UNIT-1: Binary Systems

Short Questions:

1) Convert $(367.52)_{10}$ to binary and $(1001011)_2$ to Decimal.

2) Convert $(A6C7)_{16}$ to binary and $(11000101011010)_2$ to hexadecimal.

3) Convert $(110101.101010)_2$ to octal and $(367)_8$ to binary.

4) Find out 10's and 9's complement of 572.

5) Convert $(378.93)_{10}$ to octal and $(0.1376)_8$ to Decimal 6) Perform binary addition: $(11011011)_2 + (01011101)_2$ 7) $(111.1)_2 * (10.1)_2 = (\ )_2$

8) Divide $(11011)_2$ by $(10.1)_2$.

9) Convert $(97)_{10}$ to excess-3 code.

10) Convert $(1762.46)_8$ to hexadecimal and $(3.E)_{16}$ to Octal 11.) Convert BINARY to GRAY. (i) 11011

Long Questions:

1) Explain 1's complement and 2's complement with suitable Example. Show the subtraction using complements.

2) If (i) 2's complement of a binary number is 0111, obtain the original Number. (ii) 10's complement of decimal number is 625, obtain Original number.

3) For 0 to 9 decimal numbers, write down a table of corresponding BCD and excess-3 code.

4) Explain Gray code.

UNIT-2: Binary Logic and Boolean Algebra

Short Questions:

1) Define: Logic Circuit, Logic Gate.

2) Draw logic circuit for following expression F=AB'+A'C. 3) (i) A+BC =_____, (ii) (A+B)'=_____.

4) Write any two postulates related to Boolean algebra.

5) Simplify: A (A'+C) (A'B+C').

6) Define: Bubbled gate.

7) State the De-Morgan's theorems.

Long Questions:

1) Explain all logic gates.
2) Explain NOR as a universal gate.
3) Explain NAND as a universal gate.
4) Explain absorption & distributive property of Boolean algebra.
5) State and prove De-Morgan's theorems.
6) Draw the logic circuit using basic gates Y= (A'+B'+C)(A+B'+C).
7) Simplify the equation Y=AB+ABC +A' using Boolean algebra.

UNIT-3: Boolean Function Implementation

Short questions:

1. Define Max term, Min term.
2. Define: Don't care Variable.
3. Define SOP, POS.
4. What is K-map?
5. Draw K-map for 3 variables.
6. What is the application of K-map?
7. Define Product term, Sum term.

Long questions:

1. With suitable examples explain canonical or standard form.
2. Simplify and draw a digital circuit for the following equation.
   F = ∑m(0,2,6,10,11,12,13) Don't care d(3,4,14,15)
3. Simplify POS expression using K-map method for

   F (A, B, C, D) = ∏m (0, 1, 8, 9, 10) and implement using NOR logic.
4. Discuss needs of simplification of Boolean equations in digital systems.
5. Simplify following Boolean function in SOP form using K-map and implement using logic gates.

   F (A, B, C, D) = ∑m (1, 4, 6,9,10, 11, 14, 15)

   6. Minimize the following Boolean function using K-map F (A,B,C,D) = ∏m (1,2,3,8,9,10,11,14).d(7,15)
7. Obtain simplified SOP expression using K-map method for

$\sum m$ (0, 1, 3, 4, 5, 6, 11, 14) and implement using NAND logic

8. Represent the following Boolean expression in SOP form. Also prepare a K- map for it.

9. Represent the following expression in POS form.

$Y = (A+C'+D') (A'+C') (B'+D')$

UNIT-4: Basic Combinational Logic

Short questions:

1. What is combinational logic?
2. Define: adder circuit and subtractor circuit.
3. Define: half subtractor and full subtractor.
4. Define: half adder and full adder.

Long questions:

1. Draw half adder circuit and write its truth table.
2. Draw and explain Binary 4-bit parallel adder circuit.
3. Explain half subtractor with its block diagram and draw a logic circuit of full subtractor using two half subtractor.
4. Explain 4-2 Encoder.
5. Explain 2-4 Decoder.
6. Explain 4-1 Multiplexer.
7. Explain 1-4 Demultiplexer.

UNIT-5: Basic Sequential circuits

Short questions:

1. Compare combinational circuit and sequential circuit.
2. State main types of flip flop
3. Draw symbol of clocked RS flip-flop

Long questions:

1. Explain SR flip flop with symbol, logic circuit & truth table.
2. Explain JK flip flop with symbol, logic circuit & truth table.
3. Explain D flip flop with symbol, logic circuit & truth table.
4. Explain T flip flop with symbol, logic circuit & truth table.