

## PERIPHERAL AND INTERFACES

2019

### PART -A

#### 1. Attempt any ten questions.

##### a) What are actuators.

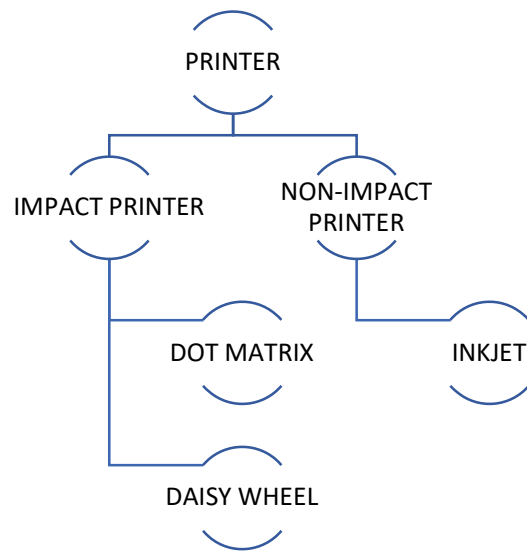
An actuator is a device or machine that helps it to achieve physical movement by converting electrical energy into mechanical force.

There are two types of actuators

Voice Coil Actuator

Steeper Motor

##### b) Differentiate between impact and non-impact printers.



IMPACT PRINTER	NON-IMPACT PRINTER
Produces character and graphics on paper by striking it is called impact printer.	A type of printer that produces character and graphic on paper without striking.
It prints by hammering a set of metal pin or character set.	Printing is done by depositing ink in any form
Slower than non-impact printer	Faster than impact printer
Affordable	Expensive
When print head strikes then they prefer special inked ribbons to produce print on paper.	They prefer cartridge or toner for printing.

**c) What do you understand by the term peripheral device. Also give examples.**

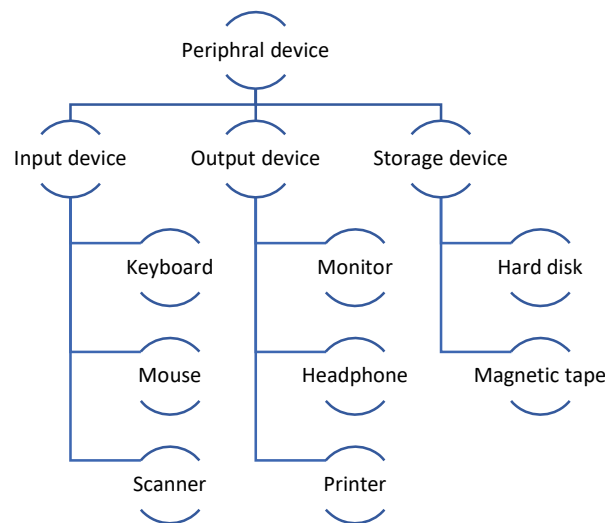
A peripheral device is defined as the device that provides input/output functions for a computer and serves as an auxiliary computer device without computing intensive functionality.

Generally peripheral devices, however are not essential for the computer to perform its basic tasks, they can be thought of as an enhancement to user's experience.

A peripheral device is a device that is connected to a computer system but is not part of the core computer architecture.

Generally, more people use term peripheral more loosely to refer a device external to the computer case.

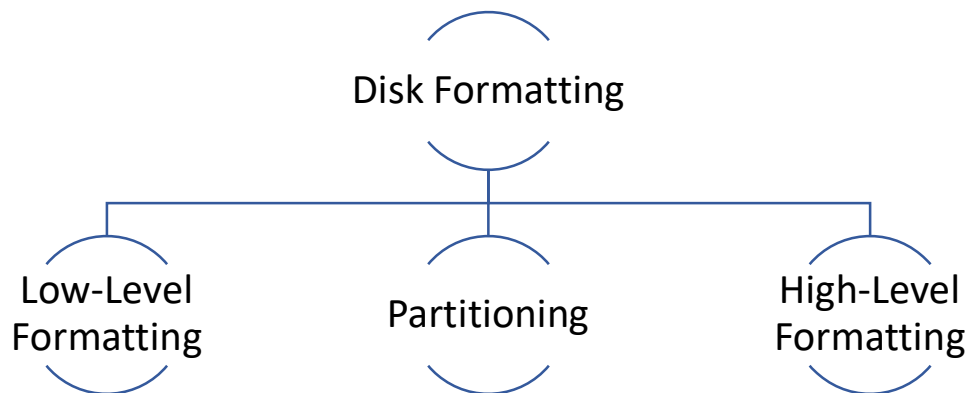
Classification of peripheral devices. Generally, it is classified into 3 basic categories given below.



**d) What is Disc Drive formatting.**

Disk formatting is the process of preparing a data storage device such as a hard disk drive, SSD, Floppy or USB for initial use. In some cases, the formatting operation may also create one or more new file systems.

When we format the disk then the existing files within the disk is also erased.



Low-Level Formatting

Low level formatting is a type of physical formatting. In is the process of marking of cylinders and tracks of the blank hard-disk.

## Partitioning

As suggesting from the name, partitioning means divisions. Partitioning is the process of dividing the hard-disk into one or more regions. The regions are called as partitions.

## High-Level Formatting

High-level formatting is commonly done if a user wishes to erase the hard drive and reinstall the operating system back onto the hard drive it initializes portions of hard drive and create important file system.

### **e) What is the basic Concept of PAL.**

PAL (Phase Alternating Line) is a type of colour encoding system. It delivers a frame rate of 25fps and a 720x576 aspect ratio. It offers automated colour correction PAL is popular in places like UK, Australia and Sweden.

### **f) List the basic principle of monitors.**

The basic principle of a CRT monitor is Cathode Ray Tube it depends on the movement of an electron beam which moves back and forth across the back of the screen. The source of the electron beam is the electron gun the gun located in the narrow cylindrical neck at the extreme rear of a CRT which produces a stream of electrons through thermionic emission.

### **g) Differentiate between low-level and high-level formatting.**

Low-Level Formatting	High-Level Formatting
Low-Level Formatting (aka physical formatting) is a hard disk operation that is used to prepare a hard drive by creating the actual sectors, tracks, cylinders, and control structures required for reading and writing data on the drive.	High-level formatting is the process of writing. Writing on a file system, cluster size, partition label, and so on for a newly created partition or volume.
Low level formatting erase all the data and it is impossible to recover that data. Some users make such a format that they can avoid their privacy leakage.	It is done to erase the hard-disk and again installing the operating system on the disk-drive.

### **h) Define Interface. Give examples of few interfaces.**

Interface is a shared boundary or a medium across which two different devices interact with each other.

When referring to software, an interface is a program that allows a user to interact with program. For example GUI

When referring to hardware, an interface is a physical medium to interact with the computer of other hardware device. For example, IDE and SATA are disk drive interfaces for computer hard drives and ATAPI is an early interface for CD-ROM drives.

### **i) What is resolution & bandwidth of monitors?**

## Resolution

Monitor resolution describes the visual dimensions of any given display. Expressed in terms of width and height, monitor resolution is comprised of a specific number of pixels.

Formula  $W \times H$

In the case of a monitor with an industry-standard Full HD 1080p resolution, this display has a resolution of 1920 x 1080. This means that the screen will have a width of 1,920 pixels while the height of the screen will be 1,080 pixels. This results in a grand total of 2,073,600 pixels on-screen.

## Bandwidth

To calculate the bandwidth required for a single frame the following equation is used:

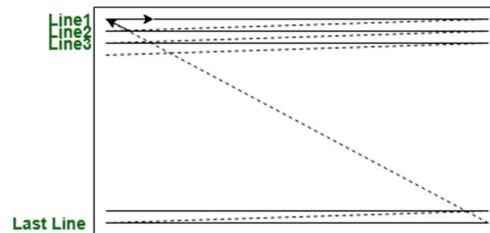
$$\text{Horizontal pixels} \times \text{Vertical pixels} \times \text{pixel (color) depth}$$

the total bandwidth required by the display/monitor interface for every frame is:

$$\text{Horizontal pixels} \times \text{Vertical pixels} \times \text{pixel (color) depth} \times \text{frame rate (in Hertz)}$$

### **j) What is Raster Scan?**

Raster Scan Displays are most common type of graphics monitor which employs CRT. It is based on television technology. In raster scan system electron beam sweeps across the screen, from top to bottom covering one row at a time. A pattern of illuminated pattern of spots is created by turning beam intensity on and off as it moves across each row.



**Raster Scan**

### **k) Explain refresh rate.**

The refresh rate of your display refers to how many times per second the display is able to draw a new image. This is measured in Hertz (Hz). For example, if your display has a refresh rate of 144Hz, it is refreshing the image 144 times per second. When paired with the high frame rates produced by a GPU and CPU working together, this can result in a smoother experience and potentially higher FPS.

### **l) What is tape drive.**

A tape drive is a data storage device that reads and writes data on a magnetic tape. Magnetic tape data storage is typically used for offline, archival data storage. Tape media generally has a favourable unit cost and a long archival stability.

A tape drive provides sequential access storage, unlike a hard disk drive, which provides direct access storage. A disk drive can move to any position on the disk in a few milliseconds, but a tape drive must physically wind tape between reels to read any one particular piece of data. As a result, tape drives have very large average access times.

### **m) List any five input devices. Also explain any one of them brief.**

#### Input devices

- I. Keyboard
- II. Mouse
- III. Joystick
- IV. Light pen
- V. Track Ball

#### Keyboard

Keyboard is the most common and very popular input device which helps to input 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.

**n) Define monochrome monitor.**

A monochrome monitor is a type of computer monitor in which computer text and images are displayed in varying tones of only one colour, as opposed to a colour monitor that can display text and images in multiple colours. They were very common in the early days of computing, from the 1960s through the 1980s, before colour monitors became widely commercially available.

**PART -B**

**2. Attempt any Five question.**

**a) Explain in details the working principle of laser printer.**

They work by using a heated wire to positively charge a drum, which is then passed over by a laser that reverses the charge in the areas that it hits. The now-negatively charged areas of the drum represents the image or text that is to be printed.

A toner roller is passed over the drum, and toner particles stick to the negatively charged areas. A sheet of paper is then fed underneath the toner-coated drum and the toner is passed onto its surface, creating a printer copy of a digital document or image.

**b) What do you understand by sector interleaving? Explain in brief.**

When referring to a computer hard drive, interleaving is a method of making data accessed more efficiently by organizing the sectors on the hard drive.

interleaving is a technique used to improve slow system performance by putting data accessed sequentially into non-sequential blocks, typically sectors. The number of physical sectors between consecutive logical sectors is called the interleave skip factor or skip factor.

Interleaving was used to arrange the sectors most efficiently, so that after reading a sector, time is allowed for processing, and then the next sector in sequence is ready to be read just as the computer is ready to do so. Matching the sector interleave to the processing speed therefore accelerates the data transfer, but an incorrect interleave can make the system perform markedly slower.

**Interleaving techniques**

One to one = Sectors are placed on a track

Two to one = Sectors are spread out by other sectors.

Computer hard drive help and support.

**c) Explain the basic concept of NTSC standards.**

NTSC (National Television Standard) delivers a frame rate of 30 frames per second Each frame contains 525 lines and can contain 16 million different colours. at an aspect ratio of 720x480. It supports manual colour correction. it is popular in places like U.S. and Japan.

#### **d) What are video display adapters? Explain VGA.**

A video display adapter is a device that enables one hardware interface to adapt to another hardware interface without any loss of function and then transmits signals to another hardware interface. Video display adapters allow the transmission of video signals to monitors, projectors, or televisions.

Example: Your laptop has USB-C ports, but It is not an HDMI port. You need to connect that laptop to a Monitor or projector with an HDMI port. What do you do? Yeah, you must use USB-C to HDMI converter/adaptor to do that.

##### Types Of Video Display Adapters.

##### HDMI

HDMI (High-Definition Multimedia Interface) is a long, flat connector that contains 19 pins. It transmits uncompressed video across the cable and integrates both the audio and video signals into one connector. This is considered an advanced cable and is present on most new HDTVs and many computer monitors.

##### VGA

VGA (Video Graphics Array) connectors are typically 15-pin cables that transmit video signal only. It contains separate information for red, greens and blues, as well as horizontal and vertical positioning. VGA is found mainly on computer monitors and has been around since the late 1980s.

##### DVI

DVI (Digital Video Interface) is a connector that is long and rectangular and designed to transmit large amounts of data to LCD and HDTV screens. It has as many as 24 pins but does not include a channel for sound like HDMI. DVI is most commonly found on computer monitors but is occasionally used on a television.

#### **e) Explain the construction of hard disk.**

Hard disks are rigid platters, composed of a substrate and a magnetic medium. The substrate – the platter's base material – must be non-magnetic and capable of being machined to a smooth finish. It is made either of aluminium alloy or a mixture of glass and ceramic. To allow data storage, both sides of each platter are coated with a magnetic medium – formerly magnetic oxide, but now, almost exclusively, a layer of metal called a thin-film medium. This stores data in magnetic patterns, with each platter capable of storing a billion or so bits per square inch (bps) of platter surface.

Platters vary in size and hard disk drives come in two form factors, 5.25in or 3.5in. The trend is towards glass technology since this has the better heat resistance properties and allows platters to be made thinner than aluminium ones. The inside of a hard disk drive must be kept as dust-free as the factory where it was built. To eliminate internal contamination, air pressure is equalised via special filters and the platters are hermetically sealed in a case with the interior kept in a partial vacuum. This sealed chamber is often referred to as the head disk assembly (HDA).

#### **f) Explain the working of a digitizer.**

A digitizer is a hardware device that receives analog information, such as sound or light, and records it digitally. Usually, the information is stored in a file on a computing device. This process is called digitization.

For example, a digital camera is a digitizer. Light enters through the camera lens, and the hardware and software inside the camera converts that information to binary data, and stores it an image file. The user may then transfer the file to a computer, where he or she can edit the image, print it out, or share it online.

##### Examples of digitizers

- Digital camera
- Audio digitizer
- Digital Tablet
- Accelerometer and gyroscope
- Scanner

**g) difference between SCSI & EIDE interfaces.**

SCSI	EIDE
Small Computer System Interface	Enhanced Integrated Drive
a SCSI system is more expensive than EIDE.	EIDE hard disks are much cheaper than SCSI drives
SCSI you need an extra controller, because there aren't a lot of motherboards with integrated SCSI controllers.	its controller is on each drive, meaning the drive can be connected directly to motherboard.
It supports data rates from 5 to 40 Mbps in 8bit and 20 to 80 Mbps in 16bit.	It supports data rates from 4 and 16.6 Mbps.
SCSI hard disks have larger cache RAM than EIDE hard disks.	EIDE hard disks have smaller cache RAM than EIDE hard disks.
Configuring SCSI can be more difficult for most users compared to EIDE.	EIDE is commonly an easier product to set up than SCSI.

**h) What is partitioning?**

Disk partitioning or disk slicing<sup>[1]</sup> is the creation of one or more regions on secondary storage, so that each region can be managed separately.<sup>[2]</sup> These regions are called partitions. It is typically the first step of preparing a newly installed disk, before any file system is created. The disk stores the information about the partitions' locations and sizes in an area known as the partition table that the operating system reads before any other part of the disk. Each partition then appears to the operating system as a distinct "logical" disk that uses part of the actual disk. System administrators use a program called a partition editor to create, resize, delete, and manipulate the partitions.<sup>[3]</sup> Partitioning allows the use of different filesystems to be installed for different kinds of files. Separating user data from system data can prevent the system partition from becoming full and rendering the system unusable. Partitioning can also make backing up easier. A disadvantage is that it can be difficult to properly size partitions, resulting in having one partition with too much free space and another nearly totally allocated.

**PART -C**

**Attempt any three questions: -**

**3. (a) Explain the construction and working of a Dot Matrix Printer.**

Working of Dot Matrix Printer.

Dot matrix printers are impact printers. They produce an image by hammering a column of 9 or 24 pins against a ribbon. ... If carbon paper is put into the printer then a dot matrix printer can print more than one copy of a document at a time.

Dot matrix (impact) printing is a type of computer printing which uses a print head that moves back-and-forth, or in an up-and-down motion, on the page and prints by impact, striking an ink-soaked cloth ribbon against the paper, much like the print mechanism on a typewriter.

All dot matrix printers create characters on paper by striking an inked ribbon with a hard surface. Unlike typewriters, which use a similar mechanism, dot matrix printers do not have fixed character shapes or fonts. Instead, each individual character is formed by the arrangement of a series of pins.

Dot matrix printing, sometimes called impact matrix printing, is a type of computer printing which uses a print head that moves back-and-forth, or in an up-and-down motion, on the page and prints by impact, striking an ink-soaked cloth ribbon against the paper, much like the print mechanism on a typewriter.

**(b) Explain briefly the working principle of keyboard and mouse.**

Working of Keyboard

A keyboard is a lot like a miniature computer. It has its own processor and circuitry that carries information to and from that processor. A large part of this circuitry makes up the key matrix.

The key matrix is a grid of circuits underneath the keys. In all keyboards, each circuit is broken at a point below each key. When you press a key, it presses a switch, completing the circuit and allowing a tiny amount of current to flow through. The mechanical action of the switch causes some vibration, called bounce, which the processor filters out. If you press and hold a key, the processor recognizes it as the equivalent of pressing a key repeatedly.

When the processor finds a circuit that is closed, it compares the location of that circuit on the key matrix to the character map in its read-only memory (ROM). A character map is basically a comparison chart or lookup table. It tells the processor the position of each key in the matrix and what each keystroke or combination of keystrokes represents. For example, the character map lets the processor know that pressing the "a" key by itself corresponds to a small letter "a," but the Shift and a keys pressed together correspond to a capital "A."

#### Working of Mouse

The LED installed at the bottom of the mouse emits a bright light in the downward direction. Since a mouse is usually used on plain surfaces, the light bounces back from the surface and enters a photocell that's also mounted on the bottom, almost next to the LED.

This photocell has a frontal lens that magnifies any light reaching it. As you move the mouse around, the pattern of the reflected beam changes; this is then used by the light-detector chip to figure out how and in which direction you're moving the mouse.

#### **4. Explain the working of CD-ROM. Also give in details its construction.**

##### Working of CD-ROM

CD-ROM, abbreviation of compact disc read-only memory, type of computer memory in the form of a compact disc that is read by optical means. A CD-ROM drive uses a low-power laser beam to read digitized (binary) data that has been encoded in the form of tiny pits on an optical disk. The drive then feeds the data to a computer for processing.

##### Construction

In terms of construction and basic components, CD-ROMs are rather similar in most regards to other storage devices that use circular, spinning media, which isn't that much of a surprise.

#### **5. (a) What do you understand by the term MFM/ Explain in detail.**

MFM (Modified Frequency Modulation) is a scheme for encoding data on single-density floppy disk or Hard Drive.

- More data can be stored on the same surface or the data storage density can be increased, if the number of pulses required to store the data can be minimized.
- When minimizing the pulses, one should be careful that the number of no pulses together should not be very long; otherwise, the disk controller may go out of synchronization with the data.
- The MFM (modified frequency modulation) method of data storage, by reducing the number of pulses, is able to store more data without any data and synchronization number of pulses, is able to store more data without any data and synchronization loss. In MFM recording the 0s and 1s are encoded as given below
- 1 is always stored as no pulse, and a pulse (NP)
- 0, when preceded by another 0, is stored as a pulse, and no pulse (PN)
- 0, when preceded by a 1, is stored as two no pulses (NN)
- If you store 1001 on the disk surface using the MFM storage method, it would be stored as NP NN PN NP.

#### **(b) Explain the IDE interface.**

Short for Integrated Drive Electronics, IDE is more commonly known as ATA or PATA (parallel ATA). It is a standard interface for IBM computers that was first developed by Western Digital and Compaq in 1986 for compatible hard drives and CD or DVD drives. IDE is different than SCSI and ESDI (Enhanced Small Disk Interface) because its



controllers are on each drive, meaning the drive can connect directly to the motherboard or controller. IDE and its updated successor, EIDE (Enhanced IDE), are common drive interfaces found in IBM compatible computers. These drive utilize either 40 or 80 wire cables with a broad 40-pin connector.

## **6. (a) What are various optical storage media? Explain the working principal of DVD.**

optical storage, electronic storage medium that uses low-power laser beams to record and retrieve digital (binary) data. In optical-storage technology, a laser beam encodes digital data onto an optical, or laser, disk in the form of tiny pits arranged in a spiral track on the disk's surface. A low-power laser scanner is used to "read" these pits, with variations in the intensity of reflected light from the pits being converted into electric signals.

### Types of Optical Storage Media

#### CD-ROM

CD-ROM stands for "Compact Disc Read Only Memory", and CD-ROM comes in the "Random Access" category's devices. These types of disc can capable to store almost 800 MB of digital data. These data can't discard by mistaken.

#### DVD-ROM

DVD-ROM stands for "Digital Versatile Disc – Read Only Memory", and it also comes in the "Random Access" category's devices. DVD-ROM discs can store data up to 4.7 GB, but Dual Layer DVD device's storage capacity is double. These types of disc are used to store ultra quality video.

#### Blue Ray

Blue Ray discs are totally replaced by DVDs, because these discs are capable to hold data up to 25-50 GB, as well as double layer Blue Rays discs can store double data. Due to high storage capacity, Blue Ray discs are used to store HD (High Definition) videos.

#### HD DVD

HD DVD stands for "High Density DVD", and these devices are capable to store data up to 15 GB (Dual Layer HD DVDS have storage capacity double). High-Density DVD discs are also used to hold HD Videos.

#### DVD-RAM

DVD-RAM stands for "DVD-Random Access Memory", and it is able to Re-Write data. DVD-RAM are available in market like as floppy-disc style case. These types of discs have storage capacity of data similar to DVD (up to 4.7 GB).

DVD-RAM devices are used in several Camcorders such as "Video Recording Cameras", and it can be used for data back-up and archiving.

#### Recordable Optical Devices

There are two types of discs such as "CD-R and DVD-R" and "CD-RW and DVD-RW".

#### CD-R & DVD-R

Full form of (CD-R & DVD-R) is "CD-Recordable and DVD Recordable", and they are able to burn data on to them, but not easy to delete data. Users can add any type of data, but they can't discard added data or re-use fully disc.

#### CD-RW & DVD-RW

CD-RW & DVD-RW stands for "CD-Re Writable and DVD-Re Writable", and they are capable to burn data similar (CD-R and DVD-R) onto them. Users can also delete and Re-Used data.

### Working Principal Of DVD.

DVD works on the principle of optical storage media. DVD are of same diameter and thickness as CDs, and they are made using some of the same materials and manufacturing methods. Like a CD, the data on a DVD is encoded in the form of small pits and bumps in the track of the disk.

DVD is composed of several layers of plastic, totalling about 1.2 millimetres thick. Each layer created by injection moulding poly carbonate plastic. This process forms a side that has microscopic bumps arranged as a single. Continuous and extremely long spiral track of data. More on the bumps later. Once the clear pieces of poly carbonate are formed, a thin reflective layer is sputtered onto the disc, covering the bumps. Aluminium is used behind the inner layers and a semi-reflective gold later is used for the outer layer allowing the laser to focus through the other and onto the inner layers.

#### **(b) Explain the concept of pen drive.**

Commonly known as a USB flash drive it is a portable device which means it can be easily transferred from one location to another due to its compact design it looks like a pen shape and therefore it is named a pen drive.

The pen drives are used in a wide range in the world they have easily replaced CDs, Floppy Disk due to their huge data storing capacity and faster data transferring speed.

Pen drives and USB flash drives are connected to USB (Universal Serial Bus) Port which is available on computer motherboards they are used without any additional power supply they receive the power directly from the USB port itself and hence are playing a dominant role in the PC world.

Pen drives, USB Flash drives, thumb drives come in huge data storage capacity from 2 GB to 128 GB.

The USB Memory Stick comes with different inbuilt features embedded in itself such as a built-in camera, built-in audio, and video playing applications.

These devices enable users to transfer data from one computer to another with ease with no data loss.

The USB Memory Stick and USB flash drives are Plug and play devices i.e. they do not require any additional drives or software and hardware or application to run them they are easily connected to USB 1.0 and USB 2.0 of desktops, laptops, palmtops, and even in small mobile devices which makes their approach more incredible and vast.

Nowadays USB Memory Stick is also used in the form of bootable medium they are widely used in installing an operating system where no optical drives are present, they are used in read, write, delete, and updating data inside these devices.

### Pen Drives Architecture

The pen drives consist of a small printed circuit board typically in a plastic or metal body, they use a technology name EEPROM (Erasable Programmable Read-only Memory) for read, write, and erasing data It is highly durable solid stage storage.

This Flash memory which saves data and data output is controlled by a crystal oscillator that has 12 MHz clock signals.

#### **7. (a) List the specifications of impact and non-Impact printers.**

##### Impact Printer

Impact printers make a picture by utilizing some tool to press an inked ribbon on the cover, presenting the ink be kept on the page in the shape accordingly. These printers produce so much noise, but people are still using them because of the quality and capability to work with multipart structures.

Ball printers, Dot-matrix, Daisy wheel printers, Line printers, Drum printers, and Chain printers are some examples of Impact Printers.

### Non-Impact Printer

Non-impact printers create pictures, characters, and figures without any uninterrupted contact between the printing device and the paper.

Laser printers, Inkjet printers and Thermal printers are some examples of non-Impact printers.

<b>IMPACT PRINTER</b>	<b>NON-IMPACT PRINTER</b>
Produces character and graphics on paper by striking it is called impact printer.	A type of printer that produces character and graphic on paper without striking.
It prints by hammering a set of metal pin or character set.	Printing is done by depositing ink in any form
Slower than non-impact printer	Faster than impact printer
Affordable	Expensive
When print head strikes then they prefer special inked ribbons to produce print on paper.	They prefer cartridge or toner for printing.

### **(b) Explain the working principal of colour monitor.**

#### CRT

A display monitor capable of displaying many colors. In contrast, a monochrome monitor can display only two colors one for the background and one for the foreground. Color monitors implement the RGB color model by using three different phosphors that appear red, green, and blue when activated. By placing the phosphors directly next to each other, and activating them with different intensities, color monitors can create an unlimited number of colors. In practice, however, the real number of colors that any monitor can display is controlled by the video adapter.

Color monitors based on CRT technology employ three different techniques to merge phosphor triplets into pixels:

- Dot-trio shadow masks place a thin sheet of perforated metal in front of the screen. Since electrons can pass only through the holes in the sheet, each hole represents a single pixel.
- Aperture-grille CRTs place a grid of wires between the screen and the electron guns.
- Slot-mask CRTs uses a shadow mask but the holes are long and thin. It's sort of a cross between the dot-trio shadow mask and aperture-grill techniques.