

# **Contents**

## **ALGEBRA**

1. Theory of Equations and Symmetric Functions of the Roots.....	3–17
2. Progressions (A.P., G.P. and H.P.).....	18–28
3. Exponential and Logarithmic Series.....	29–33
4. Permutations and Combinations.....	34–43
5. Binomial Theorem.....	44–48
6. Matrices and Determinants.....	49–73
7. Sets and Set Theory.....	74–77
8. Relations and Functions.....	78–82
9. Number Theory.....	83–89
10. Group.....	90–101
11. Linear Algebra.....	102–108
12. Probability.....	109–119

## **GEOMETRY**

### **Section–I : Analytical Plane Geometry**

1. Pair of Straight Lines.....	120–124
2. The Circle.....	125–138
3. The Parabola.....	139–146
4. The Ellipse.....	147–156
5. The Hyperbola.....	157–167
6. Polar Equations.....	168–174

**Section–II : Analytical Solid Geometry**

7. Fundamental Concept of 3D.....	175–182
8. The Plane.....	183–189
9. The Straight Line.....	190–198
10. The Sphere.....	199–208
11. The Cone.....	209–216
12. The Cylinder.....	217–225

**TRIGONOMETRY**

● Trigonometrical Ratios and Identities.....	226–228
● Trigonometrical Equations.....	228–229
● Properties of Triangles.....	229–231
● Height and Distances.....	231–231
● Inverse Circular Function.....	231–232
● Hyperbolic Functions.....	232–234
● Complex Number and DeMoivre's Theorem.....	234–252
● Miscellaneous Exercise.....	253–283

**CALCULUS****Section–I : Differential Calculus**

1. Function.....	284–290
2. Limit, Continuity and Differentiability.....	291–306
3. Rolle's Theorem, Mean Value Theorem, Taylor's Theorem.....	307–313
4. Tangents and Normals.....	314–323
5. Maxima and Minima.....	324–331
6. Curvature.....	332–340
7. Asymptotes.....	341–348
8. Curve Tracing.....	349–358
9. Partial Differentiation.....	359–369
● Miscellaneous Exercise.....	369–375

## Section–II : Integral Calculus

10. Indefinite Integrals.....	376–390
11. Definite Integrals.....	391–404
12. Rectification, Quadrature, Volume and Surfaces.....	405–419
13. Multiple Integration.....	420–430

## Differential Equations

<b>Differential Equations.....</b>	<b>431–458</b>
------------------------------------	----------------

- Definition
- Differential Equations of First Order and First Degree
- Differential Equation of First Order but not of First Degree
- Equation Solvable for  $p$ ,  $x$  and  $y$
- Clairaut's Equation
- Geometrical Meaning of a Differential Equation of the First Order
- Singular Solution
- Determination of a Singular Solution
- Trajectory
- Orthogonal Trajectory
- Linear Differential Equation with Constant Coefficient
- Solution of the Differential Equation
- Particular Integral (P.I.)
- Methods of Finding Particular Integral

## Vector Algebra

<b>Vector Analysis.....</b>	<b>459–483</b>
-----------------------------	----------------

- Scalar and Vector Quantities
- Unit Vector
- Equal Vector
- Position Vector
- Addition of Vectors
- Properties of Addition
- Subtraction of Vectors
- Multiplication of a Vector by a Scalar
- Properties of Scalar Multiplication

- Position Vector of a Point Dividing a Line in a given Ratio
- Collinear Vectors
- Linearly Independent and Dependent System of Vectors
- Coplanar Vectors
- Vectorial Equation of a Line
- Bisectors of the Angles between Two Straight Lines
- Condition for Three Points to be Collinear
- Vectorial Equation of a Plane
- Condition for Four Points to be Coplanar
- Scalar or Dot Product with their Properties
- Vector or Cross Product of Two Vectors
- Properties of Vector Product
- Scalar Triple Product with Properties
- Vector Triple Product with their Properties
- Scalar and Vector Product of Four Vectors
- Perpendicular Distance of a given Point from a Line
- Reciprocal System of Vectors

## DYNAMICS

1. Velocity, Acceleration and Rectilinear Motion.....	484–491
2. Motion under Gravity.....	492–499
3. Projectiles.....	500–508
4. Impulse, Work, Power and Energy.....	509–516
5. Collision of Elastic Bodies.....	517–524
6. D’ Alemberts Principle (Equation of Motion of a Rigid Body).....	525–534
7. Moment of Inertia.....	535–543

## STATICS

1. Equilibrium of Three Forces Acting on a Particle.....	544–551
2. Equilibrium of More than Three Forces Acting on a Particle.....	552–555
3. Equilibrium of Three Forces Acting on by a Rigid Body.....	556–569
4. General Conditions of Equilibrium.....	570–573
5. Centre of Gravity.....	574–588

---