

Assignments

Type A : Short Answer Questions/Conceptual Questions

1. What do you understand by 'truth value' and 'truth function' ? How are these related ?
2. What do you understand by 'logical function' ? What is its alternative name ? Give examples for logical functions.
3. What is meant by tautology and fallacy ? Prove that $1 + Y$ is a tautology and $0.Y$ is a fallacy.
4. What is a truth table ? What is its significance ?
5. What are the basic postulates of boolean algebra ?
6. What does duality principle state ? What is its usage in boolean algebra ?
7. State the distributive laws of boolean algebra. How do they differ from the distributive laws of ordinary algebra ?
8. Prove the complementarity law of boolean algebra with the help of a truth table.
9. Give the truth table proof for distributive law of boolean algebra.
10. Give algebraic proof of absorption law of boolean algebra.
11. What are DeMorgan's theorems ? Prove algebraically the DeMorgan's theorem.

Type B : Application Based Questions

1. In the Boolean Algebra, verify using truth table that $X + XY = X$ for each X, Y in $\{0, 1\}$.
2. In the Boolean Algebra, verify using truth table that $(X + Y)Y = X'Y'$ for each X, Y in $\{0, 1\}$.
3. Give truth table for the Boolean Expression $(X + Y)Y$.
4. Draw the truth table for the following equations : (a) $M = N(P + R)$ (b) $M = N + P + NP$
5. Using truth table, prove that : $AB + BC + CA = AB + CA$.
6. State the principle of duality in boolean algebra and give the dual of the boolean expression :
 $(X + Y)(\bar{X} + \bar{Z})(Y + Z)$
7. Prove the idempotence law of boolean algebra with the help of a truth table.
8. Use the duality theorem to derive another boolean relation from : $A + \bar{A}B = A + B$
9. What would be the complement of the following : (a) $\bar{A}(B\bar{C} + \bar{B}C)$ (b) $xy + \bar{y}z + \bar{z}z$?
10. Find the complement of the following Boolean function : $F_1 = AB + C'D$
11. Design a logic circuit to realize the Boolean function $f(x, y) = x \cdot y + x' \cdot y'$
12. Draw the logic circuit for this boolean equation : $y = \bar{A}\bar{B}\bar{C}D + A\bar{B}\bar{C}D + AB\bar{C}D + ABC\bar{D}$
13. Draw the AND-OR circuit for : $y = \bar{A}\bar{B}\bar{C}\bar{D} + A\bar{B}\bar{C}\bar{D} + ABCD$