SYLLABUS FOR CLASS XI MATHS FOR MID TERM EXAM 2021

Unit-1: Sets and Functions

1. Sets

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

2. Relations & Functions:

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 (R x R only). Definition of relation, pictorial diagrams, domain, co-domain and range of a relation. Function as a special type of relation. Pictorial representation of a function, domain, co-domain and range of a function. Real valued functions, domain and range of these functions, constant, identity, polynomial, rational, modulus, signum, exponential, logarithmic and greatest integer functions, with their graphs.

3. Trigonometric Functions:

Positive and negative angles, Measuring angles in radians and in degrees and conversion from one measure to another. Definition of trigonometric functions with the help of unit circle .Truth of the identity $\sin^2 x + \cos^2 x = 1$, for all x. Signs of trigonometric functions. Domain and range of trigonometric functions and their graphs. Expressing sin (x±y) and cos (x±y) in terms of sin x, sin y, cos x &cos y and their simple applications. Deducing the identities like the following:

$$\tan(x \pm y) = \frac{tanx \pm tany}{1 \mp tanx\ tany}, \cot (x \pm y) = \frac{cotx\ coty \mp 1}{coty \pm cotx}$$

$$\sin \alpha \pm \sin\beta = 2\sin\tfrac{1}{2}(\alpha \pm \beta)\cos\tfrac{1}{2}(\alpha \mp \beta)$$
$$\cos \alpha + \cos\beta = 2\cos\tfrac{1}{2}(\alpha + \beta)\cos\tfrac{1}{2}(\alpha - \beta)$$
$$\cos \alpha - \cos\beta = -2\sin\tfrac{1}{2}(\alpha + \beta)\sin\tfrac{1}{2}(\alpha - \beta)$$

Identities related to sin2x, cos2x, tan 2x, sin3x, cos3x and tan3x.

Unit-II: Algebra

1. Complex Numbers and Quadratic Equations

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 Statement of Fundamental Theorem of Algebra, solution of quadratic equations (with real coefficients) in the complex number system.

2. Linear Inequalities

Linear inequalities. Algebraic solutions of linear inequalities in one variable and their representation on the number line. Graphical solutions of linear inequalities in two variables. Graphical method of finding a solution of system of linear inequalities in two variables.

3. Permutations and Combinations

Fundamental principle of counting. Factorial n. (n!), Permutations and combinations formula for ^nP_r, and ^nC_r simple applications.

4. Sequence and 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., infinite G.P. and its sum, geometric mean (G.M.), relation between A.M. and G.M .