

MCA (Revised) / BCA (Revised)

Term-End Examination

December, 2018

01373

**MCS-012(S) : COMPUTER ORGANISATION AND
ASSEMBLY LANGUAGE PROGRAMMING**

Time : 3 hours

Maximum Marks : 100

(Weightage 75%)

Note : *Question number 1 is compulsory and carries 40 marks. Attempt any three questions from the rest.*

1. (a) Using K-map, simplify the following function in Sum of Product form : 5

$$F(A, B, C, D) = \Sigma(2, 4, 5, 7, 11, 12, 15)$$

Also draw the logic circuit for the simplified expression.

- (b) (i) Add (-100) and (-105) in 8-bit registers using signed 2's complement representation for negative numbers. 2
- (ii) Convert decimal number 65.41 to binary. 2

- (c) What is a zero address machine ? Write a program to compute the following expression using zero address machine : 4

$$F = (A/B) + (C * D) - E$$

- (d) A digital computer has a memory unit of $64 K \times 8$. 5

(i) How many data input and data output lines does it have ?

(ii) How many address lines does it have ?

(iii) What is the memory capacity in bytes ?

- (e) Calculate the physical address given the following 8086 register contents : 4

(i) SS = 7698h
SP = 01FFh

(ii) CS = 5526h
IP = 8874h

- (f) Simplify the boolean expression

$$F = \overline{\overline{A + B} + (\overline{A + B})}. \quad 3$$

- (g) What is the minimum set of registers for von-Neumann machine ? What are the functions of these registers ? 4

- (h) Write micro-operations for the following : 5
- (i) ADD R1, X
(Add the contents of location X to register R1 and place the result in R1).
- (ii) Interrupt processing
- (i) Write 8086 assembly language program that finds the maximum value among a list of 5 byte numbers. The result should be stored in BX register. 6
2. (a) Explain the working of CD-ROM and DVD-ROM with the help of a block diagram. 5
- (b) Using ~~Manning~~ code what should be the length of the error detection code that detects error in one bit ? Justify, using suitable example. 5
- (c) Explain the set associative cache memory mapping scheme with the help of an example. 7
- (d) Explain the following terms : 3
- (i) Seek Time for Hard Disk
- (ii) Latency Time for Hard Disk
- (iii) Hit Ratio for Cache Memory

3. (a) How many RAM chips of 256×1 bits are required to build 32 Mbytes of memory ? 5
- (b) Draw an internal organization of 32×4 RAM and explain the purpose of its associated control signals. 5
- (c) How can an interleaved memory mechanism be used to improve the processing speed of a computer system ? 4
- (d) Draw a 4-bit right-shift register and explain its operation. 6
4. (a) Discuss the features and principles of RISC processing. 5
- (b) Suppose the value of register R1 is 1101 1110. 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
- (c) Discuss the design and operation of the Wilkes control unit with the help of a diagram. 6
- (d) What are the assembler directives ? Explain the purpose of the following 8086 assembler directives : 3
- (i) Segment
- (ii) Assume

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 upper case. 8
- (b) What will be the output of the following 8086 assembly language statements? 6
- (i) SAL BX, 01 if CF = 0
 - (ii) ROR BX, 1
 - (iii) SHR BX, 01 if CF = 0
- Given : BX = 1001 1101 1011 1011
- (c) Draw the logic diagram, characteristic table and excitation table for a T flip-flop. 6
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