CHAPTER 3

LOGIC GATES

One mark questions:

1. What is a logic gate? (K)
2. What is truth table? (K)
3. Write the standard symbol for NOT gate. (U)
4. Write the truth table for NOT gate. (U)
5. Which gate is called as inverter? (A)
6. Define AND gate. (U)
7. Write the standard symbol for AND gate. (A)
8. Define OR gate. (U)
9. Write the standard symbol for OR gate. (A)
10. What are universal gates? (U)
11. What is the output of the two input NAND gate for the inputs A=0, B=1? (A)
12. What are the values of the inputs to a three input NAND gate, if its output is 1? (A)
13. What are the values of the inputs to a three input AND gate, if its output is 1? (A)
14. What are the values of the inputs to a three input OR gate, if its output is 0? (A)
15. What are the values of the inputs to three input NAND gate, if its output is 0? (A)
16. What are the values of the inputs to three input NAND gate, if its output is 1? (A)
17. What is NOR gate? (U)
18. Write the standard symbol for NOR gate. (U)
19. What is NAND gate? (U)
20. Write the standard symbol for NAND gate. (A)
21. What is XOR gate? (A)
22. Write the standard symbol for XOR gate. (A)
23. What is XNOR gate? (A)
24. Write the standard symbol for XNOR gate. (A)
25. For the truth table given below, what type of logic gate does the output F represent? (S)

X	Y	F
0	0	1
0	1	1
1	0	1
1	1	0

26. For the truth table given below, what type of logic gate does the output F represent? (S)

X	Y	F
0	0	0
0	1	1
1	0	1
1	1	0

27. For the truth table given below, what type of logic gate does the output X represent? (S)

X	Y	X
0	0	0
0	1	1
1	0	1
1	1	1

28. For the truth table given below, what type of logic gate does the output X represent? (S)

X	Y	X
0	0	0
0	1	0
1	0	0
1	1	1

29. For the truth table given below, what type of logic gate does the output X represent? (S)

X	Y	X
0	0	1
0	1	0
1	0	0
1	1	0

Two marks questions:

1. Mention the types of logic gates. (K)
2. Mention the Basic logic gates. (K)
3. Which gates are called universal gates and why? (S)
4. Mention the derived gates. (U)
5. Mention different universal gates. (U)
6. Write the standard symbol and truth table for NOT gate. (A)
7. Write the standard symbol and truth table for AND gate. (A)
8. Write the AND gate rule. (S)
9. Write the standard symbol and truth table for OR gate. (S)
10. Write the OR gate rule. (S)
11. Write the standard symbol and truth table for NOR gate. (S)
12. Write the standard symbol and truth table for NAND gate. (S)
13. Write the standard symbol and truth table for XOR gate. (S)
14. Write the standard symbol and truth table for XNOR gate. (S)

Three Marks questions:

1. Explain NOT gate. (S)
2. Explain working with AND gate. (A)
3. Write the truth table of three inputs AND gate. (S)

4. Explain OR gate. (S)
5. Write the truth table three input variable using OR gate. (S)
6. Explain NOR gate. (S)
7. Write the truth table three input variable using NOR gate. (S)
8. Explain the working of NAND gate. (A)
9. Write the truth table for three input variable using NAND gate. (S)
10. Explain XOR gate. (S)
11. Write the truth table three input variable using XOR gate. (S)
12. Explain XNOR gate. (S)
13. Write the truth table three input variable using XNOR gate. (S)
14. Mention the design rules of NAND-to-NAND logic network. (U)
15. Mention the design rules of NOR-to-NOR logic network. (U)
16. Draw the diagram of a digital circuit for the function : $F(X, Y, Z) = XYZ + XZ + \bar{X}\bar{Y}Z$ (S)
17. Design a circuit to realize the following: $F(A, B, C) = AB + \bar{A}C + \bar{B}\bar{A}C$ (S)
18. Draw the diagram of digital circuit for the function: $F(X, Y, Z) = (X + Y)(X + \bar{Z})(\bar{Y} + Z)$ (S)
19. Draw the diagram of a digital circuit for:
    $F(A, B, C, D) = AB + BC + CD$ using NAND-to-NAND logic. (S)
20. Draw the circuit diagram for $F = A\bar{B}C + \bar{C}B$ using NAND-to-NAND logic only. (S)
21. Draw the diagram of digital circuit for the function $F(X, Y, Z) = YZ + XZ$ using NAND gates only. (S)

Five marks questions:

1. Explain any two basic gates with example and truth table. (K)
2. Explain any two derived gates with truth table. (K)
3. Explain universal gates with truth table. (K)
4. Explain logical AND gate, logical OR gate. (U)
5. Explain logical NOR and logical NAND gates. (U)
6. Explain logical XOR and logical XNOR gates. (U)
7. Draw the diagram of a digital circuit for the following function
   a) $XYZ + XZ + \bar{X}\bar{Y}Z$ b) $AB + A\bar{C} + \bar{B}\bar{A}C$ (S)
8. Realize the basic gates by using only NAND gate. (S)
9. Realize logical NOT gate and logical AND gate using NAND gate. (S)
10. Design to implement logical OR gate and logical AND gate using NOR logical gate. (S)
11. Explain NAND-to-NAND rules and NOR-to-NOR rules of logic network. (U)