010310

MCA/D-16
COMPUTER ORGANIZATION
PAPER : MCA-14-12

Time Allowed: 3 Hours Maximum Marks: 80

Note: Attempt five questions in all. Question No. 1 is compulsory. All questions carry equal marks.

Compulsory Question

1. Answer the following questions in brief :
   (a) What is D Latch? Explain the working of positive level triggered D Latch with set & clear and its truth table.
   (b) Explain address bus, data bus, control bus and I/O bus.
   (c) Explain the terms with respect to floating point numbers: underflow, gap, NaN and denormalization.
   (d) Distinguish between internal and external memory fragmentation.

Unit-I

2. (a) Simplify the following Boolean function using Quine McCluskey procedure :
   F(A,B,C,D)={(1,4,6,7,8,9,10,11,15)
   (b) What is comparator circuit? Design 4-bit comparator circuit.

3. (a) What is counter? Design a 4-bit up counterand explain its working with the help of its truth table.
   (b) What is JK-flop? Explain its working with diagram and characteristics table? What is race problem in it? Explain.

Unit-II

4. (a) Explain the CPU organization with the help of its block diagram.

   (b) How can you organize 16*2 memory subsystem by using two 8*2 ROM chips with low order interleaving.

5. (a) What is I/O interface? Draw the block diagram for generic I/O interface circuitry for I/O devices and explain interleaving.

   (b) What is RTL? Show the hardwareto implement:
   A:X-X*Y.

Unit-III

6. (a) What is ALU? Design ALU for instruction set (ADD,AND,JMP and INC) for CPU with 6 bit address, 4 instructions and 64 byte memory.

   (b) Design a microcoded control unit for simple CPU using vertical microcode. Make your own assumptions needed for the design.

6. What is restoring shift-subtract division algorithm? Convert the algotithm into RTL code. Give the hardware implementation of this algorithm.

Unit-IV

8. (a) Explain the set-associative mapping scheme used in cache memory.

   (b) What is TLB? Explain conversion of logical address into physical address using TLB.

9. (a) Explain destination-initiated strobe control based data transfer with the help of suitable diagram.

   (b) What is polling? Explain its hardware implementation.