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MCS-012

MCA (Revised) / BCA (Revised)
Term-End Examination
02580
December, 2017

MCS-012 : 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) Perform the following : *2+4=6*

(i) Convert decimal 49·25 to binary and hexadecimal.

(ii) Convert the following binary to decimal and hexadecimal :

(1) 1100·1101

(2) 1010111·01

(b) A machine uses evaluation stack architecture. Write a program for evaluation of the following expression : *6*

A = B * (C + D) * E

(c) Write an assembly language program to find the smallest number in a byte array of size 10 which is stored at location ARRAY. Make suitable assumptions. *8*

(d) Discuss the use of overlapped register window in RISC architecture. *4*

(e) Write the characteristic table and excitation tables for the following : *6*

(i) JK Flip-flop

(ii) D Flip-flop

(f) How many RAM chips of size 512×8 bit are needed to design a memory of $1\ M \times 32$ bit ? *2*

(g) Differentiate between the following : *8*

(i) SRAM and DRAM

(ii) Hard disk and Magnetic tape storage

(iii) Hardware and Software interrupts

(iv) Program Counter (PC) and Code Segment Register

2. (a) Simplify the boolean function $F = \sum (0, 2, 4, 6, 8, 10)$ using a K-map and draw the logic diagram. *5*

(b) Draw the truth table and logic diagram of a 3-bit synchronous counter using JK flip-flops. *5*

(c) Discuss various elements of an instruction. *4*

(d) What is a micro-operation ? List the sequence of micro-operations in an instruction fetch. *6*

3. (a) Discuss the flag register for the 8086 microprocessor. *4*

(b) Consider a computer having 256 word RAM and cache of 16 blocks (block size = 4 words). Where is a memory word location 120 mapped in cache, if

(i) direct mapping is used ?

(ii) 2-way set associative mapping is used ? *6*

(c) Explain various cache write policies. *5*

(d) Explain the DMA technique for I/O operation. *5*

4. (a) Discuss the use of normalization and biased exponent for floating point representation using a suitable example. *6*

(b) Draw the truth table for an 8×3 encoder. *4*

(c) Explain the working of a microprogrammed control unit with the help of a diagram. *10*

5. (a) Explain the register addressing mode and indirect addressing mode in the 8086 microprocessor. *5*

(b) Differentiate between the following : *5*

(i) PUSH and PUSHF instructions

(ii) AAA and DAA instructions

(c) What is a RAID ? Explain various techniques used in a RAID to enhance reliability. *5*

(d) Explain the use of different segments in 8086 assembly language programming. *5*