

CHAPTER – 1

SETS

SYNOPSIS :

- A set is a well-defined collection of objects.
- There are two methods for the representation of a set :
 - (1) Rooter Form
 - (2) Set Builder form
- The set having finite number of elements in it is known as a 'finite set.'
- The set having infinite number of elements in it is known as an 'infinite set'.
- Two sets having equal number of elements in them are known as 'equivalent sets'.
- A set having no element in it is known as 'null set' or 'void set'. It is denoted by \emptyset .

- A set A is said to be subset of a set B , if every element of A is also an element of B . Intervals are subsets of \mathbb{R} .
- A power set of a set A is collection of all subsets of A . It is denoted by $P(A)$.
- The union of two sets A and B is the set of all those elements which are either in A or in B .
- The intersection of two sets A and B is the set of all elements which are common. The difference of two sets A and B in this order is the set of elements which belong to A but not to B .
- The complement of a subset A of universal set U is the set of all elements of U which are not the elements of A .
- **Some important properties of subsets :**
 - (1) Every set is its own subset : $A \subseteq A$
 - (2) Empty set is a subset of each set : $\varnothing \subseteq A$.
 - (3) For any two sets A and B , $A = B \Leftrightarrow A \subseteq B$ and $B \subseteq A$.
 - (4) For any three sets A , B and C , $A \subseteq B$ and $B \subseteq C, \Rightarrow A \subseteq C$,
 - (5) For any two sets A and B , $A - B = A \cap B'$.

- (6)** For any two sets A and B.
- (i) $A \cup B = B \Leftrightarrow A \subseteq B$.
 - (ii) $A \cap B = A \Leftrightarrow A \subseteq B$.
- (7)** For any two sets A and B, prove that
 $(A - B) \cup B = A \cup B$.
- (8)** For any three sets A, B and C the following laws known as De Morgan's laws (in other form) hold :
- (i) $A - (B \cup C) = (A - B) \cap (A - C)$.
 - (ii) $A - (B \cap C) = (A - B) \cup (A - C)$.