

# Boolean Algebra Problems

1. Write dual of the following Boolean Expression:

(a)  $(x + y')$

(b)  $xy + xy' + x'y$

(c)  $a + a'b + b'$

(d)  $(x + y' + z)(x + y)$

2. Find the complement of the following functions applying DeMorgan's theorem:

(a)  $F(x,y,z) = x'yz' + x'y'z$

(b)  $F(x,y,z) = x(y'z + yz)$

3. Find the complements of the expressions:

(i)  $X + YZ + XZ$

(ii)  $AB(C'D + B'C)$

4. In the Boolean Algebra, verify using truth table that  $(X + Y)' = X'Y'$  for each  $X, Y$  in  $\{0, 1\}$ .

5. Give algebraic proof of absorption law of Boolean algebra:

Absorption law states that:

(i)  $X + XY = X$

(ii)  $X(X + Y) = X$

6. Convert the following expression to canonical Sum-of-Product form:

(a)  $X + X'Y + X'Z'$

(b)  $YZ + X'Y$

$$(c) AB'(B' + C')$$