

CS & IT ENGINEERING

Digital Logic
Minimization



DPP 01

Discussion Notes

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TOPICS TO BE COVERED

01 Questions

02 Discussion

Q.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.

$$\bar{A}B + B\bar{C}$$

$$\underbrace{AB\bar{C} + ABC}_{AB(\bar{C} + C)} + \underbrace{\bar{A}BC + ABC}_{BC(\bar{A} + A)}$$

$$AB[\bar{C} + C] + BC[\bar{A} + A]$$

$$\underline{AB + BC}$$

Q.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. $A + B$

$$A[B + \bar{B}] + \bar{A}\bar{B}$$

$$A + \bar{A}\bar{B}$$

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

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

Q.3

Find out minimize expression for following function.

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

A.

1

B.

$\bar{A}\bar{B}$

C.

0

D.

$A\bar{B}$

By two Variable

$$\text{max term} = 2^2 = 4$$

$$= 0$$

Q.4

Find out minimize expression for following function.

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



A.

$$(A + C)B$$

B.

$$A + \bar{B}$$

C.

$$AB\bar{C}$$

D.

$$A(B + C)$$

$$A + B = X$$

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

$$= X + C \cdot \bar{C}$$

$$= X$$

$$= \underline{\underline{A + B}}$$

	C=0	C=1
A+B=0	0	0
A+B=1		

$$A + B$$

$$P + QR = (P + Q)(P + R)$$

Distribution Theorem

Q.5

The Boolean expression

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

$$x + y \cdot \bar{y} = x$$

$$f = x + \overline{\bar{x}\bar{y}} + \bar{x}$$

$$x + \overline{\bar{x}[\bar{y} + 1]}$$

$$x + \bar{x} = x + x = x$$

A.

Y

B.

X

C.

$\bar{X}\bar{Y}$

D.

$X + \bar{Y}$

Q.6

The logic expression $f = X + \bar{X}Y$
Is equivalent to

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

$$= X + Y$$

A.

$$X + Y$$

B.

$$XY$$

C.

$$\bar{X} + Y$$

D.

$$X + \bar{Y}$$

Q.7

The logic expression $f = (A + B)(A + C)$
Is equivalent to

A.

$A + BC$

B.

$B + AC$

C.

$C + AC$

D.

$\bar{A} + BC$

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

Distribution Theorem

Q.8

The Boolean expression $f = (1 + \bar{A})(B + AC)$ is equivalent to

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

$$= \underline{AC + B}$$

A.

$$AC + B$$

B.

$$\bar{A}C + B$$

C.

$$\bar{A} + BC$$

D.

$$1$$

Q.9

Find minimization expression

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

☒ A. 1

☐ B. 0

☐ C. $AB + CD$

☐ D. $ABC + BCD + ACD$

$$f = 1 + \{(BC + AC) \cdot (A + D)\}$$

1 + anything = 1

Q.10

Find out minimization $f = (A+B)(A+B+C)$

- A. $B+C$
- ☒ B. $A+B$
- C. $A+B+C$
- D. $AB+BC+AC$

$$= A \cdot A + AB + AC + AB + B + BC$$

$$= \underline{A + AB + AC} + \underline{AB + B + BC}$$

$$= A[1+B+C] + B[1+A+C]$$

$$= \underline{A+B}$$

Ans

