SETS

“A set is a collection of well defined objects”.

SET

- Finite Set
- Infinite Set
- Null Set
- Universal Set
- Singleton set
- Joint Set
- Disjoint set
- Euivalent Set
- Equal set

(i)
- The objects used to form a set are called elements or members of set.

(ii)
- If an element belongs to set A, we write as x € A. and it does not belong to set A, we write as x € A

(iii)
- Representation of data
- **a) Roster method** Ex: A={a,e,i,o,u}
- **b) Rule method** Ex: A={x/x is set of vowels in English alphabet

(iv)
- The number of elements in a set is called its **"cardinal number"**

❖ A set with finite number of elements is called **“finite set”.**

❖ A set with infinite number of elements is called **“infinite set”.**

❖ A set which has only one element is called **“singleton or unit set”.**

❖ A set which has no elements is called **“null or empty set”.**

  ➢ Denoted as **{ } or** ∅

  ➢ **Cardinal number of empty set is 0.**

  ➢ The set { 0 } is not empty set because it contains element zero.

❖ Two sets are said to be **“joint or overlapping sets”** if they have at least one element in common.

❖ Two sets are said to be **“disjoint sets”** if they have no element in common.

❖ Two sets are said to be **“equivalent sets”** if they have contain same number of elements

❖ Two sets are said to be **“equal sets”** if both sets have same (identical) elements.

PROPERTIES ON SETS

(i) Commutative Property

a) Union of sets….

AUB= BUA

b) Intersection of sets….

A∩B= B∩A

(ii) Associative Property

a) Union of sets….

(AUB) UC= AU (BUC)

b) Intersection of sets….

(A∩B) ∩C= A∩ (B∩C)

(iii) Distributive Property

a) Union of sets over intersection….

AU(B∩C)= (AUB) ∩ (AUC)

b) Intersection of sets over union of sets **A∩(BUC)= (A∩B)U (A∩C)**

DeMorgan’s Law:

Let A and B be two sets, then

(i)The complement of union of sets is equal to the intersection of their complement $(AUB)' = A' \cap B'$

(ii)The complement of intersection of sets is equal to the union of their complement $(A \cap B)' =$

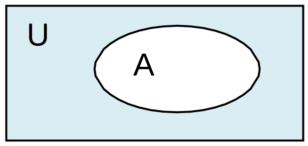
SETS

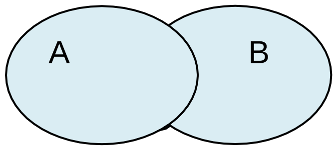
(A^C or A') Complement of set A is a set of elements of Universal set which are not in A . U={1,2,3,4} A={2,4} $\boldsymbol{A^C}$ $\boldsymbol{or}$ $\boldsymbol{A'}$**=U-A={1,3}**

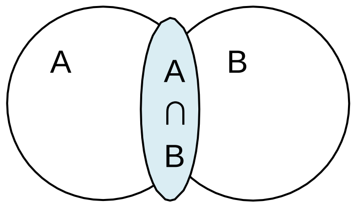
(U)Union of sets: A and B gives the set of elements that belong to both sets. U={1,2,3,4} A={1,3} B={2} **AUB={1,3} U {2} = {1,2,3}**

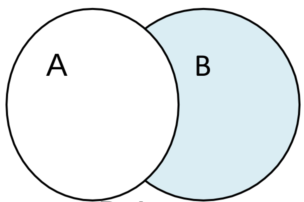
(∩)Intersection of sets: A and B gives the set of elements that belong to both sets. U={1,2,3,4} A={1,3} B={2} **AUB={1,3} ∩{2} = {1,2,3}**

(\ or -)Difference of sets: A and B are given set A={1} B={1,2,3} **B-A=B\A={1,2,3} -{1} = {2,3}**









B-A

- If all elements of set A belong to set B, the set **A is called subset of B.**
- If elements in set A belong to set B but not equal to set B, then set A is called **"proper subset".**
- If A is subset of set B, then set B is called **"super set"**
- **Universal set** is the set that contains all the elements of its subsets, denoted as U

<u>**Cardinality properties of Sets**</u>

n(AUB)=n(A) + n(B) - n(A∩B)
n(A∩B)=n(A) + n(B) - n(AUB)
n(AUB)=n(A\B)+n(B\A)-n(A∩B)
n(A\B)=n(A)-n(A∩B)
n(A\B)=n(AUB)-n(B)

If A and B are disjoint sets then
n(A∩B)=0, then (AUB)=n(A) + n(B)
n(AUB)=n(A\B)+n(B\A)
n(A\B)=n(A)
n(A\B)=n(B)

n(A')= n(U)- n(A)
n(B')= n(U)- n(B)
n(AUB)'= n(U)- n(AUB)
n(A∩B)'=n(U)- n(A∩B)