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MCS-012

MCA (Revised) / BCA (Revised)
Term-End Examination
00602 **June, 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) Add the following decimal numbers using 8 bit signed 2's complement notation. Indicate overflow, if any. *4*

(i) 50 and – 5

(ii) + 75 and + 85

(b) Represent the following using IEEE 754 single precision (32 bit) floating point number format : *4*

(i) – 20·75

(ii) + 32·50

(c) Prepare the truth table for the following Boolean expressions and simplify using K-map : 6

(i) $A\bar{B}\,\bar{C} + \bar{A}B\bar{C}$

(ii) $(A + B)(\bar{A} + \bar{B})$

(d) Explain the following addressing modes with an example each : 4

(i) Register Addressing

(ii) Register Indirect

(e) Illustrate the following operations using four-bit registers R1 and R2 :

(i) Selective Set

(ii) Mask

(iii) Selective Complement

(iv) Insert

Make suitable assumptions. 8

(f) Write an assembly language program for 8086 microprocessor to check if two byte values stored in consecutive memory locations are identical. Store '1' as a result in the next memory location if they are same, else store '0'. 6

(g) A memory has a capacity of 1 M × 16.

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

(ii) How many address lines does it have ? (Assume word addressing) 4

(h) Design a half adder. 4

2. (a) Explain the Hamming Error Correcting Code. A 4-bit data 1100 is received as 1101. How will the Hamming error correcting code detect and correct the error ? *10*

(b) Explain the use of stack for parameter passing in a subroutine/function call. *5*

(c) Explain the design of a 4 × 1 multiplexer. *5*

3. (a) Discuss the use of Interrupt Vector Table (IVT) in handling interrupts for 8086 microprocessor. *5*

(b) Explain the following in the context of cache memory : *10*

(i) Direct mapping

(ii) Set associative mapping

(c) The seek time of a disk is 25 ms. Each track of this disc has 500 sectors. If the disc rotates at 5000 rotations per second, find the access time. *5*

4. (a) Explain the concept of Instruction pipelining, using suitable illustration. *5*

(b) Discuss the register set of 8086 microprocessor. *6*

(c) Explain the structure of a Wilkes control unit with the help of a diagram. *5*

(d) Explain the differences between exe and com programs in the context of 8086 assembly language programming. *4*

5. (a) Explain the following with the help of a diagram/example, if needed : 8

(i) D flip-flop

(ii) Read Only Memory (ROM)

(iii) Opcode in an instruction

(iv) Parity bit

(b) List the differences between the following : 5

(i) LEA and MOV instructions in 8086

(ii) ROL and RCL instructions in 8086

(c) Write an assembly language program in 8086 to move a block of 100 bytes from one memory block to another. Make suitable assumptions. 7