

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

PAPER ID : 0110

Roll No.

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B.Tech.

(SEMESTER-IV) THEORY EXAMINATION, 2012-13

COMPUTER ORGANIZATION

Time : 3 Hours]

[Total Marks : 100

SECTION – A

1. Attempt all parts : 10 × 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 × 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 × 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.
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