

**MASTER OF COMPUTER
APPLICATIONS/BACHELOR OF
COMPUTER APPLICATIONS
(REVISED) (MCA/BCA)
Term-End Examination**

December, 2024

**MCS-012 : COMPUTER ORGANIZATION AND
ASSEMBLY LANGUAGE PROGRAMMING**

Time : 3 Hours

Maximum Marks : 100

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

1. (a) Add -35 and -31 in binary using 8-bit register in : 5
- (i) signed 1's complement
- (ii) signed 2's complement
- (b) How many RAM chips are required of size $128\text{ K} \times 1$ to build 1 M byte of memory. Show the address distribution for the scheme. 5
- (c) Calculate physical address using the following 8086 registers : 5
- (i) $\text{SS} = 6789\text{h}$
- (ii) $\text{SP} = 00\text{FFh}$
- (iii) $\text{CS} = 4412\text{h}$
- (iv) $\text{ZP} = 3900\text{h}$
- (d) Simplify the following using Karnaugh's map : 5

$$F(A, B, C, D) = \Sigma (0, 1, 3, 5, 8, 10, 13)$$

- (e) Write a program in 8086 assembly language that counts the number of characters in a string stored in the data segment. Make suitable assumptions, if any. 5
- (f) A digital computer has a memory unit of $64\text{ K} \times 8$: 6
- (i) How many data input and data output lines does it have ?
- (ii) How many address line does it have ?
- (iii) What is the memory capacity in bytes ?
- (g) What is an interrupt ? Explain any *one* technique that can be used to determine which device has issued the interrupt. 5

- (h) What is FAT in the context of a disk ? How is it different from Inode ? 4
2. (a) Explain the set-associative cache mapping scheme with the help of an example. Make and state suitable assumptions. 8
- (b) Explain the following terms : 3
- (i) Seek time (for hard disk)
- (ii) Latency time (for hard disk)
- (iii) Hit Ratio for cache memory
- (c) Explain the process of error detection and correction with the help of a diagram. 4
- (d) Explain the role of any *five* registers used in a basic computer. 5
3. (a) What are the differences between .com and .exe programs ? 4

- (b) Explain the role of flag register in assembly language programming with the help of an example. 4
- (c) Differentiate between programmed I/O and DMA technique of I/O. 6
- (d) Compare the following : 6
- (i) CD-ROM and DVD-ROM
 - (ii) SRAM and DRAM
 - (iii) Memory mapped I/O and Isolated mapped I/O
4. (a) What is a multiplexer ? Give block diagram, truth table and logic diagram of a 4×1 multiplexer. 8
- (b) Explain the following addressing schemes : 6
- (i) Indexed Addressing

(ii) Base Register Addressing

(iii) Relative Addressing

(c) Suppose the value of register R1 is 11011110. Perform the following micro-operations : 6

(i) Insert 0010 in place of the leftmost 4 bits

(ii) Clear all the bits of R1

(iii) Arithmetic left shift of R1

5. (a) Write a program in 8086 assembly language that accepts a character string of maximum size of 10 characters from the keyboard and converts the string to uppercase. 8

(b) Differentiate between the following : 6

(i) PUSH and PUSHF instructions

(ii) AAA and DAA instructions

(c) List all the features of RISC architecture.

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