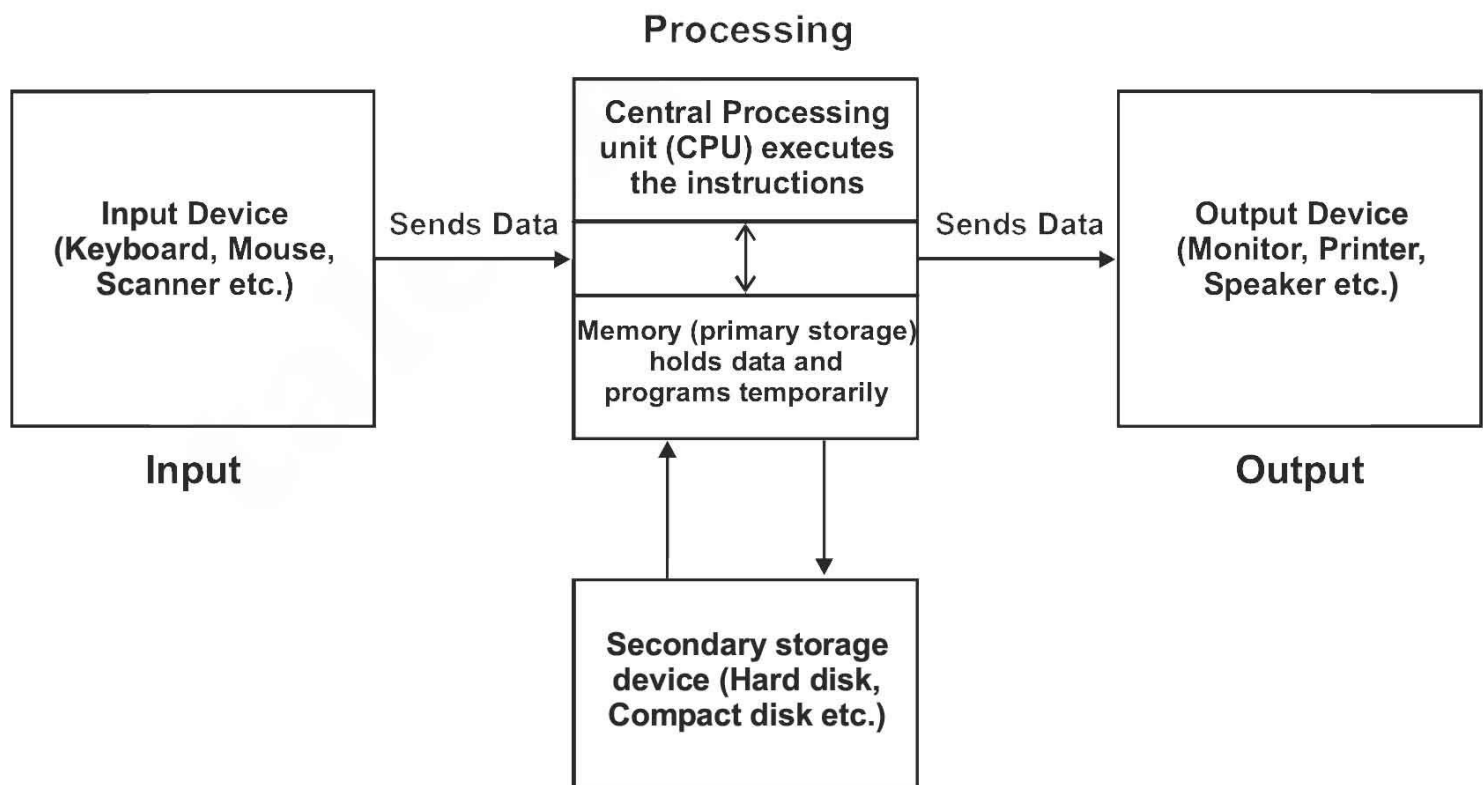# BASICS OF INFORMATION TECHNOLOGY

**Q1.    What is computer? What are its functions? Explain briefly.**

## COMPUTER:

- Computer is an electronic device or a programmable machine. It takes input. Process that given input and produces output in the form of information.  Computer can process data on the basis of instructions given to it. It can also store data on secondary storage devices for future use.

- A computer become useful only when hardware and software are combined.

**Processing**

| Input Device (Keyboard, Mouse, Scanner etc.) | →Sends Data→ | Central Processing unit (CPU) executes the instructions |  →Sends Data→ | Output Device (Monitor, Printer, Speaker etc.) |

Memory (primary storage) holds data and programs temporarily

**Input**

Secondary storage device (Hard disk, Compact disk etc.)

**Output**

**Functions of computer:**

1. **Input**
2. **Processing**
3. **Output**
4. **Storage**

**Input:**

- Everything we give to the computer is called input.
- The collection of raw facts and figures is called data. Data is entered in the computer through input devices e.g. keyboard, mouse etc.

**Data Processing:**

- The system that accepts data manipulates it in a useful and meaningful form is called data processing.
- The operations carried out on data to convert it into useful information are called data processing.
- CPU is a device which is used to process the data arithmetically or logically to convert into information.

**Output:**

- The organized and meaningful form of data after processing is called information.
- Output devices show the results or information in the form of output.
- Output devices are printers, monitors etc.

**Storage:**

- Data and information are stored on secondary storage devices for later use.
- Secondary storage devices are CD's, Hard Disk, and Floppy Disk etc.

**Q2.** **What is Information Technology? Define Digital Convergence and Modern Scenario of Information Technology.**

# INFORMATION TECHNOLOGY:

- It is a technology that combines computing with high speed communication links that carry data in the form of text, sound, images, video etc. from one place to another in this global village (all over the world).
- The interconnection of computers enables people to send and receive information.
- Internet is also used as a source of information technology.

# DIGITAL CONVERGENCE:

- In digital convergence different types of things are converted into a digital form.

- The digital convergence is the technological merger of the various industries through some electronic devices that exchange information between them.

# MODERN SCENARIO OF INFORMATION TECHNOLOGY:

- Modern scenario means the modern situation of the information technology.

- The base of information technology is computing and high speed communication through satellite, fiber optic, mobile phones, fax-machine, ecommerce, M-Commerce etc.

- IT brought a revolution in our life and it is called computer revolution, Information Revolution, Multi-media revolution, communication revolution or Internet revolution.

- The major application of computers are:

  - **AI (Artificial Intelligence):** It is used to develop machines with human-like qualities such as learning, seeing and hearing etc.

  - **Web Based Applications:** It is a type of software application that is available on the Web. The user can use it by connecting to the Internet.

  - **E-Commerce:** It is a process of performing business over the Internet.

  - **M-Commerce:** It is a process of buying goods and services using mobile phone.

  - **Computer Animation:** It is a process to create moving images using computer.

  - **Multi-media and Hypermedia:** Multimedia is a collection of graphics, animation, audio and video presented by computer. Hypermedia is a process of creating links to files that contain photographs, audio, video and text etc.

  - **Distributed Applications:** It is a process of running single task on multiple computers.

**Q3.** **What are Programs/Software and Hardware? Describe different types of Software and Hardware.**

# PROGRAM / SOFTWARE:
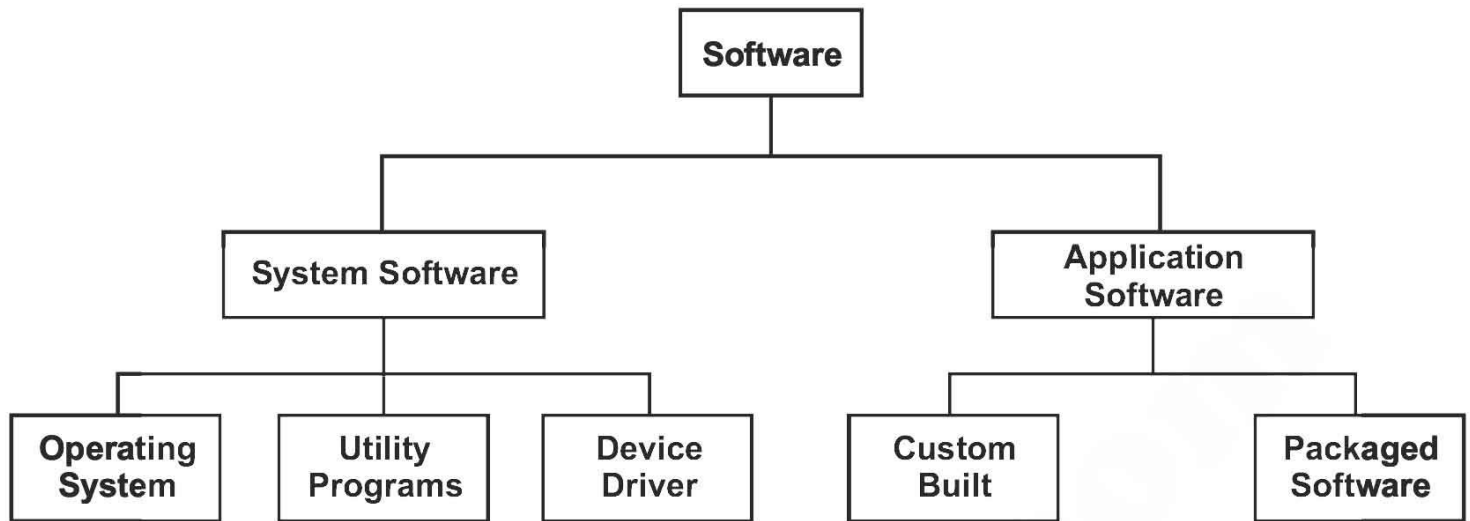


- A set of instructions given to the computer to solve any problem is called a program or software.
- These instructions tell the computer what to do. Software cannot be executed without hardware.

There are two types of software.

1. System software.
2. Application Software.

## System Software:

- It is used to control the usage and allocation of different hardware components.
- It also enables the other application programs to execute.
- This software is developed to control the hardware components.
- Operating system (DOS, Windows etc.), utility programs (data backup programs etc.) and device driver software are the kinds of system software.

## Operating System:

- An operating system is a set of programs that manages all computer components and operations. A computer cannot do anything without operating system. Operating system must be installed on every computer. Users interact with the computer through operating system. Linux and Windows are examples of operating system software.

## Utility Programs:

- A utility program is a type of system software that is used for effective management of computer system. The user can use utility program to perform maintenance tasks related to different devices and programs. The utility program keep the computer system running smoothly. Most operating systems include

different built-in utility programs. The user can also buy stand alone utility programs.

**Device Drivers:**

- A device driver is a program that is used to operate and control a device attached to computer. Device drivers are provided by manufactures of devices. The devices cannot function properly without device drivers.

**Application Software:**

- Application software are developed to perform some specific task. These are specially designed to solve the problems of users.

- This software is also used to provide audio, video or multimedia entertainment to the users.

- Microsoft Word, Microsoft Excel and Adobe Photoshop are the examples of application software.

Custom-built software and packaged software are two types of application programs.

**Custom-built software:**

- These software are designed according to the requirement of a particular customer.

- The professional team of programmers depending on the requirements develops these programs.

- Cost of customized software is more than the packaged software.

- Patient information system, inventory system, college admission system and examination system are the examples

**Packaged software:**

- These are also known as off-the-shelf (ready made) programs. These are designed for sale to the general public.

- Software developers also acquire packaged software for their ease.

- These facilitate the users in all fields of life.

- Microsoft Office Package (MS-Word, MS-Excel, etc), ORACLE, Graphics software, Communication programs are the examples

**Hardware:**

- Physical parts of the computer are called hardware.

- **Input devices:** Keyboard, Pointing devices (Mouse, joystick, track-ball etc.) Source Data entry (Scanning) devices (camera, scanner, bar code reader etc.)

- **Output devices:** Monitor, Speakers, Printers, Projectors

- **Main Memory:** RAM, ROM
- **Secondary Storage devices:** Hard disk, Floppy disk, CD, Tape, DVD, USB
- **Inter Connectors:** Cables, Ports, Buses
- **Networking devices:** Modem, network cards, Bridge, Router, Gateway
- **I/O devices:** Terminals, Touch screen

**The difference between software and hardware:**

| Software | Hardware |
|---|---|
| (1) Software is a set of instructions that tell a computer exactly what to do. | (1) Hardware is physical parts of computer that cause processing of data. |
| (2) Software cannot be executed without hardware. | (2) Hardware cannot perform any task without software. |
| (3) Software cannot be touched. | (3) Hardware can be seen and touched. |
| (4) Software is debugged in case of problem. | (4) Hardware is repaired in case of problem. |
| (5) Software is reinstalled if the problem is not solved. | (5) Hardware is replaced if the problem is not solved. |

**Q4.    What are Input Devices? Describe different types of Input Devices.**

# INPUT DEVICES:

- Input is anything given the computer e.g. data, instruction. The devices, which are used to enter data into the computer, are called input devices.
- These are the devices through which user can communicate with the computer.
- Keyboard, Pointing devices and Source data entry devices are the types of input devices

**Key Board:**

- It looks like a typewriter with some special keys.
- Data is entered through keyboard by typing keys.
- The layout of the standard keyboard is QWERTY which describes the beginning keys in the top row of keyboard.
- There are about 101 to 124 keys available on the keyboard.
- There are different types of key available on the keyboard.
- Alphabetic
- Numeric
- Functions
- Special characters

- Special function keys
- Editing keys
- Cursor movement keys

**Pointing devices/Point and Draw devices:**

- Pointing devices control the position of the cursor or pointer on the screen.
- Mouse, Trackball, Pointing stick, Joystick, Touchpad, Touch screen, Light pen, Digitizing/graphic tablet and Pen-based systems are the examples.

**Source data entry devices:**

- These devices are used for direct data entry to the computer systems. Examples are:
- Bar-code reader
- Mark-and character recognition devices.
  - o MICR (magnetic ink character recognition)
  - o OMR (Optical mark recognition)
  - o OCR (Optical character recognition)
- Magnetic strip cards
- Smart cards
- Fax machine
- Imaging system
- Audio input device
- Video input device
- Digital camera

**Q5.    What is a Keyboard? Describe different Keys available on the keyboard.**

# KEYBOARD:

- The keyboard is usually a rectangular frame having keys on it. It is used to input character data.
- In a computer, a keyboard is a device that enters letters, numbers and other characters and processor converts electrical signals into machine-readable form.
- Keyboards are of different layouts and sizes. The most common layout is QWERTY (named for the first six keys from left side of top row). The standard keyboard has 101 keys.
- Notebooks have embedded keys accessible by special keys or by pressing key combinations. Each key on a standard keyboard has one or more functions.
- Press the key to get the lower character and hold Shift to get the upper.
- There are different types of keys available on the keyboard.

- Alphabets           (Upper and lower case letters A, B,C ------, a, b, c ------)
- Numeric           ( 0 to 9)
- Function Keys           (F1 to F12)
- Special characters           (!, \$, #, ^ etc.)
- Editing keys           (Ctrl, Alt, Del, Enter, Back Space, etc.)
- Cursor movement keys      (Arrows, pg-up, pg-down, home, end)
- Command Keys:           (Ctrl, Alt, Del, Shift)

- **Command Keys -** Have a special use. The three most common are the CTRL, Alt and the Shift keys. Command keys normally do nothing on their own but work in combination with other keys. Software uses the command keys to perform different standardize functions.

- The **Control key** or Ctrl is often used to access commands.

- The **Alternative key** or Alt is often used to access menus.

- The **Shift** key is used to type CAPITAL LETTERS.

- As well the command keys are all used to move through documents and edit text faster and easier. As well many computers have Special keys design specifically for the particular computer.
- **ENTER or RETURN** - Moves the cursor on the start of next line. Enter also process commands such as choosing an option in a dialog (message) boxes and submitting a form.
- **DEL or DELETE** - Deletes one character from right side of the cursor. It will also delete the selected text on the right side.
- **BKSP or BACKSPACE** - Deletes the character to the left of cursor and all highlighted text.
- **SPACE BAR** - Moves the cursor one space at a time to the right.
- **SHIFT KEY -** is pressed in combination with other keys. Use the shift keys to type capital letters and to type the upper character on keys with two characters on them.
- **CAPS LOCK** - Locks the keyboard so it types capital letters (a light goes on when caps lock is on).
- **TAB** - Moves the cursor five spaces to the right (number of spaces are usually adjustable). Tab moves to the next field in a form or table (Shift-Tab for previous field).
- **ESC or ESCAPE** - Cancels a menu or dialog box or it allows to "escape" to the previous screen of the program.
- **ARROW KEYS** - Moves the cursor around document without changing text
- **END** Key moves the cursor to the end of current line.

- **HOME Key** – It moves the cursor to the beginning of the current line in a document.
- **PgDn Key** – It advances one full screen while the cursor stays at the same position.
- **PgUp Key** – It backs up to the previous screen while the cursor stays at the same position.
- **Insert Key** – It will overwrite the existing text.
- **Print Screen Key** – causes the screen display to be taken a copy of information.
- **Scroll Lock Key** – It stops cursor movement. It allows scrolling without changing the position of the cursor. Microsoft Excel also supports scroll lock. If scroll lock is enabled on the keyboard when you press any of the arrow keys the screen will move in that direction but the selected cell will not change.
- **Pause Key** – Causes the screen to pause when information is appearing on the screen too fast to read.
- **Function Keys (F1 to F12)** – It is an easy way to give commands to the computer. They have different functions in different programs.

**Numeric Keys:**

This part of keyboard consists of numeric keys and arithmetic operator keys. These keys are usually located on the right of the keyboard. These keys are similar to calculator keys. This part of keyboard also has an extra Enter key and Num Lock key. The Num Lock key is used to activate or de-activate the numeric keypad.

The numeric keys can be used for two purposes:

(1)    When the computer is in Num Lock mode, these keys are used to enter numeric data and mathematical operators (such as /, *, −, +).

(2)    When the computer is not is the Num Lock mode, then the numeric keys area can be used to move the cursor on the screen (or into document) and to perform other functions such as.

| | |
|---|---|
| **1**<br>**End** | In most application programs, this key is used to move the cursor to the end of current line of document or to the bottom-left corner of the screen. |
| **2**<br>↓ | This key is used to move the cursor downward (one line at a time). |
| **3**<br>**PgDn** | This key is used to move one full screen downward while cursor stays at same place. |
| **4**<br>← | This key is used to move the cursor to the left (one character at a time). |
| **6** | This key is used to move the cursor to the right (one character at a |

| | |
|---|---|
| → | time). |
| **7**<br>**Home** | In most programs, this key is used to move the cursor or the beginning of the current line of document or to move the cursor to the to-left corner of the screen. |
| **8**<br>↑ | This key is used to move the cursor upward (one line at a time). |
| **9**<br>**PgUp** | This key works opposite to $\boxed{\overset{3}{PgDn}}$ key. It is used to move one full screen upward. |
| **0**<br>**Ins** | This key is used to change insert mode to overwrite mode and vice versa. it is a toggle key. |
| **.**<br>**Del** | This key is used to delete a character or space to the right of the cursor position. If texts are selected, these are deleted when Del key is pressed. |

**Q6.     What are Pointing Devices? Describe different types of Pointing Devices.**

# POINTING DEVICES:

Pointing devices control the position of the cursor or pointer on the screen. Examples are:

- Mouse
- Trackball
- Pointing stick
- Joystick
- Touchpad

- Touch screen
- Light pen
- Digitizing/graphic tablet
- Pen-based systems

**Mouse:**

- Mouse is a small handy device. It has a ball at its bottom. Some mouse don't have ball but they use laser for motion detection.
- There are two buttons and a wheel at its top.
- When we move a mouse, cursor on the screen also moves accordingly.
- Left button is used to select an object. It can also be used to open an application by double clicking.
- Right button is used to display context menu.
- Scroll wheel is used to scroll through the documents.



**Trackball:**

- It is a variation of mouse.
- In trackball, ball is located at the top of the device.
- When we rotate this ball, cursor on the screen also moves.
- Ball on the top of a stationary device can be rotated with the fingertip or palm of a hand.
- Instead of moving the whole mouse around, the user rolls the trackball only.

**Advantage:**

- Does not need as much desk space as a mouse.
- It is less tiring because less motion is needed.

## Pointing stick:

- It is a pointing device looks like a pencil eraser.
- It is located between G, H and B keys of the keyboard.
- We move the pointing stick with our forefinger while using the thumb to press buttons located in front of the spacebar of the keyboard.



## Joystick:

- Cursor motion is controlled by vertical stick (joystick) or arrow buttons (game pad)
- A joystick gives a more natural-feeling.
- It is used to move objects in games.
- It has more buttons for special functions than a mouse and can combine buttons for even more actions.
- It can also be used in CAD (Computer aided design) applications.

## Touchpad:

- It is a small flat surface over which we slide our finger to move the cursor on the screen.
- It is common on the portable computers.
- Click operation is performed by tapping the finger on pad's surface or by pressing button that is close to the pad.



## Touch screen:

- It is a special video display screen in which data is entered by touching the screen using fingertip i.e. make selection by just touching the screen.
- It is covered with plastic layer and has infrared beam of light behind it.
- It uses sensors to detect the touch of finger on provided buttons and menus and display information on the screen accordingly.

## Advantage:

- It's natural to touch something.

**Disadvantage:**

- It's tiring if many choices are to be made.

- It takes a lot of screen space for each choice since fingers are bigger than cursors.

**Light pen:**

- It is a light sensitive stylus (pen like device) and a wire to the computer terminal connects it.

- The user brings the pen on the desired location of the screen and presses the pen button to identify the screen location to the computer.

- Engineers, graphic designers and illustrators use light pens.
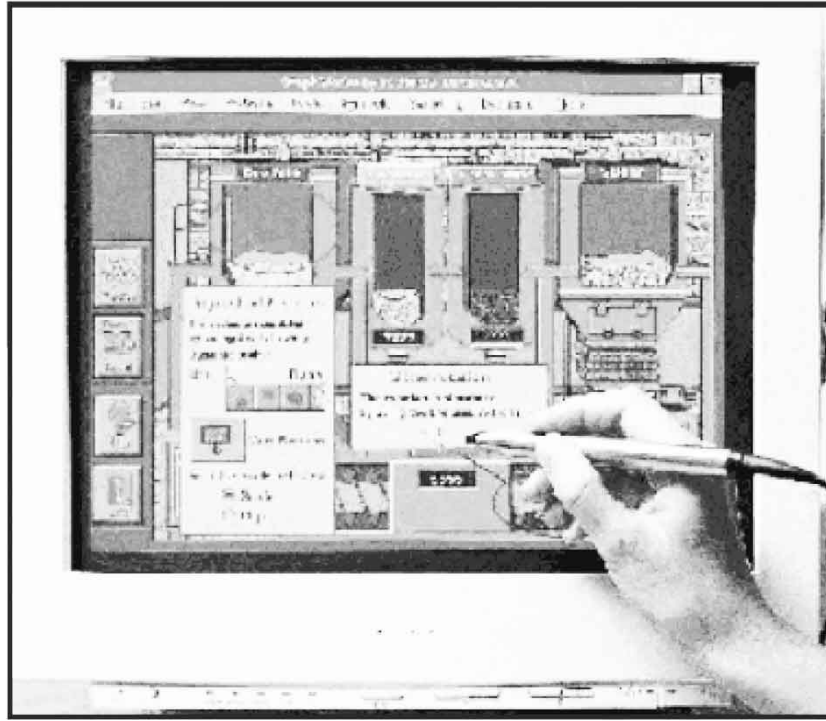


## Digitizing/Graphic Tablet:

- A digitizing tablet consists of a tablet connected by a wire to a stylus or a puck.
- A stylus is a pen like device with which user sketches an image.
- A puck is a copying device with which the user copies an image.
- It converts drawings, photos, etc. to digital form.
- The tablets have special commands.

## Advantage:

- Don't have to redraw graphics already created
- It is used in design and engineering.

## Disadvantage:

- Expensive
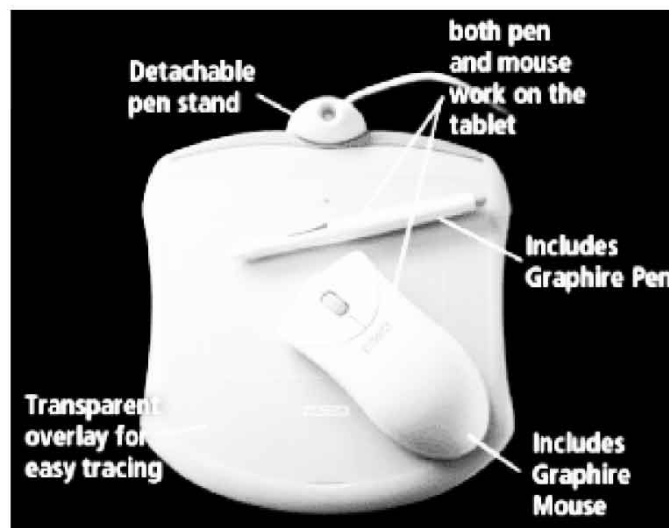
## Pen-based systems:

- It is used especially in Personal Digital Assistants (PDA).
- Pen Input is used for:

  **Data Input:** By writing, PDA recognizes your handwriting.

  **Pointing Device:** Functions like a mouse in moving a cursor around the screen and clicking by tapping the screen.

  **Command Gestures:** You can issue commands by moving pen in patterns. So a certain kind of swirl would mean to save the file and a different kind of swirl could mean to open a new file.

## Advantage:

- Can use handwriting instead of typing
- Can use gestures instead of typing commands
- Small in size

**Q7.    What are Source Data Entry Devices? Describe its different types.**

# SOURCE DATA ENTRY DEVICES:

- It is used for direct data entry to the computer system e.g. Bar-code reader, MICR, OMR, OCR, Magnetic strip cards, Smart cards, Fax machine, Imaging system, Audio input device, Video input device, Digital camera

## Bar Code Reader

- Bar-codes are vertical zebra stripped lines.
- It is usually located on the price tag of a product.
- It is also called UPC (Universal Product Code) and bar-code reader read the bar codes on products.
- Bar-code reader converts these codes in to digital form which is fed into the computer for further processing.
- Retail shops now use printed bar codes on products to keep the record of their sale.

# MARK AND CHARACTER RECOGNITION DEVICES:

## (i) Magnetic Ink Character Recognition (MICR):

- It is a method of reading characters written with magnetized ink.

- MICR equipment is used to convert them into digital form. It is then given to the computer for processing.

- Bank account # is printed with special ink of magnetic qualities which can be read by this machine.



## (ii) OMR (Optical Mark Recognition):

- OMR uses light beam to scan input data to convert it into digital form which are then sent to the computer for processing e.g. test scoring



## (iii) Optical Character Recognition (OCR):

- It reads printed characters in particular font and converts them into digital code. Most OCR devices use a small optical scanner to read characters.

- The OCR software takes a scanned image of characters and then converts that image into computer characters.

- The document can be edited with a word processor. This is a very tricky process. Documents must be carefully checked for wrong conversions.
- The common example is utility bills and price tags in departmental stores.



### (iv) Magnetic strip cards:

- Magnetic strip card has a strip of magnetically encoded data on its back.
- The back of a credit card has a metallic strip that contains magnetically encoded numbers.
- A credit card reader can read the numbers and transmit them to a computer to verify that the card is good.
- These are used for personal identification during driving, in the stores, at public places etc.

### (v) Smart Cards:

- It is a chip containing microprocessor and memory. It is used to keep the record of changes, like deducting purchases from the amount entered originally on the card.
- It has a new sensor technology that can read your finger print on the card. The digital image of the fingerprint is then transmitted to a database. In database it is compared with the record.
- Mobile SIM and ATM cards are the examples of smart cards.

### (vi) Fax Machine:

- It is also known as "Facsimile Transmission Machine".
- It scans an image and sends it as signals over telephone lines to a receiving fax machine which recreates the image on paper.
- Fax modems are also used to send and receive fax.
- Machines designed only for sending and receiving fax are called dedicated fax machines.
- Fax modems are circuit boards inside the computers and it has the ability to send signals directly to other fax machines or computers.

# Imaging System/Image Scanners:

- Scanners allow you to transfer pictures and photographs to your computer.
- The scanner works like a copy machine. It creates a digital image of what it scanned. Scanned text cannot be edited at this point.
- The image scanner scans color or black and white image with light. It then breaks the image into light and dark dots or color dots. Finally, it converts them to digital form. It is also called raster graphics. **Raster graphics** is a technique in which an image is represented as a matrix of dots.
- Flat bed scanners open wide enough to allow you to lay a document or book flat on the glass surface. A document scanner can only scan individual sheets of paper, not books or objects.



# Sound Input/Audio input device:

- Recording sounds for your computer requires special equipment (Conversion of analog into digital signals).
- Sound cards allow computers to produce sound like music and voice. It is a circuit board that converts analog signals into digital form.
- The older sound cards were 8 bit, then 16 bit cards were being used. Now 32 bit cards are very common.
- Microphones can capture sounds from the air.
- To get best results musical instrument must be directly connected to the computer.

## Video Input Device:

- Video-capture card is used to convert films and videos into digital form.
- Video cards allow computers to display video, animation and television signals.
- It is also used to capture frames from video.
- Frame-Grabber Video Card and Full-Motion Video Card are the two types of video capture card

### Frame-Grabber Video Card:

- It can capture and digitize a single frame at a time.

### Full-Motion Video Card:

- It is also known as adapter. It converts analog data into digital signals at the rate of up to 30 frames per second giving the effect of continuously flowing motion picture.

## DIGITAL CAMERA:

- Digital cameras allow you to take digital photographs. The images are stored on a memory chip or disk that can be transferred to your computer. Some cameras can also capture sound and video.

**VCR/Video Camera:**

- A **video camera or recorder** (VCR) can record data that can be uploaded to the computer with the right hardware. Though it is not digital data, you can still get good results with the right software. Both of these take huge amounts of storage. Photos make for very large files.

**Web cam:**

- A **web cam** is a tiny video camera designed especially to sit on your computer.
- It feeds pictures directly to the computer - no tape or film to develop.
- Web cam is used for video conferencing over the Internet.
- They show the world what's going on outside their window (weather, traffic etc.).

**Q8.     What are Output Devices? Briefly describe different types of output devices.**

# OUTPUT DEVICES:

- Output devices are the devices through which computer can communicate with the user.
- We can view the processed information in the form of output on output devices.
- There are two types of output:

**Soft copy:**

- It refers to data as shown on screen or in audio or voice form.
- It is not tangible.
- It cannot be touched.
- Virtual reality and robots can be considered softcopy devices.

**Hard copy:**

- It refers to the printed output on paper.

Output Devices are:

# DISPLAY SCREENS:

- The device, which displays computer output to us.

**Size:**

- Desktop screens are usually 14 – 21 inch. by diagonal measurement. (This is how TV screens are measured.).
- Larger sizes are available, at a significantly higher cost.

**Resolution**

- The number of dots or pixels per inch determines resolution.
- It determines how clear and detailed the image is.
- Pictures on a screen are made up of tiny dots and 1 dot on screen is 1 **pixel** (form "picture element").
- The more pixels per inch, the clearer and more detailed the picture.

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# PRINTERS:

- The printer takes the information on your screen and transfers it to paper or a hard copy.
- There are many different types of printers with various levels of quality.
- Resolution of printer is measured in dpi (dots per inch).
- Quality of a printer depends on its resolution and speed.
- The speed of a printer is measured in:

  **cps** = characters per second

  **lpm** = lines per minute

  **ppm** = pages per minute

- The cost depends on the speed of the printing.
- There are two types of printers.
- Impact printers form characters and images by striking mechanism such as print hammer, or wheel against the ink ribbon. Dot matrix, daisy wheel and line printers are the examples of impact printers.
- Non Impact printers do not involve actually striking the paper. Instead, it uses ink spray or toner powder. Laser, Inkjet and Thermal are the examples of Non-Impact Printers.

# PLOTTER:

- A plotter is a special output device used to produce high-quality graphics in many colors.
- It is used for specialized application such as for printing, architectural drawing, maps, graphs and charts.
- Flatbed Plotters and Drum Plotters are two kinds of plotters.

**Flatbed Plotter:**

- Flatbed plotter plots on a paper that lies on a flat bed like surface.
- The bed size varies according to the requirement.
- One to four pens move across the paper and images are printed accordingly.

**Drum Plotter:**

- It is similar to flatbed plotter.
- Paper is mounted over a drum for continuous output.
- Its usage is to track earthquake reading.

# SOUND OUTPUT - Speakers:

- It is used to get audio output from the computer.
- Sound is in the form of analog signals but the data in computer is in digital form; sound card converts digital signals into analog signals.
- A variety of speakers are available in the market for audio output.

**Q9.** **What are Display Screens and explain different types of display screen.**

# DISPLAY SCREENS:

- The device which displays soft copy computer output to us.

**Screen Features**

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**Video Display Adapter:**

- A display screen must have a video display adapter card attached with the computer.
- It is known as video graphics card and it is a circuit board that determines the resolution colors, and speed with which images appear on the screen.
- There are three types of the graphics card. VGA, SVGA and XGA

**VGA:**

- It stands for video graphics array.
- It supports 16-256 colors depending on the resolution.
- At 320 x 200 pixels, it supports 16 colors.
- At 640 x 480 pixels, it supports 256 colors.
- It is called 4 bit color.

| | | |
|---|---|---|
| **CGA** | Color Graphics Adapter | 320 x 200 |
| **VGA** | Video Graphics Adapter | 640 x 480 |

**SVGA -Super video graphics array**:

- It determines what resolutions are available and how many colors can be displayed.
- It supports 256 colors at higher resolution.
- It has two graphics modes: 800 x 600 and 1024 x 768.
- It is called 8 bit color.

**XGA -Extended graphics array**:

- It supports 16.7 million colors.
- It has resolution of 1024 x 768.
- XGA will support 256, 65536 or 16777216 colors depending on video adapter memory chip.
- It is called 24 bit color or true color.

# TYPE OF SCREENS:

**CRT screen (Cathode Ray Tube):**

- A standard monitor screen is a **CRT** (**cathode ray tube**).

- The screen is a vacuum tube. Its inner side is coated with phosphorous (phosphorous dots).

- When a beam of electrons hits a dot, the dot will glow.

- On a color monitor these phosphor dots are in groups of three: **R**ed, **G**reen, and **B**lue.

- This **RGB** system can create all the other colors by combining these three basic colours. There are 3 signals that control the 3 electron beams in the monitor, one for each RGB color. Each beam only touches the dots that the signal tells it to light. All the glowing dots together make the picture.
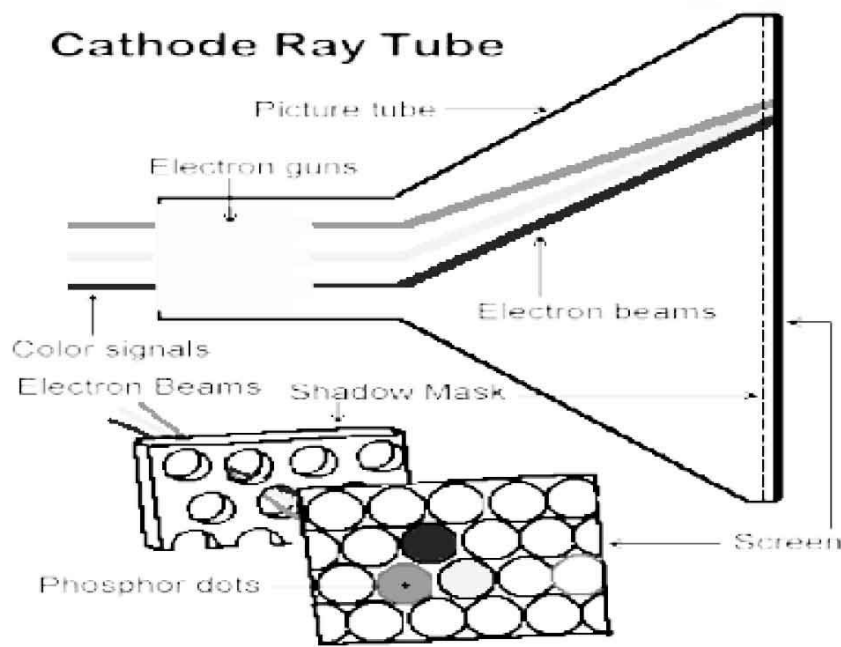


**Flat Panel Display:**

- The flat panel displays are much thinner, weightless and consume less power than CRT.

- It is used in laptops.

- Flat panel displays are made up of two glass plates with a substance in between them, which is activate in different ways.

- There are three types of flat panel display screens: LCD, Gas Plasma and EL.

**LCD (Liquid Crystal Display):**

- This screen uses a different technique.

- Impact Printers
- Non-Impact Printers

# IMPACT PRINTERS:

- These printers form characters and images by striking mechanism such as print hammer, or wheel against the ink ribbon.

- Dot matrix, daisy wheel and line printers are the examples of impact printers.

## Dot Matrix Printer:

- Dot matrix printers work like a typewriter transferring ink from a ribbon to paper with a series or 'matrix' of tiny pins.

- Dot matrix printer forms characters using row(s) of pins, 9, 18, or 24 which impact the ribbon on top of the paper.

- Dot matrix printers are also called pin printers.

- More pins will print more clear characters.

**Most dot matrix printers have the characteristics below:**

- o **Bi-directional** - prints left to right and also right to left

- o **Tractor feed** - uses sprockets to pull continuous-feed paper

- o **Friction feed** -uses pressure to pull single sheets

**Advantages:** Inexpensive, Can do multi-copy printing

**Disadvantages:** Can be slow, Loud, Graphics of low quality.



9 pins    18 pins    24 pins
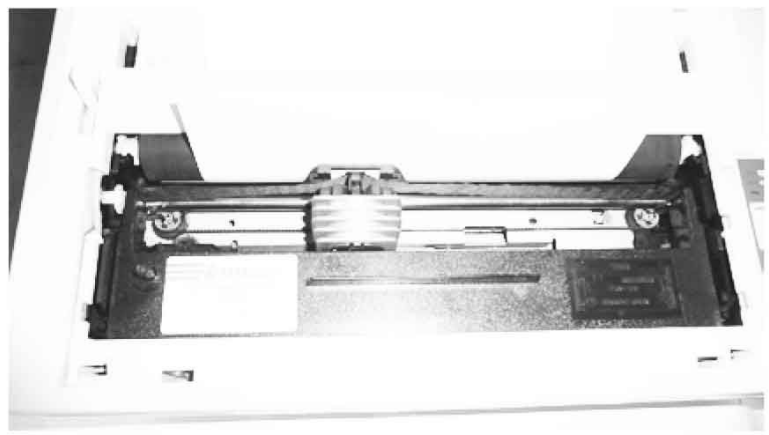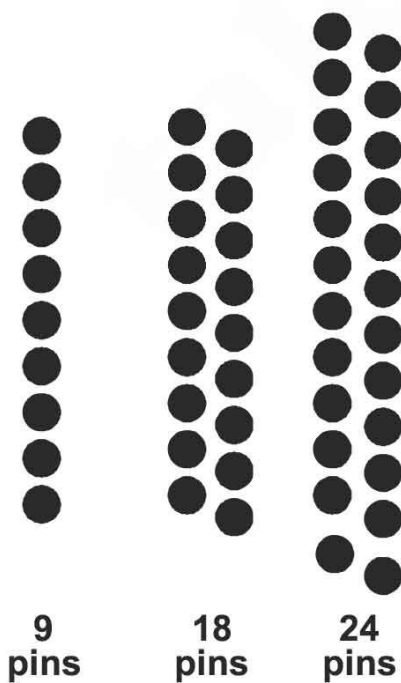
**Daisy Wheel Printer:**
- This printer uses a series of petals arranged on a wheel having a character at the end of each petal.
- A petal comes into a print position by the rotation of wheel. Image is formed when hammer strike on the desired character.
- It is slower than dot-matrix printer but better in quality.

**Line Printer:**
- It is normally used with mainframe or mini computers.
- It prints one line at a time.
- It prints 3000 lines per minute.

There are two types of line printers.

**Chain and Band Printers:**
- It uses characters on a band or chain that is moved into place before striking the characters onto the paper.
- Advantages: Very fast up to 3000 lpm (lines per minute)
- Disadvantages: Very expensive, loud

**NON-IMPACT PRINTERS:**
- This type of printer does not involve actually striking the paper. Instead, it uses ink spray or toner powder.

- Laser, Inkjet and Thermal are the examples of Non-Impact Printers

**Advantages:**
- Quiet and can handle graphics and often a wider variety of fonts than impact printers.

**Disadvantages:**
- These are more expensive than impact printers.

**Laser printers:**
- It uses the same technology as a photocopier using heat to transfer toner onto paper.
- The images are created on drum and magnetically charged toner transfers the drum image on paper.
- Laser printers are page printers.
- The Laser printer uses 300 dpi to 1200 dpi.

**Advantages:**
- Quiet and faster than other non-impact printers; its printing speed is ranging from 4-32 ppm (pages per minute) and up to 200 ppm for mainframes; High quality print and graphics; some can do color.

**Disadvantages:**
- More expensive than impact printers
- Cannot use multiple-copy paper



**Ink-Jet Printer:**
- Ink jet printers work like dot matrix printers but fire a stream of ink from a cartridge directly onto the paper to form characters.
- Its resolution is 300 dpi to 720 dpi.
- It normally prints 1 to 6 pages per minute.
- Bubble jet printer uses print head, heat element and 128 tiny nozzles for printing.

**Advantages:**
- Quiet, High quality text and graphics, some can do color, Cheaper than laser printer.

**Disadvantages:**
- Cannot use multiple-copy paper; Ink can smear

## Thermal Printer:

- It uses heat on chemically treated waxy paper to form characters. Fax machines that use rolls of paper are also of this type.

- The image is created on paper by burning dots on it.

## Advantages:

- o Quiet and High quality print.

## Disadvantages:

- o Relatively slow, Expensive, Requiring special paper, Output is affected by sunlight and cannot use multiple-copy paper

## Q11. What are Plotters and speakers?

# PLOTTER:

- A plotter is a special hard copy output device used to produce high-quality graphics in many colors.

- It is used for specialized application such as for printing architectural drawings, maps, graphs and charts.

- Flatbed Plotters and Drum Plotters are the kinds of plotters.

## Flatbed Plotter:

- Flatbed plotter plots on a paper that lies on a flat bed like surface.

- The bed size varies according to the requirement.

- One to four pens move across the paper and images are printed accordingly.

**Drum Plotter:**

- It is similar to flatbed plotter.

- Paper is mounted over a drum for continuous output.

- Its usage is to track earthquake reading.



# SOUND OUTPUT:

**Speakers:**

- It is used to get audio output from the computer.

- Sound is in the form of analog signals but the data in computer is in digital form; sound card converts digital signals into analog signals.

- A variety of speakers are available in the market.

**Q12.     What are units of data storage? Explain Bit, Byte and word.**

## BASIC UNITS OF DATA STORAGE:

- The memory is composed of an electronic circuitry which is a combination of "ON" or "OFF" switches. In computer terminology, this two state condition is represented in binary notation by the use of 1s and 0s

**Units of Data Storage:**

Bit, Byte, Word

## Bit:

- It stands for Binary Digit. The binary numbers 0 or 1 are called bits.
- It is the basic and smallest unit of data storage in computer memory.
- The circuit being on or off at a time.
- A bit on the memory is always storing some kind of data.
- The complexity of computer circuitry is described in terms of the number of bits that can be transmitted simultaneously
- This is determined by the number of wires that run parallel to one another on the circuit-boards.
- Current PCs use 8, 16, 32 and 64 bit paths.

## BYTE:

- It is a combination of 8-bits. It can store a single character of data.
- The storage capacity or memory capacity is expressed in terms of number of bytes it can hold or store.

| Unit | Abbreviation | No. of Bytes |
|------|-------------|--------------|
| Kilo Bytes | K or KB | $2^{10}$ |
| Mega Bytes | M or MB | $2^{20}$ |
| Giga Bytes | G or GB | $2^{30}$ |
| Terabytes | T or TB | $2^{40}$ |

| | | |
|------|---|-----|
| 1024B | = | 1KB |
| 1024 KB | = | 1MB |
| 1024MB | = | 1GB |
| 1024GB | = | 1TB |

## WORD:

- It is the number of bytes in common unit of data as defined by the computer system.
- The word is the size of register of a microprocessor. The length of word varies from computer to computer.
- The power of computer depends on the size of word.

| No of Bytes | No of Bits | ERA of computer |
|-------------|-----------|-----------------|
| 1 Byte | 8 | Early PC |
| 2 Bytes | 16 | Micro Computers |
| 4 Bytes Single Word | 32 | Mainframe, Mini, Micro Computers |

**Convert 240 MB Memory in bytes and kilo-bytes**

No. of Bytes in 1 MB $= 2^{20}$

No. of Bytes in 240 MB $= 240 \times 2^{20} = 251658240B$

No. of kilo-Bytes in 1MB $= 2^{10}$

No. of kilo-Bytes in 240MB $= 240 \times 2^{10} = 24560$ KB

**Convert 60GB memory in words**

No. of Bytes in 1 GB $= 2^{30}$

No. of Bytes in 60 GB $= 60 \times 2^{30}$

No. of Words in 4 B $= 1W$

No. of Words in 60GB $= 60/4 \times 2^{30}$

$= 15 \times 2^{30} = 161016127360W$

## Q13. What are System and its components?

## SYSTEM:

- A system is a combination of some related components that interact with each other to perform some specific tasks.
- System is created to solve problems.
- A problem must exist before the development of a system.
- First, the problem is defined then a system is developed to solve it.

There are five system components.

**Hardware -** The physical parts required to develop a system.

**Software -** The instructions run the system smoothly.

**People/User -** User uses the system and gets benefits from the system

**Data/Information -** Data is input provided to the system and information is output obtained from the system.

**Communication Setup -** The transmission of information from one location to another at right time and at right place is called communication setup.
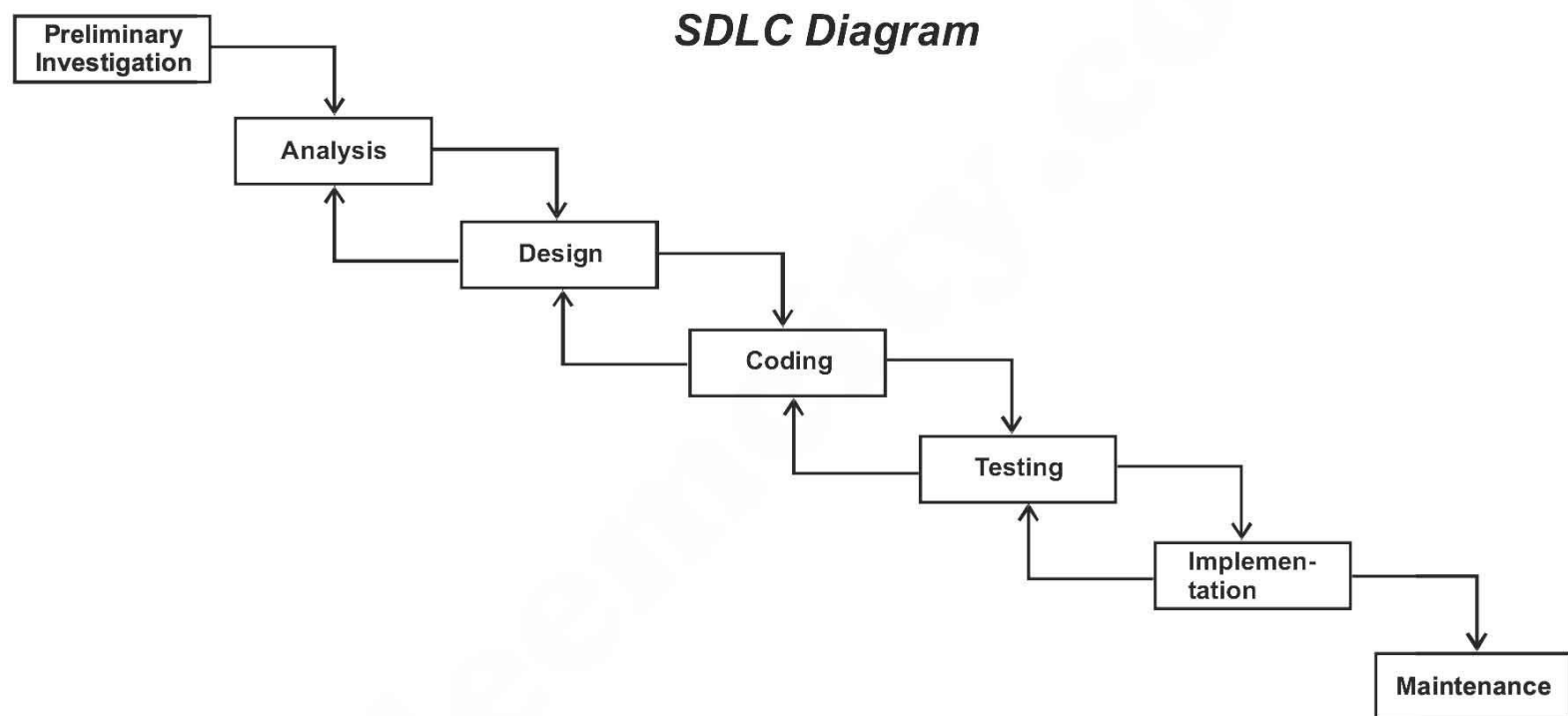
## Q14. What is SDLC and discuss all the phases of SDLC?

## SDLC:

- It stands for system development life cycle.
- It is an organized way to develop a successful system.
- Every organization requires some system in order to run smoothly; therefore the process of putting systems into a place and continuing to maintain or enhance them is referred as system development.
- The concept of life cycle fits anything that originates, matures over time and eventually dies.

- SDLC involves a series of steps that closely follow the steps of system approach.

It consists of seven phases.

1. Preliminary investigation
2. Analysis
3. Design
4. Coding
5. Testing
6. Implementation
7. Maintenance

**SDLC Diagram**

```
Preliminary
Investigation
        |
        v
    Analysis
        |
        v
     Design
        |
        v
     Coding
        |
        v
    Testing
        |
        v
  Implemen-
    tation
        |
        v
  Maintenance
```

## PRELIMINARY INVESTIGATION:

- It is the first step in developing and managing system.

- In preliminary investigation we identify the requirement for a new system.

- The objective of preliminary investigation is to conduct an initial analysis, propose alternative solutions, describe cost and benefits and submit a preliminary plan with recommendation as discussed below.

**System Identification:**

- At this stage, system must be identified because everything done in future will be based on this identification.

**System Scope:**

- The scope of the system is established at this stage.
- It is necessary to describe all the limitations of the system:
- How much resources are required?
- How much cost is required for the system?
- What is Time limit of the system?
- How many personnel are required for the system?

**Alternative Solutions:**
- There may be alternative solutions to develop a successful system.
- Identify all those solutions and select the best one.
- Observe what the competitors are doing for the same system.

**Feasibility Study:**
- In this step we see the financial, political, technical, economical, operational feasibility for the proposed system.
- It means the proposed project:
- Helps the organization to achieve overall objectives.
- Helps the organization to specify the performance criteria for the system (what is required).
- It helps to change the organization's way of doing business.

**Preliminary plan:**
- In this step, a feasibility report is submitted to the managers for approval.
- The feasibility report consists of all these findings in the shape of a written document.
- The managers will decide the future actions to be taken based on this report.
- It is possible that managers might make few amendments in the report based on the preliminary investigation.

# SYSTEM ANALYSIS:
- If management has decided to continue, then the project team moves towards the analysis of the system.
- **System analysis** is the study of the requirements of the end-user and the organization that is required before the design of the new system.
- **System analyst** is a person who is responsible for the analysis of the system. The analysts conduct three types of activities in system analysis phase.
    1. Need analysis/Requirement analysis
    2. Data gathering
    3. Data analysis and analysis Report

**Need analysis/Requirement analysis:**
- Analyst sum up the requirements of the system from the users and the managers.

**Data gathering:**

- The system analyst collects the data about the new system. He uses different tools and techniques to collect data depending on the situation. These are:
  1. Written documents
  2. Interviews
  3. Questionnaires
  4. Observations
  5. Sampling

**Written Documents:**

- The written documents are the reports, forms, memos, business plans, policy statements, organizational charts.
- The analyst collects all these manual documents to develop the new system or upgrade the existing computerized system.

**Interviews:**

- The project team or analysts interviews the managers, users, clients, suppliers and competitors.
- The questions in the interviews should be precise and relevant.
- These interviews will help the analysts to gain more knowledge about the system.

**Questionnaires:**

- Interviewing method is a time consuming method to get data; hence the analyst designs a questionnaires (a form) to collect information from different people.
- This method is inexpensive but the response of gathering data is insufficient and confusing.

**Observations:**

- The analyst and his team may collect information through observation of the working of the existing system.

**Sampling:**

- If there are large number of people and events involved in a system, then it is a better to work on a portion of all of them to save time.

**Data Analysis:**

- The collected data of the system is analyzed.
- The analyst ensures that the data is accurate, complete and readily available in the new system design.
- For this purpose the analyst and his team uses many tools which are:
  1. DFD (data flow diagrams)
  2. Flow Charts

3.      Connectivity diagrams

4.      Grid charts

5.      Decision tables etc.

**Analysis Report:**

This report is presented to management for the approval of the project and report consists of three parts:

1.      The working of the current system.

2.      Problems in the existing system.

3.      Requirements for the new system and recommendations for the future.

# DESIGN:

- It is a logical representation of the system.
- It is divided into three steps.
    1.      Logical design
    2.      Physical design
    3.      Report

**Logical design:**

- It describes the functional capabilities of the proposed system.
- The logical design describes the system components and their interaction.
- For logical design following tools are used.
- CASE (Computer Aided Software Engineering) tools
- Project management software (MS-Project, Gantt Chart, PERT diagrams etc.)

**Physical design:**

- The physical design describes how a proposed system will deliver the general capabilities described in the logical design.
- The following points are discussed in physical design:
    1.      Input requirements
    2.      Output requirements
    3.      Storage requirements
    4.      Processing requirements
    5.      System control requirements
    6.      Backup and recovery.

**Report:**

- A detailed report about the physical and logical design is submitted to the management.

- It explains the complete proposed system.

# CODING:

- It is the core area of SDLC in which actual codes of the system are written.
- It needs a lot of time, effort, and budget to produce the system.
- The analysis and designs are given to the programmers and software engineers to produce the system.
- The programmers use packaged software to write the programs and save time.

# TESTING:

- In testing phase, system developers detect and remove the errors in the software.
- There are two types of testing:
  1. Unit testing
  2. System-testing

**Unit testing:**

- It is also called modular testing.
- Each module of the software is tested individually using sample data.

**System-testing:**

- All the modules of the program are linked and tested as a single unit.
- Both sample data and actual data may be used to test the whole system.
- If the system fails then programmers removes those errors.
- If the system passes all the tests then the developers implement the system for the organization.

# IMPLEMENTATION:

- It means installation of hardware and software systems and data files for use to solve our problems.
- Users of the system are also trained in this phase.
- There are five methods to implement a system:
  1. Direct Implementation
  2. Parallel Implementation
  3. Phased Implementation
  4. Pilot Implementation
  5. Users Training

**Direct Implementation:**

- Users stop working on the old system.

- Users start working directly with the new system.

**Parallel Implementation:**

- The new and old systems are used side by side until it is felt that new system is better than the old system.

**Phased Implementation:**

- Parts of the systems are implemented from time to time until the whole system is implemented.

**Pilot Implementation:**

- This type of implementation allows to implement the complete system but to a selected group of users and departments.

**Users Training:**

- In this step of SDLC, developers provide training of users to run the new system.

- The training may conducted "In-House" or it may be "Contracted out".

- Different techniques are used to train the people. These are:

  1. Instruction Manuals

  2. Video tapes

  3. CD's

  4. Lectures

# MAINTENANCE:

- It is never ending phase.

- The system must be monitored to ensure that it is successful.

- Maintenance includes:

  1. Keeping the machinery running.

  2. Update and upgrade the system according to the new requirements.

  3. Feedback and Evaluation.

# EXERCISE

**Q.1    Fill in the blanks.**

1.    A bridge is used where the <u>similar</u> types of networks are to be joined together.

2.    WAN stand for <u>wide area network.</u>

3.    A set of instruction given to the computer to solve a problem is called <u>software</u>.

4.    <u>Laser</u> and <u>inkjet</u> printers are non impact printers.

5.    Trackball is popular among user of <u>laptop</u> computer.

6.    SVGA stands for <u>super video graphics array</u>.

7.    1024 GB are equal to <u>one Terabyte (1TB)</u>.

8.    OMR reads <u>SAT and GRE</u> marks and converts them into computer usable form.

9.    LCD stands for <u>liquid crystal display</u>.

10.    Fax stands for <u>facsimile transmission machine</u>.

11.    Dot matrix printer is a (n) <u>impact</u> printer.

12.    <u>Computer</u> is an electronic device or a programmable machine that accepts data process it into useful information according to the instructions given to it and store it on secondary storage devices for later use.

13.    There are four functions of computer <u>Data, Processing, Information, Storage</u>.

14.    <u>Hardware</u> is the physical parts of the computer.

15.    <u>Software</u> is the programs (instructions) that tell the computer what to do.

16.    <u>Default</u> is the original settings; what will happen if you don't change anything.

17.    <u>Data</u> is the collection of raw facts and figures is called data. Everything we tell the computer is called <u>input</u>.

18.    Data is entered in the computer through <u>input devices</u>.

19.    <u>Data Processing</u> is the system that accepts data manipulates it in the form of output and delivers it in a useful and meaningful form.

20.    Data Computing is the system that accepts data manipulates it in the form of output and delivers it in a useful and meaningful form.

21.    Data Computing is the system that accepts data manipulates it in the form of output and delivers it in a useful and meaningful form.

22.    The operations carried out on data to convert it into useful information are called <u>data processing</u>.

23.    <u>CPU</u> is a device which is used to process the data arithmetically or logically in the form of output.

24. Information is the organized and meaningful form of data after processing.

25. Data and Information are stored on <u>secondary storage</u> devices for later use.

26. Secondary storage devices are <u>CD's, Hard Disk, and Floppy Disk</u> etc.

27. <u>Information Technology</u> is a technology that merges computing with high speed communication links carrying data in the form of text, sound, images, video etc. from place to place over this global village.

28. Internet is used as source of <u>information technology</u>.

29. Information technology enables the heterogeneous types of industries or institutions to a phenomenon are called <u>digital convergence</u>.

30. The <u>digital convergence</u> is the technological merger of the various industries/enterprises through some electronic gadgets that exchange information between them.

31. <u>Modern Scenario of IT</u> means the modern situation of the information technology.

32. A set of instructions given to the computer to solve any problem is called a <u>Program.</u>

33. A set of instructions given to the computer to solve any problem is called <u>Software.</u>

34. <u>System Software</u> is used to control the usage and allocation of different hardware components and enables the other application programs to execute.

35. The <u>System software</u> is developed to control the hardware components.

36. Operating system, Utility programs, Drivers are the kinds of <u>system software</u>.

37. <u>Application Software</u> is a software that has been developed solve the specific problems or to provide audio, video or multimedia entertainment to the users.

38. <u>Custom-built software</u> is designed according to the requirement of a particular customer.

39. <u>Packaged software</u> is also known as off-the-shelf programs.

40. <u>Packaged software</u> is designed for sale to the general public and potential software developers.

41. <u>Input Devices</u> are used to enter data into the computer.

42. The devices through which user can communicate with the computer are called <u>Input Devices</u>.

43. The layout of the standard keyboard is <u>QWERTY</u> which describes the beginning keys in the top row of keyboard.

44. <u>Pointing devices</u> control the position of the cursor or pointer on the screen.

45. <u>Source data entry devices</u> are used for direct data entry to the computer systems.

46. <u>Command keys</u> normally do nothing on their own but work in combination with other keys.

47. The <u>Control key or Ctrl</u> is often used to access commands.

48. The <u>Alternative key or Alt</u> is often used to access menus.

49. The Shift key is used to type CAPITAL LETTERS.
50. ENTER key moves the cursor down one line and to the left margin.
51. Enter key process commands such as choosing an option in a dialog boxes and submitting a form.
52. DEL Key- Deletes the character at cursor and/or characters to the right of the cursor and all highlighted (or selected) text.
53. BKSP or BACKSPACE - Deletes the character to the left of cursor and all highlighted text.
54. SPACE BAR - Moves the cursor one space at a time to the right.
55. CAPS LOCK - Locks the keyboard so it types capital letters (a light goes on when caps lock is on).
56. TAB- Moves the cursor five spaces to the right (number of spaces are usually adjustable). Tab moves to the next field in a form or table (Shift-Tab for previous field).
57. ESC Key- Cancels a menu or dialog box or it allows to "escape" to the previous screen of the program.
58. ARROW KEYS - Moves the cursor around document without changing text
59. FUNCTION KEYS - Access commands by themselves or in combination with the three command keys; CTRL, SHIFT, and ALT
60. END Key moves the cursor to the end of current line.
61. HOME Key – It moves the cursor to the beginning of the current line in a document.
62. PgDn Key – It advances one full screen while the cursor stays at the same position.
63. PgUp Key – It backs up to the previous screen while the cursor stays at the same position.
64. Insert Key–When toggled off causes, keyed characters to override/affix with the existing characters.
65. Pointing stick is a pointing device looks like a pencil and eraser. It is located between G, H and B keys of the keyboard.
66. Joystick is controlled by vertical stick or arrow buttons (game pad)
67. Joystick is mostly used in games and in some CAD (Computer aided design).
68. Touchpad is a small flat surface over which we slide our finger to move the cursor on the screen. It is common on the portable computers.
69. Touch screen is a special video display screen in which data is entered by touching the screen using fingertip.
70. Light pen is a light sensitive stylus (pen like device). It is connected by a wire to the computer terminal.

71. Digitizing/Graphic Tablet consists of a tablet connected by a wire to a stylus or a puck.
72. A stylus is a pen like device with which user sketches an image.
73. A puck is a coping device with which the user copies an image.
74. Bar Code Reader is vertical zebra stripped lines on the products. It is also called UPC (Universal Product Code).
75. MICR characters are printed with magnetic ink.
76. OMR stands for Optical Mark Recognition
77. OMR uses light beam to scan input data to convert it into digital form which are then sent to the computer for processing.
78. OCR stands for Optical Character Recognition.
79. Magnetic strip cards have a strip of magnetically encoded data on its back.
80. Mobile SIM and ATM cards are the examples of smart cards.
81. Fax stands for "Facsimile Transmission Machine".
82. FAX scans an image and sends it as signals over telephone lines to a receiving fax machine which recreates the image on paper.
83. Scanners allow you to transfer pictures and photographs to your computer.
84. Raster graphics is a technique in which an image is represented as a matrix of dots.
85. Sound cards allow computers to produce sound like music and voice. It is a circuit board that converts analog signals into digital form.
86. Video-capture card is used to convert films and videos into digital form.
87. Frame-Grabber Video Card can capture and digitize a single frame at a time.
88. Full-Motion Video Card converts analog data into digital signals at the rate of up to 30 frames per second giving the effect of continuously flowing motion picture.
89. Digital camera takes still photos but records the pictures on computer disks.
90. A web cam is a tiny video camera designed especially to sit on your computer. It feeds pictures directly to the computer - no tape or film to develop.
91. Web cam is used for video conferencing over the Internet.
92. Output devices are the devices through which computer can communicate with the user.
93. Soft copy refers to data is shown on screen or in audio or voice form. It is not tangible.
94. Hard copy refers to the printed output on paper.
95. Resolution determines how clear and detailed the image is.
96. Pictures on a screen are made up of tiny dots and 1 dot on screen is 1 pixel.
97. The number of dots or pixels per inch determines Resolution.
98. VGA stands for video graphics array.
99. VGA supports 16-256 colors depending on the resolution.
100. SVGA stands for super video graphics array.

101. SVGA supports 256 colors at higher resolution.
102. SVGA has two graphics modes: 800 x 600 and 1024 x 768.
103. XGA stands for extended graphics array.
104. XGA supports 16.7 million colors.
105. XGA has resolution of 1024 x 768.
106. CRT stands for Cathode Ray Tube.
107. Flat Panel Displays are much thinner, weightless and consume less power than CRT.
108. There are three types of flat panel display screens: LCD, Gas Plasma and EL.
109. LCD stands for Liquid Crystal Display.
110. EL stands for Electro Luminescent display and it contains a substance that glows when it is charged by electric current.
111. Printers take the information on your screen and transfer it to paper or a hard copy.
112. Impact Printers forms characters and images by striking mechanism such as print hammer, or wheel against the ink ribbon.
113. Dot matrix, daisy wheel and line printers are the examples of impact printers.
114. Dot Matrix Printer works like a typewriter transferring ink from a ribbon to paper with a series or 'matrix' of tiny pins.
115. Dot matrix printer forms characters using row(s) of pins, 9, 18, or 24.
116. Dot Matrix Printer is also called pin printers.
117. Daisy Wheel Printer uses a mechanism in the shape of a series of petals arranged on a petal wheel having a character at the end of each petal.
118. Daisy Wheel Printer is slower than dot-matrix printer but better in quality.
119. Line Printer prints one line at a time. It prints 3000 lines per minute.
120. Non-Impact Printers do not involve actually striking the paper. Instead, it uses ink spray or toner powder.
121. Laser, Inkjet and Thermal are the examples of Non-Impact Printers.
122. Laser printers use the same technology as a photocopier using heat to transfer toner onto paper.
123. Laser printers are page printers.
124. The Laser printer uses 300 dpi to 1200 dpi.
125. Ink-Jet Printer works like dot matrix printers but fire a stream of ink from a cartridge directly onto the paper to form characters.
126. Ink-Jet Printer has a resolution of 300 dpi to 720 dpi.
127. The speed of Ink-Jet Printer is 1 to 6 pages per minute.
128. Bubble jet printer uses print head heat element and 128 tiny nozzles for printing.
129. Thermal Printer uses heat on chemically treated waxy paper to form characters.
130. Plotter is used for specialized application such as for printing, architectural drawing, maps, graphs and charts.

131. Units of Data Storage are Bit, Byte, Word.
132. Bit stands for Binary Digit.
133. The binary numbers 0 or 1 are called bits.
134. Bit is the basic and smallest unit of data storage in computer memory.
135. Each binary digit is called a bit.
136. Byte is a combination of 8-bits.
137. Byte can store a single character of data.
138. The storage capacity is expressed in terms of number of bytes it can store.
139. Word is the number of bits that constitute a common unit of data as defined by the computer system.
140. The power of computer depends on the size of word.
141. System is a combination of some related components that interact with each other to perform some specific tasks.
142. SDLC stands for system development life cycle.
143. SDLC is an organized way to develop a successful system.
144. It is the first step in developing and managing system is Preliminary investigation.
145. The objective of preliminary investigation is to conduct an initial analysis, propose alternative solutions, describe cost and benefits and submit a preliminary plan with recommendation.
146. In Preliminary plan step, a feasibility report is submitted to the managers for approval.
147. System Analysis is the study of the requirements of the end-user and the organization that is required before the design of the new system.
148. System analyst is a person who is responsible for the analysis of the system.
149. Analyst sums up the requirements of the system from the users and the managers in Need analysis or Requirement analysis.
150. In Data gathering the system analyst collects the data about the new system. He uses different tools and techniques to collect data depending on the situation.
151. Written documents, Interviews, Questionnaires, Observations, Sampling are the Data gathering techniques.
152. Written Documents are the reports, forms, memos, business plans, policy statements, organizational charts.
153. The analyst designs forms to collect information from different people. These forms are Questionnaires.
154. Logical design describes the functional capabilities of the proposed system.

155. Physical design describes how a proposed system will deliver the general capabilities described in the logical design.

156. Coding is the core area of SDLC in which actual codes of the system are written.

157. In testing phase, system developers detect and remove the errors in the software.

158. Unit testing is also called modular testing. Each module of the software is tested individually using sample data.

159. In System-testing; all the modules of the program are linked and tested as a single unit.

160. Implementation means installation of hardware and software systems and data files for use to solve our problems.

161. In Direct Implementation phase users stop working on the old system and start working directly with the new system.

162. In Parallel Implementation phase the new and old systems are used side by side until it is felt that new system is better than the old system.

163. In Phased Implementation; Parts of the systems are implemented from time to time until the whole system is implemented.

164. In Pilot Implementation Phase; it allows to implement the complete system but to a selected group of users and departments.

165. The system must be monitored to ensure that it is successful in Maintenance Phase.

## Q.2 Choose the correct option:

1. The name for the screen clarity:
   - (a) **Resolution**
   - (b) Discrete
   - (c) Pixel
   - (d) LCD

2. Another word for pointer:
   - (a) Monochrome
   - (b) Pixel
   - (c) **Cursor**
   - (d) None of the above

3. Collection of raw facts and figures is called:
   - (a) Information
   - (b) Processing
   - **(c) Data**
   - (d) Output

4. The processed data is called:
   - (a) Data
   - **(b) Information**
   - (c) Output
   - (d) Input

5. Data processing is also called:
   - (a) **Data computing**
   - (b) Information technology
   - (c) Information system
   - (d) Calculating

6. The computing and communication technologies are combined together for:
   - (a) Data sorting
   - **(b) Data communication**
   - (c) Data classification
   - (d) Data searching

7. An electronic device that accepts, processes data and produces information is called:
   - (a) Input device
   - **(b) Computer**
   - (c) Output devices
   - (d) Operating system

8. A device used for optical character recognition is a:
   - (a) Wand reader
   - (b) Cursor
   - (c) Pen
   - **(d) OCR**

9. ———— is category software:
   - (a) Application software
   - (b) System software
   - **(c) Both (a) and (b)**
   - (d) None of these

10. ———— is an example of system software:
   - (a) Word processor
   - **(b) Device Driver**
   - (c) Spreadsheet program
   - (d) Game programs

11. ———— is an example of packaged software:
   - (a) MS-Word
   - (b) Front page
   - (c) MS-Access
   - **(d) All**

12. ———— is not an example of packaged software:
   - **(a) MS-Windows**
   - (b) MS-Excel
   - (c) MS-Access
   - (d) Power point

13. ———— is not an application software:
   - (a) Internet
   - **(b) Device driver**
   - (c) Games
   - (d) Multimedia software

14. For the input of image data:
   - (a) **Scanner**
   - (b) Icon
   - (c) Bar code reader
   - (d) Tablet

15. An inkjet printer is an example of a(n):
   - (a) LASER printer
   - (b) Impact Printer
   - (c) COM printer
   - **(d) Non Impact Printer**

16. CPU is also referred to as:
   - **(a) Micro Processor**
   - (b) Storage unit
   - (c) System unit
   - (d) I/O unit

17. CPU stands for:
    (a) Central product unit          (b) Central programming unit
    (c) Control program unit          **(d) Central processing unit**

18. The data and program are stored permanently on the:
    (a) RAM                           (b) Primary storage
    (c) CPU                           **(d) Secondary storage**

19. ———— is secondary storage device:
    **(a) CD-ROM**                    (b) ROM
    (c) Cache                         (d) RAM

20. ———— is not secondary storage device:
    (a) CD/DVD ROM                    **(b) RAM**
    (c) Hard Disk                     (d) Floppy Disk

21. ———— is secondary storage device:
    (a) Hard disk drive               (b) CD-ROM drive
    (c) Tape Drive                    **(d) All**

22. ———— stores data and program temporarily:
    **(a) Primary storage**           (b) Secondary storage
    (c) CPU                           (d) Output

23. The device driver is an example of:
    (a) Application Software           **(b) System Software**
    (c) Freeware                      (d) Shareware

24. A program, which is specially designed to solve the specific problems of user is called:
    (a) Shareware                     (b) System Software
    (c) Freeware                      **(d) Application Software**

25. ———— is input device:
    (a) Keyboard                      (b) Touch pad
    (c) Microphone                    **(d) All**

26. Data and instructions given to the computer are called:
    (a) Hardware                      (b) Output
    **(c) Input**                     (d) Both b and c

27. ———— is not an example of input device:
    **(a) Speaker**                   (b) Scanner

|     | (c) | Mouse | (d) | Digital camera |

28. A standard keyboard used in personal computer has:
    - (a) 80 keys
    - **(b) 101 keys**
    - (c) 84 keys
    - (d) 102 keys

29. ———— keys is used to change lowercase letters mode to uppercase and vice versa:
    - (a) Alt
    - (b) Enter
    - (c) Ctrl
    - **(d) Caps Lock**

30. Caps Lock key is a:
    - (a) Function key
    - (b) Cursor Control Keys
    - **(c) Toggle key**
    - (d) Numeric key

31. Computer is a combination of:
    - (a) Software
    - (b) Hardware
    - **(c) Both (a) and (b)**
    - (d) None

32. The physical parts of a computer is called:
    - **(a) Hardware**
    - (b) Program
    - (c) Software
    - (d) Both (b) and (c)

33. ———— is not a hardware component:
    - (a) Input device
    - (b) Secondary storage
    - (c) Processor
    - **(d) Operating system**

34. CPU is an example of:
    - (a) Software
    - **(b) Hardware**
    - (c) Firmware
    - (d) Shareware

35. Another name of main memory is:
    - (a) Secondary memory
    - **(b) Primary storage**
    - (c) Permanent memory
    - (d) None

36. ———— executes the instructions of program:
    - **(a) CPU**
    - (b) RAM
    - (c) Monitor
    - (d) None

37. A set of instructions in a computer is:
    - (a) Software
    - (b) Program
    - (c) Hardware
    - **(d) Both (a) and (b)**

38. How many categories a software is classified?

(a) 3 (b) 4

(c) 5 **(d) 2**

39. A program or set of programs that is specially designed to control the computer system is called:

**(a) System Software** (b) Application Software

(c) Freeware (d) Shareware

40. ———— keys is used to delete a character to the left of the cursor:

**(a) Backspace** (b) Delete

(c) Tab (d) Shift

41. ———— keys is used to cancel the current operation:

(a) Alt (b) Caps Lock

**(c) Esc** (d) Num Lock

42. ———— keys is used to insert new line or paragraph into any text editor:

(a) Shift (b) Backspace

**(c) Enter** (d) Tab

43. Arrow keys are also know as:

(a) Function keys **(b) Cursor Control Keys**

(c) Toggle keys (d) Special keys

44. ———— input devices is not a pointing device:

(a) Joystick (b) Trackball

(c) Touch Screen **(d) All**

45. ———— input devices is not a pointing device:

**(a) Scanner** (b) Pointing stick

(c) Digitizing tablet (d) Touch pad

46. ———— pointing device is a stationary device with a moveable ball on its top:

(a) Mouse **(b) Track ball**

(c) Touch pad (d) Light pen

47. ———— pointing devices has a vertical handle like a gearshift lever:

(a) Light pen (b) Pointing stick

(c) Trackball **(d) Joystick**

48. ———— input devices is used for playing computer games:

| | | | | |
|---|---|---|---|---|
| (a) | Light pen | **(b)** | **Joystick** |
| (c) | Pointing stick | (d) | Stylus |

49. ———— pointing devices uses the sensors to detect the touch of a finger:

| | | | | |
|---|---|---|---|---|
| **(a)** | **Touch screen** | (b) | Light pen |
| (c) | Pointing stick | (d) | Joystick |

50. ———— is a light sensitive stylus device:

| | | | | |
|---|---|---|---|---|
| **(a)** | **Light pen** | (b) | Touch screen |
| (c) | Pointing stick | (d) | Joystick |

51. Imaging uses what device to input data:

| | | | | |
|---|---|---|---|---|
| (a) | Tablet | (b) | Icon |
| (c) | Bar Code Reader | **(d)** | **Scanner** |

52. ———— is not a marks and characters recognition device:

| | | | | |
|---|---|---|---|---|
| (a) | MICR | **(b)** | **Fax Machine** |
| (c) | OMR | (d) | OCR |

53. The barcode is called:

| | | | | |
|---|---|---|---|---|
| **(a)** | **Universal Product Code** | (b) | EBCDIC code |
| (c) | ASCII code | (d) | Unicode |

54. The vertical zebra stripped lines on manufactured products are called:

| | | | | |
|---|---|---|---|---|
| (a) | Product code | (b) | Item code |
| (c) | Pin code | **(d)** | **Bar code** |

55. ———— is a photoelectric scanner that translates the barcode symbols into digital code:

| | | | | |
|---|---|---|---|---|
| (a) | MICR | **(b)** | **Barcode reader** |
| (c) | OCR | (d) | OMR |

56. ———— devices is used to read characters, which are printed with magnetized link:

| | | | | |
|---|---|---|---|---|
| (a) | OMR | (b) | Barcode reader |
| (c) | OCR | **(d)** | **MICR** |

57. ———— devices is used to check and process the test marks of students:

| | | | | |
|---|---|---|---|---|
| **(a)** | **OMR** | (b) | Barcode reader |

(c)    OCR        (d)    MICR

58. An example of smart card:

    **(a)**    **SIM**        (b)    Magnetic-stripe card

    (c)    Network interface card    (d)    Modem card

59. ————— is an audio input device:

    (a)    Digital camera    (b)    **Microphone**

    **(c)**    Video camera    (d)    Speaker

60. ——————— is a video input device:

    **(a)**   **Video camera**       (b)   Digital camera

    (c)   Microphone       (d)   Microphone

61. ——————— is an output device:

    (a)   Monitor       (b)   Speaker

    (c)   Printer       **(d)**   **All**

62. ——————— is not an internal part of computer:

    **(a)**   **Monitor**       (b)   Computer bus

    (c)   RAM       (d)   ROM

63. Printers and monitors are examples of:

    (a)   Input unit       (b)   Storage unit

    **(c)**   **Output units**       (d)   Processing unit

64. ——————— device is used to get the softcopy output:

    (a)   Monitor       (b)   Display screen

    (c)   Printers       **(d)**   **Both a & b**

65. ——————— is not related to softcopy output:

    (a)   CRT       **(b)**   **Plotters, printers**

    (c)   Monitors       (d)   Screens

66. The printing speed of line printer is up to:

    **(a)**   **3000 lpm**       (b)   300 lpm

    (c)   30000 lpm       (d)   30 lpm

67. ——————— printers works like a photocopying machine:

    (a)   Inkjet printer       (b)   Bubble printer

    **(c)**   **Laser printer**       (d)   Band printer

68. The printing speed of laser printer for microcomputer is about:

    (a)   4 to 400 pages per minute       (b)   4 to 200 pages per minute

    (c)   4 to 100 pages per minute       **(d)**   **4 to 32 pages per minute**

69. An inkjet printer is an example of a(n):

    (a)   Laser printer       (b)   Impact printer

    (c)   COM printer       **(d)**   **Non-impact printer**

70. ——————— printers is faster:

(a) Inkjet printer      **(b) Laser printer**

(c) Thermal printer      (d) Dot Matrix

71. ——————— is not an output device:

(a) Monitor      (b) Plotter

(c) Speaker      **(d) Scanner**

72. The video graphic card inside the computer is used for the output device:

(a) Speaker      (b) Microphone

**(c) Monitor**      (d) Printer

73. How many types of graphic cards?

(a) 2      **(b) 3**

(c) 4      (d) 5

74. Pixel is short for:

**(a) Picture element**      (b) Picture edit

(c) Picture enter      (d) None

75. The monitor having VGA card has resolution:

(a) $1024 \times 768$ pixels      (b) $800 \times 600$ pixels

(c) $640 \times 570$ pixels      **(d) $320 \times 200$ pixels**

76. XGA card supports:

**(a) 16.7 million colors**      (b) 256 colors

(c) 16.7 billion colors      (d) 16 colors

77. ——————— is the characteristic(s) of display screen:

(a) Resolution      (b) Size

(c) Color      **(d) All**

78. The output printed on the paper is called:

(a) Softcopy output      (b) Hard output

**(c) Hardcopy output**      (d) Soft output

79. ——————— is an impact printer:

(a) Dot matrix printer      (b) Daisy wheel printer

(c) Line printer      **(d) All**

80. ——————— is a non-impact printer:

**(a) Inkjet printer**      (b) Dot matrix printer

(c) Daisy wheel printer      (d) Line printer

81.   ——————— print head of dot matrix printer provides best quality printout:

(a)   **24 pins**       (b)   18 pins

(c)   9 pins         (d)   20 pins

82.   ——————— printers is slower than dot matrix printer but better in quality:

**(a)**   **Daisy wheel printer**   (b)   Line printer

(c)   Laser printer      (d)   Inkjet printer

83.   The printer which can print one character at a time is:

(a)   Dot matrix printer   (b)   Daisy wheel printer

(c)   Laser printer      **(d)**   **Both a & b**

84.   ——————— printers is an example of line printer?

(a)   Dot matrix       (b)   Bubble jet

**(c)**   **Band printer**     (d)   Daisy wheel

85.   DPI stands for:

(a)   Data Per Inch     (b)   Digit Per Inch

**(c)**   **Dots Per Inch**    (d)   None

86.   How many types of plotters are there?

(a)   6           (b)   4

(c)   5           **(d)**   **2**

87.   ——————— output devices is used to print continuous output such as to track an earthquake reading:

(a)   Flatbed plotter    (b)   Dot matrix printer

**(c)**   **Drum plotter**    (d)   Line printer

88.   Smallest unit of memory is called:

(a)   Byte          **(b)**   **Bit**

(c)   Character       (d)   Word

89.   Bit stands for:

**(a)**   **Binary digit**    (b)   Binary integer

(c)   Basic digit      (d)   None

90.   How many bits are in one bytes?

(a)   2           (b)   4

(c)   1024         **(d)**   **8**

91.   ——————— is largest unit of data storage:

(a)   Byte          **(b)**   **Word**

(c)   Bit           (d)   None

92. 1KB =

(a) 256 Bytes
(b) 100 Bytes
(c) 1000 Bytes
**(d) 1024 Bytes**

93. $\frac{1}{2}$ GB =

**(a) 512 MB**
(b) 512 KB
(c) 512 bytes
(d) 1024 MB

94. 1MB =

(a) 1024 bits
(b) 1024 Bytes
(c) 2000 KB
**(d) 1024 KB**

95. 8 bytes is equal to:

**(a) 64 bits**
(b) 32 bits
(c) 48 bits
(d) 8 bits

96. 1GB =

**(a) 1024 MB**
(b) 1024 TB
(c) 1024 KB
(d) 1024 Bytes

97. 1TB =

(a) 1024 KB
(b) 1024 MB
**(c) 1024 GB**
(d) None

98. The word size of personal computers is:

(a) One byte
(b) Two bytes
**(c) Four bytes**
(d) Eight bytes

99. Double word is equal to:

(a) 8 - bits
(b) 16 - bits
(c) 32 - bits
**(d) 64 - bits**

100. ——————— is the first phase of SDLC:

(a) System analysis
(b) Design
(c) Coding
**(d) Preliminary investigation**

101. The actual system is produced in phase:

**(a) Coding**
(b) Design
(c) Implementation
(d) Testing

102. The errors are detected and removed from the software in phase:

(a) Maintenance      (b) Coding

(c) Implementation      **(d) Testing**

103. In ———— phases of SDLC, the system is installed for use to solve the problem:

(a) Design      **(b) Implementation**

(c) Coding      (d) Testing

104. System is implemented in parts is known as:

(a) Pilot implementation      (b) Direct implementation

(c) Parallel implementation      **(d) Phase implementation**

105. ———— is not related to preliminary investigation:

(a) System identification      **(b) System analysis**

(c) System scope      (d) Feasibility study

106. A person responsible for the analysis of the system is known as:

**(a) Analyst**      (b) Software engineer

(c) Programmer      (d) IT manager

107. ———— phase of SDLC comes after analysis phase?

(a) Coding      (b) Testing

(c) Implementation      **(d) Design**

108. ———— tools/methods is not used in data gathering step of system analysis:

**(a) Maintenance**      (b) Questionnaires

(c) Sampling      (d) Interviews

109. ———— methods is used in data gathering step to collect information from a part of people instead of many people of an organization:

(a) Interviews      (b) Questionnaires

**(c) Sampling**      (d) Observations

110. MS project, PERT Charts etc may be used for:

(a) Analysis of the system      (b) Physical design of system

**(c) Logical design of system**      (d) Preliminary investigation of system

111. Softcopy refers to:

(a) **Screen output**      (b) Peripheral devices

(c) OCR      (d) None of the above

112. Smallest unit of memory is:
- a) Byte
- b) **Bit**
- c) Character
- d) Word

113. The printer which can print one complete line at a time is:
- a) Dot Matrix Printer
- b) Daisy Wheel Printer
- c) Laser Printer
- d) **Line Printer**

114. The microphone converts the sound into:
- a) Mechanical signals
- b) **Electrical signals**
- c) Computer files
- d) software

115. An input device, which is used for playing computer games:
- a) Light Pen
- b) Mouse
- c) **Joy Stick**
- d) Scanner

116. Which of the following is the first phase of SDLC?
- **a) Preliminary Investigation**
- b) Analysis
- c) Coding
- d) design

117. Which task of investigation is related to limitations of the system?
- a) Alternate solutions
- **b) System Scope**
- c) Preliminary Plan
- d) Feasibility Study

118. Which of the following is the secondary storage device?
- a) Cache Memory
- b) ROM
- **c) CD-ROM**
- d) RAM

119. Which of the following is not an inter connector?
- **a) CD-ROM**
- b) PORTS
- c) Cables
- d) Computer Buses

120. Which Key is used to insert new line in any text editor?
- a) Shift
- **b) Enter**
- c) Ctrl
- d) Alt

121. Which of the following is not a pointing device?
- a) Track ball
- b) Light Pen
- **c) Scanner**
- d) Joystick

122. The bar code is also known as
- a) ASCII
- b) BCD
- c) Unicode
- **d) UPC**

123. Which device is used to read characters which are printed with magnetic ink?

    a) Bar code reader            **b) MICR**

    c) OCR                         d) OMR

124. SIM is an example of:

    **a) SMART Card**           b) NIC

    c) Magnetic Strip card       d) Modem

125. Which of the Impact printer is slower than dot matrix but better in quality?

    a) Laser Printer            b) Inkjet

    **c) Daisy Wheel**           d) Thermal

126. Which printer uses a heat sensitive waxy paper?

    a) Laser Printer            b) Inkjet

    c) Daisy Wheel           **d) Thermal**

127. Which technique is not used in data gathering?

    a) Sampling               **b) Design**

    c) Observation           d) Questionnaires

128. The actual system is produced in_____ phase.

    a) Implementation        **b) Coding**

    c) Design               d) Testing

129. The system is installed in_____ phase.

    **a) Implementation**      b) Coding

    c) Design               d) Testing

## Q.3 WRITE T FOR TRUE AND F FOR FALSE STATEMENT:

1. The keyboard arrangements provided as standard on most keyboard is the QWERTY arrangement. **(T)**

2. A picture element on the screen is called a pixel. **(T)**

3. CRT's are used on portable computers **(F)**

4. Audio output device can output only music. **(F)**

5. Non impact printers are quitter than impact printers **(T)**

6. A trackball is a pointing input device almost like a mouse turned upside down. **(T)**

7. The disk drives are known as I/O devices. **(T)**

8. Function keys are used the same way with every software application. **(F)**

9. EGA stands for extended graphics adapter **(F)**

10. The two basic types of plotter are the drum plotter and flatbed plotter. **(T)**

**Q.1    What is a Computer?**

**Ans.**   Computer is an electronic device or a programmable machine that accepts data process it into useful information according to the instructions given to it and gives output. It can stores process data on secondary storage devices for later use. There are four functions in this definition:

(i)     Input

(ii)    Processing

(iii)   Output

(iv)    Storage

**Q.2    What is Data?**

**Ans.**   The collection of raw facts and figures is called data. Everything we give to the computer is called input. Data is entered in the computer through input devices e.g. keyboard, mouse etc.

**Q.3    Define Data Processing/Data Computing.**

**Ans.**   The system that accepts data, manipulates it in the form of output and delivers it in a useful and meaningful form is called data processing. The operations carried out on data to convert it into useful information are called data processing. CPU is a device which is used to process the data arithmetically or logically in the form of output.

**Q.4    Define Information.**

**Ans.**   The organized and meaningful form of data after processing is called information. Output devices show the results or information in the shape of output.

**Q5.     What makes a computer powerful?**

**Ans.**   Speed, Reliability, Accuracy, Automation and Storage make a computer powerful.

**Q.6    What is Storage of Data?**

**Ans.**   Storage of data is about to keep data on some storage media for future use. Storage devices are used to store data permanently. Secondary storage devices are CD's, Hard Disk, and Floppy Disk etc.

**Q.7    Define Information Technology.**

**Ans.**   It is a technology that merges computing with high speed communication links carrying data in the form of text, sound, images, video etc. from place to place

over this global village (all over the world). Internet is used as source of information technology.

**Q.8** **Define Digital Convergence.**

**Ans.** The digital convergence is the technological merger of the various industries/enterprises through some electronic gadgets that exchange information between them.

**Q.9** **Define a Program / Software.**

**Ans.** A set of instructions given to the computer to solve any problem is called a program or software. There are two types of software: System software and Application Software.

**Q.10** **Define System Software.**

**Ans.** It is used to control the usage and allocation of different hardware components and enables the other application programs to execute. This software is developed to control the hardware components. Operating system (DOS, Windows etc.), Utility programs (data backup programs etc.); Drivers are the kinds of system software.

**Q.11** **What is an Application Software?**

**Ans.** It is a software that has been developed to solve the specific problems or to provide audio, video or multimedia entertainment to the users. These are specially designed to solve the problems of users. Custom-built software and packaged software are two types of application programs.

**Q.12** **Define Custom-built software.**

**Ans.** This software is designed according to the requirement of a particular customer. These programs are developed by the professional team of programmers depending on the requirements. Patient information system, Inventory system, College admission system, Examination system are the examples.

**Q.13** **Define Packaged software with examples.**

**Ans.** These are also known as off-the-shelf programs. These are designed for sale to the general public and potential software developers. These facilitate the users in all fields of life. Microsoft Office Package (MS-Word, MS-Excel, etc), ORACLE, Graphics software, Communication programs are the examples

**Q.14** **What is a Hardware?**

**Ans.** Physical parts of the computer are called hardware. Keyboard, Mouse, camera, scanner, bar code reader Monitor, Printers, RAM, ROM, Hard disk, Floppy disk, CD, Cables, Ports, Modem , network cards, Bridge etc.

**Q.15** **What is an Input Devices?**

**Ans.** The devices, which are used to enter data into the computer, are called input devices. The devices through which user can communicate with the computer. Keyboard, Pointing devices, Source data entry devices are the types of input devices.

**Q.16 What are Pointing devices/Point and Draw devices?**

**Ans.** Pointing devices control the position of the cursor or pointer on the screen. Mouse, Trackball, Pointing stick, Joystick, Touchpad, Touch screen, Light pen, Digitizing/graphic tablet, Pen-based systems are the examples.

**Q.17 What are Source data entry devices?**

**Ans.** These devices are used for direct data entry to the computer systems. Examples are: Bar-code reader, MICR, OMR, OCR, Magnetic strip cards, Smart cards, Fax machine, Video input device, Digital camera etc.

**Q.18 What is audio circuit board?**

**Ans.** Sound cards allow computers to produce sound like music and voice. It is a circuit board that converts analog signals into digital form. The older sound cards were 8 bit. Now a days 16, 32 and 64 bit cards are used. Microphones can capture sounds from the air which is good for sound effects or voices.

**Q.19 What is Video Capture card?**

**Ans.** Video-capture card is used to convert films and videos into digital form. Video cards allow computers to display video and animation. Some video cards allow computers to display television channels as well as capture frames from video. A video card with a digital video camera allows computers users to produce live video. It video capture card has two types:

1. Frame-Grabber Video Card
2. Full-Motion Video Card

**Q.20 What are Output Devices?**

**Ans.** Output devices are the devices through which computer can communicate with the user. We can view the processed information in the form of output on output devices. There are two types of output:

Soft copy: It refers to data is shown on screen or in audio or voice form.

Hard copy: It refers to the printed output on paper.

**Q.21 What is a Resolution?**

**Ans.** It determines how clear and detailed the image is. Pictures on a screen are made up of tiny dots and 1 dot on screen is 1 **pixel** (form "picture element"). The more pixels per inch, the clearer and more detailed the picture. Therefore the number of dots or pixels per inch determines resolution.

**Q.22 What are Video Display Adapter?**

**Ans.** A display screen must have a video display adapter card attached with the computer. It is known as video graphics card and it is a circuit board that determines the resolution, colors, and speed with which images appear on the screen. There are three types of the graphics card. VGA, SVGA and XGA

**Q.23** **Define VGA.**

**Ans.** It stands for video graphics array. It supports 16-256 colors depending on the resolution. At 320 x 200 pixels, it will support 16 colors. At 640 x 480 pixels, it supports 256 colors. It is called 4 bit color.

**Q.24** **Define SVGA -Super video graphics array?**

**Ans.** It determines what resolutions are available and how many colors can be displayed. It supports 256 colors at higher resolution. It has two graphics modes: 800 x 600 and 1024 x 768. It is called 8 bit color.

**Q.25** **What is XGA -Extended graphics array?**

**Ans.** It supports 16.7 million colors. It has resolution of 1024 x 768. XGA will support 256, 65536 or 16777216 colors depending on video adapter memory chip. It is called 24 bit color or true color.

**Q.26** **What are Flat Panel Displays?**

**Ans.** The flat panel displays are much thinner, weightless and consume less power than CRT. These are used in laptops. Flat panel displays are made up of two glass plates with a substance in between them, which is activate in different ways. There are three types of flat panel display screens: LCD, Gas Plasma and EL.

**Q.27** **What are Impact Printers?**

**Ans.** These printers produce printing by physically touching the paper. These printers use striking mechanism such as print hammer, or wheel against the ink ribbon to print characters and images. Dot matrix, daisy wheel and line printers are the examples of impact printers.

**Q.28** **What are Non-Impact Printers?**

**Ans.** This type of printer does not involve actually striking the paper. Instead, it uses ink spray or toner powder. Laser, Inkjet and Thermal are the examples of Non-Impact Printers

**Q.29** **What are Plotters?**

**Ans.** A plotter is a special output device used to produce high-quality graphics in many colors. It is used for specialized application such as for printing, architectural drawing, maps, graphs and charts. Flatbed Plotters and Drum Plotters are the kinds of plotters.

**Q.30** **What is a Flatbed Plotter?**

**Ans.** Flatbed plotter plots on a paper that lies on a flat bed like surface. The bed size varies according to the requirement. One to four pens move across the paper and images are printed accordingly.

**Q.31 What is a Drum Plotter?**

**Ans.** It is similar to flatbed plotter. Paper is mounted over a drum for continuous output. Its usage is to track earthquake reading.

**Q.32 Define a Bit.**

**Ans.** It stands for Binary Digit. The binary numbers 0 or 1 are called bits. It is the basic and smallest unit of data storage in computer memory. The circuit being on or off at a time. The complexity of computer circuitry is described in terms of the number of bits that can be transmitted simultaneously. This is determined by the number of wires that run parallel to one another on the circuit-boards. Current PCs use 8, 16, 32 and 64 bit paths.

**Q.33 What is a Byte?**

**Ans.** It is a combination of 8-bits. It can store a single character of data. The storage capacity or memory capacity is expressed in terms of number of bytes it can hold.

**Q.34 Define a Word.**

**Ans.** The number of bits that constitute a common unit of data as defined by the computer system. The length of word varies from computer to computer. The power of computer depends on the size of word.

**Q.35 What is a System?**

**Ans.** A system is a combination of some related components that interact with each other to perform some specific tasks.

There are five system components.

**Hardware -** The physical parts required to develop a system.

**Software -** The instructions run the system smoothly.

**People/User -** User uses the system and gets benefits from the system

**Data/Information -** Data is input provided to the system and information is output obtained from the system.

**Communication Setup -** The transmission of information from one location to another at right time and at right place is called communication setup.

**Q.36 Define SDLC?**

**Ans.** It stands for system development life cycle. It is an organized way to develop a successful system. Every organization requires some system in order to run smoothly; it consists of seven phases.

1. Preliminary investigation

2. Analysis
3. Design
4. Coding
5. Testing
6. Implementation
7. Maintenance

**Q.37   What is a Preliminary investigation?**

**Ans.**   It is the first step in developing and managing system. Identifying the requirement for a new system and introducing an investigation, a feasibility study must be based on an administrative plan. The objective of preliminary investigation is to conduct an initial analysis, propose alternative solutions, describe cost and benefits and submit a preliminary plan.

**Q.38   What is a System Scope?**

**Ans.**   The scope of the system is established at this stage. It is necessary to describe all the constraints of the system:

How much resources are required?

How much cost is required for the system?

What is Time limit of the system?

How many personnel are required for the system?

**Q.39   Define Preliminary plan?**

**Ans.**   In this step, a feasibility report is submitted to the managers for approval. The feasibility report consists of all these findings in the shape of a written document. The managers will decide the future actions to be taken based on this report. It is possible that managers might make few amendments in the report based on the preliminary investigation.

**Q.40   What is the role of a System analysis?**

**Ans.**   It is the study of the requirements of the end-user and the organization that is required before the design of the new system. **System analyst** is a person who is responsible for the analysis of the system. The analysts conduct three types of activities in system analysis phase.

1. Need analysis/Requirement analysis
2. Data gathering
3. Data analysis and analysis Report

**Q.41   What is Need analysis/Requirement analysis?**

**Ans.**   Analyst sum up the requirements of the system from the users and the managers.

**Q.42   What is Data gathering?**

**Ans.**   The system analyst collects the data about the new system. He uses different tools and techniques to collect data depending on the situation. These are: Written documents, Interviews, Questionnaires, Observations, Sampling.

**Q.43   What are Written Documents?**

**Ans.**   The written documents are the reports, forms, memos, business plans, policy statements, organizational charts. The analyst collects all these manual documents to develop the new system or upgrade the existing computerized system.

**Q.44   What are Interviews?**

**Ans.**   The project team or analysts interviews the managers, users, clients, suppliers and competitors. The questions in the interviews should be precise and relevant. These interviews will help the analysts to gain more knowledge about the system.

**Q.45   What are Questionnaires?**

Interviewing method is a time consuming method to get data; hence the analyst designs a questionnaires (a form) to collect information from different people. This method is inexpensive but the response of gathering data is insufficient and confusing.

**Q.46   What are Observations?**

**Ans.**   The analyst and his team may collect information through observation of the working behavior and some related information of the existing system.

**Q.47   What is a Sampling?**

**Ans.**   If there are large number of people and events involved in a system, then it is a better to work on a portion of all of them to save time.

**Q.48   What is Data Analysis?**

**Ans.**   The collected data of the system is analyzed. The analyst ensures that the data is accurate, complete and readily available in the new system design. For this purpose the analyst and his team uses many tools which are: DFD (data flow diagrams), Flow Charts, Connectivity diagrams, Grid charts, Decision tables etc.

**Q.49   What is Analysis Report?**

**Ans.**   This report is presented to management for the review and approval of the project. This report consists of three parts.

1.   The working of the current system.

2. Problems in the existing system.

3. Requirements for the new system and recommendations for the future.

**Q.50** **What is a Design?**

**Ans.** It is a logical representation of the system. It is divided into three steps.

1. Logical design

2. Physical design

3. Report

**Q.51** **Define Logical design.**

**Ans.** It describes the general functional capabilities of the proposed system. The logical design describes the system components and their interaction. For logical design CASE tools, Project management software (MS-Project, Gantt Chart, PERT diagrams etc.) are used

**Q.52** **What is a Physical design?**

**Ans.** The physical describes how a proposed system will deliver the general capabilities described in the logical design. Input requirements, Output requirements, Storage requirements, Processing requirements, System control requirements, Backup and recovery are the main characteristics of physical design.

**Q.53** **What is a Coding?**

**Ans.** It is the core area of SDLC in which actual codes of the system are written. It needs a lot of time, effort, and budget to produce the system. The analysis and designs are given to the programmers and software engineers to produce the system. The programmers use packaged software to write the programs and save time.

**Q.54** **What is Testing?**

**Ans.** In testing phase, system developers detect and remove the errors in the software. There is two type of testing: Unit testing and System-testing

**Q.55** **What is Unit testing?**

**Ans.** It is also called modular testing. Each module of the software is tested individually using sample data.

**Q.56** **What is System-testing?**

**Ans.** All the modules of the program are linked and tested as a single unit. Both sample data and actual data may be used to test the whole system. If the system fails then programmers removes those errors. If the system passes all the tests then the developers implement the system for the organization.

**Q.57** **Define Implementation Phase?**

**Ans.** It means installation of hardware and software systems and data files for use to solve our problems. Users of the system are also trained in this phase. Implementation may be achieved in five steps.

1. Direct Implementation
2. Parallel Implementation
3. Phased Implementation
4. Pilot Implementation
5. Users Training

**Q.58** **What is a Direct Implementation?**

**Ans.** Users stop working on the old system and start working directly with the new system.

**Q.59** **What is a Parallel Implementation?**

**Ans.** The new and old systems are used side by side until it is felt that new system is better than the old system.

**Q.60** **What is a Phased Implementation?**

**Ans.** Parts of the systems are implemented from time to time until the whole system is implemented.

**Q.61** **What is a Pilot Implementation?**

**Ans.** This type of implementation allows to implement the complete system but to a selected group of users and departments.

**Q.62** **What is Users Training?**

**Ans.** In this step of SDLC, developers provide training of users to run the new system. The training may conducted "In-House" or it may be "Contracted out". Different techniques are used to train the people. These are: Instruction Manuals, Video tapes, CD's, Lectures etc.

**Q.63** **What is a Maintenance phase?**

**Ans.** It is never ending phase. The system must be monitored to ensure that it is successful. Maintenance includes:

> Keeping the machinery running.
>
> Update and upgrade the system according to the new requirements.
>
> Feedback and Evaluation.
>
> Help is also provided to the users against their queries or problems.

# COMPUTER ARCHITECTURE

## OVERVIEW:

In 1951 John Von Neumann and his team proposed a design of stored program computer. According to the design:

- A sequence of instructions is called a program.
- All the data and the programs are stored in memory.
- The machine reads all the instructions one by one and executes these instructions sequentially.

**Q1.    What is Computer Architecture? Describe the components of Architecture.**

## COMPUTER ARCHITECTURE:

- The organization and interconnection of various computer components is called computer architecture.
- The important components are: I/O devices, CPU, Primary or Main Memory, Secondary Memory or Storage devices, I/O unit, Registers and Bus Interconnection

**I/O devices:**

- It stands for input and output devices.
- Input devices: User can communicate with the computer through input devices e.g. Keyboard, Mouse, joystick, track-ball, Microphone, camera, scanner, bar code reader etc.
- Output devices are used to communicate with the user e.g. Monitor, Speakers, Printers and Projectors etc.
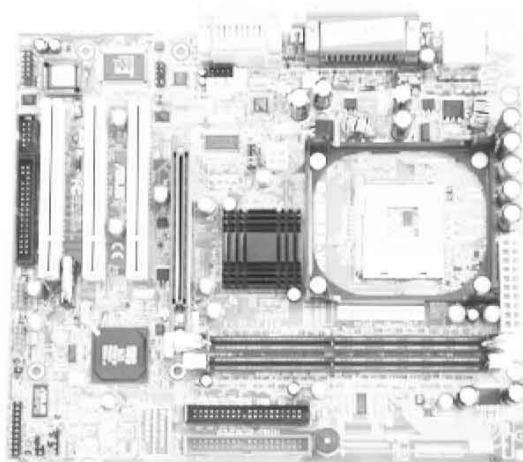
**CPU:**

- It stands for "central processing unit".
- It is a small chip mounted on the circuit board (mother board).
- CPU is the brain of computer. It controls all the functions of computer system.
- CPU also performs data processing.
- There are two parts of a CPU, CU and ALU

**CU:**

- It stands for "Control Unit". The CU reads the instruction from memory, decodes and executes these instructions.
- It acts as supervisor of the computer. It controls all the parts and activities of the computer.
- CU generates electronic signals that direct the computer to execute the programs it doesn't itself execute the instructions rather it directs the other parts to do so.
- It also controls the flow of information and co-ordinates the activities of other devices.

**ALU:**

- It stands for "Arithmetic and Logical Unit".
- It performs two types of operations on data.
- Arithmetic operations (addition, subtraction, multiplication and division)
- Logical operations (the operations produces true or false results e.g. less than, greater than, equal to not equal to etc.)
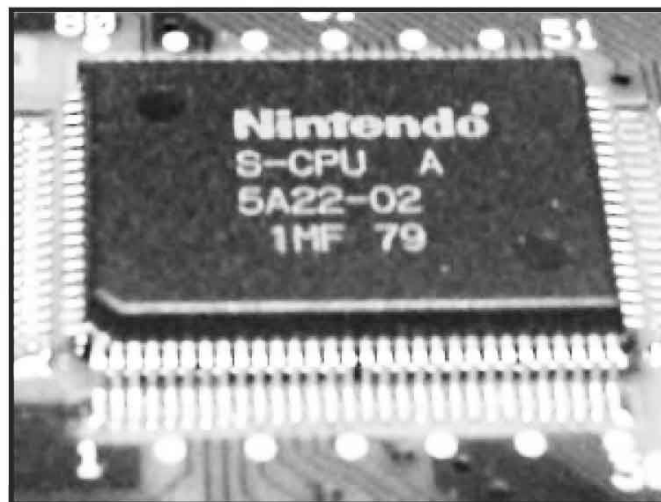


**Main Memory or Primary Storage:**

- All the program instructions and data are loaded in memory for the execution.
- This unit temporarily stores the data and instructions.
- It is also called working area of the computer. A computer cannot work without memory.
- There are two types of memory: RAM (Random Access Memory) and ROM (Read Only Memory)

**Secondary Storage devices:**

- These devices are used to store data permanently in the computer for later use.
- These are CD's, Hard Disk, and Floppy Disk etc.

**I/O unit:**

- It helps the processor to communicate with its peripheral devices.
- These are disk drives, monitor, printer etc.
- I/O unit controls different devices attached with computers.

**Register:**

- These are the high-speed memory locations built into the microprocessor. The CPU uses these locations to store data and instructions temporarily to perform certain operations.
- Data is processed and transferred from one component to another with the help of registers.

**Bus Interconnection:**

- It is used to connect different parts of the computer. It is a communication channel all the data instructions and commands flow through the bus interconnection.
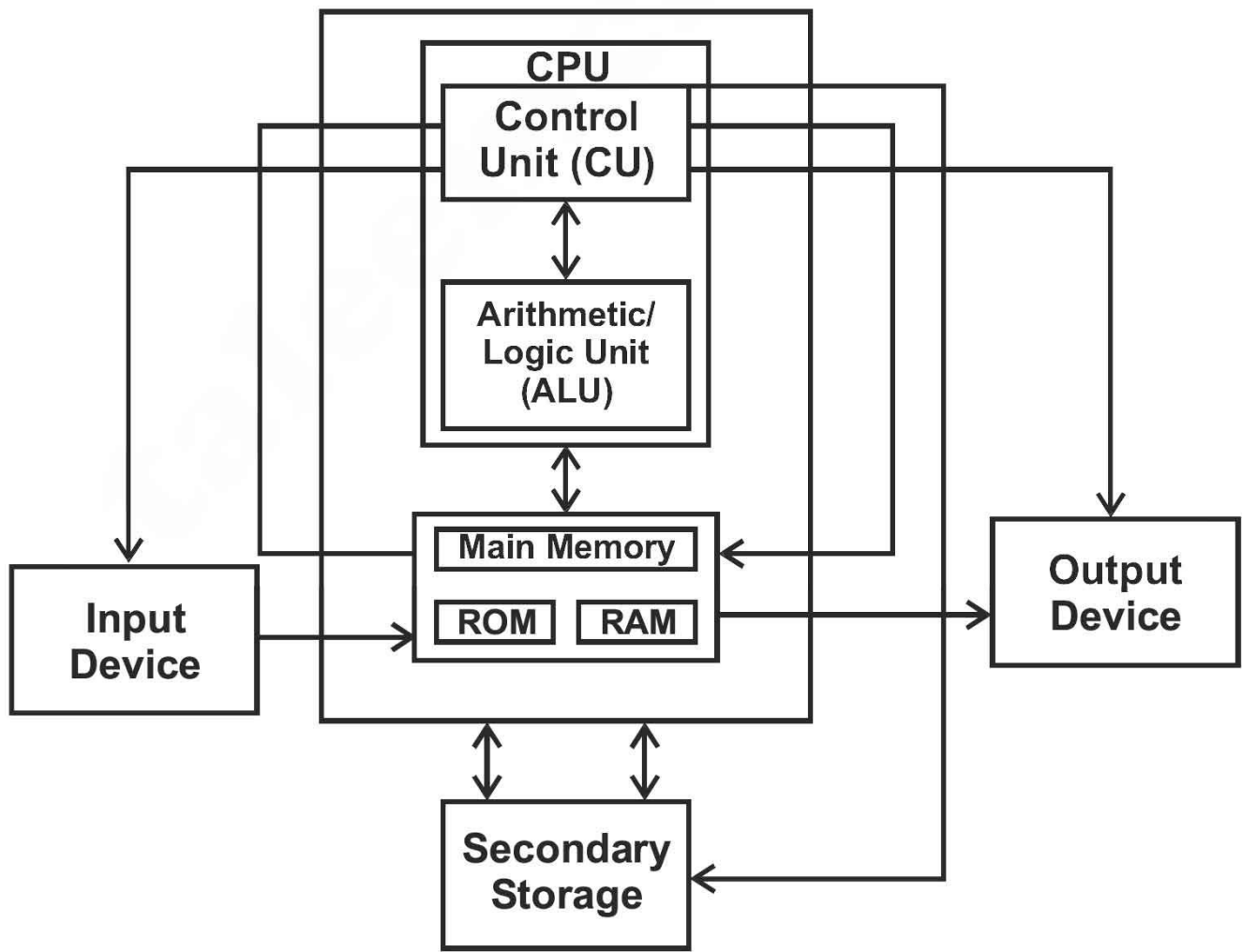
## Q2. What is Computer Memory? Describe its types.

## MAIN MEMORY:

- It is called working area of the computer. All the programs and data are stored in memory.

- A computer cannot work without main memory.

- It is a chip of semi-conductor material.

- Memory consists of identical cells. These cells are logically organized into a group of 8-bits (1-Byte). Each memory cell has a unique address.
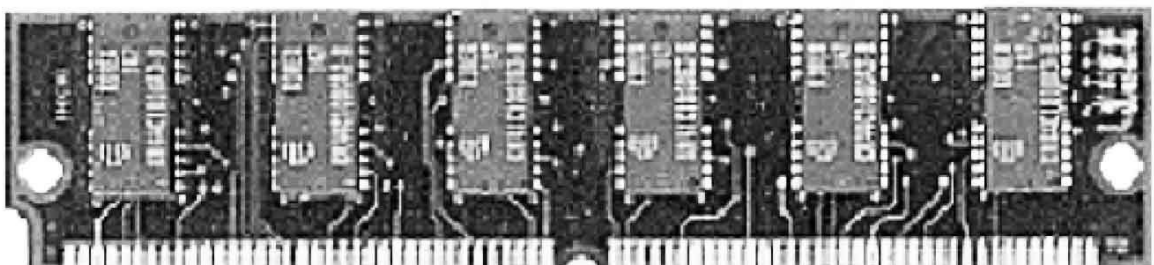
- Data and instructions are stored in these cells in the form of bits.

- It is possible to randomly select any memory cell directly to store and retrieve data and instructions because each location of memory is accessible in equal time.

- It is faster than other storage devices.

- **Types of Memory:**

    RAM (Random Access Memory) and ROM (Read Only Memory)

## RAM (Random Access Memory)

- Primary storage is also called RAM (**Random Access Memory**).

- It is used as read/write memory. It is also called volatile and user memory.

- The contents of RAM are lost if the electric supply is switched-off.

- Random Access Memory or RAM is the memory that the computer uses to temporarily store the information as it is being processed. The more information being processed the more RAM computer needs.

- RAM memory chips are available in different sizes and speeds, which are from 64MB to 2GB.

- As computer technology changes the type of memory changes and making old memory chips obsolete.

- It improves the data processing speed of the computer.

**Types of RAM:**

      SRAM, DRAM

**SRAM:**

- It stands for static random access memory.
- No refreshing is required in SRAM.
- These chips are faster than DRAM.
- SRAM uses less power than DRAM.
- Its design is more complex than DRAM.
- SRAM is more expensive than DRAM.

**DRAM:**

- It stands for dynamic random access memory.
- It is slower than SRAM
- It requires refreshing.
- Its design is simple and is not expensive.
- **EDO-DRAM:** EDO-DRAM is an example of DRAM. It stands for Enhanced Data output Dynamic Random Access Memory. It is 50% faster than ordinary DRAM

# CACHE MEMORY:

| CPU | ⟷ | Cache Memory | ⟷ | Main Memory |
|-----|---|--------------|---|-------------|

- It is very high speed memory. It is used to increase the speed of processing
- It is small memory between CPU and main memory.
- Its access time is close to the processing speed of CPU.
- It is used to store the frequently used programs and data.
- By making active programs and data available to the CPU at a rapid rate, it is possible to increase the performance of a CPU.

# ROM (Read Only Memory):

- The contents of ROM are read only.
- New data cannot be written on it.
- Its contents are permanent.
- The system manufacture writes the ROM instructions and data at the time of manufacturing and the data and instructions cannot be changed afterwards.
- It is also called non-volatile, or system memory.
- When the power is switched off, the contents of ROM do not lost.
- As ROM is supplied by the manufacturer therefore it is impossible for the users to modify the stored programs in ROM.

- ROM chips are used to store frequently used programs like operating system routines and data which is not supposed to be change for a long time.
- **Types of ROM:**
  PROM, EPROM, EEPROM
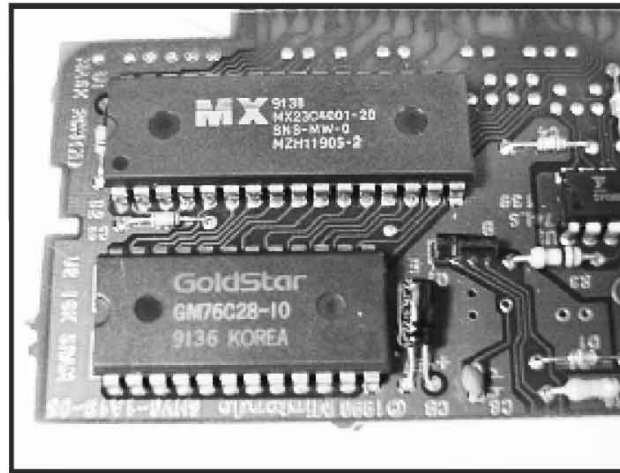


**PROM:**

- It stands for programmable read only memory.
- It is initially blank and the manufacturer writes instructions and data with some special devices.
- Once the information is stored onto PROM, then it cannot be changed.

**EPROM:**

- It stands for erasable programmable read only memory.
- It is another type of ROM chip and it is possible to erase the stored information and the chip can be reprogrammed using special devices.
- Information can be erased using ultraviolet rays.

**EEPROM:**

- It stands for electrically erasable programmable read only memory.
- It is a kind of ROM chip that can be re-written using electrical devices.
- The stored information on EEPROM can be erased, modified or reprogrammed easily using special devices.

**Q3.    What is Computer Bus? Describe its types.**

## COMPUTER BUS:

- It is a set of parallel lines used to connect two or more devices of a digital computer.
- It is the most important component of computer architecture. A computer has more than one bus interconnection.

- All the components of a computer are connected with a set of parallel lines. All these lines are used to transfer data in the form of bits from one component to another component. These lines are called BUS.

- There are two types of buses: System Bus and Expansion Bus

# SYSTEM BUS:

- System bus is used to connect main components of the computer.
- Generally there are 70-100 parallel lines in system bus.
- It is divided into three main categories.
    1. Control Bus
    2. Address Bus
    3. Data Bus

## Control Bus:

- These lines are used to transfer control signals from one component to another.
- It specifies the type of operation that is to be performed.
- It also transmits the control signals like ACKS (acknowledgement signal). When a CPU gives command to the memory for writing data, then the memory sends an acknowledgement signal to the CPU after successful writing of data.
- A few commonly control signals are:

| Command/ Control Signal | Meaning |
| --- | --- |
| **MEMORY WRITE** | It is used to write data to a given memory location |
| **MEMORY READ** | It is used to read data from a given memory location |
| **I/O WRITE** | It is used to write some data on output device. |
| **I/O READ** | It is used to read some data from input device. |
| **BUS REQUEST** | It is used to request a control on the bus so that the requesting device can use it to transmit data. |
| **BUS GRANT** | It is used by the bus controller to indicate the grant of the bus to a device. |
| **TRANSFER ASK** | This command is used to request for data transfer. |

## ADDRESS BUS:

- It is a part of system bus. It is used to carry address signals to read and write data in the memory.
- Address bus is uni-directional.
- An address is a unique ID of each component connected to the system bus. It is called address of the component.
- When a component of a computer wants to communicate with another, it uses a few system bus lines to specify the address of destination; these lines are called address bus.

# Data Bus:

- Data bus is used to transfer the data from one component to another.
- There are 32 or 64 parallel lines of data bus.
- The amount of data that a bus can transmit is called **bus-width.** A 64-line data bus can transmits 64 bits (8-bytes) at a time.
- If more lines are present in the bus, it can carry more data.
- Width of data bus has direct impact on the performance of the computer.
- Data bus is bi-directional.

# Expansion Bus:

- The major components are connected to the system bus and the remaining components are connected to expansion bus and the expansion bus is connected to the system bus.
- If all the components are attached with system bus then it will slow down the computer. All the components will have to wait longer to get access to the bus. We use the expansion bus to solve this problem.

**Q4.     What is I/O Unit? Describe Interrupts and DMA.**

# I/O UNIT:

- It handles the processor's communication with its peripheral devices.
- It is the part of a computer that is used to control the I/O devices.
- The I/O unit is responsible for controlling the different devices attached with it.
- It is also responsible for the compensation of speed difference between processor and I/O devices.
- Only the I/O unit is connected to the system bus and the remaining components are attached with I/O unit.
- There are two ways to transfer data from peripheral devices to the CPU. Interrupts and DMA
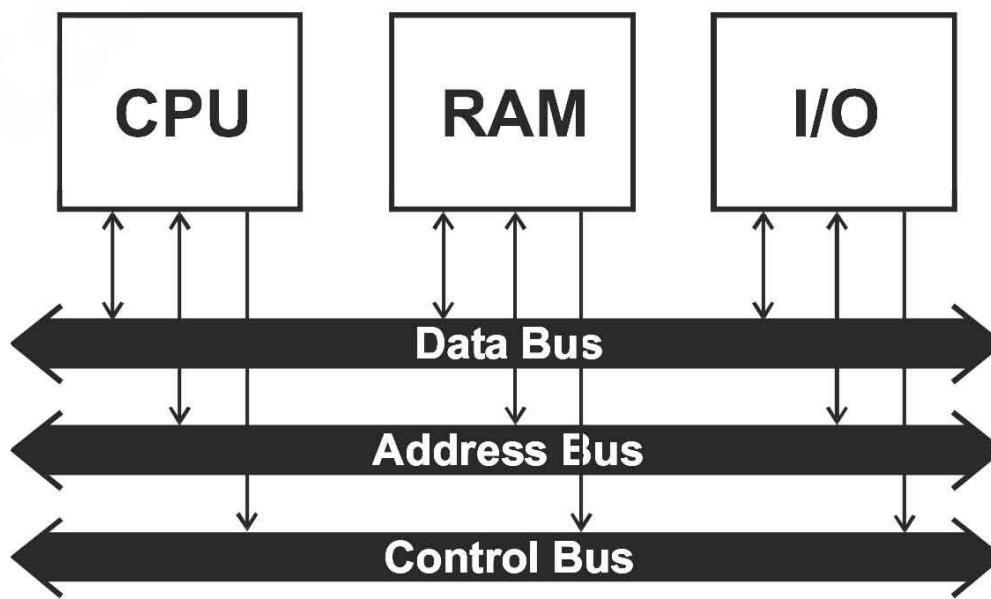
# INTERRUPTS:

- Interrupts are the signals generated by I/O devices. These signals inform the CPU about the occurrence of certain events such as completion of an I/O operation. The CPU stops all operation and control is transferred to interrupting device.

- The disadvantage of this scheme is that it reduces the overall performance of the processor.

# DMA:

- It stands for direct memory access. It is a technique of performing an I/O operation in which I/O operation is completed without involving the CPU.

- The CPU just issues an I/O command and the rest of the work is completed with the help of a special DMA module (DMA controller).

- CPU then continuous to do the other task when I/O operation is completed the DMA module sends a interrupt signal to CPU. Thus the CPU is involved in the beginning and at the end of I/O operation and the performance of the CPU is increased.

- The disadvantage of DMA scheme is that it is more complex and more hardware is required.

**Q5.    What are Registers? Describe register types.**

# CPU REGISTERS:

- These are the high speed memory locations built into the microprocessor. The CPU uses these locations to store data and instructions temporarily for processing.

- CPU processes, stores and transfers data from one component to another with the help of registers.

- The number of register varies among computers.

- It increases the performance of CPU.

- Each register receives the information, hold it temporarily and pass it on, as directed by CU.

- The size of registers depends on the computer architecture.

| | | Byte No: | 0 | 1 | 2 | 3 |
|---|---|---|---|---|---|---|

Left side register list:

| Register A for Arithmetic | General Purpose |
| Register B for Arithmetic | Arithmetic and |
| Register C for Arithmetic | |
| Register D for Arithmetic | Logical Registers |
| Operational Flags Register | Flag Registers |
| Stack Pointer Register | |
| Stack Pointer Register (Base Pointer) | Stack Registers |
| Segment Pointer Register 1 | |
| Segment Pointer Register 2 | |
| Segment Pointer Register 3 | Segment Registers |
| Instruction Pointer Register | |
| Index Register 1 | |
| Index Register 2 | Index Registers |

Right side table (EAX / AX, Byte No: 0 1 2 3):

| Register | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| Register EAX | | | AH | AL |
| Register EBX | | | BH | BL |
| Register ECX | | | CH | CL |
| Register EDX | | | DH | DL |
| Register ESP | | | SP | |
| Register EBP | | | BP | |
| Register EDI | | | DI | |
| Register ESI | | | SI | |
| Register EIP | | | IP | |
| Register EFLAGS | | | FLAGS | |

| CS |
| DS |
| ES |
| SS |
| FS |
| GS |

- **Types of Registers:**
  PC (Program Counter)
  IR (Instruction Register)
  MAR (Memory Address Register)
  MBR (Memory Buffer Register)
  IP (Instruction Pointer)
  SP (Stack Pointer Register)
  GPR (General Purpose Registers A, B, C, D)
  Address or segment Registers (CS, DS, ES, SS)
  Index Registers (DI, SI)
  flag register

## PC (Program Counter):
- It holds the address of the next instruction to be fetched and executed.
- When instruction is fetched, the value of PC is automatically incremented and it points to the address of next instruction.

## IR (Instruction Register):
- It holds the current instruction that is being executed.

## MAR (Memory Address Register):
- It holds the address of active memory location.
- When CPU wants to stores or read data from the memory, CPU stores the required address of memory location in MAR.

## MBR (Memory Buffer Register):

- It holds the contents of the memory location read from or written in the memory.

## SP (Stack Pointer Register):

- Arrangement of data is called **stack** and data is stored in or retrieved from stack using LIFO (last in first out).
- LIFO is also known as FILO (first in last out). PUSH and POP instructions are usually used in stack to store or retrieve the values.
- SP register is used to manage the stack and it stores the value of top of stack.

## GPR (General Purpose Registers A, B, C, D):

- These registers are used to perform arithmetic and logical operations.
- EAX, EBX, ECX, EDX are 4 byte registers. AX, BX, CX, and DX are 2 byte registers. AH, AL, BH, BL, CH, CL, DH and DL are 1 byte registers.
- There are four general purpose registers.

## AX stands for Accumulator Register:

- It is used for arithmetic and logical operations.
- It holds the initial data to be operated upon, and the final results of processing.
- The results of arithmetic operations are returned to accumulator for transfer to the main memory through buffer register.

## BX stands for Base Register:

- It is used for arithmetic and data movement operations.

## CX stands for Counter Register:

- It is used for counting purpose.
- It acts as counter in loops.

## DX stands for Data Register:

- It has special role in division and multiplication.
- The size of these registers is from 1 to 4 bytes.

## Address or Segment Registers (CS, DS, ES, SS) :

- It is a group of 4 registers CS, DS, ES and SS.
- Size of each segment register is 2 bytes.

## CS (Code Segment) Register:

- It holds the base location of all executable instructions in the program.
- CS along with IP register fetches the next instruction.

## DS (Data Segment) Register:

- It is the default base location for memory variables.
- DS points to data in memory using DI or SI registers.

- CPU calculates the offset of variables using the current value of DS.

**ES (Extra Segment) Register:**

- It is an additional base location for memory variables.

**SS (Stack segment) Register:**

- It contains the base location of the current program stack.

**IP (Instruction Pointer) Register:**

- CS along with IP register fetches the next instruction.

**Index Registers (DI, SI):**

- DS points to data in memory using DI (Destination Index) or SI (Source Index) registers.

**Q6.    What is an Instruction set and explain types of Instructions?**

# TYPES OF INSTRUCTIONS:

- Each CPU provides a number of instructions to perform different operations.
- The set of all the instructions provided by CPU is called **Instruction Set.**
- The instruction set increases the performance of a CPU.
- There are four types of instructions provided by a CPU.

  Data transfer instructions

  Arithmetic and logical instructions

  I/O instructions

  Control Transfer instructions

**Data Transfer Instructions:**

- These instructions are used to transfer data from or to the memory.
- The professionals use these instructions to bring the data into CPU and copy data from CPU to the memory.

**Arithmetic and Logical Instructions:**

- CPU can perform arithmetic and logical operation with the help of arithmetic and logical instructions.
- Arithmetic instructions are addition, subtraction, multiplication and division.
- These operations are performed on signed, unsigned and floating point numbers.
- Logical operation is like comparison of two numbers. XOR shifting and rotating of numbers are also logical operations and logical instructions perform logical operation.

### I/O Instructions:

- Each CPU provides instructions to read data from peripheral devices and writing data to peripheral devices.

- These instructions are used to read and write data to and from the Input/Output devices e.g. a programmer uses input and output commands e.g. input and print commands are used for these operations

### Control Transfer Instructions:

- Each CPU provides instructions to control the flow of operations.

- These instructions are used to execute the instructions repeatedly and the programmer uses these instructions to transfer the control from one instruction to another e.g. jump, jumpz (jump if zero).

**Q7. What is an Instruction format? Explain different types of Instructions format.**

## INSTRUCTION FORMAT:

- The CPU fetches the instruction from memory and decodes it and executes the instruction according to the requirement of the instructions.

- The structure of instruction is called instruction format. Each instruction has a specific format and generally it consists of:

**opcode:** A code for the instruction indicates the type of action and is 4-bit code

**Address of the operands:** These are the addresses of data locations on which CPU performs an action and each address is 6-bits.

**opcode(4-bits)        operand referce1(6-bits)      operand reference2(6-bits)**

**The different address formats are:**

1. Zero Address format
2. One address format
3. Two address format
4. Three address format

**Zero Address format:**

- It does not use any address field in the computational instruction.

- ADD and MUL instructions don't use any address field of the stack (set of memory location); however, address field is necessary for PUSH and POP instructions.

**One address format:**

- The instruction with one address format uses only one address field. It uses accumulator AC register for all types of data manipulation.

**Two address format:**

- The instruction with two address format uses two address fields. Each address field can specify a register or a memory location.

- Examples are: ADD, MOV, CMP, BIS etc.

**Three address format:**

- The instruction with three address format uses three address fields. Each address field can specify a register or a memory location.

- A program with arithmetic expressions produces fast and better results.

- A binary coded instruction requires too many bits to specify three addresses.

- These instruction formats consists of either three register address fields or two registers and one memory address field.

**Q8.    What is Fetch-Decode and Execute Cycle? Explain different steps involved in this process.**

# FETCH-DECODE AND EXECUTE CYCLE:

- This cycle describes the process of execution of an instruction within the computer.

- One round of steps from getting an instruction back to getting the next instruction is called the **Machine Cycle**.
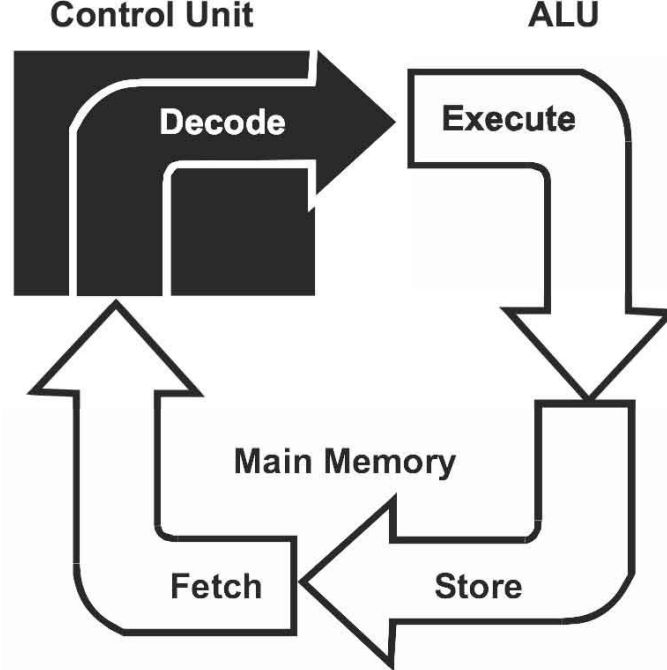
### The Machine Cycle

Fetch -    Get an instruction from Main Memory

Decode -  Translate it into computer commands

Execute - Actually process the command

Store -    Write the result to Main Memory

**Fetch Instruction:**

- The CPU reads the value of PC and the instruction is copied into the instruction register (IR). This process involves two following steps:
  - 1 Copy the contents of PC into MAR and the request for memory read.
  - 2. Copy the data from the memory to MBR and instruction is copied into IR.
- After completing the above steps the value of PC is incremented and it points to the address of next instruction.

**Decode Instruction:**

- Decoding means to activate the appropriate circuit to execute the instruction.
- After completing the fetch process the CU decodes the instruction by analyzing the opcode of the instruction.
- CU also reads the values of operands specified in the instruction.

**Execute Instruction:**

- The process of performing an action on the decoded instruction is called execution.
- After decoding the CPU executes the instruction by using the activated circuit.
- After execution the results are copied into the registers and memory.

**Q9.     What is an Operating system? Explain different functions of OS.**
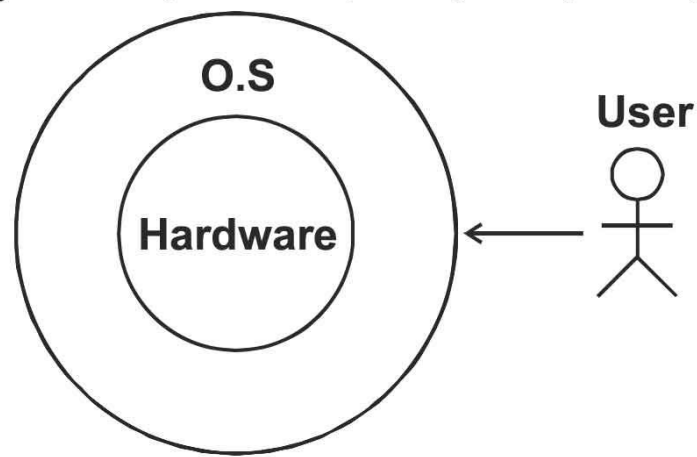
## OPERATING SYSTEM:

- It is a collection of operative programs that provides an interface for the user to interact with the computer.

         OR

- It is a set of programs running in the background on a computer system and providing an environment in which other programs can be executed  and the computer system can be used efficiently.

- Important operating system are; windows, DOS, Unix, Linux, Solaris etc.



# Functions of Operating System:

## Manage Hardware Resources:

- OS must provide programs to manage the hardware resources of the computer like disk, memory and CPU.

## Memory Management:

- Every program must be loaded in the computer memory during execution and if several programs are loaded simultaneously in the memory then it is the job of operating system to run each program individually.

  For multi-programming time-sharing technique is used.

  The operating system is responsible for the protection of data of one program from the action of other programs.

## Load and Execute Programs:

- Operating system provides the facility of easily loading programs in the main memory and starts its execution.

## Booting:

- Booting is a process of starting or restarting the computer. Operating system starts the compute to work. It checks the computer and makes it ready to work.

## Data Security:

- OS must protect the user's data from an illegal access and modification.

## Interface to the Users:

- It is an interface between user and computer and also between software and computer.
- There are two type of interfaces:
- Command-line interface
- Graphical user interface

## Command-line interface (CLI):

- In command line interface users communicate with the system by typing commands using keyboard or
- It provides a command prompt to the users for typing commands to interact with the computer.
- Each command activates a program of the operating system.
- Examples are: MS-DOS, early versions of UNIX, Novell Netware etc.

**Graphical user interface (GUI):**
- A GUI operating system provides a graphical user interface to establish the user communication with the computer.
- It consists of windows, menus, icons and pointers.
- The user issues the commands by selecting different object with the help of pointing devices.
- MS-Windows 95, Windows 98, Windows XP are the examples of GUI operating system.

**Q10. What are Programming Languages? Explain different Types of Programming Languages.**

# PROGRAMMING LANGUAGE:
- It is the way of communication between User and Computer.
- It is used to write computer programs.
- A language provides the rules to write an instruction is called its **syntax**. Each language has its own syntax.

**Types of Programming Languages:**
There are two types of computer languages.
1. Low Level Language
2. High Level Language

**Low Level Language (LLL):**
- The language which is close to machine language is called low level language.
- A Computer can easily understand low-level language.
- The low level language requires a deep understanding of the machine architecture.
There are two types of low-level language.
1. Machine language
2. Assembly language

**Machine language:**
- It is the native language of computer.
- The computer does not need any translator to understand it.
- Every machine language instruction consists of 0's and 1's.
- It is difficult for human beings to understand and learn it.
- It is difficult to locate and remove errors in the program.

- It is directly executed by the computer.
- The machine language programs are machine dependent.

## Assembly language:
- Machine language instructions(0's and 1's) are replaced with English like words known as mnemonics ( Ne-monics )
- It is also called symbolic language.
- An assembler is required to translate the assembly language programs into machine language.

## High Level Language (HLL):
- It is closed to human language.
- It is user friendly language.
- User can learn and understand high level language easily.
- The instructions of HLL are written in English like statements.
- The programs of HLL are not directly executed on the computer.
- A language translator is required to translate the HLL into low level language.
- These translators are compilers and interpreters
- The programs written in HLL are machine independent.
- Each language has its own translator.
- HLL programs are easy to modify, debug and more reliable.
- The HLL does not require a deep understanding of the machine architecture.
- HLL describes a well defined way of writing programs.
- These languages are mostly used for writing application programs; Examples :
- C and C++ (used for writing System Software), Java (Java is equipped with strong Network features), COBOL (common business oriented language and used for business applications), PASCAL, FORTRAN (Formula Translation and used for mathematical problems),BASIC (Beginners all purposes symbolic instruction code)

## Source Program:
- The program written in High Level Language is called source program.
- The computer does not understand the source code.
- The source code is converted into machine code and then it is directly executed on the computer.

## Object Program:
- The program in a machine language is called object program.
- The computer understands the object code directly.

**Q11. What are Language Translators? Discuss its different Types.**

# LANGUAGE PROCESSOR/TRANSLATOR:

- It is software that is used to translate the high level language programs (source code) into machine language (object code).
- Each language has its own translator. Only one type of translator is used in any language. There are three types of language processor.
    1. Compiler
    2. Interpreter
    3. Assembler



**Compiler:**
- The language translator translates the source code into object code and the whole program is translated at the same time.
- If a program contains errors then compiler can not convert the source code into machine code until all the errors are removed from the source program.

**Interpreter:**
- The language translator translates the source code into object code statement by statement.
- The working of interpreter is slower than the compiler.
- Any error in the program stops its execution. After removal of errors execution resumes.

**Difference between compiler and interpreter:**
- Compiler converts the whole program at a time and interpret / translate the source code instructions one by one.
- Compiler converts each instruction only once but the interpreter may translate an instruction several times.
- A compiled program runs faster than an interpreted program.

**Assembler:**
- The language translator translates the assembly language into machine code i.e. it produces the binary instructions for a given assembly language program.

**Q.12   What is a port? Explain different types of ports.**

**Ans.   Port:**
- The peripheral devices are connected to the system unit through a special device called the port. It is an interface or connecting socket.
- It provides a standard way of communication between the computer and its input and output devices (or peripheral devices). For examples, keyboard, mouse, printer, monitor, and modem etc. are connected with the computer by plugging their connectors into ports.

**Types of Ports:**

There are three basic types of ports:

- o Serial port.
- o Parallel port.
- o USB port.

**Serial Ports:**

- Serial ports provide connection for transmitting data one bit at a time. Serial ports are often referred to as communicating (COM) ports. The mouse, keyboard and modem are usually connected to the serial ports.

**Parallel Port:**

- A parallel port provides a connection for transmitting data 8-bits at a time. Therefore, it is eight times faster than serial port. The printers and scanners are connected to the parallel ports. Parallel ports are often referred to as Line Printer Ports (LPT).

**USB:**

- USB stands for Universal Serial Bus. It is a plug-and-play hardware interface. It is used to connect the peripherals such as keyboard, mouse, scanner, and modem etc. It allows up to 127 different peripheral devices to be connected to the computer.

# EXERCISE

**Q.1    Fill in the blanks:**

1.  DMA stands for <u>direct memory access</u>.
2.  In <u>full duplex transmission</u> mode, data can be transmitted in both directions simultaneously.
3.  The lexical analyzer also commonly known as <u>control unit</u>.
4.  The <u>control unit CU</u> reads the instructions from the memory and decodes these instructions.
5.  The <u>Graphical user interface (GUI)</u> consists of windows, menus, Icons and pointers.
6.  EEPROM stands for <u>electrically erasable programmable read only memory</u>.
7.  Stack pointer register is used for <u>managing stack</u>.
8.  DRAM requires <u>periodic electric</u> refreshing to maintain data storage.
9.  COBOL language was developed for business applications.
10. <u>GPR (General Purpose Register) or Accumulator</u> is used in mathematical and logical operations.
11. DVD stands for <u>digital video disk</u>.
12. BIOS stand for <u>basic input output system</u>.
13. Initial work on the internet was done in <u>UNIX</u> operating system.
14. The instruction that are use to transfer data from one unit to another during program execution is called <u>data transfer instructions</u>.
15. <u>General Purpose Register</u> is used in mathematical and logical operations.
16. The backbone of the computer is <u>computer bus</u>.
17. Typically CPU can provide between <u>4000 to 64000</u> bytes of memory on its cache.
18. A <u>parallel</u> port transmits multiple bits at a time.
19. In 1951, <u>John Von Neumann</u> and his team proposed a design of stored program computer.
20. A sequence of instructions is called a <u>program</u>.
21. All the data and the programs are stored in <u>memory</u>.
22. The machine reads all the instructions one by one and executes these instructions <u>sequentially</u>.
23. The organization and interconnection of various computer components is called <u>computer architecture</u>.
24. CPU stands for "<u>central processing unit</u>".
25. CPU is a small chip mounted on the <u>circuit board (mother board)</u>.

26. CPU is the brain of computer in term of computing power and it controls all the functions of computer system.
27. CPU performs data processing.
28. CU stands for "Control Unit".
29. The Control Unit reads the instruction from memory, decodes and executes these instructions.
30. ALU stands for "Arithmetic and Logical Unit".
31. All the program instructions and data are stored in memory for the execution.
32. Memory unit temporarily stores the data and instructions.
33. Memory unit is also called working area of the computer.
34. RAM Stands for Random Access Memory.
35. ROM stands for Read Only Memory.
36. Secondary Memory is used to store data permanently in the computer for later use.
37. I/O Unit handles the processor's communication with its peripheral devices.
38. Register are the high speed memory locations built into the microprocessor. The CPU uses these locations to store data and instructions temporarily to accomplish certain operations.
39. Data is processed and transferred from one component to another with the help of registers.
40. Bus Interconnection is used to connect different parts of the computer.
41. SRAM stands for static random access memory.
42. No refreshing of electric states is required in SRAM.
43. SRAM chips are faster than DRAM.
44. SRAM uses less power than DRAM.
45. The design of SRAM is more complex than DRAM.
46. SRAM is more expensive than DRAM.
47. DRAM stands for dynamic random access memory.
48. DRAM must have an electric current to maintain its electric states.
49. ROM is referred as non-volatile, or system memory.
50. When the power is switched off, the contents of ROM is not lost.
51. PROM stands for programmable read only memory.
52. EPROM stands for erasable programmable read only memory.
53. Information can be erased using ultraviolet rays in EPROM.
54. EEPROM stands for electrically erasable programmable read only memory.
55. Cache Memory is very high speed buffer or memory used to increase the speed of processing.
56. Cache Memory is small memory between CPU and main memory whose access time is close to the processing speed of CPU.

57. Computer BUS is circuits provide a communication path between two or more devices of a digital computer.
58. A computer has more than one bus interconnection.
59. All the components of a computer are connected with a set of parallel lines. These lines are used to transfer data in the form of bits from one component to another component. These lines are called BUS.
60. The System Bus is used to connect main components of the computer.
61. There are 70-100 parallel lines in system bus.
62. The System Bus is divided into three main categories.
63. Control Bus is the lines that are used to transmit commands or control signals from one component to another.
64. MEMORY WRITE is used to write data to a given memory location.
65. MEMORY READ is used to read data from a given memory location.
66. I/O WRITE is used to write some data on output device.
67. I/O READ is used to read some data from input device.
68. BUS REQUEST is used to request a control on the bus so that the requesting device can use it to transmit data.
69. BUS GRANT is used by the bus controller to indicate the grant of the bus to a device.
70. TRANSFER ASK is used by the bus controller to indicate the grant of the bus to a device.
71. Address Bus is a part of system bus and it carries the address of various memory locations to perform read and write operations.
72. Data Bus is used to transfer the data from one component to another.
73. The amount of data that a bus can transmit is called bus-width.
74. The major components are connected to the system bus and the remaining components are connected to another bus called expansion bus and the expansion bus is connected to the system bus.
75. The I/O unit is responsible to compensate the speed difference between processor and I/O devices.
76. Interrupts are the signals generated by I/O devices. These signals inform the CPU of the occurrence of certain events such as completion of an I/O operation.
77. DMA stands for direct memory access.
78. DMA is a technique of performing an I/O operation in which I/O operation is completed without involving the CPU.
79. PC stands for Program Counter.
80. PC holds the address of the next instruction to be fetched and executed.
81. IR stands for Instruction Register.
82. IR holds the current instruction that is being executed.

83. MAR stands for Memory Address Register.
84. MAR holds the address of active memory location.
85. MBR stands for Memory Buffer Register.
86. MBR holds the contents of the memory location read from or written in the memory.
87. SP stands for Stack Pointer Register.
88. Arrangement of data is called stack and data is stored in or retrieved from stack using LIFO.
89. LIFO stands for last in first out.
90. LIFO is also known as FILO (first in last out).
91. SP register is used to manage the stack
92. EAX, EBX, ECX, EDX are 4 byte registers.
93. AX, BX, CX, and DX are 2 byte registers.
94. AH, AL, BH, BL, CH, CL, DH and DL are 1 byte registers.
95. A stands for Accumulator. It is used for arithmetic and logical operations.
96. B stands for Base register. It is used for arithmetic and data movement and special addressing abilities.
97. C stands for Counter register. It is used for counting purpose.
98. D stands for Data register. It has special role in division and multiplication.
99. Address registers are also called segment Registers.
100. CS, DS, ES, SS are segment registers.
101. The size of each segment register is 2 bytes.
102. CS stands for code segment.
103. CS holds the base location of all executable instructions in the program.
104. CS along with IP register fetches the next instruction.
105. DS stands for Data Segment.
106. DS is the default base location for memory variables.
107. DS points to data in memory using DI or SI registers.
108. CPU calculates the offset of variables using the current value of DS.
109. ES stands for Extra Segment.
110. ES is an additional base location for memory variables.
111. SS stands for Stack segment.
112. SS contains the base location of the current program stack.
113. IP stands for Instruction Pointer.
114. The set of all the instructions provided by CPU is called Instruction Set.
115. The instruction set increases the performance of a CPU.
116. Data Transfer Instructions are used to transfer data from or to the memory.
117. Arithmetic and Logical Instructions perform arithmetic and logical operation.
118. All arithmetic and logical operations are performed by ALU.

**Types of RAM:**
      SRAM, DRAM

**SRAM:**

- It stands for static random access memory.
- No refreshing is required in SRAM.
- These chips are faster than DRAM.
- SRAM uses less power than DRAM.
- Its design is more complex than DRAM.
- SRAM is more expensive than DRAM.

**DRAM:**

- It stands for dynamic random access memory.
- It is slower than SRAM
- It requires refreshing.
- Its design is simple and is not expensive.
- **EDO-DRAM:** EDO-DRAM is an example of DRAM. It stands for Enhanced Data output Dynamic Random Access Memory. It is 50% faster than ordinary DRAM

# CACHE MEMORY:

| CPU | ←→ | Cache Memory | ←→ | Main Memory |
|-----|-----|--------------|-----|-------------|

- It is very high speed memory. It is used to increase the speed of processing
- It is small memory between CPU and main memory.
- Its access time is close to the processing speed of CPU.
- It is used to store the frequently used programs and data.
- By making active programs and data available to the CPU at a rapid rate, it is possible to increase the performance of a CPU.

# ROM (Read Only Memory):

- The contents of ROM are read only.
- New data cannot be written on it.
- Its contents are permanent.
- The system manufacture writes the ROM instructions and data at the time of manufacturing and the data and instructions cannot be changed afterwards.
- It is also called non-volatile, or system memory.
- When the power is switched off, the contents of ROM do not lost.
- As ROM is supplied by the manufacturer therefore it is impossible for the users to modify the stored programs in ROM.

141. <u>Assembler</u> is the language translator translates the assembly language into machine code.

142. A <u>parallel</u> port transmits multiple bits at a time.

143. The backbone of the computer is <u>CPU</u>.

**Q.2** **Choose the correct answer.**

1. Data and programs that are not being use by computer are stored in:
   - **(a) Secondary storage**
   - (b) Cache
   - (c) Primary storage
   - (d) printer

2. A set of instructions that run the computer are:
   - (a) Hardware
   - (b) document
   - (c) CPUs
   - **(d) Software**

3. The idea of stored program was given by:
   - (a) Charles Babbage
   - (b) John Leitbiz
   - **(c) John Von Neumann**
   - (d) Pascal

4. Which one is the brain of computer?
   - (a) RAM
   - **(b) CPU**
   - (c) Motherboard
   - (d) System unit

5. Which component of a computer decodes and executes program constructions?
   - (a) Main memory
   - **(b) Control unit**
   - (c) Bus interconnection
   - (d) ALU

6. The component of computer that stores data and program while these are being executed is called:
   - **(a) Main memory**
   - (b) Control unit
   - (c) Bus interconnection
   - (d) ALU

7. The component of computer that is used to connect different parts of the computer together is called:
   - (a) Register
   - (b) I/O unit
   - **(c) Bus interconnection**
   - (d) CPU

8. A computer drives its basic strength from:
   - (a) Speed
   - (b) Memory
   - (c) Accuracy
   - **(d) All**

9. The program that contains instructions to operate a device is called:
   - **(a) Device driver**
   - (b) Device Operator
   - (c) Device linking
   - (d) Device system

10. Which component of CPU is responsible for performing arithmetic and logical operations on numeric data?
    - **(a) ALU**
    - (b) Control unit
    - (c) Register
    - (d) None

11. CPU is an example of:

(a) Software      (b) Input unit

**(c) Hardware**      (d) Output unit

12. Which is a storage device?

(a) CPU      (b) Clock

**(c) Floppy disk**      (d) Bus

13. Which component of computer coordinates all activities in the computer?

(a) ALU      **(b) Control unit**

(c) Bus interconnection      (d) Registers

14. Which component of computer is responsible for comparison of two numbers?

**(a) ALU**      (b) Control unit

(c) Memory      (d) Hard Disk

15. ———— is the component of CPU:

(a) Main memory      (b) Bus interconnection

**(c) ALU**      (d) I/O unit

16. CPU includes all of the following components except?

**(a) Main memory**      (b) ALU

(c) Control unit      (d) Registers

17. The cells of memory are logically organized into group of:

(a) 4-bits      (b) 5-bits

(c) 7-bits      **(d) 8-bits**

18. CPU is an example of:

(a) Software      (b) a program

**(c) Hardware**      (d) an output unit

19. The address of instruction under the processor execution is contained within:

(a) Program Counter      (b) Current Instruction Register

**(c) Memory address registers**      (d) Memory Buffer register

20. RAM is a:

(a) Read Only Memory      (b) Permanent memory

**(c) Volatile memory**      (d) None

21. ———— is non-volatile memory:

(a) RAM      (b) DRAM

**(c) ROM**      (d) SRAM

22. ─────── chips must be refreshed with electric charge periodically?

(a) SRAM (b) ROM

(c) EEPROM **(d) DRAM**

23. ROM is:

(a) Read Only Memory (b) Non-volatile

(c) Volatile **(d) Both a and b**

24. ─────── is a type of ROM?

(a) PROM (b) EPROM

(c) EEPROM **(d) All**

25. ─────── memories can be re-written by using electrical devices?

(a) PROM (b) ROM

**(c) EEPROM** (d) EPROM

26. Which memory is used to increase the processing speed of computer?

(a) RAM (b) ROM

**(c) Cache Memory** (d) SRAM

27. Files not being used by computer are stored in:

**(a) Secondary storage** (b) Cache

(c) Primary Storage (d) Registers

28. A set of parallel electrical lines used to transfer data is called:

(a) Monitor (b) Computer Clock

(c) I/O unit **(d) Bus**

29. The circuit board on which processor and other chips are mounted is called:

(a) Master board (b) Main board

**(c) Motherboard** (d) All

30. The external devices that are connected to a computer are called:

(a) Buses (b) Registers

**(c) Peripherals** (d) Slots

31. A computer drives its basic strength from:

(a) Speed (b) Memory

(c) Accuracy **(d) ALL of the above**

32. The arithmetic and logic unit performs the following operations :

(a) Controls Computer operations

(b) Performs arithmetic functions such as addition and subtraction etc.

(c) Performs logical comparisons such as equal, greater than, less than etc.

**(d) Both b and c**

33. How many categories the system bus is divided?

(a) 2  **(b) 3**

(c) 4  (d) 5

34. Which one is not a type of bus?

**(a) Cache**  (b) Control bus

(c) Address bus  (d) Data bus

35. CPU sends command signals to different components of computer through:

(a) Data bus  (b) Address bus

**(c) Control bus**  (d) All

36. A bus that communicates data between CPU and memory is called:

**(a) Data bus**  (b) Address bus

(c) Control bus  (d) All

37. ———— command is used to write data into memory?

(a) I/O Write  (b) Transfer Ask

**(c) Memory Write**  (d) I/O Read

38. Temporary storage area within CPU is called:

**(a) Register**  (b) ALU

(c) Bus interconnection  (d) Linked code

39. Which one is faster?

(a) RAM  (b) Cache

**(c) Register**  (d) Hard disk

40. Which is not a type of register?

**(a) Math coprocessor**  (b) Flag

(c) Accumulator  (d) Segment

41. ———— registers holds the address of the next instruction to be fetched for execution:

(a) IR  **(b) PC**

(c) MAR  (d) MBR

42. ——————— registers holds the instruction fetched from memory?

    **(a)**   **IR**                     (b)   PC

    (c)   MAR                 (d)   MBR

43. Which register holds the address of active memory location that is being currently accessed by the CPU?

    (a)   IR                    (b)   PC

    **(c)**   **MAR**               (d)   MBR

44. Which is a storage device?

    (a)  CPU                  (b)  Clock

    **(c)**  **Floppy disk**        (d)  Bus

45. Which component is responsible for comparing the contents of two pieces of data:

    **(a)**  **ALU**              (b)  Control Unit

    (c)  Memory            (d)  None

46. Which register holds the contents of data/instruction read from, or written in memory?

    (a)   IR                    (b)   PC

    (c)   MAR                 **(d)**   **MBR**

47. ——————— registers acts as counter for looping process?

    (a)   EAX                (b)   EBX

    **(c)**   **ECX**               (d)   EDX

48. ——————— registers is used for arithmetic and data operations?

    **(a)**   **AX**                (b)   BX

    (c)   CX                  (d)   DX

49. ——————— registers holds the base location of all executable instructions in the program?

    **(a)**   **CS**                (b)   DS, SS

    (c)   ES, FS            (d)   FS, GS

50. ——————— registers contains the base location of the current program stack?

    (a)   CS                  (b)   DS

    (c)   ES                  **(d)**   **SS**

51. The size of segment register is:

    **(a)**   **2-bytes**            (b)   2 KB

| | (c) | 2 MB | | (d) | 2 bits |
|---|---|---|---|---|---|

52. The program that contains instructions to operate a device is called:

    **(a)**   **Device driver**       (b)   Device operator

    (c)   Device linking       (d)   Device system

53. Which component of CPU decodes and executes the programs instructions?

    (a)  Clock       **(b)  CU**

    (c)  Cache       (d)  ALU

54. Which component handles the processor's communication with its peripheral devices?

    **(a)  I/O Unit**       (b)  Hard Disk

    (c)  Registers       (d)  CD

55. Which is not a component of a CPU?

    (a)  Clock       (b)  Register

    **(c)  Main Memory**       (d)  Cache

56. The basic unit for data storage is:

    **(a)  Byte**       (b)  Bit

    (c)  TB       (d)  GB

57. 8 Bytes is equal to:

    (a)  Bit       (b)  48 bits

    (c)  32 Bits       **(d)  64 bits**

58. The process of taking action on the decoded instruction is called:

    (a)   Decode instruction       **(b)   Execute instruction**

    (c)   Activate instruction       (d)   None

59. The process of decoding the instruction so that the computer can understand it is called:

    **(a)   Decode instruction**       (b)   Execute instruction

    (c)   Translate instruction       (d)   Fetch instruction

60. The programming languages that are close to human language are called:

    **(a)   High-level**       (b)   Low-level

(c)    Medium-level                          (d)    Machine

61.    The programming languages that are very close to machine code are called:

(a)    High-level                          **(b)    Low-level**

(c)    Medium-level                          (d)    Machine

62.    How many types of language translator?

(a)    2                                          (b)    4

(c)    5                                          **(d)    3**

63.    ——————— is a type of language translator?

(a)    Compiler                          (b)    Assembler

(c)    Interpreter                          **(d)    All**

64.    The set of parallel lines to connect to different parts of the computer is called:

**(a)  Bus**                                   (b)  Memory

(c)  I/O                                        d)   ALL of the above

65.    Which register is used for counting purpose?

(a)  AX                                        **(b)  CX**

(c)  DX                                        (d)  BX

66.    Which register is known as Accumulator?

**(a)  AX**                                    (b)  CX

(c)  DX                                        (d)  BX

67.    The program written in assembly language is translated with the help of:

(a)    Compiler                          **(b)    Assembler**

(c)    Interpreter                          (d)    Decoder

68.    The translated program into machine code is called:

(a)    Source program                 **(b)    Object program**

(c)    System program                 (d)    Application software

69.    The output of the compiler is called:

(a)    Program                          (b)    Source code

(c)    Application                      **(d)    Object code**

70.    The special programs that are used to convert a source code into object code are called:

(a)    Language translator            (b)    Language processor

**(c)** Both a and b            (d)    Operating system

71. Which is not a general purpose register?

(a) EDX                      (b) EAX

**(c) EEX**                      d) EBX

72. The register that holds the current Instruction is called

(a) MBR                      (b) MAR

**(c) IR**                         (d) PC

## Q.3 WRITE T FOR TRUE AND F FOR FALSE STATEMENT:

1. Bps stands for byte per second           **(T)**

2. In Simplex Transmission mode, communication can take place in both directions. **(F)**

3. Random access memory is volatile memory.      **(T)**

4. Operating system is an application program.      **(F)**

5. External buses and internal buses are similar.      **(F)**

6. Accumulator register is used to control the stack in the computer. **(F)**

7. LIFO stands for last in first off.      **(F)**

8. Expansion slot is a place where an expansion card is fitted. **(T)**

9. Static RAM holds the data as long as power is supplied to it. **(F)**

10. The clock of the computer ticks once in one second just like an ordinary clock. **(F)**

11. VDU is an input device.      **(F)**

**Q.1** **What is the design of John Von Neumann?**

**Ans.** In 1951 John Von Neumann and his team proposed a design of stored program computer. According to the design:

A sequence of instructions is called a program.

All the data and the programs are stored in memory.

The machine reads all the instructions one by one and executes these instructions sequentially.

**Q.2** **What is Computer Architecture?**

**Ans.** The organization and interconnection of various computer components is called computer architecture. I/O devices, CPU, Primary or Main Memory, Secondary Memory or Storage devices, I/O unit, Registers, Bus Interconnection are the components of computer architecture.

**Q.3** **What are I/O devices?**

**Ans.** It stands for input and output devices. Input devices: User can communicate with the computer through input devices e.g. Keyboard, Mouse, joystick, track-ball, Microphone, camera, scanner, bar code reader etc. Output devices are used to communicate with the user e.g. Monitor, Speakers, Printers and Projectors etc.

**Q.4** **What is a CPU?**

**Ans.** It stands for "central processing unit". It is a small chip mounted on the circuit board (mother board). CPU is the brain of computer in term of computing power and it controls all the functions of computer system. CPU also performs data processing. There are two parts of a CPU. CU (Control Unit) and ALU (Arithmetic and logical unit)

**Q.5** **What is CU?**

**Ans.** It stands for "Control Unit". The CU reads the instruction from memory, decodes and executes these instructions.

**Q.6** **What is ALU?**

**Ans.** It stands for "Arithmetic and Logical Unit". It performs two types of operations on data. Arithmetic operations (addition, subtraction, multiplication and division) Logical operations (the operations produces true or false results e.g. less than, greater than, equal to not equal to etc.)

**Q.7**  **What is the function of Main Memory?**

**Ans.**  All the program instructions and data are stored in memory prior to the execution. This unit temporarily stores the data and instructions. It is also called working area of the computer. There are two types of memory: RAM (Random Access Memory) and ROM (Read Only Memory)

**Q.8**  **What are Secondary Storage Devices?**

**Ans.**  These devices are used to store data permanently in the computer for later use. These are CD's, Hard Disk, and Floppy Disk etc.

**Q.9**  **What is an I/O unit?**

**Ans.**  It handles the processor's communication with its peripheral devices. These are disk drives, monitor, printer etc.

**Q.10**  **What are Registers?**

**Ans.**  These are the high speed memory locations built into the microprocessor. The CPU uses these locations to store data and instructions temporarily to accomplish certain operations. Data is processed and transferred from one component to another with the help of registers.

**Q.11**  **What is Bus Interconnection?**

**Ans.**  It is used to connect different parts of the computer.

**Q.12**  **What is Main Memory?**

**Ans.**  It is a chip of semi-conductor material. Memory consists of identical cells. These cells are logically organized into a group of 8-bits (1-Byte). Each cell has a unique address to read or to write data in the memory. Data and instructions are stored in these cells in the form of bits. It is directly accessible device therefore; it is faster than other storage devices. There are two types of memory. RAM (Random Access Memory) and ROM (Read Only Memory)

**Q.13**  **What is RAM?**

**Ans.**  RAM stands for Random Access Memory. Primary storage is usually referred as RAM. It is referred as read/write memory. It is also called volatile, or user memory. The contents of RAM are lost as the electric supply is cut-off. There are two types of RAM. SRAM, DRAM

**Q.14**  **Define SRAM.**

**Ans.**  It stands for static random access memory. No refreshing of electric states is required in SRAM. These chips are faster than DRAM. SRAM uses less power than DRAM. Its design is more complex than DRAM. SRAM is more expensive than DRAM.

**Q.15**  **What is DRAM?**

**Ans.**   It stands for dynamic random access memory. It must have an electric current to maintain its electric states.

**Q.16** **What is a ROM?**

**Ans.** ROM stands for Read Only Memory. New data cannot be written on it. Its contents are permanent. The system manufacture writes the ROM instructions and data at the time of manufacturing and the data and instructions cannot be changed afterwards. It is referred as non-volatile, or system memory. When the power is switched off, the contents of ROM is not lost. ROM chips are used to store frequently used programs like operating system routines.

**Q.17** **What are the types of ROM?**

**Ans.** PROM, EPROM, EEPROM

**Q.18** **Define PROM.**

**Ans.** It stands for programmable read only memory. It is initially blank and the manufacturer writes instructions and data with some special devices. Once the information is stored onto PROM, then it cannot be changed.

**Q.19** **Define EPROM.**

**Ans.** It stands for erasable programmable read only memory. It is another type of ROM chip and it is possible to erase the stored information and the chip can be reprogrammed using special devices. Information can be erased using ultraviolet rays.

**Q.20** **What is EEPROM?**

**Ans.** It stands for electrically erasable programmable read only memory. It is a kind of ROM chip can be re-written using electrical devices. The stored information on EEPROM can be erased, modified or reprogrammed easily using special devices.

**Q.21** **What is the role of Cache Memory in computers?**

**Ans.** It is small memory between CPU and main memory whose access time is close to the processing speed of CPU. It is used to store segments of the current programs and data frequently used in the present calculations. By making active programs and data available to the CPU at a rapid rate, it is possible to increase the performance of a CPU.

**Q.22** **Define Computer BUS.**

**Ans.** These are circuits provide a communication path between two or more devices of a digital computer. A computer has more than one bus interconnection or all the components of a computer are connected with a set of parallel lines. All these lines are used to transfer data in the form of bits from one component to another component. These lines are called BUS. There are two types of buses. System Bus and Expansion Bus

**Q.23** **Define System Bus.**

**Ans.** The bus is used to connect main components of the computer. Generally there are 70-100 parallel lines in system bus. It is divided into three main categories. Control Bus, Address Bus and Data Bus

**Q.24** **What is a Control Bus?**

**Ans.** These lines are used to transmit commands or control signals from one component to another. It also transmits the other control signals like ACKS (acknowledgement signal). When a CPU gives command to the memory for writing data, then the memory sends an acknowledgement signal to the CPU after successful writing of data.

**Q.25** **What is function of MEMORY WRITE Command?**

**Ans.** It is used to write data to a given memory location.

**Q.26** **What is function of MEMORY READ Command?**

**Ans.** It is used to read data from a given memory location

**Q.27** **What is function of I/O WRITE Command?**

**Ans.** It is used to write some data on output device.

**Q.28** **What is function of I/O READ Command?**

**Ans.** It is used to read some data from input device.

**Q.29** **What is function of BUS REQUEST Command?**

**Ans.** It is used to request a control on the bus so that the requesting device can use it to transmit data.

**Q.30** **What is function of BUS GRANT Command?**

**Ans.** It is used by the bus controller to indicate the grant of the bus to a device.

**Q.31** **What is function of TRANSFER ASK Command?**

**Ans.** This command is used to request for data transfer.

**Q.32** **What is an Address Bus?**

**Ans.** It is a part of system bus and it carries the address of various memory locations to perform read and write operations. A unique ID is assigned to each component connected to the system bus and it is called address of the component. When a component of a computer wants to communicate with another, it uses a few system bus lines to specify the address of destination; these lines are called address bus.

**Q.33** **What is Data Bus?**

**Ans.** Data bus is used to transfer the data from one component to another. These are 32 or 64 parallel lines reserved on system bus. The amount of data that a bus can transmit is called **bus-width.** A 64-line data bus can transmits 64 bits (8-bytes) at a time. Width of data bus has direct impact on the performance of the computer.

**Q.34 What is an Expansion Bus?**

**Ans.** The major components are connected to the system bus and the remaining components are connected to another bus called expansion bus and the expansion bus is connected to the system bus. If all the components are attached with system bus then it will slow down the computer. All the components will have to wait longer to get access to the bus; therefore we use the expansion bus to solve this problem.

**Q.35 What is an I/O Unit?**

**Ans.** It handles the processor's communication with its peripheral devices. The I/O unit is responsible for controlling the different devices attached with it. It is also responsible to compensate the speed difference between processor and I/O devices. Only the I/O unit is connected to the system bus and the remaining components are attached with I/O unit. There are two ways to transfer data from peripheral devices to the CPU. Interrupts and DMA

**Q.36 What are Interrupts?**

**Ans.** Interrupts are the signals generated by I/O devices. These signals inform the CPU of the occurrence of certain events such as completion of an I/O operation. When I/O generates a signal (Interrupt) for the CPU, on sensing this signal, the CPU suspended all operations and performing the I/O operation. The disadvantage of this scheme is that it reduces the overall performance of the processor.

**Q.37 What is DMA?**

**Ans.** It stands for direct memory access. It is a technique of performing an I/O operation in which I/O operation is completed without involving the CPU. The CPU just issues an I/O command and the rest of the work is completed with the help of a special DMA module. The disadvantage DMA scheme is that it is more complex and more hardware is required.

**Q.38 What is a PC register?**

**Ans.** PC stands for Program Counter. It holds the address of the next instruction to be fetched and executed. When instruction is fetched, the value of PC is automatically incremented and it points to the address of next instruction.

**Q.39 What is the function of IR?**

**Ans.** IR stands for Instruction Register. It holds the current instruction that is being executed.

**Q.40** **What is the function of MAR?**

**Ans.** MAR Stands for Memory Address Register. It holds the address of active memory location. When CPU wants to stores or read data from the memory, CPU stores the required address of memory location in MAR.

**Q.41** **What is the function of MBR?**

**Ans.** MBR Stands for Memory Buffer Register. It holds the contents of the memory location read from or written in the memory.

**Q.42** **What is role of Stack Pointer (SP) Register?**

**Ans.** Arrangement of data is called **stack** and data is stored in or retrieved from stack using LIFO (last in first out). LIFO is also known as FILO (first in last out). PUSH and POP instructions are usually used in stack to store or retrieve the values. **SP** register is used to manage the stack and it stores the value of top of stack.

**Q.43** **What are General Purpose Registers?**

**Ans.** There are four general purpose registers A, B, C and D and these are used to perform arithmetic and logical operations. EAX, EBX, ECX, EDX are 4 byte registers. AX, BX, CX, and DX are 2 byte registers. AH, AL, BH, BL, CH, CL, DH and DL are 1 byte registers. The size of these registers is from 1 to 4 bytes.

**Q.44** **What is an Accumulator?**

**Ans.** Accumulator is a General purpose register. It is used for arithmetic and logical operations. It holds the initial data to be operated upon, and the final results of processing. The results of arithmetic operations are returned to accumulator for transfer to the main memory through buffer register.

**Q.45** **What is Base register:**

**Ans.** It is used for arithmetic and data movement and special addressing abilities.

**Q.46** **What is the function of Counter register?**

**Ans.** It is used for counting purpose. It acts as counter in loops.

**Q.47** **What is the function of Data register?**

**Ans.** It has special role in division and multiplication.

**Q.48** **What are Address or Segment Registers?**

**Ans.** It is a group of 4 registers CS, DS, ES and SS. Size of each segment register is 2 bytes.

**Q.49** **What is a function of CS (Code Segment) Register?**

**Ans.** It holds the base location of all executable instructions in the program. CS along with IP register fetches the next instruction.

**Q.50** **What is a function of DS (Data Segment) Register?**

**Ans.** It is the default base location for memory variables. DS points to data in memory using DI or SI registers. CPU calculates the offset of variables using the current value of DS.

**Q.51** **What is a function of ES (Extra Segment) Register?**

**Ans.** It is an additional base location for memory variables.

**Q.52** **What is a function of SS (Stack segment) Register?**

**Ans.** It contains the base location of the current program stack.

**Q.53** **What is a function of IP (Instruction Pointer) Register?**

**Ans.** CS along with IP register fetches the next instruction.

**Q.54** **What are function of Index Registers (DI, SI)?**

**Ans.** DS points to data in memory using DI or SI registers.

**Q.55** **What are the Types of Instructions?**

**Ans.** Data Transfer Instructions

Arithmetic and Logical Instructions

I/O Instructions

Control Transfer Instructions

**Q.56** **What is an Instruction set?**

**Ans.** Each CPU provides a number of instructions to perform different operations. The set of all the instructions provided by CPU is called **Instruction Set.** The instruction set increases the performance of a CPU. There are four types of instructions provided by a CPU. Data transfer instructions, Arithmetic and logical instructions, I/O instructions, Control Transfer instructions

**Q.57** **What are Data Transfer Instructions?**

**Ans.** These instructions are used to transfer data from or to the memory. The professionals use these instructions to bring the data into CPU and copy data from CPU to the memory.

**Q.58** **What are Arithmetic and Logical Instructions?**

**Ans.** CPU can perform arithmetic and logical operation with the help of arithmetic and logical instructions. Arithmetic instructions are addition, subtraction, multiplication and division. Logical operations involve comparison of two numbers. All arithmetic and logical operations are performed by ALU in CPU.

**Q.59** **What is an I/O Instructions?**

**Ans.** Each CPU provides instructions to read data from peripheral devices and writing data to peripheral devices. These instructions are used to read and write data to

and from the Input/Output devices e.g. a programmer uses input and output commands e.g. input and print commands are used for these operations

**Q.60    What is Control Transfer Instructions?**

**Ans.**    Each CPU provides instructions to control the flow of operations. These instructions are used to execute the instructions repeatedly and the programmer uses these instructions to transfer the control or control flow operations e.g. jump, jumpz (jump if zero).

**Q.61    What is an Instruction Format?**

**Ans.**    The CPU fetches the instruction from memory and decodes it and executes the instruction according to the requirement of the instructions. Each instruction has a specific format and generally it consists of:

**opcode:**

A code for the instruction indicates the type of action and is 4-bit code

**Address of the operands:**

These are the addresses of data locations on which CPU performs an action and each address is 6-bits.

**opcode(4-bits) operand referce1(6-bits)     operand reference2(6-bits)**

The different address formats are: Zero Address format, one address format, two address formats and three address formats.

**Q.62    What is Zero Address format?**

**Ans.**    It does not use any address field in the computational instruction. ADD and MUL instructions don't use any address field of the stack (set of memory location); however, address field is necessary for PUSH and POP instructions.

**Q.63    What is one address format?**

**Ans.**    The instruction with one address format uses only one address field. It uses accumulator AC register for all types of data manipulation.

**Q.64    What is Two address format?**

**Ans.**    The instruction with two address format uses two address fields. Each address field can specify a register or a memory location. Examples are: ADD, MOV, CPM, BIS etc.

**Q.65    What is Three address format?**

**Ans.**    The instruction with three address format uses three address fields. Each address field can specify a register or a memory location. A program with arithmetic expressions produces fast and better results. A binary coded instruction requires too many bits to specify three addresses. These instructions formats consists of either three register address fields or two registers and one memory address field.

**Q.66    What is a Fetch-Decode and Execute Cycle?**

**Ans.** This cycle describes the process of an execution of an instruction within the computer. CPU performs three steps. Fetches Instruction, Decodes Instruction, and Executes Instruction.

**Q.67** **What Fetch Instruction process:**

**Ans.** The CPU reads the value of PC and the instruction is copied into the instruction register (IR). This process involves two steps:

Copy the contents of PC into MAR and the request for memory read.

Copy the data from the memory to MBR and instruction is copied into IR.

After completing the above steps the value of PC is incremented and it points to the address of next instruction.

**Q.68** **What is Decoding of an Instruction?**

**Ans.** Decoding means to activate the appropriate circuit to execute the instruction. After completing the fetch process the CU decodes the instruction by analyzing the opcode of the instruction. CU also reads the values of operands specified in the instruction.

**Q.69** **What is an Operating System?**

**Ans.** It is a set of programs running in the background on a computer system and providing an environment in which other programs can be executed and the computer system can be used efficiently or it is a collection of operative programs that provides an interface for the user to interact with the computer.

**Q.70** **What are the Functions of Operating System?**

**Ans.** Manage Hardware Resources, Memory Management, Load and Execute Programs, Data Security, Interface to the Users

**Q.71** **What is Command-line interface (CLI)?**

**Ans.** In command line interface users communicate with the system by typing commands using keyboard. Each command activates a program of the operating system. Examples are: MS-DOS, early versions of UNIX, Novell Netware etc.

**Q.72** **What is Graphical user interface (GUI)?**

**Ans.** A GUI operating system provides a graphical user interface to establish the user communication with the computer. It consists of windows, menus, icons and pointers. The user issues the commands by selecting different object with the help of pointing devices. MS-Windows 95, Windows 98, Windows XP are the examples of GUI operating system.

**Q.73** **What is a Programming Language?**

**Ans.** It is the way of communication between User and Computer. It is used to write computer programs. There are two types of computer languages. Low Level Language and High Level Language

**Q.74** **What is a Low Level Language (LLL)?**

**Ans.** The language which is close to machine language is called low level language. A Computer can easily understand low level language. The low level language requires a deep understanding of the machine architecture. There are two types of low level language. Machine language and Assembly language

**Q.75** **What is a Machine language?**

**Ans.** It is the native language of computer. The computer does not need any translator to understand it. Every machine language instruction consists of 0's and 1's. It is difficult to locate and remove errors in the program. It is directly executed by the computer. The machine language programs are machine dependent.

**Q.76** **What is an Assembly language?**

**Ans.** Machine language instructions (0's and 1's) are replaced with English like words known as mnemonics (Ne-monics). It is also called symbolic language. An assembler is required to translate the assembly language programs into machine language.

**Q.77** **What is High Level Language (HLL)?**

**Ans.** It is closed to human language. It is user friendly language. The instructions of HLL are written in English statements. The programs of HLL are not directly executed on the computer. A language translator (compiler or Interpreter) is required to translate the HLL into low level language. These languages are mostly used for writing application programs e.g. C and C++, Java, COBOL, PASCAL, FORTRAN, BASIC

**Q.78** **What is a Source Program?**

**Ans.** The program written in High Level Language is called source program. The computer does not understand the source code. The source code is converted into machine code and then it is directly executed on the computer.

**Q.79** **What is an Object Program?**

**Ans.** The program in a machine language is called object program. The computer understands the object code directly.

**Q.80** **What is Language Processor/Translator?**

**Ans.** It is software that is used to translate the high level language programs (source code) into machine language (object code). Each language has its own translator. Only one type of translator is used in any language. There are three types of language processor. Compiler, Interpreter, Assembler

**Q.81** **Define a Compiler.**

**Ans.** The language translator translates the source code into object code and the whole program is translated at the same time. If a program contains errors then compiler can not convert the source code into machine code until all the errors are removed from the source program.

**Q.82** **Define an Interpreter.**

**Ans.** The language translator translates the source code into object code statement by statement. The working of interpreter is slower than the compiler. Any error in the program stops execution after removal of errors execution resumes.

**Q.83** **Differentiate between compiler and interpreter.**

**Ans.** Compiler converts the whole program at a time and interpret / translate the source code instructions one by one. Compiler converts each instruction only once but the interpreter may translate an instruction several times. A compiled program runs faster than an interpreted program.

**Q.84** **What is an Assembler?**

**Ans.** The language translator translates the assembly language into machine code i.e. it produces the binary instructions for a given assembly language program.

**Q.85** **What are POGRAMMING ERRORS/Bugs?**

**Ans.** The errors in a program are called BUGS. The process of finding and removing these errors is called debugging. There are three types of errors. Syntax Errors, Run Time Errors and Logical Errors.

**Q.86** **What is a Syntax?**

**Ans.** A language provides the rules to write an instruction is called its syntax. Each language has its own syntax.

# Data Communications

**Q. What is data communications? Explain the basic components of communication network?**

## Data Communication

Data communication is a process of transferring data electronically from one place to another. Data can be transferred by using different medium. The basic components of data communication are as follows:

- Message
- Receiver
- Encoder and Decoder
- Sender
- Transmission Medium
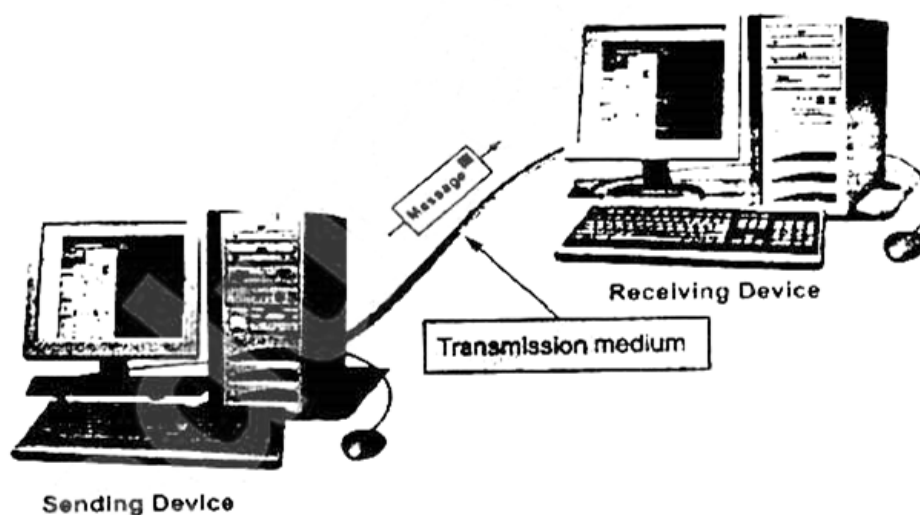


Figure: Data Communication

## 1. Message

The message is the data or information to be communicated. It may consist of text, number, picture, sound, video or a combination of these.

## 2. Sender

Sender is the device that sends the message. It is also called **source** or **transmitter**. The sender can be a computer, fax machine or mobile phone etc. The computer is usually used as sender in data communication systems.

## 3. Receiver

Receiver is the device that receives the message. It is also called **sink**. The receiver must be capable of accepting the message. The receiver can be a computer, printer, fax machine or mobile phone etc. A computer is usually used as receiver in data communication systems.

## 4. Transmission Medium

Transmission medium is the path through which the messages are transferred. It is used to carry messages from one place to another. It is also called **communication channel**. The transmission medium is a physical cable or wireless connection.

## 5. Encoder and Decoder

The **encoder** is a device that converts digital signals in a form that can pass through a transmission medium. The **decoder** is a device that converts the encoded signals into digital form. The receiver can understand the digital form of message. Sender and receiver cannot communicate successfully without encoder and decoder.

## Q. What is signal? Discuss its different forms.

## Signal

Signal is an electromagnetic or light wave that represents data. Signals are used to transfer data from one device to another through a communication medium.

## Forms of Signals

Different forms of communication signals are as follows:

1. Digital Signals
2. Analog Signals

## 1. Digital Signals

Digital signal is a sequence of voltage represented in binary form. The digital signals are in the form of electrical pulses of ON and OFF. These signals are in discrete form. Digital signals are faster and efficient. They provide low error rates. They also provide high transmission speed and high-quality voice transmission.

All data communication between the computers is in digital form. Computers understand and work only in digital form. The following figure represents a high voltage as a 1 and a low voltage as a 0.
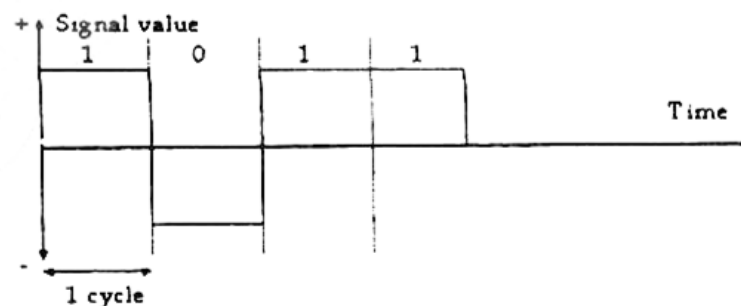


**Figure:** Digital Transmission

## 2. Analog Signals

Analog signal is a continuous electrical signal in the form of wave. The wave is known as **carrier wave**. Telephone line is most commonly used media for analog transmission of data. Light, sound, radio and microwave are also examples of analog signals.

## Characteristics of Analog Signals

Two characteristics of an analog wave are as follows:

- **Frequency:** The number of times a wave repeats during a specific time interval is known as frequency.
- **Amplitude:** The height of wave within a given period of time is known as amplitude.
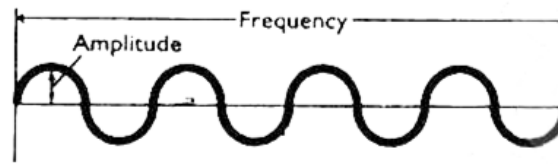


Figure: Analog Digital Transmission

## Q. Explain different data types with examples?

Data can be represented in different ways. Different types of data are as follows:

## 1. Text

Text data consists of words, sentences and paragraphs. Text processing refers to the ability to manipulate words, lines and pages. Text is normally stored as ASCII code without formatting.

## Examples

Some examples of text data are Usman Khalil, Pakistan, Islam etc.

## 2. Numeric Data

Numeric data consists of numeric digits from 0 to 9. It may also contain decimal point ".", plus sing "+" or negative sign "-". The numeric type of data may either be positive or negative. The use of "+" with positive numbers is optional.

## Examples

10, +5, -12, 13.7, -32.5 etc.

## 3. Image

This type of data includes chart, graph, pictures and drawings. This form of data is more comprehensive. It can be transmitted as a set of bits. The bits are packed as bytes.

## 4. Audio

Sound is a representation of audio. Audio data includes music, speech or any type of sound.

## 5. Video

Video is a set of full-motion images played at a high speed. Video is used to display actions and movements.

## Q. How is data represented in computer?

Computer works with binary numbers. Binary number may be 0 or 1. The data inside the computer is represented as electrical pulses. The binary digit 1 indicates the presence of electrical pulse. The binary digit 0 indicates the absence of electrical pulse.
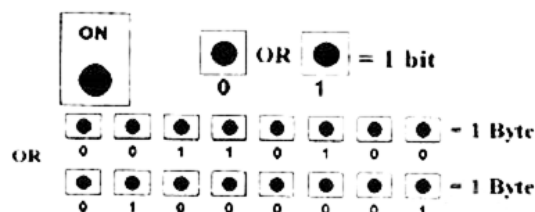


The binary digit is known as bit. It is an abbreviation of **binary digit**. It is the smallest unit of memory. A collection of four bits is called nibble. A collection eight bits is called byte. One byte can store single character.

## Q. What is meant by encoding of data? Explain different coding schemes to represent data in computer.

### Data Encoding

Computer works only with binary numbers. It stores all types of data in the form binary digits. The data is converted to binary form before it is stored inside the computer. The process of converting data into binary form is known as **encoding**. Data can be converted into binary form by using different coding schemes.

### Types of Coding Schemes

Different types of coding schemes are as follows:

### 1. BCD Code

BCD stands for **Binary Coded Decimal**. It is a 4-bit code. It means that each decimal digit is represented by 4 binary digits. It was used by early computers.

### 2. EBCDIC Code

EBCDIC stands for **Extended Binary Coded Decimal Interchange Code**. It is an 8-bit code. It is normally used in mainframe computers. It can represent 256 characters.

### 3. ASCII

ASCII stands for **American Standard Code for Information Interchange**. It was published in 1968 by ANSI (**American National Standard Institute**). It is the most widely used coding scheme for personal computers. The 7-bit code can represent 128 characters. It is not enough to represent some graphical characters displayed on computer screens. An 8-bit code can represent 256 characters. The extended 128 unique codes represent graphic symbols.
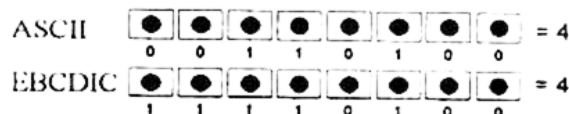
## 4. Unicode

Unicode is a 16-bit code. It can represent 65536 characters. It has started to replace ASCII code. It can represent the characters of all languages in the world.

## Q. What is data transmission mode? Explain its types with example.

## Data Transmission Mode

The way in which data is transmitted from one place to another is called data transmission mode.

## Types of Transmission Modes

There are three types of data transmission modes:

1. Simplex mode      2. Half duplex mode      3. Full duplex mode

## 1. Simplex Mode

In **simplex mode**, data can flow only in one direction. It cannot be moved in both directions. It operates in a manner similar to a one-way street. The direction of flow never changes. A device with simplex mode can either send or receive data. It cannot perform both actions.



**Figure:** Simplex mode

## Example

An example is a traditional television broadcast. The signal is sent from the transmitter to TV antenna. There is no return signal.

## 2. Half-Duplex Traffic

In **half-duplex mode**, data can flow in both directions but not at the same time. It is transmitted one-way at one time. A device with half-duplex mode can send or receive data but not at the same time. That is why the speed of half-duplex mode is slow.
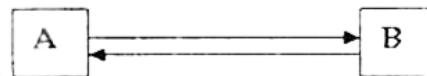


**Figure:** Half Duplex

## Example

Internet surfing is an example of half-duplex communication. The user issues a request for a web page. The web page is downloaded and displayed before the user issues another request.

## 3. Full-Duplex Mode

In **full-duplex mode**, data can travel in both directions simultaneously. Full duplex mode is a faster way of data transmission as compared to half duplex. Time is not wasted in changing the direction of data flow.

**Figure:** Full Duplex

## Example

A telephone is a full-duplex device. Both persons can talk at the same time. Another example of full-duplex communication is automobile traffic on a two-lane road. The traffic can move in both directions at the same time.
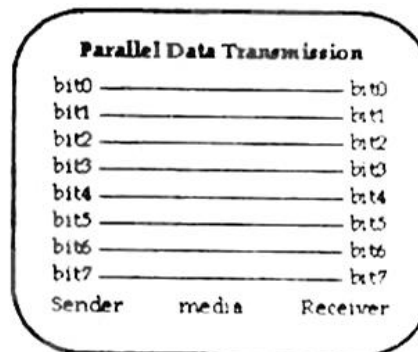
## Q. Discuss different types of data transmission.

There are two types of data transmission. These are as follows:

1. Parallel Transmission
2. Serial Transmission

## 1. Parallel Transmission

A method of transmission in which groups of bits are sent at the same time over multiple wires is called **parallel transmission**. It is usually unidirectional. Each bit is transmitted over a separate line.

The internal transfer of data in a computer uses a parallel mode. The data transmission between computer and printer is done using parallel transmission. Parallel transmission is faster because all bits are sent at the same time.



## 2. Serial Transmission

A method of transmission in which data is sent one bit at a time is called **serial transmission**. The character bits are sent sequentially. Serial transmission is slower than parallel transmission as data is sent sequentially one bit at a time.

Telephone lines use this method of data transmission. Each individual bit of information travels along its own communication path.
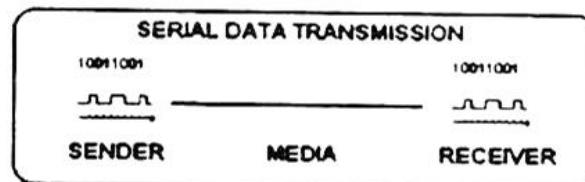
## Q. Explain asynchronous and synchronous transmission.

Two types of data transmission are as follows

1. Asynchronous transmission 2. Synchronous transmission

## 1. Asynchronous Transmission

In asynchronous transmission, data is transmitted character by character. There are irregular gaps between characters in this transmission. It is cheaper to implement because data is not saved before it is sent. It uses a special start signal. The signal is transmitted at the beginning of each message. The start signal is sent when the character is about to be transmitted.

A start bit has a value of 0. It is called **space state**. The value of 0 indicates that a character is about to be transferred. It alerts the receiver and it gets ready to receive the character. If start bit has a value 1, it indicates that the line is idle. It is also called **mark state**.

## 2. Synchronous Transmission

In the synchronous mode, the saved data is transmitted block by block. Each block may consist of many characters. It uses a clock to control the timing of bits being sent. A large amount of information can be transmitted at a single time with this type of transmission.

Synchronous transmission is much faster than asynchronous because there is no gap between characters. This transmission is suited for remote communication between a computer and related devices like printers etc.

## Q. What is bandwidth? Explain baseband and broadband.

## Bandwidth

The amount of data that can be transferred through a communication medium in a unit of time is called **bandwidth**. The bandwidth of digital signal is measured in bits per second or **Bytes per second**. The bandwidth of analog signals is measured in cycles/seconds or Hertz.

## Baseband

**Baseband** is a communications technique in which digital signals are placed on the transmission line without change in modulation. It means that digital signals are directly transmitted over transmission line. It transmits only one signal at a time. Digital signals are commonly called **baseband signals**.

### Broadband

Broadband is a technique to transmit large amounts of data such as voice and video over long distance. It can send data by modulating each signal onto a different frequency. It transmits several streams of data at the same time using **FDM (Frequency Division Multiplexing)** technique. FDM divides the bandwidth of a communication line into smaller frequency bandwidths. Each part of the communication line can be used for transmitting data separately. Broadband is faster than baseband.

## Q. What is communication media used in computer networks? What are different types of communication media?

### Communication Media / Communication Channel

The path through which data is transmitted from one place to another is called communication media or communication channel.

There are different types of communications media.

### 1. Guided Media

In **guided media**, communication devices are directly connected with each other by using some physical media like wires. It is also called **bounded** media.

### Examples

Some examples of bounded media for communication are as follows:

- Twisted Pair
- Coaxial Cable
- Fiber Optics

### 2. Unguided Media

In **unguided media**, communication devices communicate with each other through air or space using broadcast radio signals, microwave signals and infrared signals. Unbounded media is used where it is impossible to install cables. Data can be transferred all over the world using this media. It is also called **unbounded media**.

### Examples

Some examples of unbounded media for communication are as follows:

- Microwave
- Communication Satellite
- Mobile Communication

## Q. Briefly describe different guided media.

Different guided media are as follows:

### 1. Twisted Pair

**Twisted pair** is the most commonly used physical transmission medium. It is used in local area network to connect computers and other devices.

Twisted pair consists of a pair of copper wires. The pair of wires is covered by a plastic insulation and it is twisted together. Twisting of wires protects them from interference by external electromagnetic waves.
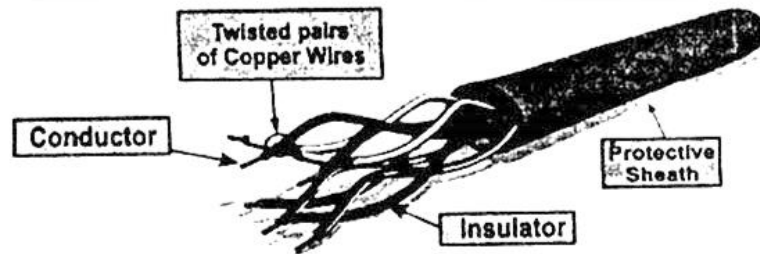
Figure: Twisted pair

## Characteristics of Twisted Pair

Different characteristics of twisted pair are as follows:

- It is an inexpensive transmission medium.
- It is easy to install.
- It can transfer data to a short distance.

## 2. Coaxial Cable

Coaxial cable consists of copper wire covered by an insulating material. The insulated copper wire is covered by copper mesh. The mesh protects the data signals from interference by external electromagnetic waves. Coaxial cable contains 4 to 22 coaxial units called tubes. Coaxial cables are used by the cable TV network and telephone companies.
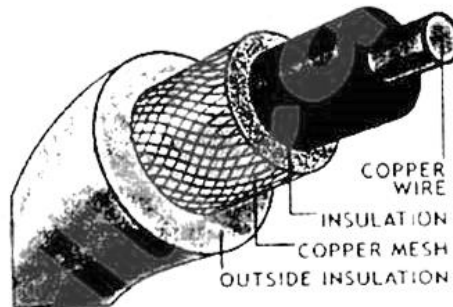


Figure: Coaxial cable

## Characteristics of Coaxial Cable

Different characteristics of coaxial cable are as follows:

- It is more expensive transmission medium than twisted pair.
- It provides higher data transfer rate than twisted pair cable.
- It can be installed very easily.

## 3. Fiber Optics

A fiber optic cable transmits data as pulses of light through tiny tubes of glass. A typical fiber optic consists of very narrow strand of glass called core. The strands are thin like human hair. The core is the center of the fiber where light travels. There is a concentric layer of glass around the core called cladding. It reflects the light back into the core. The cladding has a protective coating of plastic called jacket.
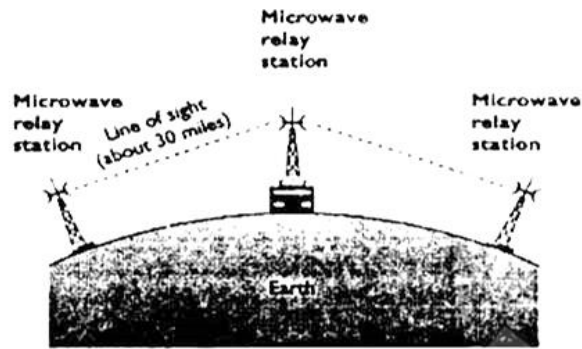
Figure: Microwave system

## 2. Communication Satellite

Communication Satellites are used in wireless communication over large distances. This communication uses the satellites and earth-based stations. The satellites are placed around the globe about 22,300 miles above the earth. A satellite receives microwave signals from earth-based station. It amplifies the signals and retransmits them back to different earth-based station. The transmission from earth station to satellite is called **uplink**. The transmission from satellite to earth station is called **downlink**.

An important advantage of satellite is that a large volume of data can be communicated at once. The disadvantage is that bad weather can severely affect the quality of satellite transmission.
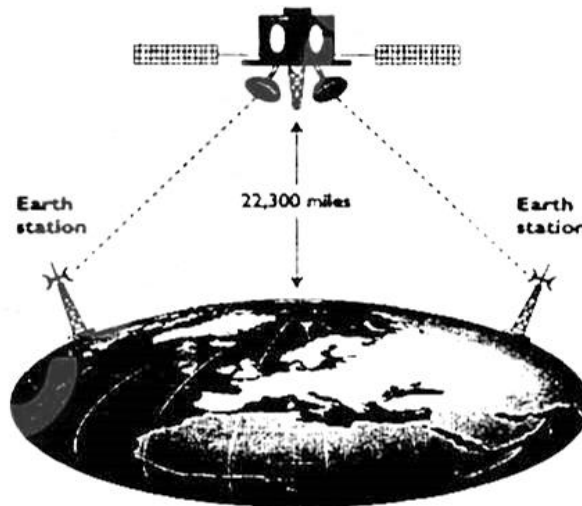


Figure: Satellite Communications

## 3. Mobile Communication

Mobile communication is radio-based network. It transmits data to and from mobile computer. It is widely used all over the world.

## Q. Write a note on modem. Describe its working and features.

## Modem

Modem stands for **modulator/demodulator**. It is a commonly used communication device. Modem sends and receives data from one computer to another on the Internet through telephone lines. The sending and receiving computers both must have modems.

## Working of Dialup Modem

Computer stores information in the form of digital signals. However, the information transmitted over the telephone lines is in the form of **analog signals**. The modem receives data from computer in digital form and converts it into analog form. This process is called **modulation**. It sends analog signals to other computer using telephone lines.

The modem on receiving computer receives data in analog form. It converts the analog data back into digital form. This process is called **demodulation**.
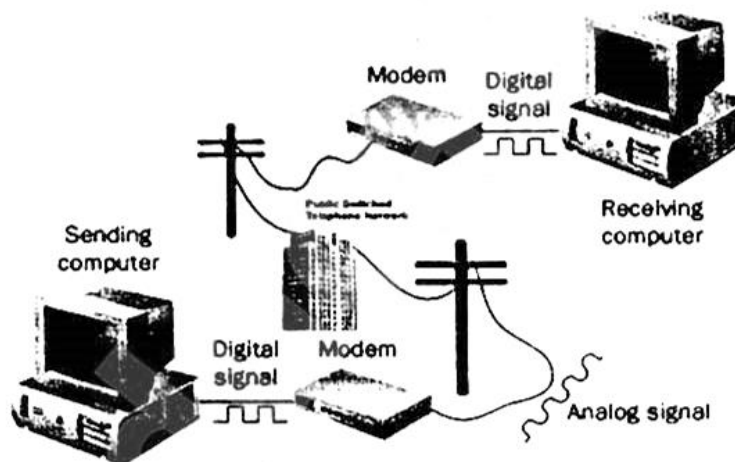


**Figure:** Working of modem

## Features of Modem

Some important features of modem are as follows:

- **Speed:** Speed is the rate at which the modem can send data in bps. Typically modem speeds are 300 bps to 56k bps.
- **Self-Testing:** Modem can test the digital connection with computer. It can also test analog connection with remote modem.
- **Voice over Data:** Modem provides the facility of voice conversation while data is being transmitted. Both the source and destination modems should have this feature.
- **Error Control:** Modems use different methods to control errors for transmitted data.

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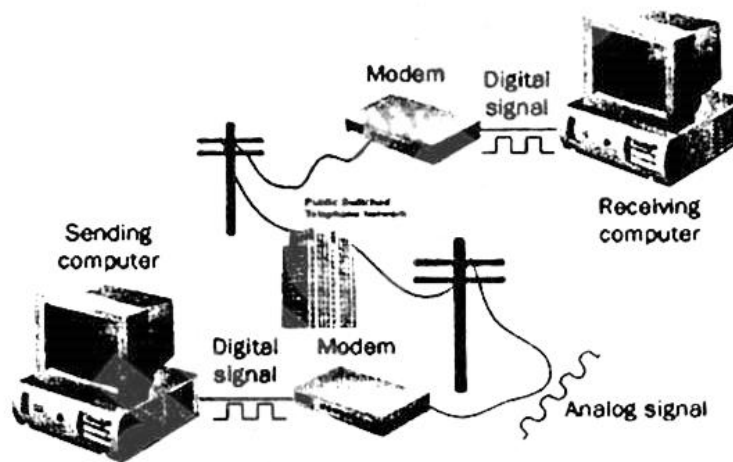


Figure: Working of modem

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- **Voice over Data:** Modem provides the facility of voice conversation while data is being transmitted. Both the source and destination modems should have this feature.
- **Error Control:** Modems use different methods to control errors for transmitted data.

## Q. What are different types of modems?

Different types of modems in terms of physical size and shape are as follows:

## 1. External Modem

**External modem** is attached to the system unit as an external device through telephone line. It is connected to the telephone wall jack by another cable. External modem is connected to computer using serial cable to COM1 or COM2 port. It requires external power supply. It is easy to setup. External modem is expensive.
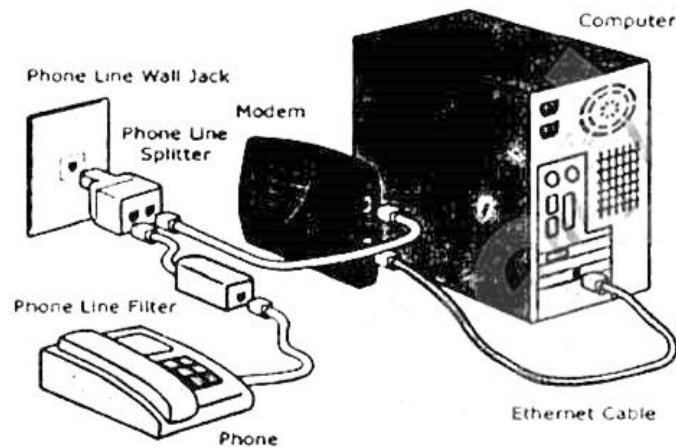


## 2. Internal Modem

**Internal modem** is a circuit board that is inserted into an expansion slot on the motherboard. Internal modem cannot be moved from one computer to another easily. It is difficult to setup than other types of modem. It is less expensive than external modem.

## 3. Wireless Modem

**Wireless modem** transmits the data signals through air instead of cable. It is also known as **radio-frequency modem**. It is designed to work with cellular technology and wireless local area networks.
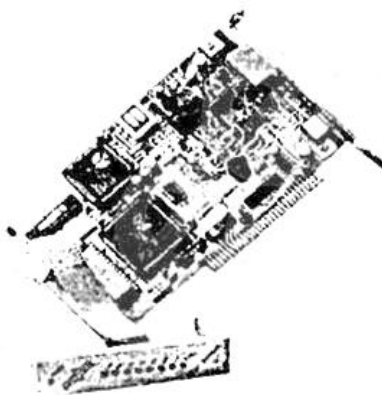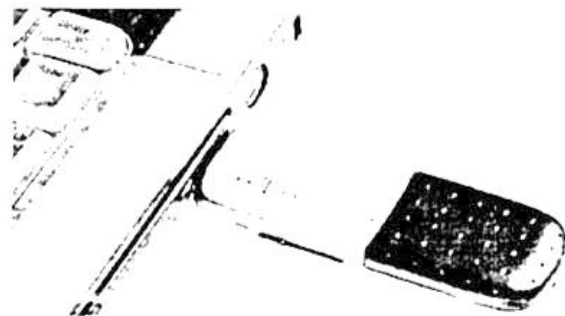


Figure: Wireless Modem



Figure: Wireless Modem

# Short Questions

**Q.1. Define data communication.**

Data communication is a process of transferring data electronically from one place to another. Data can be transferred by using different medium.

**Q.2. List out different elements of data communication.**

The basic elements of data communication are message, sender, receiver, medium and Encoder and Decoder.

**Q.3. What is the role of sender in data communication?**

Sender is the device that sends the message. It is also called source or transmitter. The sender can be a computer, fax machine or mobile phone etc. The computer is usually used as sender in data communication systems.

**Q.4. What is the role of receiver in data communication?**

Receiver is the device that receives the message. It is also called sink. The receiver must be capable of accepting the message. The receiver can be a computer, printer, fax machine or mobile phone etc. A computer is usually used as receiver in data communication systems.

**Q.5. Differentiate between sender and receiver.**

Sender is a device that sends the data message. It is also called source. Sender is normally a computer. Receiver is a device that receives message. It can be computer, printer, or another computer related device. The receiver must be capable of accepting the message.

**Q.6. How are messages transferred in data communication?**

Transmission medium is the path through which the messages are transferred. It is used to carry messages from one place to another. It is also called communication channel. The transmission medium is a physical cable or wireless connection.

**Q.7. Define the term Encoder and Decoder.**

Encoder is a device that converts digital signals in a form that can pass through a transmission medium. Decoder is a device that converts the encoded signals into digital form. Sender and receiver cannot communicate successfully without encoder and decoder.

**Q.8. How media is important in communication?**

Communication network cannot exist without a medium. The medium is used to connect the source and receiver and provide path to send messages.

**Q.9. What is signal?**

Signal is an electromagnetic or light wave that represents data. Signals are used to transfer data from one device to another through a communication medium.

**Q.10. What is digital signal?**

Digital signal is a sequence of voltage represented in binary form. Digital signals are in the form of electrical pulses of ON and OFF. These signals are in discrete form. Digital signals are faster and efficient. All data communication between computers are in digital form.

**Q.11. What is Analog signal?**

Analog signal is a continuous electrical signal in the form of wave. The wave is known as carrier wave. Sound wave is an example of analog signal. Analog signal is measured in volts and its frequency is in Hertz (Hz).

**Q.12. Write are two characteristics of analog signal.**

Two characteristics of an analog wave are frequency and amplitude. The number of times a wave repeats during a specific time interval is known as frequency. The height of wave within a given period of time is known as amplitude.

**Q.13. Differentiate between analog and digital signal. Which is popular?**

Analog signal is a continuous electrical signal in the form of wave. Sound wave is an example of analog signal. Digital signal is a sequence of voltage represented in binary form. Digital signals are popular. They provide lower error rates, higher transmission speed and higher quality voice transmission.

**Q.14. How is data represented in computer?**

Computer works with binary numbers. Binary number may be 0 or 1. The data inside the computer is represented as electrical pulses. The binary digit 1 indicates the presence of electrical pulse. The binary digit 0 indicates the absence of electrical pulse.

**Q.15. Define bit and byte.**

A binary digit is called bit. It takes one storage location in memory. A collection of eight bits is called byte. It is used to store single character.

**Q.16. Write different encoding characters used to represent data in computer.**

The process of converting data into binary form is known as encoding. Data can be converted into binary form by using different encoding techniques. These are BCD Code, EBCDIC Code, ASCII and Unicode.

**Q.17. What is ASCII code?**

ASCII is the most widely used coding scheme for personal computers. The 7-bit code can represent 128 characters. It is not enough to represent some graphical characters displayed on computer screens. An 8-bit code can represent 256 characters. The extended 128 unique codes represent graphic symbols.

**Q.18. Why does ASCII code only provide 256 character combinations?**

It is an 8-bit code and $2^8 = 256$.

**Q.19. What is Unicode?**

Unicode is a 16-bit code. It can represent 65536 characters. It has started to replace ASCII code. It can represent the characters of all languages in the world.

**Q.20. Why Unicode is superior to ASCII code.**

ASCII code uses 8 bit. It is limited to 256 different characters. Unicode uses 16 bits. It allows over 65,000 codes. It can represent all major languages.

**Q.21. What are transmission modes?**

The way in which data is transmitted from one place to another is called data transmission modes. Simplex, half duplex and full duplex are modes of data transmission.

**Q.22. How does data flow in simplex mode?**

In simplex mode, data can flow only in one direction. It operates in a manner similar to a one-way street. The direction of flow never changes. A device with simplex mode can either send or receive data. Traditional television broadcast is an example of simplex mode.

**Q.23. How does data flow in half duplex mode?**

In half-duplex mode, data can flow in both directions but not at the same time. It is transmitted one-way at one time. A device with half-duplex mode can send or receive data but not at the same time. So, the speed of half-duplex mode is slow. Internet surfing is an example of half duplex transmission.

**Q.24. Compare simplex and half duplex mode.**

In simplex mode, data can flow only in one direction. Radio and television broadcasting are the examples of this mode. In half-duplex mode, data can flow in both directions but not at the same time.

**Q.25. How does data flow in full duplex mode?**

In full-duplex mode, data can travel in both directions simultaneously. Full duplex mode is faster way of data transmission than half duplex. Time is not wasted in changing the direction of data flow. Telephone conversation is an example of full duplex mode.

**Q.26. What do you know about parallel data transmission?**

A method of transmission in which groups of bits are sent at same time over multiple wires is called parallel transmission. It is usually unidirectional. Each bit is transmitted over a separate line. Data transmission between computer and printer is a parallel transmission.

**Q.27. What is serial data transmission?**

A method of transmission in which data is sent one bit at a time is called serial transmission. Telephone lines use this method of data transmission. Each individual bit of information travels along its own communication path.

**Q.28. Differentiate between serial and parallel transmission.**

Parallel transmission is faster because all bits are sent at the same time. Serial transmission is slower than parallel transmission because data is sent sequentially one bit at a time. Each individual bit of information travels along its own communication path.

**Q.29. How is data transmitted in asynchronous transmission?**

In asynchronous transmission, data is transmitted character by character. There are irregular gaps between characters. It uses flow control instead of clock to synchronize data between source and destination. It is cheaper because data is not saved before it is sent.

**Q.30. How is data transmitted in synchronous transmission?**

In synchronous transmission, saved data is transmitted block by block. Each block may consist of many characters. It uses a clock to control timing of bits being sent. Synchronous transmission is much faster than asynchronous because there is no gap between characters.

**Q.31. Which transmission mode uses a special start signal and how?**

The asynchronous transmission uses a special start signal. A start bit has a value of 0. The value of 0 indicates that a character is about to be transferred. It alerts the receiver and it gets ready to receive the character. If start bit has a value 1, it indicates that the line is idle.

**Q.32. Compare asynchronous and synchronous transmission.**

In asynchronous transmission, data is transmitted one character at a time. The sender and receiver are not synchronized with each other. Synchronous transmission sends a block of characters at a time. It allows sender and receiver to be synchronized with each other. Synchronous transmission is typically more efficient than asynchronous communications.

**Q.33. Differentiate between bounded & unbounded communication.**

In bounded media, communication devices are directly connected via physical media like wires. Coaxial cable and fiber optics are examples of bounded media. In unbounded media, communication devices communicate through air or space using broadcast radio signals etc. Microwave and satellite are examples of unbounded media.

**Q.34. Name some bounded media.**

Some examples of bounded media are wire pairs, coaxial cable and fiber optics.

**Q.35. Name some unbounded communication media.**

Some examples of unbounded communication media are microwave system and communication satellite.

**Q.36. What is wire pair?**

Wire pair is a communication media made up of copper. Wire pair is usually made up of copper. The pair of wires is twisted together. It is used for short distance digital data communication. Its speed is 9600 bits per second in a distance of 100 meter.

**Q.37. What is coaxial cable?**

Coaxial cable consists of a copper wire core covered by insulating material. The insulated copper wire is covered by copper mesh. It protects the cable from electromagnetic waves. It is used for long-distance telephone lines and local area networks.

**Q.38. What is fiber optics?**

Fiber optics use binary method of data transfer. It is made up of a thin glass fiber. It is thinner than hair. Data transfer rate of fiber optics is very fast. There is no chance of data loss.

**Q.39. Write two advantages and two disadvantages of fiber optics cable.**

The advantages are that it provides faster data transmission and better security for signal during transmission. The disadvantages are that it is difficult to install and very costly.

**Q.40. Define refraction.**

An important characteristic of fiber optics is refraction. Refraction is a characteristic of a material to pass or reflect light.

**Q.41. What is the role of core and cladding in optical fiber?**

The core carries the light signal. Cladding reflects the signal back into the core with perfect internal reflection so that no light escapes from the core.

**Q.42. Write a short note on microwave transmission.**

Microwaves are radio waves that are used to provide high-speed transmission. Data is transmitted through the air from one microwave station to another similar to radio signals. Microwave uses line-of-sight transmission.

**Q.43. How does microwave system work?**

Microwave uses line-of-sight transmission. It means that the signals travel in straight path and cannot bend. Microwave stations are placed within 20 to 30 miles to each other. Each station receives signal from previous station and transfer to the next station.

**Q.44. What is the disadvantage of microwave system?**

A disadvantage of microwave is that it is limited to line-of-sight transmission. This means that Microwave signals must be transmitted in a straight line. There can be no obstruction such as buildings or mountains, between microwave stations.

**Q.45. What is communication satellite?**

Communication satellite is a space station. It receives microwave signals from earth station. It amplifies the signals and retransmits them back to earth. It is established in space about 22,300 miles above the earth.

**Q.46. Write one advantage and one disadvantage of communication via satellite.**

The advantage is that a satellite can allow long distance wireless communications. The disadvantage is the high cost to put a communications satellite in orbit.

**Q.47. Which units are used to measure the transmission rate of modems?**

The unit of measure is bits per second (bps).

**Q.48. Define modulation. Why is it necessary?**

The process of converting digital signal into analog signal is called modulation. Computer stores data in digital form. Since a modem transmits data using telephone line, so it is converted from digital to analog form.

**Q.49. Define demodulation. Why is it necessary?**

The process of converting analog signal into digital signal is called demodulation. The modem on receiving computer receives data in analog form. The incoming analog data is converted back into digital format to be used by the computer.

**Q.50. How does a modem allow computers to communicate over telephone lines?**

Modem translates computer data into signals compatible with the telephone system.

**Q.51. What is baseband?**

Baseband is a communications technique in which digital signals are placed on the transmission line without change in modulation. It transmits up to a couple of miles. It does not require complex modems. Digital signals are commonly called baseband signals.

**Q.52. What is broadband?**

Broadband is a technique to transmit large amounts of data over long distance. It can send data by modulating each signal onto a different frequency. It transmits several streams of data simultaneously using FDM (Frequency Division Multiplexing) technique.

**Q.53. Compare broadband and baseband transmission.**

In broadband transmission, data is carried on high-frequency carrier waves. Several channels may be transmitted over a single cable. It allows one medium to be used for a variety of transmission needs. Baseband transmission does not use a carrier wave. It sends data along channel by voltage fluctuations. It cannot transmit multiple channels on one cable but it is less expensive than broadband as it can use less expensive cable and connectors.

**Q.54. How does FDM work?**

FDM stands for Frequency Division Multiplexing. It divides the bandwidth of a communication line into smaller frequency bandwidths. Each part of the communication line can be used for transmitting data separately.

**Q.55. How is external modem attached to the computer?**

External modem is attached to the system unit as an external device through telephone line. This modem is connected to computer using serial cable to COM1 or COM2 port. It requires external power supply. It is easy to setup.

**Q.56. What do you know about internal modem?**

Internal modem is a circuit board that is inserted into an expansion slot on the motherboard. It cannot be moved from one computer to another easily. It is difficult to setup than other types of modem.

**Q.57. What do you know about wireless modem?**

Wireless modem transmits the data signals through air instead of cable. It is also known as radio-frequency modem. It is designed to work with cellular technology and wireless local area networks.

**Q.58. What is start signal? Write its different states.**

Asynchronous transmission uses a special start signal. It is transmitted at the start of each message. It is sent when the character is about to be transmitted. A start bit has a value of 0. It is called space state. If the start bit has the value 1, it indicates that the line is idle.

**Q.59. What is meant by encoding of data?**

Computer works only with binary numbers. It stores all types of data in the form binary digits. The data is converted to binary form before it is stored inside the computer. The process of converting data into binary form is known as encoding. Data can be converted into binary form by using different coding schemes.

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# Multiple Choice

1. The process of transferring data electronically from one place to another is called:
   a. Data processing
   b. Data Communication
   c. Data sequencing
   d. Data Sender

2. All of the following are elements of data communication system EXCEPT.
   a. Sender
   b. Receiver
   c. Medium
   d. Voltage

3. What is required to send data, instructions or information?
   a. Sending device
   b. Receiving device
   c. Both a & b
   d. None

4. Physical path that connects the source and receiver is known as:
   a. Communication Channel
   b. Decoder
   c. Encoder
   d. Self-testing

5. The electromagnetic or light waves representing data are called:
   a. Information
   b. Signal
   c. Sender
   d. None

6. The number of times a wave repeats during a specific time interval is called:
   a. Pulse
   b. Amplitude
   c. Frequency
   d Oscillation

7. The height of wave within a given period of time is known as:
   a. Frequency
   b. Amplitude
   c. Oscillation
   d. Pulse

8. The chart, graph, pictures and freehand drawing are examples of:
   a. Image data
   b. Audio data
   c. Numeric data
   d. Text data

9. The music and speech represent:
   a. Image
   b. Text
   c. Numeric
   d. Audio

10. Which of the following type of data is used to display actions and movement?
    a. Audio
    b. Video
    c. Image
    d. Text

11. Which type of data consists of words, sentences and paragraphs?
    a. Text
    b. Audio
    c. Numeric
    d Video

12. Which of the following coding scheme uses 4-bit code?
    a. ASCII
    b. EBCDIC
    c. BCD
    d. Unicode

13. Which of the following coding scheme used by IBM?
    a. ASCII
    b. EBCDIC
    c. BCD
    d. Unicode

14. How many characters ASCII 7-bit code can represent?
    a. 128
    b. 256
    c. 500
    d. 364

15. How many characters in ASCII 8-bit code can represent?
    a. 128 characters
    b. 256 characters
    c. 500 characters
    d. 364 characters
16. Unicode is a :
    a. 16-bit code
    b. 32-bit code
    c. 64-bit code
    d. 132-bit code
17. How many characters can Unicode represent?
    a. 65536 characters
    b. 10000 characters
    c. 15000 characters
    d. None
18. Communication mode is:
    a. LAN        b. Internet        c. Full-duplex        d. All
19. Transmission permitting data to move only one way at a time is called:
    a. Half-duplex
    b. Simplex
    c. Full-duplex
    d. Start/stop
20. An arrangement in which data can be received and sent simultaneously is called:
    a. Simples
    b. Full-duplex
    c. Half-duplex
    d. Multi-duplex
21. A telephone conversation is an example of:
    a. Full-duplex transmission
    b. Half-duplex transmission.
    c. Simplex transmission.
    d. Asynchronous transmission.
22. Television and radio broadcasts are examples of:
    a. Full-duplex transmission
    b. Half-duplex transmission
    c. Simplex transmission
    d. None
23. Internet surfing is an example of:
    a. Simplex
    b. Half duplex
    c. Full duplex
    d. None
24. Which transmission allows data to travel in both directions but only one direction at a time?
    a. Simplex
    b. Half Duplex
    c. Full Duplex
    d. Reverse Duplex
25. Full-duplex communication is made possible by devices called:
    a. Multiplexer        b. Modem        c. Keyboard        d. Mouse
26. Which of the following is the fastest communication mode?
    a. Half duplex        b. Full duplex        c. Simple        d. None
27. The internal transfer of data in a computer uses:
    a. Parallel mode        b. Serial mode        c. Both and b        d. None
28. Which of the following devices uses parallel transmission?
    a. Printer        b. Keyboard        c. Mouse        d. None
29. Most data transmitted over telephone lines uses:
    a. Serial transmission
    b. Parallel transmission
    c. Both a and b
    d. None
30. Which of the following is comprised of individual electrical pulses that represent the bits grouped together into bytes?
    a. Communications device
    b. Digital signal
    c. Analog signal
    d. Sending device

31. Analog signal is measured in:
    a. Volt        b. Hertz        c. Digits        d. WATTS
32. Sound, light and radio waves are examples of:
    a. Digital signal
    c. Simple signals
    b. Analog signal
    d. None
33. Data is transmitted block by block in:
    a. Synchronous transmission
    b. Digital transmission
    c. Asynchronous transmission
    d. Analog transmission
34. Which transmission type transmits data one character at a time, with the sender and receiver not synchronized with each other?
    a. Synchronous
    c. Asynchronous
    b. Ethernet
    d. None
35. This type of transmission is sometimes called start/stop transmission.
    a. Asynchronous
    c. Synchronous
    b. Intermittent
    d. Pulse
36. Start/stop bits are not required in this type of transmission.
    a. Asynchronous
    c. Intermittent
    b. Pulse
    d. Synchronous
37. Which data transmission type uses a clock to control the timing of bits being sent?
    a. Synchronous
    c. Parallel
    b. Asynchronous
    d. None
38. Which of the following technique uses modulation?
    a. Bandwidth
    c. Baseband
    b. Broadband
    d. None
39. A communication technique to transmit large volume of data over long distance is:
    a. Baseband
    c. Bandwidth
    b. Broadband
    d. None
40. The communication channels can be divided into:
    a. Two types    b. Four types    c. Seven types    d. None
41. Which of the following transmission media is used in LAN?
    a. Satellite
    c. Coaxial cable
    b. Microwave
    d. None
42. An important property of fiber optic cable is:
    a. Noise
    c. Interference
    b. Reflection
    d. Attenuation
43. The diameter of fiber optical cable is:
    a. 62.5 cm
    c. 62.5 m
    b. 62.5 microns
    d. 62.5 mm
44. Which of the following can severally affect the quality of satellite transmission?
    a. Bad weather
    c. Light rays
    b. Mountains
    d. Moon
45. The time taken by a data signal to reach to moon and then back to earth was about:
    a. 2 minutes    b. 2-second    c. 2 ms    d. 2 hours

46. Microwave transmission, coaxial cables and fiber optics are examples of:
    a. Modems
    b. Routers
    c. Transmission Media
    d. Ring networks

47. Which of the following consists of thin glass to transmit beams of light?
    a. Twisted pair
    b. Coaxial cable
    c. Fiber-optic cable
    d. None

48. Which of the following transmits voice and data through air as high-frequency radio waves?
    a. Twisted pair
    b. Coaxial cable
    c. Fiber-optic cable
    d. Microwave

49. All of the following are guided communications media EXCEPT:
    a. Twisted pair
    b. Fiber-optic cables
    c. Coaxial cables
    d. Satellite

50. Select unguided media:
    a. Twisted pair
    b. Co-axial
    c. Satellite
    d. Fiber optic

51. Which of the following is not a communication media?
    a. Twisted Pair
    b. UTP
    c. Microwave
    d. Modem

52. Which of the following is comprised of two separate insulated copper wires that are twisted together?
    a. Fiber optics
    b. Twisted-pair wire
    c. Submarine
    d. Coaxial cables

53. Which communications medium requires line-of-sight?
    a. Microwave
    b. Fiber optic
    c. Twisted pair
    d. Coaxial

54. Modem stands for:
    a. Modification/demodification
    b. Modulation/demodulation
    c. Mode/Modeless
    d. None

55. Which is the correct measurement of a modem's data transfer rate?
    a. Kbps
    b. Gbps
    c. bps
    d. Mbps

56. A communications signal in the form of a continuous wave is called:
    a. Digital
    b. Modulation
    c. Analog
    d. None

57. The process of converting from analog to digital signal is known as:
    a. Modulation
    b. Data routing
    c. Data sequencing
    d. Demodulation

58. Which kind of signal is mostly required by telephone lines?
    a. Digital
    b. Analog
    c. Both
    d. None

59. Converting a digital signal to an analog signal is called:
    a. Modulation
    b. Demodulation
    c. Conversion
    d. None

60. Signals produced by a computer to send over phone line must be converted to:
    a. Modems
    b. Analog signals
    c. Digital signals
    d. Microwaves

61. Modulation needs to be done:
   a. Prior to sending a digital signal over the telephone line
   b. Prior to receiving a signal from the telephone line
   c. Whenever a signal's frequency needs to be increased.
   d. Whenever a signal's amplitude needs to be manipulated.

62. A modem's rating of 56K refers to its:
   a. Memory size                        b. Transmission speed
   c. Modem Size                         d. None.

63. Which is an advantage of synchronous over asynchronous transmission?
   a. Simplicity                         b. Speed
   c. No error checking                  d. Two-way communications

64. A modem:
   a. Derives its name from modulator-demodulator
   b. Converts digital signals into analog signals
   c. Converts analog signals into digital signals
   d. All of the above

65. Which of the following features is provided with a modem?
   a. Speeds                             b. Self-testing
   c. Transmission rate                  d. All

66. Bps is short for:
   a. Baud per second                    b. bytes per second
   c. Bits per second                    d. binary packets a second

67. A modem allows computers to access other computers through all of the following types of connections EXCEPT:
   a. Wireless                           b. Telephone lines
   c. Offline                            d. Cable.

68. Which modem is used to transmit data signals through air instead of cable?
   a. Internal modem                     b. Wireless modem
   c External modem                      d. None

69. Which type of modem can be added to the system unit through expansion slot?
   a. External modem                     b. Internal modem
   c. Wireless modem                     d. None

70. Which of the following is not a common communication code?
   a. Unicode          b. EBCDIC          c. Bilateral code          d. ASCII

71. Communication between a computer and keyboard involves:
   a. simplex          b. Half-duplex     c. Full-duplex             d. All

72. BCD stands for:
   a. Binary coded decimal               b. Base coded decimal
   c. Byte coded decimal                 d. Bidirectional coded decimal

73. IBM stands for:
   a. International Business machine
   b. Internet Business Machine
   c. Internet Bulletin Machine
   d. International Binary Machine

74. BCD Code is a _____ bit code.
   a. 4       b. 8       c. 15       d. 32

75. _____ code is 7-bit or 8-bit code.
   a. BCD       b. EBCDIC       c. ASCII       d. None

76. EBCDIC is a _____ bit code.
   a. 4-bit       b. 6-bit       c. 7-bit       d. 8-bit

77. EBCDIC stands for:
   a. Extended Binary Coded Decimal Interchange Code
   b. Extended Bit Code Decimal Interchange Code
   c. Extended Bit Case Decimal Interchange Code
   d. Extended Binary Case Decimal Interchange Code

78. ASCII stands for:
   a. American Stable Code for International Interchange
   b. American Standard Case for Institutional Interchange
   c. American Standard Code for Information Interchange
   d. American Standard Code for Interchange Information

79. Example of non numerical data is:
   a. Employee address       b. Examination score
   c. Bank balance       d. Student Roll No

80. The term baud is measured of:
   a. Speed at which data travels over communication line
   b. Memory capacity
   c. Instruction execution time
   d. All

81. A large number of computer in wide geographical area can be efficiently connected by:
   a. Twisted pair       b. Coaxial cable
   c. Communication Satellite       d. None

## Answers

| 1. | b | 2. | d | 3. | a | 4. | a | 5. | b | 6. | c |
|----|---|----|---|----|---|----|---|----|---|----|---|
| 7. | b | 8. | a | 9. | d | 10. | b | 11. | a | 12. | c |
| 13. | b | 14. | a | 15. | b | 16. | a | 17. | a | 18. | c |
| 19. | a | 20. | b | 21. | a | 22. | c | 23. | b | 24. | b |
| 25. | a | 26. | b | 27. | a | 28. | a | 29. | a | 30. | b |
| 31. | a | 32. | b | 33. | a | 34. | c | 35. | a | 36. | d |
| 37. | a | 38. | b | 39. | b | 40. | a | 41. | c | 42. | b |
| 43. | b | 44. | a | 45. | b | 46. | c | 47. | c | 48. | d |
| 49. | d | 50. | c | 51. | d | 52. | b | 53. | a | 54. | b |
| 55. | c | 56. | c | 57. | d | 58. | b | 59. | a | 60. | b |
| 61. | a | 62. | b | 63. | b | 64. | d | 65. | d | 66. | b |
| 67. | c | 68. | b | 69. | b | 70. | c | 71. | a | 72. | a |
| 73. | a | 74. | a | 75. | c | 76. | d | 77. | a | 78. | c |
| 79. | a | 80. | a | 81. | c | | | | | | |

# Fill in the Blanks

1.   In _____ transmission, a start bit and a stop bit frame a character byte
2.   Data communication signals can be in _____ or _____ form.
3.   Modem is an electronic device that converts digital signal into analog signals, which is called _____
4.   The _____ transmission involves the concurrent flow of bits of data through separate communication lines
5.   ASCII is _____ bits code.
6.   A television broadcast is an example of _____ transmission.
7.   In _____ transmission data is transmitted by character by character.
8.   The data is transmitted in both directions simultaneously on same channel
9.   Fiber optic is better for very high speed, high-capacity data transmission than _____ cable because of lack of attenuation and purity of the signal
10   The number of frequencies that can fit on a link at one time is called _____
11   _____ is a process of transferring data electronically from place to another place
12   A _____ that creates the message to be transmitted.
13.  Source is also called _____
14   Message is transmitted from one place to another through _____

## Answers

| | | |
|---|---|---|
| 1. asynchronous | 2. digital, analog | 3. modulation |
| 4. parallel | 5. 7 (seven) | 6. simplex |
| 7. asynchronous | 8. full duplex | 9. coaxial |
| 10. bandwidth | 11. Data Communication | 12. Sender |
| 13. Sender | 14. Medium | |

---

# True / False

1.   An internal modem is a circuit board that can be added to system unit of computer
2.   In full transmission, the channel capacity is shared by both communication devices at all time.
3.   Normally, modern transmission is asychronous.
4.   Transmission of signals across communication medium is called signaling
5.   The voice channel has a bandwidth of 0-233 KHz
6.   Sychronous transmission is much faster than asychronous

## Answers

| 1. | T | 2. | T | 3. | T | 4. | F | 5. | F | 6. | T |
|---|---|---|---|---|---|---|---|---|---|---|---|

# INFORMATION NETWORKS

**Q1.** **What are Information Networks?**

## Information Networks:

- Information networks or computer networks are the convergence of two technologies; Computing and Telecommunication.

- This convergence resulted in LAN (Local area Network), MAN (Metropolitan Area Network), WAN (Wide Area Network) and the Internet.

- The networks were used for research among computer scientists and telecommunication engineers.

- Information networks brought many useful benefits.

- It also has created some problems.

- The most popular information networks are the internet or World Wide Web.

- The users exchange information through internet.

- Internet is a large network through which information continuously flows.

- This circulation of information may flow rapidly or slowly.

**Q2.** **What is a Network? Discuss different types of networks.**

## NETWORK:

- When two or more than two computers are connected to each other through some communication media it is called a network.　　　OR

- A distributed data processing system in which multiple computers are linked together for the purpose of data communication and resource sharing.
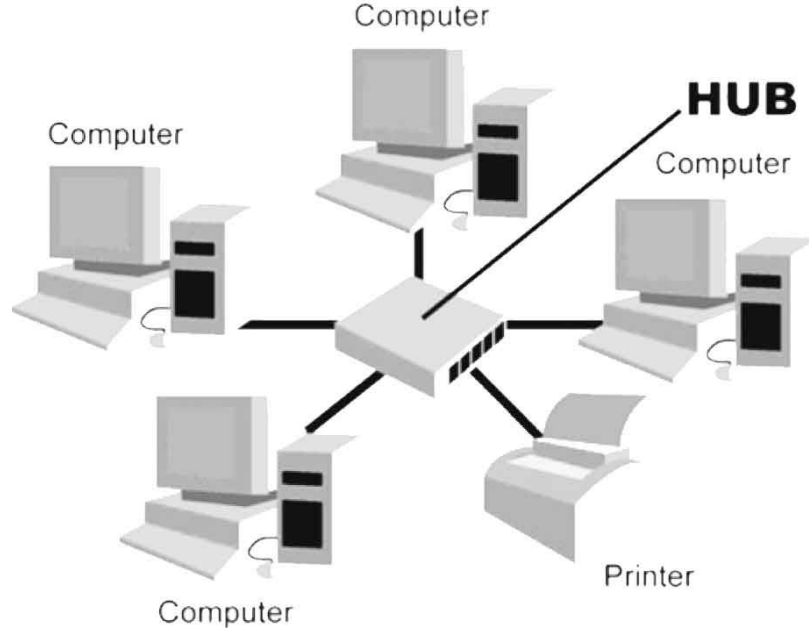
## Uses of networks:

- Networks allow users to share programs and data at the same time.
- Networks allow users to share peripheral devices.
- Networks allow users to send email messages along with attachments (files).
- Some networks also provide tools for teleconferencing and videoconferencing.

## TYPES OF NETWORKS:

- There are three types of Networks.
    - o LAN (Local area Network)
    - o MAN (Metropolitan Area Network)
    - o WAN (Wide Area Network)

## LAN (Local area Network):

- It is a digital communication system capable of interconnecting a large number of computers, terminals and peripheral devices within a limited geographical area.
- It covers a small geographical area such as an office or a group of buildings e.g. College Lab etc.
- Its speed is faster than WAN.

## MAN (Metropolitan Area Network):

- A MAN connects an area larger than LAN but less than WAN.
- A MAN covers the geographical boundaries of a city.
- The purpose of MAN is to bypass the local telephone companies when accessing long distance services.

## WAN (Wide Area Network):

- It is a digital communication system, which interconnects different sites, terminals and also enables different LANs to communicate with each other.

- It covers a large geographical area such as among cities, countries or continents e.g. Internet. It is also known as long-haul network.

- The larger computer in WAN are hosts and hosts are the computers on the network which provides services to other computers on the network.

- **Terminal Emulation Software** is used to allow computer to appear as a terminal.

## Difference Between LAN and WAN:

| LAN | WAN |
|---|---|
| **Area** ||
| It is limited to small geographical area. | It covers a large geographical area. |
| **Connection** ||
| Computer and devices are physically connected. | Computers may or may not be physically connected. |
| **Devices** ||
| Ethernet Card is used in LAN. | Modem is used in WAN |
| **Speed** ||
| Data transmission speed is very high. 100 Mbps to 1000 Mbps. | Data transmission speed is low. 56Kbps to 56Mbps |
| **Cost** ||
| Its cost of installation is less than WAN. | Its cost is high. |
| **Error** ||
| Its error rate is negligible. | Its error rate is high. |
| **Examples** ||
| Computer lab of a college. | Internet |

## Q3. What is Internet? Discuss its History and Uses.

## INTERNET:

- It is a large network of networks. Internet is a network of connected computers that provides us a facility of exchange data, messages and files with other computers that are connected to the Internet.

- Due to invention of Internet the Globe is referred as "Global Village". And Internet is an ocean of knowledge.

**History of Internet:**

- ARPANET was designed in 1960 by US-Defense department (DARPA-Defense Advance Research Project Agency) in collaboration with universities and research organizations.
- ARPANET (Advance Research Project Agency Network) was a wide area network connecting a small number of users. There were only four hosts.
- ARPANET was used for military purpose during 1970-1980.
- In 1989, NSF (National Science Foundation) established a network of five super computing centers that were available to researchers for academic purposes.
- This network of NSF was known as NSFnet.
- Internet became available for general public when in 1995 NSFnet moved the last restrictions on the use of the Internet for commercial traffic.
- NSF is still donating a lot of fund to it.

**Uses of Internet:**

WWW, E-mail, telnet, File-Transfer Facility, Gopher, Chat groups, Intranet, Extranet are the uses of Internet.

**WWW:**

- It stands for World Wide Web.
- It is a collection of millions of uploaded web pages or web sites.
- It organizes the Internet related resources so that we can easily access the information available on the Internet.
- Hyper text transfer protocol (**http**) protocol is used for WWW.

**E-mail:**

- It is a process of sending and receiving messages and files among the internet users.

**Telnet:**

- It is a software protocol that allows one computer to connect to another computer and make use of the other computer's information.

**File-Transfer Facility:**

- File Transfer Protocol (ftp) is used to transfer files from one computer to another.
- The process of transferring files from remote computers to our computer is called **downloading**.
- The process of transferring files from our computer to remote computer is called **uploading**.

**Gopher:**

- It is an access and retrieval system covering a wide range of information, from reference materials, to magazine articles, to government documents and speeches.

**Chat Groups:**

- The Internet users with similar interests form up their forums to have online real-time discussions over Internet.

**Intranet:**

- Intranet design to meet the internal need for sharing the information within single company.

- It is a privately owned secure, business network based on Internet technology (using TCP/IP) not necessarily connected to the Internet.

- Information is available to all employees, no matter where they were or what kind of hardware they were using.

- Information cannot be exchanged outside the organization-using intranet.

**Extranet:**

- It is a combination of multiple intranets.

- Intranets of different companies are connected to each other to share data and information.

- Each company on extranet provides selected information to one or more other companies.

**Q4.      What is Email? Discuss its advantages.**

# E-MAIL AND ITS ADVANTAGES:

- It stands for electronic mail.

- It is a process of sending and receiving messages from one computer to another over the Internet.

- This facility is provided by some special websites called email servers.

- The sender and receiver may be in the same building or anywhere in the world.

- The sender and receiver both have an email address and email facility e.g. Yahoo, Hotmail Gmail etc.

- The same message can be sent to many people using email facility.

- We can send letters, notes, files, data and reports using the same technique.

- When email reaches at the destination it does not interrupt the working on the computer.

- Every Internet user has this facility.

- Email facility is cost effective. We can use it at the cost of using Internet.

- The receiver's system may be off when mails arrive and receiver can read after connecting to the internet.

- Emails are not anonymous. They always carry an address of originator.

- This facility is available round the clock.

- It reaches at the destination in a minute or seconds.

- There is no problem of distances in sending and receiving emails.

**Q5.     What is Workgroup Computing? Define groupware.**

# WORKGROUP COMPUTING:

- When two or more than two people work on the same project using computer network, it is called work group. When people of a workgroup perform some processing is called workgroup computing. It is also known as collaborative computing.

- It enables the individuals and teams of certain projects to use computer networks for the purpose of cooperation, consultation and information sharing.

- The software that allows users to share the resources is called groupware.

**Q6.     What are types of Network Model?**

# NETWORK MODELS:

- There are three types of network models.

    Client-Server Modal/Dedicated Server Model

    Peer-to-Peer Network Model

    Hybrid Network Model

**Client-Server Model/Dedicated Server Model:**

- In this type of network model, one or more computers are dedicated servers and the remaining computers work as clients. The server cannot play the role of the client and vice-versa.

- Server is a computer that controls the network. It has the disks, containing database files and shared devices like printer, which can be used by other computers or nodes.

- The clients are all other computers on the network.

- It reduces the network traffic.
- The response of each node on client server network is very fast.
- In client server network terminals or clients are less expensive because mostly work is done by the server machine.

**Peer-to-Peer Network Model:**

- In this network model, every computer plays a role of server or client depending on the nature of communication. There is no clear distinction between the server and client machines.
- All computers have equal status.
- No one has the control over the others.
- Each computer is independent in terms of data storage and devices.
- The users can share data and resources when required.

**Disadvantages:**

  **Lack of Speed:**  It becomes slow under heavy use.

  **Lack of Security:**  In Peer to Peer Networks there is no security of data.

**Hybrid Network Modal:**

- It has the combined features of both client-server and peer-to-peer networks.
- The users take advantage of both models.

**Q7. What are Network Standards? Describe types of Network Standards?**

# NETWORK STANDARDS:

- The standards are the precise documents containing technical and physical specifications about the network being designed.
- Those standards are taken into considerations, which are worldwide, acceptable.

**Types of Network Standards:**

- De-Facto Standard
- De-Jure Standard

**De-Facto Standard:**

- De-Facto means "by tradition" or "by facts".
- These standards are developed informally and came into existence after historical development.
- These standards are used by organizations worldwide.

- SNA (system network architectures) an example of De-Facto standard.

**De-Jure Standard:**

- De-Jure means "According to Law or Regulation".
- These standards are properly researched, developed and approved by some networks governing bodies.
- These organizations are:

| | |
|---|---|
| ANSI | American National Standard Institute. |
| IEEE | Institute of Electrical and Electronics Engineers. |
| ISO | The International Standard Organization. |
| ITU-T | The International Telecommunication union-Telecommunication Standards Sector (formally CCITT) |
| EIA | The Electronics Industries Association. |
| Telcordia | |

**Q8.     What are Network Topologies? Describe types of Network Topologies?**

# Network Topologies:

- Topology refers to the layout of connected devices on a network or
- The scheme of joining computers in a network is called topology or
- Arrangement of computer nodes in a computer network is called topology.

# TYPES OF TOPOLOGIES:

- Bus
- Ring
- Star
- Tree
- Mesh

**Bus Topology:**

- In this topology all the computers are connected to a common communication medium.
- The communication medium is called BUS.
- A special device terminator is used at both ends of the series to absorb the signals.
- In bus topology, if a computer transmits data (broadcast message) on to the communication medium (bus) then all the nodes on the bus see this message and only the destination computer accepts and processes the message.
- Ethernet bus is mostly used in LAN because it is relatively easy to install.
- The number of computers in bus topology should be limited.

- 10 Base-2 ("ThinNet") and 10 Base-5 ("ThickNet") cables are used in bus topology.
- Problems are increased with the increase of number of computers in bus topology.
- The entire network fails if the backbone (bus/cable) fails.
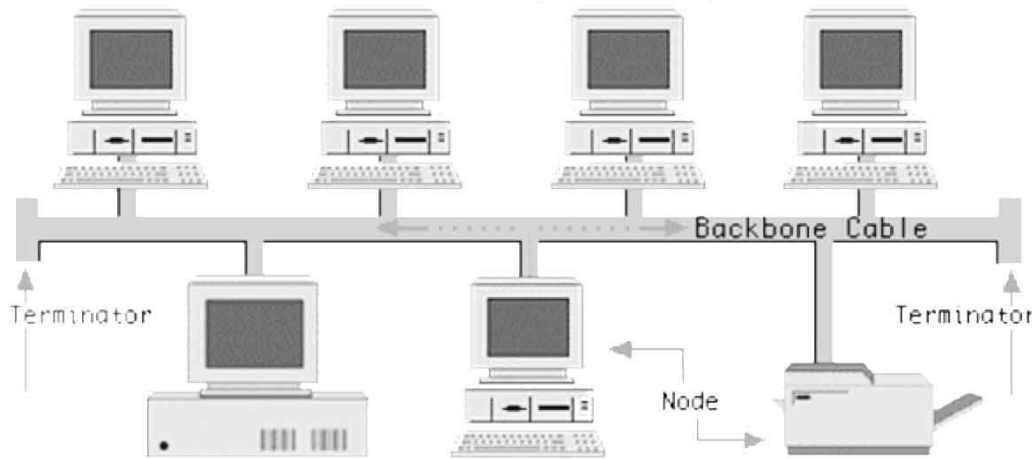


**Advantages**
- It is easy to understand
- It is easy to connect additional computers to this kind of network.
- This topology is best to connect computers close to each other.

**Disadvantages:**
- Difficult to detect errors.
- Data collisions are very high due to shared medium of communication.
- Slow speed because of shared medium.

**Ring Topology:**
- In a ring network, every device has exactly two neighbors for communication purpose and the last computer is connected to the first computer i.e. all the computers are connected in a ring shape.
- All messages travel through a ring in the same direction (clock-wise or anti-clock-wise).
- A failure in any cable or a device breaks the loop and the entire network fails.
- Token passing scheme is used in ring topology.

# RING Topology
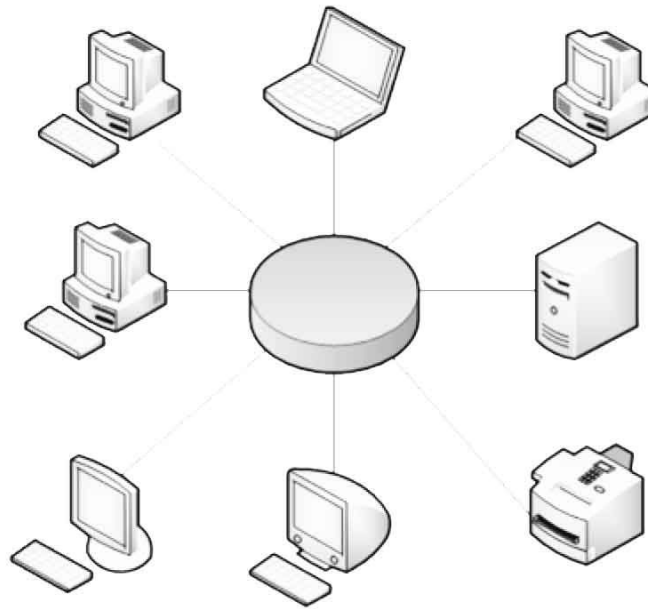


**Advantages**

- No chance of data collision.

**Disadvantages:**

- If one of the computers becomes defective, it affects the whole network.
- It is difficult to troubleshoot the ring topology.
- Speed of ring topology is very slow.

**Star Topology:**

- All the computers are connected through a central device (Hub or Switch).
- Twisted pair (UTP) cable is used in star topology. Star topology requires more cable. Therefore it is expensive.
- It is mostly used in LAN because it is easy to maintain and install.
- If any computer fails the network is not affected.
- If the HUB or Switch fails then the entire network also fails.
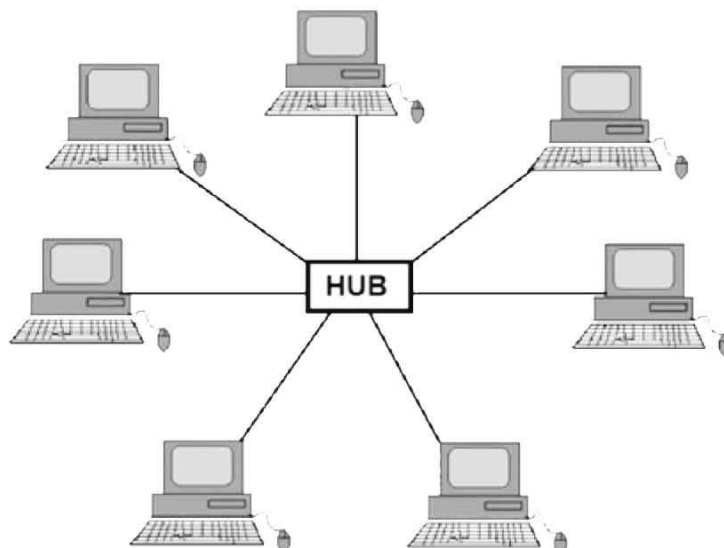
**Advantages**

- If any computer becomes defective, it does not affect any other terminal of this network.
- The central computer controls the flow of the data.
- There is no chance of data collision in star topology.

**Disadvantages:**

- This type of topology is expensive because of extra cabling cost.
- If the central device is shutdown, the whole network will be down.

**Tree Topology:**

- Tree topology integrates multiple star topologies together on to a bus i.e. all the computers are connected in such a way that forms a tree like structures.
- It has the combined features of star and bus topology.

- Only Hubs are connected directly to form tree and function of each hub as the root of tree devices.



Tree topology "branch" with multiple nodes
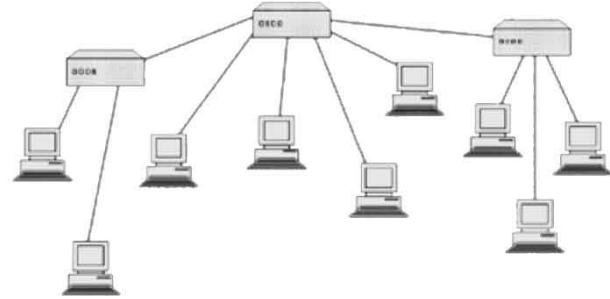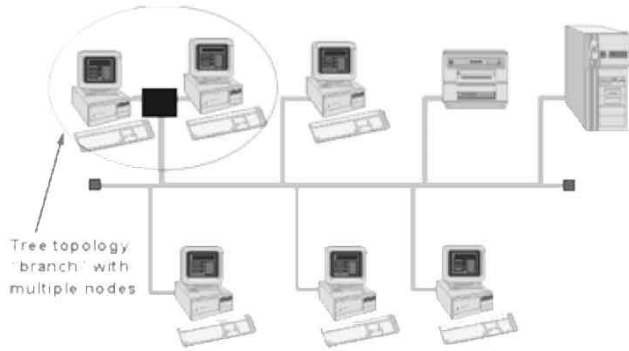
**Advantages**
- A lot of hardware and network vendors support this topology
- A point to point connection is not possible with tree networks.
- Best topology for branched out networks.

**Disadvantages:**
- Constraint of network length depends on cable type.
- Totally dependent on a trunk, if it fails the whole network fails.
- Because of large size difficult to manage.

**Mesh Topology:**
- In Mesh topology, every computer is directly connected to every other computer on the network.
- There are several possible paths from source to destination.
- Mesh topology is used in WAN or internet.
- It has high fault tolerance due to multiple links.
- Troubleshooting in mesh topology is easy as compared to other networks.
- The installation of mesh topology is difficult.
- Its performance is not affected with heavy load of data transmission.
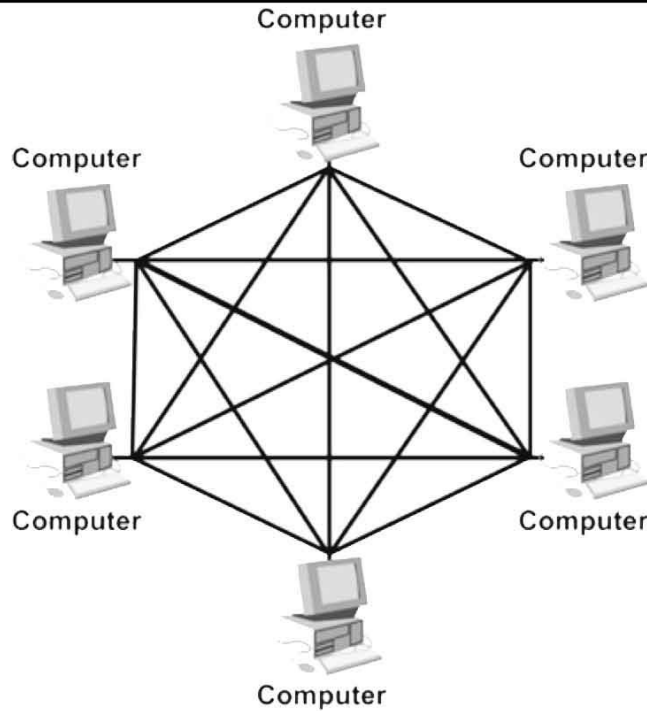
## Advantages

- No traffic problem as there are dedicated links.
- Reliable because failure of one link does not affect the entire system.
- Security as data travels along a dedicated line.
- Point to point links makes fault identification easy.
- More fault tolerant.

## Disadvantages:

- Expensive hardware is required for direct connections.
- Because of direct connections, more wire is required.
- Installation and maintenance is complex.

**Q9.    What are Network Protocols? Describe different Network Protocols.**

## PROTOCOLS:

- Protocols are the rules to exchange data between two devices.
- These protocols are defined in the network software.
- Protocols are: Ethernet, Token Ring, ARCnet, TCP/IP, ISDN, and DSL.

## LAN Protocols:

### Ethernet:

- It is most commonly used LAN protocol.
- Ethernet is used in bus topology with high-speed network cable.
- It is relatively simple and cheaper.

- As all computers share the same transmission media therefore the computers must follow certain rules for communication with each other otherwise it may cause a loss of data.
- Before transmitting data, a station listens to the network to determine whether it is already in use. If it is, then it must wait. If the network is not in use, the station transmits.
- When two stations transmit data at the same time then the data collision occurs; a special message is sent to the network to indicate that it is jammed. Each node stops transmitting, waits a random period of time and then start transmitting again.
- The access method that allows only one station to transmit at a time on a shared medium is called CSMA/CD (Carrier Sense Multiple Access with Collision Detection).

**Token Ring:**
- Token ring protocol is used in ring topology.
- A token is an electronic signal.
- Only one token is available in a network.
- When a node wants to transmit data, first it captures the token and then transmits the data. After the transmission, it releases the token back to the network.
- As one token is available to the network and the one node with token can transmits data at a time, therefore the transmission rate of token ring is very slow and there is no data collision.
- Token ring was developed by IBM (International Business Machines).
- The method of controlling access to the shared network cable is called token passing.

**ARCnet:**
- It stands for Attached Resource Computer Network and was introduced in 1977.
- It uses either twisted pair or co-axial cable.
- The original ARCnet protocol was very slow.
- ARCnet is inexpensive, reliable, easy to setup and easy to expand.
- Fast ARCnet increased the transmission rate to 100Mbps and it can also use fiber optic cable.

**WAN Protocols:**

**TCP/IP:**
- It stands for **Transmission Control Protocol/Internet Protocol**.
- It is a WAN protocol.
- Every computer is identified separately over internet using TCP/IP protocol.
- TCP/IP ensures the reliable connection between the computers over internet.

- TCP/IP software differs for different computers but it always present the same interface to the network.

**ISDN:**

- It stands for **integrated services digital network**.
- It transmits data voice and video simultaneously at a very high speed over telephone lines.
- It provides better transmission rate.
- It provides reliable digital connection at higher speeds than those offered by analog connection.

**DSL:**

- It stands for **digital subscriber line**.
- It provides high-speed digital data transmission over telephone lines.
- Modems are necessary with DSL technology because lines are analog while data is digital.
- It is an alternative to ISDN.

**Q10.    What are the different Components of a Network?**

# COMPONENTS OF A NETWORK:

- All networks require some components for interconnection. These components are: Communication Media, NIC, Repeater, Hub, Bridge, Switch, Gateway, Router

**Communication Media:**

- It is a pathway that is used for transmitting data from sender to receiver. These pathways are also called communication channels.
- There are two kinds of transmission media.
  Guided media
  Unguided media

**Guided media:**

- It refers to those channels that allow the transmission of data through a physical media.
- All the devices are connected directly with each other through physical media such as cables.
- These are also called bounded media e.g. Twisted pair, Coaxial, Fiber optic.

**Unguided media:**

- It refers to those channels that transmit data and information in the form of wave.
- These are the communication channels in which data is transmitted through the air instead of cables.
- There is no physical path between two devices for the transmission of data.

- Data signals are not bounded to cabling media therefore it is also known as unbounded media.
- Wireless LANs are easy to setup and reconfigure.
- The transmission rate is slower than the physical medium e.g. Microwave Transmission, Satellites, Mobile communication.

**NIC:**

- It is a printed circuit board that inserted into expansion slots.
- Some computers have built-in NIC.
- It provides a port to connect to the network.
- It provides network communication capabilities to and from a computer.
- It is also called LAN adapter.

**Repeater:**

- The maximum length for a UTP cable in a network is 100 meters. If you need to extend the network limit, you must add a device. This is called repeater.
- A repeater cleans, amplifies and resends the signal that is weakened by a long cable length.

# Hub:

- Hub is used in star topology as central device.
- It is a multi-port repeater.
- Hub is used instead of repeater i.e. the purpose of hub is to regenerate and retime the network signals.

# Bridge:

- It is used to connect similar types of network.
- It recognizes the message on the network and passes on the data to computer in other networks.
- It filters the network traffic and divides the network into segments.

# Switch:

- It is a multi-port bridge.
- It is more intelligent device than a hub.
- Its purpose is to concentrate connectivity.

**Gateway:**

- It is a collection of hardware and software resources that enable a computer to communicate with a computer on a different network.

- It receives data from one network and transfer it according to the protocol of other network.

**Router:**

- Router is a combination of hardware and software resources and it connects two or more networks.

- High-speed routers serve as Internet backbone and handling the excessive data traffic.

- Its purpose is to examine incoming packets, choose the best path and sends them to the proper outgoing port.

- It uses the routing protocols, operating system and management software.

**Q11.    What are CSMA/CD, CSMA/CS and CSMA/CR?**

## CSMA/CD-Carrier Sense Multiple Access with Collision Detection:

- It is a local area network access method in which contention between two or more station is resolved by collision or it is an access method that allows only one station to transmit at a time on a shared medium.

- CSMA/CD LAN can access the network at any time. Before transmitting data, CSMA/CD station listens to the network to determine whether it is already in use. If it is, then it must wait. If the network is not in use, the station transmits.

- When two stations transmit data simultaneously then the data collision occurs; CSMA/CD station can detect collision, a special message is sent to the network to indicate that it is jammed.

- Each node stops transmitting, waits a random period of time so they know when they must retransmit and then transmitting again.

- To make sure that the collision is recognized, Ethernet requires that a station must continue transmitting until the 50 micro second has ended. If the station has less than 64 bytes of data to send, then it must pad the data by adding zeros at the end.

## CSMA/CS-Carrier Sense Multiple Access with Carrier Sense:

A node or a computer listens to the bus for a predetermined amount of time before transmitting and waits until the talking node has completed the transmission.

## CSMA/CR-Carrier Sense Multiple Access with Collision Resolution:

It allows multiple devices to communicate at once; a protocol determines which device receives priority.

**Q12.     What is an OSI Model? Describe its different Layers.**

# OSI (Open System Interconnection) Model:

- It is known as OSI networking **reference model**.
- It was presented by **ISO** (International Standard Organization).
- **It provides a logical framework how data communication processes should take place across networks.**
- There are **seven layers in OSI model** and each layer has a particular function.
- These layers are: Application Layer, Presentation Layer, Session Layer, Transport Layer, Network Layer, Data Link Layer and Physical Layer.
- There are **two groups of OSI layers**.

  Upper layers

  Lower layers

**Upper layers** focus on user applications and how files are represented on computers before transmission.

**Lower layers** concentrates on how communication occurs across the network.
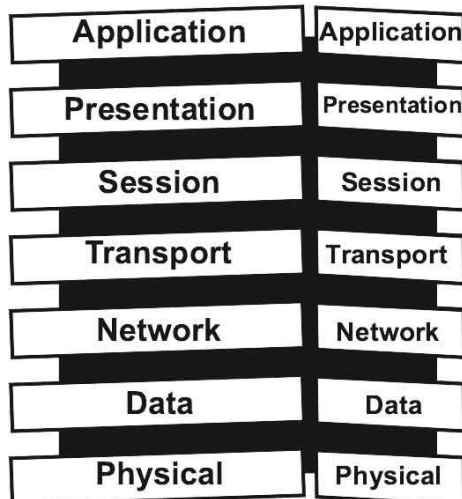


**Application Layer:**
- It provides network services to user application.
- It is responsible for exchanging information between programs running on the computer.

**Presentation Layer:**
- It is concerned with how data is converted and formatted for data transfer.
- This layer performs code conversion, data translation, compression and encryption.

**Session Layer:**
- It determines how two devices establish, maintain and manage connection.
- It determines how two devices talk to each other.
- These connections are called sessions.

**Transport Layer:**

- It is responsible for breaking the data into segments.
- It establishes a logical connection between two devices and provides error handling.
- It also controls the message flow between the systems.

**Network Layer:**

- It is responsible for determining the address on the network.
- It will determine the route from source to destination.
- It will manage the network traffic.
- Segments at this level are converted into packets.

**Data Link Layer:**

- It is responsible for the reliability of the physical connection established at physical layer.
- It provides an error free transmission of data from one computer to another.
- Packets are converted into frames at this level.

**Physical Layer:**

- It determines how data is converted into bits.
- It defines the physical characteristics of the network such as connections, voltage levels, timing and physical medium.
- It deals with the physical transmission of bits over transmission medium.
- It is responsible for activating and maintaining the physical link between systems.

# SHORT QUESTIONS

**Q.1** **What are the technologies involved in information networks?**

**Ans.** Information networks or computer networks are the convergence of two technologies, Computing and Telecommunication. This convergence resulted in LAN (Local area Network), MAN (Metropolitan Area Network), WAN (Wide Area Network) and the Internet. The most popular information networks are the Internet or World Wide Web. Internet is a large network through which information continuously flows.

**Q.2** **Define a Network?**

**Ans.** The interconnection of computer systems and/or peripheral devices with transmission medium and data communication devices to share data and resources is called networks or a distributed data processing system in which multiple computers are linked together for the purpose of data communication and resource sharing.

**Q.3** **What are uses of networks?**

**Ans.** Networks allow users to share programs and data simultaneously. Networks allow users to share peripheral devices. Networks allow users to send email messages along with attachments (files). Some networks also provide tools for teleconferencing and videoconferencing.

**Q.4** **What are types of Networks?**

**Ans.** LAN (Local area Network)

MAN (Metropolitan Area Network)

WAN (Wide Area Network)

**Q.5** **What is LAN?**

**Ans.** LAN is Local area Network. It is a digital communication system capable of interconnecting a large number of computers, terminals and peripheral devices within a limited geographical area. It spans a small geographical area such as an office or a group of buildings e.g. College Lab etc. Its speed is faster than WAN.

**Q.6** **What is MAN?**

**Ans.** MAN stands for Metropolitan Area Network. A MAN connects an area larger than LAN but less than WAN, such as a city with dedicated or high-performance

hardware e.g. Mobile phones etc. The purpose of MAN is to bypass the local telephone companies when accessing long distance services.

**Q.7** **What is WAN?**

**Ans.** WAN is a Wide Area Network. It is a digital communication system, which interconnects different sites, terminals and also enables different LANs to communicate each other. It spans a large geographical area such as among cities, countries or continents e.g. Internet. It is also known as long-haul network.

**Q.8** **What is an Internet?**

**Ans.** Internet is a network of connected computers that provides us a facility of exchange data, messages and files with other computers that are connected to the Internet. Due to invention of Internet the Globe is referred as "Global Village". And Internet is an ocean of knowledge.

**Q.9** **What are uses of Internet?**

**Ans.** WWW, E-mail, telnet, File-Transfer Facility, Gopher, Chat groups, Intranet, Extranet

**Q.10** **What is WWW?**

**Ans.** It stands for World Wide Web. It is a collection of millions of uploaded web pages or web sites. It organizes the Internet related resources so that we can easily access the information available to the Internet. Hyper text transfer protocol (http) protocol is used for WWW.

**Q.11** **What is E-mail?**

**Ans.** It is a process of sending and receiving messages and files among the Internet users.

**Q.12** **What is Telnet?**

**Ans.** It is a software protocol that allows one computer to connect to another computer and make use of the other computer's information.

**Q.13** **What is File-Transfer Facility of Internet?**

**Ans.** File Transfer Protocol (ftp) is used to transfer files from one computer to another. The process of transferring files from remote computers to our computer is called downloading. The process of transferring files from our computer to remote computer is called uploading.

**Q.14** **What is Gopher?**

**Ans.** It is an access and retrieval system covering a wide range of information, from reference materials, to magazine articles, to government documents and speeches.

**Q.15 What are Chat Groups?**

**Ans.** The Internet users with similar interests form up their forums to have online real-time discussions over Internet.

**Q.16 What is an Intranet?**

**Ans.** It is a privately owned secure, business network based on internet technology (using TCP/IP) not necessarily connected to the internet. Information is available to all employees, no matter where they were or what kind of hardware they were using. Information cannot be exchanged outside the organization-using intranet.

**Q.17 What is an Extranet?**

**Ans.** It is a combination of multiple intranets. Intranets of different companies are connected to each other to share data and information. Each company on extranet provides selected information to one or more other companies.

**Q.18 What is downloading?**

**Ans.** The process of transferring files from remote computers to our computer is called downloading.

**Q.19 What is uploading?**

**Ans.** The process of transferring files from our computer to remote computer is called uploading.

**Q.20 Define Workgroup Computing.**

**Ans.** It is also known as collaborative computing. It enables the individuals and teams of certain projects to use computer networks for the purpose of cooperation, consultation and information sharing. It permits the individuals to collaborate with their colleagues to work on the company information over the network. At the same time they can also link to other important contacts outside their organization.

**Q.21 Define groupware.**

**Ans.** A technique to share information in which many users or researchers can work on their projects by sharing the same domain of information online is called groupware. Groupware is software used for workgroup computing.

**Q.22 Define Client-Server Model/Dedicated Server Model.**

**Ans.** In this type of network model, one or more computers are dedicated servers and the remaining computers work as clients. The server cannot play the role of the client and vice-versa. Server is a computer that controls the network. It has the disks, containing database files and shared devices like printer, which can be used by other computers or nodes. The clients are all other computers on the network.

**Q.23** **What are the advantages Client-Server Model?**

**Ans.** It reduces the network traffic. The response of each node on client server network is very fast. In client server network terminals or clients are less expensive because mostly work is done by the server machine.

**Q.24** **Define Peer-to-Peer Network Model?**

**Ans.** In this network modal, every computer plays a role of server or client depending on the nature of communication. There is no clear distinction between the server and client machines. All computers have equal status. No one has the control over the others. Each computer is independent in terms of data storage and devices. The users can share data and resources when required.

**Q.25** **What is a Hybrid Network Model?**

**Ans.** It has the combined features of both client-server and peer-to-peer networks. The users take advantage of both modals.

**Q.26** **What are Network Standards?**

**Ans.** The standards are the precise documents containing technical and physical specifications about the network being designed. Those standards are taken into considerations, which are worldwide, acceptable. De-Facto Standard and De-Jure Standard are the types of network standards.

**Q.27** **What areDe-Facto Standard?**

**Ans.** De-Facto means "by tradition" or "by facts". These standards are developed informally and came into existence of historical development. These standards are used by organizations worldwide.

**Q.28** **What are De-Jure Standard?**

**Ans.** De-Jure means "According to Law or Regulation". These standards are properly researched, developed and approved by some networks governing bodies. These organizations are ANSI, IEEE, ISO, ITU-T, EIA, Telcordia.

**Q.29** **What is a Network Topology?**

**Ans.** Topology refers to the layout of connected devices on a network or the scheme of joining computers in a network is called topology or arrangement of computer nodes in a computer network is called topology. Bus, Ring, Star, Tree and Mesh are types of topologies.

**Q.30** **Define a Bus Topology?**

**Ans.** In this topology all the computers are connected in series with a common communication medium. The communication medium is called BUS. A special device terminator is used at both ends of the series to absorb the signals.

**Q.31** **What is a Ring Topology?**

**Ans.** In a ring network, every device has exactly two neighbors for communication purpose and the last computer is connected to the first computer. All messages travel through a ring in the same direction. A failure in any cable or a device breaks the loop and the entire network fails. Token passing scheme is used in ring topology.

**Q.32** **Define Star Topology?**

**Ans.** All the computers are connected through a central device (Hub or Switch). Twisted pair (UTP) cable is used in star topology. If any computer fails the network is not affected. If the HUB or Switch fails then the entire network also fails.

**Q.33** **What is a Tree Topology?**

**Ans.** Tree topology integrates multiple star topologies together on to a bus i.e. all the computers are connected in such a way that forms a tree like structures. It has the combined features of star and bus topology. Only HUBs are connected directly to the tree bus and function of each hub as the root of tree devices.

**Q.34** **Define Mesh Topology.**

**Ans.** In Mesh topology, every computer is directly connected to every other computer on the network. There are several possible paths from source to destination. Mesh topology is used in WAN.

**Q.35** **Define Protocols.**

**Ans.** Protocols are the rules to exchange data between two devices. These protocols are defined in the network software. Protocols are Ethernet, Token Ring, ARCnet, TCP/IP, ISDN and DSL

**Q.36** **What is Ethernet?**

**Ans.** This protocol is used in bus topology with high-speed network cable. It is relatively simple and cheaper. As the entire computers share the same transmission media therefore the computers must follow certain rules for communication with each other otherwise it may cause a loss of data.

**Q.37** **What is CSMA/CD?**

**Ans.** The access method that allows only one station to transmit at a time on a shared medium is called CSMA/CD (Carrier Sense Multiple Access with Collision Detection).

**Q.38** **What is Token Ring?**

**Ans.** Token ring protocol is used in ring topology. A token is an electronic signal. Only one token is available in ring topology and when a node wants to transmit data, first it captures the token and then transmits the data. After the transmission, it releases the token back to the network. The token ring is associated with IBM (International Business Machines), which worked with the concept of ring network.

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**Q.39** **What is token passing?**

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**Ans.** It stands for Attached Resource Computer Network. It uses either twisted pair or co-axial cable. The original ARCnet protocol was very slow. ARCnet is inexpensive, reliable, easy to setup and easy to expand. Fast ARCnet increased the transmission rate to 100Mbps and it can also use fiber optic cable.

**Q.41** **What is TCP/IP Protocol?**

**Ans.** It stands for Transmission Control Protocol/Internet Protocol. It is a WAN protocol. Every computer is identified separately over internet using TCP/IP protocol. TCP/IP ensures the reliable connection between the computers over Internet.

**Q.42** **What is ISDN?**

**Ans.** It stands for integrated services digital network. It transmits data voice and video simultaneously at a very high speed over telephone lines. It provides better transmission rate. It provides reliable digital connection at higher speeds than those offered by analog connection.

**Q.43** **What is DSL?**

**Ans.** It stands for digital subscriber line. It provides high-speed digital data transmission over telephone lines. Modems are necessary with DSL technology because lines are analog while data is digital. It is an alternative to ISDN.

**Q.44** **Name the Components of a Network.**

**Ans.** All networks required some components for interconnection. These components are Communication Media, NIC, Repeater, Hub, Bridge, Switch, Gateway, and Router.

**Q.45** **What is an NIC?**

**Ans.** It is a printed circuit board that inserted into expansion slots. Some computers have built-in NIC. It provides a port to connect to the network. It provides network communication capabilities to and from a computer. It is also called LAN adapter.

**Q.46** **What is the concept of Repeater?**

**Ans.** The maximum length for a UTP cable in a network is 100 meters. If you need to extend the network limit, you must add a device. This is called repeater. A

repeater cleans, amplifies and resends the signal that is weakened by a long cable length.

**Q.47   What is the function of Hub?**

**Ans.**   Hub is used in star topology as central device. It is a multi-port repeater. Hub is used instead of repeater i.e. the purpose of hub is to regenerate and retime the network signals.

**Q.48   What is a Bridge?**

**Ans.**   It is used to connect similar types of network. It recognizes the message on the network and passes on the address to computer in other networks. It filters the network traffic and divides the network into segments.

**Q.49   What is function of Switch?**

**Ans.**   It is a multi-port bridge. It is more intelligent device than a hub. Its purpose is to concentrate connectivity.

**Q.50   Define Gateway.**

**Ans.**   It is a collection of hardware and software resources that enable a computer to communicate with a computer on a different network.

**Q.51   What is a Router?**

**Ans.**   Router is a combination of hardware and software resources and it connects two or more networks. High-speed routers serve as Internet backbone and handling the excessive data traffic. Its purpose is to examine incoming packets, choose the best path and sends them to the proper outgoing port. It uses the routing protocols, operating system and management software.

**Q.52   What is CSMA/CD-Carrier Sense Multiple Access with Collision Detection?**

**Ans.**   It is a local area network access method in which contention between two or more stations is resolved by collision or it is an access method that allows only one station to transmit at a time on a shared medium.

**Q.53   Define CSMA/CS-Carrier Sense Multiple Access with Carrier Sense.**

**Ans.**   A node or a computer listens to the bus for a predetermined amount of time before transmitting and waits until the talking node has completed the transmission.

**Q.54   What is CSMA/CR-Carrier Sense Multiple Access with Collision Resolution?**

**Ans.**   It allows multiple devices to communicate at once; a protocol determines which device receives priority.

**Q.55   What is an OSI Model?**

**Ans.**   OSI is Open System Interconnection Model. It is known as OSI networking reference model. It was presented by ISO (International Standard Organization). It provides a logical framework how data communication processes should take

place across networks. There are seven layers in OSI model and each layer has a particular function. These layers are Application Layer, Presentation Layer, Session Layer, Transport Layer, Network Layer, Data Link Layer, Physical Layer

**Q.56  What are the groups of OSI layers?**

**Ans.** There are two groups of OSI layers; upper layers and lower layers. Upper layers focus on user applications and how files are represented on computers before transmission. Lower layers concentrates on how communication occurs across the network.

**Q.57  What is a function of Application Layer?**

**Ans.** It provides network services to user application. It is responsible for exchanging information between programs running on the computer.

**Q.58  What is a function of Presentation Layer?**

**Ans.** It is concerned with how data is converted and formatted for data transfer. This layer performs code conversion, data translation, compression and encryption.

**Q.59  What is a function of Session Layer?**

**Ans.** It determines how two devices establish, maintain and manage connection. It determines how two devices talk to each other. These connections are called sessions.

**Q.60  What is a function of Transport Layer?**

**Ans.** It is responsible for breaking the data into segments. It establishes a logical connection between two devices and provides error handling. It also controls the message flow between the systems.

**Q.61  What is a function of Network Layer?**

**Ans.** It is responsible for determining the address on the network. It will determine the route from source to destination. It will manage the network traffic. Segments at this level are converted into packets.

**Q.62  What is a function of Data Link Layer?**

**Ans.** It is responsible for the reliability of the physical connection established at physical layer. It provides an error free transmission of data from one computer to another. Packets are converted into frames at this level.

**Q.63  What is a function of Physical Layer?**

**Ans.** It determines how data is converted into bits. It defines the physical characteristics of the network such as connections, voltage levels, timing and physical medium. It deals with the physical transmission of bits over transmission medium. It is responsible for activating and maintaining the physical link between systems.

<div align="center">

# EXERCISE

</div>

**Q.1      Fill in the blanks:**

1.   Collection of raw facts is called <u>Data</u>.

2.   A receiver is also called a <u>sink or destination</u>.

3.   Two forms of data transmission are <u>Parallel</u> & <u>Serial</u>.

4.   TCP/IP Stand for <u>Transmission Control Protocol and Internet Protocol</u>.

5.   Data in <u>Half-Duplex Transmission</u> can travel in both directions but not at the same time.

6.   <u>Data link layer</u> ensures the data are transmitted without any error.

7.   Data transmission through a medium can be either synchronous or <u>Asynchronous</u>.

8.   WAN stands for <u>Wide Area Network</u>.

9.   A <u>Satellite</u> is a microwave station placed in outer space.

10.  A router is also used as an <u>Intermediate</u> device used for interconnecting different types of networks together.

11.  Information networks or computer networks are the convergence of two technologies; <u>Computing and Telecommunication</u>.

12.  This convergence of networks resulted in <u>LAN, MAN and WAN</u>.

13.  <u>Network</u> is the interconnection of computer systems and/or peripheral devices with transmission medium and data communication devices to share data and resources is called networks.

14.  <u>Network</u> is a distributed data processing system in which multiple computers are linked together for the purpose of data communication and resource sharing.

15.  LAN stands for <u>Local area Network</u>.

16.  <u>LAN</u> is a digital communication system capable of interconnecting a large number of computers, terminals and peripheral devices within a limited geographical area.

17.  <u>LAN</u> spans a small geographical area such as an office or a group of buildings e.g. College Lab etc.

18.  MAN stands for <u>Metropolitan Area Network</u>.

19.  WAN stands for <u>Wide Area Network</u>.

20.  <u>WAN</u> is a digital communication system which interconnects different sites, terminals and also enables different LANs to communicate with each other.

21.  <u>WAN</u> spans a large geographical area such as among cities, countries or continents e.g. Internet.

22. The larger computer in WAN are <u>hosts</u> and hosts are the computers on the network which provides services to other computers on the network.

23. The computers get information from the hosts. This can be made possible using a "<u>Terminal Emulation Software</u>".

24. The process of transferring files from host computers to our computer is called <u>downloading</u>.

25. The process of transferring files from our computer to host computer is called <u>uploading</u>.

26. <u>Internet</u> is a network of connected computers that provides us a facility of exchange data, messages and files with other computers that are connected to the internet.

27. Due to invention of internet the Globe is referred as "<u>Global Village</u>".

28. <u>Internet</u> is an ocean of knowledge.

29. ARPANET was designed in <u>1960 by US-Defense department</u>.

30. DARPA stands for <u>Defense Advance Research Project Agency</u>.

31. ARPANET stands for <u>Advance Research Project Agency Network</u>.

32. <u>ARPANET</u> was a wide area network connecting a small number of users. There were only four hosts.

33. <u>ARPANET</u> was used for military purpose during 1970-1980.

34. In 1989, <u>National Science Foundation</u> established a network of five super computing centers which were available to researchers and academic purposes.

35. NSF stands for <u>National Science Foundation.</u>

36. The network of NSF was known as <u>NSFnet</u>.

37. <u>WWW</u> stands for World Wide Web.

38. <u>WWW</u> is a collection of millions of uploading web pages or web sites.

39. <u>WWW</u> organizes the internet related resources so that we can easily access the information available to the internet.

40. Hyper text transfer protocol (http) protocol is used for <u>WWW</u>.

41. E-mail is a process of sending and receiving messages and files among the internet users.

42. Telnet is a software protocol that allows one computer to connect to another computer and make use of the other computer's information.

43. ftp stands for <u>File Transfer Protocol</u>.

44. <u>ftp</u> is used to transfer files from one computer to another.

45. <u>Gopher</u> is an access and retrieval system covering a wide range of information, from reference materials, to magazine articles, to government documents and speeches.

46. <u>Chat Groups</u> are the internet users with similar interests form up their forums to have online real-time discussions over internet.

47. <u>Intranet</u> is a privately-owned secure, business network base on internet technology (using TCP/IP) not necessarily connected to the internet.

48. <u>Extranet</u> is a combination of multiple intranets.

49. <u>E-Mail</u> stands for electronic mail.

50. <u>E-Mail</u> facility is provided by some special websites called email servers.

51. <u>Workgroup Computing</u> is also known as collaborative computing.

52. <u>Workgroup Computing</u> enables the individuals and teams of certain projects to use computer networks for the purpose of cooperation, consultation and information sharing.

53. <u>Workgroup Computing</u> permits the individuals to collaborate with their colleagues to work on the company information over the network. At the same time they can also link to other important contacts outside their organization.

54. A technique to share information in which many users or researchers can work on their projects by sharing the same domain of information online is called <u>groupware</u>.

55. Groupware is software used for <u>workgroup computing</u>.

56. In <u>Client-Server Model</u>; one or more computers are dedicated servers and the remaining computers work as clients. The server cannot play the role of the client and vice-versa.

57. <u>Server</u> is a computer that controls the network. It has the disks, containing database files and shared devices like printer, which can be used by other computers.

58. In <u>Peer-to-Peer Network Model</u>; every computer plays a role of server or client depending on the nature of communication. There is no clear distinction between the server and client machines.

59. In <u>Peer-to-Peer Network Model</u>; all computers have equal status.

60. <u>Lack of Speed and Security</u> is the disadvantages in Peer to Peer Networks.

61. <u>Hybrid Network Modal</u> has the combined features of both client-server and peer to peer networks.

62. <u>Network Standards</u> are the precise documents containing technical and physical specifications about the network being designed.

63. De-Facto Standard means "by tradition" or "by facts".

64. De-Facto Standard are developed informally and came into existence of historical development.

65. De-Jure Standard means "According to Law or Regulation".

66. De-Jure Standard are properly researched, developed and approved by some networks governing bodies.

67. ANSI stands for American National Standard Institute.

68. IEEE stands for Institute of Electrical and Electronics Engineers.

69. ISO stands for The International Standard Organization.

70. ITU-T stands for The International Telecommunication union-Telecommunication Standards Sector (formally CCITT).

71. EIA stands for The Electronics Industries Association.

72. Topology refers to the layout of connected devices on a network or

73. The scheme of joining computers in a network is called topology or

74. Arrangement of computer nodes in a computer network is called topology.

75. In Bus Topology; all the computers are connected in series with a common communication medium.

76. The communication medium in bus topology is called BUS.

77. A terminator is used at both ends of the series to absorb the signals in bus topology.

78. Ethernet is used in bus topology because it is relatively easy to install.

79. The number of computers in bus topology should be limited.

80. 10 Base-2 ("ThinNet") and 10 Base-5 ("ThickNet") cables are used in bus topology.

81. In a ring network, every device has exactly two neighbors for communication purpose and the last computer is connected to the first computer.

82. Token passing scheme is used in ring topology.

83. All the computers are connected through a central device (Hub or Switch) in Star Topology.

84. Twisted pair (UTP) cable is used in star topology.

85. If the HUB fails then the entire network also fails in star topology.

86. Tree topology integrates multiple star topologies together on to a bus.

87. Tree topology has the combined features of star and bus topology.

88. In Mesh topology; every computer is directly connected to every other computer on the network.

89. There are several possible paths from source to destination in Mesh topology.

90. Protocols are the rules to exchange data between two devices.

91. Ethernet is most commonly used LAN protocol.

92. Token Ring protocol is used in ring topology.

93. A token is an electronic signal.

94. The token ring is associated with IBM.

95. IBM stands for International Business Machines.

96. The method of controlling access to the shared network cable is called token passing.

97. ARCnet stands for Attached Resource Computer Network.

98. Fast ARCnet increased the transmission rate to 100Mbps.

99. TCP/IP stands for Transmission Control Protocol/Internet Protocol.

100. TCP/IP is a WAN protocol.

101. Every computer is identified separately over internet using TCP/IP protocol.

102. TCP/IP ensures the reliable connection between the computers over internet.

103. ISDN stands for integrated services digital network.

104. ISDN transmits data voice and video simultaneously at a very high speed over telephone lines.

105. ISDN provides reliable digital connection at higher speeds than those offered by analog connection.

106. DSL stands for digital subscriber line.

107. It provides high speed digital data transmission over telephone lines.

108. DSL is an alternative to ISDN.

109. Communication Media is a pathway that is used for transmitting data from sender to receiver.

110. Communication Channels is a pathway that is used for transmitting data from sender to receiver.

111. Guided media refers to those channels that allow the transmission of data through a physical media.

112. Guided media are also called bounded media.

113. Unguided media refers to those channels that transmit data and information in the form of wave.

114. Unguided media are the communication channels in which data is transmitted through the air instead of cables.

115. In Unguided media; there is no physical path between two devices for the transmission of data.

116. Unguided media is also known as unbounded media.

117. NIC is a printed circuit board that inserted into expansion slots.

118. NIC provides a port to connect to the network.

119. NIC It provides network communication capabilities to and from a computer.

120. NIC is also called LAN adapter.

121. The maximum length for a UTP cable in a network is 100 meters.

122. A repeater cleans, amplifies and resends the signal that is weakened by a long cable length.

123. Hub is used in star topology as central device.

124. Hub is a multi-port repeater.

125. Bridge is used to connect similar types of network and it recognizes the message on the network and passes on the address to computer in other networks.

126. Switch It is a multi-port bridge and it is more intelligent device than a hub.

127. Gateway is a collection of hardware and software resources that enable a computer to communicate with a computer on a different network.

128. Router is a combination of hardware and software resources and it connects two or more networks.

129. High-speed routers serve as internet backbone and handling the excessive data traffic.

130. The purpose of router is to examine incoming packets, choose the best path and sends them to the proper outgoing port.

131. Router uses the routing protocols, operating system and management software.

132. CSMA/CD stands for Carrier Sense Multiple Access with Collision Detection.

133. CSMA/CS stands for Carrier Sense Multiple Access with Carrier Sense.

134. CSMA/CR stands for Carrier Sense Multiple Access with Collision Resolution

135. OSI stands for Open System Interconnection.

136. OSI was presented by ISO (International Standard Organization).

137. OSI provides a logical framework how data communication processes should take place across networks.

138. There are 7 layers in OSI model.

139. <u>Upper</u> layers focus on user applications and how files are represented on computers before transmission.

140. <u>Lower</u> layers concentrates on how communication occurs across the network.

141. <u>Application Layer</u> provides network services to user application.

142. <u>Application Layer</u> is responsible for exchanging information between programs running on the computer.

143. <u>Presentation Layer</u> is concerned with how data is converted and formatted for data transfer.

144. <u>Presentation Layer</u> performs code conversion, data translation, compression and encryption.

145. <u>Session Layer</u> determines how two devices establish, maintain and manage connection.

146. <u>Session Layer</u> determines how two devices talk to each other.

147. <u>Transport Layer</u> is responsible for breaking the data into segments.

148. <u>Transport Layer</u> establishes a logical connection between two devices and provides error handling.

149. <u>Transport Layer</u> controls the message flow between the systems.

150. <u>Network Layer</u> is responsible for determining the address on the network.

151. <u>Network Layer</u> determines the route from source to destination.

152. <u>Network Layer</u> manages the network traffic.

153. Segments are converted into packets at <u>Network Layer</u>.

154. <u>Data Link Layer</u> is responsible for the reliability of the physical connection established at physical layer.

155. <u>Data Link Layer</u> provides an error free transmission of data from one computer to another.

156. Packets are converted into frames at <u>Data Link Layer</u>.

157. <u>Physical Layer</u> determines how data is converted into bits.

158. <u>Physical Layer</u> defines the physical characteristics of the network such as connections, voltage levels, timing and physical medium.

159. <u>Physical Layer</u> deals with the physical transmission of bits over transmission medium.

160. <u>Physical Layer</u> is responsible for activating and maintaining the physical link between systems.

**Q.2 Choose the Correct Option:**

1. A LAN is a combination of:

   (a) Network Adapter Cards     (b) LAN Cables

   (c) LAN Application Software     **(d) ALL of the above**

2. A collection of computers connected together is called:

   (a) Processing     **(b) Network**

   (c) Chatting     (d) None

3. Central computer in the network is called:

   (a) Client     **(b) Server**

   (c) Gateway     (d) Terminal

4. The larger computer to which the terminal or PC is attached is called:

   (a) Web Server     (b) Mainframe computer

   **(c) Host computer**     (d) None

5. The process of sharing information among various members of workgroup through computer network is called:

   (a) Workgroup computing     (b) Collaborative computing

   (c) Groupware     **(d) Both a and b**

6. What layer of OSI does data compression:

   (a) Network     **(b) Presentation**

   (c) Data Link     (d) Physical

7. Cabling on a linear bus topology can be extended using which of following:

   (a) Terminator     **(b) Barrel Connector**

   (c) Network Adapter Card     (d) Medium Attachment

8. The software used for workgroup computing is called:

   (a) Shareware     (b) Freeware

   **(c) Groupware**     (d) Firmware

9. Which one is a network model?

   (a) Client-Server     (b) Peer-to-Peer

   (c) Hybrid     **(d) All**

10. Which network model consists of many clients and one or more central computers?

(a) **Client-Server**       (b) Peer-to-Peer

(c) Hybrid                  (d) All

11. Which one is dedicated server?

(a) File Server             (b) Print Server

(c) Database Server         **(d) All**

12. In which network model all computers have equal status?

(a) Client-Server           **(b) Peer-to-Peer**

(c) Hybrid                  (d) All

13. ————— standards were properly researched, designed and finally published as a standard:

(a) De Factor               **(b) De Jure**

(c) ISO                     (d) CCIT

14. The media Access Control Sub-layer resides in which layer:

(a) Physical                **(b) Data Link**

(c) Network                 (d) Transport

15. FDDI is a:

**(a) Ring Network**        (b) Star Network

(c) Mesh Network            (d) bus Network

16. ————— standards were developed without any formal planning:

**(a) De Facto**            (b) De Jure

(c) Both a and b            (d) Workgroup

17. Which one is an example of De-Facto standard?

(a) EIA                     **(b) SNA**

(c) ISO                     (d) IEEE

18. ————— is a governing body that approve the network standard:

(a) EIA                     (b) CCITT, ITU-T

(c) ISO                     **(d) All**

19. Which one represents the shape of network?

   (a)   Protocol             **(b)   Topology**

   (c)   Technology           (d)   Hub

20. Which one is not a network topology?

   (a)   Bus topology         (b)   Tree topology

   **(c)   Source topology**     (d)   Ring topology

21. One or more computers connected to a hub is a:

   (a)  Ring Network          (b)  Node

   (c)  Information Utility    **(d)  Star Network**

22. All nodes are connected to a single cable in a:

   (a)   Ring topology        **(b)   Bus topology**

   (c)   Star topology        (d)   Mesh topology

23. One or more computers connected to hub computer is a(n):

   (a)   Ring network         (b)   Terminal

   (c)   Mesh                 **(d)   Star network**

24. ——————— network topologies uses the token passing scheme:

   (a)   Bus                  **(b)   Ring**

   (c)   Star                 (d)   Mesh

25. ——————— network topologies is formed by using multiple star topologies:

   (a)   Bus                  (b)   Ring

   **(c)   Tree**               (d)   Mesh

26. ——————— network topologies involves the concept of multiple routes:

   (a)   Bus                  (b)   Ring

   (c)   Star                 **(d)   Mesh**

27. Which one can be used to connect two dissimilar network?

   (a)   Ethernet card        (b)   Bridge

   **(c)   Gateway**             (d)   Repeater

28. Project 802 defines standards for which Layer of OSI model:
    (a) Application and Presentation Layer **(b) Physical and Data Link Layer**
    (c) Transport and Network Layer (d) Network and Data Link Layer

29. Terminal is a:
    a) device to give power supply to the computer
    b) point at which data enters or leaves the computer
    c) The last instruction in a program.
    **d) Any input/output device**

30. Which one connects two similar network segments?
    (a) Router **(b) Bridge**
    (c) Gateway (d) All

31. ——————— networks covers a short distance?
    **(a) LAN** (b) WAN
    (c) MAN (d) None

32. ——————— is not a category of network:
    (a) WAN (b) LAN
    (c) MAN **(d) NAN**

33. ——————— is used to connect a computer in LAN:
    **(a) Ethernet card** (b) Video card
    (c) Sound card (d) Modem

34. ——————— is used to connect two computers via telephone line:
    (a) Ethernet card (b) Gateway
    (c) Router **(d) Modem**

35. Software to use internet
    (a) Gateway (b) EFT
    **(c) Browser** (d) Teleconferencing

36. Which Communication Media is used in LAN?
    (a) Satellite **(b) Co-Axial**
    (c) Gateway (d) Microwave

37. ———— media is used in LAN:

(a) **Coaxial cable, NIC** (b) Microwave

(c) Satellite (d) Mobile communication

38. ———— media is used in low cost LANs:

(a) Fiber optical cable (b) Coaxial cable

(c) **Twisted wire pairs** (d) Satellite

39. ———— is not a network device:

(a) Bridge (b) Gateway

(c) NIC (d) **Topology**

40. The Internet is an example of:

(a) LAN (b) **WAN**

(c) MAN (d) None

41. What do we call a network that covers a limited geographic distance such as an office?

(a) Client server (b) MAN

(c) **LAN** (d) WAN

42. A network that covers a large geographic distance such as a country is called:

(a) Centralized network (b) MAN

(c) LAN (d) **WAN**

43. A network that covers a single city is called:

(a) Centralized network (b) **MAN**

(c) LAN (d) WAN

44. The set of rules to exchange data is called:

(a) **Protocol** (b) Software

(c) Procedures (d) Ethernet

45. Which protocol is not a LAN protocol?

(a) **ISDN** (b) Token Ring

(c) ARCnet (d) Ethernet

46. BUS topology uses _____ protocol.

(a) ISDN (b) Token Ring

(c) ARCnet **(d) Ethernet**

47. Which protocol is used to access internet?

(a) ISDN **(b) TCP/IP**

(c) ARCnet (d) Ethernet

48. ——— is LAN protocol:

(a) Ethernet (b) ARCnet

(c) Token ring **(d) All**

49. ——— is not a LAN protocol:

(a) Ethernet (b) Token ring

(c) ARCnet **(d) TCP/IP**

50. ——— topologies uses ARCnet protocol?

(a) Bus topology **(b) Star topology**

(c) Mesh topology (d) Tree topology

51. ——— protocols is associated with IBM, which works on the concept of a ring network and a token?

(a) Ethernet (b) ARCnet

(c) TCP/IP **(d) Token ring**

52. How many layers of OSI model?

(a) 5 (b) 6

(c) 4 **(d) 7**

53. Which is not related to LAN

**(a) Gateway** (b) NIC

(c) Bridge (d) Communication Channel

54. Which topology uses token passing scheme?

(a) Mesh                 (b) Star

(c) Bus                  **(d) Ring**

55. What layer of OSI provides network services to the user application?

(a) Network            **(b) Application**

(c) Data Link          (d) Physical

56. What layer of OSI is responsible for breaking data into segments?

(a) Network            (b) Presentation

(c) Data Link          **(d) Transport**

57. What layer of OSI is responsible to convert segments into packets?

**(a) Network**           (b) Application

(c) Data Link          (d) Physical

58. ——————— layer of OSI model controls transmission of data in the form of bits over the transmission medium such as cables etc:

(a) Presentation        (b) Transport

(c) Data link           **(d) Physical**

59. Which one is the top most layer of OSI model?

(a) Presentation        (b) Network

(c) Session            **(d) Application**

60. Which layer of OSI model is responsible for establishing, maintaining, and managing connections between communicating devices?

(a) Presentation        (b) Network

**(c) Session**            (d) Application

61. Which one is the bottom most layer of OSI model?

**(a) Physical**           (b) Data Link

(c) Network           (d) Transport

62. At which layer of OSI packets are converted into frames?

   (a) Network        (b) Session

   **(c) Data Link**        (d) Physical

63. At which layer of OSI frames are converted into bits?

   (a) Transport        (b) Session

   (c) Data Link        **(d) Physical**

64. Which layer of OSI is responsible for determining the best route from source to destination?

   (a) Transport        **(b) Network**

   (c) Data Link        (d) Physical

65. Which layer of OSI is responsible for transmitting data in the form of bits?

   (a) Transport        (b) Network

   (c) Data Link        **(d) Physical**

66. Which layer of OSI is responsible for flow control?

   **(a) Transport**        (b) Network

   (c) Data Link        (d) Physical

**Q.3 WRITE T FOR TRUE AND F FOR FALSE STATEMENT:**

1. Email is short for electronic mail. **(T)**

2. Teleprocessing allows a user to make queries of a computer 1000 miles away. **(F)**

3. An Ethernet system (IEEE 802.3 protocol) uses packet switching techniques. **(F)**

4. ISDN modems can communicate with other ISDN modems **(F)**

5. 16 bit and 32 bit are currently the two most popular bus widths. **(F)**

6. FTP, short for file transfer protocol is a tool that lets users transfer files across the Internet. **(T)**

7. DSL modems uses cable TV network for data transmission. **(F)**

8. A WAN is usually limited to one office building **(F)**

9. A gateway connects two similar computers. **(F)**

10. A bus network uses a central computer as the server. **(F)**

62. At which layer of OSI packets are converted into frames?

(a) Network      (b) Session

**(c) Data Link**      (d) Physical

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(c) Data Link      **(d) Physical**

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(c) Data Link      (d) Physical

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# APPLICATIONS AND USES OF COMPUTER

## OVERVIEW OF USES OF COMPUTER:

- Computer technology is very necessary for every organization.
- Managers use computers for budgeting and forecasting activities.
- Computers are also used to perform audits, prepare financial reports and analyze investments.
- Organizations are moving towards paperless environment.
- In the field of education, teaching and learning are also influenced by the possibilities introduced by computer technology.
- Interactive technology of web cams also revolutionized the world. You can talk to a group of clients sitting in different parts of the world.

## Q1. What are uses of Computer in Business?

## BUSINESS:

- Computer is very important for today's business. Businesses heavily rely on fast processing of data that can only be done using computers. In business computers are used as given below:

  Marketing

  Stock exchange

  Banks

  Departmental stores

  Office automation

## MARKETING

- The aim of marketing is to acquire, retain, and satisfy customers.
- Marketing is the process by which goods are sold and purchased.

- Marketing applications help managers to develop strategies that combine the four major elements of marketing i.e. **Product, Promotion, Place and Price.**
- Modern marketing has evolved into a complex and diverse field.
- Marketing includes a wide variety of special functions such as advertising, mail-order business, public relations, retailing and merchandising, sales, market research, and pricing of goods.

## STOCK EXCHANGE

- Brokers interconnected through a data communications network.
- They submit and receive their bids using their computers.
- On the computers brokers match buyers with sellers.
- In this way of trading neither trading floor not slips of paper are necessary.

## BANKS

- A computerized system in a bank offers various advantages when compared to previously used systems.
- Specially designed software includes cheque processing, saving and time deposits, profit sharing, stock and bond management and trust accounting.
- The cheques are read by MICR (Magnetic Ink Character Reader).
- Banks use mainframe computer to maintain their accounts.
- A customer can perform transactions using ATM (Automated Teller Machine).
- A credit card having a unique PIN (Personal Identification Number) allows the bank customer to view his current account status, deposit cash or withdraw cash amongst other operations.

## DEPARTMENTAL STORE

- People at the store level use bar code readers for their ease.
- Bar codes of products are read by bar code readers.
- The price of a particular item is set within the store's computer and appears on the sales-clerk's point of sale terminal and on our receipt.
- Record of sales are input to the store's computer and used for accounting, restocking store inventory, and weeding out products that sell well.
- Security VCR (Video Cassette Recorder) and camera are also used in stores to monitor different operations.
- Reason to use these things is that there is no other better way to monitor home or business operations and ensure safety.

# OFFICE AUTOMATION

- Office automation refers to the movement towards automating office tasks.
- Advance computer technologies are used to perform various tasks in an office. Some of them are given below.

## Document Management System (DMS)

- DMS includes word processing software. This software is used to create editable documents like proposals, reports, newsletters and brochures.
- Spreadsheet software is used to create tables. These tables are used for keeping record of expenses, profit and loss. These records are used for statistical, mathematical and logical processing.
- Reprographic is the process of reproducing multiple copies of a document.
- Image processing allow document to be scanned and stored in image oriented databases.

## Message Handling System

- It enables to send messages or documents from one location to other through facsimile (fax), electronic mail (e-mail), Voice mail etc.

## Office Support Systems

- It enables to coordinate and mange the activities of work group.
- Groupware and desktop organizers are some examples of office support systems.

**Q2.    What is E-Commerce? What are the benefits of E-Commerce?**

# E-COMMERCE

- Electronic commerce is known as e-commerce.
- It is a process of buying and selling of products or services over electronic systems such as the Internet and other computer networks.
- The amount of trade conducted electronically is growing dramatically since the wide introduction of the Internet.
- Modern electronic commerce typically uses the World Wide Web.
- A small percentage of electronic commerce is conducted entirely electronically for "virtual" items such as access to premium content on a website, but most electronic commerce eventually involves physical items and their transportation in at least some way.

## M-commerce:

- Mobile Commerce (also known as M-Commerce) is the ability to conduct commerce, using a mobile device e.g. a mobile phone ( or cell phone), a PDA, a smart-phone

while on the move, and other emerging mobile equipment, like desktop mobile devices.

**Electronic Mail (E-Mail)**

- Electronic mail (abbreviated "email" or, often, "e-mail")
- It is a method of composing, sending, storing, and receiving messages over electronic communication systems.
- The term "e-mail" applies both to the Internet e-mail system based on the Simple Mail Transfer Protocol (SMTP) and to intranet systems allowing users within one organization to e-mail each other.
- Often these workgroup collaboration organizations may use the Internet protocols for internal e-mail service.

**Video Conferencing**

- Video conferencing is a type of conferencing in which video cameras and microphones are used.
- It can speed up business process and procedures in the same way that the fax and the e-mail have revolutionize the way we share information.
- The most obvious quantifiable saving is the cost of travel and the cost of the time wasted during travel.

**Electronic Shopping (E-Shopping)**

- Many businesses now have website that allow internet users to buy their goods.
- Shopping can take place using a computer at home or from work 24 hours a day.

**Electronic Banking (E-Banking)**

- An electronic banking is also known as cyber banking or online banking includes various banking activities conducted from home or business.

**Q3.    What is the use of Computer in Industry? Discuss Robots, CAD and CAM and Simulations.**

## USES OF COMPUTER IN INDUSTRY

- Computers are used to control manufacturing system in industry.
- Computers also help in monitoring temperature, pressure, check the quality and accuracy and measurement needed in the manufacturing process.

## ROBOTS:

- A robot is an automatic programmable machine that moves and performs mechanical tasks.
- Robots can work in environment that is dangerous for humans. It can perform the same task again and again without any difference accurately.
- Remak Rx 32 Three axis Servo Robot which fits machines up to 300 tons.

- M-16i/B20T, from FANUC Robotics can carry 20Kg and is suited to injection machines up to 800 tons.
- W625H side entry robot from Wittmann.

# COMPUTER AIDED DESIGN (CAD)

- In Computer-Aided Design (CAD) different objects are designed using computer.
- Engineers and architects use it for their ease.
- It is the main geometry authoring tool that involves both software and sometimes special-purpose hardware.
- The designed product is tested against the following parameters.
    - o Test parts and their quantity list.
    - o Outline production and assembly procedures.
    - o Transmit the final design directly to the machine.
- A CAD system requires high resolution monitors, input devices and output devices.
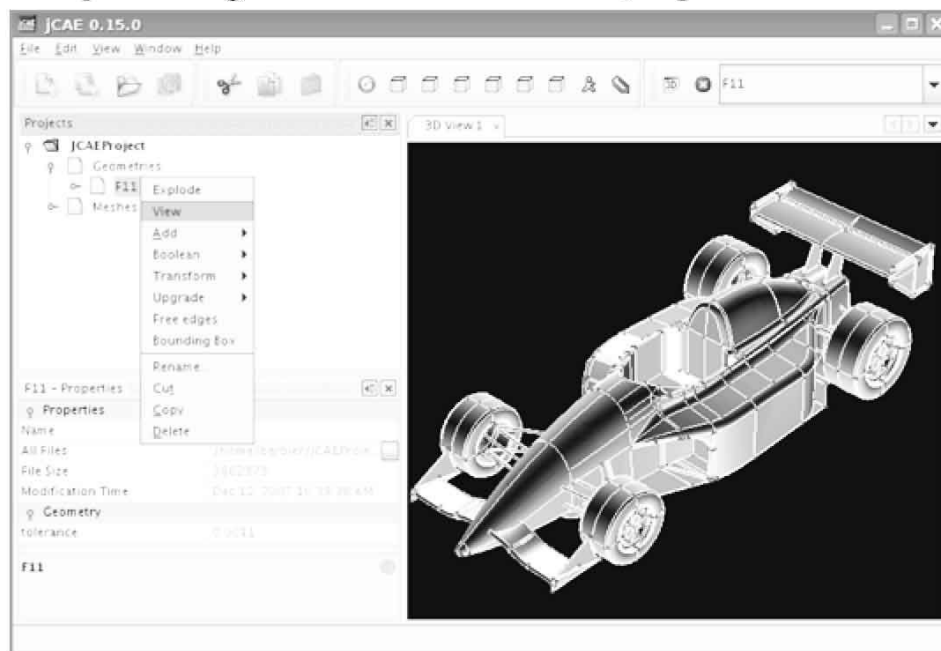


# COMPUTER AIDED MANUFACTURE (CAM)

- Using CAD, Computer-Aided Manufacturing (CAM) system can give quicker and more efficient production.
- It is used to control all the part of a manufacturing process.
- This methodology is applied in different manufacturing areas. In most cases the CAM system will work with a CAD design made in a 3D environment.
- Using CAM systems.
    - o Product can be made very accurately
    - o Production is much cheaper.
    - o Production is available around the clock.
    - o Modification in design is easy.

# SIMULATIONS

- It is a special type of computer model, which recreates a system that does not exist in real world.
- The process of imitating a real phenomenon with a set of mathematical formulas.

- Advanced computer programs can simulate weather conditions, chemical reactions, atomic reactions, even biological processes.

- In theory, any phenomena that can be reduced to mathematical data and equations can be simulated on a computer.

- A flight simulation, which is used to train pilots, how to deal with situation that would be expensive and dangerous to practice using a real aircraft.

**Q4.    What is the use of Computer in Medical?**

# MEDICAL

- Computers are commonly used in laboratories, researches, monitoring and scanning.

- All these are helpful for doctors in.

> Patient Monitoring
>
> Keeping Patient Records
>
> Diagnosis

**Patient Monitoring**

- Computers are used in hospitals to monitor the patient critically.

- Sensors are attached to the patients, which detect changes in heart rate, pulse rate, blood pressure, breathing and brain activity. If any reading is out of range then alarming device will create a sound to alert the medical staff. This is also stored and used to analyze.

**Patient Records**

- Computerized Database systems are used to record the patient history.

- This history record includes the information about patient, doctors and medicines.

- It is easy to organize records using computers.

- If a patient is admitted in one ward of the hospital but getting treatment from another ward, his record can be updated on any terminal of the hospital system.

- Computerized database systems are also used to help in finding the match of patients who want to transplant their organ, such as kidney, liver or heart with suitable organs from donors.

**Diagnosis**

- Computers are also used to scan a patient body.

- The body scanner helps the doctors to trace any tumor or cancer.

- With the help of CAT (computerized axial topography) scanner doctors can look beneath the patient's skin.

- This scanner displays the image of bone and tissue structure on a computer screen.

**Q5.    What is the use of Computer in Airline System?**

## AIRLINE SYSTEM

- In airline system computers are used to control passenger aircrafts.

- Early aircrafts were controlled by mechanical systems.

- In modern aircrafts electronic signals from the cockpit are sent that adjust the flights.

- Computer in pilot's control is linked up among different cities and given full information about its flights and seat reservation.

**Q6.    What is the use of Computer in Education? Discuss CAL and CBT.**

## EDUCATION

- Education is a process of learning by following some rules.

- This learning process can be simplified and more effective with computers.

- There are number of methods in which educational institutions can use computer to educate the students.

- Many computer based educational software are available for students.

- These software's help them in learning to read, to count or to speak a foreign language.

- Organizations are also using software in their employee training programs.

## COMPUTER AIDED LEARNING (CAL)

- Computer Aided Learning describes an educational environment where a computer program or an application is used to assist the user in learning a particular subject.

- Information technology may be able to aid us in reducing the time spent on creation and maintenance of teaching materials.

## COMPUTER BASED TRAINING (CBT)

- CBT can be defined as **an interactive learning experience between the learner and computer in which the computer provides the majority of the stimulus, the learner must respond and the computer analyzes the response and provides feedback to the learner**.

- Computer-based training (CBT) services are where a student learns by executing special training programs on a computer relating to their occupation.

- CBT is especially effective for training people to use computer applications because the CBT program can be integrated with the applications so that students can practice using the application as they learn.

- There can be many other advantages of CBT e.g.

- Students can easily learn new skills.

- Training time can be reduced.
- Course material is retained in a better way.
- Create better understanding of complex concepts.
- Planning and timetable problem can be reduced.
- Essential skills can be taught whenever needed.
- Quality and consistency of the training material is maintained.
- It is cost effective to train a large number of people.
- Training can be given on time and on demand which leads to increase efficiency.

**Q7.     What is the use of Computer in Weather Forecasting?**

# WEATHER FORECASTING

- Weather forecasting depends on accurate collection of data. Data is collected from different areas of the world.
- Computer made a model on the basis of a lot of factors like, air, humidity and temperature.
- When data is given to the model it generates a forecast of how the weather will change.
- This forecast can't be 100% accurate.
- Some businesses are very dependent on the weather that they need constantly updated information.
- SUPARCO (Space and Upper Atmosphere Research Commission) weather forecasting department offer analysis of live weather data and provide help to make business decisions based on weather forecasting.

**Q8.     What is the use of Computer in our Homes?**

# HOME

- Computers are widely used in homes.
- Computers are used to play games, surf internet, watching movies and listen music.
- All these things can be done using a single computer.
- It is cheaper and easy solution. People also uses computer to keep their records and making home budgets.
- The use of microprocessor technology in manufacturing of electronic home appliances like microwave, air conditioning, washing machine, sewing machine etc. have completely changed our way of life.

**Q9.     How Computer assist our work in daily life?**

# COMPUTER ASSISTANCE SIMPLIFYING OUR WORK PRACTICES

- Computer is a dumb machine. It can't do anything by his own, but can do whatever we want him to do.
- Computers can work faster.

- Computers never tired of work.
- Computers can do dangerous jobs.
- Computers can store large amount of information.
- Computers can retrieve information very quickly.
- Computers never lose or misplace information.
- Computer can make copies of information quickly and accurately.
- Computers linked through communications system offer major personal and business benefit to users like speed, consistency, precision and reliability etc.

**Speed**
- Computer can perform millions of calculations in a second.
- It can perform calculation even in nano and pico second.
- Computer can perform complex calculation accurately.
- Computer can perform a task in seconds that a human can do in years.
- Computer can also recall information almost with in no time.

**Consistency**
- People feel difficulty in repeating a task.
- Computer can perform a task again and again without any difference.

**Precision**
- Computers are not only fast and consistent but they also perform operations very accurately and precisely.
- For example in manufacturing an automobile the precise placement of a part may make the difference.

**Reliability**
- When computer perform a procedure consistently, precisely we can expect reliable results. We can get the same result again and again without any difference.

**Q1.** **What is the use of computer in Marketing?**

**Ans.** Marketing is the process by which goods are sold and purchased. The aim of marketing is to acquire, retain, and satisfy customers. Marketing applications help managers to develop strategies that combine the four major elements of marketing i.e. Product, Promotion, Place and Price.

**Q2.** **What is the use of computer in Stock Exchange?**

**Ans.** Computers are used in stock exchange to keep the track of sale and purchase of shares. Computers are also used to maintain the accounts of share holders. Brokers submit and receive their bids using computers. On the computers brokers match buyers with sellers. In this way, neither trading floor nor slips of paper are necessary for trading.

**Q3.** **What is the use of computer in Banks?**

**Ans.** Computers are used to maintain the records of account holders, their transactions, loan information and payments. A computerized system in a bank offers various advantages:

- It is easy for cheque processing, saving deposits, profit sharing, stock and bond management and trust accounting. The cheques are also read by MICR.
- A customer can access his/her account through an ATM.
- A credit card having a unique PIN allows the bank customer to view his current account status, deposit cash or withdraw cash amongst other operations.

**Q4.** **What is the use of computer in Departmental Store?**

**Ans.** Computers are used in departmental stores to maintain the inventory and stocks. Computers are also used to maintain the sales record. Bar codes of products are read by bar code readers and the price of a particular item is set within the store's computer and appears on the sales-clerk's point of sale terminal and on our receipt.

**Q5.** **What is the use of computer in Offices?**

**Ans.** Computers are used in offices to maintain office record. Now a day concept of paperless environment is very common and it is only possible because of computers

**Q6.** **What is office automation?**

**Ans.** Office automation refers to the movement towards automating office tasks. Advance computer technologies are used to perform various tasks in an office e.g. DMS software is used in office automation. Fax, e-mail, Voice mail etc. are used to transfer data; Groupware are used for office support systems.

**Q7.** **What is Document Management System (DMS)?**

DMS includes word processors and Spread sheets are used to create edit documents like letters, proposals, reports, newsletters, brochures and tables that are used for keeping record of expenses, profits and loses. Reprographic is the process of reproducing multiple copies of a document. Image processing allow document to be scanned and stored in image oriented databases.

**Q8.** **What is the Message Handling System?**

It enables to send messages or documents from one location to other through facsimile (fax), electronic mail (e-mail), Voice mail etc.

**Q9.** **What are Office Support Systems?**

It enables to coordinate and mange the activities of work group. Groupware and desktop organizers are some examples of office support systems.

**Q10.** **What is E-commerce?**

Electronic commerce is known as e-commerce, consists of the buying and selling of products or services over electronic systems such as the Internet and other computer networks.

Modern electronic commerce typically uses the World Wide Web. A small percentage of e-commerce is conducted entirely electronically for "virtual" items such as access to premium content on a website, but most electronic commerce eventually involves physical items and their transportation in at least some way.

**Q11.** **What is M-commerce?**

The amount of trade conducted electronically has grown dramatically since the wide introduction of the Internet Mobile Commerce (also known as M-Commerce) is the ability to conduct commerce, using a mobile device e.g. a mobile phone ( or cell phone), a PDA, a smartphone while on the move,and other emerging mobile equipment,like dashtop mobile devices.

**Q12.** **What is email?**

E-mail is a store and forward method of composing, sending and receiving messages over electronic communication systems. SMTP-Simple Mail Transfer Protocol is used for email and email method is applied to intranet systems allowing users within one organization to e-mail each other. Often these workgroup collaboration organizations may use the Internet protocols for e-mail service.

**Q13.** **What is the use of computer shopping?**

**Ans.** Electronic Shopping (E-Shopping)-Many business now have website that allow internet users to buy their goods. Shopping can take place using a computer at home or from work 24 hours a day. It is called online shopping.

**Q14.** **What is the use of computer in Cyber Banking?**

**Ans.** An electronic banking is also known as cyber banking or online includes various banking activities conducted from home or business. In cyber banking we can see our accounts and transfer money form one account to another.

**Q15. What is Video Conferencing?**

Video conferencing is a type of conferencing in which video cameras and microphones capture sight and sound transmission over networks. It can speed up business process and procedures in the same way that the fax and the e-mail have revolutionize the way we share information. The most obvious quantifiable saving is the cost of travel and the cost of the time wasted during travel.

**Q16. What is the use of computers in industry?**

Computers are used to control manufacturing system in industry. Computers also help in monitoring temperature, pressure, check the quality and accuracy and measurement needed in the manufacturing process.

**Q17. What are Robots?**

A robot is an automatic programmable machine that moves and performs mechanical tasks. Robots can work in environment that is dangerous for humans. It can perform the same task again and again without any difference accurately.

**Q18. What are CAD systems?**

**Ans.** Computer-Aided Design (CAD) is the use of a wide range of computer-based tools that assist engineers, architects and other design professionals in their design activities. A CAD system requires high resolution monitors, input devices and output devices. The designed product can be tested against the following parameters.

- Compile and test parts and their quantity list.
- Outline production and assembly procedures.
- Transmit the final design directly to the machine.

**Q19. What are CAM systems?**

**Ans.** CAM stands for computer-aided manufacturing; CAM with CAD produces quicker and more efficient manufacturing processes. It is used to control all the part of a manufacturing process. CAM systems are manufactured following goods.

- Product can be made very accurately
- Production is much cheaper.
- Production is available around the clock.
- Modification in design is easy.

**Q20. What are simulations?**

**Ans.** The process of imitating a real phenomenon with a set of mathematical formulas is called simulation. Advanced computer programs can simulate weather

conditions, chemical and atomic reactions, even biological processes. In theory, any phenomena that can be reduced to mathematical data and equations can be simulated on a computer e.g. flight simulation.

**Q21. What is the use of compute in Medical?**

**Ans.** Computers are used in medical field to monitor patients, keep patient records and for diagnosing the disease. Computers are commonly used in laboratories, researches, monitoring and scanning. All these are helpful for doctors to diagnose an illness.

**Q22. What is Patient Monitoring?**

Computers are used in hospitals to monitor the patient criticality. Sensors are attached to the patients, which detect changes in heart rate, pulse rate, blood pressure, breathing and brain activity. If any reading is out of range then alarming device will create a sound to alert the medical staff. It is also stored and used to analyze.

**Q23. What is Patient Records?**

Computerized Database systems are used to record the patient history, doctors and medicines. If a patient is admitted in one ward of the hospital but getting treatment from another ward, his record can be updated on any terminal of the hospital system. Computerized systems are also used to help in finding the match of patients who want to transplant their organ, such as kidney, liver or heart with suitable organs from donors.

**Q24. What is Diagnosis?**

**Ans.** Computers are also used to scan a patient body. The body scanner helps the doctors to trace any tumor or cancer. For example CAT (computerized axiel topography) scanner when passes rays over the patient displays an image that enables physicians to look beneath the patient's skin. This scanner displays the image of bone and tissue structure on a computer screen.

**Q25. What is the use of computer in Airline System?**

**Ans.** In airline system computers are used to control passenger aircrafts. Electronic signals from the cockpit are sent that adjusts the flights. Computer in pilot's control linked up among different cities and given full information about its flights and seat reservation.

**Q26. What is the use of computer in Education?**

**Ans.** Education is a process of learning by following some rules. This learning process can be simplified and more effective with computers. There are number of methods in which educational institutions can use computer to educate the students. CAL and CBT are two uses of computers in education.

**Q27. What do you know about CAL?**

**Ans.** Computer Aided Learning (CAL) describes an educational environment where a computer program or an application assists the users in learning a particular

subject. Information technology may be able to aid us in reducing the time spent on creation and maintenance of teaching materials.

**Q28.** **What is CBT?**

**Ans.** Computer Based Training (CBT) can be defined as **an interactive learning experience between the learner and computer in which the computer provides the majority of the stimulus, the learner must respond and the computer analyzes the response and provides feedback to the learner**.

**Q29.** **What is the use of computer in Weather Forecasting?**

**Ans.** Weather forecasting depends on collection of data and it is collected from different areas. Very high speed computers are used in calculating weather conditions on the basis of a lot of factors like, air, humidity and temperature. When data is given to the Computer it generates a forecast of how the weather will change. This forecast can't be 100% accurate. Some businesses are very dependent of the weather that they need constantly updated information.

**Q30.** **What is the use of computer in Homes?**

**Ans.** Computers are used at home to maintain personal accounts, information, listen music, play games, watching movies and for reading / writing purpose. All these things can be done using a single computer. It is cheaper and easy solution. The use of microprocessor technology in manufacturing of electronic home appliances like microwave, air conditioning, washing machine, sewing machine etc. have completely changed our way of life.

**Q31.** **What is Consistency?**

**Ans.** People feel difficulty in repeating a task. Computer can perform a task again and again without any difference.

**Q32.** **What is Precision?**

**Ans.** To perform a task as it was directed is called precision. Computers are not only fast and consistent but hey also perform operations very accurately and precisely. For example in manufacturing an automobile the precise placement of a part may make the difference.

**Q33.** **What is Reliability?**

**Ans.** The term reliability means "repeatability" or "consistency". A measure is considered reliable if it would give us the same result over and over again. (assuming that what we are measuring isn't changing).

**Q34** **What is the importance of Speed of computers in our work?**

**Ans.** Computer can perform millions of calculations in a second. It can perform calculation even in nano and pico second. Computer can perform complex calculation accurately. Computer can perform a task in seconds that a human can do in years. Computer can also recall information almost with in no time.

# EXERCISE

**Q1.    Fill in the blanks**
1.    CAD stands for <u>Computer Aided Design</u>.
2.    Electronic Banking allows individuals to obtain cash instantly from <u>ATM</u>.
3.    CAT stands for <u>Computerized Axial Topography</u>.
4.    VCR stands for <u>Video Cassette Recorder</u>.
5.    A robot is an automatic programmable machine that moves and performs <u>mechanical</u> tasks.
6.    An electronic banking is also known as <u>Cyber Banking</u>.
7.    The cheques are read by <u>MICR</u> machine in computerized bank.
8.    The <u>video conferencing</u> is a type of conferencing in which video cameras and microphones capture sight and sound transmission over networks.
9.    Office Support Systems enable to coordinate and manage the activities of <u>workgroup</u>.
10.    FAX stands for facsimile.
11.    <u>Marketing</u> is the process by which goods are sold and purchased. Its aim is to acquire, retain, and satisfy customers.
12.    Marketing applications help managers to develop strategies that combine the four major elements of marketing i.e. <u>Product, Promotion, Place and Price</u>.
13.    On the computers <u>brokers</u> match buyers with sellers. In this way of trading neither trading floor not slips of paper are necessary.
14.    The checks are read by <u>MICR (Magnetic Ink Character Reader)</u>.
15.    ATM stands for <u>Automatic Teller Machine</u>.
16.    ATM stands for <u>Asynchronous Transfer Mode</u>.
17.    <u>Office automation</u> refers to the movement towards automating office tasks.
18.    <u>Reprographic</u> is the process of reproducing multiple copies of a document.
19.    <u>Message Handling System</u> enables to send messages or documents from one location to other through facsimile (fax), electronic mail (e-mail), Voice mail etc.
20.    Office Support Systems enables to coordinate and mange the activities of work group.
21.    Electronic commerce is known as <u>e-commerce</u>.
22.    <u>E-Commerce</u> consists of the buying and selling of products or services over electronic systems such as the Internet and other computer networks.
23.    Mobile Commerce is known as <u>M-Commerce</u>.
24.    <u>M-Commerce</u> is the ability to conduct commerce, using a mobile device.
25.    <u>SMTP</u> is a protocol for e-mail.
26.    SMTP stands for <u>Simple Mail Transfer Protocol</u>.

27. Video conferencing is a type of conferencing in which video cameras and microphones capture sight and sound transmission over networks.

28. Video conferencing can speed up business process and procedures in the same way that the fax and the e-mail.

29. E-Shopping is also known as Electronic Shopping.

30. E - Banking is also known as Electronic Banking.

31. An electronic banking is also known as cyber banking.

32. An electronic banking includes various banking activities conducted from home or business.

33. Robot is an automatic programmable machine that moves and performs mechanical tasks.

34. Robots can work in environment that is dangerous for humans. It can perform the same task again and again without any difference accurately.

35. CAD stands for Computer-Aided Design.

36. CAD is the computer-based tools that assist engineers, architects and other design professionals in their design activities.

37. CAM stands for Computer Aided Manufacturing.

38. CAM controls all the part of a manufacturing process.

39. Simulation is the process of imitating a real phenomenon with a set of mathematical formulas.

40. Computerized Database systems are used to record the patient history.

41. CAT stands for computerized axial topography.

42. CAT displays the image of bone and tissue structure on a computer screen.

43. Education is a process of learning.

44. CAL stands for Computer Aided Learning.

45. CAL describes an educational environment where a computer program is used to assist the user in learning a particular subject.

46. CBT stands for Computer Based Training.

47. CBT services are where a student learns by executing special training programs on a computer relating to their occupation.

48. CBT is an interactive learning experience between the learner and computer in which the computer provides the majority of the stimulus, the learner must respond and the computer analyzes the response and provides feedback to the learner.

49. <u>SPARCO</u> offers analysis of live weather data and provide help to make business decisions based on weather forecasting.

50. Computer can perform a task again and again without any difference is called <u>consistency</u>.

**Q.2**    **Choose the correct option**

1. CBT stand for
   a) Computer Based Trade                **b) Computer Based Training**
   c) Certificate Based Training           d) None of the above

2. ——————— is not related to business:
   (a)    Stock exchange                   **(b)    CAD**
   (c)    Departmental store               (d)    Marketing

3. ——————— device is used in banks to read cheque of customer:
   (a)    OMR                              (b)    OCR
   **(c)    MICR**                         (d)    Bar-code reader

4. ——————— devices is used in departmental store:
   (a)    OMR                              (b)    OCR
   (c)    MICR                             **(d)    Bar-code reader**

5. ——————— is not relevant to office automation:
   (a)    Document management system      (b)    Message handling system
   **(c)    Security system**             (d)    Office support system

6. The benefit of CAD may be summed up as
   a) Accuracy                            b) Repeatability
   c) Speed and flexibility of production  **d) All of the above**

7. ——————— is not related to document management system:
   (a)    Word processing                 (b)    Reprographics
   (c)    Desktop publishing              **(d)    Electronic banking**

8. ——————— scanners is used in hospitals:
   (a)    Image scanner                   **(b)    CAT scanner**
   (c)    Bar-code scanner                (d)    OCR

9. Computer at home can be used
   a) Keeping records                     b) Making budgets
   c) Watching Movies                     **d) All of the above**

10. A word processor can be used to
    a) Write Text                         b) Edit Text

c) Print Text      **d) All of the above**

11. The fly-by-wire system is used in:
    (a) Medical field      (b) Business field
    (c) education field      **(d) Airline**

12. CBT stands for:
    (a) Computer Based Trade      **(b) Computer Based Training**
    (c) Certificate Based Training      (d) None

13. The benefit of CAD may be summed up as:
    (a) Accuracy
    (b) Repeatability
    (c) Speed and flexibility of production
    **(d) All**

14. CAL stands for
    **a) Computer Aided Learning**      b) Computer Assist Learning
    c) Computer Aided Leading      d) None of the above

15. Typically, and ATM can be used to
    a) Keeping records      b) Making budgets
    c) Watching movies      **d) None of the above**

16. Modern computer can perform calculations or process at _____ high speed
    a) per second      b) per minute
    c) nino second      **d) None of the above**

17. Computer at home can be used for:
    (a) Keeping records      (b) Making budgets
    (c) Watching Movies      **(d) All**

18. A Word processor can be used to:
    (a) Write Text      (b) Edit Text
    (c) Print Text      **(d) All**

19. CAT stands for
    **a) Computerized Axial Topography**      b) Computer Axial Topography
    c) Computerized Aided Topography      d) None of the above

20. Computer based weather forecasting depends on accurate collection of data from
    a) Television      **b) Weather stations**
    c) Radar      d) Antenna

21. MICR stands for

a) Magic in character Redo  b) Magnetic Ink Character Recorder

c) **Magnetic Ink Character Reader** d) None of the above

22. CAL stands for:
    (a) **Computer Aided Learning** (b) Computer Assist Learning
    (c) Computer Added Learning (d) None

23. Modern computer can perform calculations or process at ———— high-speed:
    (a) Per second (b) Per minute
    (c) Nino second **(d) None**

24. Which term is not related to business?
    a) Stock exchange **b) CAD**
    c) Departmental Store d) Marketing

25. Bar Code reader is used in:
    a) Banks **b) Departmental Stores**
    c) Offices d) None of these

26. Which term is not related to Office Automation?
    a) Document management System b) Message handling system
    c) Office support systems **d) CBT**

27. Computer based weather forecasting depends on accurate collection of data from:
    (a) Television **(b) Weather stations**
    (c) Radar (d) Antenna

28. MICR stands for:
    (a) Magic in Character Redo (b) magnetic Ink Character Recorder
    **(c) Magnetic Ink Character Reader** (d) None

29. Bar Code reader is used in:
    a) Banks **b) Departmental Stores**
    c) Offices d) None of these

30. Which software is not related to DMS?
    **a) E-Banking** b) Word Processors
    c) Spreadsheet d) Desktop publishing

31. Which scanner is used in hospitals?
    a) Bar Code reader b) OMR
    **c) CAT** d) Image Scanner

**Q.3. WRITE T FOR TRUE AND F FOR FALSE STATEMENT:**

1. CBT is more expensive than non-CBT training. **(F)**
2. Videoconferencing is an advanced form of teleconferencing. **(T)**
3. The e-shop has opened for limited time period on the web sites. **(F)**
4. CAL could be described as the use of information technology to assist in the teaching and learning processes. **(T)**
5. Bar Code Reader can be read all types of ink characters. **(F)**

6.   FAX machine can be inserted inside computes.   **(F)**
7.   A robot is an automatic programmable machine.   **(T)**
8.   A computer simulation is a special type of computer hardware.   **(F)**
9.   An electronic banking is also known as cyber-banking.   **(T)**
10.  Modern computer can perform calculations at a second.   **(F)**

# FUNDAMENTALS OF THE INTERNET

**Q1.    Discuss Internet History and Working of Internet.**

## INTERNET:

- The Internet was brought online in 1969 by ARPANET.
- ARPANET was the new name of ARPA (Advanced Research Projects Agency).
- ARPA initially connected four major computers at universities and defense organizations.
- The Internet was designed to made communication possible in the days of war (nuclear attack).
- If the most direct route was not available, routers would direct traffic around the network via alternate routes.
- Almost at the same time another research organization, National Science Foundation, joined the ARPA project.
- NSF established their own network to connect five supercomputing centers.
- These centers were available to all researchers for academic purpose.
- To provide high speed access to their supercomputers, NSF established a separate high speed network called NSFnet.
- During this era some other networks were also established in different universities. All these networks were joined and referred to as the Internet.

## WORKING OF INTERNET

- Internet is a network of networks.
- A lot of interconnected networks made internet.
- The network allows users to share information with each other.
- A person at home can connect his computer to the internet using phone line modem, **DSL** or cable modem. He connects his computer to an **ISP** (Internet Service Provider).

- A person at office or in college laboratory will connect his computer to the local network to get the internet access.
- This local network then connects to an **ISP** (Internet Service Provider) using a high-speed phone line like a **T1** line.
- A **T1** line can carry **1.5 million** bits and a normal phone line can carry **30000** to **50000** bits per second.
- ISP then connects to larger ISP's and these largest ISP's are connected through fiber-optic backbones.
- Backbones around the world are connected through submarine cable system, or satellite links.
- In this way all the computers on the internet are connected.

**Q2.     Discuss Internet Addressing Schemes.**

## ADDRESSING SCHEMES

- In real life when we want to send a letter to our friend, we must know his address which is unique. Otherwise we can't send him a letter.
- Similarly on the internet every computer has a unique address. Using this address that computer can be contacted.
- There are two types of addressing schemes used on the internet.

## IP ADDRESSING

- It is a numeric address of a computer on the network.
- IP stands for **Internet Protocol**.
- Each computer connected to the Internet must have a unique address.
- Internet addresses are in the form nnn.nnn.nnn.nnn where nnn must be a number from 0 - 255. This address is known as an **IP** address.
- The picture below illustrates two computers connected to the Internet; your computer with IP address 1.2.3.4 and another computer with IP address 5.6.7.8. The Internet is represented as an abstract object in-between. (As this paper progresses, the Internet portion of Diagram 1 will be explained and redrawn several times as the details of the Internet are exposed.)



Your Computer
1.2.3.4

Internet

Another Computer
5.6.7.8
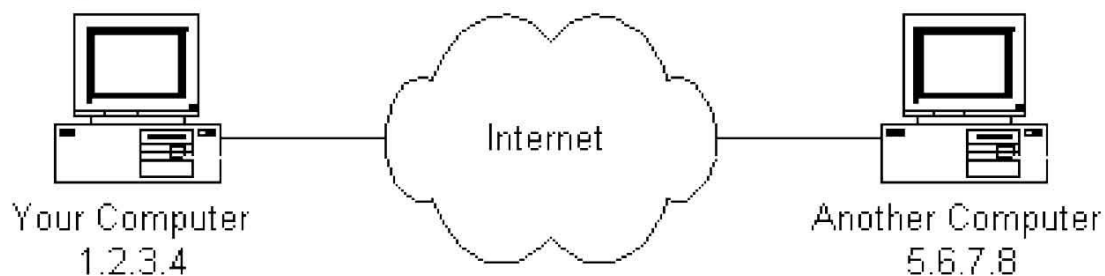
- If you connect to the Internet through an **Internet Service Provider (ISP)**, you are usually assigned a temporary IP address for the duration of your dial-in session.

- If you connect to the Internet from a local area network (LAN) your computer might have a permanent IP address or it might obtain a temporary one from a **DHCP Server.**
- DHCP stands for Dynamic Host Configuration Protocol.
- In any case, if you are connected to the Internet, your computer has a unique IP address.
- As internet's machines are concerned, you need an IP address to talk to a server. For example in your browser, you can type the URL http://243.24.54.121 and arrive at the machine that contains the web server for the specified IP-Address.

# DNS ADDRESSING

- It is a human readable name of a computer on a network.
- It is difficult to remember the addresses in the form of strings of numbers.
- These numeric addresses are need to be changed, for this purpose all internet servers also have human readable names called domain names e.g. **www.yahoo.com** is a name in human readable form. It is easier to remember IP address in this form.
- The name **www.yahoo.com** has two parts, a host name and domain.
- These domain names are called top level domain. Following is the list of few top level domain types.

| Domain | Type of Institution |
|--------|---------------------|
| .com | Commercial |
| .gov | Government organizations |
| .edu | Educational institutions |
| .org | Other organizations |
| .pk | Domains from Pakistan |
| .biz | Commercial institutions (New) |
| .info | Unrestricted use (New) |
| .net | Commercial institution (addition to .com) |

**Q3.    What is Web Browsing? Discuss different terminologies of Internet.**

# WEB BROWSING

- The software to use internet is called browser and the searching information on the World Wide Web is called Web Browsing.
- For this purpose software called web browser or web client is used.
- Millions of web pages are available on the World Wide Web having information on every topic.
- Here we are discussing some important terminologies about World Wide Web.

# WORLD WIDE WEB (WWW)

- The World Wide Web is a system of interlinked, hypertext documents accessed via the Internet.

- With a web browser, a user views web pages that may contain text, images, and other multimedia and navigates between them using hyperlinks.

- The World Wide Web was created in 1989 by the Englishman Sir Tim Berners-Lee and the Belgian Robert Cailliau working at CERN (Particle Physics Laboratory) in Geneva, Switzerland.

- The www uses http (hypertext transfer protocol) to link hypertext documents on the World Wide Web.

- A **web page** is a document written in HTML (Hyper Text Markup Language).

- The language allows embedding hyperlinks in the documents.

- A hypertext document is also called web page.

- Collection of related web pages is called **web site**.

- Web sites are hosted on web severs. The process of launching web page is called **publishing the page**.

# URL (UNIFORM RESOURCE LOCATOR)

- Complete address of a web site is called URL or "web address". It is always unique for a web page e.g. **http://www.yahoo.com/weather/lahore/weather.html**

- A URL is made up of several parts. The **first part** is the protocol, which tells the web browser what sort of server it will be talking to in order to fetch the URL. In this example, the protocol is http.

- The **second part** of the example URL above is the **fully qualified domain** name of the web site to connect to. In this case, the fully qualified domain name is **www.yahoo.com**. This name identifies the web site containing the page. The term "fully qualified domain name" refers to a complete web site or other computer's name on the Internet. The term **"domain name"** usually refers only to the last part of the name, in this case yahoo.com, which has been registered for that particular company's exclusive use.

- The **third part** of the example URL is the path at which this particular web page is located on the web server. In this case, the path is **/weather/lahore/weather.html**. Similar to a filename, a path usually indicates where the web page is located within the web space of the web site; in this case it is located in the **lahore** sub-folder of the **weather** folder, which is located in the top-level web page directory of our web site.

**Q4.    What are Search Engines?**

# SEARCH ENGINE

* A search engine is a website used to search information on the internet.

* They are useful because otherwise you would have to know the address of the site you are going to, or keep going from one web page to the next till you find it which would take a pretty long time.

* Search engines maintain a list of billions of web pages containing information on variety of topics.

* Search engines ask you to enter some key words about the data or information you want to search on the Internet.

* On the basis of your provided information search engine find the list of web pages, and finally display the links of the required web pages containing that information.

**Q5.    What is Email? Discuss different techniques and Limitation of Email; also discuss email address.**

# EMAIL

* Email is shorthand term meaning Electronic Mail.
* Email is like a letter, but exchanged in a different way.
* Computers use the TCP/IP protocol suite to send email messages in the form of packets.
* Email takes a few seconds to go across the world.
* It leaves a written record.
* You can keep copies of email messages for your record.
* In order to send and receive e-mail, you will need an e-mail address.
* There are two different sources from which you might get an e-mail address:

**Internet Service Provider**

* If you are using an e-mail address from your ISP, you need a special program e.g. Microsoft Outlook.
* Once set-up, that program will remember your log-in and password and download your e-mail onto your computer.

**A website on the internet that offers it. (Yahoo, G-mail, Hotmail)**

* The "**web mail**" style of e-mail is accessed directly through the World Wide Web.
* Just open your web browser and go to the website that handles your e-mail. At that point, you will need to enter your log in and password.
* All the e-mail you receive is kept on your e-mail provider's website rather than sent to your computer.

- A powerful feature of email is attachment. An e-mail **attachment** is a computer file which is sent along with an e-mail message. Attached files are sent as part of the message to which it is attached.
- You can attach word processing document, spreadsheet programs, images even audio message to your email message.
- Attached messages are sent in **MIME (Multipurpose Internet Mail Extension)** format.
- In MIME, the standard Internet e-mail format, messages and their attachments are sent as a single multipart message.
- Yahoo allows a file of size of 10MB to be attached. This limit varies for paid accounts.

# LIMITATIONS ON EMAIL

**Privacy:**
- When we communicate through internet, a lot of intermediary systems are involved.
- There is a great chance of interception of email messages.
- Many systems have the protection to stop users from reading other's email but it is still possible for a system administrator to read the email of someone.

**Text only Emails:**
- There is a facility to send images with email but not necessarily all the recipients of mail are able to view those pictures.
- It is subject to the availability of the program on their computer to display pictures.

**Forged Emails:**
- This is not common but it is possible to forge the address of the sender.
- You may need to take steps to confirm the source of some important emails you receive.

**No Emotions:**
- Through emails recipients are not able to view your facial expressions and hear your voice.
- You have to be very careful with humor or irony, since it is easy for someone to take your message the wrong way.

**Unwanted Emails:**
- You receive a lot of junk mails from different sources.
- These mails reach to your mailbox just like other emails. These junk mails are also called **spam**.

**Unknown Emails:**
- Using emails communication can be possible with unknown people.
- Some people misrepresent themselves. Because of text message of email it is possible for us to get an incorrect impression of the person sending us email.

# EMAIL ADDRESS

- To send and receive email you need an email address.
- This address can be created on email server e.g. yahoo, hotmail and google.
- The general format of an email address is **username@DNS Address**
- For example, **abc@yahoo.com**. In this email address **abc** is the username and **yahoo.com** is DNS Address of the email server.

**Q6.    What are Newsgroups?**

# NEWSGROUPS

- A discussion group on the Internet is called news group.
- Just as e-mail and the Web are two distinct services on the Internet, newsgroups are part of the "Usenet" (user network), which is another service, or facility, on the Internet.
- Newsgroups have nothing to do with the daily news; thus, the term is somewhat misleading.
- Newsgroups are organized into categories and subcategories, with the alt (alternative) category having the most diversity. Newsgroups were started in the late 1970s as a message board for UNIX and related technical issues. They continue to prosper alongside the Web.
- Newsgroups start by someone posting an initial query or comment.
- As others reply, the text forms a chain of related postings called a "**message thread.**"
- Newsgroups are similar to **blogs**, but usually have more questions and answers, whereas the blog is often used for general commentary.
- Newsreader software NNTP (Network News Transfer Protocol) client is used to "subscribe" to newsgroups and read and post messages.
- A newsreader, which may be a stand-alone application or part of an e-mail program or Web browser, offers many features such as searching for and automatically subscribing to newsgroups that match some criteria.

**Q1. What is an Internet?**

**Ans.** The internet is a huge collection of millions of computer, all linked together on a computer network. Internet is also known as ARPANET, was brought online in 1969. Internet was introduced by US-defense department in 1960. Internet is a network of networks. A lot of interconnected networks made internet. The network allows users to share information with each other.

**Q2. What is ARPA?**

**Ans.** ARPA stands for Advance Research Project Agency. The Internet was designed in part to provide a communications network that would work even if some of the sites were destroyed by war. The internet is a huge collection of millions of computer, all linked together on a computer network. It was brought online in 1969. Internet was introduced by US-defense department in 1960.

**Q3. What is NSFnet?**

**Ans.** NSFnet stands for National Science Foundation Network. NSF joined the ARPA project. NSF established their own network to connect five supercomputing centers. These centers were available to all researchers for academic purpose. To provide high speed access to their supercomputers, NSF established a separate high speed network called NSFnet.

**Q4. What is an ISP?**

**Ans.** ISP stands for Internet Service Provider, a company which provides the internet service. A person at home can connect his computer to an **ISP**. ISP then connects to larger ISP's and these largest ISP's are connected through fiber-optic backbones. Backbones around the world are connected through submarine cable system, or satellite links. In this way all the computers on the internet are connected.

**Q5. What is the capacity of a T1 line and normal Phone line?**

**Ans.** It is special phone line that can handle approximately 1.5 million bits per second while a normal phone line using a modem can typically handle **30,000** to **50,000** bits per second.

**Q6. What is an IP?**

**Ans.** IP stands for Internet Protocol. The size of IP address is 32 bits. Each computer connected to the Internet must have a unique address. Internet addresses are in the form nnn.nnn.nnn.nnn where nnn is called an octet must be a number from 0 - 255. This address is known as an **IP** address.

**Q7.** **What is a DNS addressing?**

**Ans.** DNS stands for domain name service. The human readable names assigned to each computer on the internet is called domain name e.g. hotmail.com etc.

**Q8.** **What are the parts of DNS addressing?**

**Ans.** DNS stands for domain name service. The human readable names assigned to each computer on the internet is called domain name e.g. hotmail.com etc. each DNS has two parts; a host name (server) and a top level domain (which comes at the end of domain separated with dot) and specifies the type of organization.

**Q9.** **What is a Web Browser?**

**Ans.** It is software used to view web pages. Example of web browser is Internet Explorer. It is software that allows the internet users to find and send information over the internet.

**Q10.** **What is WWW?**

**Ans.** World Wide Web, it is collection of millions of linked web pages. WWW was launched in 1989. It uses http (hyper text transfer protocol).

**Q11.** **What is HTML?**

**Ans.** HTML stands for Hyper Text Markup Language. It is a language used to develop web pages. The document created in HTML is called hypertext document. It may contain text, images and links to other pages.

**Q12.** **What is a Web Page?**

**Ans.** An HTML page is called web page. Hyper Text Markup Language is used to develop web pages. The document created in HTML is called hypertext document. It may contain text, images and links to other pages.

**Q13.** **What is a Web Site?**

**Ans.** A collection of related web page is called web site. Web sites are hosted on computers called web servers.

**Q14.** **What is a Web Server?**

**Ans.** A host computer on which website is placed is called the web server. The process of storing the webpage on the server is called publishing the page.

**Q15.** **What is URL?**

**Ans.** URL stands for Uniform Resource Locator. It is a unique address of a web page on the World Wide Web. Each URL has three parts:
- Type – specifies the type of server
- Address – specifies the address of the server
- Path – specifies the path of the web page on the disk of the server.

**Q16.** **What is a Search Engine?**

**Ans.** A website that is used for powerful data searching and it helps the user locate web sites containing specific types of information e.g. Google.com, ask.com, altavista.com etc.

**Q17.** **What is a MIME?**

**Ans.** MIME stands for Multipurpose Internet Mail Extension. A powerful feature of email is attachment and attached file is sent as part of the message. Attached messages are sent in **MIME** format. In MIME, the standard Internet e-mail format, messages and their attachments are sent as a single multipart message.

**Q18.** **What is DHCP?**

**Ans.** **DHCP** stands for Dynamic Host Configuration Protocol. If you connect to the Internet from a LAN, your computer might have a permanent IP address or it might obtain a temporary one from a **DHCP** server.

**Q19.** **What is a Newsgroup?**

**Ans.** These are discussion groups on the internet. Newsgroups are part of the "Usenet" (user network). Newsgroups are organized into categories and subcategories. Newsgroups started in the late 1970s as a message board for UNIX and related technical issues. Newsgroups start by someone posting an initial query or comment. As others reply, the text forms a chain of related postings called a "**message thread**."

**Q20.** **What is NNTP?**

**Ans.** NNTP stands for Network News Transfer Protocol. Newsreader software NNTP client is used to "subscribe" to newsgroups and read and post messages. A newsreader, which may be a stand-alone application or part of an e-mail program or Web browser, offers many features such as searching for and automatically subscribing to newsgroups that match some criteria.

**Q21.** **What is Email Address?**

**Ans.** To send and receive you need an email address. This address can be created on email server e.g. yahoo, hotmail and google. The general format of an email address is username@DNS Address e.g. **abc@yahoo.com**. In this email address **abc** is the username and **yahoo.com** is DNS Address of the email server.

**Q22.** **What is a difference between Newsgroup and blogs?**

**Ans.** Newsgroups are discussion groups on the internet. Newsgroups are part of the "Usenet" (user network). Newsgroups are similar to **blogs**, but usually have more questions and answers, whereas the blog is often used for general commentary.

**Q23.** **What is a message thread?**

**Ans.** The discussion groups on the internet are called Newsgroups and these are the part of the "Usenet" (user network). Newsgroups are organized into categories and subcategories. Newsgroups start by someone posting an initial query or

comment. As others reply, the text forms a chain of related postings called a **"message thread**."

# EXERCISE

**Q1.    Fill in the blanks**
1.    Collection of related web pages is called <u>web site</u>.
2.    Initially ARPANET was a <u>wide area network</u> connecting small number of users.
3.    News server use <u>NNTP</u> protocol to transfer articles among them.
4.    NSF established a separate high speed network called <u>NSFnet</u>.
5.    The LAN can be connected to ISP using a high speed phone line called a <u>T1</u> line.
6.    World Wide Web was establishes in <u>1989</u>.
7.    MIME stands for <u>Multipurpose Internet Mail Extension</u>.
8.    The four numbers in an IP address are called <u>octets</u>.
9.    <u>DNS</u> address is easy to remember.
10.    HTML stands for <u>Hyper Text Markup Language</u>.
11.    The Internet is known as <u>ARPANET</u>.
12.    Internet was brought online in <u>1969</u>.
13.    Internet was brought online under a contract let by the ARPA which initially connected <u>four major computers</u>.
14.    NSF established their network to connect <u>five supercomputing centers</u>.
15.    A lot of interconnected networks made <u>internet</u>.
16.    The network allows users to <u>share</u> information with each other.
17.    A person at home can connect his computer to the <u>internet</u> using phone line modem, <u>DSL</u> or cable modem.
18.    ISP stands for <u>Internet Service Provider</u>.
19.    The local network connects to an ISP using a high-speed phone line <u>T1 line</u>.
20.    A T1 line can handle approximately <u>1.5 million bps</u>.
21.    A normal phone line using a modem can handle <u>30,000 to 50,000 bps</u>.
22.    Backbones around the world are connected through <u>submarine cables</u>, or satellite links.
23.    DHCP stands for <u>Dynamic Host Configuration Protocol</u>.
24.    Searching information on the World Wide Web is called <u>Web Browsing</u>.
25.    World Wide Web is a system of interlinked, <u>hypertext documents</u> accessed via the Internet.
26.    With a <u>web browser</u>, a user views web pages that may contain text, images, and other multimedia and navigates between them using hyperlinks.
27.    The www uses <u>http-hypertext transfer protocol</u> to link hypertext documents on the World Wide Web.
28.    http stands for <u>hypertext transfer protocol</u>.

29. Web page is a document written in HTML (Hyper Text Markup Language).
30. A hypertext document is also called web page.
31. Collection of related web pages is called web site.
32. Web sites are hosted on web severs.
33. The process of launching web page is called publishing the page.
34. A URL can be the "address" of a web page and is sometimes referred "web address".
35. Search engine is a website that allows you to search through a huge list of web pages.
36. Email is shorthand term meaning Electronic Mail.
37. Attached messages are sent in MIME format.
38. MIME stands for Multipurpose Internet Mail Extension.
39. Yahoo allows a file of size of 10MB to be attached.
40. The general format of an email address is username@DNS Address.
41. A discussion group on the Internet is called newsgroup.
42. Newsgroups are part of the "Usenet" (user network).
43. Newsgroups start by someone posting an initial query or comment. As others reply, the text forms a chain of related postings called a "message thread"
44. Newsgroups are similar to blogs,
45. The blog is often used for general commentary.
46. NNTP stands for Network News Transfer Protocol.
47. NNTP is used to "subscribe" to newsgroups and read and post messages.

**Q.2.  CHOOSE THE CORRECT OPTION:**

1. A computer can be linked to the internet through
   (a)  A phone-line modem        (b)  DSL
   (c)  Cable modem        **(d)  All of the above**

2. A collection of millions of computers interlink to one another is called:
   (a)  Interlink        **(b)  Internet**
   (c)  Intranet        (d)  Network

3. The globe has become a global village, due to:
   (a)  Television        (b)  Radio
   (c)  Computer        **(d)  Internet**

4. When DARPA established a small computer network?
   (a)  1869        **(b)  1969**
   (c)  1769        (d)  1990

5. Who owns the Internet?
   (a)  Unite Nations        (b)  USA Government

(c)     ISO                                    **(d)    None**

6.      ———— is a high speed communication line:
        (a)     ISP                            (b)     Repeater
        **(c)    T1**                          (d)     COM

7.      How many types of addressing schemes?
        (a)     5                              (b)     3
        **(c)    2**                           (d)     4

8.      ———— specifies the correct format of IP address:
        (a)     67234                          (b)     261.27
        **(c)    216.28.91.130**               (d)     216.27.6137

9.      Software to use the Internet:
        (a)     Gateway                        (b)     EFT
        **(c)    Browser**                     (d)     Teleconferencing

10.     If "Yahoo.com" is a domain name, then what will be the top level domain?
        (a)     Yahoo                          **(b)    .com**
        (c)     Yahoo.com                      (d)     None

11.     Which of the following protocol is used to access web pages on World Wide Web?
        (a)     TCO/ID                         (b)     Gopher
        **(c)    HTTP**                        (d)     HTML

12.     Which one represents the top level domain?
        (a)     HTTP                           (b)     WWW
        **(c)    .gov**                        (d)     URL

13.     ———— services is provided by Internet:
        (a)     WWW                            (b)     FTP
        (c)     e-mail                         **(d)    All**

14.     Which of service of Internet is used to transfer files:
        (a)     WWW                            **(b)    FTP**
        (c)     Telnet                         (d)     Gopher

15.     FTP stands for:
        (a)     File Testing Program           **(b)    File Transfer Protocol**
        (c)     File Telnet Protocol           (d)     File Transmission Protocol

16.     The computers on the Internet that contain the web sites are called:
        (a)     Central computer               (b)     Site computer

**(c)** **Web Servers** (d) URL

17. The process of launching web pages is called:

(a) Downloading page **(b)** **Publishing a web page**

(c) Storing page (d) Loading page

18. Web pages are linked together using?

(a) HTTP **(b)** **Hyperlinks**

(c) Interlinks (d) None

19. ———— represents URL address:

(a) hotmail.com (b) abc@yahoo.com

**(c)** **http://www.hotmail.com** (d) abc.html

20. ———— protocol is used by news services:

**(a)** **NNTP** (b) HTTP

(c) TCP/IP (d) FTP

21. Which of the following is used to find information on World Wide Web?

(a) Web Browser (b) Web Site

**(c)** **Search Engine** (d) Web Server

22. A computer can be linked to the Internet through:

(a) Phone-line modem (b) DSL

(c) Cable modem **(d)** **All**

23. ———— is an e-mail client:

(a) Internet Explorer **(b)** **Outlook Express**

(c) Google (d) None

24. Initially, ARPNET has only ———— hosts:

**(a)** **4** (b) 8

(c) 16 (d) 32

25. The four numbers in an IP address are called:

(a) Domain (b) Top Level Domain

(c) Hexagon **(d)** **Octets**

26. The human readable name assigned to the computer on the Internet is called:

**(a)** **domain name** (b) Top Level Domain

(c) IP address (d) octets

27. The length of IP address is

(a) 8 bit (b) 16 bit

| | | | |
|---|---|---|---|
| **(c)** | **32 bit** | (d) | 64 bit |

28. A collection of related web pages is called:

| | | | |
|---|---|---|---|
| (a) | URL | (b) | www |
| **(c)** | **website** | (d) | web server |

29. ———— is used to create web pages:

| | | | |
|---|---|---|---|
| **(a)** | **HTML** | (b) | C/C++ |
| (c) | FORTRAN | (d) | Machine |

30. The process of transferring a file from a remote computer to our local computer is called:

| | | | |
|---|---|---|---|
| **(a)** | **downloading** | (b) | uploading |
| (c) | browsing | (d) | surfing |

31. The process of transferring a file from our own computer to the remote computer is called:

| | | | |
|---|---|---|---|
| (a) | downloading | **(b)** | **uploading** |
| (c) | browsing | (d) | surfing |

32. E-mail stands for:

| | | | |
|---|---|---|---|
| (a) | Electric mail | **(b)** | **Electronic mail** |
| (c) | Elective mail | (d) | Elaborated mail |

33. ———— symbols is used in e-mail address:

| | | | |
|---|---|---|---|
| **(a)** | **@** | (b) | & |
| (c) | # | (d) | ^ |

**Q.3. WRITE T FOR TRUE AND F FOR FALSE STATEMENT:**

1. IP address is a 16-bit addressing scheme. **(F)**

2. Every computer on a network has a Network Interface Card that directly connects it to the other computers. **(T)**

3. URL is used to locate a computer on the Internet. **(F)**

4. A hypertext document is also called web page. **(T)**

5. Email server is software used to create, send and receive emails. **(F)**

6. Each computer on the internet must have HTTP server configured to connect to the internet. **(F)**

7. NNTP stands for National News Transmission Protocol. **(F)**

8. On Internet, Junk mails are also called spam. **(T)**

9. News Server is used to streamline the news transmission of the local radio stations. **(F)**

10.     You cannot attach a file larger than 20MB to an email.                    **(F)**

# SECURITY COPYRIGHT & THE LAW

**Q1.** **What is Security? Discuss its different approaches or How the security maintained on a computer?**

## SECURITY:

- It is a system of safeguards designed to protect a computer system and data from intentional and accidental damage or access by unauthorized persons.

- A computer system must be protected from unauthorized persons. Different methods have been planned to give access to authorized persons. For this purpose there are four approaches.

- **What you have:**

  You may have a key, token, or a card to give you physical access to the server room or computer building.

- **What you know:**

  IDs and Passwords are given to users to access the computers.

- **What you do:**

  Authorized users put their signatures on the documents to confirm their authority.

- **What you are:**

  Some security measures are biometrics-biological means of identification e.g. fingerprints, voice recognition, eye retina etc.

**Q2.      What is a Virus? What are the causes of Virus?**

## VIRUS:

- A virus is a program that disturbs the normal execution of the programs.

- A virus is a program that attaches itself with other executable files by modifying them so that the virus program is also loaded and executed with the execution of these programs.

- Virus is a destructive program containing code that can generate copies of it and attaches itself with other programs so that it is automatically executed when those programs are executed.

- A virus is a program designed by a computer programmer to do a certain unwanted function.

- The virus program can be simply annoying like displaying a happy face on the user's screen at a certain time and date.

- A virus usually performs destructive operations by deleting or modifying the data on storage devices attached to the computer.

- Virus cannot physically destroy the hardware.

- Some virus may make invisible changes in the user's data.

- A virus may make network resources unavailable to the users.

- A virus may detect some special information e.g. password, pin code etc. and transfers it to other users on the network.

- Virus infects computers data and can costs a lot of time and money to correct it.

## CAUSES OF VIRUSES:

- Emails, Networks, Removable Storage media, Pirated software are ways through which a virus reaches from one computer to another.

**Emails:**

- Computers are infected due to receiving of emails containing virus programs.

- When a user opens an infected email, the virus is also loaded into the memory and attaches itself with other programs.

- You cannot get a virus from a plain email message. Modern email programs provide the ability to allow users to format email messages with HTML and attach scripts to them for various purposes and it is possible for a hacker to attempt to spread a virus by building a virus script into an HTML type of email message.

**Networks:**

- Virus is also spreading by using Internet and other networks

- When you are accepting software or scripts on Internet sites or reading mail from unknown senders it is wrong to run a program from that site or sender without checking it with an **anti-virus program**.

- When you download a file from the internet or from a shared disk on the network, the infected files may be attached with the downloaded data that ultimately infects the computer.

**Removable Storage Media:**

- You can transfers the data from one computer to another through some removable media like floppy disks, CDs, or flash drives; therefore, when you copy the data using removable storage, the infected files can be transferred to your computer.

**Pirated software:**

- The virus can also infect your computer by the use of pirated software (The software without license is called pirated software).

- Some companies may intentionally attach some virus programs into their software. This program will only activate when it does not find licensed files on the computer.

**Q3.     What are the different types of Virus?**

# TYPES OF VIRUSES:

- Boot Sector Virus, Chernobal virus, Logic Bomb, Trojan Horse, RedLof etc.

**Boot Sector Virus:**

- Boot sector virus modifies the boot sector (the first sector which contains the instructions to automatically load OS in memory) program and is loaded in the computer memory whenever the computer is turned on.

- This virus is attached with system executable files i.e. .exe, .com and .dll files.

- When the user uses these files, the virus performs destructive operations and destroys all the data files.

**Chernobal virus:**

- It deletes all the Microsoft office files.

- It also deletes the partition information from the disk.

- User cannot access files from the disk because of this virus.

**Logic Bomb:**

- It is a virus that is activated on the basis of a logical condition.

- The virus instruction is executed if the logical condition is true.

- It is activated on a certain date and time.

- The bomb can be discovered by chance.

**Trojan horse:**

- It is a part of some computer programs e.g. destructive instructions inside the game programs.

- When the infected program (game) runs on the system, then this virus is activated.

- An example of Trojan horse is FORMAT C instruction which is executed with the execution of a game.

**RedLof:**

- It is polymorphic virus written in VB Script.

- It infects the Folder.htt file which is the part of Windows Active desktop.

- It appends itself to other infected files on the hard disk and causes destruction.

   Some viruses make unnoticeable changes. They corrupt data being used. Some viruses may make data unusable. A virus may detect some special information like passwords or sensitive data. It may send the data to some other user on a network. For example a virus may read the pin code or credit card number and then send it to another user. A virus may also make some resources unavailable to the users. For example, a virus may start sending data on a network. The network may become unavailable for the users.

**Q4.    What are the different safety measures against virus?**

# SAFEGUARD AGAINST VIRUSES:

Following are the few steps to save your computer from viruses.

- Never open unknown emails.

- Scan all emails even if you know the sender.

- Minimize the data transfer from one computer to another through removable media.

- Avoid downloading freeware programs without checking it for virus.

- Always use latest version of antivirus software and remove the infected files from the system.

- Always keep copy (backup) of your data on removable media.

**Q5.    What is a importance of data security?**

# DATA SECURITY:

It is the most important issue in any organization. The organization is responsible for the security of data so that unauthorized persons cannot access and modify the data. Many organizations store data of their customers online for providing fast services e.g.

- A credit card company stores data of its customers online.

- A bank providing online services will be using online data storage for the customers.

- A university may provide online results of examinations.
- People take online exams like GRE, GMAT etc.

These developments generate a new problem called **"Data Security"**. As the sensitive data of people is available online therefore security of data is necessary. If an unauthorized person gets this data, the whole organization may suffer irreparable or permanent loss.

**Q6.    What are Security Violations and Security Threats?**

# SECURITY VIOLATIONS:

Following are the some ways in which security of data may be violated.

- Unauthorized persons may get into the computer room and takes away all storage devices containing sensitive data.

- Unauthorized users may get access to personal data and use it to get some benefits.

- Unauthorized users may use an online mail server to view email messages of other users hence causing privacy issues.

- Unauthorized users may get access to the bank accounts and transfer a large amount of money from other accounts to his personal account.

- A person may make a computer so busy by sending many requests, so that computer is unavailable to authorized users. This is called **denial of service situation**.

# SECURITY THREATS:

Following are the main threats to data security.

**Intentional Threats:**

- A user can intentionally delete important data. The intentional threats may occur for the following reasons.
    o   A hacker can delete data on a computer.
    o   An angry employee of the organization can delete the data.

**Un-Intentional Threats:**

- Some authorized user of the data may unintentionally delete or change sensitive data.

**Solutions:**

**User Rights:**

- Users must be assigned proper rights to minimize such events. Only the authorized users with certain rights may be allowed to delete or modify data after following a step by step process.

**Periodic Backup:**

- Periodic backup of data should be taken to recover from this sort of situation.

**Password Protection:**

- Password protection should be used to use any resource.
- Authorized users must be asked to change their passwords periodically.
- Very short and common passwords should be avoided.

**Encryption Algorithms:**

- Encryption algorithms should be used, so that if anyone gets access to the data, he should not be able to make any sense out of it.

**Anti-Virus:**

- Anti-virus software should be used to scan all data coming into the organization.

**Lock Room:**

- Computers and all backing storage devices should be placed in lock rooms with only authorized access to these resources.

**Q7.     What is meant by DATA Protection?**

## DATA PROTECTION:

Data protection means make sure that personal data of any organization or a person is kept hidden from unauthorized users. The organizations collect required data of the customers for business transactions and these pieces of data contains the personal information of a customer e.g. a hospital having data about the disease history of patients.

All the data kept by different organizations may be disclosed by the organization for some legal purpose e.g. the medical researches may use the patient's history or any other data to draw some conclusions. If the hospital management distributes this data to someone else then this may make the patient feel embarrassment. The data protection legislation consider such cases.

**Q8.     What are DATA Privacy Issues?**

## PRIVACY ISSUES:

- It is the right of a person to keep his personal information away from other people.
- A person has a right to see his data and he has to submit an application to view that data any time.
- He has to stop the processing of his data by the organization.
- He has a right to claim compensation from the organization for any kind of disclosure of data disallowed by the law.
- No worker of the organization is allowed to disclose or use the data kept by its organization and if he fails to abide by, he is committing a crime.

It is clear from the above points that:

- Data protection act tries to minimize the misuse of personal information.
- Data protection act provides a safeguard against such crimes.

An organization collecting data should collect relevant data for its working and should not collect unnecessary information. The following points should be considered to ensure the individual's privacy issues.

- The organization is responsible for keeping the data updated.
- The organization should keep data for the specific period of time only and cannot keep it longer than necessary.
- At no point during the processing of data, the rights of subject should be violated.
- The organization is responsible for all kinds of security of data.

**Q9.     What is Data Protection Legislation?**

# DATA PROTECTION LEGISLATION:

Data protection legislation defines the laws that ensure data protection. The principles of Data Protection Act are as follows:

- The purpose of keeping and using of personal data must be clearly defined by organization obtaining that data.
- The individual, about whom data is kept, must be informed about the identity of the organization/individual. The processing is necessary to fulfill the contract between two parties. The processing is required by law or is necessary to carry out the interest of the individual.

**Q10.    What are Important Privacy Acts?**

# IMPORTANT PRIVACY ACTS:

- 1980 Privacy Protection Act
- 1984 Cable Communication Policy Act
- Data Protection Act 1984
- 1987 Computer Security Act
- 1988 Video Privacy Protection Act
- 1988 Matching and Privacy Protection Act
- 1990 Computer Misuse Act

- 1998 Data Protection Act

# 1980 PRIVACY PROTECTION ACT:

- It prohibits agents of federal government from making unannounced, searches of press office if no one there is suspected of crime.

# 1984 CABLE COMMUNICATION POLICY ACT:

- This act restricts cable companies in the collection and sharing of information about their customers. It was the first piece of legislation to regulate the use of information, which is processed on computer.

## Data Protection Act 1984:

It consists of eight points and the main purpose of this Act is to protect the personal data from unauthorized access held on computer systems.

- The information and personal data shall be obtained and processed, fairly and lawfully.
- Personal data shall be held only for one or more specified and lawful purposes.
- Personal data held for any purpose shall not be used or disclosed in any manner.
- Personal data held for any purpose shall be adequate, relevant and not excessive in relation to that purpose or those purposes.
- Personal data shall be accurate, where necessary, kept up to date.
- Personal data held for any purpose shall not be kept for longer than is necessary for that purpose or those purposes.
- An individual should be allowed at reasonable intervals, without expense and delay, to have access to his/her data, and where appropriate, to have such data corrected or erased.
- Appropriate security measure shall be taken against unauthorized access to, or alteration, accidental loss, or destruction of personal data.

# 1987 COMPUTER SECURITY ACT:

- This Act makes actions that affect the computer security files and telecommunication illegal.

# 1988 VIDEO PRIVACY PROTECTION ACT:

- This Act prevents retailers from disclosing a person's video rental records without a court order; privacy supporters want the same rule for medical and insurance files.

## 1988 Matching and Privacy Protection Act:

- It prevents the government from comparing certain records in an attempt to find a match; however most comparisons are still unregulated.

## 1990 Computer Misuse Act:

This Act makes provision for securing computerized material against unauthorized access and modification; and for connected purposes. This Act was passed

to deal with the problem of hacking of computer system. With the developments in technology the issue has become more serious and therefore legislation was introduced to recognize three key offences:

- Unauthorized access to computer material.
- Unauthorized access with intent to commit or facilitate commission of further offences.
- Unauthorized modification of computer material.

# 1998 DATA PROTECTION ACT:

It came into force early in 1999 and covers how information about living identifiable person is used. It is much broader in scope than the earlier 1984 Act but it contains some provision for a transitional period for compliance with the new requirements. The 1998 Act applies to:

- Computerized personal data.

- Personal data held in structured manual files.

**Q11.    What is the Copyright Act?**

# THE COPYRIGHT ACT:

Software is like a property and copyright is a right to copy software. The principal law governing software piracy is the "Copyright Act 1976". Some amendments were made in 1983. Software piracy is believed to be punishable crime involving huge amount of penalties. Software is an "Intellectual Property" that has been developed and brought to market after a lot of efforts and cost. So is future financial interest may be sure by the concerned legal authorities.

**Q.12    Explain anti virus software with examples. Write some benefits of using anti virus software.**

**Ans.    Antivirus Software:**

A type of software that is used to detect and remove viruses is called antivirus software. Antivirus programs contain information about different known viruses. They can detect viruses and remove them.

Many Antivirus programs are available in the market. But no single software can detect and remove all viruses. Many new viruses are invented and spread through Internet continuously. Antivirus programs are also upgraded continuously to detect these new viruses. Antivirus program not only detects viruses from computer but also prevent new viruses from entering into the computer.

**Examples:**

Some important Antivirus programs are as follows:

- Norton Antivirus
- McAfee

- NOD32
- Kaspersky
- AVC

**Benefits:**

Some important benefits of using antivirus programs are as follows:

- Antivirus program protects important data from virus.
- It checks all files before they enter computer system.
- It alerts the user about the virus before it causes any damage to computer.
- It quarantines or eliminates a virus so that it may not harm computer.

**Q.13   What is password?**

**Ans.   Password:**

- Pass is a secret word that is used to protect a computer system or program. It may consist of numbers, alphabets or both. The user has to type the password to access the computer system.

- The purpose of password is to protect data stored on a computer. It protects data from being lost, misused or deleted by any person.

- A person who knows the password can access the system.

- Only authorized person can change password.

- An unauthorized person cannot access a computer system or program that is protected by a password. So the computer and the data stored on it will be safe and protected.

- Every computer provides an option for setting password. If the computer is protected with password, it will ask for that password to login.

- Email facility on the Internet is also protected with password. Every user has to give email ID and password to check emails.

- Internet Service Providers provide user accounts with passwords. The user ID and password is used to connect to the Internet.

**Q.14   What is backup of data? What are reasons of backup and types of backup?**

**Ans.   Backup of Data:**

- An additional copy of data or information stored on secondary storage media is called the backup of data. The common media for backup are zip disk, magnetic tap, floppy disk, CD-ROM and hard disk etc.

- The computer system can be damaged due to many reasons. The data stored on the system may also be lost, deleted or altered. Sometimes the data is very important and

it cannot be created again. For example, computer in a bank may contain the records of all money transactions. The backup of data is used if your system crashes accidentally and the data stored in it is lost.

**Reasons of Backup:**

The purposes of taking backup of data are as follows:

- An important file can be deleted accidentally.

- The user may overwrite a part or whole of an existing file.

- A mechanical failure in computer may result in loss of data.

- A virus may damage the data stored on the computer.

- Computer system may be stolen by anybody.

- Computer system may be damaged due to fire or power failure.

- It is very important to take the backup of data regularly.

- It should be stored at a safe and protected place. In big organization, the backup is normally stored on a centralized networked computer.

- In small organization, the backup is stored on floppy disks, Zip disks or CD-ROM.

**Types of Backup:**

There are two ways to take the backup of data. These are complete backup and incremental backup.

**Complete Backup:**

- Backup of all data on the hard disk is called complete backup.

- The advantage of this backup is that the entire hard disk is backed-up.

- The data can be restored from this backup in case of a problem in system.

- It takes more time and storage capacity because the entire data of hard disk is copied.

**Incremental Backup:**

- Incremental backup creates a copy of only the data that is newly created or modified since the last backup.

- This process is performed automatically in some software. In this type of backup, the entire disk is not copied.

- It takes less time and space than complete backup.

# SHORT QUESTIONS

**Q.1**   **What is security?**

**Ans.**   It is a system of safeguards designed to protect a computer system and data from intentional and accidental damage or access by unauthorized persons.

**Q.2**   **What is a Virus?**

**Ans.**   A virus is a program that attaches itself with other executable files by modifying them so that the virus program is also loaded and executed with the execution of these programs or Virus is a destructive program containing code that can generate copies of it and attaches itself with other programs so that it is automatically executed when those programs are executed.

**Q.3**   **What are biometrics?**

**Ans.**   Biometrics are technologies used for measuring and analyzing a person's unique characteristics. Biometrics are generally used for verification. Examples of biometrics are fingerprint, retina, palm vein and face.

**Q.4**   **What are the Causes of Viruses?**

**Ans.**   Emails, Networks, Removable Storage media, Pirated software are ways through which a virus reaches from one computer to another.

**Q.5**   **What are Pirated software?**

**Ans.**   Making illegal copies of copyright software is called **"software piracy"**. Some companies may intentionally attach some virus programs into their software. This program will only activate when it does not find licensed files on the computer.

**Q.6**   **Write Virus Types.**

**Ans.**   Boot Sector Virus, Chernobal virus, Logic Bomb, Trojan Horse, RedLof etc.

**Q.7**   **What is the function of Boot Sector Virus?**

**Ans.**   Boot sector virus modifies the programs in the boot sector (the first sector which contains the instructions to automatically load OS in memory) and is loaded in the computer memory whenever the computer is turned over. This virus is attached with system executable files i.e. .exe, .com and .dll files. When the user uses these files, the virus performs destructive operations and destroys all the data files.

**Q.8**   **What is a Chernobal virus?**

**Ans.**   It deletes the all the Microsoft office files. It also deletes the partition information from the disk and with the deletion of partition the information cannot be accessed.

**Q.9    What is a Logic Bomb?**

**Ans.**    It is a virus that is activated on the basis of a logical condition. The virus instruction is executed if the logical condition is true. It is activated on a certain date and time and can be detected by chance.

**Q.10    What is a Trojan Horse?**

**Ans.**    It is a part of some computer programs e.g. destructive instructions inside the game programs. When the infected program (game) runs on the system, then this virus is activated. An example of Trojan horse is FORMAT C instruction is executed with the execution of a game.

**Q.11    What is RedLof?**

**Ans.**    It is polymorphic virus written in VB Script. It infects the Folder.htt file which is the part of Windows Active desktop feature. It appends itself to other infected files on the hard disk and causes destruction. Some virus may make invisible changes in the user's data.

**Q.12    What is denial of service situation?**

**Ans.**    A person may make a computer so busy by sending many requests, so that computer is unavailable to authorized users. This is called denial of service situation.

# EXERCISE

**Q.1 FILL IN THE BLANKS:**

1. The rate of transfer of data on a USB port can be 10 to 20 times faster than parallel port device.

2. When the virus starts to impact on data, it is known as virus attack.

3. The right to use software on the computer is called license.

4. Making illegal copies of copyright software is called "software piracy".

5. A special program that can detect and remove viruses from computer is called antivirus.

6. Software that is available free for a limited period is called shareware.

7. FAST Stand for Federation Against Software Theft.

8. IR stands for Instruction Register.

9. Winzip is software used for data compression.

10. Software is an "Intellectual Property" or "Intellectual Rights" of a person who developed it.

11. Security is a system of safeguards designed to protect a computer system and data from intentional and accidental damage or access by unauthorized persons.

12. A computer system must be protected from unauthorized persons.

13. Virus is a destructive program containing code that can generate copies of it and attaches itself with other programs so that it is automatically executed when those programs are executed.

14. A virus is a program designed by a computer programmer to do a certain unwanted function.

15. Emails, Networks, Removable Storage media and Pirated software are ways through which a virus reaches from one computer to another.

16. Computers are infected due to receiving of emails containing virus programs.

17. Virus is also spreading by using Internet and networks.

18. Pirated software:

19. The virus can also infect your computer by through the use of pirated software.

20. The software without license is called pirated software.

21. Boot sector virus modifies the programs in the boot sector.

22. Boot sector is the first sector which contains the instructions to automatically load OS in memory whenever the computer is turned over.

23. Boot sector virus is attached with system executable files i.e. .exe, .com and .dll files.

24. Chernobal virus deletes the all the Microsoft office files.

25. Chernobal virus deletes the partition information from the disk.

26. Logic Bomb is a virus that is activated on the basis of a logical condition. It is activated on a certain date and time.

27. A programmer working on temporary basis creates programs like Logical bomb.

28. Trojan horse is a part of some computer programs e.g. destructive instructions inside the game programs.

29. RedLof is polymorphic virus written in VB Script.

30. RedLof infects the Folder.htt file which is the part of Windows Active desktop feature.

31. Data protection legislation defines the laws that ensure data protection.

32. 1987 Computer Security Act makes actions that affect the computer security files and telecommunication illegal.

33. 1988 Video Privacy Protection Act prevents retailers from disclosing a person's video rental records without a court order.

34. 1988 Matching and Privacy Protection Act prevents the government from comparing certain records in an attempt to find a match.

**Q.2    Choose the correct option:**

1. A virus program usually hidden in:
   (a) The operating system only
   (b) An Application program only
   (c) The disk drive
   (d) **The Operating system or application programs**

2. A virus is just a:
   (a) **Computer program**          (b) Device driver
   (c) hardware component          (d) None

3. A virus can destroy:
   (a) **Executable program**          (b) Keyboard
   (c) CPU          (d) Display screen

4. Viruses are transferred from one computer to another due to:
   (a) **Exchange of data and programs** (b) Exchange of display screen

(c)      High temperature of room    (d)    Dust in room

5.    Most common crimes are committed by:

    **(a)  Hackers**

    (b)  International spies

    (c)  Highly trained computer consultants

    (d)  Company insiders who have no extraordinary technical ingenuity.

6.    ———— viruses infects the first sector of disk:

    **(a)    Boot sector virus**    (b)    Horse Trojan virus

    (c)    Chernobal virus    (d)    Logic bomb virus

7.    ———— virus is activated on the basis of a logical condition:

    (a)    Boot sector virus    (b)    Atomic bomb virus

    (c)    Chernobal virus    **(d)    Logic bomb virus**

8.    Format C is an example of virus:

    (a)    Boot sector    **(b)    Trojan Horse**

    (c)    Chernobal    (d)    Logic bomb

9.    Software that is used to detect and remove the viruses from the computer is called:

    (a)    Pirated software    **(b)    Antivirus**

    (c)    Trojan Horse    (d)    Virus

10.    ———— is not an anti-virus program:

    **(a)    Red-lof**    (b)    Norton

    (c)    Dr. Solomon    (d)    McAfee

11.    ———— is an anti-virus program:

    (a)    Red-lof    (b)    Horse Trojan

    **(c)    Dr. Solomon**    (d)    Logic bomb

12.    ———— is cause of virus:

    (a)    e-mail    (b)    Network

    (c)    Pirated software    **(d)    All**

13.    Types of software that can be freely distributed without violating copyright laws are called:

    (a)    Shareware    (b)    Public domain

    (c)    Copy protected    **(d)    Both a and b**

14.    Another name for antivirus is:

    **(a)    Vaccine**    (b)  Worm

(c)   Trojan Horse                    (d) DES

15.   Security Protection for personal computer include:
      a) Internal components          b) Locks and cables
      c) Software                     d) **All of these**

16.   A secret word or number to be typed by a keyboard before an activity can take place are called:
      (a) Biometric data              (b)   Data encryption
      **(c) Password**                (d)   Private Word

17.   Which is not an antivirus program?
      **(a) Redlof**                  (b)   Norton
      (c) McAfee                      (d)   Dr. Solomon

18.   Format C is an example of:
      (a) Logic bomb                  **(b) Trojon Horse**
      (c) Boot Sector                 (d) Chernobal

19.   What is the most common computer crime of these listed below?
      (a)   Extortion of bank funds   (b)   IRS database sabotage
      (c)   Putting people on junk mailing lists **(d)   Software piracy**

20.   ——————— media is used for backup:
      (a)   Floppy diskette           (b)   Zip Disk
      (c)   Tape drive                **(d)   All**

21.   Which Virus is activated on the basis of a logical condition?
      **(a) Logic bomb**              (b) Trojon Horse
      (c) Boot Sector                 (d) Chernobal

**Q.3   WRITE T FOR TRUE AND F FOR FALSE STATEMENT:**

1.    Software errors can result in data loss.                                              **(T)**
2.    Any person can change password.                                                      **(F)**
3.    All viruses activate exactly in the same manner                                       **(F)**
4.    A full backup means that once a week you can perform a complete backup                **(F)**
5.    IR Stands for "Intellectual rights"                                                   **(T)**
6.    A computer virus is a part of hardware.                                               **(F)**
7.    Passwords, auditor checks and separation of employee functions are data protection techniques.   **(T)**
8.    No one has ever been able to read encrypted messages without key.                     **(T)**
9.    It is legitimate to make copy of software for backup purpose                          **(T)**

10. The computer fraud and abuse act of 1984 define software piracy as crime. **(T)**

# WINDOWS OPERATING SYSTEM

**Q1.** **What is an Operating System? What is its purpose? Discuss types of Operating System.**

## OPERATING SYSTEM:

- An operating system (OS) is a set of computer programs that manage the hardware and software resources of a computer. An operating system performs basic tasks such as:
- Controlling and allocating memory
- Prioritizing system requests
- Controlling input and output devices
- Facilitating networking and managing file systems.
- **Example:** Examples of operating system are DOS, Windows 98, 2000, XP, Linux and UNIX etc.

## PURPOSE/OBJECTIVES OF OPERATING SYSTEM:

There can be many objective of an operating system but a few important are discussed below:

- It manages the hardware resources (processor, memory, disk space etc) of the system.
- It manages the software resources (application programs, utilities etc) of the system.
- It provides a user interface.
- It provides the facility to use the hardware without knowing its detail.

## TYPES OF OPERATING SYSTEM:

On the basis of user interface there are two types of operating system.

## GRAPHICAL USER INTERFACE OPERATING SYSTEM:

- In GUI operating system icons, windows and buttons are used as visual components.
- These components or objects are used to perform different tasks.

- Users of these operating systems need not to memorize commands.
- User can perform a task like copying a file without writing a command.
- **Example:** Examples of GUI operating systems are windows, Linux, and Solaris etc.

# COMMAND LINE OPERATING SYSTEM:

- In Command Line operating system user need to write a command to perform a certain task.
- To write commands user need to memorize them.
- These operating systems are providing textual interface.
- **Example:** Examples of Command Line operating system are DOS (Disk Operating System), Unix etc.

## A Comparison of Command Line and GUI Operating System:

| Command Line Interface Operating System | GUI Operating System |
|---|---|
| **Ease** ||
| It is difficult to remember its commands. It s also difficult to type commands for different tasks. | It is easy to use. It is very easy to remember different sequence of activities to perform a certain task. |
| **Control** ||
| Users have excellent control on the file system. | Users have better control on the file system. But in some cases they need to use the command line interface to complete a task. |
| **Multitasking** ||
| Many command line interfaces are multitasking but they don't have the ability to display multiple tasks on the screen at the same time. | In GUI multiple tasks can be performed at the same time. These tasks are also displayed on the screen. GUI operating systems are faster in multitasking. |
| **Speed** ||
| Command line interface is fast to perform a task. | GUI is slower while performing a certain task. |
| **Scripting** ||
| In command line operating system a user can write the commands in a sequence and use them to perform a certain task. | GUI operating system provides shortcuts to perform task fast, but it doesn't come close in comparison to what is available |

| | through a command line. |
|---|---|

## Starting to Use Windows Operating System:

- Windows is a Graphical User Interface operating system. It is used in many businesses, research organizations and educational institutes.

- The first version was windows 1.01 and it was released in 1985.

- After five years, in 1990 windows 3.0 was introduced. It was a complete operating environment. It was providing GUI that runs on top of DOS.

- In 1995 Microsoft released Windows 95. It was a complete operating system.

- Meanwhile Windows NT (New Technology) was also introduced for networks. In 1998 a new version of windows was launched.

- Now today's most commonly versions of windows like 2000 (server and professional) and XP are based on NT Technology.

**Q2.     What are the Objects of Windows Operating System?**

## OBJECTS OF WINDOWS OPERATING SYSTEM

To control windows working there are many objects. These objects help in providing multitasking environment to the users. Following are the basic components of windows operating system.

### Desktop

- The work area of a windows operating system is called desktop.

- Different icons, menus and dialog boxes appear on the desktop.

- It is the main screen from where user can interact with the system.

### My Computer

- It is a special icon on the desktop. It shows all the disks installed in a computer.

- Drives are displayed as icons in My Computer folder.

- Using my computer folder we can access our files and folders to store and retrieve data.

### Recycle Bin

- A recycle bin, or trash can, is a temporary storage for files and folders that have been deleted.

- These files and folders are not permanently erased from the physical media.

- Typically, a recycle bin allows the user to browse deleted files, undelete those that were deleted by mistake, or delete them permanently (either one by one, or all at once).

**My Documents**

- On Microsoft Windows operating systems, My Documents is the name of a special folder. It is commonly used to store documents, music, pictures, downloads, and other files.

- It is the default storage location for a lot of application programs.

- This folder is visible on the desktop.

**Windows Explorer**

- Windows Explorer is an application that provides detailed information about your files, folders, and drives.

- You can use it to see how your files are organized and to copy, move, and rename files, as well as perform other tasks pertaining to files, folders, and drives.

- There are several ways to get to Windows Explorer.

- The simplest way is to right-click the Start menu or the My Computer icon and selects Explore. Alternatively, you can access it from the Start menu as described below.

- The difference between windows explorer and my computer is of tree view control.

- In windows explorer tree view control is present on the left side of the window.

**Internet Explorer**

- Internet explorer is a web browser. It is used to browse different web sites.

- It is the part of windows operating system. It has very power full features with high security.

**The Window**

- It is a rectangular box.

- It is resizable object.

- In Microsoft Windows operating system most of the objects are displayed in window.

- It is the basic building block of all the graphical objects.

- Different applications have their own windows.

**Control Panel**

- Control Panel is a part of the Microsoft Windows graphical user interface which allows users to view and manipulate basic system settings and controls, such as adding hardware, adding and removing software, controlling user accounts, and changing accessibility options.

- The control panel is an independent program, not a folder as it appears, which is accessed from the start menu, and is stored in the system32 directory as control.exe under Windows XP.

**Start Button**

- The Start Menu and Start Button are user interface elements in the Microsoft Windows, which serve as the central launching point for applications. Start Menu provides

- A customizable nested list of programs for the user to launch

- A list of most recently opened documents

- A way to find files and get help, and access to the system settings.

**Q3.    Discuss use of Mouse and Keyboard events in windows.**

## USE OF MOUSE AND KEYBAORD

- Mouse and keyboard are two very basic input devices.

- These two devices are used with almost every computer.

- Mouse is a point and draw device and used with GUI environment.

- Keyboard is a textual input device and used with both GUI and command line systems.

## MOUSE EVENTS

- Mouse events are those actions which are performed by the mouse.

- Following are three common events initiated with mouse.

### Left Click

- This event triggers when we press left click button of the mouse.

- Windows perform certain tasks against this action e.g. it is used to select an item.

- Another example can be to activate the start button by using left click button of the mouse.

### Right Click

- This event triggers when we press right click button of the mouse.

- Windows perform certain tasks against this action e.g. it is used to display the context menu about a particular object on which our mouse pointer lies.

- Another example can be to view the properties of an object right click option is used.

### Drag

- Select an item, press the left click button and drag it to from one location to another while keeping the left mouse button pressed.

- This facility is available only in GUI environment. Mouse is the best device used to perform such tasks.

# KEYBOARD EVENTS

- Keyboard events are those which occur with the help of keys of the keyboard. Different application programs perform different actions against these events.

  ### *Key Up*

- This event triggers when we release already pressed key of the keyboard.

  ### *Key Down*

- This event triggers when we press a key from the keyboard

**Q4.     What are features of Windows?**

# FEATURES OF WINDOWS

- Microsoft Windows is a Graphical User Interface operating system.

- In early versions of windows there was no network support but later ones have this feature. Here we are discussing a few features of windows.

## Multitasking

- Performing more than one tasks at the same time is called multitasking e.g. while typing we are enjoying the music on our computer.

- Windows 2000 has this capability to load multiple programs in memory at the same time and execute them concurrently.

## Multiprocessing

- The ability to manage more than one microprocessor is called the multiprocessing.

- Windows 2000 has the capability to manage more than one microprocessor.

- In this environment operating system assigns different jobs to different microprocessors to perform. Multiprocessing system are fast than uni-processor systems.

## Multi-User

- A multi-user operating system allows more than one users to use it at the same time.

- Windows 2000 is a multi-user operating system.

## Plug and Play

- Plug and play refers to the capability to attach a device with computer and start to use it.

- Operating system will automatically installs and configure its drivers.

- Windows 2000 has this feature. A mechanism is defined in windows 2000 that automatically detects a new hardware device.

- There is a long list of drivers available with windows 2000.

## Networking

- Windows 2000 provides complete networking support.

- It provides the features of establishing, maintaining and troubleshooting the network.

**Q5.     What is Disk Management feature of Windows?**

# DISK MANAGEMENT

- Disk management is a process of organizing the disks attached to a computer system.
- Windows operating system has this capability.
- To keep the data managed at separate locations a disk can be divided into different partitions.
- There are two types of disk partitions.

**Primary Partition**

- This partition is used as system partition.
- Files required to boot a system are located on this partition.
- A maximum of four primary partitions or three primary and one extended partition can be created on a hard disk.
- Primary partitions can be created only on basic disks and cannot be further partitioned.

**Extended Partition**

- Extended partition is a partition that can contain further partitions.
- One out of four on a physical disk can be an extended partition, and no primary partitions needs to be present to create an extended partition.

**Disk Management Utility**

- Disk management utility provides a graphical interface to view and manage disks and their partitions.
- All information about disks can be viewed in a single window.
- This utility is used to perform disk related tasks, such as creating partitions, formatting them and assigning drive letters.
- Disk management utility also tells which drive contains the system partition.
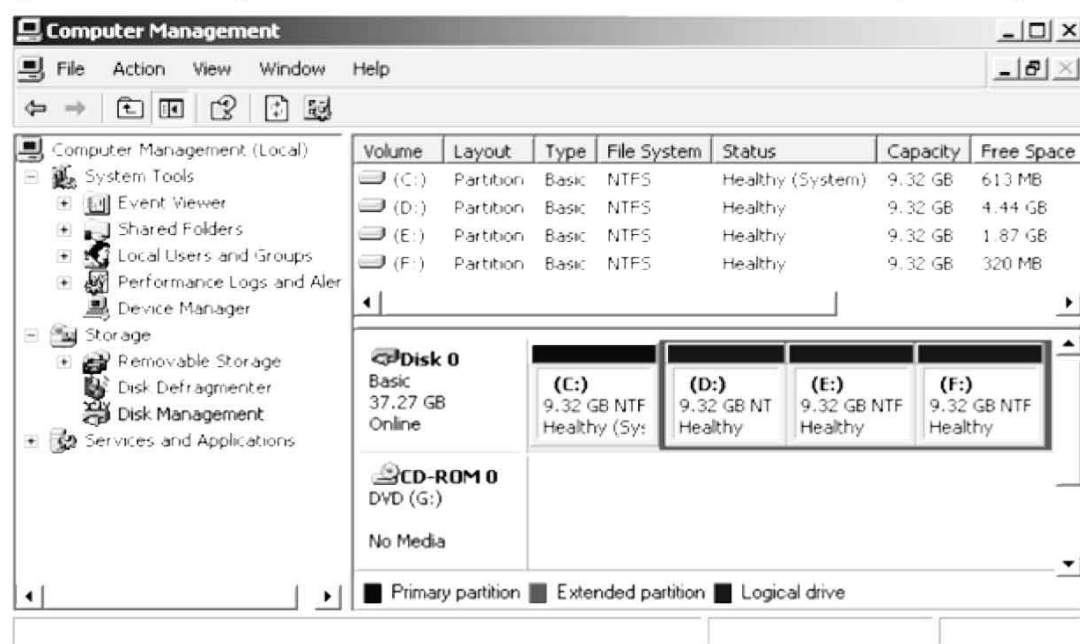
**Q6.    What is File Management feature of Windows? Discuss Windows Explorer.**

## FILE MANAGEMENT

- In Microsoft windows operating system files are recognized by their extensions. Extensions are the characters, usually three or four letters such as .doc, .txt, or .html, that follow the period at the end of a file name.

- Windows checks the file extensions against a database of registered files.

- From this database of registered files it is determined that which program will be used to open or edit a file.

- If windows encounter a new file type which is not already registered it will open a dialog to let you choose a program of your choice to open the file.
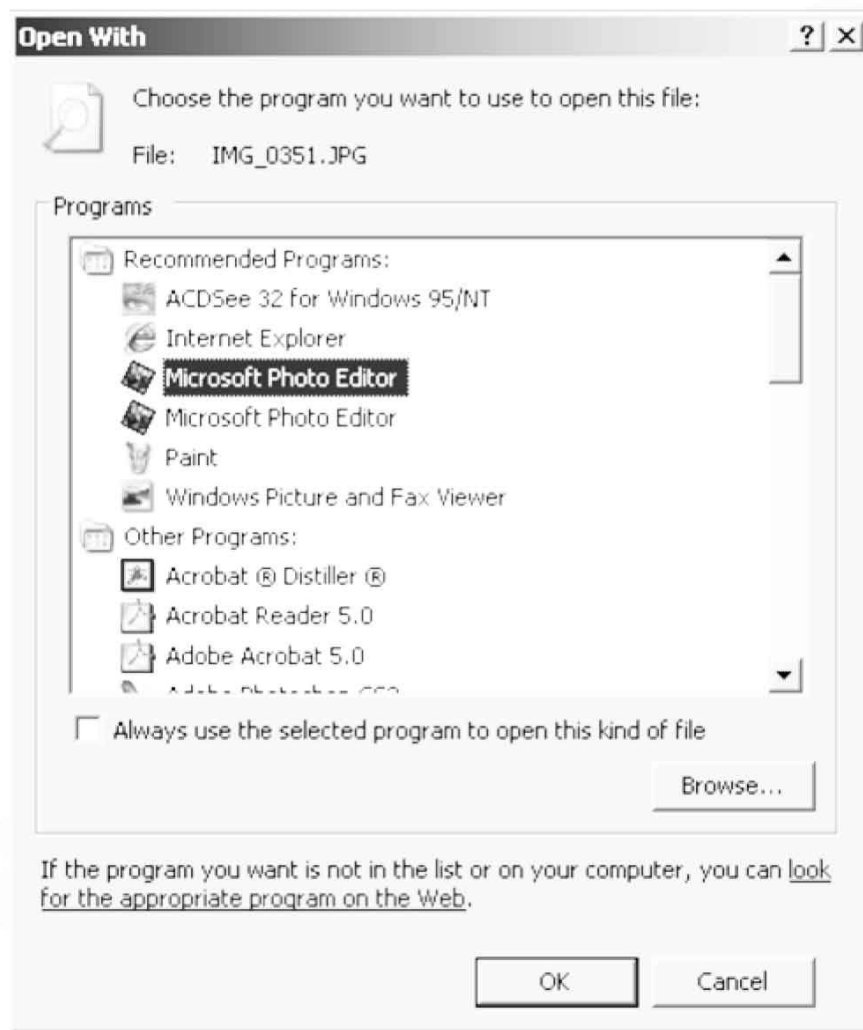


## WINDOWS EXPLORER

- It works as a file manager for windows operating system.

- You can have different views of files using this utility.

- A hierarchical tree like structure is displayed on the left side of the windows.

- Using windows explorer files can be copied from one place to other.

- From windows explorer you can also delete, rename or share the files and folders.

- With windows explorer, you can manage the local files, folders and retrieves but also the remote files and folders.
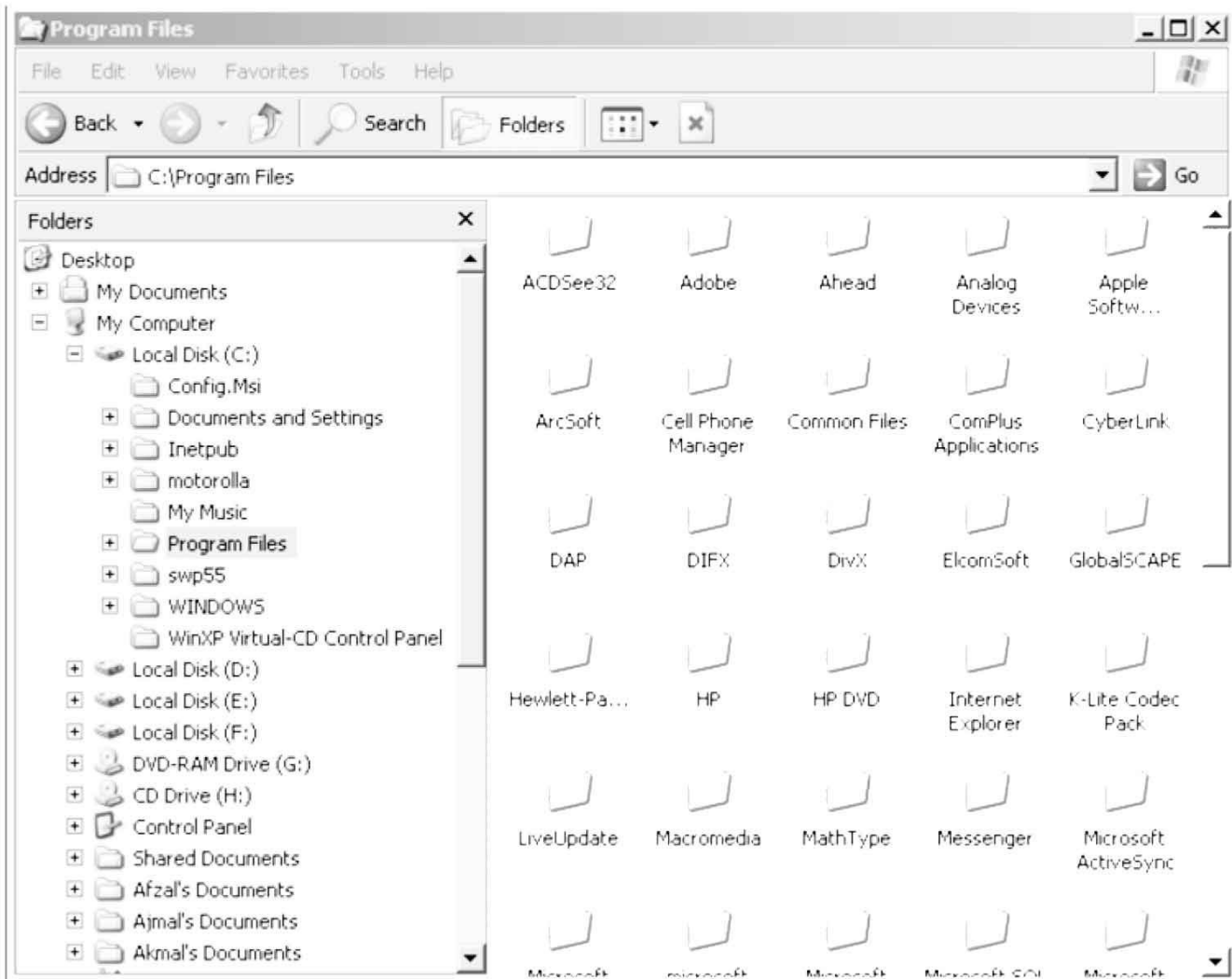


**Q7.**     **How printing jobs are controlled in Windows? What are the steps of adding a printer? Discuss printing queue.**

# CONTROL PRINTING JOBS

- Windows operating system has a feature to control printing jobs.

- Windows maintains a print queue.

- You can add multiple printers to your computer and these printers can be shared on a network so that other users take the advantage of shared printers.

- From many printers there will be a default printer.

- All print jobs send directly to the default printer.

- The status of a printer can be changed to default by right click and select the option of default.

**Adding a new printer**

- You can add new printer to your computer by following these steps.

- Click Start ⟶ Settings ⟶ Printer and Faxes

- A window will appear.

- Select Add a Printer

- Follow the steps of wizard to add a new printer.
- Click the Next button to begin to printer installation process.
- Select the Local Printer radio button.
- Click the Next button to continue.
- Select the port to which your printer is connected in the Available Ports list.
- Click the Next button to continue.
- Scroll down in the Manufacturers list and select the manufacturer of your printer. It displays list of printer models.
- Select the model of your printer and click Next button. If your printer is not listed, click the Have Disk button and browse to the location of driver files.
- Enter a name of your printer. By default the system uses the name associated with the printer driver.
- Click the Next button to continue. Print Test Page will appear.
- Select Yes to print a test page or No to skip test page.
- Click the Finish button to complete the installation.

**Print Queue**

- The print queue shows the documents that are waiting to be printed.
- For each item on the list, information, such as the print status and number of pages, is provided.
- The following table shows the information displayed for each document in the queue.

| Column | Description |
|---|---|
| Document Name | The file name of the document. |
| Status | The current status of the document, such as Spooling, Paused, or Printing. |
| Owner | The user name of the person who sent the document to the printer. |
| Pages | The number of pages that have printed and the total number of pages in the document. |
| Size | The size of the document in kilobytes. |
| Submitted | The time and date that the document was sent to the printer. |

| | |
|---|---|
| Port | The port being used by the printer. |

- If you manage a printer, you can control certain operations from the print queue. For example, you can pause or resume operation of the printer, and you can cancel printing of all documents waiting to be printed.

- You can also manage documents you send to the printer.

- You can pause, resume, or cancel printing of a document; restart printing of a document.

- For documents waiting to print, you can view, but not change, settings such as the page orientation, paper source, and number of copies.
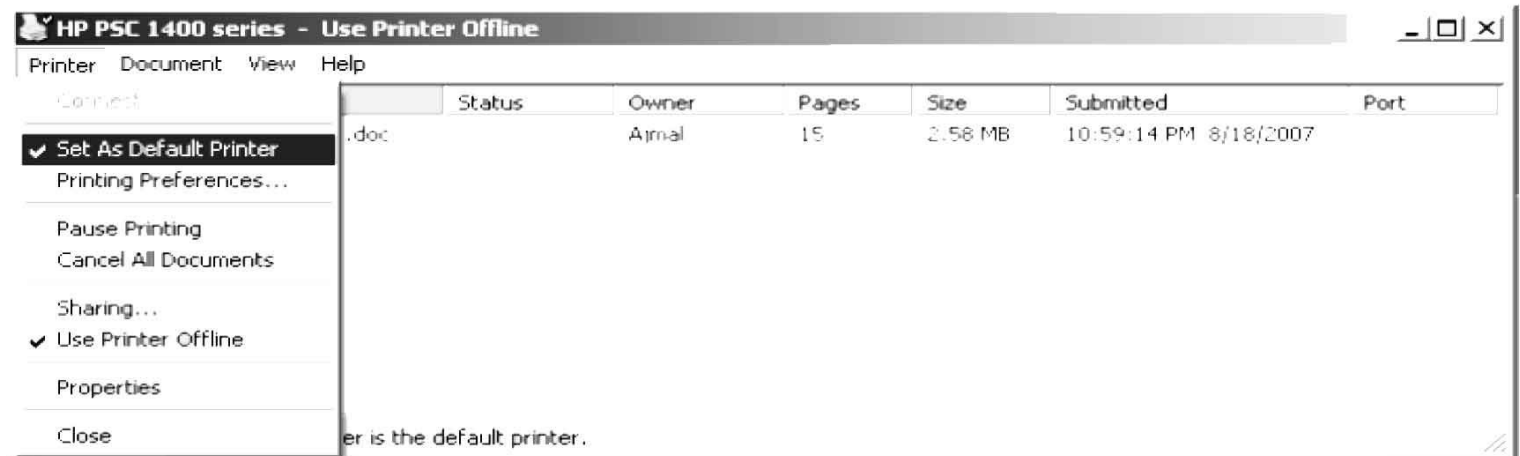


## Q.8 Explain how to select, rename and delete files and folders in Windows.

**Selecting a File or Folder:**

The following procedure is used to select a file or folder:

- Click the desired file or folder to select it.

- Press CTRL key and click on desired files or folders to select multiple files or folders.

- Click Edit > Select All OR press CTRL+A to select all files and folders in a windows.

**Renaming a File or Folder:**

The following procedure is used to rename a file or folder:

- Open Windows Explorer.

- Right click the file or folder to be renamed. A popup menu will appear.

- Click Rename option. A cursor will appear in file or folder name.

- Type the new name and press Enter. The file or folder will be renamed.

**Deleting a File or Folder:**

The following procedure is used to delete a file or folder:

- Open Windows Explorer.

- Select the file or folder to be deleted.

- Press Delete key. A message will appear to confirm the deletion.
- Click Yes button to delete the selected file or folder. The file or folder will move to the Recycle Bin.

**Q.9    Write a short note on finding files in Windows.**

- Windows search feature makes it easy to search files and folders, printers, people and other computers on network. It also has an indexing service to maintain an index of all files on computer for faster searches. The user can specify several search criteria.

**Searching a File:**

The following steps are performed to search a file in Windows:

- Click on Start button. The Start menu will appear.
- Select Find option from the menu. A new window will appear.
- Enter appropriate words in the textboxes and click Search button. Window will start searching the required file.

The user can search the file using the following options:

- Files or folders.
- On the Internet.
- People.
- Using Microsoft Outlook.
- The user can also specify the location for searching the file using Look in: list box. The user can select a particular drive such as C:\ or D:\ etc. The user can also use other options on search pane for advance searching.

# SHORT QUESTIONS

**Q1.** **What is an Operating System?**

**Ans.** An operating system is collection of operative programs that provide an interface for the user to interact with the computer. An operating system performs basic tasks such as

- It manages the hardware resources.
- It manages the software resources.
- It provides a user interface.
- It provides the facility to use the hardware without knowing its detail.

**Q2.** **Define types of Interface provided by Operating Systems.**

**Ans.** **GUI (Graphical User Interface)**

In GUI operating system icons, windows and buttons are used as visual components. These objects are used to perform different tasks. Users of these operating systems need not to memorize commands. User can perform a task like copying a file without writing a command e.g. windows, Linux, and Solaris etc.

**Command Line Interface**

In CLI, A user needs to write a command to perform a certain task. To write commands user need to memorize them. These operating systems are providing textual interface e.g. DOS (Disk Operating System), UNIX etc.

**Q3.** **What is a Graphical User Interface?**

**Ans.** In GUI operating system icons, windows and buttons are used as visual components. These objects are used to perform different tasks. Users of these operating systems need not to memorize commands. User can perform a task like copying a file without writing a command e.g. windows, Linux, and Solaris, windows 98, windows 200, windows XP.

**Q4.** **What is Command Line Interface?**

**Ans.** A command line interface operating system provides a command prompt to the user for typing different command to interact with the computer. To write commands user need to memorize them. These operating systems are providing textual interface e.g. DOS (Disk Operating System), UNIX etc.

**Q5.** **What is a Desktop?**

**Ans.** The on screen work area on which windows, icons, menus and dialog boxes appear is called desktop. Different icons, menus and dialog boxes appear on the desktop. It is the main screen from where user can interact with the system.

**Q6.** **What is My Computer folder?**

**Ans.** This folder is placed at the desktop. It shows all the disks installed in a computer. Drives are displayed as icons in My Computer folder. Using my computer folder we can access our files and folders to store and retrieve data.

**Q7.** **What is Recycle Bin folder?**

**Ans.** This folder contains all deleted files and folders. From here deleted files and folder can be permanently deleted or restored to their original locations. A recycle bin is a temporary storage for files and folders that have been deleted. These files and folders are not permanently erased from the physical media.

**Q8.** **What is My Documents folder?**

**Ans.** This folder is used to store one's work or data. It is a default storage folder for a lot of application programs. My Documents is used to store a user's documents, music, pictures, downloads, and other files. This folder is visible on the desktop.

**Q9.** **What is Windows Explorer?**

**Ans.** Windows Explorer is an application that provides detailed information about your files, folders, and drives. You can use it to see how your files are organized and to copy, move, and rename files, as well as perform other tasks pertaining to files, folders, and drives.

**Q10.** **What is Internet Explorer?**

**Ans.** Internet explorer is a web browser and it is used to browse different web sites. It is the part of windows operating system. It has very power full features with high security.

**Q11.** **What is the Window?**

**Ans.** It is a rectangular box. It is resizable object. In Windows operating system most of the objects are displayed in window. It is the basic building block of all the graphical objects. Different applications have their own windows.

**Q12.** **What is a Control Panel?**

**Ans.** It is a system folder from here we can manage and control all the hardware and software components of the computer. It allows users to view and manipulate basic system settings and controls, such as adding hardware, adding and removing software, controlling user accounts, and changing accessibility options.

**Q13.** **What is a Start button?**

**Ans.** On the left lower side of desktop a buttons exists. This button is called start button, as its caption is "Start". It is used to open the program menu of the system. The Start Menu and Start Button are user interface elements in the Microsoft Windows, which serve as the central launching point for applications. Start Menu provides

- A customizable nested list of programs for the user to launch
- A list of most recently opened documents
- A way to find files and get help, and access to the system settings.

**Q14.** **What is Multitasking?**

**Ans.** The capability of an operating system to load multiple programs into memory at the same time and to perform two or more processes concurrently. While typing we are enjoying the music on our computer. Windows has this capability to load multiple programs in memory at the same time and execute them concurrently.

**Q15. What is Multiprocessing?**

**Ans.** The ability to manage more than one microprocessor is called the multiprocessing. Windows has the capability to manage more than one microprocessor. In this environment operating system assigns different jobs to different microprocessors to perform. Multiprocessing system are fast than uni-processor systems.

**Q16. What is Multi-User Operating System?**

**Ans.** A multi-user operating system allows for multiple users to use the same computer at the same time.

**Q17. What is Plug and Play?**

**Ans.** Plug and Play refers to a set of specifications that allow a computer to automatically detect and configure a device, and install the appropriate device drivers. Windows has this feature. A mechanism is defined in windows that automatically detect a new hardware device. There is a long list of drivers available with windows.

**Q18. Define Partition.**

**Ans.** A partition is a portion of physical disk that functions as though it were a physically separate disk.

**Q19. Define Primary Partition.**

**Ans.** A primary partition is one that can be used as the system partition. Files required to boot a system are located on this partition. A maximum of four primary partitions or three primaries and one extended partition can be created on a hard disk. Primary partitions can be created only on basic disks and cannot be further partitioned.

**Q20. What is Extended Partition?**

**Ans.** Extended partition is a partition that can contain further partitions. One out of four on a physical disk can be an extended partition, and no primary partitions needs to be present to create and extended partition.

**Q21. What is Disk Management?**

**Ans.** Disk management is a process of organizing the disks attached to a computer system. Windows has this capability. To keep the data managed at separate locations a disk can be divided into primary partitions and extended disk partitions.

**Q22. What is Disk Management utility?**

**Ans.** Disk management utility provides a graphical interface to view and manage disks and their partitions. All information about disks can be viewed in a single window. This utility is used to perform disk related tasks, such as creating partitions, formatting them and assigning drive letters. Disk management utility also tells which drive contains the system partition.

**Q23. What is Print Queue?**

**Ans.** The print queue shows the documents that are waiting to be printed. For each item on the list, information, such as the print status and number of pages, is provided. If you manage a printer, you can control certain operations from the print queue e.g. you can pause or resume operation of the printer, and you can cancel printing of all documents waiting to be printed.

# EXERCISE

**Q1.** **Fill in the blanks**

1. GUI stands for Graphical User Interface.

2. The capability of an operating system to load multiple programs into memory at one time is called multitasking.

3. With plug and play a computer can automatically detect and configure a device.

4. Multiple actions can be performed on a registered file type.

5. Extended partition refers to a portion of a disk that can contain other partitions.

6. A multi-user operating system allows multiple users to perform multiple tasks at the same time.

7. Windows explorer offers many actions that can be performed on files and folders.

8. Windows maintain a print queue for all printing jobs.

9. All deleted items are stored in recycle bin.

10. The disk management utility gives you a graphical interface.

11. Operating system (OS) is a set of computer programs that manage the hardware and software resources of a computer.

12. Operating System manages the hardware resources (processor, memory, disk space etc) of the system.

13. Operating System manages the software resources (application programs, utilities etc) of the system.

14. Operating System provides a user interface.

15. Operating System provides the facility to use the hardware without knowing its detail.

16. The work area of a windows operating system is called desktop.

17. My Computer is a special icon on the desktop. It shows all the disks installed in a computer.

18. Recycle Bin is a temporary storage for files and folders that have been deleted.

19. A recycle bin allowing the user to browse deleted files, undelete those that were deleted by mistake, or delete them permanently.

20. My Documents is the name of a special folder is the default storage location for a lot of application programs.

21.    Windows Explorer is an application that provides detailed information about your files, folders, and drives.

22.    Windows Explorer can be used to see how your files are organized and to copy, move, and rename files, as well as perform other tasks pertaining to files, folders, and drives.

23.    Internet Explorer is a web browser. It is used to browse different web sites.

24.    Window is a rectangular box. It is resizable object.

25.    Control Panel is a part of the Microsoft Windows which allows users to view and manipulate basic system settings and controls, such as adding hardware, adding and removing software, controlling user accounts, and changing accessibility options.

26.    Performing more than one task at the same time is called multitasking.

27.    The ability to manage more than one microprocessor is called the multiprocessing.

28.    A multi-user operating system allows more than one users to use it at the same time.

29.    Plug and Play refers to the capability to attach a device with computer and start to use it.

30.    Disk management is a process of organizing the disks attached to a computer system.

31.    Primary Partition is used as system partition. Files required to boot a system are located on this partition.

32.    A maximum of four primary partitions can be created on a hard disk.

33.    Primary partitions can be created only on basic disks and cannot be further partitioned.

34.    Extended Partition is a partition that can contain further partitions.

35.    Disk management utility provides a graphical interface to view and manage disks and their partitions.

36.    Windows Explorer works as a file manager for windows operating system.

37.    Windows maintains a print queue to control printing jobs.

38.    Print queue shows the documents that are waiting to be printed.

**Q.2    Choose the correct option**

1.    An Operating System is a
      a) System Utility                    b) Application Software
      **c) System Software**               d) Software Package

2.    ———— is most necessary to interact with the computer:
      (a)    Word processor, Excel    (b)    Device driver
      **(c)    Operating system**     (d)    Language translator

3.    ———— organizes and controls the hardware and software:
      (a)    Word processor, Excel    (b)    Device drive
      **(c)    Operating system**     (d)    Language translator

4.    An operating system is:
      (a)    Custom built              (b)    Application Software
      **(c)    System Software**       (d)    Packaged software

5.    Ctrl + Alt + Del is
      a) An invalid key combination         **b) Recognized by windows only**
      c) Used to close the active window    d) Both b and c

6.    How many types of operating systems are there on the basis of user interface?
      **(a)    2**                     (b)    3
      (c)    4                         (d)    5

7.    ———— is not an example of GUI operating system:
      (a)    Windows                   (b)    Solaris
      (c)    Linux                     **(d)    DOS**

8.    GUI stands for:
      **(a)    Graphical User Interface**    (b)    General User Interrupt
      (c)    Graphs, Utilities, Icons        (d)    Grayed User Interface

9.    ———— is an example of command line operating system:
      (a)    Windows                   (b)    Solaris
      **(c)    Unix**                  (d)    Linux

10. What type of operating system MS-DOS is?

    **(a)**   **Command Line Interface**   (b)   Graphical User Interface

    (c)   Multitasking                  (d)   Menu Driven Interface

11. As compared to command line operating system, a GUI operating system is:

    (a)   More efficient            (b)   Easier to use

    (c)   More reliable             **(d)**   **All**

12. The maximum number of primary partitions that can be created on a disk is

    a) Two                       b) Tree

    **c) Four**                  d) None of the above

13. ———— is based on the NT technology:

    (a)   Windows 95           (b)   Windows 98

    (c)   Windows 3.x          **(d)**   **Windows 2000, XP**

14. The capability of an operating system to load multiple program into memory at a time and to perform two or more processes concurrently, is called:

    (a)   Multiprocessing       **(b)**   **Multitasking**

    (c)   Multiprogramming     (d)   Multi-user

15. ———— involves the processing on multiple processors in a computer:

    **(a)**   **Multiprocessing**     (b)   Multitasking

    (c)   Multiprogramming     (d)   Multi-user

16. ———— is the entering point in Windows:

    (a)   My computer        **(b)**   **Desktop**

    (c)   My document        (d)   Windows explorer

17. Windows explorer is used to

    a) Access the Internet         b) Explore system resources

    c) Perform maintenance on the hard disk

    **d) Navigate files and folders on the computer**

18. ———— acts as file manager for Windows:

    (a)   Recycle Bin          (b)   Desktop

    (c)   My document        **(d)**   **Windows explorer**

19. ———— contains the files and folders that are deleted from the hard disk:

    (a)   My Document        **(b)**   **Recycle Bin**

    (c)   My Computer        (d)   Windows Explorer

20. By default, Windows save the documents created in MS-Word in the folder:
   **(a)** **My Document** (b) Recycle Bin
   (c) My Computer (d) Windows Explorer

21. ————— is a Web Browser that is included with Microsoft Windows operating system:
   (a) Netscape Navigator (b) Windows Explorer
   **(c)** **Internet Explorer** (d) None

22. The File Manager in Windows is:
   a) Internet Explorer **b) Windows Explorer**
   c) My Computer d) My Documents

23. The term _____ involves the multiple processors in the computer
   a) Multitasking **b) Multi processing**
   c) Multiprogramming d) Multi User

24. ————— is used to surf Internet:
   **(a)** **Internet Explorer** (b) Window Explorer
   (c) My Computer (d) Control Panel

25. ————— folders contains the administrative tools:
   (a) Recycle Bin (b) My Document
   (c) My Computer **(d)** **Control Panel**

26. Which is a mouse event?
   (a) Left click (b) Right click
   (c) Double click **(d)** **All**

27. ————— is not a mouse event:
   (a) Left click (b) Right click
   **(c)** **Center click** (d) Drag

28. ————— event of mouse is normally used to select an object:
   **(a)** **Left click** (b) Right click
   (c) Center click (d) Drag

29. ————— events of mouse is used to select multiple items at a time or to move an item(s) from one location to another:
   (a) Left click (b) Right click
   (c) Center click **(d)** **Drag**

30. An operating system is able to perform multiple processes at the same time is called:
   a) Plug and play                          b) Multi processing
   **c) Multiprogramming**                    d) Multi User
31. The extension of an executable file is:
   (a)   xls                       (b)   doc
   (c)   ext                       **(d)   exe**
32. How many types of partitions are there?
   **(a)   2**                     (b)   3
   (c)   4                         (d)   5
33. ———— text stored in clipboard:
   (a)   Deleted text              **(b)   Copied text**
   (c)   Repeated text             (d)   Entered text

**Q.3.   WRITE T FOR TRUE AND F FOR FALSE STATEMENT:**
1. Primary partitions can not be created on basic disks. **(F)**
2. Microsoft Windows is a single user operating system. **(F)**
3. In Windows explorer, left pane displays folders and drives on your computer in a tree view shape. **(T)**
4. With windows explorer, you can only manage the local files, folders and drives. **(F)**
5. GUI was first introduced by Apple's Macintosh computers. **(T)**
6. Operating system is responsible for the effective use of computer system. **(T)**
7. Maximum four primary partitions can be created on a basic disk. **(T)**
8. Windows checks the file extension against a database of registered file types. **(T)**
9. Disk management also indicates which drive contains the system partition. **(T)**
10. Prior to Windows installation on a computer, the disk is partitioned. **(T)**

# WORD PROCESSING

**Q1.    What is a Word Processor?**

## WORD PROCESSOR:

- A word processor more formally known as document preparation system is a computer application program used for preparation of text-based documents.
- Word processor can manipulate the textual data.
- It also allows you to add images, sounds, charts and graphics in your document.
- Word processors can create the hypertext document to publish on the World Wide Web.
- The advantage of word processing software over typewriter is that you can add and change text written in word processing software very easily.
- You can also print your document on any available printer.
- There are two broad categories of word processing application software.
- A Simple Word Processor (Text Editor)
- Full-featured Word Processors

**Q.2    Discuss a Simple Word Processor and its features.**

## A SIMPLE WORD PROCESSOR/TEXT EDITOR:

- Text editor is a simple word processor with only very basic features.
- Text editors are used to create, edit and save simple text documents.
- In Windows operating system notepad, WordPad are examples of simple word processors or text editors.
- A text editor provides the following basic features.
- **Insert Text**

This feature allows you to enter text in the document.

- **Delete Text**

  Entered text can be deleted as per requirement. You can erase characters, spaces, words, complete sentences, paragraphs and even pages easily.

- **Cut and Paste**

  **Cut** allows you to move selected text from its original location and **Paste** feature allows you to transfer it another location. To move text from one place to another is a two step procedure. First cut it and then paste it at new location.

- **Copy**

  It will create the copy of selected text for duplication.

- **Page size and margin**

  This helps in managing the size of page and set it margins. Word processor will automatically readjust text according to the page size and margins.

- **Find and Replace**

  This feature is used to find a piece of text, portion of a word or phrase. It also allows replacing the found text with another piece of text.

- **Word Wrap**

  While typing when you have completed one line it will move your cursor on the beginning of the next line. This feature is called word wrap.

- **Print**

  To create a hard copy of document we need to print it. This feature allows to print a document.

**Q3.    Discuss a Full-featured Word Processor.**

# FULL-FEATURED WORD PROCESSOR:

Most word processors provide additional features that allow manipulating and formatting documents more conveniently.

These advance word processors are also called full-featured word processors.

These full-featured word processors support the following features.

- **File Management**

  This feature allow to create, delete, move and search for files.

- **Font Specifications**

  Allow you to change the font of your text with in a document. For example you can bold, italics or underline your text.

- **Footnotes**

  Footnotes are used in printed documents to explain, comment on, or provide references for text in a document. You might use footnotes for detailed comments.

- **Cross-references**
  Cross-reference refers to an item that appears in another location in a document — for example, "See Figure 1." You can create cross-references to headings, footnotes, bookmarks, captions, and numbered paragraphs.
- **Graphics**
  This feature allows you to insert pictures and graphics into a document. Some word processors also provide facility to create and edit the pictures and graphic objects within the document.
- **Headers and Footers**
  Headers and footers are areas in the top and bottom margins of each page in a document. You can insert text or graphics in headers and footers for example, page numbers, the date, a company logo etc.
- **Page Numbering**
  The word processor automatically keeps track of page numbers so that the correct number appears on each page.
- **Layout**
  This feature allows you to specify page size, margins, indents and line spacing with a document.
- **Macros**
  If you perform a task repeatedly in word processing software, you can automate the task by using a macro. A macro is a series of commands and instructions that you group together as a single key to accomplish a task automatically. All commands in a macro are executed when a key assign to a macro is pressed.
- **Merges**
  It allows you to merge text from one file into another file. This is useful for creating many files that have the same format but different data. Creating mailing labels is an example of using merges.
- **Spell Checkers**
  This utility allows checking the wrong spelling of words in a document. It highlights the misspelled words. Word processors have their own dictionary to check spellings.
- **Thesaurus**
  The thesaurus provides a list of synonyms for the text you look up, and highlights the one that is closest to what you have typed.
- **Tables of Contents and Indexes**
  This feature allows you to automatically create a table of contents and index based on the headings you have inserted in the document.
- **Document Windows**
  Document windows allow you to edit two or more documents at the same time. Each document appears in the separate window.
- **WYSIWYG (What You See Is What You Get)**
  A document will appears on the display screen exactly as it will look when printed.

**Q4.    What is the interface of Word Processor?**

**STARTING TO USE WORD PROCESSOR:**

To have a better understanding with a word processor you should be familiar with its **interface**. Interface represents a way through which you can interact with the word processing software.

**THE WORD PROCESSOR'S INTERFACE:**

Word processor's interface consists of an edit window to write and edit text, a list of several tools in the form of toolbars to manipulate the text and other objects of the document.
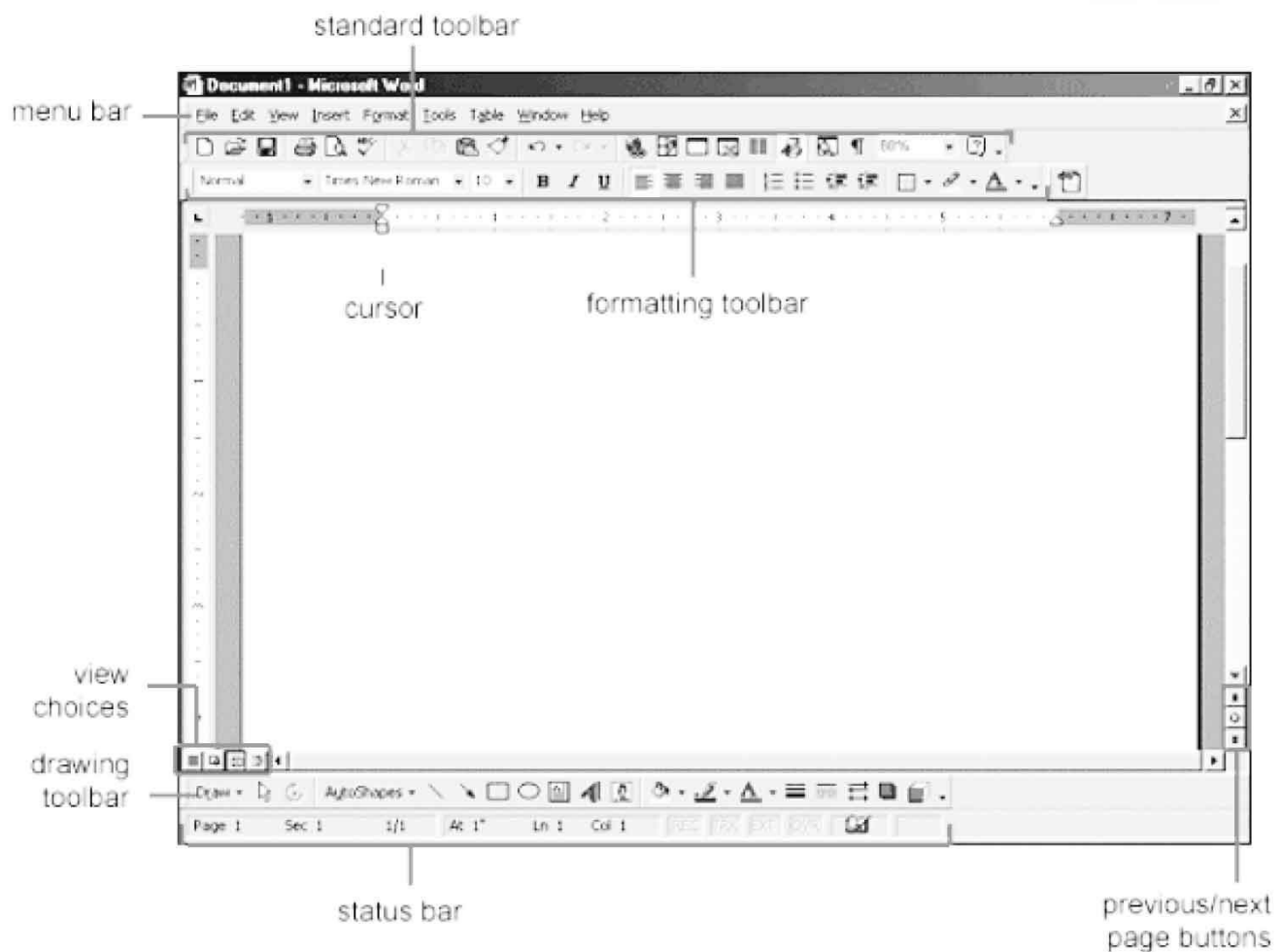


- **Title Bar**

  It is the top most bar of the application window that contains the name of program.

- **Menu Bar**

  It displays the names of all menus e.g. file menu, edit menu etc.

- **Standard Tool Bar**

  It consists of various buttons representing different commands to perform tasks. It provides the quick way to access the commonly used commands e.g. open, copy and print a file.

- **Formatting Tool Bar**

The formatting toolbar contains buttons for formatting commands.

- **Ruler**

  It shows the positioning of text, margins, tabs indents and other elements on the page.

- **Document Window**

  A rectangular portion of the screen in which you view and edit a document.

- **Status Bar**

  It is the bottom most bar of a word processing software. It shows the position of insertion point, and status of some important keys e.g. Insert and Caps Lock.

## Entering and Editing Text

- In a document text is entered using keyboard.

- The word processor places a cursor (insertion point) at the left upper side of the document window.

- While typing when you reach at the end of the line your cursor will automatically moves to the beginning of the next line.

- Word processor also allows changing text without retyping the whole document.

- Changing and existing document is called editing the document.

- There are many ways to edit an existing document e.g. by typing new or by replacing an existing text with new one etc.

**Q5.    Discuss Typing Modes.**

## TYPING MODES:

There are two typing modes in word processors

- **Insertion Mode**

  In insertion mode new text is placed at the insertion point or current position.

- **Overtype Mode**

  In overtype mode new text replaces the existing one.

**Q6.    Discuss the procedure of selecting, editing and formatting text.**

## SELECTING TEXT:

- To make any change in attribute of text, it must be selected first.

- In many cases you will need to change the character or paragraph format, copy or move information, or delete information.

- Word works on the "select, then do" principle. If you are a touch typist, you do not have to move your fingers off the keyboard to select text.
- Move the insertion point to the beginning of the text you want to select.
- Use one of the key combinations from the following tables.

### Select Text Using the Arrow Keys

| Key | Action |
|---|---|
| Shift + ↓ or Shift + ↑ | Select one line at a time |
| Shift + → or Shift + ← | Select one character at a time |
| Shift + Ctrl + → or Shift + Ctrl + ← | Select one word at a time |
| Shift + Ctrl+ ↓ or Shift + Ctrl +↑ | Select one paragraph at a time |

### Select Text Using The Home And End Keys

| Key | Action |
|---|---|
| Shift + Home | Select from the insertion point to the beginning of the current line |
| Shift + End | Select from the insertion point to the end of the current line |
| Shift +Ctrl +Home | Select from the insertion point to the beginning of the document |
| Shift + Ctrl + End | Select from the insertion point to the end of the document |
| Ctrl + A | Select the entire document, regardless of where the insertion point is |

## ERASING TEXT:

- Two keys are used to erase text from the document.
- These two keys are **Delete** and **Back Space** keys.
- The **Delete** key erase the characters from the right side of the cursor (insertion point).
- **Back Space** key erase the characters from the left side of the cursor.
- These keys erase one character at a time.
- To erase more character first select them and then press **Delete** key.

**Undo and Redo:**
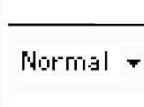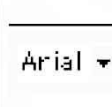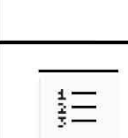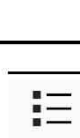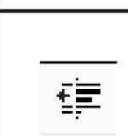
- It is a good idea to undo an action as soon as you realize you made a mistake.

- Undo erases the last change done to the document reverting it back to an older state.

- Redo is used to reverse the previous undo.

# FORMATTING TEXT:

- To enhance the appearance and to improve readability of your documents you can change the fonts, or apply attributes such as boldface, italic, underline, borders, patterns, and colors.

- Many of the formats you will use most often are accessible on the Formatting toolbar.
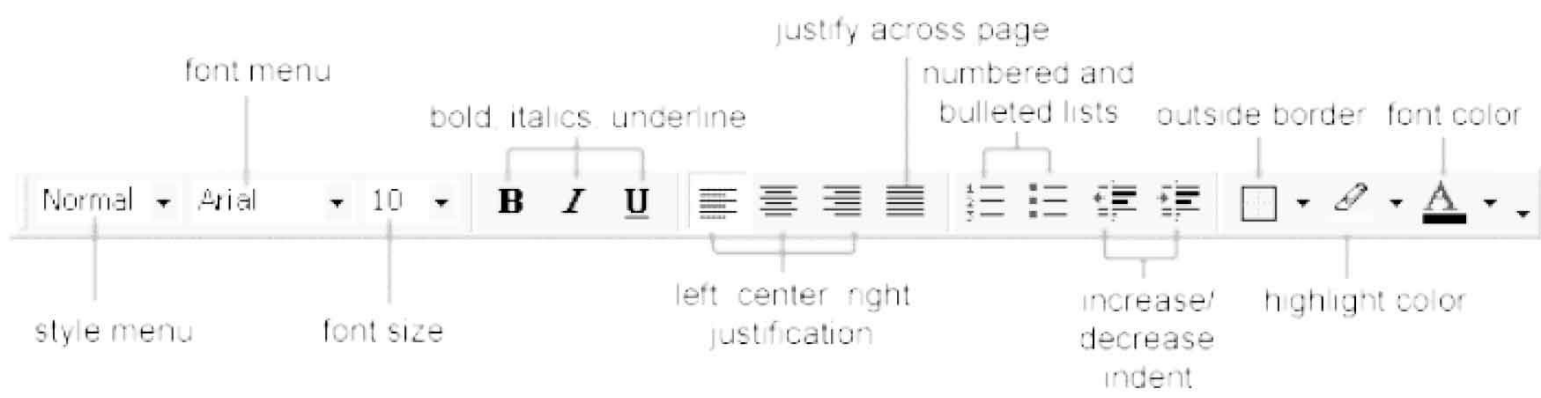


| Function of commonly used buttons | | | |
| --- | --- | --- | --- |
| Normal ▾ | Select the style to apply to paragraphs | Arial ▾ | Changes the font of the selected text |
| 12 ▾ | Changes the size of selected text and numbers | B | Makes selected text and numbers bold |
| I | Makes selected text and numbers italic | U | Underlines selected text and numbers |
| | Aligns to the left with a ragged right margin | | Centers the selected text |
| | Aligns to the right with a ragged left margin | | Aligns the selected text to both the left and right margins |
| | Makes a numbered list or reverts back to normal | | Add, or remove, bullets in a selected paragraph |
| | Decreases the indent to the previous tab stop | | Indents the selected paragraph to the next tab stop |

| | | | |
|---|---|---|---|
| ☐ ▾ | Adds or removes a border around selected text or objects | ✐ ▾ | Marks text so that it is highlighted and stands out |
| A ▾ | Formats the selected text with the color you click | | |

## Q7. What is a font and formatting fonts? Discuss the types of fonts.

# FORMATTING FONTS

- It is appearance of text. Fonts represent the various typefaces used in printed materials.
- The height of fonts is measured in points, and there are 72 points per inch.
- You can also change many character attributes of fonts, such as applying bold, italic, underline, or strikethrough to the text.
- The font is basically appearance of characters.
- One character can be represented in different fonts.
- It can be said that font is a writing style of a character.
- There are two general categories of fonts

# SERIF

- Serif fonts have extra decorative lines at the extremes of a character. Serif, or "roman", fonts are named for the features at the ends of their strokes. Times Roman and Garamond are common examples of serif fonts.
- Serif fonts are probably the most used class in printed materials, including most books, newspapers and magazines.

## AaBbCc  Serif Font

## AaBbCc  Sans Serif Font

# SANS-SERIF

- Sans-Serif has no extra decorative lines at the extremes of character. Arial is an example of this category of font.
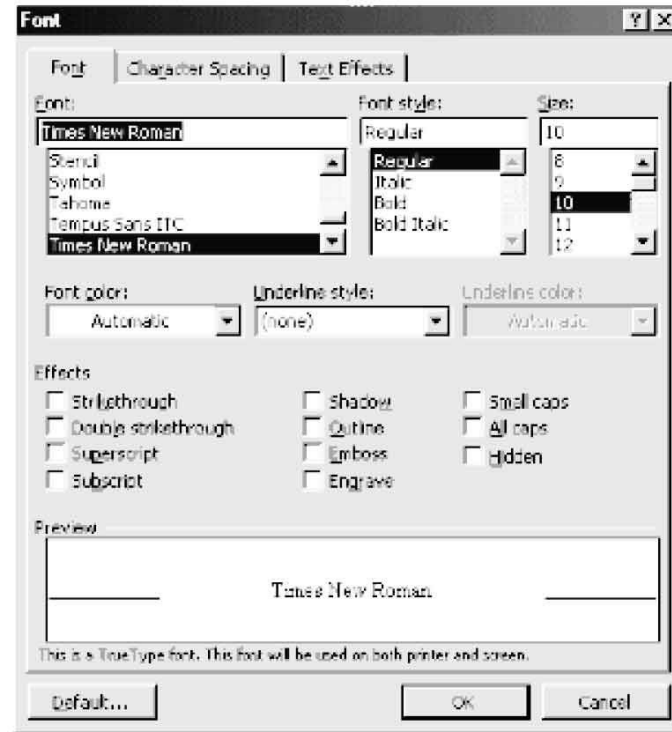
**Font Size:**

- Font size can be changed from **Formatting Toolbar** and **Font** dialog box.

- Font dialog box can be displayed from **format** menu.

- A common font size used in business documents is 82-points type.

**Font Style:**

- Font style is used to bold, italicize and underline the text. **Formatting Toolbar** has separate buttons for this and **Font** dialog also have these options.

**Font Color:**

- The color of font can be change. Normally black color is used for font.

- In addition to these basic characteristics many effects can also be applied to all types of fonts. These are as follows.

- **Strikethrough:** It draws a line through the middle of the text.

- **Shadow:** It adds a shadow behind the text.

- **Outline:** It displays inner and outer boundaries of each character.

- **Superscript:** It raises the text and reduces font size like $X^3$.

- **Subscript:** It lowers the text and reduces font size like $X_3$.

- **Emboss:** It displays text as raised on the screen.

**Q8.** **Discuss the procedure of Line spacing, and paragraph features.**

**LINE SPACING:**

- Line Spacing sets the amount of space between lines within a paragraph.

- Single spacing is the default.

- The spacing for each line is set to accommodate the largest font on that line.

- If there are smaller fonts on the line, there will appear to be extra space between lines where the smaller fonts are located.

- At 1.5 lines, the Line Spacing is set to one-and-a-half times the single-space amount.

- For double-spaced lines, the line spacing is set to two times the single-space amount.

## PARAGRAPH SPACING AND FEATURES OF PARAGRAPHS

- Space Before sets the amount of space before the paragraph.

- Space After sets the amount of space after the paragraph.

- By default the paragraph spacing is same as the line spacing but it can be changed.

# INDENTS

- The space or distance between the page margin and the text in a paragraph is called indent.

- Indent can be set for first line and remaining paragraph separately.

- **First line** indent option indent only the first line of a paragraph.and **Hanging** option indent all but the fist line of a paragraph.

**Alignment:**

- Controls how the text is positioned within a paragraph line (the left and right sides of the paragraph. There are four types of alignment.

| Alignment | Hot key | Toolbar button |
|-----------|---------|----------------|
| Left | Ctrl+L | ≣ |
| Right | Ctrl+R | ≣ |
| Centered | Ctrl+E | ≣ |
| Justified | Ctrl+J | ≣ |

- **Left** the text is aligned to the left edge of the paragraph.

- **Right** the text is aligned to the right edge of the paragraph.

- **Centerd** the text is centered horizontally between the paragraph edges.

- **Justified** the text of all the paragraph lines is expanded to fill the whole width of the paragraph. The list line is the paragraph is aligned to the left.

# TAB STOP:

- In the days of the typewriter, fonts were mono-space characters (i.e., spaces between characters were equal).

- Computers use proportional space fonts (i.e., characters and spaces use only the amount of space needed).

- With mono-space fonts, you could press the space bar to align text, but if it is tried with proportional space fonts, you may end up with undesired results, even if it looks good on the screen.

- To avoid problems with text alignment, use tabs rather than spaces.

- The default tab settings for Microsoft Word are every half-inch.

- If you do not like the Word settings, you can set your own tabs.

**Q9.     What is a procedure of borders and shading?**

# BORDERS AND SHADING

- For a finished look, you can add borders and shading to your documents.
- A border could be a box surrounding a paragraph or multiple paragraphs, or a line on one or more sides of the paragraphs.
- Horizontal and vertical lines are considered borders.
- A border can include shading or you can use shading without borders.
- Borders and shading are particularly useful in setting special paragraphs apart from the rest of your text for emphasis.

## Formatting a Page

- Each document section has its own page settings.
- Page settings include the paper format (width, height), page orientation, margins, and a few other characteristics shared by the section pages.
- When a document contains multiple sections, you can specify different page settings for each section.
- For example, you could specify larger page margins for the first section, or the landscape page orientation for the last section of this document.
- Some components of page settings are shared by all the document sections.
- When you toggle "Mirror margins" or "Different odd and even headers/footers", the whole document is affected, ie all the document sections.

## Page Size:

- It is very important while printing a document.
- We can set the size of page according to our requirement.
- Changing the size of page disturb the formatting.
- So it is strictly recommended to set the page size before going to format it.
- To change the page size select **Page Setup** from **File** menu.

## Orientation:

- Dimensions of a document are called its orientation.
- By default the documents are set to use **Portrait**.
- In portrait document is taller than its width.
- The second option for orientation is **Landscape**. In landscape document's width is more than its height.

## Page Margins

- Page margins are the blank space around the edges of the page.
- In general, you insert text and graphics in the printable area inside the margins.
- You can position some items in the margins for example, headers, footers, and page numbers.

**Q10.    What is Header, Footer, page Number?**

## HEADER/FOOTER:

- Headers and footers are areas in the top and bottom margins of each page in a document.
- You can insert text or graphics in headers and footers for example, page numbers, the date, a company logo, the document's title or file name, or the author's name that are printed at the top or bottom of each page in a document.
- You can select **Header and Footer** option from the **View** menu.

**Page Numbers:**

- The word processor automatically keeps track of page numbers so that the correct number appears on each page.

**Q11.    What is the procedure to create columns?**

## INTRODUCING COLUMNS

- Sometimes, you want to use columns in your document, especially if you're creating some type of newsletter.
- Formatting your document into columns is a quick and easy process.
- To change your document layout to a multiple-column layout, start by positioning your cursor where you want the multiple-column layout to begin.
- From the **Format** menu, choose **Columns**. This will open the **Columns** dialog box.
- From here, you can choose one of the **Preset** column styles - **One** column, **Two** columns, **Three** columns, **Left** (two columns with the left column smaller than the right) or **Right** (two columns with the right column smaller than the left).
- You can also enter the number of columns you want to use from the Number of columns: drop-down box. If you want a line between the columns, check the **Line between** boxes.
- If you uncheck the **Equal column width** box, you will be able to change the width of the columns and the amount of spacing between columns.
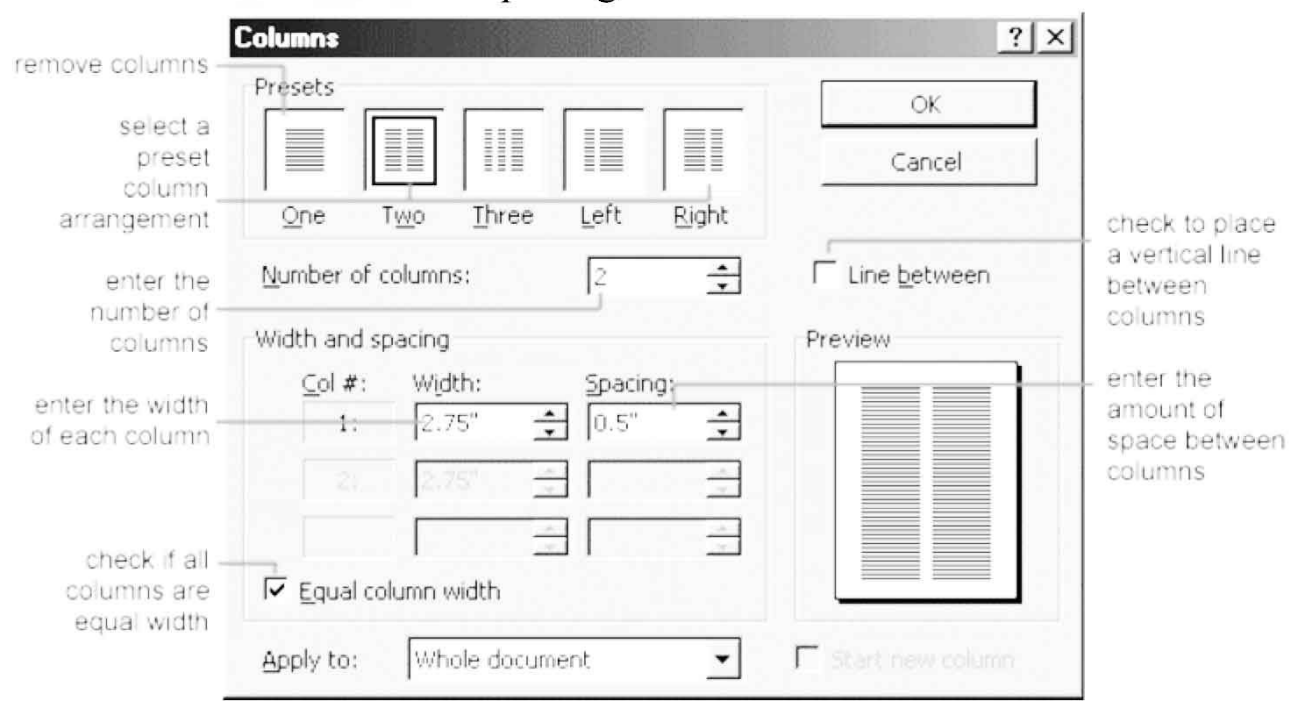
- From the **Apply to** drop-down box, you can choose to apply the column layout to the **Whole document**, **This section of the document**, or just **From this point forward** in the document.

- If you only want to use columns in one part of the document, highlight the text you want to change to a column layout before opening the **Columns** dialog box. From the **Apply to**: drop-down box, choose **Selected text**.

- When using columns in a document, be careful that you don't use too many columns on a page. This can make the document difficult to read.

**Q12.** **What is the procedure to create Tables? Discuss different options of table menu.**

# INTRODUCING TABLES

- Tables can be used for a variety of purposes.

- These include displaying data, listing related items and for producing columnar text.

- A table can be created easily and quickly in Microsoft Word 2000.

- By default the table is delimited with single lines which will print.

- Tables are good alternatives to tabs when you have more than one column of related information to present.

- You can remove some or all of the lines or borders to create a tabbed effect.

- Within tables you can also add shading or colors, create formulae, change row height and width, and sort the information within the table.

**Creating a Table:**

You can create a table by one of the following methods:

- o  Using the Table icon

- o  Using the Table menu

- o  Drawing the table using the *Draw Table* option

**Creating a Table Using the Table Icon**

The easiest way to create a table in Word is using the Table Icon shown here. 

- Click where you want to insert the table, this ensures that the **Insertion Point** (cursor) is correctly positioned.

- Click on the **Table** icon on the Toolbar and, holding the left mouse button down, drag until you have a table of the desired size: 3 rows and 3 columns in this example.
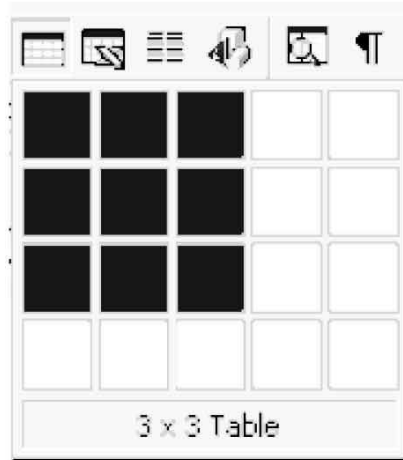


- Release the mouse button and a table will be inserted at the Insertion Point in your text.

**Creating a Table Using the Menus**

To create a table in Word using the menus carry out the following steps:

- Position the cursor at the point in the document where the table is required.

- Click on the **Table** menu and then on **Insert** You can then select Table from the sub menu.
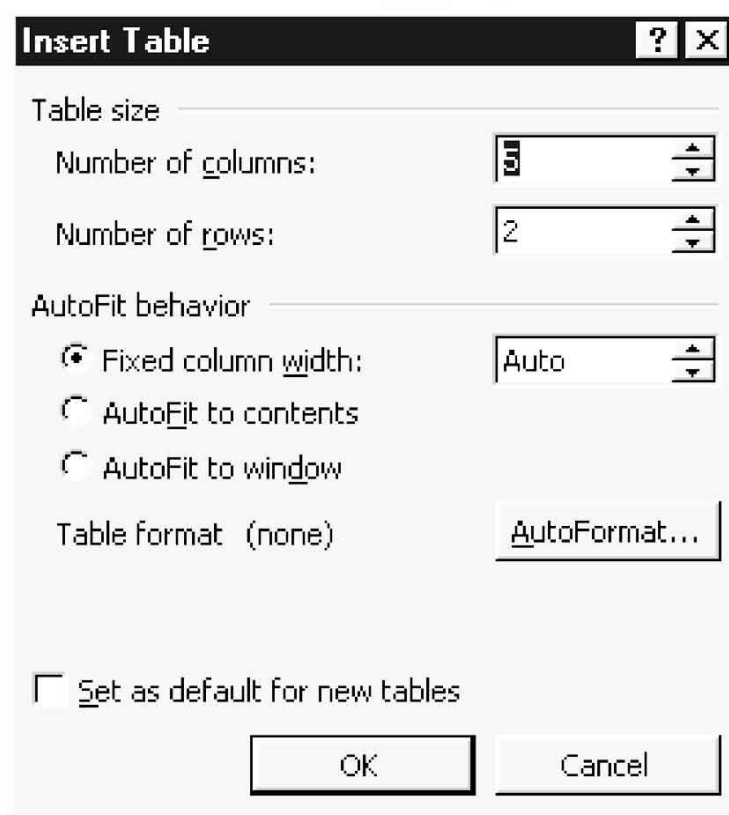


- Enter the number of Rows and Columns required in the Dialog box.

- By default the column width is automatically determined so that the table will fill the page horizontally. If you require specific column widths change the width from *Auto* to the desired size then click on **OK**.

## Inserting Rows and Columns:

- Once the table is created additional rows can be added.

- Place the cursor in the row or column where you want to adjust the new row or column.

- Select **Table** menu ⟶ **Insert** ⟶ **Columns to the left** or **Columns to the right**.

- Much like inserting a row, add a new column by placing the cursor in a cell adjacent to where the new column will be added.

- Select **Table** menu ⟶ **Insert** ⟶ **Columns to the Left** or **Columns to the Right**. Or, select the column, right-click with the mouse, and select **Insert Columns**.

## Moving and Resizing a Table:

- If the mouse is placed over the table a four-sided moving arrow and open box resizing handle will appear on the corners of the table.

- Click and drag the four-ended arrow to move the table and release the mouse button when the table is positioned where you want it.

- Click and drag the open box handle to resize the table.

- Change the column widths and row heights by clicking the cell dividers and dragging them with the mouse.
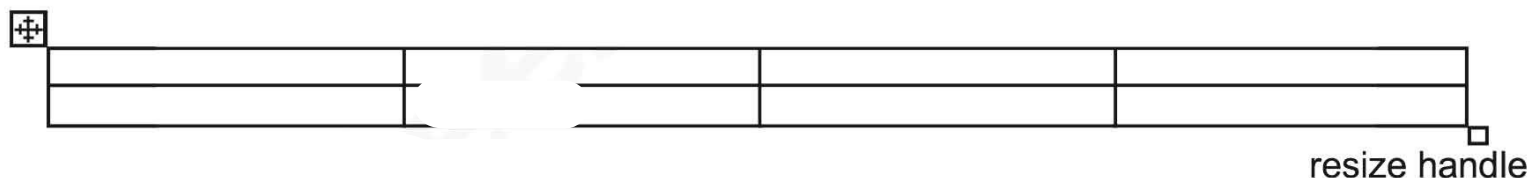


## Changing Table borders

- The Tables and Borders toolbar allows you to add border styles, shading, text effects, alignment, and more options to your table. Access the toolbar by clicking

  **Table** ⟶ **Draw Table** or **View** ⟶ **Toolbars** ⟶ **Tables and Borders**.



- You will need to highlight the cells of the table you want to format.

- Click and drag the mouse over the cells, or use the following shortcuts.

# Table Properties

Use the **Table Properties** dialog box to modify the alignment of the table with the body text and the text within the table. Access the box by selecting **Tables → Table Properties**.
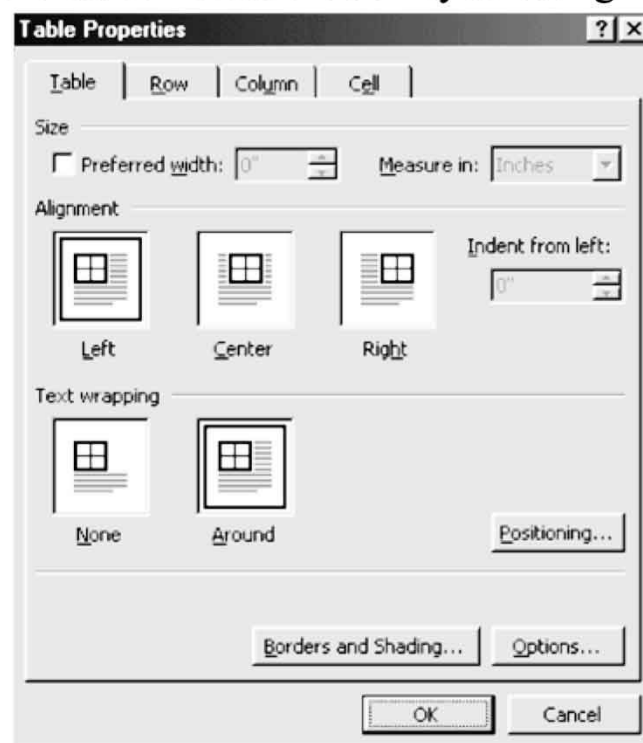


- o **Size:** Check the **Preferred width** box and enter a value if the table should be an exact width.
- o **Alignment:** Highlight the illustration that represents the alignment of the table in relation to the text of the document.
- o **Text wrapping:** Highlight "None" if the table should appear on a separate line from the text or choose "Around" if the text should wrap around the table.
- o **Borders and Shading:** Select from a number of border styles, colors, and widths. Click the **Shading** tab to change the background color and pattern.
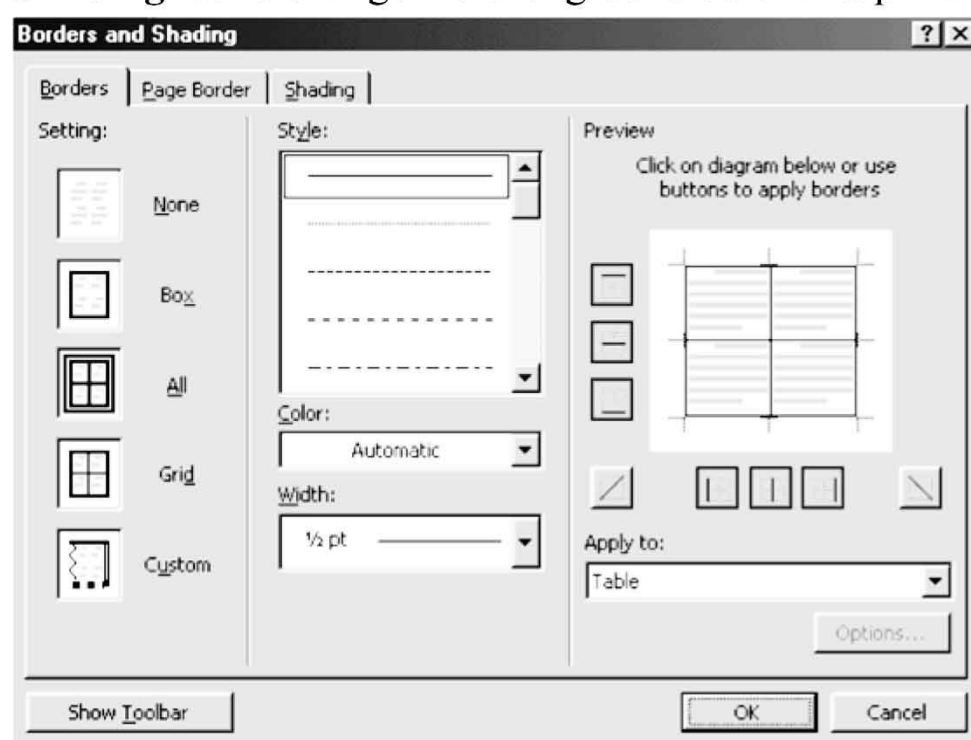
o **Options:** Click the **Options** button on the **Table Properties** window. To change the spacing between the document text and the table borders under **Default cell margins**. Check the **Allow spacing between cells** box and enter a value to add space between the table cells.
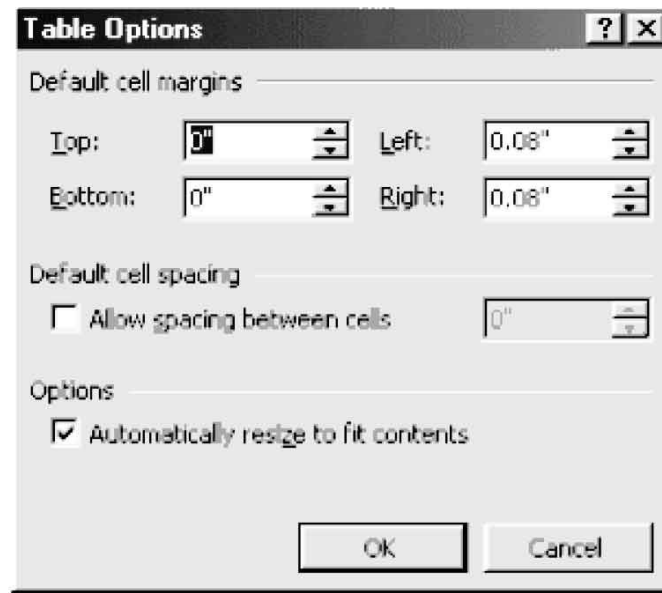


**Q13.    What is the procedure to Print Documents?**

**PRINTING A DOCUMENT**

- After completing the document if you want to print it out you can do this.
- All word processing programs provide this facility.
- The simplest way to print is to use the Print button on the Standard toolbar.
- Word skips displaying the Print dialog box and uses the settings last defined or the default settings.
- When you click the Print button, one copy of the entire document prints to the default printer.
- You can also change print options by using the Print dialog box.
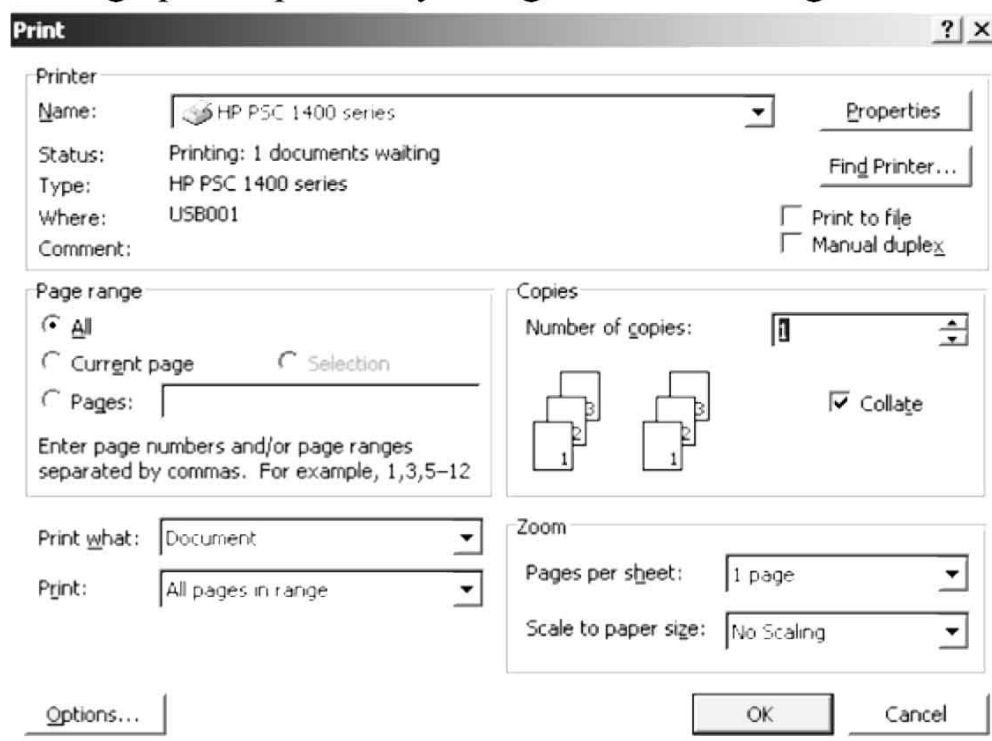
**Multiple Copies**

- You can print the multiple copies of the same document.

- Select the collate option if you want o print the document in proper binding order.

**Page Ranges**

- You can choose to print any page or combination of pages in the Print dialog box, rather than printing the entire document.

**Q14.    What is Clipboard?**

## CLIPBOARD:

- The clipboard is a temporary holding space in the computer's memory.

- The Microsoft Office Clipboard allows you to collect text and graphic items from any number of Office documents or other programs and then paste them into any Office document.

- For example, you can copy some text from a Microsoft Word document, some data from Microsoft Excel, a bulleted list from Microsoft PowerPoint, some text from Microsoft FrontPage or Microsoft Internet Explorer and a datasheet from Microsoft Access, then switch back to Word and arrange any or all of the collected items in your Word document.

- Office Clipboard works with the standard **Copy** and **Paste** commands.

- Just copy an item to the Office Clipboard to add it to your collection, and then paste it from the Office Clipboard into any Office document at any time.

- The collected items stay on the Office Clipboard until you exit Office.

- The last 12 elements that were cut or copied are placed onto Word's clipboard.

- You can view the elements on the clipboard by selecting **View** $\longrightarrow$ **Toolbars** $\longrightarrow$ **Clipboard** from the menu bar.



- Place the mouse arrow over each element in the clipboard to view the contents of each item and click on an element to add its contents to the document.

- Click **Paste All** to add all of the items to the document at once.

- Click the **Clear Clipboard** button (the icon with an "X" over the clipboard image) to clear the contents of the clipboard.

**Q15.    Why we use TEXT BOXES?**

**USING TEXT BOXES**

- Sometimes you need to move text around a text box.

- You might want to create letterhead in which the body of letters wraps around the block of material containing you name and address.
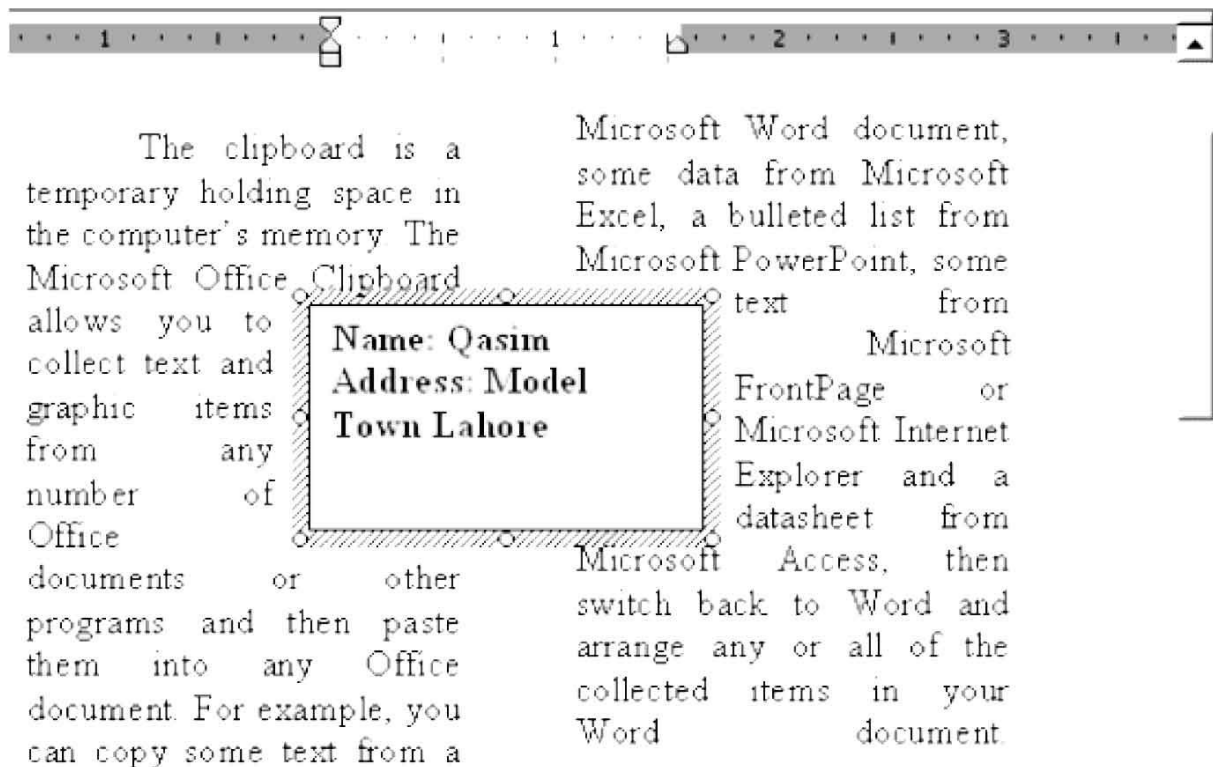


- Text Box can be created by selecting **Text Box** from **Insert** menu or by just clicking the Text Box icon from the drawing toolbar.

**Q16.    What are Graphics? Discuss the procedure for inserting Pictures and Auto shapes**

**GRAPHICS**

- All word processors also have the capability to handle graphics.

- Microsoft word has number of tools for manipulating graphics.

- These tools are divided into two main categories: those for bitmap graphics and for vector images.

- Bitmaps are painted pictures and vector graphics are line drawings.

- Pictures can be added to the document by select picture option from insert menu.

- Pictures can be inserted from a file, clip art, from scanner or cameras.

- Charts and word art can also be added to a document in the same way.

**Pictures:**

- Activate the image you wish to edit by clicking on it once with the mouse.
- Nine handles will appear around the graphic.
- Click and drag these handles to resize the image.
- The handles on the corners will resize proportionally while the handles on the straight lines will stretch the image.
- More picture effects can be changed using the Picture toolbar.
- The **Picture toolbar** should appear when you click on the image. Otherwise, select **View** ⟶ **Toolbars** ⟶ **Picture** from the menu bar to activate it.
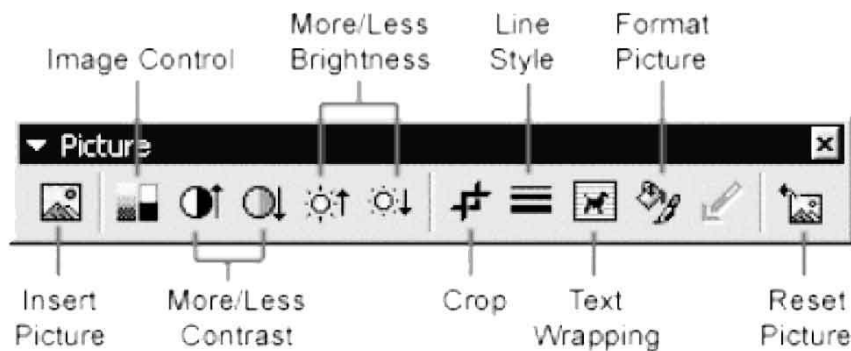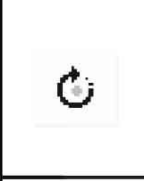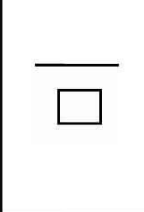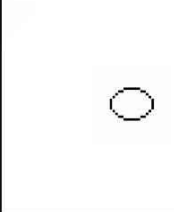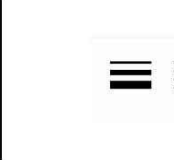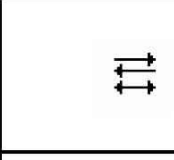


- o **Insert Picture** will display the image selection window and allows you to change the image.
- o **Image Control** allows to make the image grayscale, black and white, or a watermark.
- o **More/Less Contrast** modifies the contrast between the colors of the image.
- o **More/Less Brightness** will darken or brighten the image.
- o Click **Crop** and drag the handles on the activated image to delete outer portions of the image.
- o **Line Style** will add a variety of borders to the graphic.
- o **Text Wrapping** will modify the way the document text wraps around the graphic.
- o **Format Picture** displays all the image properties in a separate window.
- o **Reset Picture** will delete all the modifications made to the image.

**AutoShapes:**

- AutoShapes option in drawing toolbar allows you to draw many different geometrical shapes, arrows, flow chart symbols, stars and banners on the document.
- The AutoShapes toolbar will allow you to draw many different geometrical shapes, arrows, flow chart symbols, stars, and banners on the document.
- Activate the AutoShapes toolbar by selecting **Insert** ⟶ **Picture** ⟶ **AutoShapes** or **View** ⟶ **Toolbars** ⟶ **AutoShapes** from the menu bar, or clicking the **AutoShapes** button on the Drawing toolbar.

- Click each button on the toolbar to view the options for drawing the shape.



| | | | |
|---|---|---|---|
| Lines | Block Arrows | Stars and Banners | More |
| Basic Shapes | Flow Chart | Call Outs | |

| Function of commonly used buttons | | | |
|---|---|---|---|
| Draw ▾ | A pull down menu with several drawing options | ▸ | Changes the pointer to a selection arrow |
| ↻ | Rotates the selected object to any degree | AutoShapes ▾ | A pull down menu with several libraries of shapes |
| ＼ | Draws a line where you click and drag. Hold the Shift key down to make the line straight | ↘ | Inserts a line with an arrowhead where you click and drag |
| ▭ | Draws a rectangle where you click and drag. Hold down Shift to draw a square | ◯ | Draws an oval where you click and drag. Hold down Shift to draw a circle |
| ▤ | Draws a text box where you click and drag | 4| | Create text effects with Word Art |
| ◇ ▾ | Add, modify, or remove fill color from a selected object | ✎ ▾ | Add, modify, or remove line color |
| A ▾ | Formats the selected text with the color you click | ≡ | Changes the thickness of lines |
| ▦ | Selects dash style for dashed lines | ⇄ | Select arrow style; placement and shape of arrowhead |
| ▣ | A pull down menu | ◰ | Add 3-d effects to rectangles or ovals |

| | offers shadow choices | | |
|---|---|---|---|

**Q17.    What are Word Art? Discuss the procedure for inserting Word Art.**

# WORD ART:

Word Art is a feature of Microsoft Word's drawing program.

To access the Drawing toolbar, go to the **View** menu and select **Toolbars** $\longrightarrow$ **Drawing**.

- The Drawing toolbar appears under the text near the bottom of the window.
- If you're not sure which button it is, run your mouse over each button on the toolbar which has the letter A on it. The "Insert Word Art" box will appear.
- Use Word Art as a heading for creative essays or centered over or within columns.
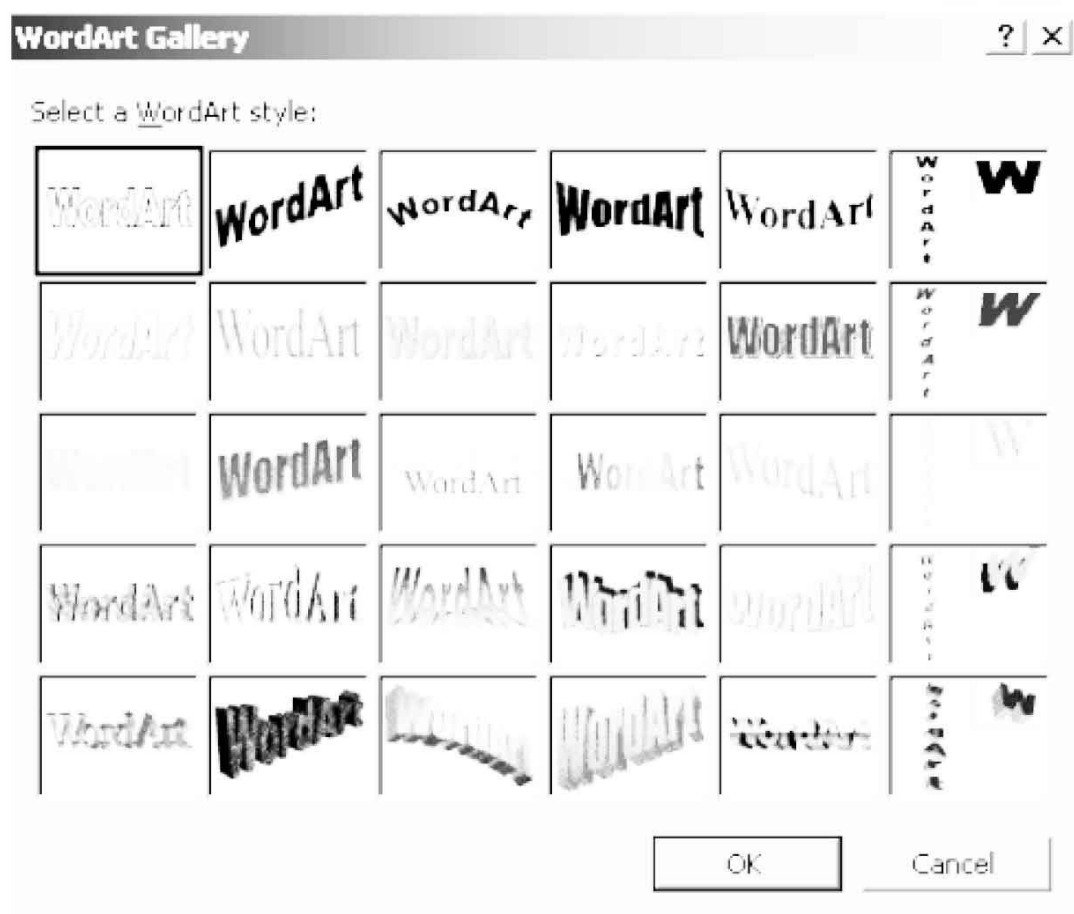


- Click on the **WordArt** button on the Drawing Toolbar to bring up the WordArt Gallery.
- Click on a style to select it. This opens the **Text dialog box**.
- Type your text and select a Font, but accept the default Font Size as it can be adjusted more effectively on the page.
- Click OK to place the WordArt on the page.
- The WordArt Toolbar should appear when you select the text and disappear when it is deselected. If it doesn't appear, go to View $\longrightarrow$ Toolbars $\longrightarrow$ WordArt.

- You can customize the text by using the different options on the WordArt Toolbar.

## Q.18   Discuss paragraph formatting.

- Paragraph formatting is related with the general appearance of your overall word document.

- You can change the alignment, indentation, and spacing between lines or before and after paragraphs.

- For Paragraph Formatting you'll choose Format, and then Paragraph from main menu.
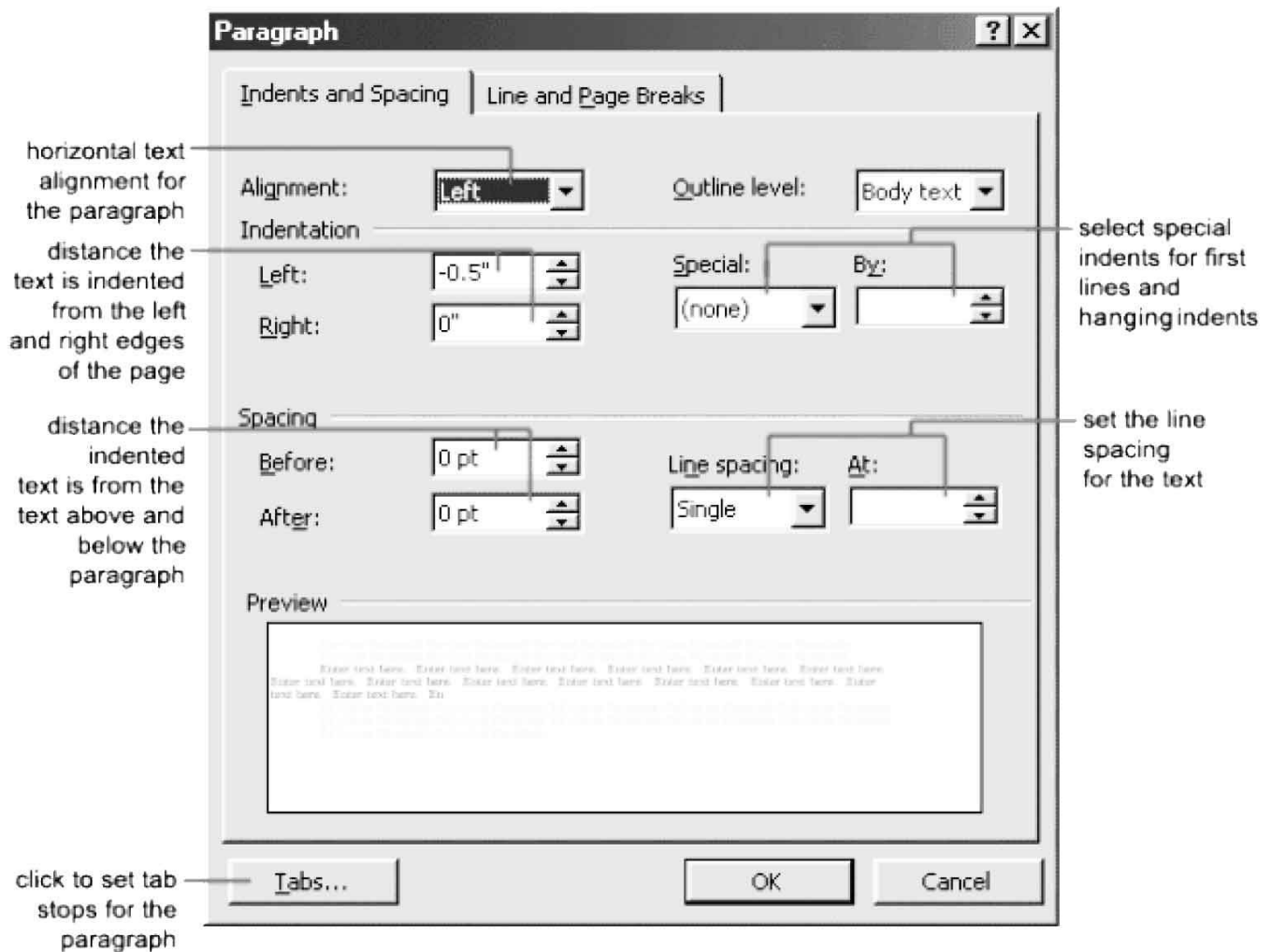
# SHORT QUESTIONS

**Q.1.** **What is a Word Processor?**

**Ans.** A word processor is an application software that provides extensive tools for creating all kinds of text based documents.

**Q.2.** **What is Word Wrap?**

**Ans.** Word processor automatically moves to the next line when you have filled one line with text and it will readjust the text if you change the margins.

**Q.3.** **What is Copy?**

**Ans.** Transfer the duplicate of selected text or object to clipboard is called copy.

**Q.4.** **What is Cut?**

**Ans.** Transfer of selected text or object to clipboard is called cut.

**Q.5.** **What is a Paste?**

**Ans.** Transfer of text or object from clipboard to another location is called paste.

**Q.6.** **What is a Macro?**

**Ans.** A macro is a character or word that represents a series of keystrokes. The keystrokes can represent text or commands.

**Q.7.** **What is Thesaurus?**

**Ans.** A built-in thesaurus, that allows you to search for synonyms without leaving the word processor.

**Q.8.** **What is WYSIWYG?**

**Ans.** What You See Is What You Get. A document appears on the display screen exactly as it will look when printed.

**Q.9.** **What is Title Bar?**

**Ans.** The top most bar on a window which displays the name of the file and application program.

**Q.10.** **What is Menu Bar?**

**Ans.** A bar which displays the list of menus.

**Q.11.** **What is Status Bar?**

**Ans.** The bottom most bar of an application window. It displays the status of some important keys e.g. **Insert** and **Caps Lock**.

**Q.12.** **What is Insertion Mode?**

**Ans.** In insertion mode text is added at the point of insertion (cursor).

**Q.13.** **What is Overtype Mode?**

**Ans.** In overtype mode text is overtyped on previous text.

**Q.14.** **What is Undo?**

**Ans.** Undo reverse the last action.

**Q.15.** **What is Redo?**

**Ans.** Redo reverse the previous undo.

**Q.16.** **What is Header and Footer?**

**Ans.** The text that is added to the top margin of every page is called header and the text added to the bottom margin of every page is called footer.

**Q.17.** **What is a Clipboard?**

**Ans.** Clipboard is a temporary holding space in the computer's memory for data that is being copied or moved.

# EXERCISE

**Q1. Fill in the blanks**

1. The bar which contains the name of active application is known as <u>title bar</u>.

2. WYSIWYG stands for <u>What You See Is What You Get</u>.

3. The appearance or shape of a character is referred to as <u>font</u>.

4. The page orientation may be <u>Portrait</u> or <u>Landscape</u>.

5. <u>Bitmap</u> graphics can be thought of painted pictures.

6. The <u>word wrap</u> automatically moves to the next line when you have filled one line with text.

7. A <u>macro</u> is a character or word that represents a series of keystrokes.

8. A built-in <u>thesaurus</u> allows you to search for synonyms.

9. A <u>ruler</u> shows you the positioning of text, tabs, margins, indents and other elements on the page.

10. In case of <u>overtype</u> mode the newly entered text is written over the existing text.

11. Word processors can create the <u>hypertext</u> document to publish on the World Wide Web.

12. Text editor is a <u>simple word processor</u> with only very basic features.

13. <u>Cut</u> allows you to move selected text from its original location

14. <u>Paste</u> feature allows you to transfer it another location.

15. <u>Copy</u> will create the copy of selected text for duplication.

16. While typing when you have completed one line it will move your cursor on the beginning of the next line. This feature is called <u>word wrap</u>.

17. <u>Footnotes</u> are used in printed documents to explain, comment on, or provide references for text in a document.

18. <u>Cross-reference</u> refers to an item that appears in another location in a document.

19. <u>Headers and Footers</u> are areas in the top and bottom margins of each page in a document.

20. You can insert text or graphics, page numbers, the date, a company logo, the document's title or file name, or the author's name in <u>headers and footers</u>.

21. <u>Layout</u> feature allows you to specify page size, margins, indents and line spacing with a document.

22. <u>Macro</u> is a series of commands and instructions that you group together as a single key to accomplish a task automatically.

23. <u>Spell Check</u> utility allows checking the wrong spelling of words in a document.

24. <u>Spell Check</u> utility highlights the misspelled words.

25. <u>Word processors</u> have their own dictionary to check spellings.

26. <u>Document windows</u> allow you to edit two or more documents at the same time. Each document appears in the separate window.

27. <u>Interface</u> represents a way through which you can interact with the software.

28. <u>Title Bar</u> is the top most bar of the application window that contains the name of program.

29. <u>Menu Bar</u> displays the names of all menus e.g. file menu, edit menu etc.

30. <u>Standard Tool Bar</u> provides the quick way to access the commonly used commands e.g. open, copy and print a file.

31. <u>Formatting Tool Bar</u> contains buttons for formatting commands.

32. <u>Status Bar</u> is the bottom most bar of a word processing software. It shows the position of insertion point, and status of some important keys e.g. Insert and Caps Lock.

33. In <u>insertion mode</u> new text is placed at the insertion point or current position.

34. The <u>Delete key</u> erases the characters from the right side of the cursor (insertion point).

35. The <u>Back Space key</u> erases the characters from the left side of the cursor.

36. <u>Undo</u> erases the last change done to the document reverting it back to an older state.

37. <u>Redo</u> is used to reverse the previous undo.

38. <u>Fonts</u> represent the various typefaces used in printed materials.

39. The height of fonts is measured in <u>points</u>, and there are <u>72 points</u> per inch.

40. <u>Serif fonts</u> have extra decorative lines at the extremes of a character.

41. <u>Sans-Serif</u> has no extra decorative lines at the extremes of character.

42. Font size can be changed from <u>Formatting Toolbar and Font dialog box</u>.

43. Font dialog box can be displayed from <u>format</u> menu.

44. A common font size used in business documents is <u>82-points</u> type.

45. <u>Font style</u> is used to bold, italicize and underline the text.

46. The space or distance between the page margin and the text in a paragraph is called <u>indent</u>.

47. <u>First line indent</u> option indent only the first line of a paragraph and <u>Hanging</u> option indent all but the fist line of a paragraph.

48. Alignment controls how the text is positioned within a paragraph line (the left and right sides of the paragraph.

49. There are <u>four</u> types of alignment.

50. Left the text is aligned to the left edge of the paragraph.

51. Right the text is aligned to the right edge of the paragraph.

52. Centered the text is centered horizontally between the paragraph edges.

53. Justified the text of all the paragraph lines is expanded to fill the whole width of the paragraph. The list line is the paragraph is aligned to the left.

54. Dimensions of a document are called its <u>orientation</u>.

55. By default the orientation of documents are set to use <u>Portrait</u>. In portrait document is taller than its width.

56. The second option for orientation is <u>Landscape</u>. In landscape document's width is more than its height.

57. <u>Clipboard</u> allows you to collect text and graphic items from any number of Office documents or other programs and then paste them into any Office document.

58. <u>Clipboard</u> works with the standard Copy and Paste commands.

# Q.2 CHOOSE THE CORRECT OPTION:

1. Which of the following is a word processor

   (a) Adobe Acrobat        (b) Photo Express

   (c) MS Excel             **(d) MS Word**

2. ———— is most commonly used word processing package:

   (a) Word Star            (b) Word Perfect

   **(c) MS-Word**          (d) WordPad

3. A word processor includes the process of:

   (a) Entering text        (b) Editing text

   (c) Formatting text      **(d) All**

4. ——————— is not a feature of simple word processor or text editor:

(a) Insert text  (b) Word wrap

**(c) Macros**  (d) Search and replace

5. During text entering process into document, the cursor automatically shifts to the next line when it reaches to the right margin. This feature of word processor is called:

   (a) Insert text **(b) Word wrap**

   (c) Search and replace (d) Page margin

6. ———— features of word processor allows to insert text from one file into another file:

   (a) Macro (b) Thesaurus

   **(c) Merge** (d) Footnote

7. ———— features of word processor allows to specify margins of the documents:

   (a) Macro (b) Thesaurus

   (c) Merge **(d) Layout**

8. In MS Word, the data that is being copied or moved is

   (a) Temporarily stored in Recycle bin

   (b) Permanently stored in Recycle bin

   **(c) Temporarily stored in Clipboard**

   (d) Permanently stored in Clipboard

9. The bar that displays the name of program and the name of documents is called:

   (a) Menu bar (b) Status bar

   **(c) Title bar** (d) Toolbar

10. The bar that contains the group of commands is called:

    **(a) Menu bar** (b) Status bar

    (c) Title bar (d) Toolbar

11. The bar that shows the total pages of document, position of cursor etc. is called:

    (a) Menu bar **(b) Status bar**

    (c) Title bar (d) Toolbar

12. Which of the following can be used to launch the WordArt?

    (a) Status Bar (b) Ruler

    (c) Standard Toolbar **(d) Drawing Toolbar**

13. ———— shows the margins, position of tabs, and indents etc:

    (a) Status bar **(b) Ruler**

    (c) Title bar (d) Menu bar

14. The insertion point in the document is also called:

    (a) Mouse pointer (b) End marks

    **(c) Cursor** (d) Eraser

15. How many typing modes are provided by word processor?

    **(a)   2**                        (b)   3

    (c)   4                            (d)   1

16. ———— keys of keyboard in conjunction with arrow keys is used for selecting text:

    (a)   Ctrl                         **(b)   Shift**

    (c)   Alt                          (d)   Enter

17. The bold text specifies the:

    (a)   Font size                    **(b)   Font style**

    (c)   Font color                   (d)   None

18. A common font size used in business documents is:

    (a)   2 points                     (b)   100 points

    **(c)   82 points**                (d)   10 points

19. Font size is measure in:

    **(a)   Points**                   (b)   Pixels

    (c)   Dots                         (d)   Inches

20. A group of sentences is called:

    (a)   Document                     **(b)   Paragraph**

    (c)   Session                      (d)   Page

21. ———— is not related to paragraph formatting:

    (a)   Line spacing                 (b)   Indents

    (c)   Tab stops                    **(d)   Footer and Header**

22. ———— menus contains 'Paragraph' command:

    (a)   File                         (b)   Table

    (c)   View                         **(d)   Format**

23. The Ruler is used to set the:

    (a)   Alignment of paragraph       (b)   Margins of paragraph

    **(c)   Indent of paragraph**      (d)   Paragraph spacing

24. ———— command buttons is used for right alignment:

    (a)   ▤                            **(b)   ▤**

    (c)   ▤                            (d)   ▤

25. ——————— refers to the orientation of the lines of a paragraph with respect to the margins:

    (a)    File        (b)    Indents

    **(c)    Alignment**        (d)    Tab stops

26. ——————— menus contains the 'Page Setup' command:

    **(a)    File**        (b)    Format

    (c)    View        (d)    Edit

27. ——————— menus contains the 'Header and Footer' command:

    (a)    File        (b)    Format

    (c)    Insert        **(d)    View**

28. ——————— menus contains the 'Page Numbers' command:

    (a)    File        (b)    Format

    **(c)    Insert**        (d)    View

29. ——————— menus contains the 'Column' command:

    (a)    File        **(b)    Format**

    (c)    Insert        (d)    View

30. ——————— menus contains the 'Print' command used to print the document on printer:

    **(a)    File**        (b)    Format

    (c)    Insert        (d)    View

31. ——————— menus contains 'Picture' command used to insert a picture stored in a file on disk:

    (a)    File        (b)    Format

    (c)    Table        **(d)    Insert**

32. ——————— tools of MS-Word is used to rotate the text:

    (a)    Auto shape        (b)    Text boxes

    **(c)    Word art**        (d)    None

33. ——————— is a Word processor:

    (a)    Adobe Acrobat        (b)    Photo Express

    (c)    MS Excel        **(d)    MS Word**

34. ——————— keyboard shortcuts is used to change the case:

    (a)    Ctrl+F3        **(b)    Shift+F3**

    (c)    Alt+F3        (d)    Ctrl+Shift+F3

35. In MS Word, the data that is being copied or moved is:
    (a) Temporarily stored in Recycle bin.
    (b) Permanently stored in Recycle bin.
    **(c) Temporarily stored in Clipboard.**
    (d) Permanently stored in Clipboard.

36. ———— can be used to launch the Word Art:
    (a) Status bar      (b) Ruler
    (c) Standard toolbar      **(d) Drawing toolbar**

37. ———— feature enables you to reverse the changes you have made to the document:
    (a) WYSIWYG      (b) Redo
    **(c) Undo**      (d) GUI

38. A word processor can:
    (a) Copy Text      (b) Insert Text
    (c) Find & Replace Text      **(d) All**

39. Which of the following feature enables you to reverse the changes you have made to the document?
    (a) WYSIWYG      (b) Redo
    **(c) Undo**      (d) GUI

**Q.3 WRITE T FOR TRUE AND F FOR FALSE STATEMENT:**

1. Word processor is just an electronic typewriter. **(F)**
2. The bar containing the drop down menus is called scroll bar. **(F)**
3. Font face is shown on Formatting tool bar. **(T)**
4. Footnote appears at the bottom of every page. **(F)**
5. The interface represents the way through which you can interact with the word processing software. **(T)**
6. In insertion mode the newly entered text is placed at the current position of the cursor. **(T)**
7. Sans-Serif fonts have extra decorative lines at the end of the strokes that make up each character. **(F)**
8. Alignment refers to the orientation of the lines of a paragraph with respect to the margins. **(T)**
9. Line Spacing refers to amount of space between paragraphs **(F)**
10. Clipboard is managed by Microsoft Word. **(F)**

# SPREADSHEET PROCESSING

**Q1.    What is a Spreadsheet? Discuss its features.**

**SPREADSHEET:**

- A spreadsheet, also known as a worksheet, contains rows and columns and is used to record and compare numerical or financial data.

- Spreadsheets only existed in paper format, but now they are most likely created and maintained through a software program that displays the numerical information in rows and columns.

- Spreadsheets can be used in any area or field that works with numbers and are commonly found in the accounting, budgeting, sales forecasting, financial analysis, and scientific fields.

- Computerized spreadsheets mimic a paper spreadsheet.

- The advantage of using computerized spreadsheets is their ability to update data and perform automatic calculations extremely quickly.

- On a computerized spreadsheet, the intersection of a row and a column is called a cell.

- Rows are generally identified by numbers 1, 2, 3, and so on.

- Columns are identified by letters, such as A, B, C, and so on.

- The cell is a combination of a letter and a number to identify a particular location within the spreadsheet, for example A3.

- To maneuver around the spreadsheet, you use the mouse or the tab key.

- When the contents of one cell are changed, any other affected cell is automatically recalculated according to the formulas in use.

- Formulas are the calculations to be performed on the data.
- Formulas can be simple, such as sum or average, or they can be very complex.
- Spreadsheets are also popular for testing hypothetical scenarios.

# FEATURES OF SPREADSHEET SOFTWARE:

All the spreadsheet software has different features, but some of the basic features of spreadsheet software are mentioned below.

### Grid of Rows and Columns

- A spreadsheet is a collection of rows and columns and made a grid like structure.
- Columns are assigned character as their name and rows are assigned numbers as their name to refer them.
- The column and row combines to form a cell address e.g. A12 represent column A and row 12. It is also called the **cell label** or **address**.
- Cell contains data e.g. text, numeric, a formula and a date, that is called **cell value**.

### Formulas

- Formula is a combination of operands and operators. Here operands can be cell references and values.

### Functions

- Functions are built in formulas.
- You can give direct value or cell reference to the function for calculations.

### Commands

- Commands are used to perform operations on the worksheet or its contents.

### Text Manipulation

- You can perform some simple text manipulations e.g. combine the textual data of two cells into a single cell.

### Print

- This facility allows you to print your spreadsheet on a printer to get a hard copy.

**Q2.    What is an Interface? Discuss the Interface of Spreadsheet.**

# STARTING SPREADSHEET:

- To have a better understanding with a spreadsheet you should be familiar with its **interface**.
- Interface represents a way through which you can interact with the Spreadsheet software.
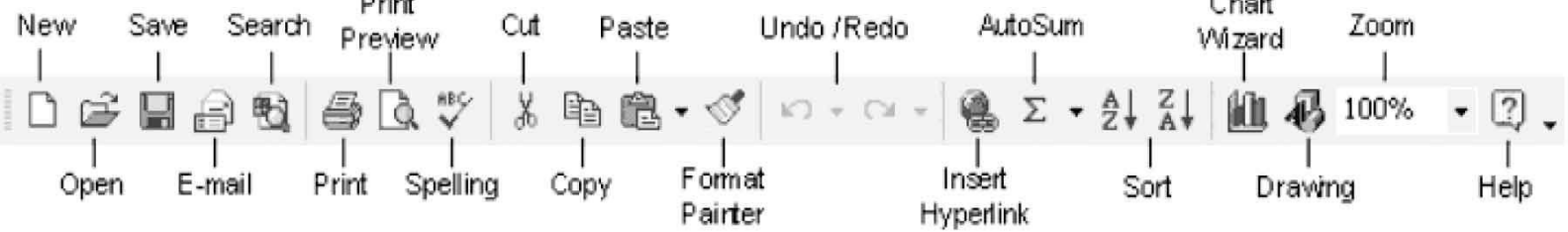
# THE SPREADSHEET'S INTERFACE:

- Spreadsheet's interface consists of a grid like structure (word area) and a set of various tools to perform different operations.
- A grid like structure is called a **worksheet**.
- More than one worksheet combined to form a **workbook**.
- In early days there were only one worksheet in a document but now there can be more than one worksheet to form **3D-Worksheets**.
- It s like a pad of worksheets.
- It is due to this that data in one worksheet can be used in another worksheet of the same workbook.
- Spreadsheet interface also contain menu bars, toolbars, and a formula bar.
- Formula bar is used to write certain formulas.
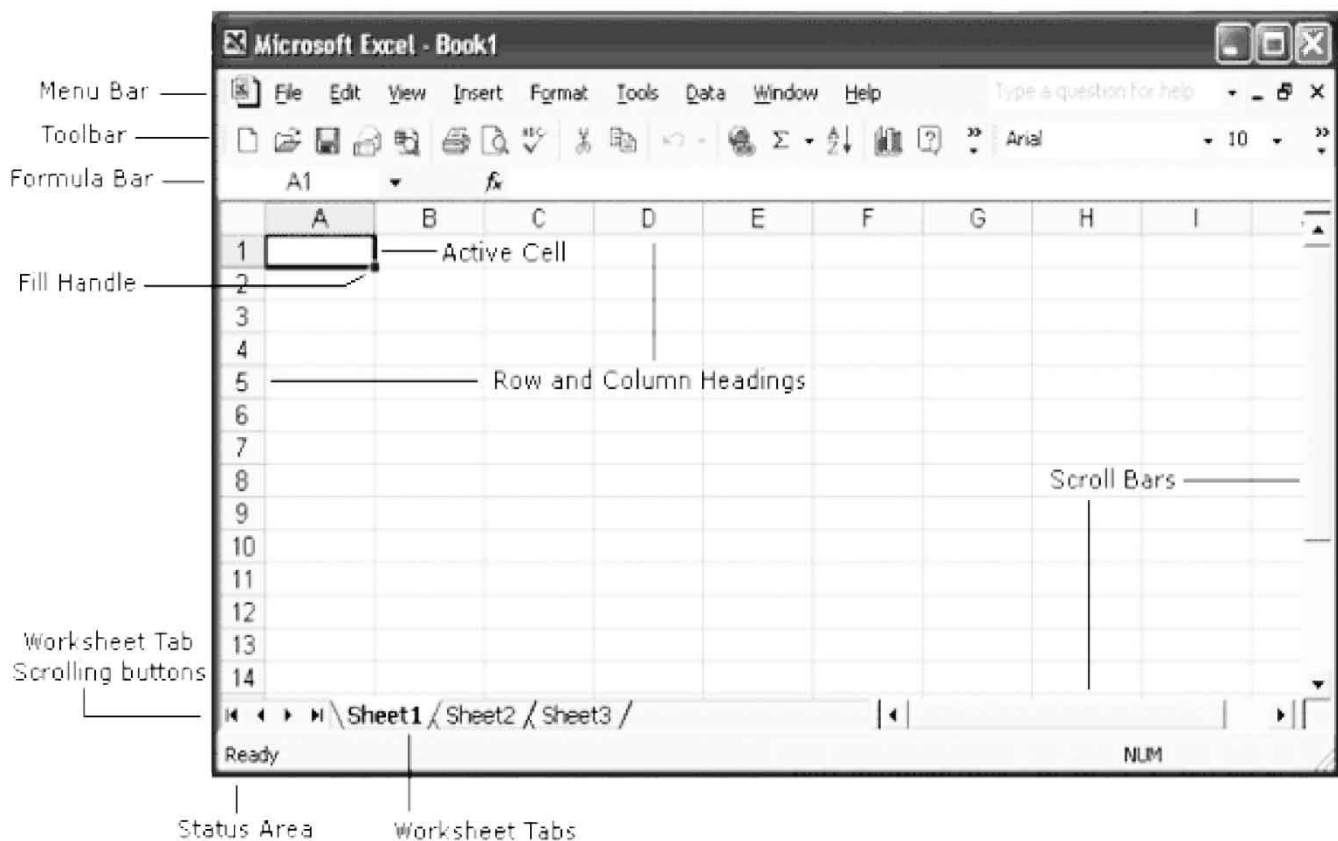


## Standard Toolbar

- The Standard toolbar, located beneath the menu bar, has buttons for commonly performed tasks like adding a column of numbers, printing, sorting, and other operations.
- Excel let's you customize the toolbar or even display multiple toolbars at the same time.
- The Standard Excel toolbar appears in the figure below.

New  Save  Search  Print  Cut  Paste  Undo /Redo  AutoSum  Chart  Zoom
                   Preview                                   Wizard

Open  E-mail  Print  Spelling  Copy  Format  Insert  Sort  Drawing  Help
                                     Painter  Hyperlink

**Formatting toolbar**

- The Formatting toolbar, located beneath the Standard toolbar bar, has buttons for various formatting operations like changing text size or style, formatting numbers and placing borders around cells.
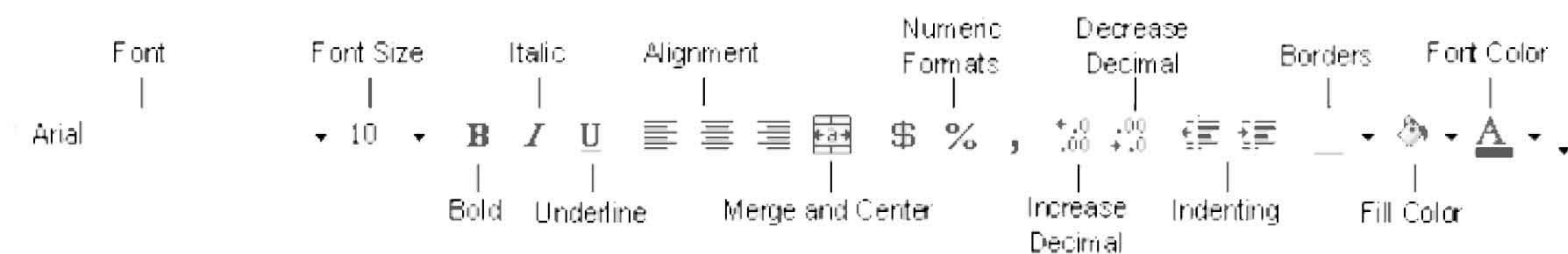


**Formula bar**

- The formula bar is located beneath the toolbar at the top of the Excel worksheet.
- Use the formula bar to enter and edit worksheet data.
- The contents of the active cell always appear in the formula bar.
- When you click the mouse in the formula bar, an X and a check mark appear.
- You can click the check icon to confirm and completes editing, or the X to abandon editing.
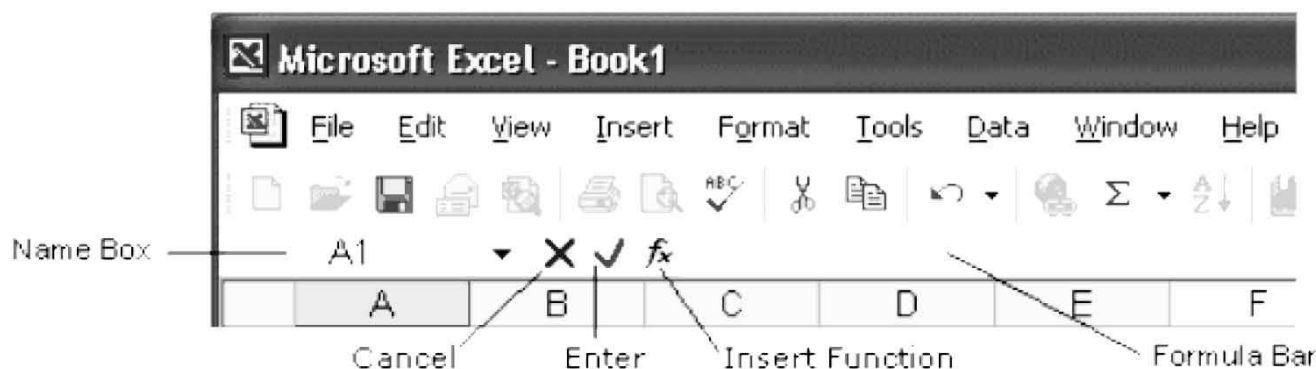


**Name box**

- The Name box displays the reference of the selected cells.

**Q3.** **What is the procedure to enter data in a Worksheet? Discuss basics of a Worksheet.**

# ENTERING DATA IN A WORKSHEET

- The place where data is entered in spreadsheet is called cell.
- You can enter data in the form of text, numbers, formulas, functions and dates.
- The cell can also hold videos, images, sound files etc.
- There are two states of a cell.
- **Active cell** When a cell has control on it, it is called active cell. Control is showed with a rectangular frame on the cell.

- **Passive cell** The cell without rectangular frame is called passive cells.
- To enter data into a cell it must be active.
- Now just start to write whatever you wants to enter in the cell. You can also edit the contents of a cell. For this just make that cell active and change it into edit mode.
- To change a cell into edit mode simply double click on it by using mouse or press F2 key from the keyboard.
- Like other application software spreadsheets also provide the facility of **cut**, **copy** and **paste**.

# BASICS OF WORKSHEET

- Data in a worksheet can have many different forms but the most common forms of data in a cell are as follows.

- **Labels**

  Labels are used to identify a value or series of values e.g. "Marks" can represents a column having marks of students. Label should be short and self explanatory. No mathematical operation can be applied on labels.

- **Values**

  Values are numeric data entered in a cell. These values can be whole numbers, decimals, negative numbers, currency and other types of values including scientific notations.

- **Formulas**

  It is the most powerful feature of spreadsheet. Formula can produce results on the basis of values. More complex formulas can evaluate logical condition and perform certain calculations on the basis of their results. All logical condition are evaluated to either true or false.

## Difference between Labels and Values

| Values | Labels |
| --- | --- |
| A value can be numeric constant, date, a formula or a formula's result. | Label is a text entry such as "Marks", or "Name" etc. |
| Mathematical calculations can be performed on values. | No mathematical operation can be performed on labels. |

## Cell References

- Reference identifies a cell or a range of cells on a worksheet and tells Microsoft Excel where to look for the values or data you want to use in a formula.
- With references, you can use data contained in different parts of a worksheet in one

- formula or use the value from one cell in several formulas.
- You can also refer to cells on other sheets in the same workbook, and to other workbooks.
- References to cells in other workbooks are called links.
- By default, Excel uses the **A1** reference style, which refers to columns with letters (**A** through **IV**, for a total of **256** columns) and refers to rows with numbers (**1** through **65536**).
- These letters and numbers are called row and column headings.
- To refer to a cell, enter the column letter followed by the row number. For example, **B2** refers to the cell at the intersection of column **B** and row **2**.

# Cell Ranges

- A collection of cells is called a cell range.
- Cell ranges are used in functions.
- It is useful when you want to add many cells. For example if you want to **add cells** from A1 to **A123**.
- It is very difficult and tiresome to write formula for this but we can easily use this range in a function to calculate the sum e.g. **=SUM(A1:A123)**

- **Named Ranges**
- Named Ranges are a powerful tool in Excel that allows you to assign a meaningful name to a single cell or a range of cells.
- For example, you can assign the name "**TaxRate**" to cell **C1** and then use the name "**TaxRate**" anytime you would normally use the cell **C1**, such as **=A5*TaxRate**.
- There are 3 advantages to using Named Ranges:
- Formulas are more readable and meaningful. A formula like **=A5*TaxRate** is more meaningful to you when you are working with a complex worksheet.
- Named Ranges, by default, always use absolute cell references. Therefore, you don't have to worry about address translation, which occurs with relative cell references, when you Copy/Paste or Fill Down/Right cell ranges.
- Named Ranges make it easier to create well organized and attractive workbooks. You can use a named reference, rather than a cell address, in formulas, and then define that name to a specific cell after you've designed the workbook. With Named Ranges, you won't have to edit and change the dependent formulas. Just change the reference of the name.

# Valid Range Names

- A range name can contain letters, numbers, and underscores, but not spaces or special punctuation characters. Moreover, it cannot be the same as a normal cell reference.

For example, "AA10" is not a valid range name because "AA10" is the name of a normal cell reference (row **10**, column "AA").

## Adding and Deleting Named Ranges

- To create a new Named Range from Excel, use the following procedure:
- Select the cell or range of cell that you want to assign a name to.
- Go to the **Insert** menu, select **define** from **Name** menu item, and type your name in the text box.
- To delete a named range, go to the **Insert** menu, select the **Name** menu item, then select the **name** from this list, and click the Delete button.

**Q4.** **What is relative and absolute referencing? What is the procedure of linking worksheets?**

## RELATIVE REFERENCING

- A relative cell reference in a formula, such as **A1**, is based on the relative position of the cell that contains the formula and the cell the reference refers to.
- If the position of the cell that contains the formula changes, the reference is changed.
- If you copy the formula across rows or down columns, the reference automatically adjusts. By default, new formulas use relative references. For example, if you copy a relative reference in cell **B2** to cell **B3**, it automatically adjusts from **=A1** to **=A2**.

## ABSOLUTE REFERENCING

- An absolute cell reference in a formula, such as **$A$1**, always refer to a cell in a specific location.
- If the position of the cell that contains the formula changes, the absolute reference remains the same.
- If you copy the formula across rows or down columns, the absolute reference does not adjust.
- By default, new formulas use relative references, and you need to switch them to absolute references. For example, if you copy a absolute reference in cell **B2** to cell **B3**, it stays the same in both cells **=$A$1**.

## LINKING WORKSHEETS

- You may want to use the value from a cell in another worksheet within the same workbook in a formula.
- For example, the value of cell **A1** in the current worksheet and cell **A2** in the second worksheet can be added using the format "**sheetname!celladdress**".

- The formula for this example would be **"=A1+Sheet2!A2"** where the value of cell **A1** in the current worksheet is added to the value of cell **A2** in the worksheet named **"Sheet2"**.

**Q5.     What is formula? Write down the procedure to apply formula in worksheets.**

# FORMULA:

- A formula is a mathematical expression that uses numbers, cell references or both.

- Formulae enable you to perform calculations by using values in the worksheet.

- When you use a formula to create a calculation, and you change any of the values referenced by the formula, Excel automatically recalculates the result.

- You can enter formulae in two ways: type the formula directly in the cell, or point to the cells that you want the formula to compute.

- Following are arithmetic operators that you can use in formulae.

| Operator | Description |
|:---:|:---|
| + | Addition |
| - | Subtraction |
| * | Multiplication |
| / | Division |
| % | Percentage |
| ^ | Exponentiation |

**Example:**

Write **=5+7** in a cell and press **Enter**. It will display **12** as a result in the cell. You can use different operator for different formulas. You can also use cell references instead of constant values to calculate formulas.

**Q6.     What is a function? Write down the procedure to apply functions in worksheets.**

# FUNCTIONS

- Functions are predefined formulas that perform calculations by using specific values, called arguments, in a particular order, or structure.

- Functions can be used to perform simple or complex calculations. For example, the **ROUND** function rounds off a number in cell **A10**.

- Functions can be a more efficient way of performing mathematical operations than formulas.

- For example, if you wanted to add the values of cells **A1** through **A5**, you would type the formula "=A1+A2+A3+A4+A5 ". A shorter way would be to use the **SUM** function and simply type "=**SUM(A1:A5)**".

# STRUCTURE OF A FUNCTION

- The structure of a function begins with an equal sign (=), followed by the function name, an opening parenthesis, the arguments for the function separated by commas, and a closing parenthesis.

- Function name: For a list of available functions, click a cell and press **SHIFT+F3**.

- Arguments: Arguments can be numbers, text, logical values such as TRUE or FALSE, error values such as **#N/A**, or **cell references**. The argument you designate must produce a valid value for that argument. Arguments can also be constants, formulas, or other functions.

- Some examples of commonly used functions are given below.

| Function | Example | Description |
|---|---|---|
| SUM | =SUM(B1:B50) | finds the sum of cells B1 through B50 |
| AVERAGE | =AVERAGE(F1:F20) | finds the average of cells F1 through F20 |
| MAX | =MAX(D1:D500) | returns the highest number from cells D1 through D500 |
| MIN | =MIN(D1:D500) | returns the lowest number from cells D1 through D500 |
| SQRT | =SQRT(A10) | finds the square root of the value in cell A10 |
| TODAY | =TODAY() | returns the current date (leave the parentheses empty) |

# FUNCTION WIZARD

- View all functions available in Excel by using the Function Wizard.

- Activate the cell where the function will be placed and click the **Function Wizard** button on the standard toolbar.

- From the **Paste Function** dialog box, browse through the functions by clicking in the **Function category** menu on the left and select the function from the **Function name** choices on the right. As each function name is highlighted a description and example of use is provided below the two boxes.
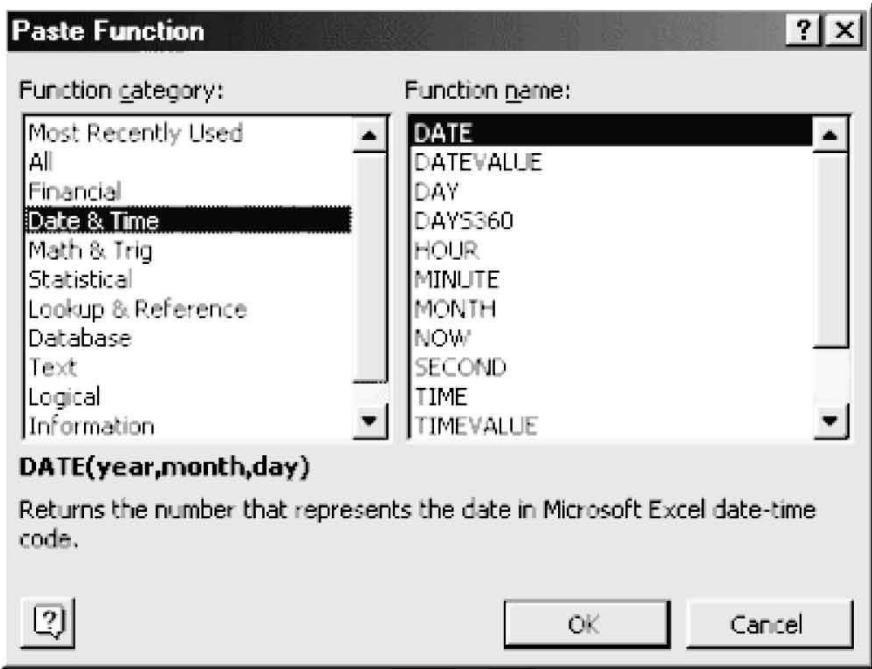


- Click **OK** to select a function.
- The next window allows you to choose the cells that will be included in the function. In the example below, cells **B4** and **C4** were automatically selected for the sum function by Excel. The cell values {**2, 3**} are located to the right of the **Number 1** field where the cell addresses are listed. If another set of cells, such as **B5** and **C5**, needed to be added to the function, those cells would be added in the format "**B5:C5**" to the **Number 2** field.
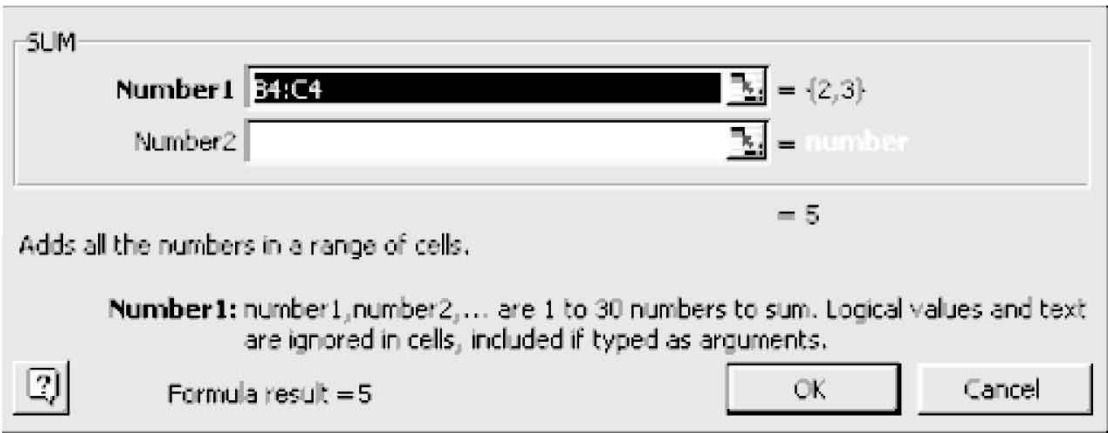


  o Click **OK** when all the cells for the function have been selected.

**Difference between Formula and Function**

| Formulas | Functions |
|---|---|
| They are created by the users | These are built in programs. |

| | |
|---|---|
| They can perform function as required by the user. | They can only perform the predefined functions. |
| A formula has no name. | Function has a unique name. |
| No parameter is passed to the formula. | Certain arguments are passed to the function. |
| Formula is a difficult way to perform calculations. | It provides easy and efficient process to perform calculations. |

**Q7.** **What is Cell Formatting? Write down the procedure to apply formatting in worksheets.**

# CELL FORMATTING

- To enhance the appearance and to improve readability of your worksheets, you can format the information in worksheet cells either before or after you enter the data.

- You can change the fonts or apply attributes such as boldface, italic, underline, borders, patterns, and colors.

- You also can apply numeric and date and time formats.

- Many of the formats you will use most often are accessible on the Formatting toolbar. Additional formatting options are available on the Format menu.

- You will get the following Format dialog box
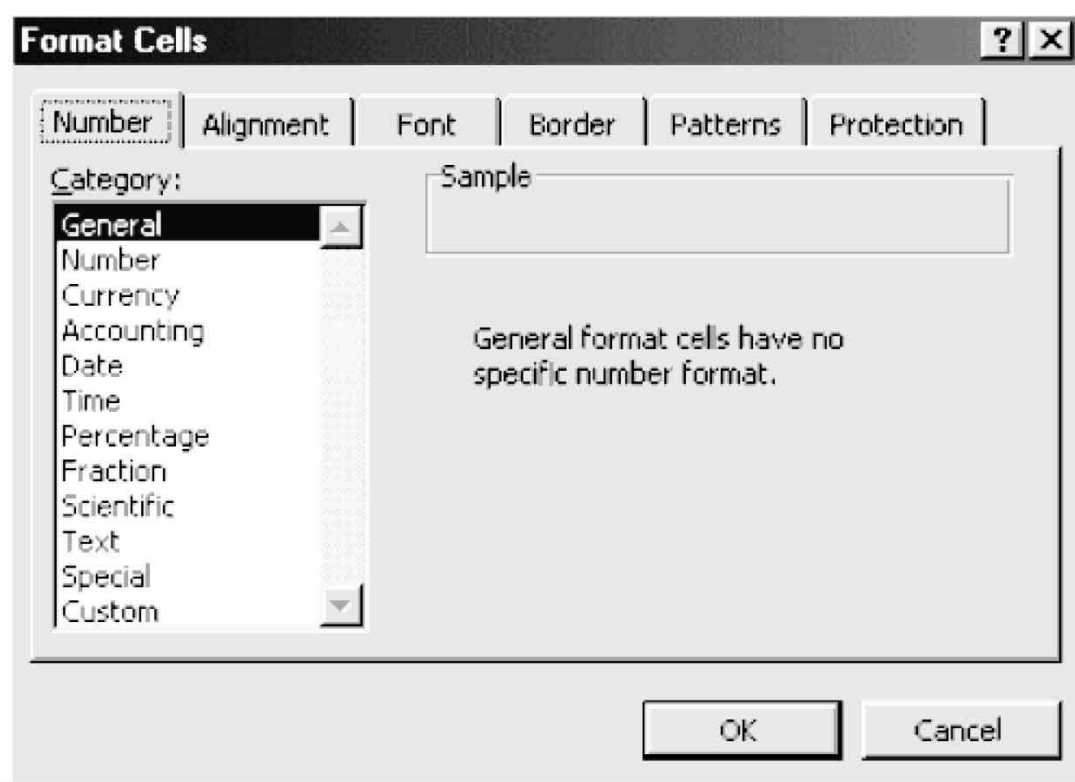


# CREATING CUSTOM FORMAT

- You can create your own custom numeric formats for financial or scientific tasks and create formats for catalog numbers, international currency, and so on.

- Any time you need to display a number in a special way, you should consider using a custom numeric format.

- Each number format consists of four parts.

- First part describes the positive numbers, the second describe the negative numbers third describe zero values and the fourth describe text values.

- Each part is separated by semicolon.

- These parts of format are optional.

- If you specify two the first will be used for positive numbers and zero values and the second is used for negative numbers.

- If you specify only one, all numbers use the same format and text value use general format.

**Symbols used in Custom Format**

| Symbol | Meaning | Example |
|--------|---------|---------|
| # | Using # insignificant zeros will not display. | If custom format is #,### then 4500 will be displayed as 4,500 |
| .<br>(Period) | It indicated that how many digits appear to the right of a decimal pint. The cell display will round to the number of placeholders to the right of the decimal pint in the format. | If the custom format is ###.00 then 2.3 will be displayed as 2.30 and 658 will be displayed as 658.00 |
| 0 | It determines that how many digits will display on either side of a decimal number. | If custom format is 000 then 7 will be displayed as 007 and 70 will be displayed as 070. |
| ? | A space holder similar to 0 character, except that space is left for insignificant zero character on either side of a decimal pint. | If custom format is 0.??? Then for 34.876 and 5.6, if displayed vertically the decimal pint of 34.876 will become under the decimal point of 2.4 |
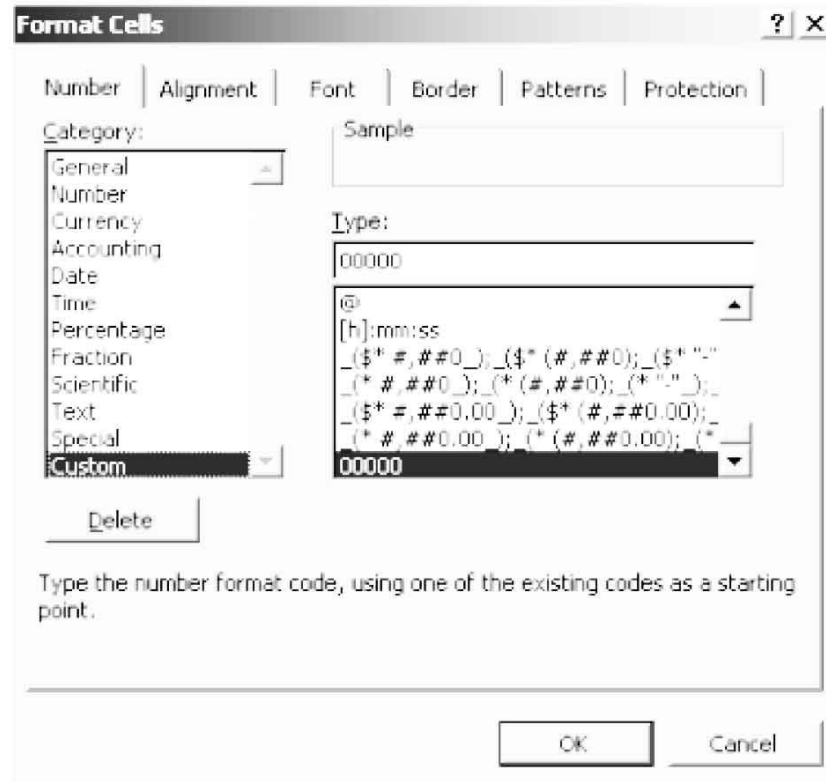
- The format you select for the cell will change the contents of cell according to that format.

- There are separate formats for different data values like currency, date etc.

## ALIGNING CELL CONTENTS

- Excel automatically aligns entries within a cell, according to the data you enter.

- When you enter text in a cell, Excel aligns the data to the left of the cell.

- When you enter numbers, Excel aligns them to the right.

- You can override this automatic alignment, and specify how you want data aligned: to the **left**, to the **right**, **centered**, **justified** or **Fill**.

- In most cases, you will probably want to change the alignment of column headings so that the text is centered in each cell.

- If your worksheet data includes a title, you may also want to center the title over the worksheet data.
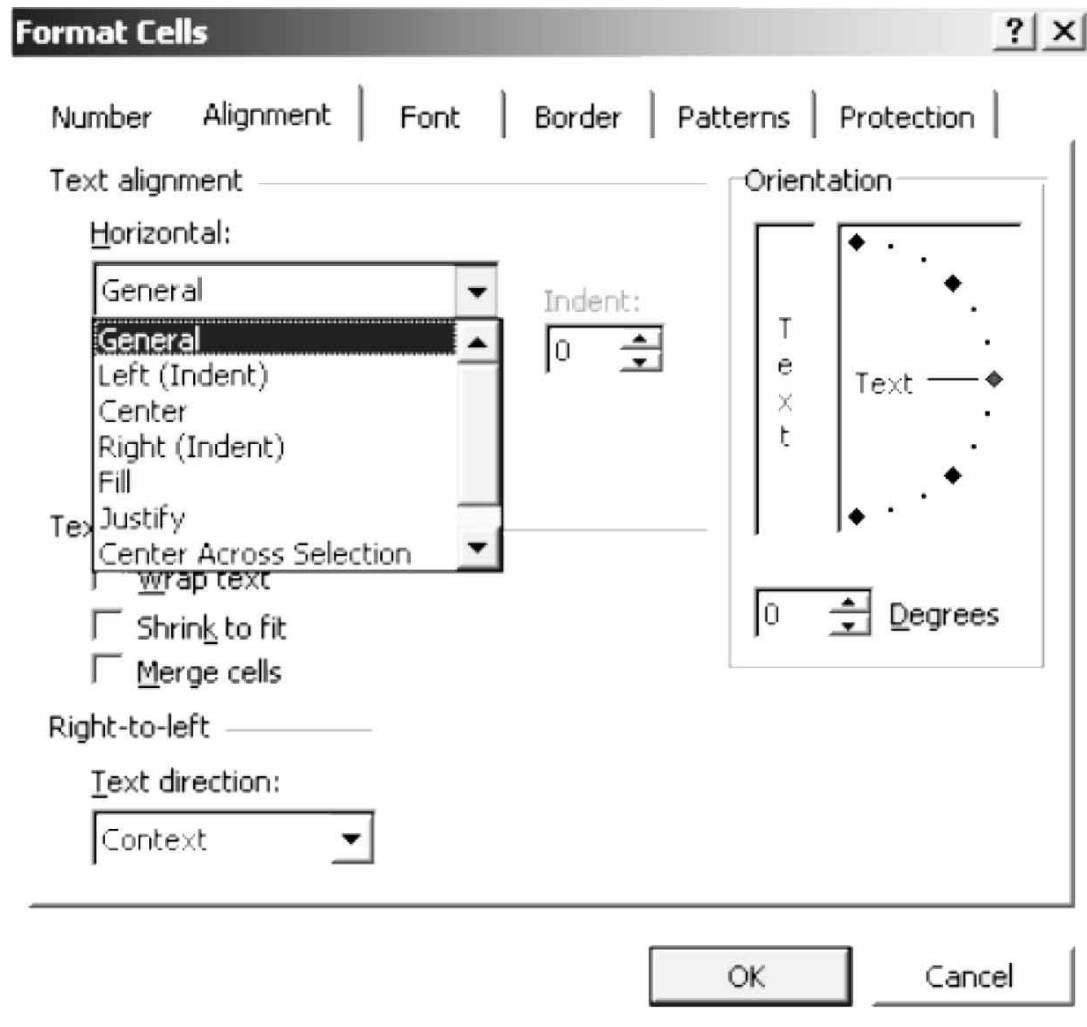
## MERGE CELL AND WRAP TEXT

- **Merge cell** option combines two or ore selected cells into a single cell.
- The cell reference for a merged cell is the upper left cell in the original selected range.
- **Wrap text** option wraps text into multiple lines in a cell.
- The number of wrapped lines is dependent on the width of the column and the length of the cell contents.
- These two options can be applied by following these steps
- Selecting cell or range of cells.
- From **format** menu select cells **format cells** option.
- A dialog box will appear, from this dialog box select **alignment** tab.
- Here select the required option and press **ok** button.

**Q8.** **What is a Chart? Write down the procedure to Create Charts in worksheets.**

## INTRODUCING CHARTS

- Charts are visually appealing and make it easy for users to see comparisons, patterns, and trends in data.

- For instance, rather than having to analyze several columns of worksheet numbers, you can see at a glance whether sales are falling or rising over quarterly periods, or how the actual sales compare to the projected sales.
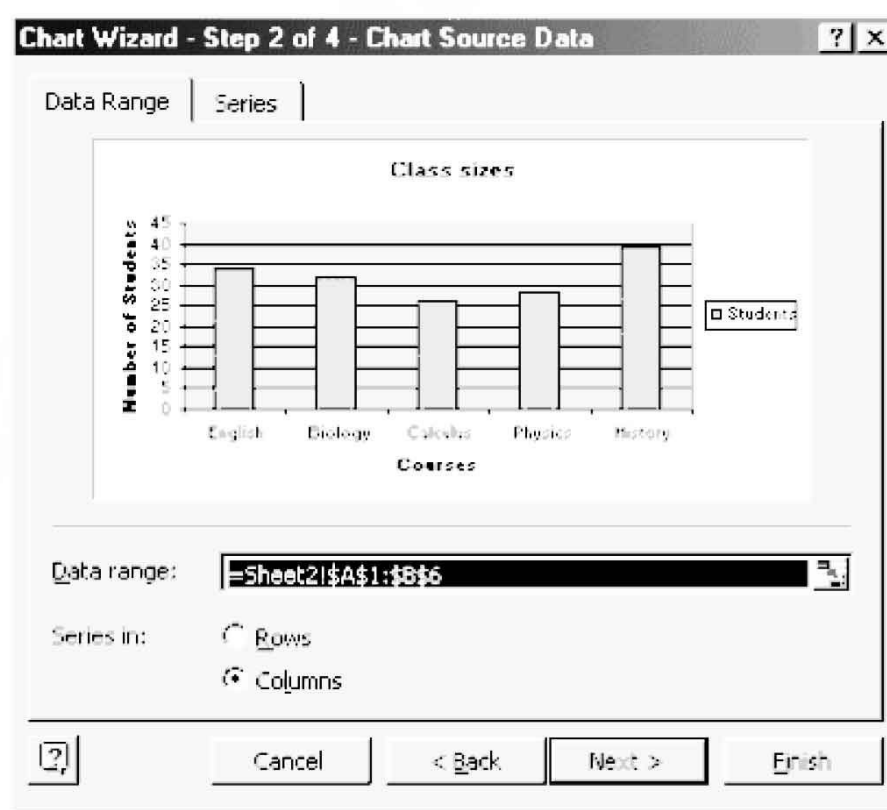
# CHART WIZARD

- The Chart Wizard brings you through the process of creating a chart by displaying a series of dialog boxes.

- Enter the data into the worksheet and highlight all the cells that will be included in the chart including headers.



- Click the Chart Wizard button on the standard toolbar to view the first **Chart Wizard** dialog box.

- **Chart Type:** Choose the Chart type and the **Chart subtype** if necessary. Click **Next**.
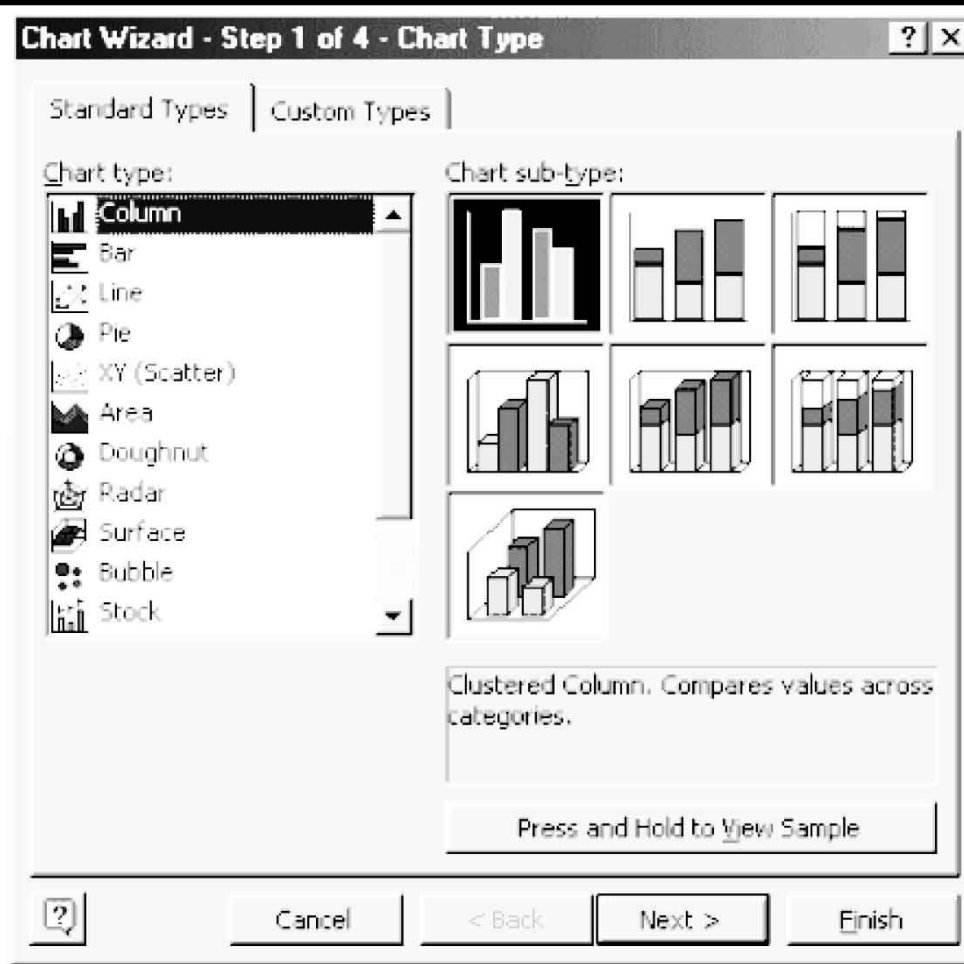
- **Chart Source Data:** Select the data range (if different from the area highlighted in step 1) and click **Next**.

- **Chart Options:** Enter the name of the chart and titles for the X- and Y-axes. Other options for the axes, grid lines, legend, data labels, and data table can be changed by clicking on the tabs. Press **Next** to move to the next set of options.
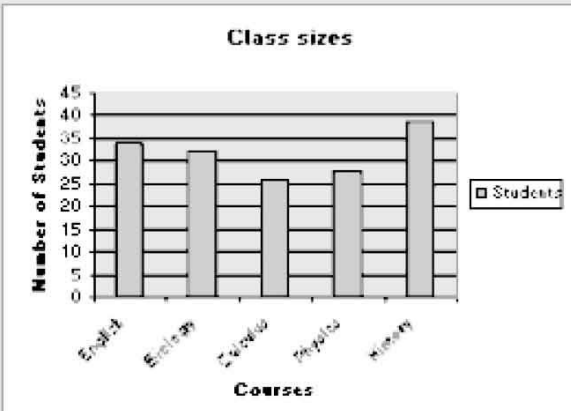


- **Chart Location:** Click **As new sheet** if the chart should be placed on a new, blank worksheet or select **As object in** if the chart should be embedded in an existing sheet and select the worksheet from the drop-down menu.

- Click **Finish** to create the chart.

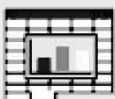|   | A | B |
|---|---|---|
| 1 |   | Students |
| 2 | English | 34 |
| 3 | Biology | 32 |
| 4 | Calculus | 26 |
| 5 | Physics | 28 |
| 6 | History | 39 |

Chart

Chart Area

**Class sizes**

Number of Students

60
40
20
0

English  Biology  Calculus  Physics  History

**Courses**

☐ Students

# Chart Formatting Toolbar
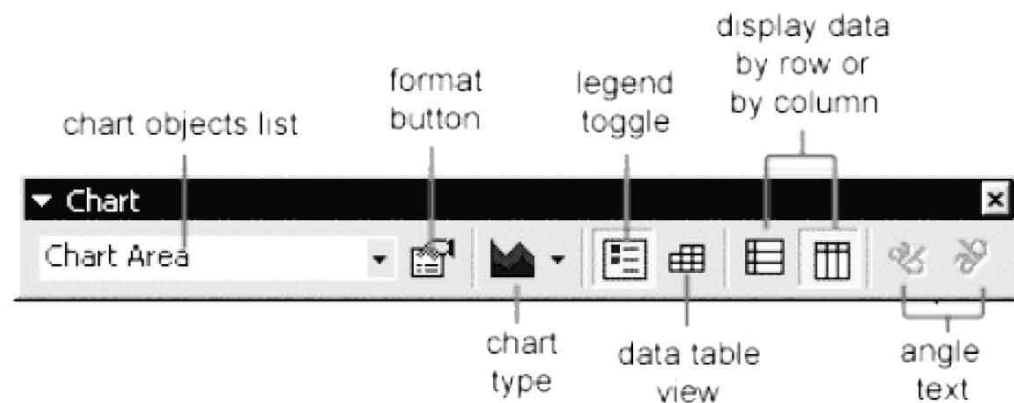


- **Chart Objects List:** To select an object on the chart to format, click the object on the chart or select the object from the **Chart Objects List** and click the **Format button**. A window containing the properties of that object will then appear to make formatting changes.

- **Chart Type** - Click the arrowhead on the chart type button to select a different type of chart.

- **Legend Toggle** - Show or hide the chart legend by clicking this toggle button.

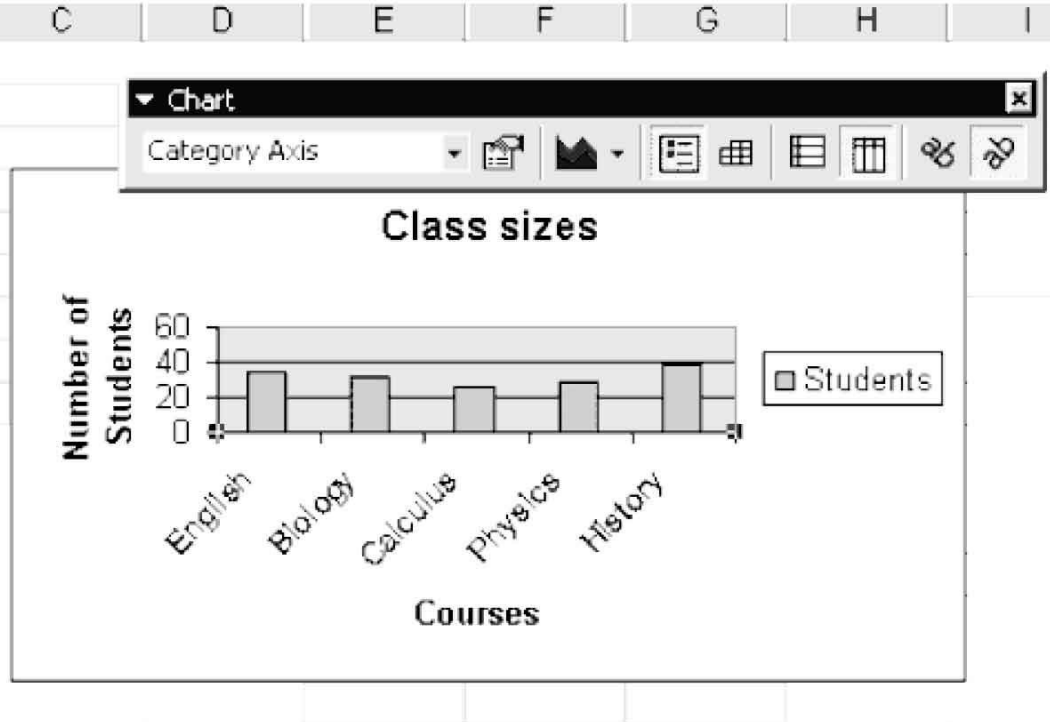- **Data Table view** - Display the data table instead of the chart by clicking the Data Table toggle button.

- **Display Data by Column or Row** - Charts the data by columns or rows according to the data sheet.

- **Angle Text** - Select the category or value axis and click the **Angle Downward** or **Angle Upward** button to angle the selected by +/- 45 degrees.

**Q9.      What is page setup of worksheets?**

Select **Page Setup** from the **File** menu bar to format the page, set margins, and add headers and footers.

- **Page**

    Select the **Orientation** under the **Page** tab in the Page Setup window to make the page Landscape or Portrait. The size of the worksheet on the page can also be formatting under **Scaling**. To force a worksheet to print only one page wide so all the columns appear on the same page, select **Fit to 1 page(s) wide**.
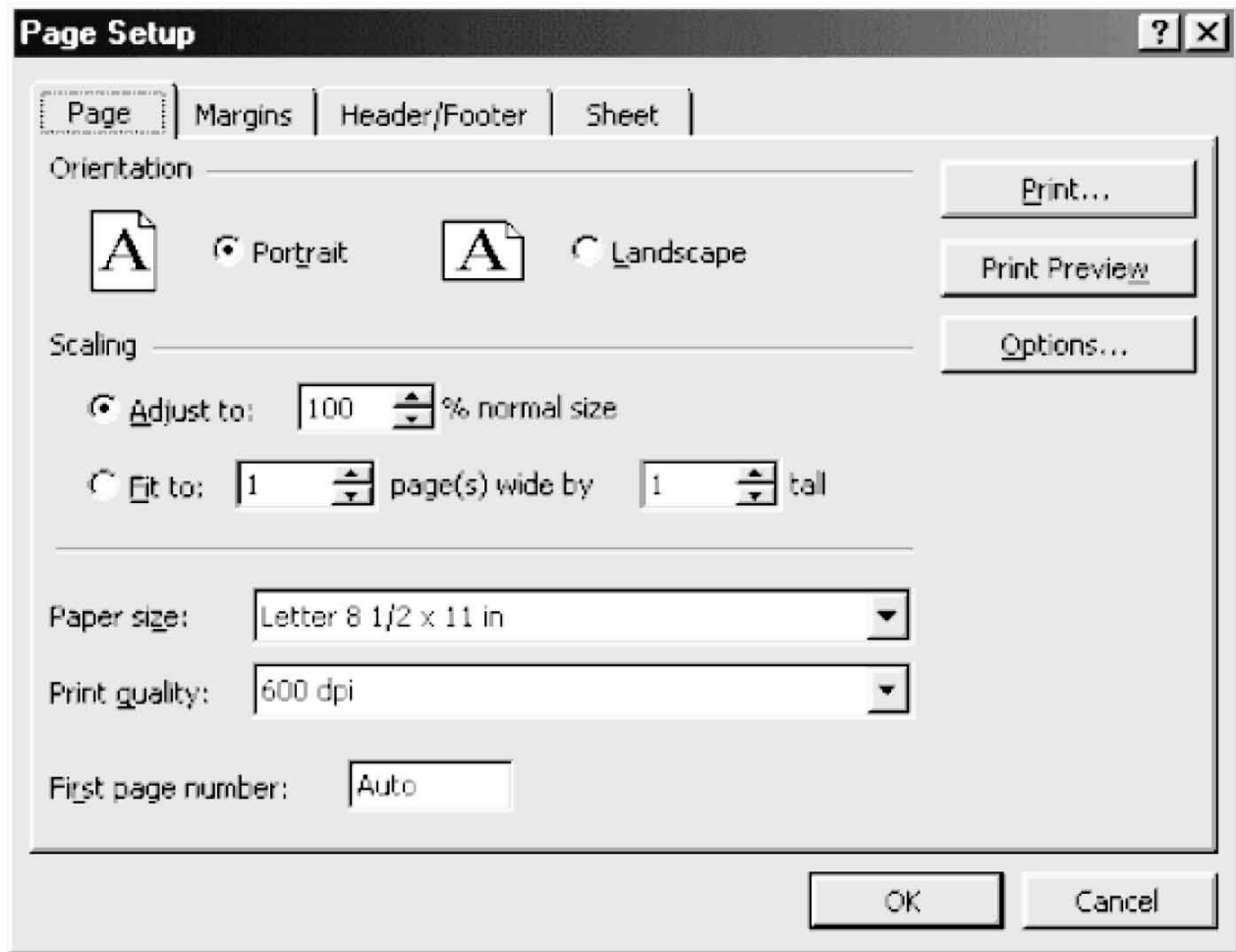
- **Margins**

  Change the top, bottom, left, and right margins under the **Margins** tab. Enter values in the header and footer fields to indicate how far from the edge of the page this text should appear. Check the boxes for centering horizontally or vertically on the page.
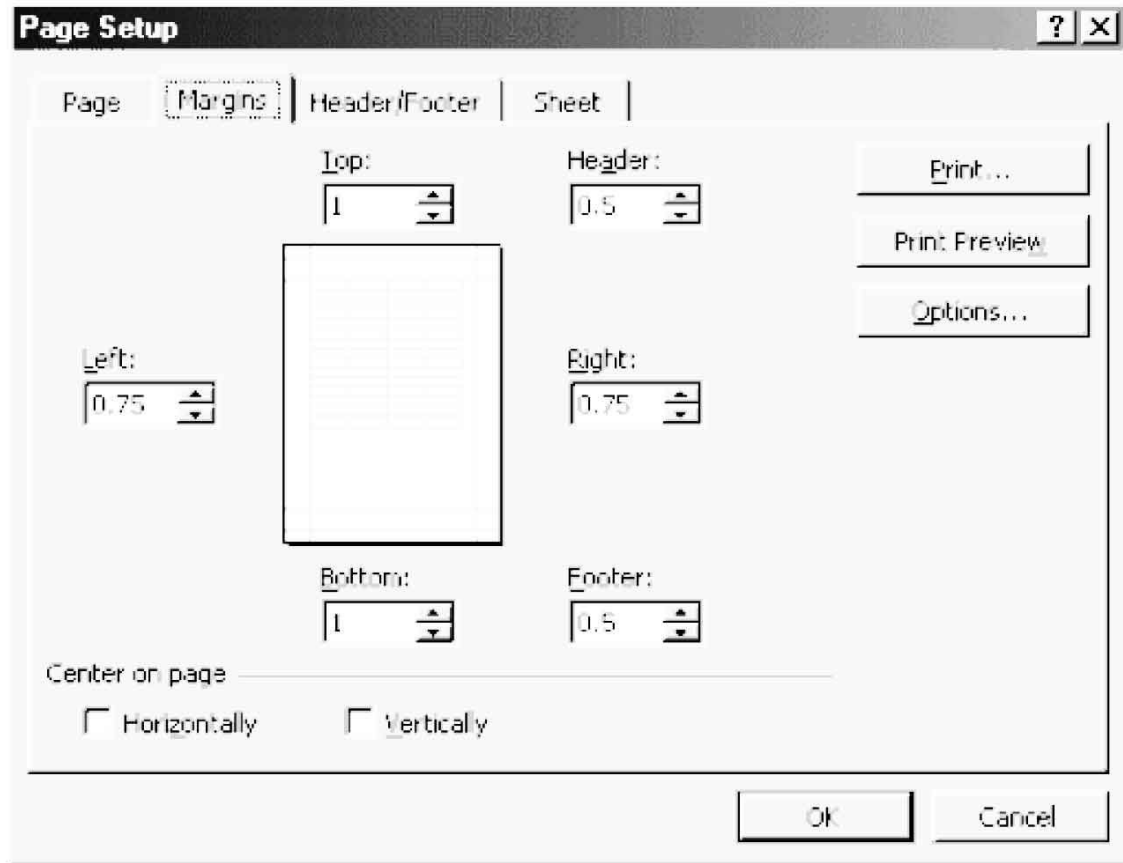
- **Header/Footer**
  Add preset headers and footers to the page by clicking the drop-down menus under the Header/Footer tab.
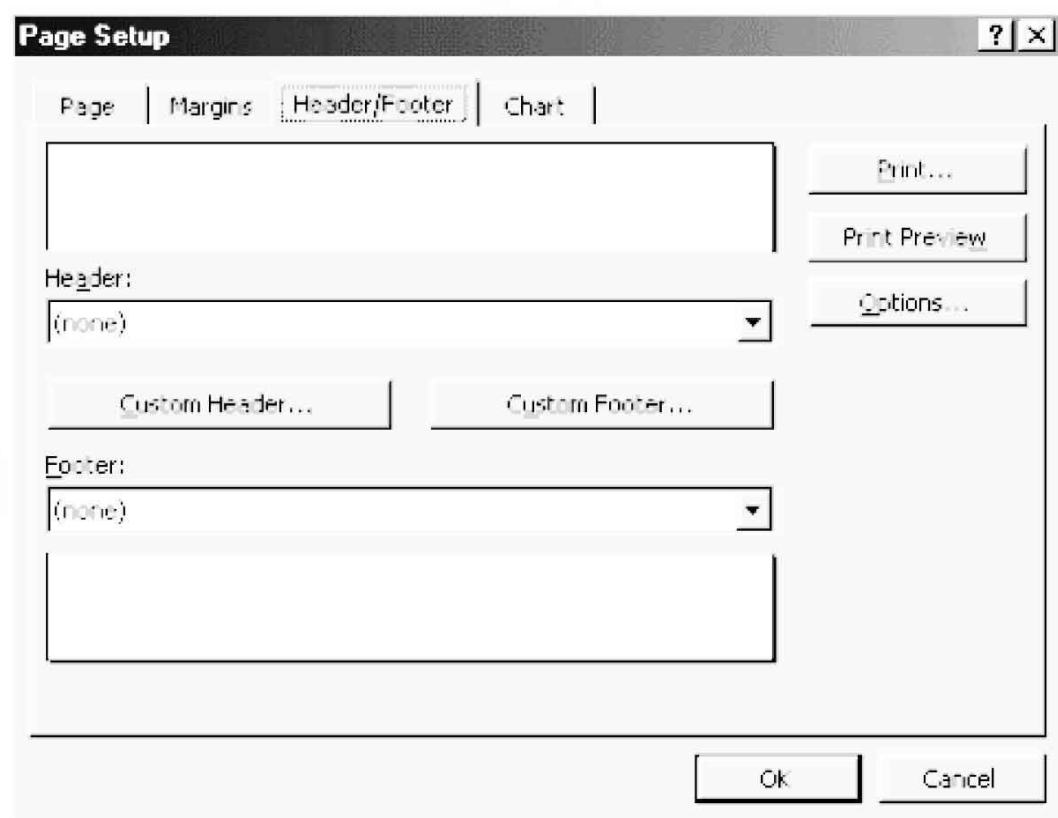


To modify a preset header or footer, or to make your own, click the **Custom Header** and **Custom Footer** buttons. A new window will open allowing you to enter text in the left, center, or right on the page.
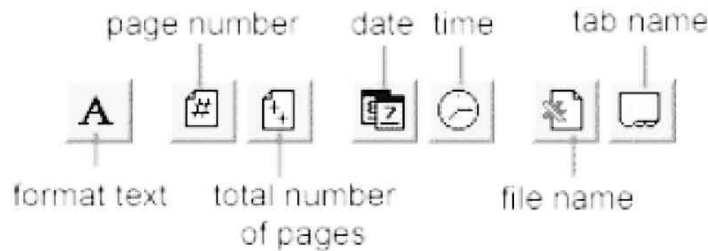
**Format Text** - Click this button after highlighting the text to change the font, size, and style.

**Page Number** - Insert the page number of each page.

**Total Number of Pages** - Use this feature along with the page number to create strings such as "page 1 of 15".

**Date** - Add the current date.

**Time** - Add the current time.

**File Name** - Add the name of the workbook file.

**Tab Name** - Add the name of the worksheet's tab.

- **Sheet**
  Check **Gridlines** if you want the gridlines dividing the cells to be printed on the page. If the worksheet is several pages long and only the first page includes titles for the columns, select **Rows to repeat at top** to choose a title row that will be printed at the top of each page.
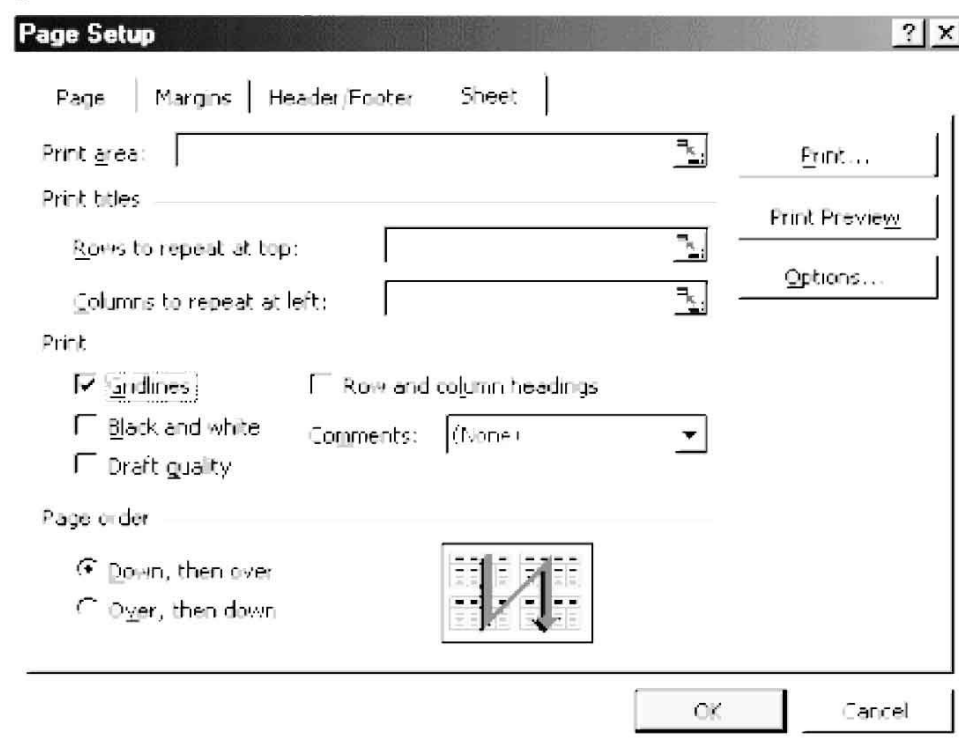


# Print Preview

Select **Print Preview** from the **File** menu bar to view how the worksheet will print. Click the **Next** and **Previous** buttons at the top of the window to display the pages and click the **Zoom** button to view the pages closer. Make page layout modifications needed by clicking the **Page Setup** button. Click **Close** to return to the worksheet or **Print** to continue printing.

# Q.10 Discuss the process of printing worksheet.

To print the worksheet, select **Print** from **File** menu bar.
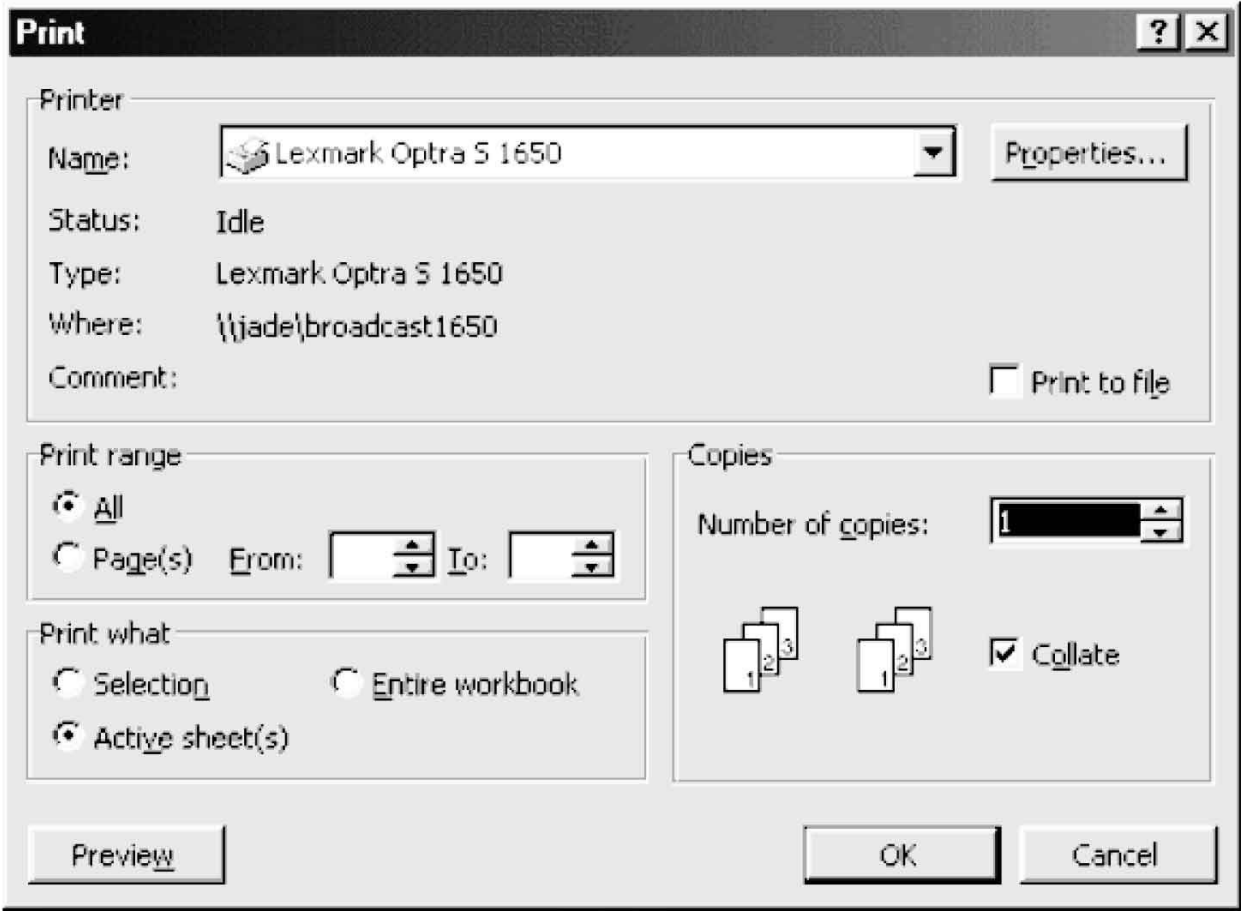


- **Print Range** - Select either all pages or a range of pages to print.
- **Print What** - Select selection of cells highlighted on the worksheet, the active worksheet, or all the worksheets in the entire workbook.
- **Copies** - Choose the number of copies that should be printed. Check the **Collate** box if the pages should remain in order.

# Q.11 What is difference between word processor and spreadsheet?

| Sr. | Word Processor | Spreadsheet |
|-----|----------------|-------------|
| (1) | Word processor provides the facility to create and edit documents. | Spreadsheet provides the facility of calculations. |
| (2) | The data in word processor is inserted in documents. | The data in spreadsheet is inserted in worksheets. |
| (3) | It provides no data validation facility. | It provides data validation facility. |
| (4) | It does not provide data analysis facility. | It provides data analysis facility such as filter, subtotal, pivot table and auditing. |
| (5) | It provides a small number of predefined | It provides many predefined functions |

| | | |
|---|---|---|
| | functions to manipulate data. | to manipulate data. |
| (6) | It does not provide the facility of automatic recalculating of data. | It provides the facility of recalculating data. The result changes automatically if the data is changed. |
| (7) | Conditional formatting is not available in word processors. | Spreadsheets provide the facility of conditional formatting. Format of data is changed when it meets a certain criteria. |
| (8) | Word processor is used to create letters, applications, memos and reports etc. | Spreadsheet is used to create salary sheets, home budgets and balance sheet. |

**Q.12   What is difference between function and formula?**

| Sr. | Function | Formula |
|---|---|---|
| (1) | Function is predefined facility. | Formula is defined by the user. |
| (2) | Function is written in predefined syntax. | Formula is written according to the user requirements. |
| (3) | Function may require parameters. | Formula does not require parameters. |
| (4) | Function is identified by a particular name. | Formula has no particular name. |
| (5) | All functions are formulas. | All formulas are not functions. |

# SHORT QUESTIONS

**Q.1.** **What is a Spreadsheet?**

**Ans.** A Spreadsheet is application software that provides extensive tools for applying formulas and functions to perform calculations of numeric data.

**Q.2.** **What is Formula?**

**Ans.** Formula is a combination of operands and operators. Here operands can be cell references and values.

**Q.3.** **What is Function?**

**Ans.** Functions are built in formulas. You can give direct value or cell reference to the function for calculations.

**Q.4.** **What is an Interface?**

**Ans.** Interface represents a way through which you can interact with the Spreadsheet software. Spreadsheet's interface consists of a grid like structure (work area) and a set of various tools to perform different operations.

**Q.5.** **What is an Active Cell?**

**Ans.** When a cell has control on it, it is called active cell. Control is showed with a rectangular frame on the cell.

**Q.6.** **What is a Passive Cell?**

**Ans.** The cell without rectangular frame or have no control on it is called passive cells.

**Q.7.** **What is a Label?**

**Ans.** Labels are used to identify a value or series of values e.g. "Marks" can represent a column having marks of students. Label should be short and self explanatory. No mathematical operation can be applied on labels.

**Q.8.** **What are Values?**

**Ans.** Values are numeric data entered in a cell. These values can be whole numbers, decimals, negative numbers, currency and other types of values including scientific notations.

**Q.9.** **What is a Cell Reference?**

**Ans.** Cell reference is the address of cell in terms of column name and row number e.g. **A1** is a cell reference of a cell of column **A** and row **1**.

**Q.10.** **What is a Cell Range?**

**Ans.** Cell Range represents a collection of cells. You can refer a cell range in formula e.g. **A1:A100** is a range of cells from **A1** to **A100**.

**Q.11.** **Which operator is used to refer a cell of different sheet?**

**Ans.** To refer a cell from different sheet ! operator is used e.g. **"=A1+Sheet2!A2"** where the value of cell **A1** in the current worksheet is added to the value of cell **A2** in the worksheet named **"Sheet2"**.

**Q.12.** **What is Undo?**

**Ans.** Undo reverse the last action.

**Q.13.** **What is Redo?**

**Ans.** Redo reverse the previous undo.

**Q.14.** **What is Header and Footer?**

**Ans.** The text that is added to the top margin of every page is called header and the text added to the bottom margin of every page is called footer.

**Q.15.** **What is a Clipboard?**

**Ans.** Clipboard is a temporary holding space in the computer's memory for data that is being copied or moved.

# EXERCISE

**Q1. Fill in the blanks**

1. For the custom format ##.000, the number 242.59 will appear as <u>242.590</u>

2. The intersection of a row and a column forms a <u>cell</u>.

3. In a spreadsheet <u>functions</u> are built in formulas

4. <u>Labels</u> are used to identify a value or a series of values.

5. <u>Named Ranges</u> are names that you define to represent a cell or cell range on a worksheet.

6. Calling cells by just their addresses (such as "A1") is called <u>relative referencing</u>.

7. An <u>active cell</u> is indicated by a bold rectangular border.

8. <u>A spreadsheet</u> is software for manipulating numbers.

9. A <u>workbook</u> may contain multiple <u>worksheets</u>.

10. <u>0</u> is a place holder that determines how many digits to display on either side of a decimal number.

11. <u>Spreadsheet</u> contains rows and columns and is used to record and compare numerical or financial data.

12. On a computerized spreadsheet, the intersection of a row and a column is called a <u>cell</u>.

13. <u>Rows</u> are generally identified by numbers 1, 2, 3, and so on.

14. <u>Columns</u> are identified by letters, such as A, B, C, and so on.

15. <u>Cell</u> is a combination of a letter and a number to identify a particular location within the spreadsheet.

16. Spreadsheets are also popular for testing <u>hypothetical scenarios</u>.

17. Spreadsheet is a collection of rows and columns and making a <u>grid</u> like structure.

18. The column and row combines to form a <u>cell address</u>.

19. Cell address is also called <u>cell label</u>.

20. Cell contains data e.g. text, numeric, a formula and a date is called <u>cell value</u>.

21. <u>Formula</u> is a combination of operands and operators.

22. <u>Functions</u> are built in formulas.

23. <u>Commands</u> are used to perform operations on the worksheet or its contents.

24. Spreadsheet's interface consists of a grid like structure and a set of various tools to perform different operations.

25. A grid like structure is called a worksheet.

26. More than one worksheet combined to form a workbook.

27. Formula bar is used to write certain formulas.

28. Standard toolbar located beneath the menu bar, has buttons for commonly performed tasks like adding a column of numbers, printing, sorting, and other operations.

29. Formatting toolbar located beneath the Standard toolbar bar, has buttons for various formatting operations like changing text size or style, formatting numbers and placing borders around cells.

30. The contents of the active cell always appear in the formula bar.

31. Name box displays the reference of the selected cells.

32. The place where data is entered in spreadsheet is called cell.

33. When a cell has control on it, it is called active cell.

34. In Active Cell Control is showed with a rectangular frame on the cell.

35. The cell without rectangular frame is called passive cells.

36. To enter data into a cell it must be active.

37. To change a cell into edit mode simply double click on it or press F2 key from the keyboard.

38. Labels are used to identify a value or series of values.

39. Reference identifies a cell or a range of cells on a worksheet

40. References to cells in other workbooks are called links.

41. By default, Excel uses a total of 256 columns and total 65536 rows.

42. A collection of cells is called a cell range.

43. Named Ranges in Excel allows you to assign a meaningful name to a single cell or a range of cells.

44. Formula is a mathematical expression that uses numbers, cell references or both.

45. Functions are predefined formulas that perform calculations by using specific values.

46. The structure of a function begins with an equal sign (=), followed by the function name, an opening parenthesis, the arguments for the function separated by commas, and a closing parenthesis.

47. Merge cell option combines two or ore selected cells into a single cell.

48. <u>Wrap text</u> option wraps text into multiple lines in a cell. The number of wrapped lines is dependent on the width of the column and the length of the cell contents.

**Q.2    CHOOSE THE CORRECT OPTION:**

1.    Which of the following is a spreadsheet

   (a)    MS Word                              **(b)    MS Excel**

   (c)    MS Power Point                   (d)    Both b and a

2.    ————— is a spreadsheet:

   (a)    MS Word                              **(b)    MS Excel**

   (c)    MS PowerPoint                    (d)    Both a and b

3.    The intersection of a row and column form a:

   **(a)    Cell**                                  (b)    Address

   (c)    Reference                           (d)    Field

4.    The actual working area in Microsoft Excel is:

   (a)    Workbook                            **(b)    Worksheet**

   (c)    Spreadsheet                        (d)    Note sheet

5.    A cell at third column and 15 rows has a cell address:

   (a)    A15                                      (b)    B15

   **(c)    C15**                                    (d)    D15

6.    A collection of related worksheets is called:

   (a)    Spreadsheet                       (b)    Cells

   (c)    File                                       **(d)    Workbook**

7.    The currently selected cell where data can be entered or edited is called:

   (a)    Idle cell                               **(b)    Active cell**

   (c)    Passive cell                        (d)    Present cell

8.    In a worksheet, a bold rectangle border indicates (n):

   (a)    Present cell                        **(b)    Active cell**

   (c)    Passive cell                        (d)    Idle cell

9.    ————— is not a feature of spreadsheet program:

   (a)    Rows and columns             (b)    Formula

   (c)    Print                                     **(d)    WordArt**

10.    The actual working area in Microsoft Excel is

(a)   Workbook               **(b)   Worksheet**

(c)   Spreadsheet            (d)   Note sheet

11.   A cell of worksheet, which is not active is called:

(a)   Active cell            (b)   Idle cell

**(c)   Passive cell**       (d)   Present cell

12.   ———— cell addresses is correct:

(a)   Z2                     (b)   AZ3

(c)   2Z                     **(d)   Both a and b**

13.   ———— represents a label:

**(a)   Mubeen Ahmad**       (b)   736

(c)   =Al + B2               (d)   None

14.   The 0.0000000001 is displayed in default column width as:

**(a)   1E − 10**            (b)   E − 10

(c)   1E − 9                 (d)   01E − 9

15.   ———— menus contains the 'Cells' command:

(a)   File                   (b)   View

**(c)   Format**             (d)   Edit

16.   Which of the following is an absolute address?

(a)   A1                     (b)   A1$

**(c)   $A$1**               (d)   None of the above

17.   Each number format consists of ———— part:

(a)   2                      (b)   3

**(c)   4**                  (d)   5

18.   The default number format assigned to a cell is the:

(a)   Currency               (b)   Number

(c)   Text                   **(d)   General**

19.   If the custom format is 00000 then the number 420 will be displayed as:

(a)   420                    (b)   0420

**(c)   00420**              (d)   420.00

20.   If the custom format is # #, # # # then the number 23349 will be displayed as:

(a)   167,00                 **(b)   23,349**

(c)   16.300                 (d)   16.3

21. If the custom format is # # # .000 then the number 16.3 will be displayed as:

(a) 016.3 (b) 16.30

**(c) 16.300** (d) 16.3

22. For a currency format cell, the number 461.593 will be displayed as:

(a) 461,593 (b) $4615.19

(c) $46159.3 **(d) $461.59**

23. Formula can only be applied on:

**(a) Values** (b) Labels

(c) Unmerged cells (d) None

24. To add the value of cell 'C9' of worksheet "Sheet3" with the cell 'B2' of current worksheet, the formula is written as:

(a) = C9 + B2 **(b) = Sheet3!C9+B2**

(c) = Sheet3!B2+C9 (d) = Sheet3!B2+sheet3!C9

25. Formula can only be applied on

**(a) Values** (b) Labels

(c) Unmerged cells (d) None of the above

26. ——————— is an absolute address:

(a) A1 (b) A1$

(c) A$1$ **(d) None**

27. The absolute reference of cell address A15 is written as;

(a) $ A15 (b) $ A15 $

(c) A $ 15 **(d) $ A $ 15**

28. ——————— menus contains the 'Name' command:

(a) File (b) View

**(c) Insert** (d) Format

29. ——————— symbols is used before the formula:

(a) & **(b) =**

(c) # (d) $

30. Range of cells from C2 to C100 is referenced as:

(a) C2-100 **(b) C2:C100**

(c) C2 to C100 (d) C2:100

31. ———— represents valid range in Excel:
    **(a)** **C1:C3**                    (b) C1, C2, C3
    (c) =C1+C2+C3                   (d) C1 to C3
32. Calling a cell with the reference of its address is called:
    (a) Absolute referencing        (b) Reference address
    **(c)** **Relative referencing**    (d) None
33. ———— symbols is used in absolute referencing:
    (a) &                          (b) =
    (c) #                          **(d)** **$**
34. To add values of cells C9 and D10, the formula by using absolute reference can be written as:
    (a) =$C9+D10                   **(b)** **=$C$9+$D$10**
    (c) =$C9+$D10                  (d) =$C$9+#10
35. ———— function is used to return current system date:
    (a) Max                        (b) Min
    **(c)** **Today**              (d) None
36. Which of the following function is used to get the current date?
    (a) Exact()                    **(b)** **Today()**
    (c) Month()                    (d) Year()
37. ———— menus contains the 'Function' command used to active to function wizard:
    (a) File                       (b) Format
    **(c)** **Insert**             (d) View
38. ———— is not a table of Page Setup dialog box of Excel:
    (a) Page                       (b) Margins
    **(c)** **Paper**              (d) Header/Footer
39. ———— menus contains the 'Print' command:
    **(a)** **File**               (b) Edit
    (c) Format                     (d) Insert
40. In a spreadsheet, rows are labeled by:
    (a) Letters                    **(b)** **Numbers**
    (c) Cell reference             (d) None

41. In a spreadsheet, columns are labeled by:

   **(a)** **Letters** (b) Numbers

   (c) Cell references (d) None

42. A workbook is a group of:

   (a) Many rows (b) Many columns

   **(c)** **Worksheets** (d) None

43. A mathematical expression that is used to perform calculation on worksheet is called:

   (a) Cell (b) Format

   **(c)** **Formula** (d) Address Bar

## Q.3. WRITE T FOR TRUE AND F FOR FALSE STATEMENT:

1. Because Microsoft Excel is a spreadsheet, therefore it does not have a spellchecker component. **(F)**

2. Functions can be a more efficient way of performing mathematical operations than defining your own formulas. **(T)**

3. A formula can not manipulate labels. **(T)**

4. Worksheet is the basic unit where the data is manipulated in a workbook. **(F)**

5. Footnote cannot be applied in spreadsheet software. **(F)**

6. By default, the numbers as well as the text is aligned RIGHT in a cell. **(F)**

7. A formula containing relative referencing is not copied exactly. **(T)**

8. # is a place holder similar to the 0 character, except that space is left for insignificant zero characters on either side of a decimal pint. **(F)**

9. A formula containing referencing is not copied exactly. **(F)**

10. In MS Excel, a worksheet can have maximum 65,536 rows. **(T)**