LOGICAL ORGANIZATION OF COMPUTER-1

Note : Attempt five questions in all. Q. No. 1 is compulsory. Select one question from each section.

(Compulsory Question)

1. (a) Express 6, 8 in 2421 code.

   (b) Abbreviate ASCII, EBCDIC.

(c) What is (X)2 = AF3D

(d) Define Duality principle.

(e) Make T.T. for 3-variable 'OR'.

(f) How many control signals are needed in 16:1 MUX?

(g) $(X)u = (768)_{10}$.

(h) Make table for self-complementing code.

(i) Make T.T. for XOR gate. 18

SECTION-1

2. (a) Define error-detection and correction scheme using Parity-bit.

(b) Perform the following using 1's and 2's complement:

-8 -42

-10 +43 8

(c) Make table for Cyclic code. 4

(d) A Register stores High, Low, Low, High. Find number in binary and hexadecimal. 2

3. (a) Define Floating point representation and discuss overflow and underflow conditions. 10

(b) Convert

$(10.3)10 \rightarrow (\ )_2$

$\rightarrow (\ )_8$

$\rightarrow (\ )_{16}$

(c) Write 4-bit BCD for 25, 128. 2

UNIT-II

4. (a) Define Boolean algebra and differentiate in with ordinary algebra. 4

(b) Solve Full-adder using Boolean algebra. 4

(c) Solve the following using Boolean algebra :

$XY + \bar{X}Z + YZ = XY + X\bar{X}Z$

$ABC + A\bar{B}C + AB\bar{C} + A\bar{B}\bar{C} = A$ 10

5. (a) Draw and label 4 variable K-map and solve for four corners. 10

(b) Solve the following using K-map :

$$Z = \sum 0,1,4,5,11 + \sum_{9} 3,10,14,15$$

$$Z = \pi\, 0,2,4,6$$ 8

UNIT-III

6. (a) Prove that NAND is a universal gate. 4

(b) Make circuit for

$$X = \left(\bar{A}B + A\bar{B}\right)\left(\overline{CD} + CD\right)\left(\bar{X}Y + XY\right)$$ 4

(c) Make Half-adder using NAND gates only. 10

7. (a) Expand the following using Boolean algebra and make gate realization :

XY+YZ+ZX

(b) Make circuit using NAND gates only :

X = AB + CD

F = $A\bar{B} + \bar{A}B + C\bar{D}$

UNIT-IV

8. (a) Explain 4 : 1 MUX.

(b) Make code convertor from 8421 to cyclic. 18

9. (a) Make circuit for 2's complement adder.

(b) Explain 7-segment display. 18