

MCA (Revised)
Term-End Examination
December, 2006

**MCS-012 : COMPUTER ORGANISATION &
ASSEMBLY LANGUAGE PROGRAMMING**

Time : 3 hours

Maximum Marks : 100

(Weightage 75%)

Note : Question no. 1 is **compulsory** and carries 40 marks. Attempt any **three** questions from the rest.

1. (a) Construct the Karnaugh map for the function $F(A, B, C, D) = \Sigma(0, 2, 4, 5, 7, 10, 13, 15)$ and find the function in SOP form. Also, draw the logic diagram using NOR gates only. 6

- (b) What is the difference between direct and indirect address instruction ? Show how many memory references are required for each type of instruction to bring an operand into processor register. 6

- (c) Use a 8-bit binary representation for integers using signed 2's complement notation. Perform the following operations and also indicate the overflow/underflow if it occurs : 5
- (i) $-25 + 35$
- (ii) $-29 - 9$
- (iii) $-65 + (-61)$
- (iv) $98 + 30$
- (v) $-20 - 90$
- (d) Design and draw the combinational circuit that converts a hexadecimal input to an equivalent BCD. 5
- (e) Discuss the use of parity bits for error detection. How is Hamming code useful for error detection and correction ? Demonstrate the use of Hamming code for a 4-bit word sequence transmitted as 1010 whereas received as 1000. 10
- (f) Write an assembly program to find whether two strings, stored in memory, match or not. 5
- (g) Give two reasons why a RISC processor is better than a CISC processor. 3

2. (a) What is RAID ? List three features of RAID level 2.
In RAID technology, what are the important performance considerations ? Explain briefly. 5

- (b) Using a 4-bit counter with parallel load and a 4-bit adder, draw a block diagram that shows how to implement the following statements :

$$X : R_1 \leftarrow R_1 + R_2$$

$$X'Y : R_1 \leftarrow R_1 + 1$$

where R_1 is a counter with parallel load and R_2 is a 4-bit register. 6

- (c) Write an assembly program for adding two five-byte numbers using arrays. 4

- (d) What is interrupt ? Briefly explain the four interrupt conditions. 5

3. (a) What do you mean by associative memory ? Explain briefly the concept of Match-logic. 5

- (b) What is FAT ? Explain the structure of FAT briefly. Calculate the number of entries required in the FAT table using the following parameters for an MS-DOS system :

Disk capacity = 30 MB

Block size = 512 bytes

Blocks/Clusters = 4 5

5. (a) What are the advantages of using SRAM ? Why do we use L1 and L2 cache memories ? How is a main memory address mapped to a cache address ? Assume the main memory size of 1 K words, 1 cache block size = 32 bits, number of cache slots = 16 and cache mapping = 2 way set associative. 5
- (b) Write an assembly program to add two 4-digit packed BCD numbers. 8
- (c) What is the difference between floating point and fixed point number formats ? Explain the floating point format briefly with the help of an example. What is the precision w.r.t. floating point numbers ? 7