Q.1(a) i)Cluster (1 mark)

- 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

2) MBR: Master Boot Record (1 mark)

- The MBR is located at Cylinder 0, head 0 sector1 and partition boot sector are located at the beginning of each partition volume

- MBR contains a small program to load and start the active / bootable partition

- This area also contains information about all four primary partitions on HDD, their starting sector, ending sector, size etc. in the form of partition table record

3) SATA: (1 mark)

Serial ATA interface. SATA uses only one data channel. It will operate at a very high speed, to improve the throughput. SATA has a transfer rate of 300 MBps – 600MBps. It allows hot swapping facility

4) Interleave factor: (1 mark)
Numbering the sectors out of order with leaving a gap of one or more sectors in sector numbering is called *Interleaving.*

1:2 Interleave   1:3 Interleave
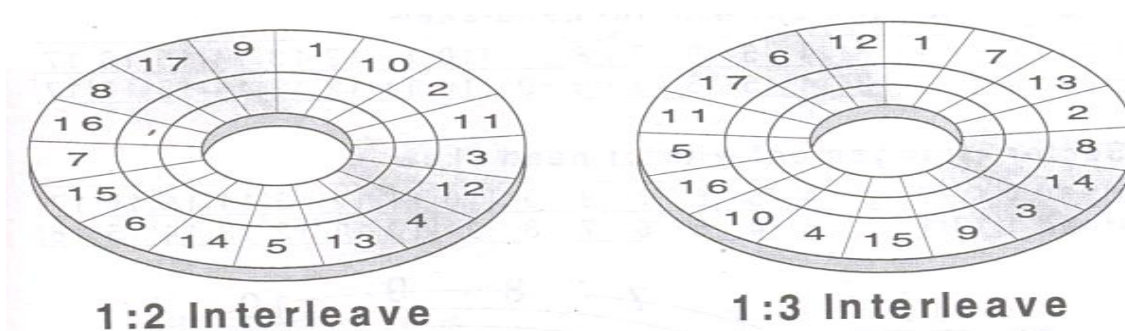
Note:- Diagram not necessary.

Q.1 (a)ii (Initialization-1 mark, Carrier Detection-1 mark, Transfer of data-1 mark, Receive of data-1mark)

Note: An example of any DTE/DCE communication can be given.

Consider an example when a remote modem wants to communicate with the local modem, it generates an RI signal. This signal is transferred by the local modem to local PC.

- The local Pc responds to the RI signal (Ring Indicator), by asserting the DTR signal (Data Terminal Ready). When it is ready to communicate.
- After recognizing the DTR signal, the modem responds by asserting DSR (Data Set Ready) after it is connected to the communication line. DSR indicates to the PC that the modem is ready to exchange Control signals with the DTE. When DSR is asserted, the PC begins monitoring CD (Carrier Detect) for indication that data is being sent over the communication line.
- The modem asserts CD after it has received a carrier signal from the remote modem that meets the suitable signal criteria.
- Now data transfer begins

  If local modem has full duplex capability, CTS (Clear-to-Send) and RTS (Request –to-Send) signals are held in the asserted state.

  If the modem has half –duplex capability CTS & RTS signals provide the handshaking necessary for controlling the direction of data flow.

- Data is transferred over TxD (Transmit data)& RxD lines (Receive data).

Q.1(a)iii) (Classification-2 marks,

Note: Any type of classification based on technology/interfacing/method of printing can be considered.

Printers are of two types:

1. Impact Printers
2. Non Impact Printers

Impact Printers

These types of printers use impact to create an image on output media. The impact printers smash a hammer against an inked ribbon to squeeze ink from ribbon onto the printing media examples of impact printers are Dot matrix printers, Daisy wheel printer etc.

Non Impact Printers

In this type of printers the printer does not strike the carbon or paper but instead it use ink spraying, heat process or electrostatic magnetization to produce the required image on the output media. Example ink jet, Laser etc.

Based on interfacing of printer, they can be classified as

1. **Serial**
2. **Parallel**

Selection of a particular type of interface depends on the requirement and location of printer.

Print graphic resolution of laser printer is 600X600dpi. (Any typical value may be given) (1 mark)

Print speed of laser printer is 12-14 ppm. (Any typical value may be given) (1 mark)

Q.1 (a)iv)

This symptom indicates that video adapter failed to initialize during POST. Since Video adapter is not responding, it is impossible to display information. (1 mark)

The following steps should be followed (3 marks)

First of all check the power connection to the monitor and the CPU and if problem persist.

I.   Power down the PC and Check that the video adapter is installed properly in the expansion card.
II.   Make sure that the video adapter is not touching any wiring or any other expansion card.
III.   Isolate the Video adapter and replace with another adapter installed.
IV.   If display is seen, check the setting and jumpers are correct.
V.   If problem persists, there is problem in the motherboard main memory.
VI.   Replace Memory.

Q.1 b(i) Centronics interface provides a handshake protocol between a computer and a printer. Signals involved in interface mode are of two types

1.   Signal from PC to Printer (3 marks)
These are 12 signals from Pc printer out of these 8 signals are data bits and 4 signals are control signals.
The control signals are

   i. $\overline{\text{Strobe}}$

   ii. $\overline{\text{INIT}}$

   iii. $\overline{\text{SLCT IN}}$

   iv. $\overline{\text{Autofeed XT}}$

2.   Signal from Printer to PC (3 marks)
There are 5 status signals from printer to PC. These are

   i. $\overline{\text{ACK}}$

   ii.   Busy

   iii.   PE

   iv.   SLCT

   v. $\overline{\text{Error}}$

Note: Each signal should be explained

Q.1 b(ii)
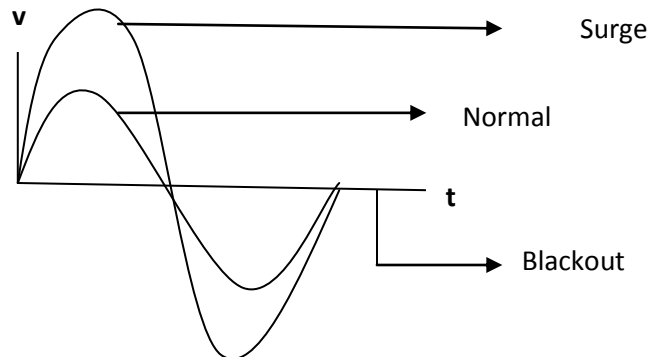
Surge: -Small over voltage conditions that take place over a long period. The excess energy needs to be dissipated. This can damage power supply. (1 mark)

Blackouts:- A complete loss of electric power when voltage and current become zero. (1 mark)

A **surge protector** (or **surge suppressor**) is an appliance designed to protect electrical devices from voltage spikes. A surge protector attempts to limit the voltage supplied to an electric device by either blocking or by shorting to ground any unwanted voltages above a safe threshold.

It contains circuitry that can detect impulse increases in the input voltage. When it detects a higher voltage, it shuts off and its fuse opens. Such devices protect the computer when there is an error in the power line or when lightening strikes (2 marks)

Q.2 (a) (1 mark each)

Sr. No.	ISA	PCI
1	Industry Standard Architecture (ISA) has 8 bit bus latter expanded to 16 bits	Peripheral Component Inter connect (PCI) has 32 bit wide data
2	It is slower	It is faster
3	It can handle 1MB memory	It can handle
4	High / low priority queues	No priority queues
5	Address / Data lines demultiplexed	Address / Data lines multiplexed
6	Single target, single master	Multi target, multi master

Q.2 (b)

L1, or primary cache, is a high speed cache incorporated right onto the processor chip.
L1 typically ranges in size from 8 KB to 64 KB and uses the high speed SRAM instead of the slower and cheaper DRAM. The cache controller ensures that the information frequently used by the CPU is kept in the cache memory. The controller also ensures 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 as the CPU does not have to wait for data from the memory.   (2 marks)

L3 cache is slowly replacing the L2 cache function the extra cache built into the motherboard The L3 cache has been present in high end work stations and servers such as Xenon and Itanium. (2 marks)

Q.2(c) (1 mark for each point)

Modified Frequency Modulation (MFM) Encoding

1. Data storage density can be increased if the number of pulses required to store the data can be minimized. This method of data storage is able to store more data without any data or synchronization loss.
2. In MFM 1 is stored as No Pulse and 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 2 no pulses (NN)

3. Thus to store 1001 NP NN PN NP. Thus only 3 pulses are required where

   As in FM 1001 is stored as PP PN PN PP i.e. 6 pulses are required.

4. In MFM the minimum number of 0's together is 1 and maximum number of 0's is 3. Thus method is also known as (1,3) RLL.

Q.2 (d) (1 mark each)

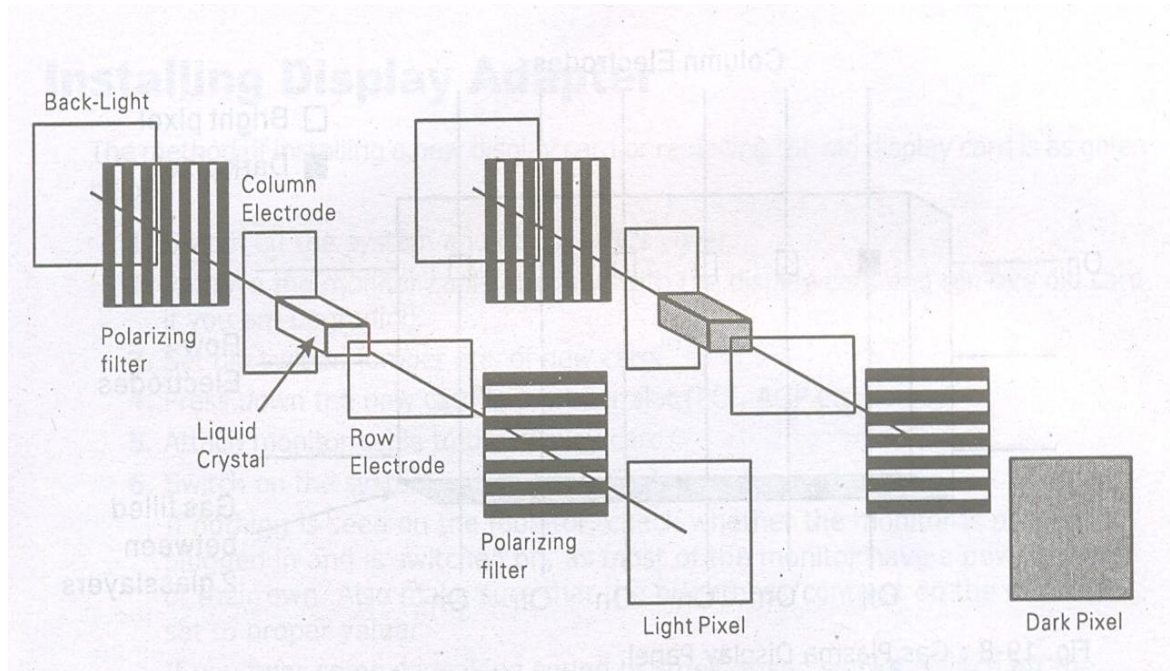| Sr. no.	CD	DVD
1	Compact Disc	Digital Versatile Disc
2	Track pitch 1600 nanometer	Track pitch 740 nanometer
3	Minimum pit length 830 nanometer	Minimum pit length 400 nanometer
4	Lower density data storage	Higher density data storage
5	Single layer storage	Multi layer storage

Q.2 (e) (4 marks)

Note: Any diagram showing the following blocks may be drawn.

Q.2 (f) (1 mark each)

Characteristics of LCD

1. Resolution: LCD monitors display information only at the resolution they are designed for, known as native resolution. If resolution settings are changed the quality of image suffers.

Size	Resolution
17"	1024 x 768
19"	1280 x 1024
20"	1600 x 1200

2. Refresh Rate: rate at which electronics in the monitor address the brightness of each pixel on the screen. Typically is 60 to 75 Hz. For each LCD monitor maintains constant light output from one addressing cycle to the next. Hence there is no need to set a high refresh rate.

3. Response time: Time taken by through put of a pixel to fully react to a change in its brightness.
    Recommended < 12ms

    Typical 4 – 6 ms.

4. Viewing Angle: Viewing angle affect the brightness contrast and colour shown . wide angle can lead to contrast and colour reversal viewing angle 150°.

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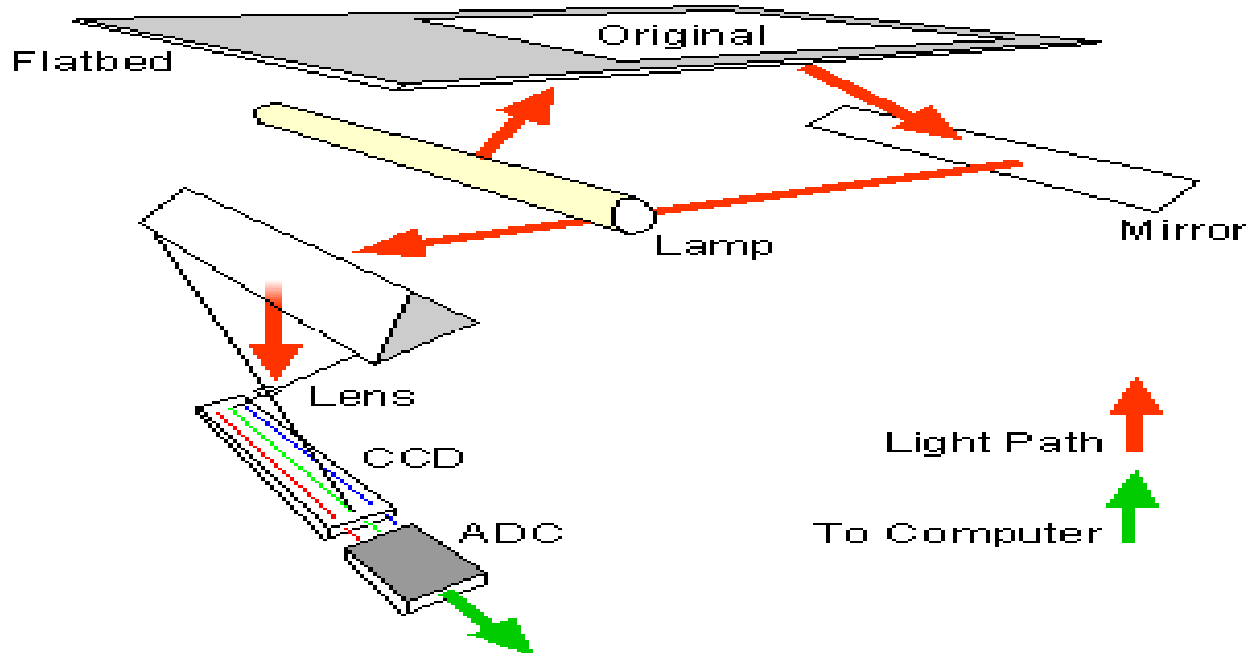WINTER – 12 EXAMINATION
Subject Code : **12186**   <u>**Model Answer**</u>   Page No : 7/21

Q.3 (a) (Fig- 2 marks)

Note: Any other block diagram showing following blocks may be considered.

WORKING OF FLAT BED SCANNER (2 marks)

- Light Source illuminates a piece of paper placed face down on the glass window above the scanning mechanism.
- Motor moves the scan head beneath the page. As it moves the scan head captures light reflected from individual areas of the page. Reflection takes place through a system of mirrors.
- A lens focuses the beams of light on to light sensitive diodes that translate the amount of light into electrical current.
- The more the reflected light, the more is the voltage of the signal. White spaces reflect more light than black or colored images.
- ADC converts each analog signal of voltage into digital pixel representing the scanned area.
- For monochrome scanner 1 bit per pixel is stored either on or off representing black or white.
- For color scanner, the scan head makes three passes under the images and the light on each pass is directed through a red, green or blue filter before it strikes the original image. Signals from three passes are converted into digital information and stored to represent red, green, or blue color value of the scanned area on the page.
- This digital information is sent to the software in the PC, where data is stored in a format on which a graphics program or OCR can work.

Q.3 (b) **Basic Parts of Optical Mouse.** (4 marks)

1. LED to illuminate the surface on which the mouse is moved.

2. A sensor made of photo detector array which acts a small video camera to detect the pattern on the surface.

3. Digital signal processing for pattern recognition purpose.

Working Principle

1. LED at the mouse button shines a bright focused light at the surface on which mouse is placed. Light is kept very close to the surface and directed at an angle to create a pattern of dark and light areas even on a smooth surface.

2. Sensor detects the pattern created by the LED on the surface.

3. Sensor contains a lens and photo detector arrays. Lens focuses the pattern on the array. Array is a matrix of light sensitive CMOS elements.

4. DSP samples the output of the sensor several thousands times/sec. Each sample is compared with the previous sample to detect the direction & extend of change in the mouse position, compared to the last position.

5. Based on the info from the DSP, mouse informs the new position to the computer & the computer moves the screen cursor to a new position.

6. Sample rate-1500 to 6000 images per sec.

7. No moving parts hence low maintenance.

8. Mouse may not work on a highly reflective surface or on glass surface that has no visual details.

9. Highly repetitive pattern may confuse the pattern recognition system of this mouse.

Q.3 (c) **ATX style SMPS** (2 marks)

An ATX power supply does not directly connect to the system power button allowing the computer to be turned off via software

ATX used one large keyed connector

They use following 3 motherboard power connectors.

- 20 pin main power connector
- 6 pin auxiliary power connector

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- 4 pin +12V power connector

The main power connector is always required, but the other two are optional depending on the application.

20 pin main power connector (Wire side view) (2 marks)

Color	Signal	Pin14	Pin	Signal	Color
Orange	+3.3V	11	1	+3.3V	Orange
Blue	-12V	12	2	+3.3V	Orange
Black	GROUND	13	3	GROUND	Black
Green	PS_On	14	4	+5V	Red
Black	GROUND	15	5	GROUND	Black
Black	GROUND	16	6	+5V	Red
Black	GROUND	17	7	GROUND	Black
White	-5V	18	8	Power_Good	Red
Red	+5V	19	9	+5V (Standby)	Purple
Red	+5V	20	10	+12V	Yellow

Q.3 (d)
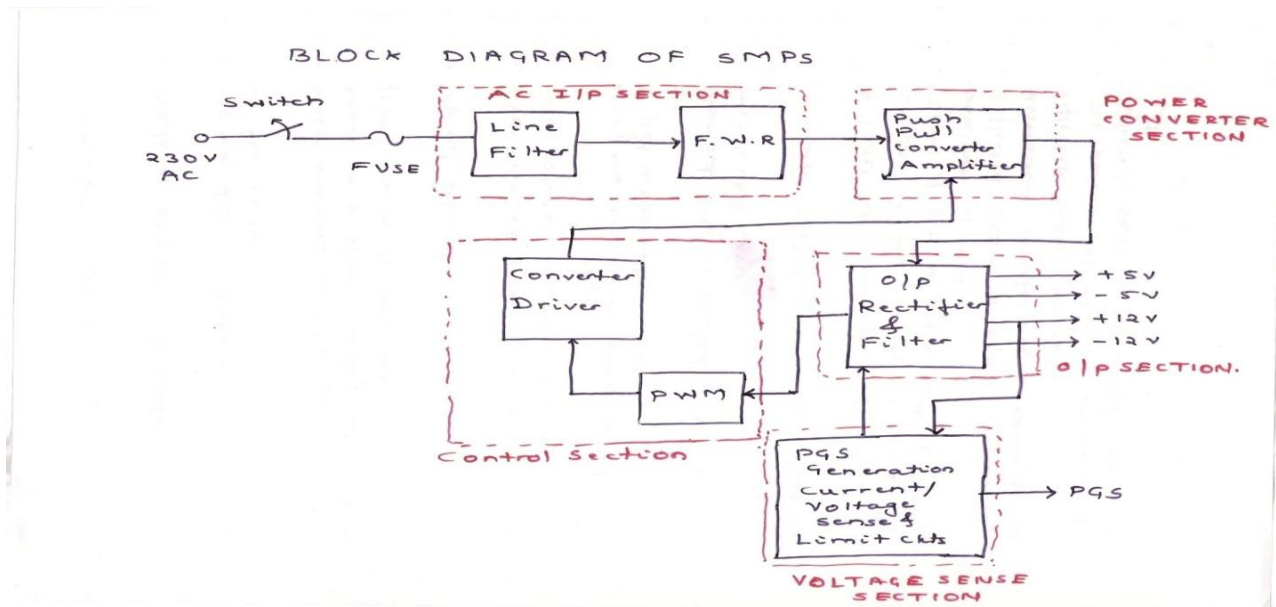
Pulse – width modulation (PWM) sets the on off duty cycle of the devices. The output voltage of the power supply is determined by this timing.

Other features designed into the PWM controller help to regulate, stabilized and provide the requirement for higher load current and instantaneous current

Q.3 (e) **Universal Serial Bus (USB)**

- A USB device can be connected without powering off the PC. The plug and play feature in the BIOS together with intelligence in the USB device takes care of detection, device recognition and handling. USB controller in the PC detects the presence or absence of USB devices and does power allocation.

Features

- Up to 127 different devices can be connected on a single USB bus.

- Initial USB standard supported 12 Mbps transfer rate. Currently 60 Mbps is supported.

- Supports wide range of peripherals such as keyboard, mouse, printer, FDD, game pad, joystick etc.

- Devices are not daisy chained. Each device is connected to USB hub, which is an intelligent device interacting with the PC on one side and USB peripheral devices on the other side.

Q.4 (a) i) Features of EISA Bus (2 marks)

- o 32 bit bus technology
- o Backward compatibility with 8 bit, 16 bit ISA adapters
- o Allow Auto configuring
- o Allows bus mastering

Disadvantages (2 marks)
- o It does not allow the devices connected to them to communicate with the CPU at the maximum speed that CPU can offer.
- o EISA requires separate memory buses to handle the high speed processors, which results in every manufacturer having its own memory expansion cards.
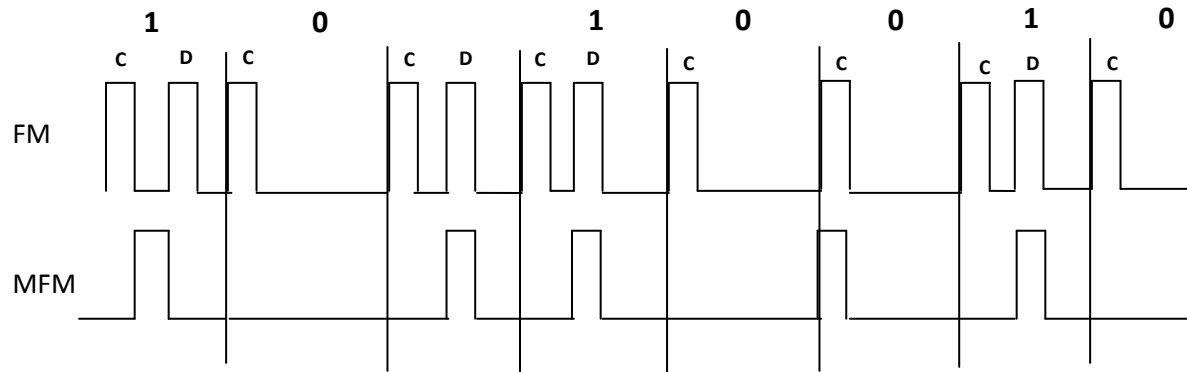
Q.4 (a)ii)

FM-10110010→PPPNPPPPPNPNPPPN (2 marks)

MFM-10110010→NPNNNPNPNNPNNPNN (2 marks)

Q.4 (a)iii **HDD types and Interface (Type-1 mark, Description-3 marks)**

There are mainly two types of interfaces available in case of Hard disk.

   (i)   IDE   (ii) SCSI drive

(i) IDE (Interface Integrated Device Electronics.)
   The ATA IDE uses a 40-pin connector with 3 connectors. One of these connectors plug into IDE on the Motherboard and the other two are attached to the drive. Most IDE comes in 3 configurations single drive, master & Slave. These are set and controlled by small series of jumper usually on the rear of the device. Single drive setting is used for single HDD and it responds to all the commands. If it is configured as Master, this tells the drive that a slave is also present, and drive will respond to the Master command. If drive is configured as a slave, it responds to the slave commands. The jumper settings are particularly labeled on the drive for particular configuration.

   OR

(ii) SCSI Drive (Small computer system Interface.)
   A single SCSI bus can hold up to 8 units, each with different SCSI IDE, ranging from D1 to D8. SCSI drives are used for high performance to attach different types of hardware multitudes that can be used. It comes in 68-pins or 78-pins connector. The SCSI connector called "host adapter "functions the gateway between the SCSI bus & the PC system Bus. Each device has a controller built-in. The SCSI bus doesn't talk directly with the devices such as Hard Disk, instead it talks to controller that is built –in to the drive especially for network servers and workstations, where heavy data is processed, SCSI is used.

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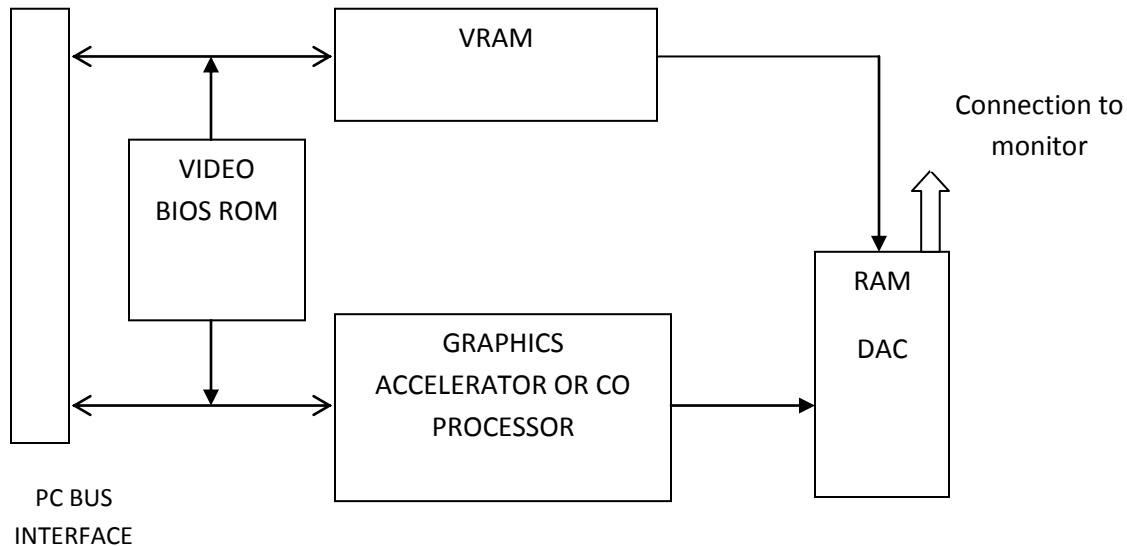
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Q.4 (a)iv) (Diagram-2 marks, Explanation-2 marks)

Block diagram

The core of the accelerator is the graphics chip (or Video chipset). The graphics chip connects directly with the PC expansion bus. Graphics command and data are transmitted into pixel data and stored in Video memory offers a second data bus that is routed directly to the Video board's RAM DAC (Random Access Memory Video to Analog Converter).

The graphics chip directs RAM DAC operation and ensures that VRAM data is available. The RAM DAC then translates Video data into red, green and horizontal and vertical synchronization signals output signals generated by the monitor. This architecture may appear simple, but this is due to high level of integration provided by the chipsets being used.

Q.4(b) i) _**Logic probe**_

Working with diagram: (2 Marks)

The logic probe uses a simple lamp to indicate the logic levels of the circuit. The probe is compatible with different kind of chips like TTL, DTL, HTL, MOS CMOS integrated circuits.

The logic probe has many features .The most important one is the memory indicator lamp, which is located under the MEM_CLR button. This indicator lamp turns on:
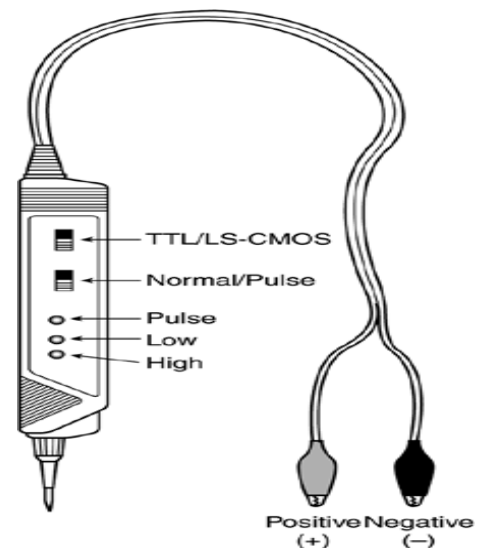
1. when the probe is powered up.
2. when the probe tip touch a circuit.
3. when Low or High logic level is detected .

The memory indicator remains on until the MEM_CLR button is pressed .The probe has also a mode switch that can be used to toggles the probe to operate in either TTL or CMOS modes. In the TTL mode the probe should be powered by a voltage supply of 4.5-15v DC, while in the CMOS mode the probe should be powered by a voltage supply of 3-18v DC.

The logic probe is ideal for detecting short duration's and low repetition rate pulses that would be difficult to observe on an oscilloscope. Positive pulses up to >=10 ns   in width trigger the indicator for >=50ms ,while negative pulses cause the indicator to go off momentarily.

Uses: (2 marks each)

The logic probe is an essential tool in the digital electronic field .It is used to detect and indicate High or Low logic levels .In addition the probe also can indicate the intermediate or "bad" logic level, including the open nodes on TTL or CMOS circuits.

Several logic circuit analysis techniques use the logic probe to detect the faults .One of these techniques is to run the circuit under test at normal clock rate while monitoring the circuit using the probe for various control signals such as reset, start shift, transfer, or clock signals. Many suspected fault can be detected using the probe which will show the state of the circuit whether it is working as it should be or not.

Another useful way is to use the logic pulser to inject the circuit with a slow pulse which allow the changes in the logic signals to occur at a rate that is slow enough to be observed. Then the logic probe could be used to inspect any part of the circuit.

Q.4 (b) ii) Power good signal (Definition-2 mark, Use-2 mark, Identification of colours-1/2 mark each)

A power good signal is a specific identification given to motherboard by the SMPS indication that the output voltages are OK and can be used by the motherboard. If this signal is not present computer does not start.

When power supply is turned on, it generates a power good signal which indicates that there is adequate power for processing. When the four output voltages are above the minimum sense levels, a TTL compatible high level (2.4V DC to 5V DC) is generated. This power good signal has a turn on delay of about 100ms after the output voltages have reached their respective levels.

+5V – Red
+5V Stand By – Purple
-12V – Blue
GND - Black

Q.5 (a) **Laser Printer Specifications (Any four specifications (1 mark each))**

1. Printer Type: Monochrome/Color
2. Width: 16.3in
3. Depth:19.1in
4. Height: 9.5in
5. Weight: 7kg
6. Enclosure Color: White/black
7. Printer Speed: upto 19 ppm
8. Connectivity Technology: Wired
9. Interface: USB /parallel
10. Max Resolution: 1200 dpi X 1200 dpi
11. Fonts included: 45X PCL6 35 X Postscript
12. Processor: Motorola ColdFire 133MHz
13. RAM installed: 16 MB (80MB Max)
14. Technology: SDRAM DIMM (100 pin)
15. Media Type: Cards, transparencies, Envelopes, Labels, plain Paper
16. Max Media Size:
17. Media Sizes:
18. Envelope Sizes:
19. Total Media Capacity:
20. Cartridge/ Print head included: 01

Q.5 (b) **Low level formatting (2 marks) High level formatting(2 marks)**

Low Level Formatting (Physical or true formatting)

It is done at the factory level. (In low level formatting all the data stored on the disk is lost as the disk is physically formatted)

1. It magnetically divides the disk into tracks and sector.
2. Basic addressing information is written to each sector of each cylinder.
3. It checks for bad sectors and maps them out.

High Level Formatting

1. It is done with the help of OS.
2. High level Format program scans the disk for tracks and sectors marked bad during low level formatting. The scanning program performs five retries to read the tracks or sectors. If the tracks are still unreadable, the area is noted as bad cluster in FAT.
3. After scanning the entire disk, the drive heads return to the first sector of the partition and write MBR. Immediately in the next sector 1st copy of FAT is written and after that 2nd copy of FAT is written. Initially FATS are blank except for the bad cluster marks found in the initial scan.
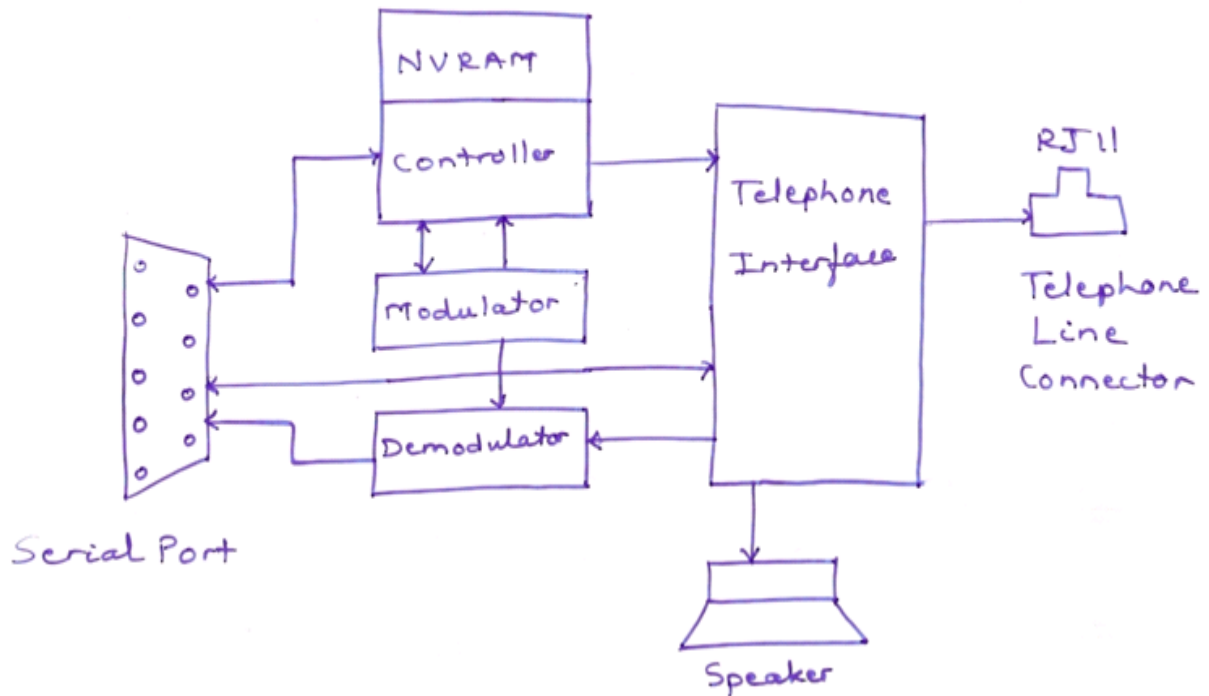4. After the 2nd copy of FAT blank root directory is created.

Q.5 (c) **External Modem: (Diagram: 1 ½ marks, Explanation 2 ½ marks)**

BLOCK DIAGRAM OF EXTERNAL MODEM.

- 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 must be 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 (DTFM) 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.

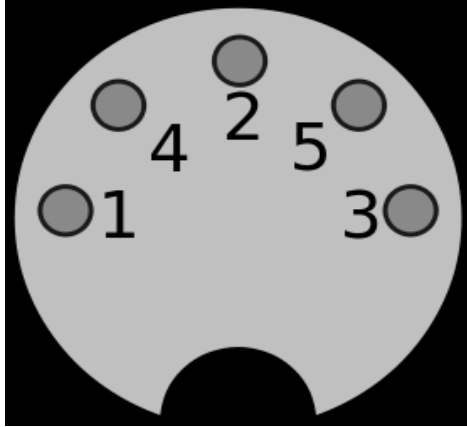Q.5 (d) **Keyboard Connector: (Any one) (2 marks diagram 2 marks functions)**

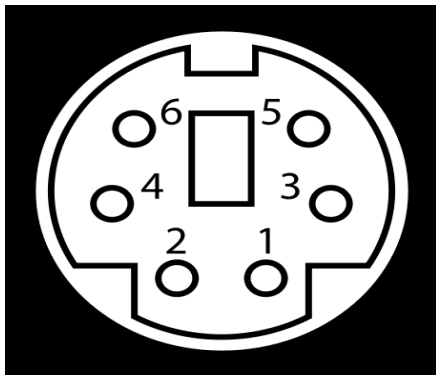**AT Connector**

Pin 1: Clock
Pin 2: Data
Pin 3: N/C (Not Connected)
Pin 4: Ground
Pin 5: Vcc (+5 V DC)

PS2 Connector

Pin 1: Data
Pin 2: N/C (Not Connected)
Pin 3: Ground
Pin 4: Vcc (+5 V DC)
Pin 5: Clock
Pin 6: N/C (Not Connected)
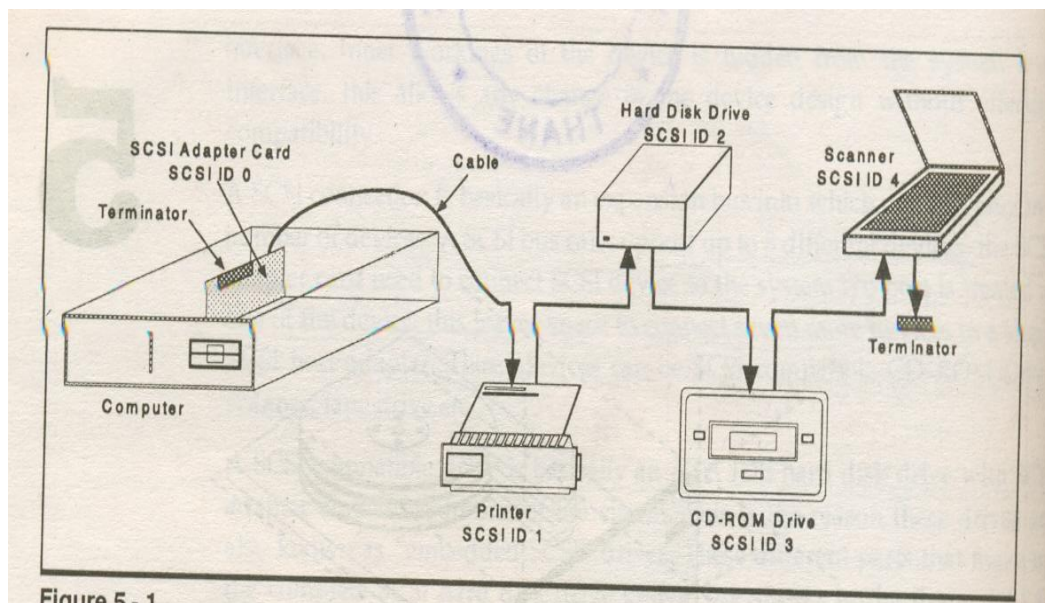
Q.5 (e) Error Indications (1 mark each)

Short Beep: Normal POST, Computer is OK.

No Beep: No Power, Loose card or short.

Continuous Beep: No Power, Loose card or short.

Three long beeps: Keyboard or Keyboard card error

Q.5 (f) **SCSI Drive Configuration (Diagram 2 marks, Explanation 2 marks)**

Figure 5 - 1

- It is a system level interface which is not based on any specific device, but it uses signals converted from device level signals to the signals used by the host computer system. A HDD, printer, scanner etc require different device level interface, but can use same system level interface.
- A SCSI connection is an expansion bus into which up to 8 different devices can be supported. A SCSI adapter card used to connect a SCSI device to the system I/O port is treated as one of the devices hence 7 more devices can be connected in single SCSI host adapter.
- One of its main uses is to connect HDD, printer, scanner, CD-ROM drive that require high speed communication with the computer.
- In SCSI different peripherals are connected in daisy chain, each new device is connected at the end of the old device.
- In the SCSI daisy-chain the first and the last device is always terminated using proper terminating resistors. This prevents signals in the bus from reflecting back after reaching the last device.
- Each every device in the chain is given a unique device identification number called SCSI ID which helps the SCSI controller to identify the device during data communication.

Q.6 (a) **Passive Matrix 2 marks, Active Matrix 2 marks**

Active Matrix or Thin Film Transistor (TFT)

1. A transistor and a storage capacitor are integrated at each cross point of electrodes.
2. To address a particular pixel, proper row is switched on and charge is sent down the correct column.
3. Only the capacitor at the designated pixel receives the charge.
4. Capacitor holds the charge until the next refresh cycle.

Passive Matrix:

1. Passive-matrix is a technology that uses a grid of vertical and horizontal wires to display an image on the screen.
2. Each pixel is controlled by an intersection of two wires in the grid.
3. By altering the electrical charge at a given intersection, the color and brightness of the corresponding pixel can be changed.
4. Since the charge of two wires (both vertical and horizontal) must be altered in order to change a single pixel, the response time of passive-matrix displays is relatively slow.

Q.6 (b) **Advantages of UPS over Normal voltage Stabilizer (Any four 1 mark each)**

1. Data Loss Protection

During power supply disruption, it provides battery energy to run the device. In case of longer time, the safe shutdown is enabled. This helps avoid any kind of data loss while working midway.

2. Reliable Power Source

It is a reliable alternate for power supply needs during any kind of disruption in the electricity. During power outages, the electronic devices are kept operational by the UPS system.

3. Protection from Power Fluctuation

The direct alternating current supply is prone to power fluctuations that cause damage to the electronic device. This voltage instability is controlled by the UPS system; through which a stable power output is provided.

4. Offers Surge Protection

Surges, outages and sudden spikes in the power supply are detected by the UPS system. Hence, the automatic switchover to the battery power takes place during such conditions. Any damage caused to the device due to such interruptions is thus avoided.

5. Maintenance of the Battery Charge

Once connected to the AC outlet, the battery charge of the UPS system is maintained. This ensures that there is enough power to be supplied to the electronic device during electricity cuts.

6. Other features

The latest UPS also offers many other feature such as surge suppression built-in device, hot-swap power module and battery module replacements. Additional backup time and run time calculation during power failure has great advantage for the end users to know the approximate time left for them to save their data before it completely shuts down (if the absence of utility power is too long and beyond the capacity of the UPS to operate).

Q.6 (c) **(2 marks each)**

Radio Frequency interference (RFI)

It is caused by any source of radio transmission near a PC. It is high frequency radiation (freq > 10 Khz).

Sources of RFI

High speed digital Circuits, Near by radio source, Cordless telephones, Mobile phones, motors, Power line intercoms.

Prevention

Put all the sources which can produce RFI away from the PC.

ESD (Electro Static Discharge)

This problem usually arises in winter when the humidity is low. Our body can accumulate static charges up to 25,000V. When we touch any component in the PC the accumulated static charge will discharge to ground. This can damage the component.

Prevention

- Before touching any component we must discharge any accumulated potential to ground. This can be done by touching the ground area of the system.
- Use ground strap attached around your wrist. The other end of the strap is connected to the system ground.
- Use anti static mat
- Do not wear synthetic clothes.

The system should have good power line grounding

Q.6(d) **Laser Printer problems and their causes (2 marks each)**

Sr. No	Problem	Cause
1.	Ghost images appear at regular intervals on the printed page.	Photosensitive drum is not fully discharged. Previous images used too much toner, and the supply of charged toner is either insufficient or not adequately charged to transfer to the drum.
2.	Light ghosting appears on pages.	Previous page(s) used too much toner; therefore, the drum could not be properly charged for the image (called developer starvation).
3.	Dark ghosting appears on pages.	Drum is damaged.
4.	Page is completely black.	Primary corona, laser scanning module, or main central board has failed.
5.	Random black spots or streaks appear on page.	Drum was improperly cleaned; residual particles remain on drum.
6.	Printing is too light (appears in a column-like streak).	Toner is low.
7.	Memory overflow error.	Not enough RAM-printing resolution too high.
8.	Characters are incomplete.	Print density is incorrect. (Adjust the darkness setting on the toner cartridge.)
9.	Mass of melted plastic is spit out.	Wrong transparency material is used.
10.	Pages are creased.	Paper type is incorrect.
11.	Characters are warped, overprinted, or poorly formed.	There is a problem with the paper or other media or with the hardware. (For media: avoid paper that is too rough or too smooth. Paper that is too rough interferes with fusing of characters and their definition. If the paper is too smooth, it can feed improperly, causing distorted or overwritten characters. For hardware: run the self-test to check for connectivity and configuration problems.)
12.	After clearing a paper jam from the tray, printer still indicates a paper jam.	Printer has not reset. (Open and close the cover.)
13.	Paper continues to jam.	Problem with the pickup area, turning area, and registration (alignment) area. (Look for worn parts or debris.)

Q.6 (e) **Hardware specifications for components in high speed gaming applications**

(Any four 1 mark each)

1. Processor: 3.6GHz
2. FSB Speed: 533MHZ to 1600MHz
3. RAM: 2 GB
4. Hard disk space: 13 GB free or more
5. Video memory: 256MB or more
6. Video Card: NVIDIA GeForce 8500 or similar
7. Sound: DirectX 9.0c Compliant

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