PAPER –V (A)

MECHANICS

TIME: 3 hours **Max. Marks: 100**

UNIT-I

Hydrodynamics: Lagrange's and Euler's, Methods; Acceleration, Equation of Continuity, Boundary surface, Stream lines, velocity potential. Euler's dynamical Equations, Bernoulli's Theorem, Lagrange's Equations under conservative forces, the motion once irrotational is always irrotational.

UNIT- II

Central Orbit, Kapler's Law of Planetary motion. Rigid Dynamics: Moments and products of inertia, Principal axes theorem, Parallel axes, Momental ellipsoid, D'Alembert's principle and the equation of motion.

UNIT-III

Motion in two dimensions under finite forces including sliding and rolling friction, Impulsive motion in two dimensions.

UNIT-IV

Principle of momentum and energy, Lagrange's equations in generalized coordinates.

UNIT-V

Michelson-Morley experiment, Lorentz-Fitgerald contraction, postulates of special theory of Relativity, Lorentz transformations, Mass - Energy formula, transformation formulas for momentum and energy. Minkowski's 4-dimensional continuum space, Space like and time like intervals, Relativistic Hamiltonian and Lagrangian.

Books Recommended:

1. S.L. Loney : Dynamics
2. A.S. Ramsay : Dynamics
3. A.S. Ramsay : A Text book of Hydrodynamics
4. M. Ray : Hydrodynamics
5. Gaur, Mathur & Goyal : Hydrodynamics
6. Bansal, Sharma & Goyal : Dynamics of a Rigid Body
7. Ray & Sharma : A Text Book of dynamics of a Rigid Body
8. M. Ray : Dynamics of a particle
9. Roy & Bali : Theory of Relativity