

# MATHEMATICS

## CLASS- XI

### SEMESTER- I

#### Unit-1: SETS AND FUNCTIONS

##### 1. Sets:

Sets and their representations. Empty & Infinite sets. Equal sets, subsets, Subsets of the set of real numbers especially intervals (with notations). Power set, Universal set, Venn diagrams, Union and Intersection of sets, Difference of sets, Complement of a set.

##### 2. Relations & Functions:

Ordered pairs, Cartesian product of sets. Number of elements in the Cartesian product of two finite sets. Cartesian product of the reals with itself (upto  $\mathbb{R} \times \mathbb{R} \times \mathbb{R}$ ). Definition of relation, pictorial diagrams, domain, co-domain and range of a relation. Function as a special kind of relation from one set to another. Pictorial representation a function, domain, co-domain range of a function. Real valued function of the real variable, domain and range of these functions, constant, identity, polynomial, rational, modulus, signum and greatest integer functions with their graphs. Sum, difference, product and quotients of functions.

#### Unit-II: ALGEBRA

##### 1. Principle of Mathematical Induction:

Processes of the proof by induction, motivating the application of the method by looking at natural numbers as the least inductive subset of real numbers. The principle of mathematical induction and simple applications.

##### 2. Complex Numbers and Quadratic Equations:

Need for complex numbers, especially  $\sqrt{-1}$  to be motivated by inability to solve every quadratic equation. Brief description of algebraic properties of complex numbers. Argand plane and polar representation of complex numbers. Statement of Fundamental Theorem of Algebra, solution of quadratic equations in the complex number system.

##### 3. Linear Inequalities:

Linear inequalities, Algebraic solutions of linear inequalities in one variable and their representation on the number line. Graphical solution of linear inequalities in

two variables. Solution of system of linear inequalities in two variables-graphically.

**4. Sequence of Series:**

Sequence and Series, Arithmetic progression (A.P.), arithmetic mean (A.M.), Geometric progression (G.P.), general term of a G.P., sum of n terms of a G.P. Geometric mean (G.M.), relation between A.M. and G.M. Sum to n terms of the special series  $\sum n$ ,  $\sum n^2$  and  $\sum n^3$ .

**Unit IV: CALCULUS**

**1. Limits and Derivatives:**

Derivatives introduced as rate of change both as that of distance function and geometrically, intuitive idea of limit. Definition of derivative, relate it to slope of tangent of the curve, derivative of sum, difference, product and quotient of functions. Derivatives of polynomial and trigonometric functions