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BCA/D-16 **856**

LOGICAL ORGANISATION OF COMPUTER – I

Paper : BCA-114

Time : Three Hours] [Maximum Marks : 80

Note : Attempt any *five* questions. Question No. 1 is compulsory. Attempt remaining *four* questions selecting *one* from each unit. All questions carry equal marks.

Compulsory Question

1. (i) Explain Minterm.

(ii) Define Involution law of Boolean Algebra.

(iii) Prove Distributive law using Venn Diagram.

(iv) $(1100.001)_2 = (?)_{10}$.

(v) What is NAND gate ?

(vi) What is Combinational circuit ?

(vii) What is Multiplexer ?

(viii) Why computer system uses binary number system ?

(2×8=16)

UNIT–I

2. (i) What is Number system ? Explain two positional number systems. 8

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

3. (i) Discuss how negative numbers can be represented in computer system. 8

(ii) Explain ASCII and EBCDIC Code. 8

UNIT–II

4. (i) State De Morgan's Theorem and prove it. 8

(ii) Explain two Canonical forms of Boolean Expression for a truth table of your choice. 8

5. (i) Simplify the Boolean function 8

$$F(x, y, z, u) = \Sigma(0, 2, 4, 6, 9, 13, 15) + \underset{\phi}{\Sigma}(1, 3, 7)$$

(ii) Examine the validity of following Boolean equation

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

and also draw circuit diagram of L.H.S. using NAND gate. 8

UNIT–III

6. (i) Simplify the following Boolean expression and implement it using OR and AND gates : 8

$$Y = A\overline{B}C\overline{D} + \overline{A}B\overline{C}D + \overline{A}BC\overline{D} + A\overline{B}\,\overline{C}D$$

(ii) Explain the working of 3 input NAND gate. 8

7. (i) Explain implementation of AND, OR, NOT gates by NOR gate. 8

(ii) Prove that NAND gate is an universal gate. 8

UNIT–IV

8. (i) Describe the design procedures of Combinational circuit with an example. 8

(ii) What is Full Adder ? Explain it. Draw its logic diagram by using Half Adder. 8

9. (i) Explain and draw the logic diagram of decimal to BCD encoder. 8

(ii) Design a 6 × 32 decoder with the help of 3 × 8 decorder. 8
