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Class/Semester: **BCA FY SEM-I**

Name of Paper: **FSIT(BCA-101)**

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Model Question Paper

Q.1 Attempt any FIVE of the following: (3 Marks each) **15**

a) Write short note on Microcomputer.
b) Explain Light pen in detail.
c) Give difference between S-RAM and D-RAM memory.
d) What is Operating System?
e) Define Network? Explain the types of network
f) Explain Web browser in detail.
g) Give the characteristics of second generation computer.

Q. 2 Attempt any Three of the following: (5 Marks each) **15**

a) Explain the basic computer organization.
b) Give the characteristics of computer.
c) Explain third generation of computer with its characteristics.
d) Differentiate between second and third generation of Computer.
e) Explain the Workstation computer.

Q. 3 Attempt any Three of the following: (5 Marks each) **15**

a) Explain Cache memory with suitable diagram.
b) Explain Biometrics in detail.
c) Explain Printer and its types.
d) Explain Keyboard and Mouse.
e) Explain Joystick.

Q. 4 Attempt any Three of the following: (5 Marks each) **15**

a) Explain Windows Operating System.
b) Explain HDD in detail.
c) Explain USB flash drive.
d) Explain the functions of operating system.
e) Explain CD and DVD in detail.

Q. 5 Attempt any Three of the following: (5 Marks each) **15**

a) Write short note on WAN.
b) Explain FTP protocol.
c) Explain different data transmission modes.
d) Explain E-Mail in detail.
e) Draw and explain OSI reference model.

Model Answer Sheet

Q.1 Attempt any FIVE of the following: (3 Marks each) 15

a) Write short note on Microcomputer.

A PC can be defined as a small, relatively inexpensive computer designed for an individual user. PCs are based on the microprocessor technology that enables manufacturers to put an entire CPU on one chip.

Businesses use personal computers for word processing, accounting, desktop publishing, and for running spreadsheet and database management applications.

At home, the most popular use for personal computers is playing games and surfing Internet.

Although personal computers are designed as single-user systems. In terms of power, now-a-days High-end models of the Macintosh and PC offer the same computing power and graphics capability as low-end workstations by Sun Microsystems, Hewlett-Packard, and Dell.

Characteristics of a microcomputer:

1. It is the smallest in size among all types of computers.
2. A limited number of software can be used.
3. It is designed for personal work and applications. Only one user can work at a time.
4. It is less expansive and easy to use.
5. It does not require the user to have special skills or training to use it.
6. Generally, comes with single semiconductor chip.
7. It is capable of performing multiple tasks such as printing, scanning, browsing, watching videos etc.

b) Explain Light pen in detail.

Light pen is a pointing device which is similar to a pen. It is used to select a displayed menu item or draw pictures on the monitor screen. It consists of a photocell and an optical system placed in a small tube.

When the tip of a light pen is moved over the monitor screen and pen button is pressed, its photocell sensing element detects the screen location and sends the corresponding signal to the CPU.

A light pen is a light-sensitive pointing input device commonly used to select or otherwise modify text or data on a screen.

Used with a CRT monitor, these devices were an early form of manipulating and highlighting data on the screen. In the picture is an example using a light pen to highlight text on the screen.

Light pens were originally developed around 1955 and in the 1960s, they became more commonly used with graphics terminals, like the IBM 2250. In the 1980s, light pen usage expanded to home computers, like the BBC Microcomputer. Some graphics cards also included a connection for a light pen.

Today, light pens are no longer used due to the invention of touch screens.

A light pen may also be used to describe the pen (stylus) used with a graphics tablet.

Uses of Light pen-

1. Light Pens can be used as input coordinate positions by providing necessary arrangements.
2. If background color or intensity, a light pen can be used as a locator.
3. It is used as a standard pick device with many graphics systems.
4. It can be used as stroke input devices.
5. It can be used as valuators.

c) Give difference between S-RAM and D-RAM memory.

SRAM	DRAM
It stores information as long as the power is supplied	It stores information as long as the power is supplied or a few milliseconds when power is switched off
SRAM is faster compared to DRAM	DRAM provides slow access speed.
Transistors are used to store information	Capacitors are used to store data
It does not have refreshing unit	It has a refreshing unit
These are expensive	These are cheaper.
SRAMs are low-density devices	DRAMs are high-density devices
These are used in cache memories	These are used in main memories
Consume less power and generates less heat	Uses more power and generates more heat
In this bits are stored in voltage form	In this bits are stored in the form of electric energy.
Capacitors are not used hence no refreshing is required	To store information for a long time, contents of the capacitor need to be refreshed periodically.

d) What is Operating System?

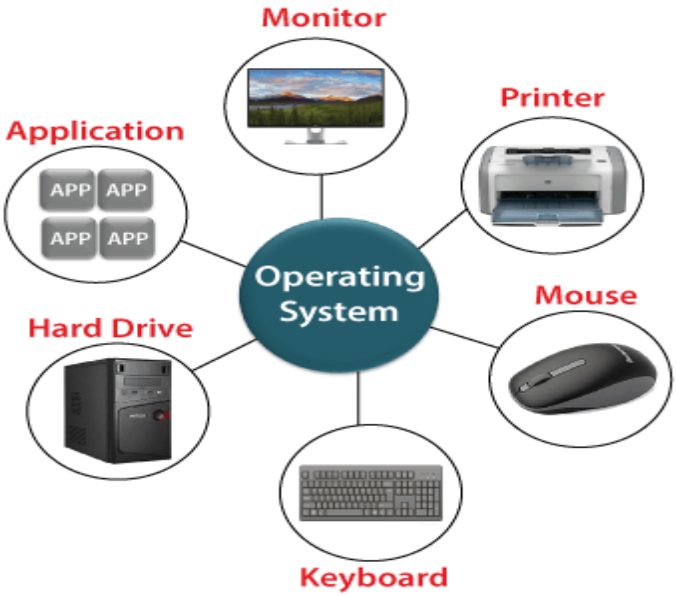
"An operating system is the program that after being initially loaded into the computer by a boot program, which manages all other programs in the Computer. The other programs are called as Application or Application programs."

The functions of operating systems are as follows:

1. Controlling the peripheral devices such as, disk drives, printers, etc.
2. Operating system performs tasks such as, recognizing input from the Keyboard, Sending output to display screen.
3. Provides a user interface.

Examples: Command Line, Graphical user Interface.

The following diagram shows attached the peripheral devices to operating system.



e) Define Network? Explain the types of network?

"The Connection between two or more computers for sharing Information and Resources such as, File, Folder, Disk Drive, and Printer."

Followings are the types of Network-

1. **LAN (Local Area Network)**

   LAN is a Private Network within a single building or campus and up to few Kilometers in length. They are widely used to connect Personal computers and Workstation in company, Offices.

Local Area Network is a group of computers connected to each other in a small area such as building, office.

LAN is used for connecting two or more personal computers through a communication medium such as twisted pair, coaxial cable, etc.

It is less costly as it is built with inexpensive hardware such as hubs, network adapters, and Ethernet cables.

The data is transferred at an extremely faster rate in Local Area Network.

Local Area Network provides higher security.

Characteristics of LAN-

1. It is a network owned by a private owner.
2. Personal computers, printers, etc., are connected through LAN.
3. LANs are very easy to design and troubleshoot.
4. A central database is used to connect the LAN networks.

2. MAN (Metropolitan Area Network)

MAN is basically bigger version of LAN. It creates a group or nearby corporate office or City might be either private or public.
A metropolitan area network (MAN) is a network that interconnects users with computer resources in a geographic area or region larger than that covered by even a large local area network (LAN) but smaller than the area covered by a wide area network (WAN).

Characteristics of MAN

1. MAN is a larger network than LAN.
2. The geographical area covered is larger than LAN.
3. MAN generally covers a city. The television network is the prime example of MAN.
4. Two or more computers are connected through this network.

3. WAN (Wide Area Network)

A Wide Area Network is a network that extends over a large geographical area such as states or countries.
It is quite bigger network than the LAN.

A Wide Area Network is not limited to a single location, but it spans over a large geographical area through a telephone line, fibre optic cable or satellite links.

The internet is one of the biggest WAN in the world. A WAN is widely used in the field of Business, government, and education.

f) Explain Web browser in detail?

A web browser is a software application for retrieving, presenting & transferring information resources on the www i.e. World Wide Web.

An information resource is identified by a uniform resource locator (URL) and may be web page, image, video or other piece of content.

Hyperlink present in resource enables users easily to navigate their browsers to related resources. The World Wide Web was the first web browser. It was created by W3C Director Tim Berners-Lee in 1990.

Types of web browser are; especially sites should be compatible to major browsers like Explorer, Firefox, Chrome, Netscape, and Opera.

a. **Internet Explorer**
   In **1995,** Microsoft introduced the Internet Explorer It was the first web browser developed by Microsoft.

b. **Google Chrome**
   The popular browser Google Chrome was launched in 2008. This web browser is developed by Google and its beta version was first released on September 2, 2008 for Microsoft Windows. Today, chrome is known to be one of the most popular web browser with its global share of more than 50%.

c. **Mozilla Firefox**
   In 2004, Mozilla introduced Firefox as Netscape Navigator.

d. **Safari**
   Safari browser was introduced in 2003. It was specifically released for Macintosh computers.

e. **Opera**
   It is fast-growing mobile-based browser Opera Mini was released in 2011.

f. **Lynx**
   Lynx browser was a text-based browser, which was invented in 1992. It was not able to display the graphical content. Most users can use Internet Explorer, Chrome, and Mozilla Firefox for working on Internet.

g) Give the characteristics of second generation computer?

"The computer is an electronic device that takes input from the user through input devices then processes these data under the control of a set of instructions (called program) and gives the result (output) through output devices and saves future use."

Followings are the characteristics of Second Generation Computer:

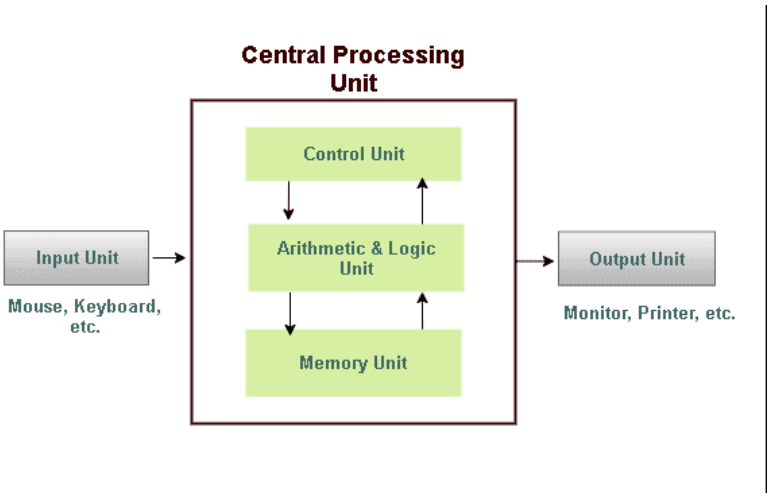
1. As the computers made in the second generation used transistors that made them more reliable, smaller in size, faster in speed, more energy-efficient, and cheaper compared to the first generation of computers.
2. They contain magnetic storage disks and magnetic core memory.
3. They used high-level languages such as FORTRAN and COBOL and allowed communication with the help of a telephone line.
4. The speed and reliability were improved in the second-generation computers as compared to the computers made in the first generation; the data processing time reduced from milliseconds to microseconds.
5. Use of transistors
6. Reliable in comparison to first generation computers
7. Smaller size as compared to first generation computer.
8. Generated less heat as compared to first generation computers
9. Consumed less electricity as compared to first generation computers
10. Faster than first generation computers
11. Still very costly

Q. 2 Attempt any Three of the following: (5 Marks each) 15

a) Explain the basic computer organization.

Basic Computer Organization is as follows:

1. **Input Unit-**
   The process of sending the data and Instructions for the processing through some suitable devices such as Keyboard, Mouse etc. is called Input. The devices translate the data from human understandable form into electronic impulses which are understood by the computer.
   Ex., keyboard, mouse, joystick, light pen, trackball, scanner, microphone, OMR (optical mark reader)



2. Central Processing Unit (CPU)

This unit of the computer is the brain of computer system, which does all the processing, calculations, problem solving and controls all other functions of all other elements of the computer.

The CPU consists of the following three distinct units namely: Memory Unit, Control Unit , Arithmetic and Logic Unit etc.

1) Memory or Storage Unit

This holds the data terms of Program and files. This memory unit is usually referred as primary storage section.

The units in which memory unit is measured are known as BYTES. BYTE is the space required to store 8 characters or alphabet or digits to any other special character.

This unit can store instructions, data, and intermediate results. It supplies information to other units of the computer when needed.

It is also known as internal storage unit or the main memory or the primary storage or Random Access Memory (RAM).

2) Control Unit

This unit which coordinates all the activities of each and every element of computer.

It decodes the instructions given by various users and it sends commands and signals that determine the sequence of various instructions.

It also controls the flow of data from the main storage.

It obtains the instructions from the memory, interprets them, and directs the operation of the computer.
It communicates with Input/output devices for transfer of data or results from storage. It does not process or store data.

3) **Arithmetic and Logic Units**
This unit performs arithmetic operations such as addition, subtraction, multiplication and division.
Function of logic section is to perform logic operations such as comparing of numbers, selecting, matching, and merging of data.
Thus this unit helps by processing data and taking logical decisions.

3. **Output**
The processing of extracting the data from CPU through some suitable devices is called Output. The common used output devices are VDU, Printers, Plotter, magnetic media like floppy Disks etc.

b) Give the characteristics of computer.

"The computer is an electronic device that takes input from the user and processes these data under the control of a set of instructions (called program) and gives the result (output) and saves future use. It can process both numerical and non-numerical (arithmetic and logical) calculations."

Followings are the characteristics of Computer-

1. **High Speed**
Computer is a very fast device.
It is capable of performing calculation of very large amount of data.
A computer works with much higher speed and accuracy compared to humans while Performing mathematical calculations.
Computers can process millions (1,000,000) of instructions per second.
The time taken by computers for their operations is microseconds and nanoseconds.

2. **Accuracy**
In addition to being very fast, computers are very accurate. The calculations are 100% error free.
Computers perform all jobs with 100% accuracy provided that correct input has been given.

3. **Storage Capability**
   Memory is a very important characteristic of computers.
   A computer has much more storage capacity than human beings.
   It can store large amount of data.
   It can store any type of data such as images, videos, text, audio and many others.

4. **Diligence**
   It can work continuously without any error.
   It can do repeated work with same speed and accuracy.
   A computer can perform millions of tasks or calculations with the same consistency and accuracy.
   It doesn't feel any fatigue or lack of concentration. Its memory also makes it superior to that of human beings.

5. **Versatility**
   A computer is a very versatile machine. A computer is very flexible in performing the jobs to be done. Versatility refers to the capability of a computer to perform different kinds of works with same accuracy and efficiency.

6. **Reliability**
   A computer is a reliable machine.
   Modern electronic components have long lives. Computers are designed to make maintenance easy.

7. **Automation**
   Computer is an automatic machine.
   Automation means ability to perform the given task automatically.
   Once a program is given to computer i.e. stored in computer memory, the program and instruction can control the program execution without human interaction.

8. **No IQ**
   Computer is a dumb machine and it cannot do any work without instruction from the user. It performs the instructions at tremendous speed and with accuracy. It is you to decide what you want to do and in what sequence. So a computer cannot take its own decision as you can.

9. **No Feeling**
   It does not have feelings or emotion, taste, knowledge and experience. Thus it does not get tired even after long hours of work. It does not distinguish between users.

c) Explain third generation of computer with its characteristics.

The period of third generation was 1965-1971. The computers of third generation used integrated circuits (IC's) in place of transistors.

Development of a small chip consisting of the capacity of the capacity of the 300 transistors.

These ICs are popularly known as chips.

So it is quite obvious that the size of the compute got further reduced.

Internal storage capacity increased up to 5, 00,000 (half million) characters.

High level languages such as COBOL, FORTRAN-II to IV, BASIC, PASCAL and ALGOL-68 were used during this generation.

The main features of third generation are:

1. IC used
2. More reliable in comparison to previous two generations
3. Smaller size
4. Generated less heat
5. Faster
6. Lesser maintenance
7. Still costly
8. A.C needed
9. Consumed lesser electricity
10. Supported high-level language

Examples

a) IBM-360 series
b) Honeywell-6000 series
c) PDP (Personal Data Processor)

d) Differentiate between second and third generation of Computer.

Second generation	Third generation
1956 – 1963 [Timeline].	1964 to 1971 [Timeline].
Used Transistors	Used Integrated circuits
The transistor was designed and developed by Walter Brattain, John Bardeen, and William Shockley.	The Integrated Circuit was invented by Jack Kilby.
They were huge in size	They are compact in shape and size
Need huge space for installation	Required less space for installation compared to second generation computer
Generated lot of heat and energy	Less amount of heat was generated
They were expensive machines	They are comparatively cheaper
Less storage capacity	More advanced storage capacity
Slower Computers.	Faster operating computers than second generation of computers.
Used punch cards for input and outputs.	Keyboards and monitors were used for input and output.

e) Explain the Workstation computer.

Workstation is a computer used for engineering applications (CAD/CAM), desktop publishing, software development, and other such types of applications which require a moderate amount of computing power and relatively high quality graphics capabilities.

Workstations generally come with a large, high-resolution graphics screen, large amount of RAM, inbuilt network support, and a graphical user interface.

Most workstations also have a mass storage device such as a disk drive, but a special type of workstation, called a diskless workstation, comes without a disk drive.

Common operating systems for workstations are UNIX and Windows NT. Like PC, Workstations are also single-user computers like PC but are typically linked together to form a local-area network, although they can also be used as stand- alone systems.

A workstation is a computer intended for individual use that is faster and more capable than a personal computer. It's intended for business or professional use (rather than home or recreational use).

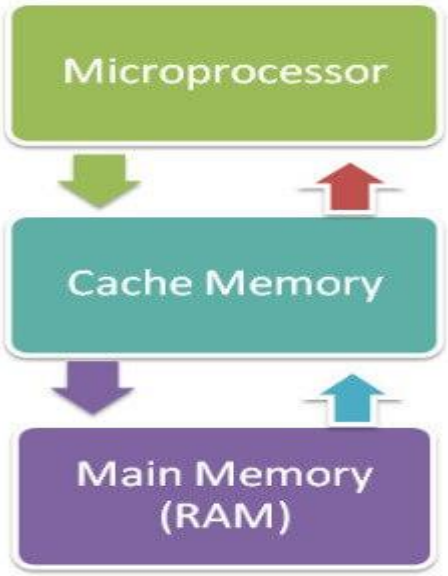
Workstations and applications designed for them are used by small engineering companies, architects, graphic designers, and any organization, department, or individual that requires a faster microprocessor, a large amount of random access memory (RAM), and special features such as high-speed graphics adapters.

Q. 3 Attempt any Three of the following: (5 Marks each) (15)

a) Explain Cache memory with suitable diagram.

Cache memory is a very high speed semiconductor memory which can speed up CPU. It acts as a buffer between the CPU and main memory. It is used to hold those parts of data and program which are most frequently used by CPU.

The parts of data and programs are transferred from disk to cache memory by operating system, from where CPU can access them.



Cache memory can only be accessed by CPU. It can be a reserved part of the main memory or a storage device outside the CPU.

Cache memory holds the data and programs which are frequently used by the CPU. So, it makes sure that the data is instantly available for CPU whenever the CPU needs this data.

In other words, if the CPU finds the required data or instructions in the cache memory, it doesn't need to access the primary memory (RAM). Thus, by acting as a buffer between RAM and CPU, it speeds up the system performance.

The advantages of cache memory are as follows:

i) Cache memory is faster than main memory.

ii) It consumes less access time as compared to main memory.

iii) It stores the program that can be executed within a short period of time.

iv) It stores data for temporary use.

Disadvantages:

i) The disadvantages of cache memory are as follows

ii) Cache memory has limited capacity.

iii) It is very expensive.

b) Explain Biometrics in detail.

A Biometric device is a security identification and authentication device. Such devices use automated methods of verifying or recognizing the identity of a living person based on a physiological or behavioral characteristic. These characteristics include fingerprints, facial images, Iris prints and voice recognition.

Biometrics is being used to establish better and accessible records of the hour’s employee's work. With the increase in "Buddy Punching (a case where employees clocked out coworkers and fraudulently inflated their work hours) employers have looked towards new technology like fingerprint recognition to reduce such fraud.

Additionally, employers are also faced with the task of proper collection of data such as entry and exit times. Biometric devices make for largely foul proof and reliable ways of enabling to collect data as employees have to be present to enter biometric details which are unique to them.

i) Face Scanner: It is designed to identify a person by scanning his or her face. It takes the face measurements of a person. For example, the distance between eyes, nose, and mouth, etc., accordingly, it confirms the identity of a person. Besides this, it is smart enough to differentiate between a person's picture and the real person.

ii) Hand scanner: The hand of a person can also be used to verify his or her identity as every person has a unique pattern of veins in the palm, just like fingerprints. This device takes advantage of this feature; it identifies a person by scanning the palm of his hand. It uses infrared light to scan veins' patterns and blood flowing in them. Palm is even more unique than fingerprints.

iii) Fingerprint Scanner:
It scans the fingerprints to identify people or for biometric authentication. This device is developed, keeping in mind the fact that no two persons in the world can have the same fingerprints. It is widely used in companies as a fingerprint attendance system to mark the attendance of employees. This type of scanners captures the pattern of valleys and ridges found on a finger and store it in the memory or database. When you press your finger on the given space, it verifies the identity by using its pattern-matching software.

iv) Retina or Iris Scanner:
It scans the retina or iris of a person's eye to confirm the identity. This device is more secure than others as it is next to impossible to copy the retina or iris. It works by mapping the retina's blood vessel patterns of the eye. The blood vessels of retina absorb light more easily as well as can be identified with appropriate lighting.

In this scan, a beam of low-energy infrared light falls on the retina through the scanner's eyepiece. Then, the software captures the network of blood vessels in the retina and uses it to verify a person's identity.

v) Voice Scanner:
It records the voice of a person and digitizes it to create a distinctive voice print or template. The voiceprints are stored in the database, and are used to verify the voice of a person to confirm his or her identity. The person is required to speak in the normal or same voice that was used to create a voice template. It is not much reliable as it can be misused using a tape recording.

c) Explain Printer and its types.

Printer is an output device, which is used to print information on paper.

1. Dot Matrix Printer

In the market one of the most popular printers is Dot Matrix Printer. These printers are popular because of their ease of printing and economical price. Each character printed is in form of pattern of dots and head consists of a Matrix of Pins of size (5*7, 7*9, 9*7 or 9*9) which comes out to form a character that is why it is called Dot Matrix Printer.

Advantages:

1. Inexpensive
2. Widely used
3. Other language characters can be printed

Disadvantage:

1. Slow speed
2. Poor quality

2. Laser Printers

These are non-impact page printers. They use laser lights to produce the dots needed to form the characters to be printed on a page.

Advantages

1. Very high speed
2. Very high quality output
3. Give good graphics quality
4. Support many fonts and different character size

Disadvantages

1. Expensive
2. Cannot be used to produce multiple copies of a document in a single printing.

3. Inkjet Printers

Inkjet printers are non-impact character printers based on a relatively new technology. They print characters by spraying small drops of ink onto paper. Inkjet printers produce high quality output with presentable features.
Color printing is also possible. Some models of Inkjet printers can produce multiple copies of printing also.

Advantages

1. High quality printing
2. More reliable

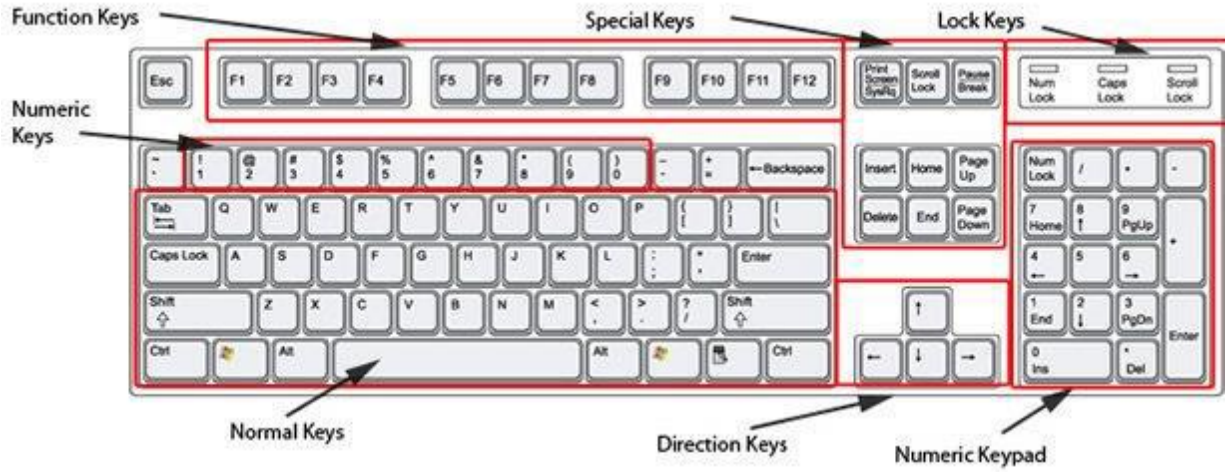
Disadvantages

1. Expensive as cost per page is high.
2. Slow as compared to laser printer

d) Explain Keyboard and Mouse.

Keyboard is the most common and very popular input device which helps in inputting data to the computer. The layout of the keyboard is like that of traditional typewriter, although there are some additional keys provided for performing additional functions.

Keyboards are of two sizes 84 keys or 101/102 keys, but now keyboards with 104 keys or 108 keys are also available for Windows and Internet.



Following are the Keys available on Keyboard:

1. **Typing Keys-**These keys includes Letters keys (A-Z) & Digits (0-9)
2. **Numeric Keys-** It is used to Insert Numeric Data. It Consist of 17 Keys.

3. **Function Keys-**The Twelve keys present in the Keyboard. Which are arranged in a row at the top of the Keyboard.
4. **Control Keys-** These Keys Provide Cursor and Screen Control. It includes End, Insert, Delete, Page-Up, Page-Down, Control, Alternate (Alt), Escape (Esc).
5. **Special Purpose Keys-** It consists of different Keys such as, Enter, Shift, Caps Lock, num Lock, Print Screen, etc.

Mouse

Mouse is most popular pointing device. It is a very famous cursor-control device having a small palm size box with a round ball at its base which senses the movement of mouse and sends corresponding signals to CPU when the mouse buttons are pressed.

Generally it has two buttons called left and right button and a wheel is present between the buttons. Mouse can be used to control the position of cursor on screen, but it cannot be used to enter text into the computer.

Advantages-

1. Clicking
2. Double Clicking
3. Dragging
4. Easy to use
5. Not very expensive
6. Moves the cursor faster than the arrow keys of keyboard.

e) Explain Joystick.

The first joystick was invented by C. B. Mirick at the U.S. Naval Research Laboratory.
A joystick can be of different types such as displacement joysticks, finger-operated joysticks, hand operated, isometric joystick, and more. In joystick, the cursor keeps moving in the direction of the joystick unless it is upright, whereas, in mouse, the cursor moves only when the mouse moves.
Joystick is also a pointing device which is used to move cursor position on a monitor screen. It is a stick having a spherical ball at its both lower and upper ends. The lower spherical ball moves in a socket.
The joystick can be moved in all four directions.
The function of joystick is similar to that of a mouse.
It is mainly used in Computer Aided Designing (CAD) and playing computer games.
A joystick is an input device consisting of a stick that pivots on a base and reports its angle or direction to the device it is controlling.

A joystick, also known as the control column. Joysticks are often used to control video games, and usually have one or more push-buttons whose state can also be read by the computer.
A popular variation of the joystick used on modern video game consoles is the analog stick.

Q. 4 Attempt any Three of the following: (5 Marks each) 15

a) Explain Windows Operating System.

Windows are Graphical User Interface, i.e. GUI. Which provide an easy to way to access programs and data on the computer.

Windows is nothing but an area on the screen, through which a particular pieces of software or data file may be viewed.

The Windows O.S. is developed & maintained by Microsoft, the company founded by 'Bill Gates'

The first version of Windows 1.0 was released in 1985.

Then Windows 2, Windows 2.0, Windows 2862.1 & 3862.1, Windows 3.0, Windows 3.1, Windows 3.11, Windows 95. That contains five versions such as, Windows 95A, Windows 95B, Windows 95B USB, Windows 95C, Windows 98, Windows 2000, that contains five editions Windows 2000 professional, Windows 2000 Server, Windows 2000 Advanced Server, Windows 2000 data center service, Windows 2000 small business server, Windows Multimillion Edition, Windows XP, Windows 2003 that contains five editions such as, Web edition, Standard Edition, Enterprise Edition, Data Center Edition, Small Business server, Windows Vista was released. Now a day's windows 2007, 2010 also available.

Windows O.S. Basics or Elements such as:

1. **Desktop-**

We can see after we log on to Windows, that contains icons, menus, applications, desktop features such as, My Documents, My Computer, My Network Places, Recycle Bin, Internet Explorer & so on.

2. **My Computer-**
   It contains different drivers such as, C:, D:, E:, F: & so on. We can save our files & folders in any drive.
3. **Recycle Bin-**
   In the Recycle Bin stores deleted files, folders, graphics & so on.
4. **My Network Places-**
   Network is the connection between two or more computers for shared resources. You can see all resources in my network places such as, files, folders, printers, etc.

b) Explain HDD in detail.

HDD is an electro-mechanical storage device, which is an abbreviation of Hard Disk Drive. It uses magnetic storage for storing and retrieving the digital data. It is a non-volatile storage device.

Hard disk drive is made up of a series of circular disks called **platters** arranged one over the other almost ½ inches apart around a **spindle**. Disks are made of non-magnetic material like aluminum alloy and coated with 10-20 nm of magnetic material.

Hard Disk Drive is installed internally in our computer systems, which is connected directly to the disk controllers of the motherboard. Hard Disk Drive is a storage device which stores the operation system (OS), installed software, and the other computer files.

HDD means the data is retained when our computer system is shut down. HDD is also called a fixed disk, hard disk, or hard drive. The HDD was introduced in the year 1956 by IBM.

The first personal computer contains a hard drive of less than 1 megabyte, while modern computers contain the hard drive of 1 terabyte. The desktop computers which have external hard drives are used for backup purposes or additional storage.

Data is stored by magnetizing or demagnetizing the magnetic coating. A magnetic reader arm is used to read data from and write data to the disks. A typical modern HDD has capacity in terabytes (TB).

c) Explain USB flash drive.

A USB flash drive, also commonly known as a USB drive, USB stick, USB key, and a variety of other names, is a data storage device that includes flash memory with an integrated USB interface. USB flash drives are typically removable and rewritable, and physically much smaller than an optical disc. Most weigh less than 30 grams.

A USB flash drive can store essential files and data backups, hold favorite settings or programs, perform device troubleshooting diagnostics or launch an operating system from a bootable USB. Microsoft Windows, Linux, MacOS, various Linux flavors and several BIOS boot ROMs are supported on this drive.

The first Flash drive arrived in the market in 2000 with a storage capacity of 8 MB. Depending on the manufacturer, drives currently have capacities ranging between 8 gigabytes and 1 terabyte, and future capacity levels are projected to exceed 2 TB.

The memory is a multi-level cell in most USB flash drives and is ideal for 3,000 to 5,000 program delete cycles. Some drives, however, are designed with single-level cell memory, which supports around 100,000 writes.

The advantages of USB are as follows-

1. USB is easy to use.
2. USB has a robust connector system.
3. USB is very low cost.
4. It has a different variety of connector types and sizes available.
5. It has true plug and play nature.
6. It has Low power consumption.
7. The Daisy chain consists of 127 USB components at the same time to one PC.
8. Fits almost all devices that have a USB port.
9. Data is secured as to who can access it.
10. Durability − How many read/writes cycles are there it allows the life of pen drive.

d. Explain the functions of operating system.

"An operating system is the program that after being initially loaded into the computer by a boot program, which manages all other programs in the Computer. The other programs are called as Application or Application programs."

The functions of operating systems are as follows:

1. Controlling the peripheral devices such as, disk drives, printers, etc.
2. Operating system performs tasks such as, recognizing input from the Keyboard, Sending output to display screen.
3. Provides a user interface.
4. **Security –** An operating system uses password protection to protect user data and similar other techniques. It also prevents unauthorized access to programs and user data.
5. **Control over system performance-** Monitors overall system health to help improve performance. Records the response time between service requests and system response to having a complete view of the system health. This can help improve performance by providing important information needed to troubleshoot problem.
6. **Error detecting Aids –** An operating system constantly monitors the system to detect errors and avoid the malfunctioning of a computer system.

Examples: Command Line Interface(CUI), Graphical user Interface(GUI).

The following diagram shows attached the peripheral devices to operating system.

e) Explain CD and DVD in detail.

Compact Disc-

A compact disc (CD) is a circular disc introduced by James Russell. It is 4.75 in diameter, which is a flat, round, portable storage medium used to record, store and playback audio, video, and other data. It can store data up to 700 MB or 80 minutes of audio.

The first CDs were able to store only audio, which was replaced by audiotapes. Audio CDs have the ability to enable users to skip to different places on the disc.

CDs can be used unlimited time without losing quality, while audio tapes can lose the quality if you use it around ten times. Because in the CDs, the laser that reads data does not put the pressure on the disc.

CDs are used to store data, which can be executed in the future. Thus, you can load software programs in the compact disc that can be moved onto the computer.

Even, Windows files are also stored in the CD, which can be installed onto the computer. Furthermore, the stored files on the compact disc can be transferred to other computers, through which you can make a backup of all files.

Digital Video Disc or Digital Versatile Disc (DVD)-

DVD stands for Digital Versatile Disc. It is commonly known as Digital Video Disc. It is a digital optical disc storage format used to store high capacity data like high quality videos and movies. It is also used to store operating system. It is invented and developed by 4 companies named Philips, Sony, Toshiba and Panasonic in 1995. DVDs provide higher storage capacity than CDs (compact disc) and can be played in multiple types of players like DVD players.

Physical measurements of a DVD- A DVD comes in two dimensions.

a) **12 cm (120 mm)**: It is the most common size and generally used for storing software, movies, and operating system etc.

b) **8 cm (80 mm)**: This size of DVDs is generally used for small devices like portable music player and video camera etc.

On the basis of applications, a DVD can be categorized in different ways as described below:

1. **DVD-ROM:** It can only be used for reading and cannot be written.
2. **DVD-R:** It can be used to record any type of data.
3. **DVD-RW:** It can be read, written, erased and rewritten.

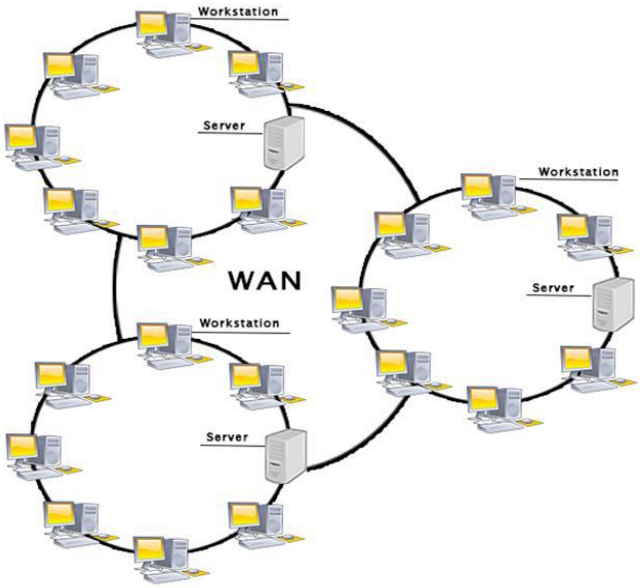
Q. 5 Attempt any Three of the following: (5 Marks each) 15

a) Write short note on WAN.

A Wide Area Network is a network that extends over a large geographical area such as states or countries. It is quite bigger network than the LAN.
A Wide Area Network is not limited to a single location, but it spans over a large geographical area through a telephone line, fibre optic cable or satellite links.
The internet is one of the biggest WAN in the world.
A Wide Area Network is widely used in the field of Business, government, and education.
It contains a connection of LAN and MAN.
The network of WAN is connected through broadband services, 3G or 4G internet services, etc.

Advantages of WAN-

1. Increase efficiency
2. Easy of communication
3. Large network cover
4. Share information over the large area
5. Message can be sent very quickly to anyone else on the network
6. It supports the global market and global business
7. Centralized IT infrastructure
8. Boost your privacy



b) Explain FTP protocol.

FTP stands for File Transfer Protocol. It enables an Internet user to move a file from one computer to another on the Internet.

A file may contain any type of digital information i.e. text document, image, artwork, movie, sound, etc. By using FTP service.

A user encores FTP command on local computer.

An FTP process running on user's computer (caused FTP client process) establishes a connection with an FTP process running on remote computer (called FTP server process)

The system then asks the user to enter his/her login name & password on the remote computer to ensure that the user is authorized to access the remote computer.

After successful login desired file are downloaded or uploaded by using net for downloading & put for uploading commands.

User can also list directories of the remote computer, before deciding which file to transfer.

The FTP service is also used for more secure file transfer operations. In such cases, a user reads a valid username & password to access a particular computer.

Ex. For organizations that wish to let only certain people access their computer.

Advantages of FTP-

FTP is very easiest and most secure way to exchange files over the Internet.

Speed, efficient and security are also advantages of FTP.

By Using FTP, we can download the files.

Following types of file, we can download such as-

1. Images
2. Sound
3. Video
4. Software.exe
5. Data file like Video games
6. Document file

c) Explain different data transmission modes.

The **transmission mode** is a computer network process in which data or information is transmitted between two devices over the network. We can also say that it is a mechanism that transfers data in electro-magnetic bits format between two devices that are connected through network. It is also known as **communication mode**.

The **transmission mode** defines the **direction** of the flow of the data. For example, a sender wants to send data to a particular receiver, then the sender can send information to a receiver using transmission mode over the network.

There are following three types of transmission modes in Network.

1. Simplex Mode
2. Half duplex Mode
3. Full duplex Mode

1. Simplex Mode

It is a basic mode of transmission that enables the transmission of data only in one direction. When the data is transferring to the other side, the other person can only receive the data but cannot respond to the message at the same time. Simplex mode is also called a **unidirectional mode**.

The examples of simplex mode are keyboard, monitor, television, and radio etc.

Advantage of Simplex Mode-

1. It uses the full capacity of bandwidth during transmission of data due to single directional.
2. There is no traffic issues occur during communication.

Disadvantage of Simplex Mode-

1. Two devices cannot communicate with each other in at the same time.
2. Bidirectional transmission is not occurring in the simplex mode.

2. Half Duplex Mode

Half-duplex mode transfers data in both directions but not at the same time. We can also say it is a way of communication in which sender sends the information to the receiver, and the receiver can receive the information.
After receiving the information, the receiver can respond to the sender. The walkie-talkie is the best example of half duplex mode.
In this device, when the sender completes his message speaks **over and out** which indicates that the receiver can responds to the message now.

Advantage of Half Duplex Mode:

1. It is a two-dimensional model of transmission of the data.
2. In half-duplex mode, data can be received or sent from both directions but only one at a time.

Disadvantage of Half Duplex Mode:

1. When one device sends data to another device, the second one must wait for that may cause delays in receiving the output.
2. Slow in the transmission of data.

3. Full Duplex Mode

Full-duplex mode allows the transmission of data between the two devices at the same time. It is also known as a **bidirectional** mode. The sender and receiver can simultaneously send and receive the data over a network. For example, in a telephonic conversation, two people can talk and listen simultaneously at the same time.

Advantage of Full Duplex Mode-

1. The performance of a full-duplex transmission mode is much higher than the simplex and the half-duplex mode.
2. Both devices can send or receive the data simultaneously.
3. There is no delay in transmitting data over the network.

Disadvantage of Full Duplex Mode-

1. In full-duplex mode, there can be a traffic problem while transmitting the data on a network.
2. There is no proper utilization of bandwidth in full-duplex mode while sending or receiving data at the same time.

d) Explain E-Mail in detail.

E-Mail stands for electronic mail. It is one of the most popular facilities of the Internet people can send and receive message referred as, main, within a few minute across content.

It can be used for personals and business communication and exchange of information. Any type of computer on the Internet can send and receive mail.
The Heart of E-mail service is the E-mail service provider.

The E-mail service provider is also caused as, Internet service provider (ISP). This is an organization that maintains a computer capable of sending and receiving, E-mail.

When user wants an E-mail address, an account is created for him/her, on the E-mail sender. The name of this account is referred as, his E-mail ID.

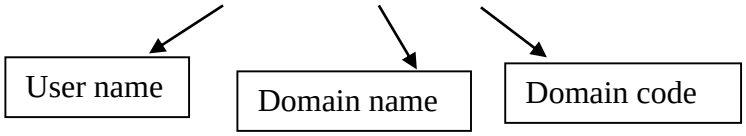
A typical E-mail will be as follows-

Username@domin name

1. The username is identifying of the user.
2. @ separates the user name and domain name.
3. Every E-mail server is given a unique name, referred as domain name

For example-

Shiksha@gmail.com



Like .com other types of Organization are as below-

1. **.Edu –** refers to Educational Institute.
2. **.com –** refers to Commercial Organization.
3. **.gov –** refers to Government site.
4. **.net –** refers to network related Organization

e) Draw and explain OSI reference model.

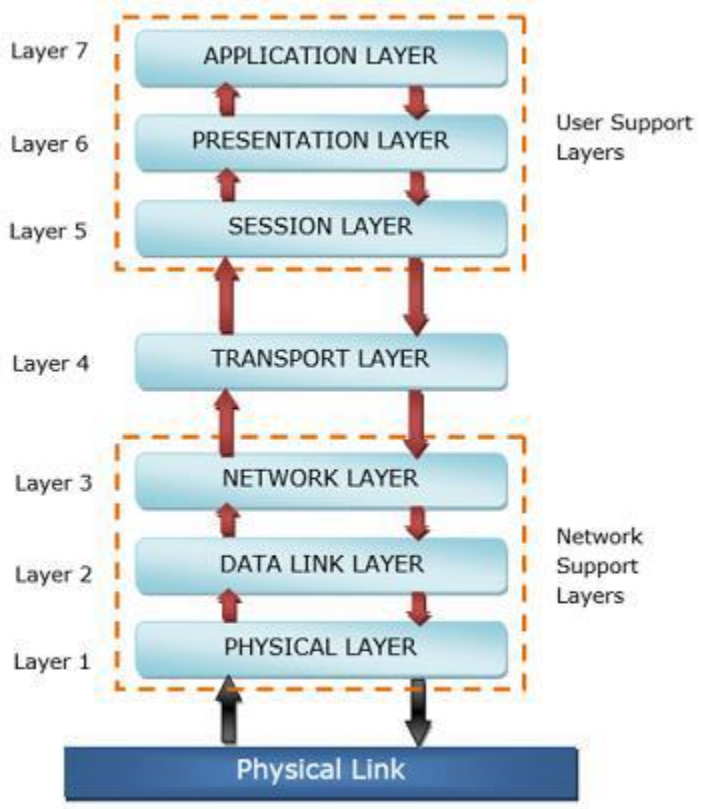


Fig: OSI Model

An OSI stands for (Open System Interconnection).
There are following seven layers are used in OSI reference modes such as:

1. Application Layer

An Application layer provides services that directly support end users of network.
It is a collection of miscellaneous protocols for various commonly used applications such as, e-mail, file transfer, remote login, etc.
An application layer serves as a window for users and application processes to access network service.
It handles issues such as network transparency, resource allocation, etc.
An application layer is not an application, but it performs the application layer functions.
This layer provides the network services to the end-users.

2. Presentation Layer

A Presentation layer is mainly concerned with the syntax and semantics of the information exchanged between the two systems.
It acts as a data translator for a network.
This layer is a part of the operating system that converts the data from one presentation format to another format.
The Presentation layer is also known as the syntax layer.

It performs data encoding, conversion, compression, decompression depending upon application requirement.

3. Session layer

Session layer has the primary responsibility of beginning, maintaining and ending the communication between two devices, which is called Session.

It also provides for orderly communication between devices by regulating the flow of data.

The session protocol defines the **format of the data** sent over the connections.

Session layer **establish and manages the session** between the two users at different ends in a network.

It also manages who can transfer the data in a certain amount of time and for how long.

This layer provides establishing, maintaining & transmitting a dialog or session between two end users.

4. Transport Layer

That layer accepts msg. from session layer, segment them into packet, submits them to tent layer i.e. network layer for further transmission & finally reassemble the packet towards destination. There are two commonly used. Transport layer protocol is TCP & user Datagram protocol (UDP).

5. Network Layer

Network layer sets up a logical path between two nodes. Two most commonly used network layer protocol are the x.25 protocol & the Internet protocol (IP). There are two types of IP addresses (i) IPV4 (ii) IPV6 Network Layer function are used in WANS. In LAN data transfer from one node to another node.

6. Data-link Layer

Physical layer transmit data between two nodes as electrical final (digital/analog), that signals are connected into frames data by using data-link layer also detect and corrects any error in transmitted data.

7. Physical Layer

Physical layer transmit row bit streams between two nodes by connecting sequence of binary digits into electrical digits. It is the lowest layer of the OSI model.

The main functionality of the physical layer is to transmit the individual bits from one node to another node.

It establishes, maintains and deactivates the physical connection.

It specifies the mechanical, electrical and procedural network interface specifications.