

Subject : Digital Logic

Chapter : Minimization

DPP-01

1. Find out minimize expression for following function.

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

- (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) $A + B$

3. complement means 1 in pos 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

$$\begin{aligned}
 1. \quad f &= ABC\bar{C} + ABC + \bar{A}BC \\
 &= AB + \bar{A}BC \\
 &= B(A + \bar{A}C) \\
 &= B(A + C)(A + \bar{A}) \\
 &= AB + BC
 \end{aligned}$$

$$\begin{aligned}
 2. \quad f &= AB + A\bar{B} + \bar{A}\bar{B} \\
 &= AB + (A + \bar{A})\bar{B} \\
 &= AB + \bar{B} \\
 &= (A + \bar{B})(B + \bar{B}) \\
 &= A + \bar{B}
 \end{aligned}$$

$$\begin{aligned}
 3. \quad f &= (A + AB + A\bar{B})(\bar{A} + \bar{A}B + \bar{A}\bar{B}) \\
 f &= 0
 \end{aligned}$$

$$\begin{aligned}
 4. \quad f &= (A + B + C)(A + B + \bar{C}) \\
 f &= (A + AB + AC)(AB + B + BC)(A\bar{C} + B\bar{C} + 0) \\
 f &= (A)(B)(A\bar{C} + B\bar{C}) \\
 f &= ABC\bar{C} + AB\bar{C} \\
 f &= ABC\bar{C}
 \end{aligned}$$

$$\begin{aligned}
 5. \quad \text{Let } f &= (X + Y)(X + \bar{Y}) + \overline{(X\bar{Y})} + \bar{X} \\
 f &= (X + Y)(X + \bar{Y}) + \bar{X}\bar{Y} + \bar{X} \\
 f &= (X + Y)(X + \bar{Y}) + (X + Y)X
 \end{aligned}$$

$$\begin{aligned}
 f &= (X + Y)(X + \bar{Y}) + X + XY \\
 f &= X + XY + X\bar{Y} + Y\bar{Y} + X + XY \\
 f &= X[1 + Y + \bar{Y} + 1 + Y] \\
 f &= X
 \end{aligned}$$

$$\begin{aligned}
 6. \quad f &= X + \bar{X}Y \\
 f &= (X + \bar{X})(X + Y) \\
 f &= X + Y
 \end{aligned}$$

$$\begin{aligned}
 7. \quad f &= (A + B)(A + C) \\
 f &= A + AB + AC + BC \\
 f &= A + BC
 \end{aligned}$$

$$\begin{aligned}
 8. \quad f &= (1 + \bar{A})(B + AC) \\
 f &= 1 \cdot (AC + B) \\
 f &= AC + B
 \end{aligned}$$

$$\begin{aligned}
 9. \quad f &= (A + \bar{A}) + (BC + AC)(A + D) \\
 f &= 1 + (BC + AC)(A + D) \\
 f &= 1
 \end{aligned}$$

$$\begin{aligned}
 10. \quad f &= (A + B)(A + B + C) \\
 f &= A + AB + AB + B + AC + BC \\
 f &= A + B
 \end{aligned}$$



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