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

PAPER ID : 0110   Roll No. [ ][ ][ ][ ][ ][ ][ ][ ][ ]

B.Tech.
(SEMESTER-IV) THEORY EXAMINATION, 2012-13
COMPUTER ORGANIZATION

Time : 3 Hours]   *[Total Marks : 100*

SECTION – A

1. Attempt **all** parts : $10 \times 2 = 20$

   (a) What do you mean by self complimenting BCD code ?

   (b) Using 8-bit 2's complement representation of negative numbers, perform $-35 + (-11)$.

   (c) State the condition in which overflow occurs in case of addition and subtraction of two signed 2's complement number.

   (d) What do you mean by instruction set completeness, for a computer ?

   (e) What are zero-address instructions ? Explain with the help of an example.

   (f) Explain the use of condition field in the micro instruction code format.

   (g) Why do we need virtual memory ?

   (h) What do you mean by write-back method ?

   (i) Differentiate between synchronous and asynchronous communication.

   (j) What is cycle stealing DMA operation ?

SECTION – B

2. Attempt any **three** parts : $3 \times 10 = 30$

(a) There are four resistors A, B, C & D. Design a common bus data path with necessary logic circuit to perform the transfer of content of any register to self or any other registers. Also draw the logic circuit.

(b) Draw and explain the flowchart to perform the subtraction of two numbers in signed magnitude form.

(c) What is a microprogram sequencer ? With the help of a block diagram, explain the working of microprogram sequencer.

(d) Explain the various types of mapping procedures used by cache memory.

(e) How, DMA is connected to RAM, CPU and I/O peripherals ? Draw a diagram of DMA transfer and explain its working.

SECTION – C

Attempt **all** parts : $5 \times 10 = 50$

3. Attempt any **two** parts :

(a) When do you say the floating point number is normalized ? Explain how floating point representation of number is done. Represent the number $(+46.25)_{10}$ as floating point binary number with 32 bits.

(b) Explain with the help of an example, the use of hamming code as error detection and correction code.

(c) A digital computer has a common bus system of 16 registers of 32 bits each. The bus is constructed with multiplexers.

   (i) How many selection inputs are there in each multiplexer ?

   (ii) What size of multiplexers is needed ?

4. Attempt any **two** parts :

(a) Evaluate the arithmetic statement $X = (A + B) * (C + D)$ using a general register computer with three address, and two address instruction format.

(b) Multiple $(-7)_{10}$ with $(3)_{10}$ by using Booth's multiplication. Give the flow table of the multiplication.

(c) What is addressing mode ? Why do computers use addressing mode techniques ? Explain two modes with examples, which do not use address fields.

5. Attempt any **two** parts :

(a) Compare horizontal microcode with vertical microcode. State the advantages of microprogrammed control unit.

(b) Explain Fetch and Decode phase. Draw the block diagram of a register transfer for fetch phase.

(c) Control Unit in processor generates time and control signals to control other devices in computer. How does control unit of CPU generate time and control signal based on the instructions ? Explain it with necessary diagram.

6. Attempt any **two** parts :

(a) The memory unit has a capacity of 8192 words of 32 bits per word.

(i) How many flip-flops are needed for the memory address register and memory buffer register ?

(ii) How many words will the memory unit contain if the address register has 15 bits ?

(b) What is hit ratio ? Explain the term, locality of reference ? How is it used to improve the performance of cache memory ?

(c) Explain the need of memory hierarchy. What is the main reason for not having a large main memory for storing the totality of information in a computer system.

7. Attempt any **two** parts :

(a) What do you mean by asynchronous data transfer ? Explain strobe controlled and handshaking mechanism for asynchronous data transfer.

(b) Describe different techniques used for interfacing I/O units with the processor.

(c) What is the difference between isolated I/O and memory mapped I/O ? State the advantages and disadvantages of each.