Roll No. ....

Total Pages : 3

MCA/D-19   **10011**

COMPUTER ORGANIZATION

Paper—MCA-14-12

Time Allowed : 3 Hours]   [Maximum Marks : 80

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. Question No. 1 is compulsory. All questions carry equal marks.

Compulsory Question

1. Answer the following questions in brief :   4×4=16

   (a) What is K-Map ? Explain rules to use it.

   (b) What is System Bus ? Explain its different parts.

   (c) Distinguish between Horizontal Microcode and Vertical Microcode.

   (d) Explain about memory protection mechanisms.

UNIT–I

2. (a) Simplify the following Boolean function using Quine McCluskey procedure :

   $$F(A, B, C, D) = \sum(0, 1, 2, 8, 10, 11, 14, 15).$$ 8

   (b) Design 8 × 1 priority encoder using two 4 × 1 priority encoder and any necessary additional logic gates.   8

3. (a) What is Synchronous Binary counter ? Design 4-bit synchronous binary counter and explain its working with the help of timing diagram.   8

   (b) What is Flip-flop ? Draw the diagram and characteristics table for JK flip-flop. Also, construct D type flip flop using it.   8

UNIT–II

4. (a) How can you organize 16 × 2 memory subsystem by using two 8 × 2 ROM chips with high order interleaving ?   8

   (b) What is the need of I/O interface ? Draw the block diagram for generic I/O interface for an input device along with its circuitry of enable logic.   8

5. (a) Design a simple computer system with 16 bit address bus and 8 bit data bus which uses isolated I/O. Further suppose it has 8K × 8 RAM, 8K × 8 ROM and bidirectional I/O device. Show the design with all required signals and logic.   9

   (b) What is RTL ? How can you use RTL to specify a digital system ? Explain with an example.   7

UNIT–III

6. (a) Design a very simple CPU. Explain fetching, decoding and execution of instructions on this CPU.   8

(b) What is Microsequencer ? Design a simple microsequencer and explain its working. 8

7. Write a shift-subtract division algorithm. Convert the algorithm into RTL code. Give the hardware implementation of this algorithm. 16

UNIT–IV

8. (a) What is Cache memory ? Explain direct mapping scheme used in Cache memory. What are limitations of this mapping scheme. 8

(b) What is Virtual Memory (VM) ? Explain segmentation scheme of implementation of VM. 8

9. Write short notes on the following :

(a) IOP. 8

(b) RS232C standard. 8