Long Questions

4.1 Main memory (RAM)

Q.1 Define RAM. Also write down different types of RAM.

Ans: Storage devices are used to store larger amount of data for long period.

Main memory

Digital computers are stored program computer that means a program to be executed is first loaded in the memory and then instructions are executed one by one.

RAM.

RAM is the primary storage device and the data and instructions are stored temporarily in it. It takes the same amount of time to access any location in RAM.

Operations of RAM

CPU can perform two types of operations on RAM, these are

- Read
- Write

Read operation of RAM

Read operation the contents of memory location are copied to a CPU register.

Write operation of RAM

Write operation the contents of a CPU register are copied to the memory location.

Types of RAM

RAM is usually built by using two different technologies i.e. DRAM dynamic RAM and SRAM static RAM.

DRAM

DRAM is the most commonly used technology to build RAM chips and consumes a lot of power as data stored in a DRAM needs to be refreshed periodically.

SRAM.

SRAM is faster than the DRAM but it is more expensive. Unlike DRAM, the contents of SRAM do not need to be refreshed periodically.

Cache memory

Cache memory usually is very small in size as compared to the total memory in the computer but increase the performance of a computer.

Volatile memory

The content of the memory are lost when the electricity supply is cut off so the main memory is volatile.

4.2 ROM and its Types

Q.2 Define ROM. Also write descriptive note on types of ROM.

Ans: The manufacturer of the ROM writes the data and programs permanently into it and this data and program can not be changed afterwards. ROM is used to save frequently used instructions and data. The data stored in ROM will not change for a very long time.

PROM.

This form of ROM is initially blank and the user can write his own data/programs on it by using special devices. it is obvious kind of ROM will be used for storing data for a very long period of time.

EPROM

PROM it is initially blank and programs and data can be written on it by the manufacturer or by the user with special devices. PROM a user by using special purpose devices and ultraviolet rays can erase the data written on it. Data program written on it can be changed and new data can also added on this form of ROM.

EEPROM.

This kind of ROM can be re-written by using electrical devices and so data stored on EERPM can be easily modified. EEPROM can be very useful for taking backup of data and for keeping records that are updated periodically.

4.3 Hard disk

Q.3 Define secondary memory. Write a complete note on hard disk and its working.

Ans: Secondary Memory

Secondary storage is required to permanently store information that is not needed in memory all of the time and which may be too large to fit into the memory of the computer.

Categories on the base of data access

Two main categories, based on the ways of accessing data from a secondary storage device are

(i) Sequential access or serial access

(ii) Random access respectively.

Hard disk.

Hard disks are used to permanently store digital collection of bytes.

Data rate

The data rate is the number of bytes per second that the drive can deliver to the CPU. Rates between 5 and 40 megabytes per second are common.

Seek Time

The time used to move the head to the appropriate track after reading the address is called the seek time.

Data organization in hard disk

Data is stored on the surface of a platter in sectors and tracks. Tracks are concentric circles. The tracks are further divided into sectors. A sector usually contains a fixed number of bytes of data i.e. 512 bytes. The tracks on a surface are numbered from 0,1,2……n.

Low level formatting

During the process of low level formatting a drive marks the tracks and sectors on the disk. Usually this is done by the manufacturer of the disk. In this process the starting and ending points of each sector are written onto the platter.

High level formatting

During high level formatting, the information about file storage is written on to the disk called file allocation table. This process also prepares the drive to bold data.

Transfer delay in hard drive

The appropriate sector comes under the read /write head it reads the data from the disk and send this data to the processor. The time consumed in this process is called the transfer delay.

Rotational delay in hard drive

When the head reaches the required track the read/write head ahs to wait for some time so that the required sector comes under it due to the rotation of the platters