Mathematics B Course

B.A/B.Sc.: Elective

Part-I

Outlines of Tests

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<th>Paper</th>
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<td>A</td>
<td>Vector Analysis and Mechanics</td>
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Syllabi and Courses of Reading

**PAPER-I: VECTOR ANALYSIS AND MECHANICS**

Note: Attempt six question by selecting one question from section I, two from section II, two from section III and one from section IV.

**SECTION I (2/12) (Vector Analysis)**

Review of vector algebra with particular reference to scalar and vector products, Differentiation of Vectors, Differentiation Formulas, Simple Examples, Scalar and Vector point functions, gradient, divergence and curl of point functions, expansion formulas.

**SECTION II (i) (2/12)**

Composition and resolution of force, Equilibrium of particle, Forces Moments, Couples, Equilibrium of a system. General Plane force System. General Conditions of equilibrium of coplanar forces.

(ii) (2/12)

Principle of virtual work, Friction, Centre of mass and centre of gravity. Calculation of centre of mass for various bodies: a uniform rod, circular disc, rectangular plate, sphere, hemisphere, cylinder, cone.

**SECTION III (i) (2/12) Kinematics and Dynamics of a Particle**


(ii) (2/12) Central Force Motion

SECTION IV (2/12)

Collisions of particles: Laboratory and centre of mass frames of reference, Blastic and Inelastic Collisions. Impulse and momentum from Newton’s Laws. Conservation of momentum for colliding bodies direct collision between a particle and a fixed barrier, oblique collision between two particles.

Recommended Books:-

3. C.D Collinson, Introductory Mechanics, Edward Arnold (Publisher Ltd London, 1988)
Mathematics B Course
B.Sc.: Elective

Part-II
Outlines of Tests

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<td>A</td>
<td>Mathematical Methods, Group Theory and Metrics Space</td>
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Syllabi and Courses of Reading

PAPER-II: MATHEMATICAL METHODS, GROUP THEORY & METRIC SPACES

Note:- Attempt six question by selecting two question from section I, two from section II, one from Section III and one from Section IV.

SECTION I (i) Complex Number and Spherical Trigonometry (2/12)
Complex numbers and their properties, de Moiver’s Theorem and its applications, circular, logarithmic and hyperbolic functions, Separation into real and imaginary parts. Simple cases of summation of trigonometric series, cosine, sine and four-part formulae, latitude and longitude, Determination of direction of Qibla.

(ii) Calculus of Several Variables (2/12)

SECTION II (i) Sequences and Series (2/12)

(ii) Improper and Multiple Integrals (2/12)
Improper integrals the gamma function and its properties, Volume and area of surface of revolution. Double and triple integrals with applications.
SECTION III. Group Theory (2/12)


SECTION IV. Metric Spaces (2/12)


Recommended Books:-