83142

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MCS-012

MCA (REVISED)/BCA (REVISED)

Term-End Examination

June, 2019

MCS-012 : COMPUTER ORGANIZATION AND ASSEMBLY LANGUAGE PROGRAMMING

Time : 3 Hours *Maximum Marks : 100*

(Weightage 75%)

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

1. (a) Perform the following : 6

   (i) Add (–35) and (–75) number in an 8-bit register using signed 2's complement representation. Also indicate an overflow if any.

(ii) Convert binary 01001011 into octal and hexadecimal notation.

(iii) Write BCD equivalent of 256.

(b) Simplify the following Boolean function in SOP form using K-map : 6

$F(A, B, C, D) = \Sigma (0, 3, 7, 9, 13, 15, 18, 21)$

and draw the logic diagram.

(c) Given the 8 bit value 10101101 stored in a register, what are microinstructions required in order to : 6

(i) Clear to 0 the first 4 bits

(ii) Set to 1 the last 4 bits

(iii) Complement the first 4 bits

(d) Assume R2 register having suitable values to perform the micro-operations. Discuss the importance of flags in a computer system. 2

(e) Draw the block diagram of hardwired control unit and explain how does it work ? 5

(f) Explain the use of large register file for RISC machines with the help of an example. 5

(g) Write an 8086 assembly language program to add five byte numbers stored in an array. The result should be stored in AX register. 6

(h) Why does DMA have priority over the CPU when both request a memory transfer of data ? 4

2. (a) How is execution of an instruction done ? Draw the flow chart of the instruction cycle. 5

(b) What are the key features of Von-Neumann Architecture ? 5

(c) Describe through an example how does a two-way set associative cache mapping scheme work. 6

(d) Draw an excitation table for RS flip-flop. 4

3. (a) Draw a 4-bit parallel register using D flip-flops and explain its operation. 6

(b) Categorize the following 8086 assembly language instructions to the instruction types given below : 6

Assembly Instructions		Instruction Type
(1) Move	(i)	Data processing instruction
(2) TRAP	(ii)	Data transfer instruction

(3) BRN (iii) Privileges instruction

(4) DIV (iv) Program control instruction

(5) STORE

(6) XOR

(c) List the important characteristics of instruction set of a basic computer. 4

(d) What is the difference between the following operations ? 4

(i) Arithmetic shift and logic shift

(ii) Logic shift and circular shift

4. (a) Suppose the value of the registers R_1 and R_2 are : 6

$R_1 = 1101\ 0110$

$R_2 = 1111\ 1001$

Perform the following operations on R_1 using R_2 :

(i) Selective Complement

(ii) Selective Set

(iii) Selective Clear

(b) What is a multiplexer ? Why is it needed ? Draw the logic diagram and truth table for a 4×1 multiplexer. 6

(c) Explain the following 8086 microprocessor addressing modes with the help of an example for each : 6

(i) Indexed

(ii) Register Indirect

(iii) Direct

(d) Discuss the use of a device driver. 2

5. (a) What are the constraints with MOV instruction of 8086 microprocessor ? 3

(b) List all the features of RISC architectures. 6

(c) Draw a general configuration of microprogrammed control unit and discuss its operation. 6

(d) What is performance degradation in a pipeline ? Explain any *two* possible hardware schemes that can be used in an instruction pipeline in order to minimize the performance degradation caused by instruction branching. 5