

PAPER – 6 : INFORMATION TECHNOLOGY

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

Question 1

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

- (i) $(11011101)_2 = (\quad)_{10}$
- (ii) $(423.25)_{10} = (\quad)_2$
- (iii) $(6437)_8 = (\quad)_{16}$
- (iv) $(CDEF)_{16} = (\quad)_2$
- (v) $(11011.11101)_2 = (\quad)_{16}$ (1×5 = 5 Marks)

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

- (i) Digitization
- (ii) Compiler
- (iii) PCI slots
- (iv) Debug
- (v) Cursor (1×5 = 5 Marks)

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

- (i) Use of Modem
- (ii) Use of Graph Plotter
- (iii) Use of Subroutine
- (iv) Use of Operating System
- (v) Need of Protocol Converters. (1×5 = 5 Marks)

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

- (i) Digital computer process data input in a continuous form
- (ii) Each side of DVD can hold upto 4.7 GB data.
- (iii) Speed of Non-Impact Printers is measured in LPM.
- (iv) Microcomputers are based on RISC architecture.
- (v) E.X.NGN offers 72 basic reports in accounting. (1×5 = 5 Marks)

Answer

- (a) (i) $(11011101)_2 = (\quad)_{10}$

$$\begin{aligned}
 (11011101)_2 &= 1 \times 2^7 + 1 \times 2^6 + 0 \times 2^5 + 1 \times 2^4 + 1 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0 \\
 &= 128 + 64 + 16 + 8 + 4 + 1 \\
 &= (221)
 \end{aligned}$$

$$\text{Hence, } (11011101)_2 = (221)_{10}$$

$$(ii) \quad (423.25)_{10} = (\quad)_2$$

2	423	Remainder	
2	211	1	
2	105	1	
2	52	1	
2	26	0	
2	13	0	
2	6	1	
2	3	0	
2	1	1	
	0	1	

$\uparrow$

.25

$\times 2$

0.50

$\times 2$

1.00

$$\text{Hence, } (423.25)_{10} = (110100111.01)_2$$

$$(iii) \quad (6437)_8 = (\quad)_{16}$$

To convert the given number from octal to hexadecimal, we will represent each digit of the number by three bit binary number. These binary bits will then be combined in group of four bits adding leading zeros, if required.

$$\begin{aligned}
 (6437)_8 &= (110 \quad 100 \quad 011 \quad 111) \\
 &= (1101 \quad 0001 \quad 1111) \\
 &= (D \quad 1 \quad F)
 \end{aligned}$$

$$\text{Hence, } (6437)_8 = (D1F)_{16}$$

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

To convert the given hexadecimal number to binary, each digit will be represented by a group of four binary bits.

$$(CDEF) = (1100 \quad 1101 \quad 1110 \quad 1111)$$

$$\text{Hence, } (CDEF)_{16} = (1100110111101111)_2$$

$$(v) \quad (11011.11101)_2 = (\quad)_{16}$$

To convert the given number from binary to hexadecimal, we will combine the digits

in groups of four, adding leading or trailing zeros wherever required.

$$\begin{aligned}(11011.11101)_2 &= (0001 \ 1011. \ 1110 \ 1000) \\ &= (1B \cdot E8)\end{aligned}$$

$$\text{Hence, } (11011.11101)_2 = (1B \cdot E8)_{16}$$

- (b) (i) **Digitization:** The process of converting the graphical information such as lines, pictures and graphs etc. to digital form with the help of Image Scanner is called digitizing.
- (ii) **Compiler:** It is a software which converts source programs written in a high level language into machine level language. It is an important part of systems software for most computers.
- (iii) **PCI slots:** The PCI (Peripheral Component Interface) slots are used for connecting PCI based devices like sound cards, internal modems and graphics accelerator cards.
- (iv) **Debug:** Error in a programme is called a bug and the process of finding and correcting the errors in a source programme is called debug.
- (v) **Cursor:** A symbol that marks the current position of the mouse on the screen or the point of entry of data is referred to as cursor.
- (c) (i) **Use of Modem:** Modem stands for modulator/demodulator. It is a device that converts a digital computer signal into analog telephone signal or vice-versa. Modems are required to communicate computer data with (using) ordinary telephone lines because computer data is in digital form but telephone lines are analog.
- (ii) **Use of Plotters:** It is an output device which is used to print graphs, designs, drawings and maps on the paper. It is used particularly in applications like computer-aided design (CAD).
- (iii) **Use of subroutine:** It is a small independent program which is included in the main program to perform a specific function again and again with different values of data.
- (iv) **Use of operating system:** It is a system software which acts as an interface between the user and the computer system. It is used to managed the system resources like memory, processor, I/O devices and data.
- (v) **Need of Protocol Converters:** Protocols are the standard set of rules which govern the flow of data on a communication network. To enable diverse system components to communicate with one another and to operate as functional unit, protocol conversion is needed. It can be accomplished via hardware, software, or a combination of hardware and software.
- (d) (i) False
- (ii) True
- (iii) False

(iv) False

(v) True

Question 2

Distinguish between the following:

- (i) DDL and DML
- (ii) Dumb Terminal and Intelligent Terminal
- (iii) LAN and WAN
- (iv) Computer Aided Design (CAD)/Computer Aided Manufacturing (CAM)
- (v) Sequential File Organisation and Random File Organisation. (4×5 = 20 Marks)

Answer

(i) DDL and DML

Data Definition Language (DDL) is used to create a link between logical and physical structure of database file. Logical refers to the way the user views the data and physical refers to the way the data is stored on the storage media. Overall logical view of the data is called Schema and particular application view is called Subschema.

Functions performed by DDL include the following:

- (a) Describes the Schema and Subschema.
- (b) Describes the field name and data type of each field.
- (c) Indicates the keys of record i.e. defines Primary, Secondary and Foreign key.
- (d) Defines for data security restrictions i.e. defines the passwords and access rights of various users.
- (e) Provides for logical and Physical data independence.
- (f) Provides means for associating the related records of different files.

On the other hand, **Data Manipulation Language (DML)** provides the techniques for processing the data stored in database files.

Functions performed by DML include the following:

- (a) Provides the techniques for data manipulation such as insertion, deletion and updation of records.
- (b) Enables the user and application programmes to process the data on logical basis rather than physical location basis.
- (c) Provides for programming languages independence. A DML must support various high level programming languages like COBOL, PL/1, C++ etc.
- (d) Allows the user and application programmers to be independent of physical data

structure and physical data structure maintenance.

(e) Provides for use of record relationship which is defined using DDL.

(ii) Dumb Terminal and Intelligent Terminal

Dumb Terminal consists of I/O devices for data entry and obtaining the results but has no processing capability. This terminal cannot process the data at its own level, processing is done by central host computer. In other words, in these types of terminals, entire workload is on the main computer. Thus, if the processing speed of main computer is less, the waiting time of the users working on different terminals will be increased. Further, failure of main computer will result in breakdown of the entire network. Such terminals are generally used in centralised processing.

Intelligent Terminal, on the other hand, consists of a small microprocessor in addition to I/O devices. This microprocessor can process the data upto a certain level. It means that these terminals have processing capabilities in addition to performing Input and Output operations. Using these terminals, workload on the central computer is reduced, hence response to the users is fast. Intelligent terminals can be used in a stand-alone basis, or can be part of a network of terminals.

(iii) LAN and WAN

LAN

It stands for Local Area Network.

It is the collection of computers and associated devices within restricted geographical area of 1 kilometer.

Computers are physically connected with each other using special network cabling like Co-axial cable/UTP cable/Fiber optic cable.

Communication channel is privately owned.

Data is transferred in digital form.

Modem is not required for connectivity.

It is relatively cheap to establish.

Data transfer cost is less.

Less expensive communication interface device like Network Interface Card (NIC) is required.

WAN

It stands for Wide Area Network.

It is the collection of computers and associated devices within thousands of Kilometers e.g. within state/Country/World.

Computers are connected with telephone lines/satellite link.

Communication channel is public owned.

Data is transferred in analog form.

Modem is always required for connectivity.

It is expensive to establish.

Data transfer cost is high.

Expensive communication interface devices like Modem/VSA T (Very Small aperture terminal) etc. are required.

Data transmission is less error prone.	Data transmission is more error prone.
Data transfer speed through Co-axial cable is less than the data transfer through satellite link used in WAN.	Data transfer speed (baud rate) is highest through satellite.
Computer networks established within College/University campus, Bank Branch or within an organisation are examples of LAN.	Bank network in the whole country and Railway/Airlines Reservation Systems are examples of WAN.

(iv) Computer Aided Design (CAD)/Computer Aided Manufacturing (CAM)

Computer-Aided Design (CAD) refers to the use of a wide range of computer-based tools that assist engineers, architects and other design professionals in their design activities. It involves both software and sometime special-purpose hardware. CAD is sometimes translated as "computer-assisted" or "computer-aided drafting". First commercial applications of CAD were in large companies in automotive and aerospace industry, as well as in electronics. As computers became more affordable, the application area gradually expanded.

When the field was initially established it was typically limited to producing drawings similar to hand-drafted drawings. Advances in computer technology have allowed more skillful application of computers in design activities. Today CAD is not limited to drafting, it ventures into more "intellectual" areas of designer's expertise.

On the other hand, CAM stands for **computer-aided manufacturing**. CAM with computer-aided design systems produces quicker and more efficient manufacturing processes. This methodology is applied in different manufacturing areas. CAM can be used for following applications:

- Verification of the data
- Panelization of the design to fit the raw material.
- Ability to edit
- Ability to add manufacturing information

CAM has great usage in mechanical engineering. In electronic design automation, CAM tools prepare printed circuit board (PCB) and integrated circuit design data for manufacturing.

(v) Sequential File Organisation and Random File Organisation

In Sequential File organization, all records are in ascending or descending order by a record key. To locate an individual record, a sequential search from the first record on the file must be performed. Each individual record must be examined until the required record is located. Such a search can be time consuming. Therefore, sequential organisation is impractical for an application that requires immediate access to individual

records. On the other hand, sequential organisation would be good for payroll system that is run on a batch basis and every record on the master file being accessed.

Under **Random File Organisation**, transactions can be processed in any order and written at any location through the stored file. To access a record, prior records need not be scanned. The CPU can go directly to the desired record using randomizing procedure without searching all the previous records in the file. Randomizing procedure is characterized by the fact that records are stored in such a way that there does not exist any simple relationship between the keys of the adjacent records. The technique provides for converting the record key number to a physical location represented by a disk address through a computational procedure. This type of file organization is used for those applications where file activity is low or high amount of file interrogation is involved.

Question 3

- (a) Define an Expert System. Explain its benefits. (5 Marks)
- (b) What are the constituents of a Data Centre ? (5 Marks)
- (c) A water distribution company has two categories of consumers (Domestic and Commercial).

The charges of water per unit consumed by these consumers are Rs. 5.00 and Rs. 8.00 respectively. The computer database of the company has the following information:

- Consumer's name
- Category
- Units consumed
- Bill's date
- Date of payment.

The company processes bills according to the following criterion:

If the consumer is domestic and pays his bill within 10 days of the bill date, 7% discount is given. If he pays the bill within 15 days, no discount is given. If he makes the payment after 15 days of the bill date, 10% surcharge is levied. For commercial consumers, corresponding percentage be 15%, 0% and 15% respectively.

Draw a Flow chart to calculate the bill amount, discount, surcharge and net amount of the bill for each type of consumer and print it. (10 Marks)

Answer

- (a) **Expert System:** It is a computerized information system that allows non-experts to make decisions comparable to those of an expert. Expert systems are used for complex or ill-structured tasks that require experience and specialized knowledge in newer and specific subject areas. Expert systems can be example-based, rule-based or frame-based.

Expert systems contain the following components:

- (i) Knowledge base which includes data, knowledge, relationships, rules of thumb and decision rules etc.
- (ii) Inference engine which contains the logic and reasoning mechanism that simulate the expert logic process and deliver advice.
- (iii) User interface, a program which allows the user to design, create, update, use and communicate with the expert system.
- (iv) Explanation facility, which provides the user with an explanation of the logic.
- (v) Knowledge acquisition facility.

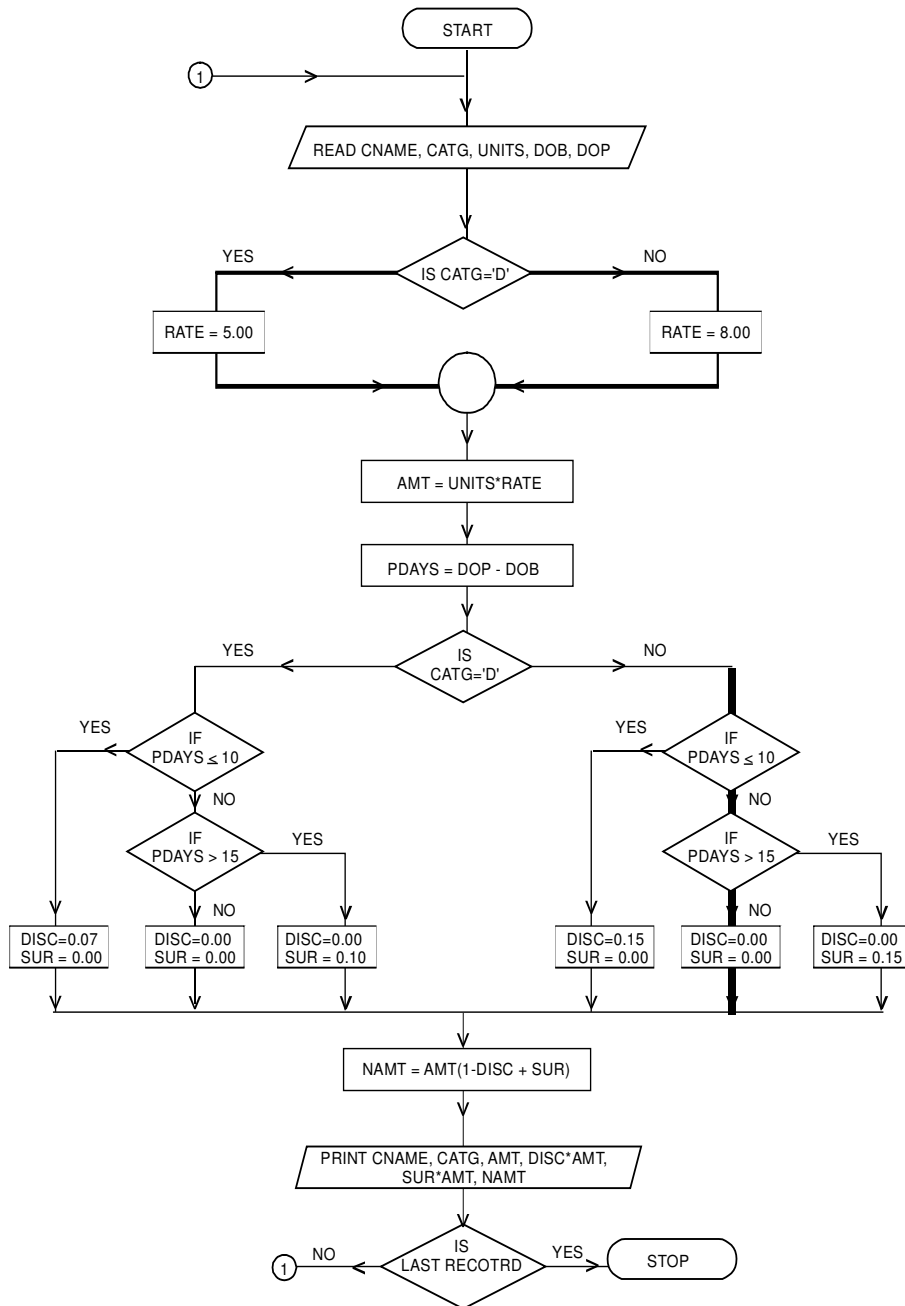
Benefits offered by expert systems are:

- They provide a cost effective alternative to human experts.
- They are faster and more consistent and do not get distracted, overworked or stressed out.
- They produce better quality and more consistent decisions. Expert systems assist users in identifying potential decision making problems, which increase the probability that sound decisions will be made.
- They can increase productivity.
- They preserve the expertise of an expert leaving the organisation.
- They can outperform a single expert because their knowledge is representative of numerous experts.

(b) Constituents of a Data Centre: To keep equipments running reliably, even under the worst circumstances, the data centre is built with following carefully engineered support infrastructure:

- (i) Network connectivity with various levels of physical connectivity using Fibre Optic and copper communication link and service provider redundancy.
- (ii) Dual DG sets and Dual UPS,
- (iii) Heating, ventilation and Air Conditioning (HVAC) systems for temperature control.
- (iv) Fire extinguishers.
- (v) Physical security systems like Security guards, Biometric devices, Smart Card, CCTV etc.
- (vi) Raised flooring to avoid flood and water logging.
- (vii) Network equipments, Network Management software,
- (viii) Network security by segregating the public and private network using Intrusion detection system (IDS) and firewalls.

(c) The required flowchart is given below.



Question 4

- (a) *Explain the various functions of communications software.* (5 Marks)
- (b) *Explain any five communication interface devices.* (5 Marks)
- (c) *Discuss the several integrity controls that DBMS has to support.* (10 Marks)

Answer

- (a) Communications software manages the flow of data across a network. It performs the following functions:

- (i) **Access control:** Linking and disconnecting the different devices, automatically dialing and answering telephones; restricting access to authorized users; and establishing parameters such as speed, mode and direction of transmission.
- (ii) **Network management:** Polling devices to see whether they are ready to send or receive data; queuing input and output; determining system priorities; routing messages, and logging network activity, use and errors etc.
- (iii) **Data and file transmission:** Controlling the transfer of data, files and messages *among* the various devices.
- (iv) **Error detection and control:** Ensuring that the data sent was indeed the data received.
- (v) **Data security:** Protecting data during transmission from unauthorized access.

- (b) Five commonly used communication interface devices are briefly discussed below:

- (i) **Network Interface Card (NIC):** It is an electronic card which is installed in server as well as in all the nodes for interconnection of nodes with server. Network Interface card provides a connector on its back for connection of nodes and server using network cable. NIC has buffer for storing incoming and outgoing packets, thus improving the network throughput. NIC uses Linear bus topology, according to which only one node can access the data from the server at a time. NIC is installed in one of the available PCI/ISA slot on the motherboard.
- (ii) **Modem (Modulator/Demodulator):** It is an electronic device which is used to convert digital signals to analog telephone signals (modulation) and analog signals to digital data (demodulation) in a data communication system. Modem allows the communication *among* computers through telephone lines. Motorola, GVC, O-Link, AOCOM are some of the manufacturers of Modems. Modems can be categorized on the basis of speed, price and other features. But, most commonly people classify them as internal or external. Internal modem looks like the sound cards and video cards that fit inside the computer. External modem connects to the serial port of the computer. Speed of modem can be 28.8Kbps (Kilo bits per second) or 56.6 Kbps.

Modem installed in Laptop computers is similar to credit card size, known as PCMCIA (Personal Computer Memory Card International Association) modem.

- (iii) **Multiplexer (MUX):** It is an electronic device which allows number of devices to share a single communication line. Multiplexer continuously scans the nodes and server to find out whether any of them wants to send data to other nodes or not. This process of continuously scanning by multiplexer is called Polling. Multiplexer may perform Time division multiplexing (TOM) or Frequency division multiplexing (FOM).
 - (iv) **Front-end communication processor:** In case of high volume data transfer, a separate computer, known as front-end communication processor is used for sending and receiving data, code conversions, editing and verification of data, terminal recognition and control of transmission lines thus relieving the main computer for data processing tasks rather than data transmission.
 - (v) **Protocol Converter:** Protocols are the standard sets of rules which govern the flow of data on a communication network. Dissimilar devices, which follow different protocols, can not communicate with each other without protocol conversion. For example, one computer representing data in ASCII code can not communicate with another computer using EBCDIC code for data representation without protocol conversion. Protocol converter is an electronic device which is used for protocol conversion. However, protocol conversion can also take place through software.
- (c) Data Integrity Controls can be built into the physical structure of the fields. In order to have the correct data base, DBMS needs to have certain controls on the data fields. Security controls that DBMS may impose on the data fields are as follows:
- (i) **Data Type:** It enforces one form of data integrity control since it defines the type of data to be entered in the field. It may be number, character, alphanumeric data etc.
 - (ii) **Length of the data field:** It defines the maximum number of characters or digits to be entered.
 - (iii) **Default value:** A default value is the value a field will assume unless a user enters an explicit value for an instance of that field. Assigning a default value to a field can reduce data entry time since entry of a value can be skipped and it can also help to reduce data entry errors for the most common value.
 - (iv) **Range control:** A range control limits the set of permissible values a field may assume. The range may be a numeric lower to upper bound or a set of specific values. Range controls must be used with caution since the limits of the range may change over time. A combination of range controls and coding led to the Year 2000 problem faced by many organizations, in which a field for year was represented by only the numbers 00 to 99. It is better to implement any range controls through a DBMS since range controls in programs may be inconsistently enforced and it is more difficult to find and change them.
 - (v) **Null value control:** A null value is an empty value. Each primary key must have an integrity control that prohibits a null value. Any other required field may also have a null value control placed on. For example, a university may prohibit adding a course to its database unless that course has a title as well as a value of the primary key,

Course_ID. Many fields legitimately may have a null value, so this control should be used only when truly required by business rules.

- (vi) **Referential integrity:** Referential integrity on a field is a form of range control in which the value of that field must exist as the value in some field in another row of the same or different table. That is, the range of legitimate values comes from the dynamic contents of a field in a database table, not from some pre-specified set of values. It may be noted that referential integrity guarantees that only some existing cross-referencing value is used, not that it is the correct one.

Question 5

- (a) Explain "Decision table". Explain in brief four parts of a decision table. (5 Marks)
- (b) Describe any five formatting features available in MS-WORD. (5 Marks)
- (c) Define the following functions with respect to MS-EXCEL:
- (i) STDEV
 - (ii) TRANC
 - (iii) SQRT
 - (iv) LN
 - (v) PV. (1×5 = 5 Marks)
- (d) Explain any five features offered by e-mail software. (5 Marks)

Answer

- (a) A decision table is a table, which may accompany a flowchart, defining the possible contingencies that may be considered within the program and the appropriate course of action for each contingency. Decision tables are necessitated by the fact that branches of the flowchart multiply at each diamond (comparison symbol) and may easily run into scores and even hundreds. If, therefore, the programmer attempts to draw a flowchart directly, he is liable to miss some of the branches.

A decision table is divided into four parts:

- (i) **Condition stub:** It contains statements i.e., the factors to be considered in making a decision.
- (ii) **Action stub:** It introduces one or more actions i.e., steps to be taken when a certain combination of conditions exists.
- (iii) **Condition entries:** It lists in its various columns the possible permutations of answers to the questions in the condition stub.
- (iv) **Action entries:** It lists in its columns corresponding to the condition entries, the actions contingent upon the set of answers to the questions in that column.

(b) Five formatting features available in MS-Word are discussed below:

1. **Modify Fonts:** Font refers to the print type, style and size of characters used in printing. The use of different fonts changes the look of the text. Word 2000 offers a number of different font types to choose from, e.g., Times New Roman, Arial, Courier etc. The default font in any word document is Times New Roman. Besides the regular style, it can be made either bold, italic or bold italic. Underlining the text can further enhance the style. Word 2000 also offers eleven different effects that can be applied to the text. Text can be shadowed, outlined, embossed, engraved etc.
2. **Paragraph alignment, Indenting & line spacing:** Alignment of lines for the written text is the most common convention followed. Each line of written matter on a page maintains a constant horizontal distance from the left edge of the page. Word makes alignment effortless even while offering four types of alignment to text. They are Left, Right, Centre and Justify.

Indenting of paragraph means we specify the distance of the text from the margin. By using indenting, the selected paragraphs stand out from the other text in the document. Various types of paragraph indent options are available in Word 2000. Line spacing determines the amount of vertical space between lines of text. By increasing the line spacing, the readability of document increases.
3. **Drop Cap:** Word 2000 allows the first character of the word at the beginning of a chapter or article to be enlarged. This feature is called drop cap. The number of lines that the capital letter can be dropped ranges between one to ten lines below.
4. **Tab:** In order to align text in a columnar manner, Word offers tab feature which is similar to the tab function key available in the manual or electronic typewriters. Word 2000 allows to change the tab setting to suit user requirements. It is further possible to specify suitable alignment for text in each tab.
5. **Numbers and Bullets:** While writing certain kind of communication e.g. business or legal communication, it is convenient to state the ideas point by point. This usually happens in letters where user is trying to put across his views and wishes to give reasons. Word offers numbers and bullets options to highlight each new point in the list. It is also possible to have multi-level bullets and numbering.

(c) **Functions in MS-Excel**

- (i) **STDEV:** This statistical function is used to calculate the standard deviation of items in the range of cells.
- (ii) **TRANC:** This mathematical function is used to truncate a number to an integer by removing the decimal or fractional part of the number.
- (iii) **SQRT:** This mathematical function is used to calculate the square root of a number.
- (iv) **LN(x):** This mathematical function is used to calculate natural logarithm of a number to the base.

- (v) **PV:** This financial function is used to calculate the present value of payments made in each period and not changed during the life of annuity at the given rate of interest and for a particular time period.
- (d) **Five features offered by e-mail software:** Electronic mail (e-mail) on the Internet provides quick and cost effective transfer of messages to other e-mail users worldwide. The e-mail software comprises of many important and useful features. Five of them are briefly discussed below:
- (i) **Composing messages:** With the help of an Internet Browser, it is possible to compose messages in an attractive way using various fonts. It is also possible to spell-check the message before finalizing it.
 - (ii) **Replying to the mails received:** It is possible to reply to any mail received by merely using the "Reply" facility available on the Internet Browser. This facility also allows one to send the same reply to all the recipients of the original message. This helps in saving lot of time in terms of remembering addresses, typing the subject matter etc.
 - (iii) **Address book:** This is an electronic form of address book wherein the following information can be saved: Name, full address, e-mail address, organization and designation of a person etc. It is also possible to store addresses on the basis of categories. Letters or circulars can be sent to individual address or all members of a particular category.
 - (iv) **Printing of messages:** It is possible to print messages received as well as messages sent. As a result, hard copy of any message can also be kept.
 - (v) **Offline Editing/Composing/Reading:** One does not have to be connected to the Internet all the time to be able to read/edit/compose messages. Ideally, one should log on to the Internet, download all the messages on to one's own hard disk and then get disconnected from the Internet. Once the user is offline, he should read all the messages that have been received. Even composing of messages can be done offline. This saves Internet time as well as helps in keeping the telephone line free.
- In addition to above mentioned features, e-mail software also allows forwarding of messages, transfer of data files and sending e-greeting cards on various occasions.

Question 6

- (a) *Explain white box approach for Auditing.* (5 Marks)
- (b) *Explain in brief the advantages of Optical Character Reader.* (5 Marks)
- (c) *Explain the various matters on which power of controller can make rules under Section 89 of Information Technology Act.* (5 Marks)
- (d) *What are the different OLE automation support provided by E.X.NGN software ?* (5 Marks)

Answer

- (a) **White box approach for auditing:** Computerisation has progressed to a point where entire processing cycle occurs within the computer systems. Thus, traditional audit trail has disappeared. No corresponding manual documents are available. It is thus necessary to examine the internal working of the computer system. The auditor can verify the programs himself and technically satisfy himself that systems, checks, controls, error detection and data security procedures are satisfactory. The auditor can use test-checks to test the system in operation and ask for special print outs by making use of programming facilities available within the installation. By acquiring the necessary skills, the auditor can use the computer itself as an audit tool to improve the quality of his own audit and reduce time spent on detailed verification of transactions. This is called White-box approach for audit.

Auditor's primary concern under this approach includes the system of controls, examination and testing of computer-implemented controls. Practically the computer itself could be used to perform such examination and testing functions. In some cases, sheer volume and complexity of transactions require use of corresponding powerful tools for the audit. This leads to the need for using Computer Assisted Audit Techniques (CAAT).

(b) **Advantages of Optical Character Reader (OCR)**

- (i). It employs a set of printing characters with standard font that can be read by both human and machine readers.
 - (ii) OCR eliminates the human effort of transcription. It has the potential of reading even handwritten documents straightway.
 - (iii) Paper work explosion can be handled because OCR is economical for a high rate of input.
 - (iv) Since documents have only to be typed or handwritten, not very skilled staff is required.
 - (v) These input preparation devices are much cheaper than the keypunch or the key-to-tape devices.
- (c) The Controller has been given powers under Section 89 to make regulations consistent with the Information Technology Act and the related rules so as to carry out the purposes of this Act. However, he may do so after consultation with the Cyber Regulations Advisory Committee and with the previous approval of the Central Government. These regulations shall be notified in the Official Gazette. These regulations shall be related to the following matters:
- (i) the particulars relating to maintenance of data base containing the disclosure record of every Certifying Authority,
 - (ii) the conditions and restrictions subject to which the Controller may recognise any foreign Certifying Authority,
 - (iii) the terms and conditions subject to which a licence may be granted,

- (iv) other standards to be observed by a Certifying Authority,
 - (v) the manner in which the Certifying Authority may make the disclosure under Section 34,
 - (vi) the particulars of statement to be submitted along with an application for the issue of a Digital Signature Certificate,
 - (vii) the manner in which the subscriber should communicate the compromise of private key to the Certifying Authority.
- (d) **Different OLE automation support provided by E.X.NGN software:** Automation allows the user to program on E.X.NGN. The automation objects can be called using VBA scripts for getting data from E.X.NGN or data into E.X.NGN. Various functions of E.X. are provided as automation objects. The properties and a methods of these objects can be set from outside E.X. Some of the important E.X automation objects are create accounts, maintain accounts and balances, maintain items and narration and enter vouchers through OLE controllers. OLE automation offers the unique opportunity of integrating another application say payroll software, personal management, portfolio management etc. along with E.X NGN so as umbrella of applications can be integrated with EX.NGN.

Question 7

Write short notes on the following:

- (i) *Parallel Processing*
- (ii) *IT Act, 2000*
- (iii) *Extranet*
- (iv) *Video Conferencing.*

(5×4 = 20 Marks)

Answer

- (a) **Parallel Processing:** It is also called Multiprocessing. It requires use of two or more CPUs, linked together to perform coordinated work simultaneously. Instructions are executed simultaneously because the available CPUs can execute different instructions of the same program or of different programs at any given time.

In case of parallel processing, there may be multiprogramming or there may not be multiprogramming. If there is no multiprogramming, then different CPU execute different programs, thereby reducing the overall execution time. Parallel processing systems provide those data processing capabilities, which are not found in those systems that have single processor. Many complex operations can be performed at the same time. CPUs can function on complementary units to provide data and control for one another. Parallel processing is used in Air Traffic control systems, and Traffic lights control system etc. Super Computers, which have multiple CPU's, perform parallel processing.

- (b) **IT Act 2000:** Computers are being used to create, transmit and store the information in electronic form instead of paper documents but the main hurdle in e-Governance is the requirement of writing and signature for legal recognition. At present, many legal provisions require the evidence in the form of paper documents having signatures.. The law of evidence is based on paper-based records; hence for success of *e-Governance e-Commerce*, legal changes were required.

Therefore, Govt. of India introduced a new law for giving legal recognition to electronic records. This gave birth to Information Technology bill, 1999 which was passed by both the houses of Parliament in May 2000 and the President gave his assent in August 2000. This Information Technology bill is called Information Technology Act, 2000 which also contains cyber laws.

Objectives of the Information Technology Act 2000 are:

- (a) To grant legal recognition to transactions carried out by means of EDI and E-Commerce in place of paper based methods of communication.
- (b) To give legal recognition to digital signatures for authentication of any information.
- (c) To facilitate electronic filing of documents with Govt. departments.
- (d) To facilitate electronic storage of data.
- (e) To facilitate and give legal recognition to electronic fund transfers between bank and financial institutions.
- (f) To give legal recognition for keeping books of accounts in electronic form by bankers.
- (g) To amend the Indian penal code, the Indian Evidence Act, the Banker's Book Evidence Act and Reserve bank of India Act.

The Act consists of 94 Sections spread over thirteen chapters and four schedules to the Act. The schedules of Act contain related amendments in other acts namely the Indian Penal Code, the India Evidence Act, 1972, the Banker's Book Evidence Act, 1891 and the Reserve Bank of India, 1934.

- (c) **Extranet:** An extranet is an extension of an Intranet that makes the latter accessible to outside companies or individuals with or without an intranet. It is also defined as a collaborative Internet connection with other companies and business partners. Parts of an intranet are made available to customers or business partners for specific applications. The extranet is thus an extended intranet, which isolates business communication from the Internet through secure solutions. Extranet provides the privacy and security of an Internet while retaining the global reach of the Internet. The key characteristic of an Extranet is that it extends the Intranet from one location to another across the Internet by securing data flows using cryptography and authorization procedures, to another Intranet of a business partner. This way, Intranets of business partners, material suppliers, financial services, distributors, customers, etc. are connected to the Extranets by an agreement between the collaborating parties. The emphasis is on allowing access to authorised groups through strictly controlled

mechanisms. This has led to the true proliferation of e-commerce.

- (d) **Video conferencing:** Video Conferencing is the use of television equipment to link geographically dispersed conference participants. The equipment provides both sound and picture. Like audio conferencing, video conferencing does not require a computer.

In video conferencing participants can see and hear each other, generally, participants gather in relatively expensive, specially equipped rooms that can handle the complexities of simultaneous video and audio transmission.

There are three possible video conferencing configurations:

One way Video and Audio: Video and Audio signals are sent from a single transmitting site to one or more receiving sites.

One way Video and two way Audio: People at the receiving sites can talk to people at the transmitting site, while every one views the same video images.

Two way Video and Audio: The Video and Audio communications between all sites are two-way. This is the most effective of the electronically aided conferencing approaches.