. Use of test data generators can overcome this disadvantage.

(d) Facilities provided by Financial Accounting Package

Financial accounting package must be user friendly with on-line help facility so that even novice user can use it without any problem. Security must be of prime importance in a good financial accounting package so that no unauthorized user can enter/modify the financial data. It must provide the following facilities:-

- a. It must offer well designed data entry screens with various verification/validations controls so that correct data could be entered easily and fastly.
- b. It must have screen to create information about company such as its name, address, contract numbers, Income tax number, Sales tax number and other relevant details
- c. It must have flexibility to modify the company's accounting and inventory features by the authorized users using their passwords.
- d. It must be able to maintain the Group Accounts (Single Group & Multiple Groups) as well as single and multiple ledgers.
- e. It must facilitate day-to-day accounting transactions through voucher entry like entry of sales, purchase, receipt, payment and journal vouchers without the need of remembering the accounting codes.
- f. It must generate various financial statements like Day book, Cash book, Bank book, General ledger, Subsidiary ledger, Profit & Loss A/Cs, Trial balance, Balance sheet etc. In addition to these, the package must prepare various financial statements required by auditors and Government. It must be possible that all the required reports could be customized by user according to their requirements rather than generation of the same in standardized formats.

Question 7

Write short notes on the following. Answer any four.

- (i) Virtual Memory
- (ii) Firmware
- (iii) Integrated Test Facility (ITF)

(iv) Light pen

(v) Distributed Database.

(5 × 4 = 20 Marks)

Answer

- (i) **Virtual Memory:** Programmer writes the program with the illusion that there is infinite main memory but main memory is always limited in size. Therefore, when the size of a program exceeds the size of available RAM, then the entire program is stored in secondary memory. Operating system divides the program into number of equal parts, known as pages. Main memory is also considered to be divided into no. of parts having same size as that of page, known as Blocks. Those pages which can be accommodated in available blocks are shifted from secondary memory to main memory and execution starts. When a page which is currently not in main memory is required, then the required page is brought in the main memory after shifting an unwanted page from main memory to secondary memory. This process is known as swapping. In this way, program having size more than the size of available RAM is executed. Since the size of the main memory is not same as the size of job, hence it gives rise to a concept of virtual memory.
- (ii) **Firmware:** These are micro programs which are written in machine language and are permanently stored in ROM to perform complex operations like Multiplication, Division, Move data and Compare data etc. These micro programs deal with low level machine operations and provide the substitution for additional hardware circuits, thus reducing the cost of computer system. In ALU, there is a hardware circuit to perform 'addition' known as adder and hardware circuit to perform 'subtraction' known as subtractor but there is no hardware circuit to perform multiplication and division. These operations are performed by the way of repeated additions and repeated subtraction using basic electronic circuits namely adder and subtractor. Thus, firmware helps in reducing the cost of computer system and results in faster processing of data.
- (iii) **Integrated Test Facility (ITF):** Integrated test facility (ITF) is a particular form of test data involving the creation of dummy entity like creation of a dummy branch in case of a Banking system. Once the dummy entity is created, the auditor can input the transactions related to this dummy entity and process these data using client's application program to obtain the output. The generated output is compared with the manually calculated results to determine the accuracy of the client's application programs.
- (iv) **Lightpen:** A lightpen 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. A lightpen has a photo-detector at its tip. This detector can detect changes in brightness of the screen. When the pen is pointed at a particular point on the screen, it records the instant change in brightness that occurs and informs the computer about this. The computer can find out the exact spot with the information. Thus, the computer can identify where the user is pointing on the screen. Lightpens are useful for menu-based applications. Instead of moving the mouse around or using a keyboard, the user can select an option by pointing at it. A lightpen is also useful for drawing graphics in CAD.

- (v) **Distributed database:** Distributed data processing refers to a system in which computer intelligence is located at more than one site and the actual running of application programs and processing of data are completed at more than one site. Distributed data processing may save a lot of time and money for an Organisation. When processing is distributed, the data to be processed usually must be located at the processing site. This means that the data base, or parts of the data base must be distributed. There are two ways to distribute a database. The first one is to provide duplicates of all data at all sites. This approach is called a replicated database. Another means of distributing the database is to partition it. The data base may be divided into segments that are appropriate for certain locations and these segments distributed only to those locations. This approach is called a partitioned database. Distributed database systems usually reduce costs for an organisation because they reduce transfer of data between remote site and the organisation's headquarters. Distributed database systems may also provide organisations with faster response times for filling orders, answering customer requests, or providing managers with information.