DLD
UNIT II
Important Questions

1. Implement the function f = BD+BCD+AB'C'D'+A'BC'D with NAND gates. Assume that both normal and complement inputs are available.
2. Simplify the Boolean function in Sum of Product(SOP) and Product of Sum (POS)
   F = Σm(0,1,2,5,8,9,10)
3. Simplify the Boolean function F using the don't care condition d, in
   i) Sum of product and ii) Product of sum.
   F= A'B'D'+A'CD+A'BC
4. Determine the minimal SOP of the function f(w,x,y,z) = Σm(0,4,5,7,8,9,13,15)
5. Minimize the following Boolean function using K-map and Implement the circuit using AND OR realization.
   F(A,B,C,D) = Σm(0,1,4,5,6,7,9,11,15)+d(10,14)
6. Simplify the function using K-map ad Realize the circuit using NAND gates.
   a. F(V,W,X,Y,Z) = Σm(0,2,4,6,9,11,13,15,17,21,25,27,29,31)
   b. F(A,B,C,D) = Σm(0,1,2,5,7,8,11,14)
   c. F(A,B,C,D) = Σm(0,1,2,4,5,7,8,10,11,14)
   d. F = Σm(0,1,2,3,5,7,8,9,11,14)
   e. F(A,B,C,D) = Σm(0,1,2,4,5,6,8,9,12,13,14)
   f. F(A,B,C,D) = ΣM(0,1,3,7,15) + Σd(2,11,12)
   g. F(x1,x2,x3) = Σm(1,2,4,7)
   h. F = AB+AB'C+A'BC'+BC'
   i. F = AB'C+B+ABD'+AC'
   j. F = b'+ac'+a'cd
   k. F(X,Y,Z) = Σm(3,4,6,7)
7. Simplify the following Boolean expression using K-map and implement them neither using NOR gates:
   a. F(WXYZ) = W'X'Y'Z'+WXY'Z'+W'X'YZ+WXYZ
   b. F(ABCD) = AB'C'+AC+A'CD'
   c. F(A,B,C,D) = πM(0,3,4,7,8,10,12,14).d(2,6)
   d. F = πM(0,4,6,7,8,12,13,14,15)
   e. F = πM(0,1,2,3,4,5,6,7,9,11)
   f. F = Σm(1,3,4,5,9,11,14,15) + d(2,6,7,8)
8. Simplify given POS function usig K-map and mention essential prime implicants terms F(A,B,C,D) = πM(0,2,3,6,7,8,9,14,15).d(10,13)
9. What is meant by a Prime Implicant, an Essential Prime Impicant, and a selective Prime Implicant?
10. Determine the prime implicants and simplify the following Boolean function F(A,B,C,D,E,F) = Σm(6,9,13,18,19,25,27,29,41,45,57,61 using Tabulation method.
11. Reduce the following function using K-Map and identify prime implicants and essential prime implicants. F(a,b,c,d) = Σm(0,1,2,3,6,7,13,15)

12. What are the advantages and disadvantages of K-Map and Tabulation method?
13. Simplify using Quine Mc Cluskey tabular method and draw the logic diagram using NAND gates
    a. $F(A,B,C,D) = \Sigma m(0,2,4,6,7,9) + \Sigma d(10,11)$
    b. $F(W,X,Y,Z) = \Sigma m(1,2,3,5,9,12,14,15) + d(4,8,11)$
    c. $F(A,B,C,D,E,F,G) = \Sigma M(20,28,52,60)$
    d. $F(A,B,C,D) = \Sigma m(0,1,2,4,6,8,9,11,13,15)$
14. Minimize following function using Tabular minimization and realize the minimal function using NAND gates.
    a. $F(v,w,x,y,z)= \Sigma m(2,3,7,9,11,18,23,31)$
    b. $F(w,x,y,z)= \Sigma m(2,3,12,13,14,15)$
    c. $F(A,B,C,D) = \Sigma m(6,7,8,9) + \Sigma d(10,11,12,13,14,15)$
    d. $F(A,B,C,D) = \Sigma m(0,1,3,5,8,13,15) + \Sigma d(2,7,10,14)$
15. Distinguish between combinational and sequential circuit.
16. Design a 4 bit binary code into gray code converter using only NAND gates.
17. Design a Half subtractor and Half adder using Logic gates.
18. Draw Half adder with minimum number of NAND gates.
19. What is a full adder? Draw the block diagram and truth table, obtain the design equations. Show an implementation using fundamental gates.
20. Define multiplexer and decoder.
21. Design a 3-to-8 Decoder using 2-to-4 decoders.
22. Construction a 4X16 decoder with two 3X8 decoders.
23. What is priority encoder? Realize 4X2 Priority encoder with appropriate gates.
24. What is a full adder? Design full adder using two half adders and other necessary gates.
25. Diagrammatically show the implementation 1X8 demultiplexer using 1X4 demultiplexer.
26. Give the complete steps involved in simplifying Boolean expressions using Karnaugh's Map. Illustrate using 4-variable K-map.
27. Explain the working of a 4-to-1 multiplexer. Draw its logic diagram and truth table.
28. Explain in detail about Multiplexer and Demultiplexer.
29. Compare the function of Decoder and Encoder with neat diagram.
30. What is a decoder? Implement 3 to 8 decoder with circuit diagram.