

[illegible]

SECTION-B

2. Derive an expression for the time of oscillation of a torsion pendulum. How will you use it to determine the modulus of rigidity of a wire? [5]
3. Prove that a frame of reference moving with uniform translational acceleration with respect to an inertial frame is a non-inertial frame. [5]
4. a) Prove that the work done by a conservative force round a closed path is zero. [3]
b) Show that in a central force field the angular momentum of a particle is conserved. [2]
5. Describe the principle of motion of a rocket. Explain that the final velocity of a multistage rocket is much greater than the final velocity of a single stage rocket of the same weight and fuel supply. [5]
6. Discuss length contraction and time dilation on the basis of Lorentz transformation. [5]

SECTION-C

7. Describe the Searle's method of measuring Young's modulus of the material in the form of a wire. Derive the formula used.
8. Show that for a particle executing simple harmonic motion, the average value of kinetic and potential energy is the same and is equal to half the total energy.
9. a) What is the principle of conservation of linear momentum? Show that the linear momentum of a system of particles remains constant in the absence of any external force acting on it.
b) What do you mean by potential energy? Show that it is a function of position whose negative gradient gives the conservative force.

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