MT-001 Mathematics – I

Sets:

Defining Set and their types, operations on set and their properties, De Morgan's law.

Quadratic Equations:

Formation and method to solve equation, Synthetic division, Solution of quadratic equations, theory and nature of the roots of quadratic equation, System of two equations involving two variables, Solution of different types of systems of equations.

Complex Number:

Complex Number, Properties of complex numbers, cube root of unity, conjugate and modules, Geometrical representation of complex numbers $a \pm ib$.

Matrices:

Properties, sum, difference and multiplication of matrices. Cramer's rule, solution of linear equations of three unknowns.

Determinants:

Properties, addition, subtraction and multiplication of determinants,

Sequence and Series:

Arithmetic, Geometric and Harmonic progressions, and their means. Arithmetic, Geometric and Harmonic series, Relation between H.M., A.M. and G.M.

Permutation and Combination:

Recognition between permutation and combination cases, factorial n! , 0! = 1 etc.

Binomial Expression:

Expansion for positive integer $'n'$. Use of the general term and determine the middle term or other terms of the expansion.

Partial Fractions:

Resolve into partial fractions, proper fraction, improper fraction, when all factors of denominator are linear but some are repeated. When denominator has repeated irreducible quadratic factors.

Circular Measure:

Understand the definition of radians and use the relationship between radians and degrees.

Trigonometric Functions:

Basic functions e.g. sine, cosine, tangent etc. relation between them. Trigonometric identities sum and difference formulae, multiple angle formulae. Inverse functions.

Textbook(s):

1. "Mathematics for Class XI", Sindh Text Book Board. Publisher: Iqbal Publishing Company, Hyderabad

2. "Mathematics for Class XII", Sindh Text Book Board. Publisher: Iqbal Publishing Company, Hyderabad

Reference Book(s):

1. Gilbert Strang, Brett Coonly and Andrew Bulman, 2005, "Linear Algebra and its Applications", 4th Ed., Thomson Brooks/Cole, Belmont, CA, USA.

2. S. K. Chung, "Understanding Basic Calculus", Create Space Independent Publishing Platform, 2014.

3. Howard Anton, Irl Bivens and Stephen Davis, "Calculus", 10th Ed, 2011, John Wiley & Sons Inc.

4. "Calculus and Analytic Geometry", MATHEMATICS 12 (Mathematics FSc Part 2 or HSSC-II), Punjab Text Book Board Lahore, Pakistan.