RAMAKRISHNA MISSION VIDYAMANDIRA
(Residential Autonomous College affiliated to University of Calcutta)

FIRST YEAR [2016-19]
B.A./B.Sc. FIRST SEMESTER (July – December) 2016
Mid-Semester Examination, September 2016

Date : 16/09/2016

COMPUTER SCIENCE (General)

Time : 12 noon – 1 pm

Paper : I

Full Marks : 25

[Use a separate Answer Book for each group]
Group – A

(*Answer **any one** questions*) [1×12·5]

1. a) Using 2's complement find the value of $(101011)_2 - (1111)_2$? Show the necessary steps. [2·5]

    b) Write short note on ASCII character code. [3]

    c) Express the Boolean function $F = xy + y'z$ in a product of maxterm canonical form using Boolean algebra. [3]

    d) Simplify the Boolean function $F(A,B,C,D) = \sum(1,3,5,7,9,15)$ with the don't care conditions $d(A,B,C,D) = \sum(4,6,12,13)$. [4]

2. a) Determine the base of the number for following operations :
       (i) $54/4 = 13$　　　(ii) $5 \times 4 = 26$ [1+1]

    b) Evaluate the 9's and 10's complement of the decimal number 983245. Show the necessary steps. [2]

    c) What do you mean by don't care condition? Give example. [1·5]

    d) Reduce the following Boolean expression to one literal, using Boolean algebra $A'B(D' + C'D) + B(A + A'CD)$. [3]

    e) Simplify the following Boolean function by first finding the essential prime implicants. $F(w,x,y,z) = \sum(1,3,4,5,10,11,12,13,14,15)$. [4]

Group – B

(*Answer **any one** questions*) [1×12·5]

3. a) 'Implied addressing mode follows zero-address instruction'— Justify. [2]

    b) What is the task of Program Counter (PC)? [2]

    c) What is the advantage of keeping inter track gap in a secondary memory? [1]

    d) Explain K-way set-associative mapping of cache memory. [3·5]

    e) Implement the logic function $F = A \oplus B \oplus C$ using a 8 : 1 MUX. [2·5]

    f) 'A 3-to-8 decoder with an enable input is a 1-to-8 DEMUX' —Justify. [1·5]

4. a) What is rotational delay? [1]

    b) Implement a 16:1 MUX using two 8:1 MUXs. [3]

    c) Why DRAM is called 'dynamic'? [1]

    d) 'Write back protocol may also result in unnecessary write operations' —Justify. [2]

    e) What is the significance of dirty bit in cache memory? [1]

    f) Differentiate between EPROM and EEPROM. [1·5]

    g) Explain program-controlled I/O with suitable diagram. [3]

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