# 21PHY1C2L

## M.Sc. I Semester Degree Examination, April/May - 2023
## PHYSICS
### Classical Mechanics
### (CBCS)

Time : 3 Hours                                              Maximum Marks : 70

**Note :** *Answer **any five** of the following questions with Question no.* **1 (Q.1) Compulsory,** *each question carries **equal** marks.*

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**1.** (a) Derive the equation of the orbit of the particle under central force field and discuss the nature of the orbits by the value of energy and eccentricity.  **11+3**

(b) State Kepler's laws of planetary motion.

**2.** (a) Derive the expression for deflection of a freely falling particle under the effect of coriolis force.  **10+4**

(b) State and prove Euler's theorem.

**3.** Derive Lagrange's equation of motion for a conservative holonomic system using D'Alembert's principle and discuss the importance of the formulation.  **14**

**4.** (a) Write a note on configuration space.  **4+3+7**

(b) State Hamiltonian principle and write down the Hamilton's equations of motion.

(c) Obtain the Hamiltonian for a simple pendulum with moving support given below.
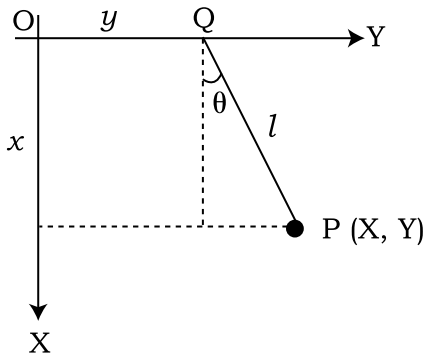
**5.** What do you mean by elastic and inelastic scattering ? Describe the kinematics **14** of elastic scattering in the laboratory system.

**6.** (a) Obtain the expression for Euler's equations of motion of rigid body. **10+4**

    (b) What are constraints ? Explain.

**7.** (a) Write a note on canonical transformation. **4+10**

    (b) What are Poisson brackets ? Define and write the properties of Poission brackets.

**8.** (a) Write a note on Phase space. **5+5+4**

    (b) Explain briefly the Rutherford theory of scattering.

    (c) Give an account on generalized coordinates.

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