(b) (i) Differentiate the following memory technologies : SRAMs and DRAMs.

(ii) A magnetic hard disk drive has the following specifications in its data sheet :

Number of disks (recording surface) 14 (27)

Number of tracks per recording surface 4925

Number of sectors on all recording surface 17, 755, 614

Storage capacity (formatted) of disk drive 9.09 GB

Disk rotation speed 5400 rev/min.

Average seek time 11.5 ms.

Internal data-transfer rate 44 to 65 MB/Sec

Calculate the block size B and the average block access time t_B.

(c) (i) Discuss the memory map used in 8085.

(ii) Write a short note on SCSI interface.

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 0322 **Roll No.**

B.Tech.

(SEM. IV) EVEN THEORY EXAMINATION 2012-13

COMPUTER ARCHITECTURE AND ORGANIZATION

Time : 3 Hours *Total Marks : 100*

Note :– (1) Attempt **all** questions.

(2) All questions carry equal marks,.

(3) Make suitable assumptions wherever required.

1. Attempt any **two** parts of the following : **(10×2=20)**

(a) (i) Discuss some important speedup features of modern computers.

(ii) In what way computer aided designing contributes to the overall design process of a computer system. Discuss.

(b) (i) What is a programmable logic device ? List various techniques to program to PLD. Explain any one technique with example.

(ii) Draw the block diagram of an eight-input multiplexer constructed from two-input multiplexer.

(c) (i) Describe the various types or levels of memory found in a typical computer. Why is more than one memory type needed ?

(ii) Explain why secondary-memory units such as hard-disk drives are part of the I/O system, whereas main memory is not.

2. Attempt any **two** parts of the following : **(10×2=20)**

(a) (i) Draw a block diagram for a small accumulator-based CPU.

(ii) Write a short note on pipelining. Does pipelining always improve the performance of computer ? Explain with example.

(b) (i) How floating point numbers are represented in computer ? Also give the IEEE 754 standard 32-bit floating-point number format.

(ii) What do you understand by normalization and biasing in floating point representation ? Explain with example.

(c) (i) Differentiate between RISC and CISC based microprocessors.

(ii) What types of instructions should be included in a general-purpose processor's instruction set ? Discuss.

3. Attempt any **two** parts of the following : **(10×2=20)**

(a) Draw the data-path of a sequential n-bit binary divider. Give the nonrestoring division algorithm for unsigned integer. Also illustrate the algorithm for unsigned integer with a suitable example.

(b) (i) Draw a data-path of sixteen-bit ALU composed of four 4-bit slices.

(ii) Discuss a four-stage floating point adder pipeline. Also discuss the operation of it with some example.

(c) Write a short note on Booths multiplication algorithm.

4. Attempt any **two** parts of the following : **(10×2=20)**

(a) What is micro-programmed control unit ? Give the basic structure of a micro-programmed control unit. Also discuss the microinstruction format and the control unit organization for a typical micro-programmed controller using suitable diagrams.

(b) What is the function of control unit ? Explain. Also discuss the design of CPU control unit using suitable block diagram.

(c) Discuss the organization of a CPU incorporating a four-stage instruction pipeline with suitable block diagram. Does a control dependency affect the performance of an instruction pipeline ? Explain.

5. Write short notes any **two** of the following : **(10×2=20)**

(a) (i) Give the significance of cache memory in computer system. Also discuss in qualitative terms the impact of selecting of too small associativity level k on cache performance.

(ii) What do you mean by locality of reference ? Explain with an example.