

SUBJECT: MATHEMATICS (MTH1)**CLASS XI****SEMESTER I****THEORY****FULL MARKS – 40****(MCQ Type Question)**

UNIT	Topic	No of periods assigned	Marks
Unit - I	Sets and Trigonometric Functions	30	20
Unit - II	Algebra	18	12
Unit - III	Calculus	12	8
		Total Periods: 60	Total Marks: 40

DETAIL SYLLABUS

UNIT	Topic / Sub Topic	No of periods
Unit – I	<p>Sets and Intervals</p> <p>Sets and their representations, Empty set, Finite and 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. Properties Complement sets.</p> <p>Ordered pairs. Cartesian product of sets, Number of elements in the Cartesian product of two finite sets. Cartesian product of the set of reals with itself (up to $R \times R \times R$).</p>	6
	<p>Measurement of Angles and Associated Angles</p> <p>Positive and negative angles, Measuring angles in radians and in degrees and conversion from one measure to another. Signs of trigonometric functions, domain, range and sketch their graphs. Associated Angles.</p>	4
	<p>Compound Angles and Transformation Formula</p> <p>Expressing $\sin(x \pm y)$ and $\cos(x \pm y)$ in terms of $\sin x$, $\cos x$, $\sin y$ and $\cos y$.</p> <p>Expressing $\tan(x \pm y)$ and $\cot(x \pm y)$ in terms of $\tan x$, $\tan y$, $\cot x$, $\cot y$</p> $\sin x + \sin y = 2 \sin\left(\frac{x+y}{2}\right) \cos\left(\frac{x-y}{2}\right)$ $\sin x - \sin y = 2 \sin\left(\frac{x-y}{2}\right) \cos\left(\frac{x+y}{2}\right)$ $\cos x + \cos y = 2 \cos\left(\frac{x+y}{2}\right) \cos\left(\frac{x-y}{2}\right)$ $\cos x - \cos y = 2 \sin\left(\frac{x+y}{2}\right) \sin\left(\frac{y-x}{2}\right)$	8

	<p align="center">Multiple Angles and Sub- Multiple Angles</p> <p align="center">Identities related to $\sin 2x$, $\cos 2x$, $\tan 2x$, $\sin 3x$, $\cos 3x$ and $\tan 3x$.</p>	8
	<p align="center">General solutions of Trigonometric Equations</p> <p align="center">General solutions of trigonometric equations of the type $\sin \theta = \sin \alpha$, $\cos \theta = \cos \alpha$ and $\tan \theta = \tan \alpha$.</p>	4
Unit – II	<p align="center">Complex numbers and Quadratic Equations</p> <p>Need for complex numbers, especially $\sqrt{-1}$, to be motivated by inability to solve some of the quadratic equations. Algebraic properties of complex numbers. Argand plane, polar representation of complex numbers, modulus, argument. solution of quadratic equation in complex number system.</p>	10
	<p align="center">Linear Inequalities</p> <p>Linear inequalities, Algebraic solutions of linear inequalities in one variable and modulus function and their representation on the number line. Graphical solution of linear inequalities in two variables</p>	8
Unit – III	<p align="center">Functions and Graphs</p> <p>Function as a special kind of relation from one set to another. Pictorial representation of a function, domain, codomain and range of a function. Real valued functions, domain and range of these functions, even and odd functions.</p> <p>Domain, Range and Graph of the following functions: constant, identity, polynomial, rational, modulus, exponential, logarithmic, signum and greatest integer functions.</p> <p>Sum, difference, product and quotients of functions.</p>	12

SUBJECT: MATHEMATICS (MTH1)**CLASS XI****SEMESTER II****THEORY****FULL MARKS –40****(SAQ AND LAQ Type Question)**

UNIT	Topic	No of periods assigned	Marks
Unit - I	Algebra	14	12
Unit - II	Co-ordinate Geometry	24	18
Unit - III	Calculus	10	10
		Total Periods: 48	Total Marks: 40

DETAIL SYLLABUS

UNIT	Topic / Sub Topic	No of periods assigned
Unit - I	Progression (A P and GP) Sequence and series. Arithmetic Progression (A.P.), Arithmetic Mean (A.M.), Geometric Progression (G.P.), Geometric Mean (G.M.) relation between A.M. & G.M., infinite G.P. and its sum, sum to n terms of the special series: $\sum n$, $\sum n^2$, $\sum n^3$	8
	Binomial Theorem History, Statement and proof of the binomial theorem for positive integral indices. Pascal's Triangle, General and middle term in Binomial expansion, Simple applications.	6
Unit - II	Basic co-ordinates and Locus Brief recall of two - dimensional geometry from earlier classes. transformation of axes, Polar co-ordinates and Locus	2
	Straight Lines Slope of a line and angle between two lines. Various forms of equations of a line: Parallel to Axis, Point–slope form, slope intercept form, two- point form, intercept form, distance of a point from a line.	6
	Conic Sections Sections of a Cone: circle, ellipse, parabola, hyperbola, a point, a straight line and a pair of intersecting lines as a degenerated case of conic section; Standard equation of circle, general equation of circle, Standard equations and simple properties of Parabola, Ellipse and Hyperbola.	16
Unit - III	Limits and Derivatives Intuitive idea of limit. Limits of polynomials and rational functions, trigonometric, exponential and logarithmic functions. Derivative introduced as rate of change both as that of distance function and geometrically. 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.	10

**PROJECT / PRACTICAL
CLASS XI**

FULL MARKS – 20

NO OF PERIODS ASSIGNED – 36

NOTES:

1. Projects should be conducted regularly throughout the year.
2. A project notebook is to be prepared by each and every student where all the below mentioned activities should be recorded.
3. There should be a project assessment once a year (once in Class XI and once in Class XII) where the student will be asked to do one of the activities and write it in his/her script provided for the purpose.
4. The student should carry his/her project notebook during the assessment.
5. A viva should also be conducted during the assessment to test the knowledge of the student regarding the project activity.

List of Projects for Class XI

Serial Number	Topics	Activities
1	Theory of sets	Verification of De 'Morgan's Laws $(A \cup B)^c = A^c \cap B^c$, $(A \cap B)^c = A^c \cup B^c$ by Venn diagram
2	Theory of sets	Verification of distributive laws using Venn Diagrams.
3	Trigonometric Functions	Comparative study of the graphs of the functions $y = \sin x$, $y = \sin 2x$
4	Complex Numbers	To interpret geometrically the meaning of $i = \sqrt{-1}$ and its integral powers.
5	Trigonometric Functions	To illustrate the values of sine and cosine functions for different angles which are multiples of $\pi/2$ and π .
6	Sequence and Series	To illustrate that the arithmetic mean of two different positive numbers is always greater than the geometric mean.
7	Conic Sections	Classification of different conics from general equation of 2 nd degree
8	Conic Sections	To recognize different types of conics using plane section to a cone or a pair of cones
9	Binomial Theorem	History, Theory and Application of Pascal's Triangle

Marks Division for the Project Assessment

Serial Number	Item	Marks
1	Project Notebook	10
2	Doing and writing a project during the Project Assessment	5
3	Viva	5
	Total	20