

**MAJOR PAPER VII – MECHANICS (STATICS AND DYNAMICS)**

**Unit I**

Introductory ideas on forces, moments, parallel forces, Moment of a force about a point and a line – Theorem on moments – couples – equilibrium of three forces acting on a rigid body – coplanar forces

**Unit II**

Friction – Laws of friction – coefficient of friction – angle and cone of friction – equilibrium of a particle on a rough inclined plane under a force parallel to the plane and under any force.

**Unit III**

Kinetics – Velocity and acceleration – tangential and normal components, Projectile in vacuum - maximum height reached – range and time of flight – projectile up / down an inclined plane.

**Unit IV**

Simple harmonic motion – simple pendulum – load suspended by and elastic string – moment of inertia of simple bodies – theorems of parallel axis and perpendicular axis

**Unit V**

Impulsive forces and impulses – conservation of linear momentum – direct and oblique impacts of two smooth spheres, central orbit – central force – differential equation to a central orbit in polar and polar co-ordinates. Given the central orbit to find law of force – Kepler's laws of planetary motion (only statement)

**Text Book:**

1. Statics by M.K. Venkataraman
2. Dynamics by M.K. Venkataraman