VITEEE – 2024 –
MATHEMATICS

1. Matrices and their Applications

Algebra of matrices, Determinants and its properties – Adjoint and inverse of a square matrix using determinants and elementary transformations – Rank, Test of consistency and solution of simultaneous linear equations up to three variables – Solution of Linear Programming problem in two Variables.

2. Trigonometry and Complex Numbers

Fundamentals of Trigonometry, Trigonometric, inverse Trigonometric functions and their properties, heights and distances.

Complex number system – conjugate, properties, ordered pair representation. Argand diagram, Algebra of complex numbers, modulus and argument (or polar form) of a complex number. Solution of polynomial equations – De Moivre's theorem and its applications. Roots of a complex number – Cube and fourth roots.

3. Analytical Geometry of two dimensions

Coordinate geometry – Equation of a straight line and family of straight lines - Properties
Definition of a conic – general equation of a conic, classification with respect to the general equation of a conic and eccentricity. Equations of conic sections (parabola, ellipse and hyperbola) in standard forms and general forms – Directrix, Focus and Latus-rectum – parametric form of conics and chords. – Tangents and normal's – Cartesian form and parametric form – equation of chord of contact of tangents.

4. Vector Algebra

Scalar Product and Vector product of two Vectors, properties and applications – Scalar and Vector triple product – Properties.

5. Analytical Geometry of Three Dimensions

Coordinates of a point in space, the distance between two points, section formula, directions ratios and direction cosines, the angle between two intersecting lines. Skew lines, the shortest distance between them and its equation. Equations of a line and a plane in different forms, the intersection of a line and a plane, coplanar lines.

6. Differential Calculus

Limits, continuity and differentiability of functions – properties – applications: tangent, normal and angle between curves.

Mean value theorem – Rolle's Theorem, Lagrange Mean Value Theorem, Taylor's and Maclaurin's series**,** stationary points, increasing, minima **of** decreasing, maxima, **functions of** one variable, concavity and points of inflexion-Errors and approximations.

7. Integral Calculus and its Applications

Simple definite integrals – fundamental theorems of calculus, properties of definite integrals, Reduction formulae – Area of bounded regions, length of the curves.

8. Differential Equations

Differential equations – formation, order and degree. Solution of first order differential equations: Variables separable, Homogeneous, Linear equations and applications.

9. Probability and Distributions

Basics of Probability – Axioms – Addition law – Conditional probability – Multiplicative law – Baye's Theorem.

Random variables – probability density function**,** distribution functions, mathematical expectation, variance – Discrete distributions: Binomial and Poisson.

10. Discrete Mathematics

Sets – Relations – Functions – Binary Operations. Sequence and series (AP, GP, HP) – Binomial Theorem – Counting Techniques

Mathematical logic – logical statements, connectives, truth tables, logical equivalence, tautology, contradiction.

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