SETS

1. **Sets and their Representations**
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- **Set**: A set is a well-defined collection of objects.
- **Representaiton of sets**: (i) Roster or Tabular form, (ii) Rule method or set builder form.

Types of sets:

- **Empty set**: A set which does not contain any element is called empty set or null set or void set. It is denoted by ϕ or $\{\}$.
- **Singleton set**: A set, consisting of a single element, is called a singleton set.
- **Finite set**: A set which consists of a definite number of elements is called finite set.
- **Infinite set**: A set, which is not finite, is called infinite set.
- **Equivalent sets**: Two finite sets A and B are equivalent, if their cardinal numbers are same, .i.e, $n(\mathrm{A}) = n(\mathrm{B})$.
- **Equal sets**: Two sets A and B are said to be equal if they have exactly the same elements.
- **Subset**: 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 R.
- **Proper set**: If $\mathrm{A} \subseteq \mathrm{B}$ and $\mathrm{A} \neq \mathrm{B}$, then A is called a proper set of B, written as $\mathrm{A} \subset \mathrm{B}$.

- **Universal set**: If all the sets under consideration are subsets of a large set U, then U is known as a universal set. And it is denoted by rectangle in Venn-Diagram.
- **Power set**: A power set of a set A is collection of all subsets of A. It is denoted by P(A).
- **Venn-Diagram**: A gepmetrical figure illustrating universal set, subsets and theiroperations is known as Venn-Diagram.
- **Union of sets**: The union of two sets A and B is the set of all those elements which are either in A or in B.
- **Intersection of sets**: 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.
- **Disjoint sets**: Two sets A and B are said to be disjoint, if $A \cap B = \phi$.
- **Difference of sets**: Difference of two sets i.e., set (A - B) is the set of those elements of A which do not belong to B.
- **Compliment of a set:** 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. A' = U - A.
- For any two sets A and B, $(A \cup B)' = A' \cap B'$ and $(A \cap B)' = A' \cup B'$
- If A and B are finite sets such that $A \cap B = \varphi$, then

  $n(A \cup B) = n(A) + n(B)$.

- If $A \cap B \neq \varphi$, then

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