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MCS-012

MASTER OF COMPUTER APPLICATION/BACHELOR OF COMPUTER APPLICATION (REVISED) (MCA/BCA)

Term-End Examination

June, 2020

MCS-012 : COMPUTER ORGANIZATION AND ASSEMBLY LANGUAGE PROGRAMMING

Time : 3 Hours *Maximum Marks : 100*

Weigthage : 75%

***Note** : (i) Question No. 1 is compulsory and carries **40** marks.*

*(ii) Attempt any **three** questions from the rest.*

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1. (a) Convert the following numbers as stated : 6

   (i) $(23.125)_{10}$ to binary

   (ii) $(36.5)_{10}$ to octal

   (iii) $(135)_{10}$ to hexadecimal

   (b) Draw the truth table for the following Boolean function :

   $$F = (A \cdot B + C) + (\overline{A} \cdot C) + (\overline{B} \cdot A \cdot \overline{C})$$

   Use k-map to simplify the above Boolean function. 5

   (c) What is the need of Cache memory ? Explain the direct Cache mapping scheme with the help of an example/diagram. 6

   (d) Explain the interrupt-driven I/O technique with the help of a diagram. 4

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(e) How is the next instruction that is to be executed brought into Instruction Register for execution ? Explain the sequence of micro-operation that are needed to perform this operation. Which of these micro-operations will take longest time to execute ? Give justification in support of your answer. 6

(f) How is the large register file of RISC useful ? 3

(g) Write a program using 8086 assembly language that finds the larger of two byte values stored in two memory locations named A and B respectively. The larger of two values should be stored in AL register. 6

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(h) Calculate the physical address for the following segment register : 4

Offset (or Register) pair

(i) Offset of date byte in segment $(0200)_h$

Data Segment (DS) : $(IFFF)_h$

(ii) Code Segment Register (CS) : OF10

Instruction Pointer Register (IP) :

2562

2. (a) Explain the 'Stored Program Concept' for a Von Neumann machine. 4

(b) What is an I/O processor ? Explain its characteristics. Explain the selector and multiplexer channels with the help of diagram(s). 6

(c) Consider the Registers R1 having value $(1011\ 0101)_2$ and R2 having value

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$(0110\ 0111)_2$. Perform the following operations using R1 and/or R2. The result should be stored in a register R :

(i) Addition of R1 and R2 with carry

(ii) Decrement R1

(iii) Increment R1

(iv) Subtract R2 from R1

It may be noted that only addition micro-operation is allowed. 6

(d) Explain the FAR procedure call in the context of 8086 assembly language. 4

3. (a) What is an Interrupt Vector Table in 8086 microprocessor ? How is it used to process an Interrupt ? Explain with the help of a diagram. 6

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(b) Explain the following in the context of micro-programmed control unit : 6

(i) Control memory

(ii) Sequencing logic

(iii) Vertical micro-instruction

(c) Explain the following in the context of printing technology : 6

(i) Print quality

(ii) Impact and non-impact printers

(iii) Print resolution

(d) List any ***four*** advantages of densely packed integrated circuits. 2

4. (a) What is the use of Multiplexers ? Draw and explain the logic diagram of a 4 × 1 multiplexer. Also draw the truth table for this multiplexer. 6

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(b) A memory chip has a capacity of 1 M × 16 bits : 4

(i) How many address lines does it have ?

(ii) What is the capacity of the chip in bytes ?

(c) What is an Accumulator base Instruction Set Architecture ? Write the assembly code for the expression A = B * C + D for Accumulator based machine. 6

(d) What is the role of Flag register in 8086 microprocessor ? Explain the role of any *three* flags in this register. 4

5. Explain briefly any ***eight*** of the following :

$8 \times 2\frac{1}{2} = 20$

(a) Assembler

(b) Stack segment

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(c) EXE programs

(d) Shift instruction

(e) D flip-flop

(f) Memory interleaving

(g) Latency time in disk access

(h) Normalization of floating point numbers

(i) Unicode

(j) Counters

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