MCA/D-18　　　**10061**

COMPUTER ORGANIZATION
MCA-14-12

Time : Three Hours]　　　　[Maximum Marks : 80

Note : Attempt *Five* questions in all. Q. No. **1** is compulsory. Attempt *four* more questions selecting *one* question from each Unit.

1. Answer the following questions in brief :

   (a) Simplify $(w.x)' + x'.z' + w'.x.y.z + x.y.z$ using Boolean algebra and realise the circuit.

   (b) Explain the following terms w.r.t. floating point numbers : precision, overflow, NaN and normalization.

   (c) What is locality of reference ? Explain its signficance ?

   (d) Distinguish between write-through and copy-back cache designs.　　　　　　4×4=16

Unit I

2. (a) Simplify the following Boolean function using Quine McCluskey procedure : **8**

$$F(A,B,C,D) = \Sigma(0, 2, 8, 9, 10, 11, 14, 15)$$

(b) What is Decoder ? Design a BCD-to-Seven-Segment decoder. **8**

3. (a) What is Shift Register ? Design a 4-bit left-shift register. **8**

(b) What is JK flip-flop ? Explain its working with the help of logic diagram and characteristics table. **8**

Unit II

4. (a) Explain read and write operations in memory with the help of timing diagram. Also distinguish between SRAM and DRAM. **8**

(b) How can you construct 8×4 memory subsystem from two 8×2 ROM chip with control signals ? **8**

5. (a) What is I/O Interface ? Draw the block diagram for generic I/O interface circuitry for an output device along with its load logic circuitry. **8**

(b) What is RTL ? Design Total Booth controller using RTL. **8**

Unit III

6. (a) What is hardwired control ? Design hardwired control CPU with 6 bit address, 4 instructions and 64 byte memory. **8**

   (b) What is the purpose of microsequencer ? Design a simple microsequencer. **8**

7. Write a shift-add multiplication algorithm. Convert the algorithm into RTL code. Give the hardware implementation of this algorithm. **16**

Unit IV

8. (a) Why do you have levels in cache memory ? Explain the associative mapping scheme. **8**

   (b) What is segmentation ? Explain conversion of logical address into physical address using segmentation. **8**

9. (a) Explain source-initiated data transfer using handshaking with the help of suitable daigram. **8**

   (b) Write a short note on USB standard. **8**