



**Important Instructions to examiners:**

- 1) The answers should be examined by key words and not as word-to-word as given in the model answer scheme.
- 2) The model answer and the answer written by candidate may vary but the examiner may try to assess the understanding level of the candidate.
- 3) The language errors such as grammatical, spelling errors should not be given more Importance (Not applicable for subject English and Communication Skills).
- 4) While assessing figures, examiner may give credit for principal components indicated in the figure. The figures drawn by candidate and model answer may vary. The examiner may give credit for any equivalent figure drawn.
- 5) Credits may be given step wise for numerical problems. In some cases, the assumed constant values may vary and there may be some difference in the candidate's answers and model answer.
- 6) In case of some questions credit may be given by judgement on part of examiner of relevant answer based on candidate's understanding.
- 7) For programming language papers, credit may be given to any other program based on equivalent concept.



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Q.1 A] (1-mark for Definition, 3-marks for Explanation)

a) The process of moving the heads to the designated/safe area is called **Head Parking**.

- The R/W head of the HDD floats on an air cushion during the normal operation of the drive.
- When the drive is stopped the rotation of the platter slows down which reduces the air cushion and the head slowly moves towards the platter surface and lands on the surface.
- By the time the platter stops completely the head skids on the disk surface and damages the surface. Similar process is repeated when the drive is switched on.
- To avoid this, the R/W head is moved to some safe area on the disk surface before switching off the drive.
- The process of moving the R/W head to some safe area is called head parking.
- The area where the R/W is parked is called landing zone and in most of the HDDs it is the area inside the innermost cylinder of the drive.

b) (½-mark for each point)

USB Features

1. Host: The computer acts as a Host
2. Multiple devices: We can connect up to 127 devices to the host directly or by USB hubs.
3. USB Cable length: Individual USB cables can be as long as 5 meters; with hubs, devices can be upto 30 meters., away from the host.
4. Transfer Rate: The initial USB 1.0 standard supported 12 Mbps transfer rate. The USB 2.0, the bus has a maximum data rate of 480 megabits per second.
5. Ease of installation: A USB cable has two wires for power (+5 volts and ground) and a twisted pair of wires to carry the data.
6. Hot-swappable: USB devices are hot swappable, meaning you can plug them into the bus and unplug them any time.
7. Power Saving: Many USB devices can be put to sleep by the host computer when the computer enters a power saving mode.
8. Power allocation: USB controller in PC detects the presence or absence of the USB devices and does allocation of electrical power. On the power wires, the computer can supply upto

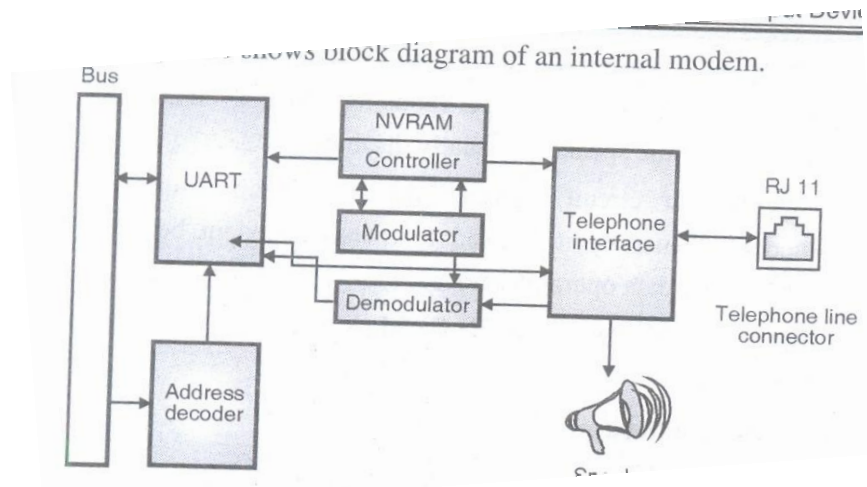
500 milliamps of power at 5 volts. Low power devices (such as mice) can draw their power directly from the bus. High power devices (such as printers) have their own power supplies and draw a minimal power from the bus. Hubs can have their own power supplies to provide power to devices connected to the hub.

c) (2-marks for Diagram, 2-marks for Explanation)

Types of Modem:

1. Internal Modem
2. External modem

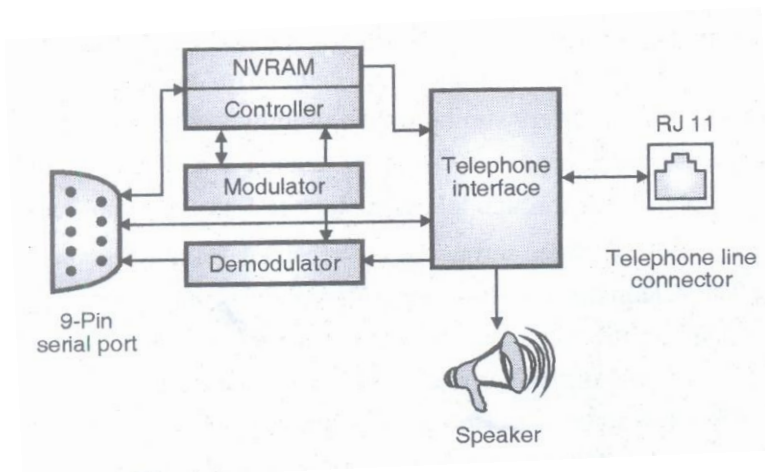
### Internal modem



- The internal modem is a stand-alone board that plugs directly into an ISA or PCI expansion slot
- It contains its own Universal Asynchronous Receiver/Transmitter (UART).
- A modulator Circuit converts the serial data from the computer into audio signals to be transmitted over telephone lines. This modulated audio is then coupled to the telephone line. The signal passes through telephone jack (RJ-11) connector at the rate of the modem to the telephone line.

- On the receiver side, signals received from the telephone line is translated into serial data. The telephone interface separates the received signals and passes them to the demodulator. After demodulation the resulting serial data is passed to UART, which in turn converts the serial bits into parallel words that are placed on the system's data bus.
- The telephone interface also generates Dual Tone multi Frequency (DTMF) dialing signals needed to reach a remote modem. When the remote modem dials in, the telephone interface detects the incoming signal and alerts the UART to begin negotiating a connection.
- The telephone interface drives a speaker. During the initial stages of modem operation the speaker is used to hear the dial tone, dialing signals, and audio negotiation between the two modems. Once the connection is established, the speaker is disabled.
- The controller circuit manages the overall operation of the modem. It switches the modem between the control and data operating modes. The controller accepts commands from the modulator that allow the modem characteristics and operating parameters to be changed.
- In the event of power loss or reset conditions default modem parameters can be loaded from NVRAM. Permanent changes to modem parameters are stored in the NVRAM.

### External Modem



- The external modem does not include built in UART. It uses existing serial port already configured in the PC.
- A 9 pin (DB9) or 25 pin serial cable connects the PC serial port to the modem. Thus CPU need not be opened during modem installation.



- External modems avoid hardware conflicts such as (conflict of I/O address lines and that of interrupt lines) the external modem setup is faster and easier than internal modems.
- In the external modem the status of serial communication can be checked from the signal status LEDs.

d) (½ mark for each point)

Active preventive maintenance procedure

- An active preventive maintenance includes several steps that promote a longer, trouble free life for your PC.
- It includes several procedures to clean and lubricate all the major components, cleaning all boards, connectors, contacts etc.
- It also describes similar procedures for different peripheral devices such as HDD, FDD, keyboard, printer, monitor etc.
- It includes performing backups, antivirus and antispyware scans.
- Cleaning a system
- Regular and through cleaning of the system removes any layer of dust and benefits the system in the long run.
- Dust acts as thermal insulator, which prevents proper system cooling,
- Excessive shortens the life of system components.
- Dust can contain conductive elements that can cause partial short circuit in the system.
- Other elements in the dust can accelerate corrosion of electrical contacts.
- Following cleaning tools and solutions can be used to clean the internal components, peripherals and the boards inside the system.

Q.1 B a) (6-marks for Description)

SCSI drives are complicated when compared with IDE drives while configuring. The SCSI standard controls the way the drives must be set up. Following setup has to be done while configuring SCSI drive:



1. SCSI Device ID: Every device on a SCSI bus must be uniquely identified for addressing purposes. Narrow SCSI drives will have a set of three jumpers that can be used to assign the disk an ID number from 0 to 7.

Wide SCSI drives will have four jumpers to enable ID numbers from 0 to 15. Some systems don't use jumpers to configure SCSI device IDs.

2. Termination activate: The devices on the ends of the SCSI bus must terminate the bus for it to function properly. If the hard disk is at the end of the bus, setting this jumper will cause it to terminate the bus for proper operation.

3. Disable auto start: When present, this jumper will tell the drive not to automatically spin up when the power is applied but instead wait for a start command over the SCSI bus. This is usually done to prevent excessive startup load on the power supply. If by default startup is disable then it is provided by an "Enable Auto Start" jumper.

4. Stagger spin: An "enhanced version" of "Delay Auto Start". When a system with many hard drives has this option set for each unit, the drives stagger their startup time by multiplying user-defined constant times their SCSI device ID. This ensures no two drives on the same SCSI will start up simultaneously.

5. Narrow/Wide: Some drives have a jumper to control whether they will function in narrow or wide mode.

Q.1 B] b) . (1-mark for each point any four points)

Beep indicators in POST.

Sr. No	Error Indication	Failing sub system	Fault clues/Reasons
1	Short beep		Normal post, system OK
2	2 short beeps	POST error	Error code shown on screen
3	No beep	Power supply System board problem DRAM DIMM on	Fuse blown, loose connections, no output. Processor, ROM, Northbridge, Southbridge. DIMM is not properly inserted in slot.



		motherboard speaker	Disconnected speaker.
4.	Continuous beep	Power supply, system board or keyboard problem.	Improper output voltages of SMPS, DIMM fails, clean and reset the DIMM and check the keyboard connection.
5.	Repeating short beeps.	Power supply, system board or keyboard problem.	Check power supply connections & output voltages, system board & keyboard connection.
6	1 long, 1 short beep	Motherboard problem	Motherboard
7	1 long, 2 Short beeps	Display adapter problem (MDA or CGA)	6845 in display adapter video buffer RAM, I/O port logic in display adapter.
8.	1 long, 3 short beeps	Enhanced Graphics Adapter (EGA)	Check EGA Adapter.
9.	3 long beeps	Keyboard problem.	Check 3270 keyboard card.

Q.2

a) (1-mark for each point)

Following are the advantages of using AGP:-

1. Dedicated Port - There are no other devices connected to the AGP other than the graphics card. With a dedicated path to the CPU, thus allowing for faster communication
2. Address/data bus are de-multiplexed.
3. With AGP, the graphics card can receive a request for all of the information needed to render a particular image and send it out all at once. While with PCI, the graphics card would receive information on the height of the image and wait... then the length of the image, and wait... then the width of the image, and wait... combine the data, and then send it out.
4. With sideband addressing, the AGP issues eight additional lines on the data packet just for addressing. This puts the address on the outside of the envelope, so to speak, freeing up the total bandwidth of the data path used to transfer information back and forth. In addition, it unclogs system resources that were previously used to open the packet to read the addresses



b) (1-mark for each point)

### **Logical Memory Organization**

#### **Conventional Memory**

The PC and PC-XT systems used 8086/8088 processor. These chips had 20 address lines hence the processor could access  $2^{20}$  bytes or 1 MB of memory.

Out of 1MB, 0 – 640 Mb of this memory was used by DOS and other programs such as WordStar, Lotus etc. This 640 KB is known as conventional memory or Dos memory or Base memory. Even today to make the older software and hardware compatible to the new generation software and hardware the 640 KB limitation exists.

#### **Upper Memory area**

The memory area between 640 KB and 1MB is called upper memory area. It contains the video memory, adapter ROM, motherboard ROM BIOS etc. and some unused address area. The memory locations in these areas cannot be used by a PC as there is no physical memory assigned to this area. For higher processors these empty locations can be mapped to some real memory area and use them for storing small resident programs. Higher processors can relocate drivers such as mouse drivers from conventional memory to upper memory area.

#### **Extended Memory**

It is the memory beyond 1 MB limit. Any memory available after 1 MB is called extended memory. It is available in 286 and later processors only. Extended memory is of no use for DOS users because DOS does not use this memory. For windows users this memory is very useful as the OS can use this extended memory by allowing multiple Dos programs to run in the extended memory in its own 640 KB memory area.

#### **Expanded Memory**

It is a specification which defines a method to access system memory above 1 MB of RAM on PC XT and AT computers. This memory is accessed via 16 KB window within the first 1 MB. Expanded memory is not a part of main memory, it is separately installed into the system which can be accessed in fixed size pages using a method called 'bank switching'. In this method a small window located in the upper memory area in the main memory is used to view the contents of EMS. The EMS is arranged in the blocks of 16KB each. To access this memory one block is copied in the window in main memory and after processing it is copied back to the EMS memory.





c) (1-mark for each point any four)

High level and Low Level formatting

S.N	High Level Formatting	Low Level Formatting
1.	It is done at users premises	Low level formatting done at manufacturers premises
2.	It is the process of creating the disk's logical structures such as the file allocation table and root directory.	It involves the creation of the actual structures on the surface of the media that are used to hold the data.
3.	The high level format uses the structures created by the low level format to prepare the disk to hold files using the chosen file system.	Recording the tracks and marking the start of each sector on each track. This is called as low level formatting and sometimes is called "true formatting".
4.	It is easy process so it does not require experts.	It is difficult process, so required experts.
5.	After high level formatting we can store data on disk.	After low level formatting disk is not able to store data.

d) (1-mark each)

DVD with CD

DVD's can store more data than CDs.

- Higher density data storage
- Less overhead, more area.
- Multi layer storage
  
- Higher Density Data Storage:

Single sided, single layer DVDs can store about seven times more data than CDs. A large part of this increase comes from the pits and tracks being smaller on DVD's and the reduced laser wavelength.



Specification	CD	DVD
Track pitch	1600 nanometers	740 nanometers
Minimum Pit length (single layer DVD)	830 nanometers	400 nanometers
Minimum Pit length (double layer DVD)	830 nanometers	440 nanometers.

- Less Overhead more area:

On CD for error connection lot of extra information is encoded which is repetition that is already on the disc. Error correction scheme is quite old and inefficient.

DVD doesn't waste space for error correction, and to store real information. DVDs achieve higher capacity by encoding data on slightly a larger area of the disc.

- Multi layer storage

To increase the storage capacity even more, a DVD can have up to four layers, two on each side. The laser that reads the disc can actually focus on the second layer through the first layer.

The capacity of the DVD does not double when you add a whole second layer to the disc. When a disc is made of two layers the pits have to be a little longer, on both layers, than when a single layer is used.

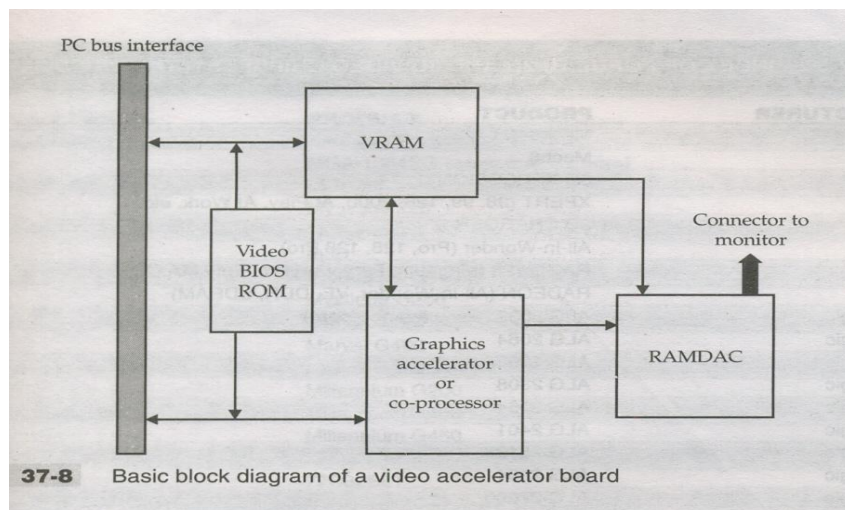
Helps to avoid interference between the layers, which causes error while playing the disc.

e) (½ mark for each point, any other suitable advantage can be considered.)

Advantages of CRT over LCD

- i. Significantly lower cost compared to LCD, because of advance technology.
- ii. Color fidelity is essential for graphic artists.
- iii. Contrast ratio allows perception of true black. Darks are darker.
- iv. It has the ability to adjust multisync images.
- v. It has very good multiple resolutions.

- vi. Displays full motion video better.
- vii. Sleep-mode for energy efficiency is included in modern versions.
- viii. Flat viewing screens for fewer glares are available.
- f) (2-marks for Diagram, 2-marks for Explanation)

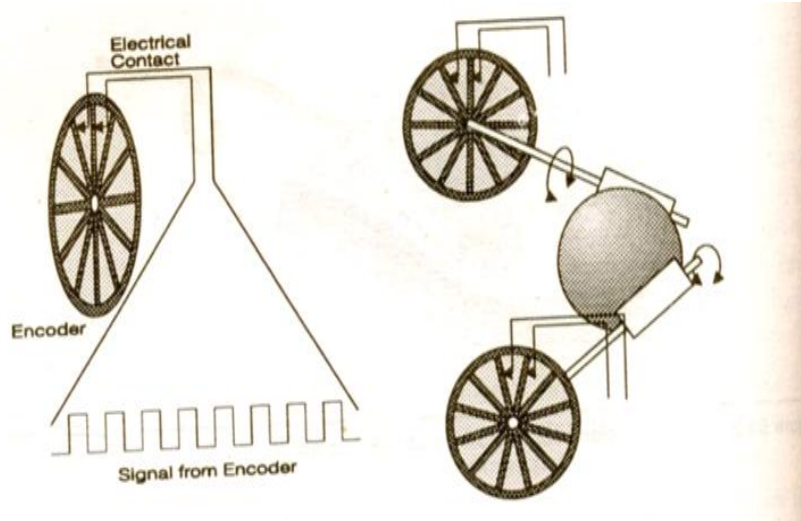


#### Components of Video Accelerator Card:

- Incorporate processing power onto video board (rather than CPU) for graphics data processing.
- A graphics accelerator application specific chip (ASIC) that intercepts graphics tasks and processes them without the intervention of system CPU.
- Core of the accelerator is the graphics chip which connects directly to PC expansion bus.
- Graphics instructions and data are translated into pixel data and stored in video RAM.
- VRAM offers second data bus that is routed directly to RAMDAC (Random Access Memory Video to Analog Converter).
- Graphics chip directs RAMDAC operation and ensures that VRAM data is available.
- RAMDAC(random access memory digital-analog converter) translates video data into R, G and B video signals along with vertical and horizontal signals.
- Output signals generated by the RAMDAC drive the monitor.

Q.3 (2-marks for Diagram, 2-marks for Working)

a)

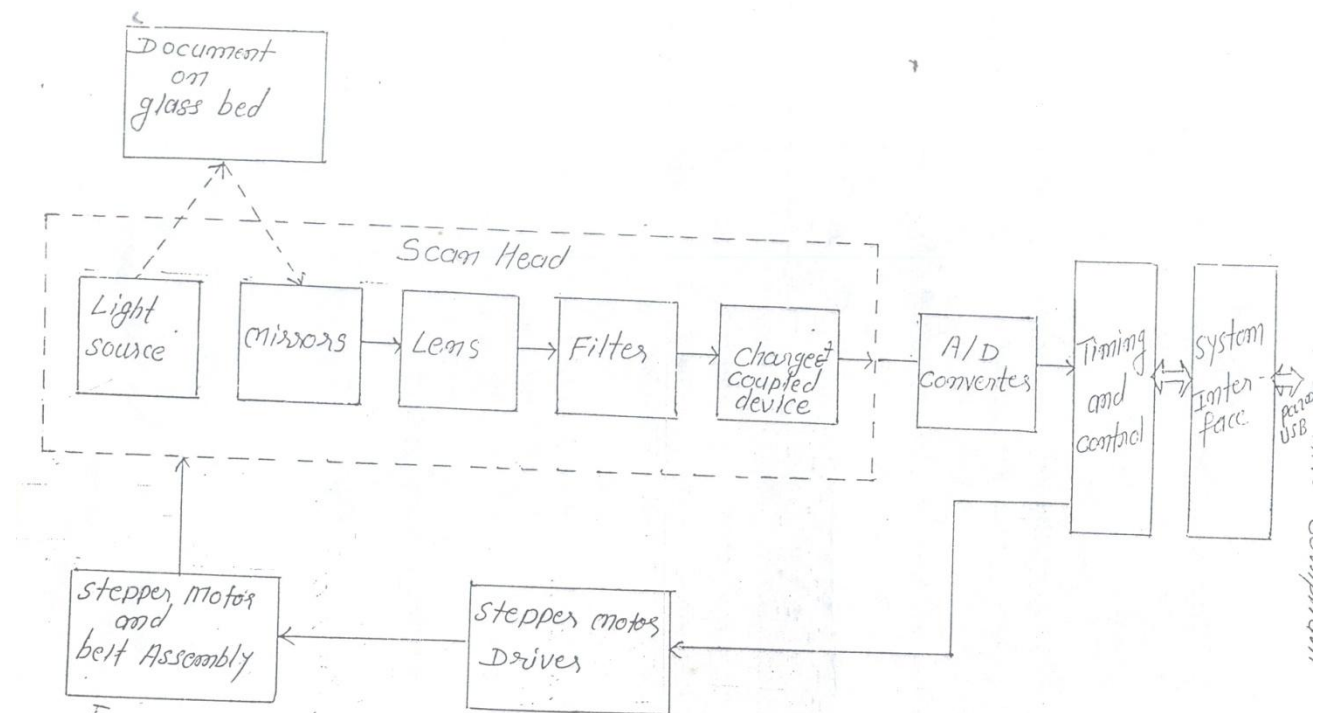


It works by the mechanical activities of different parts. When the mouse is rolled across the flat surface, the rollers inside the mouse generate electronic signals. These signals are given to the computer, which in turn converts them into proper actions on screen. The rollers in the mouse are mounted at 90 degree angle to each other. One roller is used for back & forth movement of the cursor on the screen. The other roller is used for sideways movements which correspond to the horizontal movement of the cursor on the screen. Each roller is attached to the encoder which is a wheel like structure. As a roller turns, the encoder rotates. Two pairs of contact bars touch the small metal contact provided on the ring of each of these encoders.

Each time the contact bars touches the metal contact, an electric signal is generated. The number of signals indicates how many points, the contact bar has touch. When the mouse moves the larger distance, more signals are generated. The direction in which the mouse is moving can be found out by finding the number of signals from these two vertical & horizontal rollers.

The signal generated by these rollers is sent serially to the PC over the mouse cable. The mouse driver software converts these signals into distance, direction & speed. Pressing of any of the mouse buttons sends a signal to the PC based on the button pressed. Number of times the button has been pressed, the position of the cursor at the time of pressing.

b) (2-marks for Diagram, 2-marks for Working)



A light source illuminates a piece of paper placed face down against a glass window.

A motor moves the scan head beneath the page. As it moves, Scan head captures light reflected from individual areas of the page.

The light from the page is reflected through a system of mirrors

A lens focuses the beam of light on to light sensitive diodes which converts light into electrical signal. The voltage or current is proportional to the light intensity.

An A/D converter converts each analog voltage into a digital pixel.

ADC in a monochrome scanner stores only one bit per pixel, either on or off representing black or white. If it is a colour scanner, the scan head passes thrice under the images and light on each pass is directed through a red, green or blue filter.

The digital information is then sent to the software in the PC, where data is stored in a format with which a graphics program or optical character Recognition(OCR) work.

c) (Assuming the question is related Power supply used in computers) (4-marks any four points)

The factors to be considered while selecting power supply for the computer are:

1. Form factor: Based on physical dimension AT/ATX etc.



2. Connectors : Type of connectors used for motherboard / Harddisk drive / AUX connection etc.

3. Efficiency.

4. Power density

5. Transient Recovery.

6. Hold up time.

7. Percentage Regulation.

8. KVA or Wattage.

d) (1-mark for each point)

The use of SMPS output voltages are:

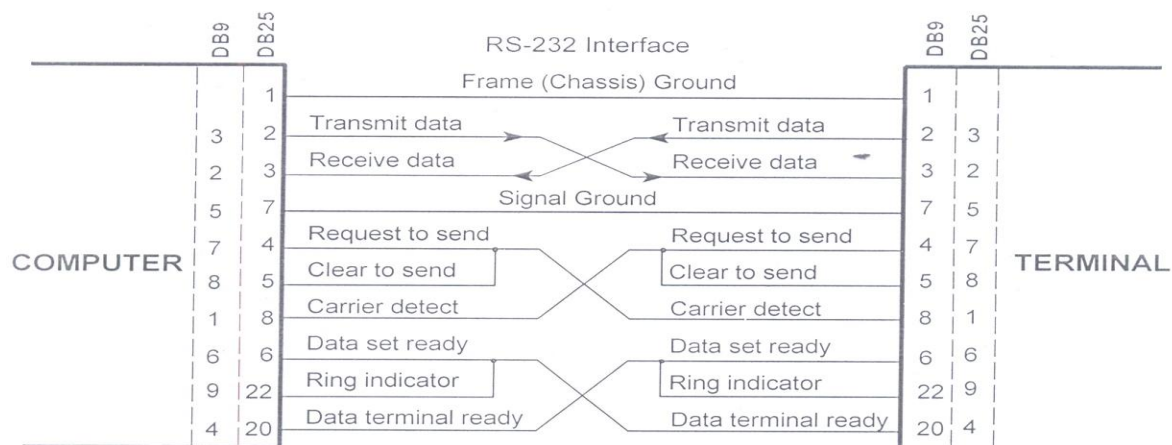
-12 V – Logic 1 in RS-232 signals / serial ports.

-5 V - For ISA bus for full backward.

0 V – Ground compatibility – Vcc for dynamic RAM's

+3.3 V Powering chipsets DIMMs, AGP cards etc.

e) (4-marks for correct diagram showing all signals )





Q.4 A]a) (2-mark for Definition, 1-mark for L1 and 1-mark for L2)

It is a very small amount of very high speed memory used between the main memory (RAM) and the processor. The information frequently required by the processor is kept in the cache memory by a cache controller. The cache controller makes sure that the data required by the processor in the next memory access is available in the cache memory. This improves the speed of the computer; the required data is made available to the processor by the cache without any wait state.

The performance of the cache is depends on speed and size of the cache and logic the logic used to read the data around the memory area read by the CPU. When the required data is available in the cache it is called a hit and if the required data is not available in the cache memory, it is called a miss. The cache uses a separate cache bus, different from the memory bus, to access the cache (read/write).

Internal cache: It is internal to the processor. This cache is also known as the primary cache or the or the L1 cache. The most common size of this cache is 8KB. The cache is further divided into data cache and instruction cache based on its function. This further enhances the function of the cache system. However, L1 cache suffers the limitation of size since it is internal to the processor.

External Cache: It is a separate high speed memory in between the processor and the main memory which is controlled by a cache controller. This cache is also known as secondary memory or L2 cache. It is external to the processor. The most common size of the L2 cache is 128 KB. It gives good enough improvement in the performance at a reasonable cost.

Q.4 A] b) (1-mark for each)

### **Cluster**

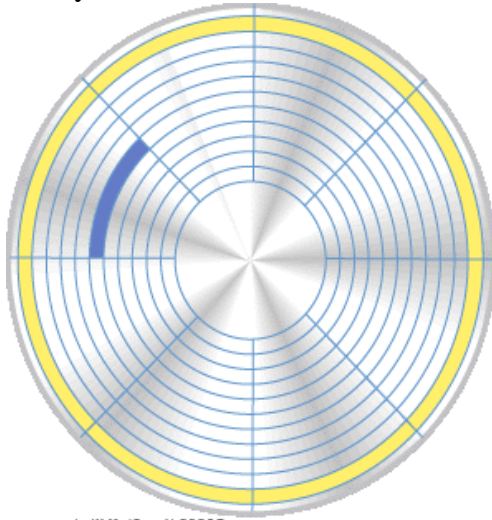
- When OS writes some information on the hard disk, it does not allocate the space sector wise, instead uses a new unit of storage called “Cluster”
- Clusters are the minimum space allocated by DOS when storing any information on the disk
- Even to store only one byte long information on the disk requires minimum one cluster area on the disk surface

### **Track**

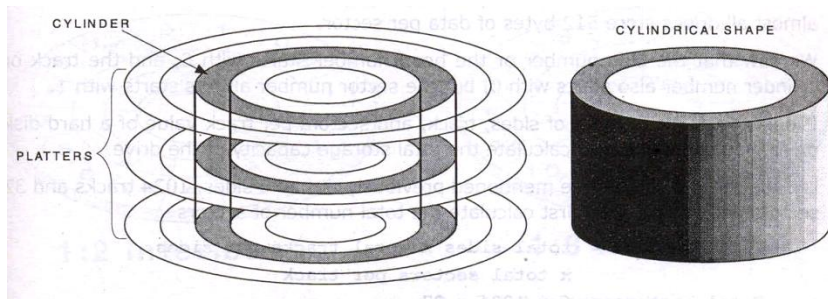
- Each side of HDD platter’s surface is divided into concentric circles called tracks
- They are magnetic information written during formatting of HDD
- Outermost track is called track 0. The innermost will have the highest number

**Sector**

- The formatting program divides disk surface into sectors by writing magnetic pattern on disk surface
- Different HDD capacities have different number of tracks
- 512 byte data can be stored in each sector. Sector no. starts from 1

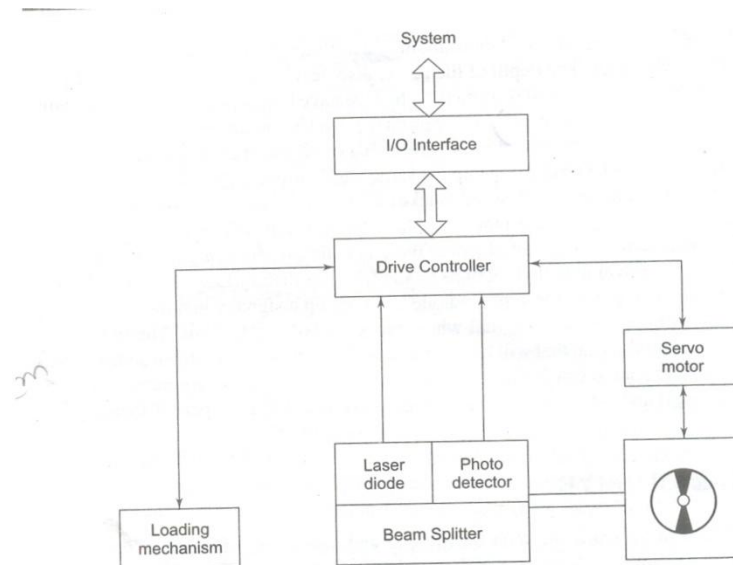
**Cylinder**

- Same tracks of different platters form an imaginary cylinder like structure
- Data is stored cylinder by cylinder
- All tracks on a cylinder are written and then the R/W head moves to the next Cylinder . This reduces movement of R/W head and increases the speed of read and write operation





Q.4 A] c)(2-marks for Diagram, 2-marks for Explanation)



The CD-ROM drive reads the data on the CD and sends the information to the interface connector (expansion board) attached to the computer motherboard. The information then travels to the CPU for processing to make video, text or sound.

The CD recording method makes use of optical recording, using a beam of light from a minute semiconductor laser. Such a beam is of low power (milli watts) but the focus of the beam can be a very small point so that low melting point materials like plastics can be vaporized by a focused beam. Turning the recording beam onto a place on a plastic disc for a fraction of a millionth of a second will therefore vaporize the material to leave a tiny created pit, about  $0.6\text{ }\mu\text{m}$  ( $1\text{ }\mu\text{m}$ - 1 millionth of a meter, equal to one thousandth of a millimeter) in diameter a human hair e.g. is around  $50\text{ }\mu$  in diameter. The depth of the pits is also very small of the order of  $0.1\text{ }\mu\text{m}$ . if no beam strikes the disc, then no pit is formed, so that we have here a system that can digitally code pulses into the form of pit or no pit.

Reading a set of dimples on a disc also makes use of semiconductor laser, but of much lower power since it need not vaporize material. The reading beam will be reflected from the disc where no dimple exists, but scattered where there is a dimple. By using an optical system that allows the light to travel in both directions to and from the disc surface, it is possible to focus a reflected beam onto a detector, a photodiode and pick up a signal when the beam is reflected from the disc. There will be no signal when the beam falls onto a pit. The output from the detector is the digital signal that will be amplified and then processed into an audio signal.



Q.4 A] c)(1-mark each)

**Dot pitch:** It is the distance between each group (triad) of red, blue and green phosphors. A smaller dot pitch helps produce sharper and clearer image

**Resolution:** Resolution describes the number of potential pixels the monitor is capable of displaying.

$$\text{Resolution} = \text{Total Horizontal Pixels} \times \text{Total vertical pixels}$$

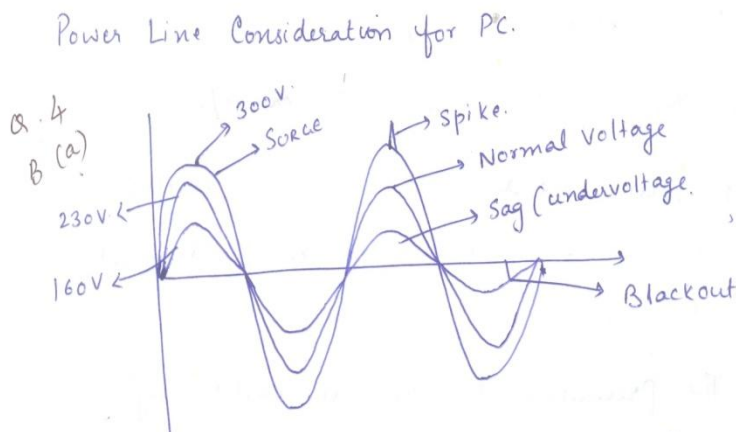
**Video bandwidth:**

- It is the highest input frequency a monitor can handle and helps in determining the resolution capabilities of the monitor .
- The video bandwidth is measured in MHz.
- Higher the video bandwidth , better the image quality.
- Video Bandwidth = Hor. Pixel X Ver. Pixel X Frame rate

**Horizontal scanning:**

Scanning of the electron beam on the screen of the monitor is called raster scanning. The tracing of the horizontal lines in synchronism with H – Sync pulse is called Horizontal Scanning

Q.4 B] a) (2-marks for Diagram, 1-mark for each point (any four))





The power problems can be divided into two main category, that is

- Overvoltage
- Undervoltage

Overvoltage:

- Spikes: Spikes are very high voltage, split second events that can disrupt the operation of electronic devices such as computers.
- Surges: these are overvoltage that last for more than one cycle. Surges are caused when some heavy electrical load is suddenly switched off.

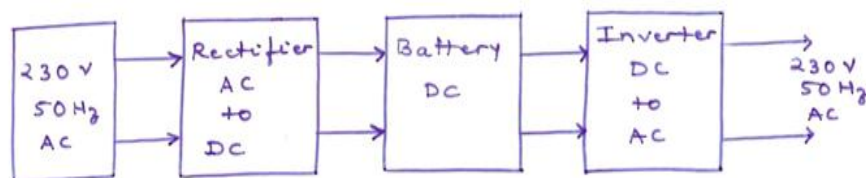
Spikes and surges are a leading cause of aging and destruction of the electronic equipments.

Undervoltage can be further divided into three categories, sags, brownout and blackout.

- Sags: Sags are undervoltage that last for more than one cycle. Sags can slow down the computer disk-drives, leading to data errors and can cause head crash making permanent data loss.
- Brownout: Brownout is the low voltage condition that can be present even for several hours. This is often created when the power demand exceeds the capacity of the power generator.
- Blackout: Blackout is the complete no power condition. Sometimes sudden power failure can bring about wastage of time, money and resources.
- Line Noise: Any signal present on the power line besides the expected alternating current of 50 Hz is called the line noise.
- Common Mode Noise: Common mode noise appears between the ground and the neutral or the ground and the live wire of the computer.
- Harmonic Distortion: Harmonic Distortion is the deviation of the power supply waveshape from a pure sinewave. It can disrupt the operation of some sensitive devices like computers and communication equipments.

b) (4-marks for Diagram & Explanation, 1-marks for advantages, 1-marks for disadvantages)

BLOCK DIAGRAM OF ON-LINE UPS





- It contains a transformer, a rectifier and a filter which convert AC into DC
- This DC is given to the battery charger which charges the battery. The output of the battery is given to the inverter which converts DC to AC and gives it to the PC.
- In this type of UPS the system is supplied power from the batteries continuously.
- Thus the battery charges continuously and it provides DC voltage to the inverter
- The inverter converts DC to 230V, 50Hz AC signal and gives it to the computer.
- As switching is not involved, spikes are not generated.
- It isolates the AC mains from the PC.

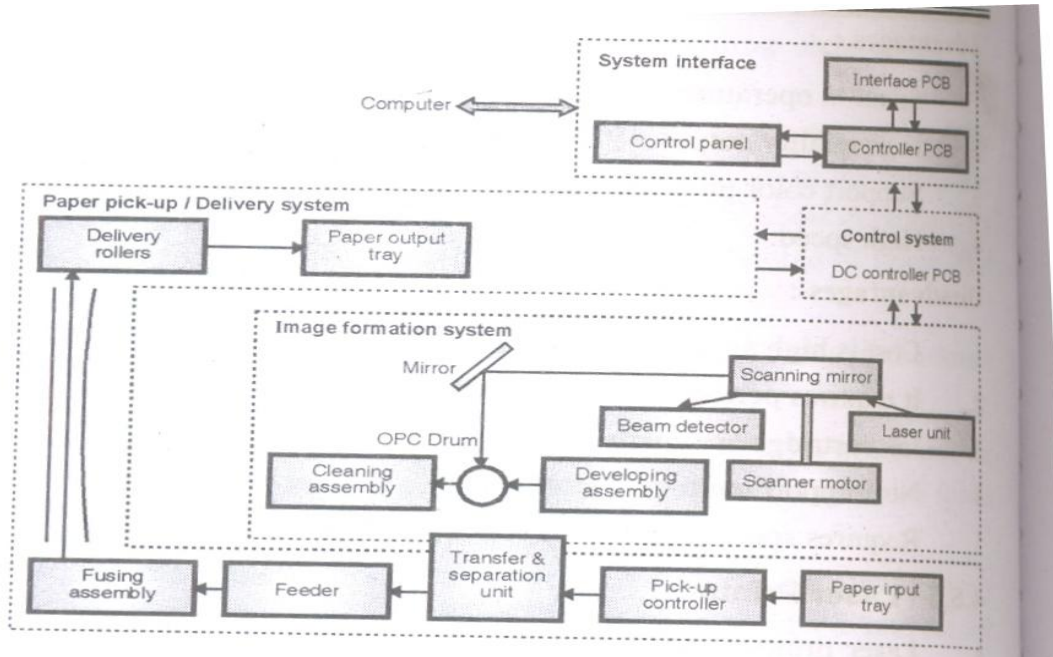
#### Advantages

- 1. Since switching is not involved, it avoids resetting of PC and spike generation.
- 2. It isolates AC mains from the PC.

#### Disadvantages

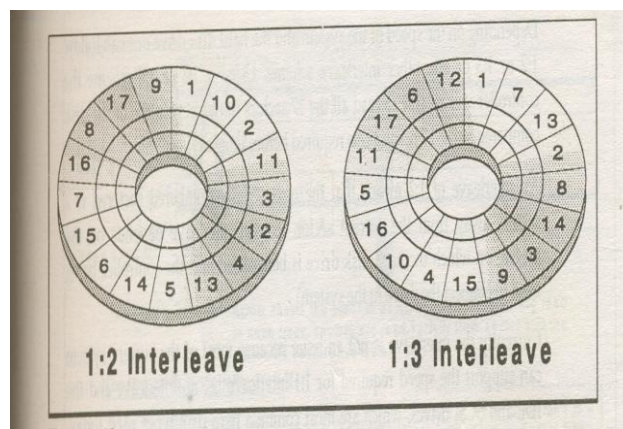
- 1. It is costlier than off-line UPS.
- 2. It generates more heat.

Q.5 a) (4-marks for correct diagram and naming)



b)

**Inter leaving in HDD** (Diagram : 1 mark, Explanation 1 mark)

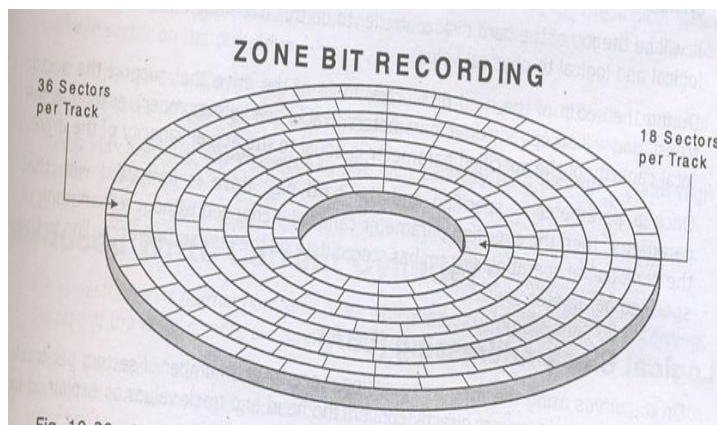


- By the time data is read from the first sector and processed, the read write head reaches the third or fourth sector.
- To overcome this problem, the second sector is put at the position of third or fourth sector, the second sector will be at the correct position (as far as reading or writing the data is

concerned) when read second sector command is given. This will save unnecessary disk rotation after each sector is read.

- An interleave of 1:2 means that next serially numbered sector is one sector away from the current sector.
- An interleave of 1:3 means that next serially numbered sector is two sectors away from the current sector.
- All IDE and SCSI drives are pre-formatted with 1:1 interleave in the factory itself (No interleave).

**Zone bit recording (Diagram : 1 mark, Explanation 1 mark)**



- Using the same number of sectors in the inner as well as outer tracks of a drive is a waste of storage capacity of the disk drive. The outer tracks because of their large circumference can hold 50% more data than the inner tracks.
- In zone bit recording the complete surface of the disk platter is divided into a number of different zones. Each zone will have a fixed number of sectors per track.
- The outer zone will have maximum number of sectors per track and the innermost zone will have minimum number of sectors per track.
- For e.g. 9 tracks can be divided into 3 zones each having 3 tracks. Outermost zone can have 24 sectors, middle zone 16 sectors, and innermost zone 8 sectors.
- As BIOS and OS cannot work with disk drive having different number of sectors per track, the disk controller does the function of translating the different number of sectors on the zone bit recorded hard disk to constant number of track when giving information to any software accessing the hard disk. This method is called sector translation scheme.



c) (1-mark for each point (any four points))

Sr. No	Parameter	IDE HDD	SATA HDD	SCSI HDD
1.	Interface	Device level interface supported	Device level interface supported	System level interface supported
2.	Speed	Speed is low as compared to SATA and SCSI	Speed is high as compared to IDE and SCSI	Speed is low as compared to IDE and SATA.
3.	Used In	Used in desktop PC	Used in desktop PC	Used in server system.
4.	Types of Cable	40/80 wire cable	4 wire cable	50 wire cable.
5.	Setup	Easy to install	Easy to install	Complex to install.
6	Use of Adapter	Adapter not required	Adapter not required	SCSI Adapter required.

d) (1/2 mark for each step, working may also be explained by combining steps.)

Working of Keyboard:

- When a key is pressed, it pushes down on a rubber dome sitting beneath the key. A conductive contact on the underside of the dome touches a pair of conductive lines on the circuit below.
- This bridges the gap between them and allows current to flow (i.e. the circuit goes from open to closed), changing the signal strength.
- A scanning signal is emitted by the chip along the pairs of lines to all the keys.
- When the signal in one pair becomes different, the chip generates a “make code” corresponding to the key connected to that pair of lines.



v. The code generated is sent to the computer either via keyboard cable (using on-off electrical pulses to represent bits) or over a wireless connection. It may be repeated.

vi. A chip inside the computer receives the signal bits and decodes them into the appropriate key press.

vii. The computer then decides what to do on the basis of the key pressed (e.g. display a character on the screen, or perform some action)

viii. When the key is released, a break code (different than the make code) is sent to indicate the key is no longer pressed. If the break code is missed (e.g. due to a keyboard switch) it is possible for the keyboard controller to believe the key is pressed down when it is not, which is why pressing then releasing the key again will release the key.

e) (2-marks for Checks, 2-marks for Causes)

No cursor, no screen display, no keyboard, but fan running in power supply.

Preliminary checks:

- i. Check cables for proper mating.
- ii. Clean all edge connectors on adapter cards.
- iii. Reset the CPU chip.
- iv. Visually inspect the system board.
- v. Reset DRAM memory

Causes:

- i. Bad crystal on motherboard.
- ii. Bad 284 clock generator.
- iii. Bad DRAM memory
- iv. Motherboard bus controller circuitry bad.

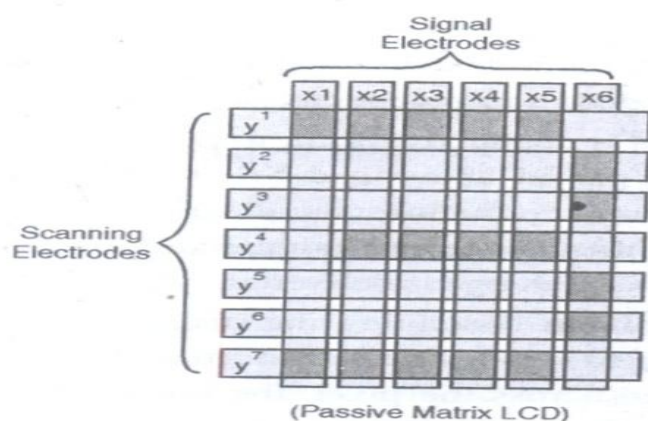


f) (4-marks any four points)

The features of fire wire are listed as follows:

1. Hot pluggability
2. Fire wire can connect together upto 63 peripherals in an cyclic topology.
3. It allows peer-to-peer device communication, such as communication between a scanner and a printer, to take place without using system memory or the CPU.
4. Fire wire also supports multiple hosts per bus.
5. It is designed to support plug and play and hot swapping.
6. It uses six wire cable which is more flexible than most parallel SCSI cables and can supply upto 45 watts of power per port at upto 30 volts.
7. Fire wire 400 can transfer data between devices at 100, 200, or 400 Mbit/s data rates. The different transfer modes are commonly referred to as S100, S200, and S400.
8. Cable length is limited to 4.5 meters, although upto 16 cables can be daisy chained using active repeaters, external hubs, internal hubs often present in fire wire equipment.

Q.6 a) (2-marks for Diagram ,2-marks for Explanation)



- Passive matrix LCDs use a simple grid to supply the charge to a particular pixel on the display.
- The liquid crystal material is sandwiched between the two glass substrates and a polarizing film is added to the outer side of each substrate. To turn on a pixel, the integrated circuit

sends a charge down the correct column of one substrate and a ground activated on the correct row of the other.

- The row and column intersect at the designated pixel, and that delivers the voltage to untwist the liquid crystals at that pixel.
- To address a pixel the column containing the pixel is sent a charge, the corresponding row is connected to ground. When sufficient voltage is placed across the pixel, the liquid crystal molecules align parallel to the electric field.
- In passive matrix LCDs (PMLCDs) there are no switching devices, and each pixel is addressed for more than one frame time.

b) (1-mark for Definition, 3-marks for Explanation)

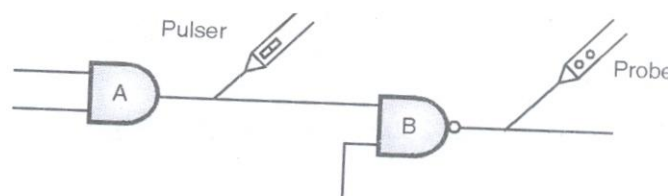
A surge suppressor also called a “surge protector” is a device inserted in the alternating current (AC) utility line and/or telephone line to prevent damage to electronic equipment from voltage “spikes” called transients. A typical surge suppressor is a small box with several utility outlets, a power switch, and a 3-wire cord for plugging into a wall outlet.

A surge suppressor prevents the peak AC voltage from going above a certain threshold such as plus-or-minus 200 volts. Semiconductor devices are used for this purpose. The power line is exceeding the threshold, while the flow of normal 50-Hz current is unaffected. For the suppressor to work, a 3-wire AC power connection must be used.

Surge suppressors should be used with all semiconductor based electronic and computer hardware, including peripherals such as printers, monitors, external disk drives, and modems. But the lightning induced transients. The safest procedure, inconvenient though it be, is to ensure that all susceptible hardware is plugged into the suppressor box, and to unplug the suppressor’s main power cord when the equipment is not in use if you live in a thunderstorm-prone area.

c) (1-mark for Diagram, 3-marks for working)

Logic Pulser





- It is used to inject pulses into the circuit using logic pulser.
- A logic pulser is designated to test circuit reaction by delivering a logical high (+5 V) pulse into a circuit.
- Logic probe and pulser are used together to test ICs and verify truth table.
- It has ability to introduce a changing signal into circuit without desoldering or cutting wires
- The above figure shows several way to test logic gates using the probe and pulser. Pulser injects pulses to output of AND gate and probe should checking or indicating a change at the input to the NAND gate.
- If probe does not blink, you know this line or gate is shorted to ground.

d) (4-marks any four points)

Sr. No	Parameter	Dot Matrix	Inkjet
1	Type	Impact	Non-Impact
2	Speed	Depends on quality of printing, maximum upto 533 characters/sec per line.	Upto 30 pages per minute.
3	Cost	Inexpensive	Expensive
4	Noise	Noisy	Quiet
5	Printing	Can print multiple copies simultaneously	Cannot print multiple copies simultaneously
6	Technology	Ribbon Cartridge	Liquid Ink

e) (1-mark for Definition, 3-marks for any three functions)

The BIOS (Basic Input Output System) provides the processor with the information required to boot the system from a non-volatile storage unit (HDD, FDD, CD or other). It provides the system with the settings and resources that are available on the system.



BIOS is an electronic set of instructions that a computer uses to successfully start operating. The BIOS is located on a chip inside of the computer and is designed in a way that protects it from disk failure.

#### Main functions of BIOS

1. The main function of the BIOS is to give instructions for the power-on-self-test (POST). This self-test ensures that the computer has all of the necessary parts and functionality needed to successfully start itself, such as use of memory, a keyboard and other parts.
  2. If errors are detected during the test, the BIOS instruct the computer to give a code that reveals the problem. Error codes are typically a series of beeps heard shortly after startup.
  3. The BIOS also works to give the computer basic information about how to interact with some critical components such as drives and memory that it will need to load the operating system.
  4. Once the basic instructions have been loaded and the self-test has been passed, the computer can proceed with loading the operating system from one of the attached drives.
  5. Computer users can often make certain adjustments to the BIOS through a configuration screen on the computer. The setup screen is typically accessed with a special key sequence during the first moments of the startup. This setup screen often allows users to change the order in which drives are accessed during startup and control the functionality of a number of critical devices. Features vary among individual BIOS versions.
  6. Many PC manufacturers today use flash memory cards to hold BIOS information. This allows users to update the BIOS version on computers after a vendor releases an update. This system was designed to solve problems with the original BIOS or to add new functionality. Users can periodically check for updated BIOS versions, as some vendors release a dozen or more updates over the course of a product's lifetime. To check for an updated BIOS, users can check the website of the specific hardware vendor.
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