SET: A set is a collection of well defined objects which are distinct from each other.

Set are generally denoted by capital letters A, B, C and the elements of the set by a, b, c .... etc.

if a is an element of a set A, then write $a \in A$ and say a belongs to A.

SUBSETS :- Let A and B be two set if every element of A is an element B, then A is called a subset of B if A is subset of B. we write $A \subseteq B$

Example

$A = \{1, 2, 3, 4\}$

$B = \{1, 2, 3, 4, 5, 6, 7\}$

$\Rightarrow \boxed{A \subseteq B}$

PROPER SUBSET :- if A is a subset of B and $A \neq B$ then A is a proper subset of B. and we write $A \subset B$.

POWER SET :- Let A be any set. The set of all subsets of A is called power set of A and is denoted by P(A). To calculate the total number of sets present in a power set we have to use the formula:

No of sets in $\boxed{P(A) = 2^n}$ n :- No of element in set A.

SOME OPERATIONS ON SETS

(i) Union of two set: $A \cup B = \{x : x \in A \text{ or } x \in B\}$

(ii) Intersection of two set: $A \cap B = \{x : x \in A \text{ and } x \in B\}$

(iii) De-morgan Law: $(A \cup B)' = A' \cap B'$

$$(A \cap B)' = A' \cup B'$$

if A and B are any two sets then

(i) $A - B = A \cap B'$

(ii) $B - A = B \cap A'$

(iii) $A - B = A \Leftrightarrow A \cap B = \phi$

(iv) $(A - B) \cup B = A \cup B$

(v) $(A - B) \cap B = \phi$

(vi) $(A - B) \cup (B - A) = (A \cup B) - (A \cap B)$

SOME IMPORTANT RESULTS ON NUMBER OF ELEMENTIN SETS

if A, B, and C are finite set, and U be the finite universal set, then

(1) $n(A \cup B) = n(A) + n(B) - n(A \cap B)$

(2) $n(A \cup B) = n(A) + n(B) \Leftrightarrow A, B$ are disjoint non-void set

(iii) $n(A-B) = n(A) - n(A \cap B)$ i.e

$$n(A-B) + n(A \cap B) = n(A)$$

(iv) $n(A \Delta B)$ = No of elements which belongs to exactly one of A or B.

$$n(A \Delta B) = n((A-B) \cup (B-A))$$

$$= n(A-B) + n(B-A) \quad [\because (A-B) \text{ and } (B-A) \text{ are disjoints}]$$

$$\boxed{n(A \Delta B) = n(B) + n(A) - 2n(A \cap B)}$$

(v) $n(A \cup B \cup C) = n(A) + n(B) + n(C) - n(A \cap B) - n(B \cap C) - n(C \cap A) + n(A \cap B \cap C)$

(vi) $n(A' \cup B') = n((A \cap B)') = n(U) - n(A \cap B)$

(vii) $n(A' \cap B') = n((A \cup B)') = n(U) - n(A \cup B)$