MCA/D-15
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. (a) State the postulates of Boolean algebra.
   (b) What is a Ripple adder?
   (c) Draw and explain the timing diagram of memory write operation.
   (d) What is a RTL?
   (e) How a floating point number is represented in IEEE 754 standard?
   (f) Describe Microinstruction format.
   (g) Cite the circumstances where paging should be preferred over segmentation.
   (h) Explain USB standard in brief.

UNIT-I

2 (a) Using Karnaugh-map and Quine McClusky procedures simplify the following Boolean function:

$F(A, B,C, D) = \sum(1, 3, 5, 8, 9, 11, 15) + \sum(2, 13)$

(b) Design a 4-bits bi-directional shift register.

3. (a) Consider a JK flip-flop, i.e., a JK flip-flop with an inverter between external input K and internal input K.

(i) Obtain the flip-flop characteristics table.
(ii) Obtain the characteristic equation.
(iii) Show that tying the two external inputs together forms a D flip-flop.

(b) What is a Multiplexer? Design and explain a 8 : 1 multiplexer.

UNIT-II

4. (a) Explain the one-dimensional (linear) chip organization of internal memory.
   (b) Explain the design and working of a modulo-6 counter.

5. Design a complete machine using various Micro-operations and RTL specifications. Explain the architecture of the machine with the help of suitable example.

UNIT-III

6. Explain the design and working of a simple micro sequencer.

7. (a) Explain the hardware implementation for division of signed and unsigned numbers.

   (b) Differentiate between hardwired and Micro programmed control.

UNIT-IV

8. (a) Describe the hierarchy of memory system in detail.

   (b) What do you mean by Virtual memory? How the mapping is done from virtual to Physical memory? Explain along with various types of mappings.

9. Write short notes on the following:
   (a) Handshaking
   (b) Interrupts
   (c) IOP.