Branch : CS & IT

English

Subject : Digital Logic

Chapter : Minimization

DPP-01

1. Find out minimize expression for following function.

$$f = AB\bar{C} + ABC + \bar{A}BC$$

(a) $AB + BC$ (b) $A\bar{C} + \bar{A}B$

(c) $BC + \bar{A}B$ (d) $\bar{A}B + B\bar{C}$

2. Find out minimize expression for following function.

$$f = AB + A\bar{B} + \bar{A}\,\bar{B}$$

(a) $\bar{A} + B$ (b) $A + \bar{B}$

(c) $\bar{A} + \bar{B}$ (d) $A + B$

complement means 1 in pos

3. Find out minimize expression for following function.

$$f = (A + B)(A + \bar{B})(\bar{A} + B)(\bar{A} + \bar{B})$$

(a) 1 (b) $\bar{A}\,\bar{B}$

(c) 0 (d) $A\bar{B}$

4. Find out minimize expression for following function.

$$f = (A + B + C)(A + B + \bar{C})$$

(a) $(A + C)B$ (b) $A + B$

(c) $AB\bar{C}$ (d) $A(B + C)$

5. The Boolean expression

$$f = (X + Y)(X + \bar{Y}) + \overline{\bar{X}\,\bar{Y} + \bar{X}}$$

(a) Y (b) X

(c) $\bar{X}\,\bar{Y}$ (d) $X + \bar{Y}$

6. The logic expression

$$f = X + \bar{X}\,Y$$

Is equivalent to

(a) $X + Y$ (b) XY

(c) $\bar{X} + Y$ (d) $X + \bar{Y}$

7. The logic expression

$$f = (A + B)(A + C)$$

Is equivalent to

(a) $A + BC$ (b) $B + AC$

(c) $C + AC$ (d) $\bar{A} + BC$

8. The Boolean expression

$$f = (1 + \bar{A})(B + AC)$$

is equivalent to

(a) $AC + B$ (b) $\bar{A}C + B$

(c) $\bar{A} + BC$ (d) 1

9. Find minimization expression

$$f = (A + \bar{A}) + (BC + AC)(A + D)$$

(a) 1 (b) 0

(c) $AB + CD$ (d) $ABC + BCD + ACD$

10. Find out minimization

$$f = (A + B)(A + B + C)$$

(a) $B + C$ (b) $A + B$

(c) $A + B + C$ (d) $AB + BC + AC$

Answer Key

1. **(a)**
2. **(b)**
3. **(c)**
4. **(b)**
5. **(b)**
6. **(a)**
7. **(a)**
8. **(a)**
9. **(a)**
10. **(b)**

Hints and solutions

1. $f = AB\bar{C} + ABC + \bar{A}BC$

$= AB + \bar{A}BC$

$= B(A + \bar{A}C)$

$= B(A + C)(A + \bar{A})$

$= AB + BC$

2. $f = AB + A\bar{B} + \bar{A}\,\bar{B}$

$= AB + (A + \bar{A})\bar{B}$

$= AB + \bar{B}$

$= (A + \bar{B})(B + \bar{B})$

$= A + \bar{B}$

3. $f = (A + AB + A\bar{B})(\bar{A} + \bar{A}B + \bar{A}\,\bar{B})$

$f = 0$

4. $f = (A + B + C)(A + B + \bar{C})$

$f = (A + AB + AC)(AB + B + BC)(A\bar{C} + B\bar{C} + 0)$

$f = (A)(B)(A\bar{C} + B\bar{C})$

$f = AB\bar{C} + AB\bar{C}$

$f = AB\bar{C}$

5. Let $f = (X + Y)(X + \bar{Y}) + \overline{(\bar{X}\,\bar{Y}) + \bar{X}}$

$f = (X + Y)(X + \bar{Y}) + \bar{\bar{X}}\,\bar{\bar{Y}} \cdot \bar{\bar{X}}$

$f = (X + Y)(X + \bar{Y}) + (X + Y)X$

$f = (X + Y)(X + \bar{Y}) + X + XY$

$f = X + XY + X\bar{Y} + Y\bar{Y} + X + XY$

$f = X\left[1 + Y + \bar{Y} + 1 + Y\right]$

$f = X$

6. $f = X + \bar{X}\,Y$

$f = (X + \bar{X})(X + Y)$

$f = X + Y$

7. $f = (A + B)(A + C)$

$f = A + AB + AC + BC$

$f = A + BC$

8. $f = (1 + \bar{A})(B + AC)$

$f = 1 \cdot (AC + B)$

$f = AC + B$

9. $f = (A + \bar{A}) + (BC + AC)(A + D)$

$f = 1 + (BC + AC)(A + D)$

$f = 1$

10. $f = (A + B)(A + B + C)$

$f = A + AB + AB + B + AC + BC$

$f = A + B$