

**MASTER OF COMPUTER****APPLICATIONS/BACHELOR OF****COMPUTER APPLICATIONS****(REVISED) (MCABCA)****Term-End Examination****June, 2023****MCS-012 : COMPUTER ORGANIZATION AND  
ASSEMBLY LANGUAGE PROGRAMMING***Time : 3 Hours**Maximum Marks : 100**(Weightage : 75%)*


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

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1. (a) Describe the structure of 8086 micro-processor with the help of a diagram. 6
- (b) What is an instruction cycle ? Explain with the help of a flowchart. 6

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- (c) Represent the following numbers using IEEE-754 floating point single precision number format : 4
- (i) 1010.0001
- (ii) - 0.00001111
- (d) Explain instruction pipeline with the help of a diagram. 4
- (e) What are the different kinds of Interrupts ? How does CPU know that an interrupt has occurred ? 5
- (f) What is DMA ? Explain the functions of DMA. 5
- (g) Consider a four variable Boolean function :
- $$F = \Sigma (0, 4, 6, 7, 8, 10, 11, 15)$$
- Minimize this function using K-map and draw the resultant function using logic gates. 6
- (h) Convert decimal number  $(49.25)_{10}$  into : 4
- (i) binary
- (ii) hexadecimal
- (iii) octal
2. (a) Explain the differences between micro-programmed control and hardwired control. 5

- (b) Draw and explain the logic diagram of a  $3 \times 8$  decoder. 5
- (c) Design a combinational circuit with three inputs  $x, y, z$  and three outputs A, B, C. When the binary equivalent of input to this circuit is 0, 1, 2 or 3 the binary output is one greater than the input. When the binary equivalent of input is 4, 5, 6 or 7 the binary output is one less than the input. Also draw the truth table. 6
- (d) Find the 9's and 10's complement of 128. Then convert 128 to binary and find 1's and 2's complement. 4
3. (a) Add 25 and  $(-25)$  in binary using 8-bit register for the following representations : 6
- Signed magnitude representation
  - Signed 1's complement
  - Signed 2's complement
- (b) Explain the following instructions of 8086 assembly language with the help of an example : 8
- ADC
  - MUL
  - XOR
  - ROL

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- (c) Explain the role of Interrupt Vector Table (IVT) in the context of 8086 micro-processor with the help of a diagram. 6
4. (a) The following memory units are specified by the number of words times the number of bits per word. How many address lines and input-output data lines are needed in each case ? 4
- $2K \times 16$
  - $64K \times 8$
- (b) What is a micro-operation ? Explain the sequence of micro-operations required to fetch an instruction stored in the memory in the context of a Von Neumann machine. 6
- (c) Explain the following addressing modes with the help of an example of each : 6
- Register addressing
  - Index addressing
  - Direct addressing
- (d) Find the even and odd parity bits for the following 7-bit data : 4
- 1010101
  - 0000111
5. (a) Explain the terms ASCII and UNICODE. 3

- (b) Register 'A' holds 8-bit binary 11011001. Determine B operand and the logic micro-operation to be performed in order to change the value in A to : 6
- (i) 0000 1001
  - (ii) 1111 1001
  - (iii) 0010 0110
- (c) Write the assembly language code using 8086 assembly language for performing the following operation : 6
- $$Z = ((A - B) / 10 * C) ** 2$$
- (d) Explain the use of circular overlapped register window in a RISC processors with the help of a diagram. 5