LOGICAL ORGANIZATION OF COMPUTER-I

Time Allowed : 3 Hours *Maximum Marks : 80*

Note **:** Attempt five questions in all, selecting ***one*** question from each unit in addition to compulsory **Question No. 1.** All questions carry equal marks.

Compulsory Question

1. (a) Discuss cyclic code. 3

   (b) Abbreviate 3
   ASCII, BCD, EBCDIC.

   (c) Make 'Venn Diagram for AND gate. 3

   (d) Make T.T. for 3 variables AND, NOR gate. 3

   (e) Discuss Half Adder 3

   (f) Makte T.T. (only) for 1
   $a + (b + c) = (a + b) + c$ T = 16

UNIT-I

2. Convert as follows :

   (a) (i) $(7.3)_{10} \rightarrow (\ )_2$ 4
   $\rightarrow (\ )_8$

(ii) $(X)_5 = (2134)_{10}$ 2

(iii) $(DE4) \rightarrow ( )_2$

$\rightarrow ( )_8$ 4

(b) Use 2's compliment to solve :

−16	+48
−20	−32
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6

3. (a) Discuss floating point Arithmetic with conditionsof overflow and underflow. 8

(b) Explain error detection and correction coding scheme. 3

UNIT-II

4. (a) Write postulates of Boolean Algebra. 8

(b) State and prove Demogran's Law. 4

(c) Solve using Boolean Algebra

$(X + Y)(\dot{X}Z + Z)\ \overline{(\bar{Y} + XZ)} = \bar{X}YZ$. 4

5. (a) Draw and label 4 variable K-Map. 4

(b) Solve using K-Map

$$Z(A, B, C) = \sum 1,3,5 + \sum_{\phi} 6,7$$

$$Z(A, B, C, D) = \pi 0, 1, 2, 3, 8, 9, 10, 11$$

$$Z(A, B, C, D) = \sum 0,1,4,5,1 + \sum_{\phi} 10,11,15$$ 12

UNIT-III

6. (a) Prove that NAND, NOR are Universal gates.

(b) Use NAND gates only to solve Full-Adder. 4

(c) Use Logic Gates to Design

$(\bar{X}Y + X\bar{Y})(A\bar{B}C + \bar{A}\bar{B}\bar{C}$

$(\overline{a}+\overline{b}).\overline{(a+b)}.(\overline{X}Y+PQ)$ 8

7. (a) Explain Design and Analsis Procedure of Combinational Circuits. 8

(b) Explain concept of Multilevel NAND and NOR gates. 8

UNIT-IV

8. (a) Design 4 : 1 multiplexer. 8

(b) Design Binary to Decimal Decoder as 4 to 10 line. 8

9. (a) Explain 7-Segment Display 8

(b) Make code convertor from 8421 to cyclic. 8