

Duration: 2.5 Hrs.

G312NDLA

Marks:- 75

Note:- 1) All questions are compulsory

2) All questions carry equal marks

3) Figures to the right indicate maximum marks.

**Q.1) Attempt Any 3**

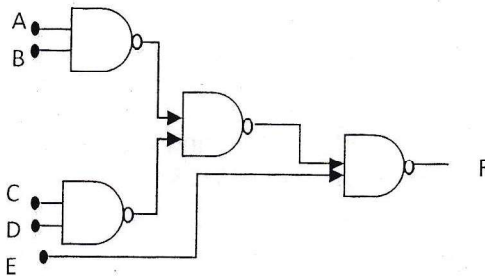
(15 M)

- 1) Write short note on number system and give its bases.
- 2) Convert the binary number 1011.01 into its decimal equivalent.
- 3) Convert the octal number  $(365.25)_8$  into its equivalent decimal number.
- 4) Convert  $(0.6234)_{10}$  into its equivalent octal number
- 5) Convert  $(85.63)_{10}$  into its equivalent binary number.
- 6) Convert  $(2003.31)_{10}$  into its equivalent hex number

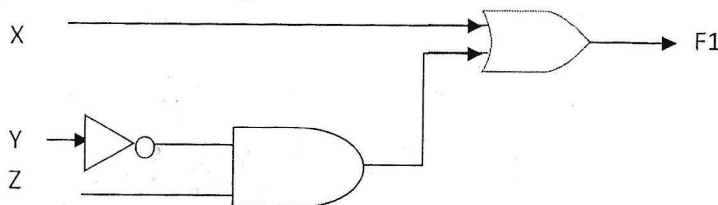
**Q.2) Attempt any 3**

(15 M)

- 1) Find out 2's complement of following numbers
  - a)  $(110110)_2$
  - b)  $(010101)_2$ .
- 2) Write the truth table of following.
  - 1) Three input Ex-OR gate.
  - 2) Three input Ex-NOR gate.
- 3) Write the expression for F for the circuit shown in figure



- 4) Draw the symbol, truth table of
  - A) NAND gate
  - B) Ex-OR gate
- 5) Write the output equation for following and prepare the truth table of F1 for Possible values of X, Y & Z refer the fig.



- 6) Write application of universal gates.

(15 M)

**Q.3) Attempt Any 3 :-**

1) Derive the SOP of the following expression using K- maps and draw the logical diagram.

$$F(W,X,Y,Z) = \sum m (0,2,5,8,10,13)$$

2) Simplify the following expression given below using K-map. Draw its simplified diagram:

$$Y = \sum m(1,3,7,11,15) + d(0,25)$$

3) Represent the following canonical POS Equation on the karnaugh map.

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

4) Obtain POS expression for the following function and implement it using gates.

$$F(P,Q,R,S) = (1,3,4,5,6,7,12,13)$$

5) Write a note on: Duality theorem.

6) Explain the properties of Boolean Algebra.

(15 M)

**Q.4) Attempt Any 3:-**

1) What is full adder? Draw logic circuit diagram and explain it.

2) Describe half subtract with help of circuit diagram and truth table.

3) Implement 4 bit adder using parallel adder.

4) Design two bit magnitude comparator give its truth table.

5) Obtain an 8:1 multiplexer using two 4:1 multiplexer.

6) Difference between multiplexer and demultiplexer.

(15 M)

**Q.5) Attempt Any 3 :-**

1) Explain the conversion of hex to binary.

2) Write short note on Octal number system .

3) Using don't care condition find reduced SOP equation and draw the circuit diagram using basic gates.  $F(P,Q,R,S) = \sum m (1,2,3,6,12,14) + d(0,11,13)$

4) Write comparison between encoder and decoder.

5) Design two bit magnitude comparator.

6) Draw the logical circuit diagram and describe the working of 8:3 encoder.

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