B.Sc.-1(Physics)   **Semester – II**

Physics- PH-201

Paper –III: Properties of Matter and Kinetic Theory of Gases

Max. Marks: 40

Internal Assessment: 10

Time: 3 hours

Note:-

1. Nine Questions will be set in total

2. Question number 1 will be compulsory and will be based on the conceptual

aspects of entire syllabus. This question may have five parts and the answer

should be in brief but not in Yes/ No.

3. For more questions are to be attempted, selecting one question out of two

questions set from each unit. Each question may contain two or more parts

4. 20% numerical problems are to be set.

5. Use of scientific (non-programmable) calculator is allowed.

Unit I: Moment of inertia

Rotation of rigid body, Moment of inertial, Torque, angular momentum, Kinetic

Energy of rotation. Theorem of perpendicular and parallel axes (with proof), Moment of

inertia of solid sphere, hollow sphere, spherical shell, solid cylinder, hollow cylinder and

solid bar of rectangular cross–section, Fly wheel, Moment of inertia of an irregular body,

Acceleration of a body rolling down on an inclined plane.

Unit 2: Elasticity

Elasticity, Stress and Strain, Hook's law, Elastic constant and their relations, Poisson's ratio, Torsion of cylinder and twisting couple, Determination of coefficient of modulus of rigidity for the material of wire by Maxwell's needle, Bending of beam (Bending moment and its magnitude), Cantilever and Centrally loaded beam, Determination of Young's modulus for the material of the beam and Elastic constants for the material of the wire by Searle's method.

Unit 3: Kinetic theory of gases-I

Assumption of Kinetic theory of gases, pressure of an ideal gas (with derivation), Kinetic interpretation of Temperature, Ideal Gas equation, Degree of freedom, Law of equipartition of energy and its application for specific heat of gases, Real gases, Vander wall's equation, Brownian motion(Qualitative)

Unit 4: Kinetic theory of gases-II

Maxwell's distribution of speed and velocities (derivation required), Experimental verification of Maxwell's law of speed distribution: most probable speed, average and r.m.s. speed, Mean free path, Transport of energy and momentum, Diffusion of gases.

Reference:1. Properties of Matter by D.S. Mathur.

2. Heat and Thermodynamics (5th Edition) by Mark W. Zermansky.