

Q.1(a) Attempt any THREE of following : [12]

Q.1(a) (i) What is cache memory? Explain its types? [4]

Ans.: **Concept of Cache Memory**

Cache Memory in Computer System

As the microprocessor speeds started increasing, memories and its input/output devices started to be relatively slow and accesses by microprocessor are required to have number of wait state due to this slower memory.

A further increase in microprocessor speed could not improve the system performance any more as it would just mean more number of wait state. Therefore system integrators introduce a high speed static RAM based memory between the main memory and the processor, this was called Cache memory.

(a) **Single Level Cache** : In this type of cache memory configuration a single level cache memory faster but smaller, is introduced between the processor and the main memory. It would stored the most frequently used portions of program and data.

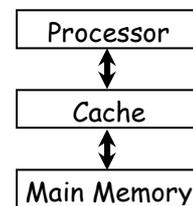


Fig. 1 : Single Level Cache

(b) **Two Level Cache** : As the processor speeds increased further there was need to have two level Cache memory level 1, Cache memory is build on the same chip of the processor and it was called L1 internal on chip Cache memory.

The 2nd level Cache memory was implemented on system motherboard as SRAM chip. It was called L2 external on board Cache memory.

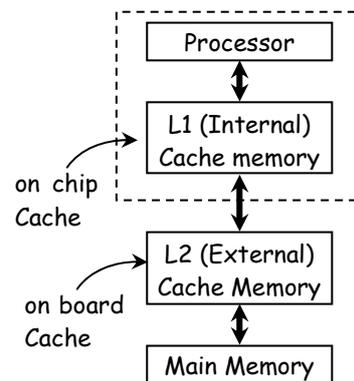


Fig. 2 : Two Level Cache

Q.1(a) (ii) Define (i) Dot pitch (ii) Resolution (iii) Refresh Rate (iv) Response time [4]

- Ans.:
- (i) **Dot pitch**: The distance between dots(sub-pixels) on a display screen.
 - (ii) **Resolution**: The horizontal and vertical size expressed in pixels (e.g. 1024 X 768).
 - (iii) **Refresh Rate**: Rate at which electronics in the monitor address the brightness of each pixel on the screen.
 - (iv) **Response time**: The minimum time required to change a pixel's color or brightness.

Q.1(a) (iii) Explain the preventive Maintenance of (i) Scanner (ii) Printer [4]

Ans.: (i) **Scanner**

- Clean the exterior of Scanner using soft cloth with mild organic solvent.
- Do not place the Scanner near heat generating machines such as heaters and furnaces.
- Slower Scanner can be made faster by increasing the RAM so that swap file size is increased.

- If the image is blurry or distorted, make sure the original document is placed firmly and cover is closed properly.
- If the quality of the image scanned is poor, make sure the scanner and scanner software is set to the appropriate setting for the type of image being scanned.
- Lamp effectiveness will gradually weaken over time. Replacement of the lamp unit (lamp, reflector, power connectors)
- The air filters protect your scanner's air-cooling vents and keep out dust and unwanted particles. Replace the air filters if not working properly.

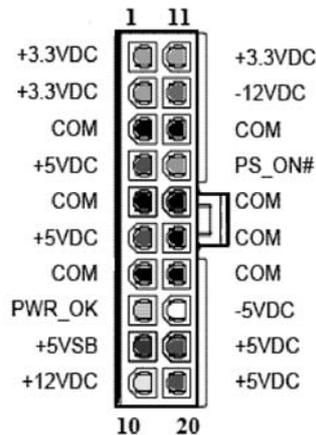
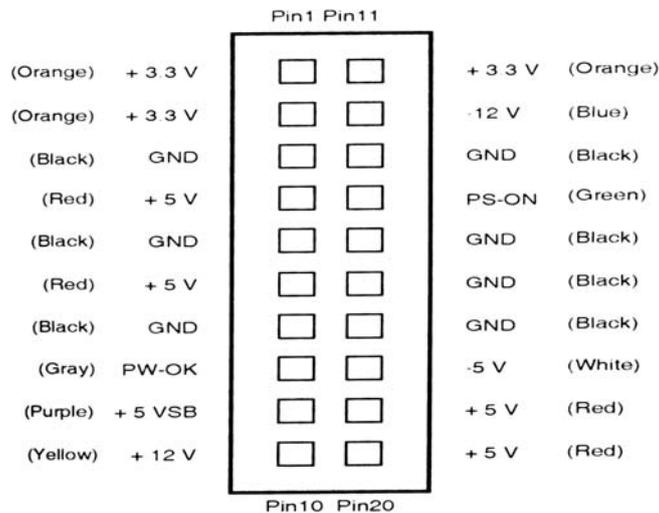
(ii) Printer

- Clean the exterior of printer using soft cloth with mild organic solvent.
- Do not place the printer near heat generating machines such as heaters and furnaces.
- Periodically, clean out dust, paper fragments and dirt from its mechanism using soft brush.
- Check that the paper feed path is free of obstructions and clear paper feed path, platen and ribbon path with soft cloth.
- Check and clean the printer head and ink cartridge.
- Denatured alcohol can be used for cleaning the inner parts such as stepper motor, print heads etc.
- Test for the satisfactory print quality.
- The mechanics of different printers vary with their types. So, consult their manuals for their preventive maintenance.

Q.1(a) (iv) Draw 20 – pin ATX connector with colour code with its functions.

[4]

Ans.: 20 Pin ATX Power Connection with color code :



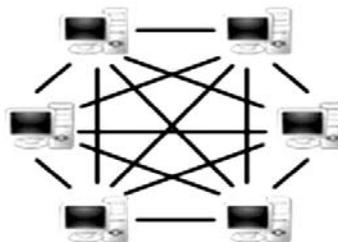
- -12V used in some types of serial port circuits.
- -5V used for floppy controllers.
- 0V Ground.
- +3.3V used in many of the new CPUs, system memory , AGP video cards.
- Power Good Signal (PW – OK). The computer will start up only after power good signal has been generated.
- +5 VSB Standby voltage. Which supplies power to special circuits even when SMPS is off.
- PS-ON is an input to SMPS only when the signal is low.

Q.1(b) Attempt any ONE of the following : [6]

Q.1(b) (i) Describe peer to peer and client server networks. [6]

Ans.: Peer to Peer network

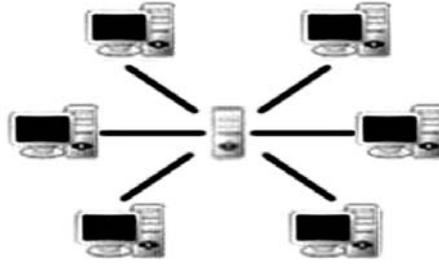
- Peer to peer (P2P) is an alternative network model to that provided by traditional client-server architecture.
- P2P networks use a decentralized model in which each machine, referred to as a peer, functions as a client with its own layer of server functionality.
- A peer plays the role of a client and a server at the same time.
- That is, the peer can initiate requests to other peers, and at the same time respond to incoming requests from other peers on the network.
- It differs from the traditional client-server model where a client can only send requests to a server and then wait for the server's response.
- In P2P networks overall network performance actually improves as an increasing number of peers are added to the network.
- These peers can organize themselves into ad-hoc groups as they communicate, collaborate and share bandwidth with each other to complete the tasks at hand (e.g. file sharing).
- Each peer can upload and download at the same time, and in a process like this, new peers can join the group while old peers leave at any time.
- This dynamic re-organization of group peer members is transparent to end-users.



A peer to peer based network

Client Server Network

- There are an almost infinite variety of client/server networks, but all of them have a couple of things in common.
- All have centralized security databases that control access to shared resources on servers.
- A client can only send requests to a server and then wait for the server's response.
- The server contains a list of usernames and passwords. Users can't log on to the network unless they supply valid usernames and passwords to the server.
- Once logged on, users may access only those resources that the network administrator allows them to access.
- Thus, client/server networks possess much more security than do peer-to-peer networks. Client/server networks also tend to be much more stable.



A server based network

Q.1(b) (ii) Compare between OSI and TCP/IP reference model (any 6 points)

[6]

Ans.:

Sr. No.	TCP/IP	OSI
1)	It has four layers.	It has 7 layers.
2)	It is predated to OSI (1970).	It is postdate to TCP/IP (1983).
3)	Session layer & presentation layers are absent.	Session & presentation layers are present.
4)	Protocol came first it model describe the existing protocol .	Models were divided first. Doesn't state the protocols to be use.
5)	Particularly use in maximum networks.	Not particularly use to compare other model.
6)	Can't be used to compose every model.	Can be used to compose other model.
7)	Network/Internet layer is connection less.	N/W layer is both connection oriented and connectionless.
8)	Transport layer is both connection less and connection oriented.	Transport layer is connection oriented.

Q.2 Attempt any FOUR of the following :

[16]

Q.2(a) Write four functions of BIOS.

[4]

Ans.: **BIOS:** 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.

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 products lifetime. To check for updated BIOS, users can check the website of the specific hardware vendor.

Q.2(b) State features of DDR2 and DDR3 RAM

[4]

Ans.: Features of DDR2

- DDR2 RAM chip have 240 pins
- DDR2 operates at data rates of 400MHz, 533MHz, and 667MHz and above.
- Operates at 1.8Volts.
- Operation max temperature is 95°C
- It prefetch 4 bits at a time.

Features of DDR 3

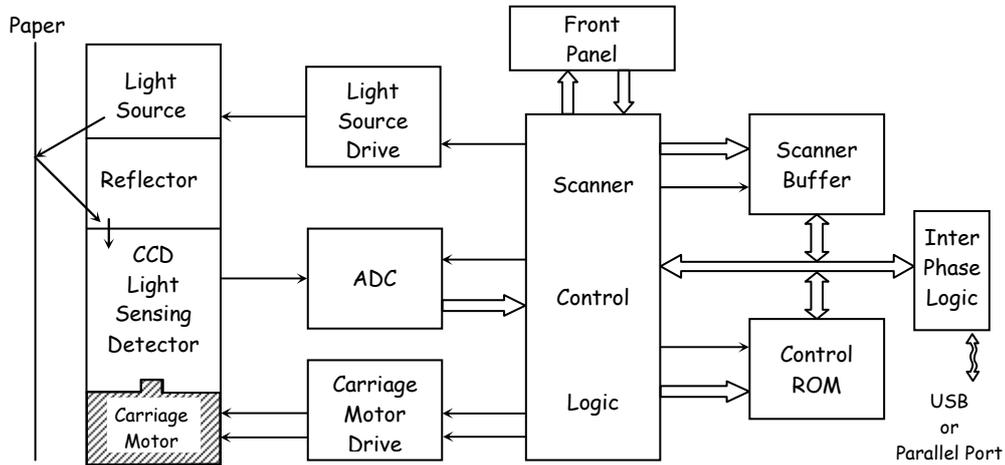
- DDR SDRAM or Double Data Rate three Synchronous Dynamic Random Access Memory is a random access memory technology used for high speed storage of the working data of a computer or other digital electronic devices.
- Its primary benefit is the ability to run its I/O bus at four times the speed of the memory cells it contains, thus enabling faster bus speed and higher peak throughputs than earlier technologies.
- Also the DDR3 standard allows for chip capacities of 512 MB to 8 GB, effectively enabling memory modules of maximum 16 GB in size.
- Higher bandwidth performance increase (up to effective 1600 MHz)
- Enhanced low power feature
- Improve thermal design (cooler).

Q.2(c) Explain working of flatbed scanner with diagram.

[4]

Ans.: Working of flat bed scanner: A flat bed scanner uses a light source, a lens, a charge coupled device(CCD) array and one or more ADCs to collect the optical information about the object to be scanned and transforms it to a computer image file.

- A CCD is a miniature photometer that measures incident light and converts that measured value to an analog voltage.
- A CCD element is all in one row with one element for each pixel in a line.
- The following steps are involved in scanning a document:
 - A light source illuminates a piece of paper placed face down against a glass window above the scanning mechanism.
 - A stepper motor moves the scan head beneath the page. As it moves, the 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 beams of light onto light-sensitive diodes that translate the amount of light into electrical current.
 - The more light that's reflected, the greater the voltage. White spaces reflect more light than black or colored letters or images.
 - An ADC converts each analog reading of voltage as digital pixel representing, black or white.
 - ADC on monochrome scanner stores only 1 bit per pixel, either on or off.
 - If the scanner is color scanner then the scan head makes three passes under the images and light on each pass is directed through a red, green or blue filter before it strikes the original image.
 - The digital information is sent to software in the PC, where the data is stored in a format with which graphics program.



Q.2(d) Describe IP address classes with suitable examples. [4]

Ans.: IP address classes: There are five classes of available IP ranges: Class A, Class B, Class C, Class D and Class E, while only A, B, and C are commonly used.

Class A: Class A type of IP addresses have First byte consisting of Network address with first bit as 0 and the next 3 bytes with host id. Hence, number of hosts are more when compared to number of networks. Example : 10.1.12.56

Class B: This type has first two bytes specifying network ID with starting two bits as 10 and last two bytes referring to host ID. Example : 131.25.1.6

Class C: This class has first three bytes referring to network with starting bits as 110 and last byte signifies Host ID. Here, number of networks are more when compared to number of hosts in each network. Example : 198.152.1.2

Class D: Class D is used for multicasting and its starting bits are 1110. Example : 226.5.1.2

Class E: Class E is reserved for future use and its starting bits are 1111. Example : 248.1.2.1

Class A	0	net id (7 bit)	host id (24 bit)
Class B	10	net id (14 bit)	host id (16 bit)
Class C	110	net id (21 bit)	host id (8 bit)
Class D	1110	multicast (28 bit)	
Class E	1111	future use (28 bit)	

Q.2(e) Compare TCP and UDP. [4]

Ans.:

Parameter	TCP (Transmission Control Protocol)	UDP (User Datagram Protocol)
Speed	TCP has error checking and handshaking signals, which makes it slower.	UDP is faster than TCP as it does not have error checking and hand shaking signals.

Reliability	There is absolute guarantee that the data transferred remains intact and arrives in the same order in which it was sent. Thus reliability is more.	There is no guarantee that the messages or packets sent would reach at all, hence less reliable.
Acknowledgement	Handshaking is done (SYN, SYN-ACK, ACK signals)	No handshake and no acknowledgement
Security	Since TCP has acknowledgement signal, it can be considered as more secure compared to UDP	No Acknowledgement and hence less secure.

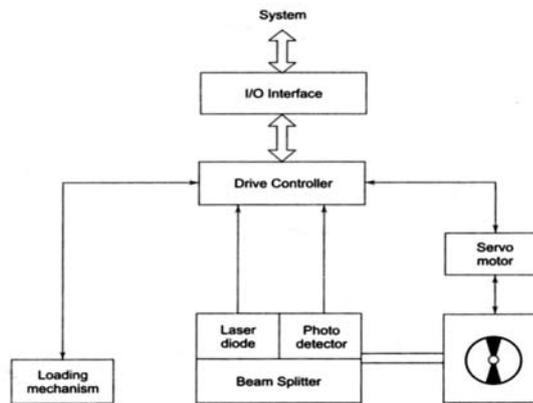
Q.3 Attempt any TWO of the following :

[16]

Q.3(a) Explain working of CDROM Drive with diagram.

[4]

Ans.:



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 μm (1 μm - 1 millionth of a meter, equal to one thousandth of a millimeter) in diameter a human hair e.g. is around 50 μm in diameter. The depth of the pits is also very small of the order of 0.1 μm . 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.3(b) State the pin description of various pins in RS 232 serial interface.

[4]

Ans.: RS 232 Serial Interface Pin description:

- Transmit Data (TXD): The serial data leaving the port travels on Transmit data line.
- Receive Data (RXD): The bits coming in from a distant serial port go through receive data line.

- Data Terminal Ready (DTR): when the data terminal is able to participate in communications, it signals its readiness by applying a positive voltage on the DTR line.
- Data Set Ready (DSR): When the data terminal is ready to receive data, it signals its readiness by applying a positive voltage on the DSR line.
- Request To send (RTS): When the data terminal is on and capable of receiving transmissions, it puts a positive voltage on the request to send line. Absence of RTS signal will prevent the data set from sending out the data.
- Clear To Send (CTS): The data set needs to control the signal flow of from the data terminal. The CTS signal indicates to the data set that data can be sent. Absence of CTS signal will prevent the data set from sending out the data.
- Carrier Detect (CD): This signal gives a modem a means of signaling the data terminal that it has made a connection with the distant modem.
- Signal Ground (GND): It provides the return path to all the signals used in the serial port.

Q.3(c) State the functions of

[4]

- | | |
|---------------|----------------|
| (i) hubs | (ii) Switch |
| (iii) Routers | (iv) Bridges |
| (v) Gateways | (vi) Firewalls |

Ans.: (i) Hubs

It is essentially a multi port repeater (repeater receives digital data, regenerates the signal and then re-transmits the data)

(ii) Switches

It is used to transport the data to the specific computer.

(iii) Routers

It connects dissimilar networks such as LAN and Internet together.

(iv) Bridges

It is used to send the data to the concerned segment, thus reducing excess traffic.

(v) Gateways

A gateway repackages information to match the requirements of the destination system.

(vi) Firewalls

A firewall blocks unauthorized connections being made to your computer or LAN, normal data is allowed through the firewall but all other data is blocked.

