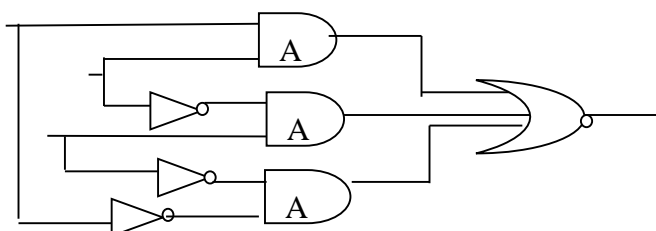


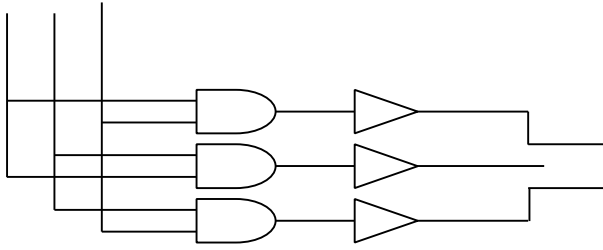
**BHARATIYA VIDYA BHAVAN'S V M PUBLIC SCHOOL, VADODARA**  
**QUESTION BANK CHAPTER 12 . Boolean Algebra**

**2 Marks Questions**

1. Convert the following Boolean expression into its equivalent Canonical Sum of Product Form((SOP)  
 $(X'+Y+Z').(X'+Y+Z).(X'+Y'+Z).(X'+Y'+Z')$
2. Convert the following Boolean expression into its equivalent Canonical Product of Sum form (POS):  
 $A.B'.C + A'.B.C + A'.B.C'$
3. Draw a Logical Circuit Diagram for the following Boolean Expression:  $A.(B+C')$
4. Prove that  $XY+YZ+YZ'=Y$  algebraically
5. Express the  $F(X,Z)=X+X'Z$  into canonical SOP form.
6. Write the equivalent Boolean Expression for the following Logic Circuit.
7. Interpret the following logical circuit as Boolean expression
8. Design  $(A+B).(C+D)$  using NAND Gate
9. Simplify the following Boolean Expression using Boolean postulates and laws of boolean Algebra.
10.  $Z=(a'+a).b'.c+a.b'.c'+a.b.(c+c')$
11. Prove  $x'.y'+y.z = x'yz+x'yz'+xyz+x'yz$  algebraically.
12. Prove that  $(a'+b')(a'+b)(a+b')=a'b'$ .
13. A Boolean function F defined on three input variable X,Y,Z is 1 if and only if the
14. number of 1(One) input is odd (e.g. F is 1 if X=1,Y=0,Z=0). Draw the truth table
15. for the above function and express it in canonical sum of product form.
16. 16. Write SOP form of the given expression .
17.  $F(a,b,c) = (a + b + c') (a' + b + c') (a' + b' + c) (a' + b' + c')$
18. 17. Write the equivalent expression for the following diagram

A B C





### 3 Marks Questions

1. Reduce the following Boolean expression using K-Map:

$$F(A,B,C,D)=\Sigma(0,1,2,4,5,8,9,10,11)$$

2. Reduce the following Boolean expression using K – Map

$$F(A, B, C, D) = \Sigma(0,2,3,4,6,7,8,10,12)$$

3. Reduce the following Boolean Expression using K-Map:

$$F(A,B,C,D)= \Sigma(0,1,2,4,5,6,8,10)$$

4. If  $F(a,b,c,d)=\Sigma(0,2,4,5,7,8,10,12,13,15)$ , obtain the simplified form using K-Map.

5. If  $F(a,b,c,d) = \Sigma(0,1,3,4,5,7,8,9,11,12,13,15)$ , obtain the simplified form using KMap

6. Obtain a simplified form for a boolean expression

$$F(U,V,W,Z)= \prod(0,1,3,5,6,7,10,14,15)$$

7. Reduce the following boolean expression using K-Map

$$F(A,B,C,D) = \prod(5,6,7,8,9,12,13,14,15)$$

8. State the absorption laws in Boolean algebra. Prove one of them algebraically.

9. State the DMorgan laws in Boolean algebra. Prove one of them algebraically.

10. State the Distribution laws in Boolean algebra. Prove one of them algebraically.