



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

PAPER ID : **110401**

Roll No.

| | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|

B. Tech.

(SEM. IV) THEORY EXAMINATION, 2014-15 COMPUTER ORGANIZATION

Time : 3 Hours]

[Total Marks : 100

Note:(1) Attempt all questions.

(2) Make suitable assumptions wherever necessary.

- 1 Attempt any **two** parts of the following: [10×2=20]
- (a) What is a multiplexer and demultiplexer ? Explain how an 8 x 1 multiplexer can be designed using two 4x1 multiplexers.
- (b) (i) Simplify the following function using K map and draw the circuit using AND, OR, NOT gates.
 $F(A, B, C, D) = \sum(0, 2, 8, 9, 10, 11, 13, 15)$
- (ii) Add -35 and -31 in binary using 8 bit registers, in signed 1's complement and signed 2's complement
- (c) Show step by step the multiplication process using Booth's algorithm when (+15) and (-13) numbers are multiplied. Assume 5-bit registers that hold signed numbers.

2 Attempt any **two** parts of the following : [10×2=20]

- (a) What is an instruction in the context of computer organization ? Explain the purpose of various elements of an instruction with the help of a sample instruction format.
- (b) Explain the following addressing modes with the help of an example each:
 - (i) Direct
 - (ii) Register Indirect
 - (iii) Implied
 - (iv) Immediate
 - (v) Indexed
- (c) Write the steps in fetching a word from memory. Differentiate between a branch instruction and call subroutine instruction.

3 Attempt any **two** parts of the following : [10×2=20]

- (a) Compare and contrast hardwired and micro programmed control units. Also lists their advantages and disadvantages.
- (b) What are the different categories of micro-operations that may be carried out by CPU? Explain each category of micro-operations giving one example for each.
- (c) Write short notes on the following:
 - (i) Micro program sequencer for control memory.
 - (ii) RISC.

4 Attempt any **two** parts of the following: [10×2=20]

- (a) What is the difference between isolated I/O and memory mapped I/O? Explain the advantages and disadvantages of each.
- (b) Consider a cache uses a direct mapping scheme. The size of main memory is 4K bytes and word size of cache is 2 bytes. The size of cache memory is 128 bytes. Find the following:
 - (i) The size of main memory address (assume each byte of main memory has an address)
 - (ii) Address of cache block
 - (iii) How many memory location address will be translated to cache address/block/location?
 - (iv) How can it be determined if the content of specified main memory address exists in cache.
- (c) Explain the following memory schemes discussing why needed the :
 - (i) Interleaved memory
 - (ii) Associative memory

5 Write short notes on any **four** of the following: [5×4=20]

- (a) Interrupt
- (b) Bus arbitration
- (c) Virtual Memory
- (d) Organization of 2D and 2 ½ D.
- (e) Programmed I/O
- (f) DMA.