SECTION- A

Short questions: (each 2 marks)

1. What is y-chart?
ans: The y- chart consists of three domains:- behavioral, structural and geometrical.

2. What is fabrication?
ans: It is the process used for N-mos are relevant to c-mos and by c-mos which may be viewed as the involving additional fabrication steps.

3. What is doping and dopants?
ans: The process of adding impurity in a substance is called doping and impurities is called dopants. These impurities are added to enhance the properties of any substance.

4. Define floor plan.
ans: It refers to the allocation of area and position to each unit in the overall system.
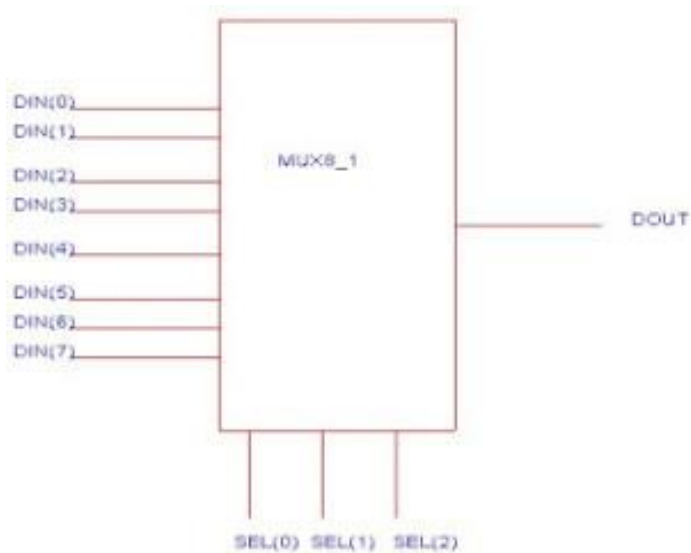
5. Define photo lithography.
ans: The fabrication sequence consists of a series of steps in which layers of the chip's are defined through a process called photo lithography.

6. What is characteristics table?
ans: The equation specifies the values of next state as a function of present state and inputs.
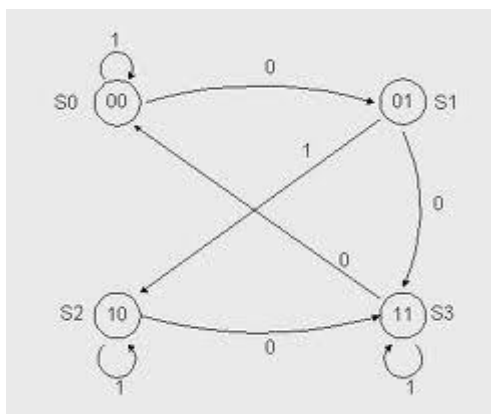
7. Write the vhdl code for 8:1 mux?

MULTIPLEXER1

ans: The VHDL code for 8:1 mux is as follows-

```
LIBRARY IEEE;
USE IEEE.STD_LOGIC_1164.ALL;
ENTITY MUX8_1 IS
PORT(DIN:IN STD_LOGIC_VECTOR(7 DOWNTO 0);SEL:IN STD_LOGIC_VECTOR(2 DOWNTO
0);DOUT:OUT STD_LOGIC);
END MUX8_1;
ARCHITECTURE BEH123 OF MUX8_1 IS
BEGIN
PROCESS(DIN,SEL)
BEGIN
CASE SEL IS
WHEN"000"=>DOUT<=DIN(0);
WHEN"001"=>DOUT<=DIN(1);
WHEN"010"=>DOUT<=DIN(2);
WHEN"011"=>DOUT<=DIN(3);
WHEN"100"=>DOUT<=DIN(4);
WHEN"101"=>DOUT<=DIN(5);
WHEN"110"=>DOUT<=DIN(6);
WHEN"111"=>DOUT<=DIN(7);
WHEN OTHERS=>
DOUT<='Z';
END CASE;
END PROCESS;
```
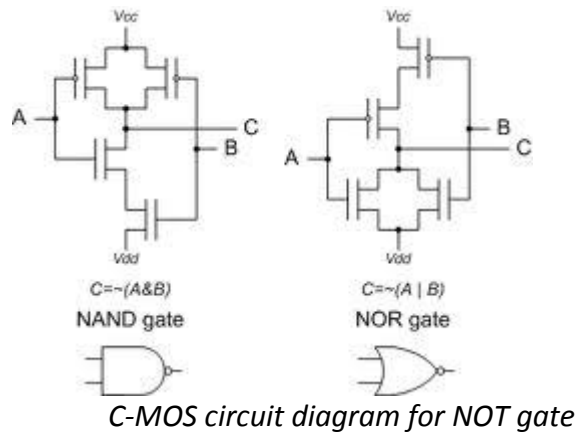
8. What is state diagram?

ans: The representation of information in form of circles etc is called as state diagrams. The states of the system are connected through arrows that describe transition of system from one state to another. An example of state diagram is shown in figure.

Example of state diagram

9. Draw the c-mos circuit for not gate.
ans: C-MOS circuit diagram for NOT gate is shown below-

C=~(A&B)	C=~(A | B)
NAND gate	NOR gate

C-MOS circuit diagram for NOT gate

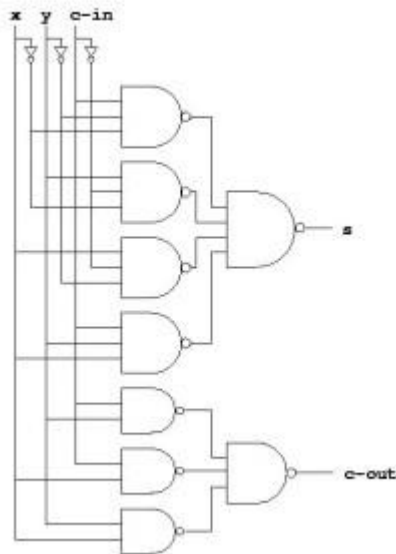**10. Differentiate between volatile and non-volatile memory.**
ans: Volatile memory is temporary and while other is permanent. In volatile data storage cannot be possible for long duration .

SECTION-B
LONG QUESTIONS: (each 10 marks)

1. Design a combinational circuit which acts as a both full adder and full substractor.
ans: Diagram of a combinational circuits acting both as full adder and full substractor is given below-

full-adder-circuit

2. What is Boolean Algebra and write its laws?
ans: According to this algebra the boolean constants and variables are allowed to have only two possible values 0 or 1.
In boolean algebra functions decimals, -ve numbers ,square roots , cube roots , logarithm and imaginary numbers are not allowed.
In Boolean there are only three basic operations :-
logic addition
logic multiplication
logic complementation

There are three basic laws of Boolean Algebra which are as follows:-

Commutative Laws: - These laws of addition and multiplication say that this order in which the variables are ORed or ANDed makes no difference as the same answer is arrived at either way.

Associative law: - These laws of addition and multiplication say that in yhe oring or anding of several variables, grouping of the variables is immaterial and the results obtained are the same.

Distributive law: - This states that ORing several variables and ANDing the result with a single variable is equivalent to ANDing the single variable with each of several variables and then ORing the products.

3. Describe about the standard representation for logical functions.
ans: Logical functions are expressed in terms of logical variables. The values assumed by the logical functions as well as the logical variables are in the binary form.

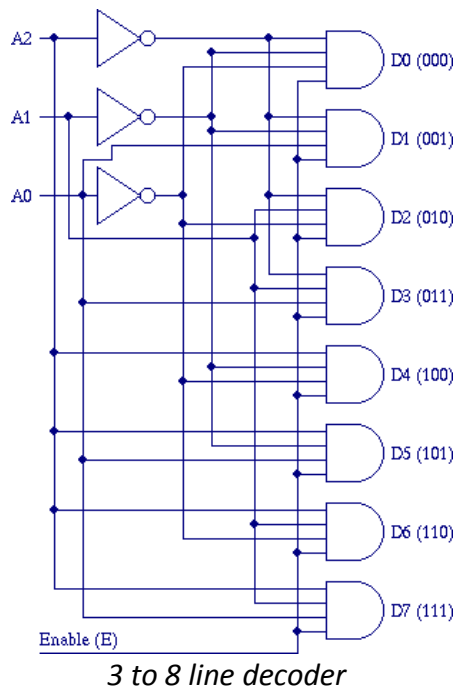Any arbitary logic function can be expressed in the following two forms:-

a) Sum of the products (SOP) form
b) Product of sums(POS) form

a) SOP (Sum Of the Product)- A Product of two or more variables or their complements , in Boolean algebra is simply the AND function of those variables. The product of two variables can be expressed as AB , the product of three variables ABC , and so on . Similarly a sum in the boolean algebra is same as the or function.

b) POS (Product Of Sum):- The product of sum form can be thought of as the dual of the sum of the products . It is in terms of logic functions the AND of two or more OR functions .

4. Design 3 to 8 line decoder.
ans: Diagram of a 3 to 8 line decoder is given below-

3 to 8 line decoder

5. List few comparisons of Combinational logic circuit and sequential Logic Circuit.
ans: Combinational Logic Circuit

- It has one or more inputs and one or more outputs.
- Its output is determined by the present values of inputs only.
- It does not have a memory.
- It does not have a feedback path.
-Its operation can be described by the truth table.
- It does not have a clock signal.
- It does not depend upon clock transition.
- The circuit is more simpler.
- It is built usling basic gates like, NOT, NAND, AND , OR etc
- Its examples are substaractor, adders, Multilplexers and demultiplexers.

Sequential Logic Circuit :

-It has one or more inputs and one or more outputs.
- Its output is determined by the present values of input as well as the past values of output.
- It has a memory
- It has a feedback path
-Its operation can be described by truth table and timing diagram
- It may be or may not have a clock signal.
- Its action is governed by clock transition
- The circuit is more complex
- It is built using basic gates and combinational gates.
- Its examples include flip flops, shift registers.