LOGICALI ORGANIZATION OF COMPUTER-1

Time : 3 Hours   *Maximum Marks : 80*

(Compulsory Question)

1. Attempt all the following :

    a) Abbreviate :

        BCD, ASCII, PROM

    b) A Register stores High, Low, Low, High. Find number in Decimal, Octal and Hexadecimal.

    c) Prove NOR is a Universal gate.

    d) Make Venn diagram for NOR, AND, NOT gates.

    e) Draw and lable 3-variable K-Map.
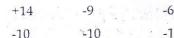
    f) Make Truth Table for 8421 code.

Unit-I

2. a) Convert as follows :

    $(10.625)_{10} \rightarrow (\quad)_{16}$

    $(17.3)_{10} \rightarrow (\quad)_2$

    $(X)_2 \rightarrow (1AB7)$

    $(1101110110)_2 \rightarrow (\quad)_8$

    $(X)_4 = (768)10.$

    b) Solve using 2's complement

+14	-9	-6
-10	-10	-16

3. a) Define Floating point Representation. Also discuss Overflow and Underflow in floating airthmetic using example.

   b) Write notes on the following :

   i) Error Detection and Correction

   ii) Self-complementing code.

Unit-II

4. a) Differentiate between Ordinary and Boolean Algebra, and write postulates of Boolean Algebra.

   b) Solve using Boolean Algebra

$$(X + Y)(XZ + Z)(\overline{\overline{Y} + XZ}) = \overline{X}YZ$$

   c) Find SOP, POS for Full-adder.

5. a) Solve using K-Map :

$$Z(A, B, C, D) = \sum (0, 2, 8, 10, 15)$$

$$Z(A, B, C) = \sum (0, 1, 2) + \sum_{\phi} (6, 7)$$

$$Z(A, B, C, D) = \pi (0, 2, 4, 6, 8, 10, 12, 14)$$

   b) State and prove Demorgan's Law for 3-variables.

Unit-III

6. a) Define Logic, and explain AND, NOR, NAND gates for 3 variables.

   b) Explain Half-Adder using NAND gates only.

7. a) Write a note on AND-OR-INVERT.

   b) Implement using NOR gate only :

$$F = (A+B) (C+D)E$$

$$X = \left(A\bar{B} + \bar{A}B\right)\left(C + \bar{D}\right).$$

Unit-IV

8. a) Explain 4 to 10 Line decorder.

   b) Make circuit for Comparator.

9. Write notes on the following :

   i) 8421 to 2421 Code convertor.

   ii) 7-segment Display unit.

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