# Tutorial-10

Q-(A)- How many 128*8 RAM chips are needed to provide a memory capacity of 2048 bytes ?

(B)- How many lines of the address bus must be used to access 2048 bytes of memory ?How many of these lines will be common to all chips ?

(C)- How many lines must be decoded for chip select ? Specify the size of the decoders.

(a) $\frac{2048}{128} = 16 \text{ chips}$

(b) $2048 = 2^{11}$

$128 = 2^{7}$

11 lines to address 2078 bytes.

7 lines to address each chip

4 lines to decoder for selecting 16 chips

(c) $4 \times 16$ decoder

**Q- A permanent memory, which holds data and instruction for start-up the computer and does not erase data after power off.**

(A) Network interface card

(B)CPU

(C)RAM

(D)ROM

(E)None of these

**Q-Consider a hard disk with:**

- **6 surfaces**
- **32 tracks/surface**
- **64 sectors/track**
- **512 bytes/sector**

1. **What is the capacity of the hard disk?**

2. **The disk is rotating at 2160 RPM, what is the data transfer rate?**

3. **The disk is rotating at 2160 RPM, what is the average access time for transferring 256 bytes?**
   If seek time is 2.75 msec , controller time = 1.5 msec and the amount of data to be transferred is given as 20KB/sec,

**Solution:-**

**What is the capacity of the hard disk?**
Disk capacity = surfaces * tracks/surface * sectors/track * bytes/sector
Disk capacity = 6291456 bytes = 6144 KB
Disk capacity = 6 MB

**The disk is rotating at 2160 RPM, what is the data transfer rate?**
60 sec -> 2160 rotations
1 sec -> 2160/60= 36 rotations
Data transfer rate = number of rotations per second * track capacity * number of surfaces
Data transfer rate = 36 * 64 * 512 * 6
Data transfer rate = 6.75 MB/sec

T**herefore, Average Access time = Average rotational delay/latency+ seek time+ controller time+ data transfer time**
Rotational latency => 60 sec -> 2160 rotations
1 sec -> 2160/60=36 rotations
Rotational latency = (1/36) sec = 27.7 msec.
Average Rotational latency = (27.7)/2 = 13.8msec.
Data transfer time = 256/ 20*1024 sec = 12.5 msec
**Average Access time = Average rotational delay/latency+ seek time+ controller time + data transfer time**
**Average Access time = add all = 30.55 msec**

**Q. Storage which stores or retains data after power off is called-**

(A) Volatile storage

(B)Non-volatile storage

(C)Sequential storage

(D)Direct storage

(E)None of these

Q—A hard disk system has the following parameters :

- Number of tracks = 500
- Number of sectors/track = 100
- Number of bytes /sector = 500
- Average seek time=249.5ms
- Rotation speed = 600 rpm.
- Data transfer time = 0.5ms
- Average rotational delay =50ms

**What is the average time taken for transferring 250 bytes from the disk ?**

**(A)** 300.5 ms
**(B)** 255.5 ms
**(C)** 255.0 ms
**(D)** 300.0 ms

Q- A computer employs RAM chip of size 256*8 and ROM chip of size 1024*8. The new computer system needs 2Kbytes of RAM and 4K bytes of ROM. Determine how many RAM and ROM chips required for the new system?

A-8 RAM and 8 ROM chips
B-8 RAM and 4 ROM chips
C-4 RAM and 4 ROM chips
D-4 RAM and 8 ROM chips

Q-Consider a hard disk with:

4 surfaces

64 tracks/surface

128 sectors/track

256 bytes/sector

What is the capacity of the hard disk?

A-Disk capacity = 64 MB

B-Disk capacity = 32 MB

C-Disk capacity = 8 MB

D-Disk capacity = 16 MB

**Q. Which device is used to back up the data?**

(A) Disk

(B)Tape

(C)Network Drive.

(D)All of the above

(E)None of these

Q-Consider a disk pack with the following specifications- 16 surfaces, 128 tracks per surface, 256 sectors per track and 512 bytes per sector.

- What is the capacity of disk pack?
- What is a data transfer rate, If the disk is rotating at 3600 RPM ?
- If the disk system has rotational speed of 3000 RPM, what is the average access time with a seek time of 11.5 msec?

**Q- A half byte is known as_____.**

(A) data

(B)bit

(C)half byte

(D)nibble

(E)None of these

Q- Which type of memory is also known as content addressable memory ?

A- Auxiliary  memory
B- primary memory
C- Cache memory
D- Associative memory