BCA (14-15)/D-15
LOGICAL ORGANISATION OF COMPUTER–I
Paper–BCA–114

Time allowed : 3 hours]   *[Maximum marks : 80*

Note :   *Attempt any **five** questions. Each question carry equal marks. **First question is compulsory**. Attempt other **four** questions selecting **one** from each unit.*

1.   (i)   Explain Maxterm.

     (ii)   What is closure property in Boolean Algebra ?

     (iii)   Prove DeMorgan's Law by Venn Diagram.

     (iv) $(3 \text{ BFC})_{16} = (?)_{10}$

     (v)   What is an XOR gate ?

     (vi)   What is a combinational Circuit ?

     (vii)   What is a Decoder ?

     (viii)   What is code convertor ? 8×2

Unit–1

2.   (i)   Explain the following complement representation of numbers by using suitable example :   8

     (a)   True complement

     (b)   Radix - minux one Complement

     (ii) $(01011111)_2 = (?)_8 = (?)_{16} = (?)_{10} = (?)_5$ 8

or

3.   (i)   What is Error Detecting and Correcting code ? Explain.   8

     (ii)   Add $(79)_{10}$ and $(98)_{10}$ by using BCD addition.   8

Unit–2

4. (i) Explain :

    (a) Idempotent Law

    (b) Associative Law.   8

  (ii) Simplify the following Boolean function by K-map

$$F(w, x, y, z) = \Sigma (0, 3, 4, 6, 7, 11, 15)$$
$$+ \underset{\phi}{\Sigma} (2, 5, 9, 13)$$

and also draw circuit diagram for simplified expression 8

or

5. (i) Prove DeMorgan's Law for three variables.   8

  (ii) Prove the following expression using Boolean Algebra

$$XYZ + \overline{X}YZ + X\overline{Y}Z + X\overline{Y}\overline{Z} = XY + YZ + ZX$$ 8

Unit–3

6. (i) Implement the following Boolean expression using NOR gates only

$$Y = A + \overline{B}C + AC$$ 8

  (ii) NAND gate is an Universal gate. Justify.   8

or

7. (i) Implement AND, OR and NOT gate using NAND gate 8

  (ii) Draw the circuit diagram of Boolean function using NAND gate

$$F = A(BC + D) + \overline{C}D$$ 8

Unit–4

8. (i) Explain 4 bit Full Adder.   8

  (ii) Draw circuit diagram and truth table for comparators.   8

or

9. Explain Seven Segment Display and also draw its circuit diagram.

    16

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