

# BOOLEAN ALGEBRA

The basic function of Boolean Algebra is 1 & 0, i. e. ON – OFF process.

There are basically three logic gates – AND, OR & NOT.

## Properties of Boolean Algebra:-

(1) *Commutative Property:*

$$A + B = B + A$$

$$A \cdot B = B \cdot A$$

(2) *Associative Property:*

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

$$A \cdot (B \cdot C) = (A \cdot B) \cdot C$$

(3) *Distributive Property:*

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

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

(4) *Absorption Law:*

$$A + AB = A$$

$$A \cdot (A + B) = A$$

(5) *De Morgan's Theorem:*

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

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

(6) *Involution Law:*

$$\overline{\bar{A}} = A$$

(7)  $A + 0 = A$

(8)  $A + 1 = 1$

(9)  $A + A = A$

(10)  $A + \bar{A} = 1$

(11)  $A \cdot 1 = A$

(12)  $A \cdot 0 = 0$

(13)  $A \cdot A = A$

(14)  $A \cdot \bar{A} = 0$