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MCS-012

MCA (Revised) / BCA (Revised)

Term-End Examination

December, 2015

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.*

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1. (a) IEEE floating point representation for single precision number uses the format as :

Sign bit (1 bit) Biased exponent (8 bits) Significant (23 bits)

In this representation a floating point number where $0 < E < 255$ having any significant bits is equivalent to $\pm (1 . N)\ 2^{(E - 127)}$. Using this format represent the following decimal numbers :

(i) 0·375

(ii) 7

Now using the representation perform the following operations : *10*

(i) $0{\cdot}250 \times 7$

(ii) $0{\cdot}375 + 7$

(b) Simplify the following using Karnaugh's map : 4

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

(c) Write an assembly language program to find the maximum in a group of 10 numbers stored in memory. Store the result in AL register. 8

(d) What is RAID ? List three features of RAID level 3. 4

(e) How is a main memory address mapped to a cache address ? Assume the main memory size of 1 K words.

1 cache block size = 32 bits

No. of cache slots = 16

Cache mapping = 2 way set associative 6

(f) Explain the use of PC, IR, AC, MBR registers of a computer system. 4

(g) Consider Registers R_1 and R_2 containing

$R_1 = 10100000$

$R_2 = 01101100$

Perform the following microoperations using these registers : 4

(i) $R_1 \leftarrow R_1 + R_2$

(ii) Shift Left R_1

(iii) $R_1 \leftarrow R_1$ XOR R_2

(iv) $R_1 \leftarrow R_1 - 1$

2. (a) Explain using a flowchart the steps of an instruction execution. 6

(b) How many RAM chips of size 256 k × 1 bit are required to build 1 MB of memory ? 4

(c) Explain the various displacement addressing schemes with the help of an example each. 6

(d) Calculate the physical address for the following register offset pairs : 4

(i) SS : SP = 0100h : 0020h

(ii) DS : BX = 0200h : 0100h

(iii) CS : IP = 4200h : 0123h

(iv) ES : SI = 0300h : 0245h

3. (a) Explain the use of parity bit in error detection with the help of an example using odd parity scheme. 5

(b) Compare the following : 9

(i) CD-ROM and DVD-ROM

(ii) SRAM and DRAM

(iii) Memory mapped I/O and Isolated mapped I/O

(c) Explain the following 8086 instructions : 6

(i) XCHG

(ii) XLAT

4. (a) What is a Multiplexer ? Give block diagram, truth table and logic diagram of a 4×1 multiplexer. *8*

(b) Explain any three techniques of identifying the device that has caused the interrupt. *6*

(c) Write a program in 8086 Assembly language for displaying the contents of CL register. *6*

5. Explain the following with the help of an example or diagram for each : *5×4=20*

(a) T flip-flop

(b) DMA

(c) COM programs

(d) The stack

(e) LCD