

**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)  $\bar{A}B+BC$

- 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.** 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)  $ABC\bar{C}$                               (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) | 6. (a)  |
| 2. (b) | 7. (a)  |
| 3. (c) | 8. (a)  |
| 4. (b) | 9. (a)  |
| 5. (b) | 10. (b) |



## Hints and solutions

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

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

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

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

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

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

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

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

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

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

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



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