



Date: 08-11-2024

Dept. No.

Max. : 100 Marks

Time: 01:00 pm-04:00 pm

SECTION A**Answer ANY FOUR of the following****4 x 10 = 40 marks**

1. What are the body and space coordinates in relation to the motion of a rigid body?
2. Show that in absence of the external torque the total angular momentum of a system of particles is conserved.
3. List the Characteristics of motion under a central force.
4. Derive the Euler's equations of motion in terms of Euler's angles.
5. Define action and angle variables
6. Neatly draw potential energy curve for stable and unstable equilibrium and explain with suitable examples.
7. Prove the invariance of Poisson's brackets under a canonical transformation
8. Show that when the kinetic and potential energies are expressed in terms of normal co-ordinates, both kinetic and potential energies are homogenous quadratic equation.

SECTION B**Answer ANY THREE of the following****3 x 20 = 60 Marks**

9. State and prove Jacobi's identity for the dynamical variables X, Y and Z.
10. Derive Hamilton's equations for compound pendulum.
11. Obtain Lagrange's equation from D'Alembert's principle.
12. Discuss the vibrations of a linear triatomic molecule.
13. Discuss the problem of scattering of charged particles by a Coulomb field and obtain Rutherford's formula for the differential cross section.
14. Find the relation between the angular momentum vector, the inertia tensor, and the angular velocity vector.

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