SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai — 600 044.
M.Sc. - END SEMESTER EXAMINATIONS NOVEMBER - 2022
SEMESTER - I
20PPHCT1002 - Classical Mechanics and Relativity

Total Duration : 2 Hrs 30 Mins.   Total Marks : 60

Section A

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. What are cyclic coordinates? How is it used in conservation of momenta?

2. What is Coriolis force? Where does it arise?

3. Write equations of motion in Poisson bracket formalism.

4. Explain stable,unstable and neutralequilibrium.

5. What are two coupled oscillators? Where does it arise?

6. Explain the generators of Canonical transformations.

7. What is a moment of inertia tensor? Give examples.

8. What is Hamilton's variational principle? Mention its significance.

Section B

Part A

Answer any **TWO** questions $(2 \times 10 = 20$ Marks)

9. State and deduce Kepler's laws of planetary motion using classical mechanics principles.

10. Use Euler's equations of motion to explain symmetrical top.

11. State and apply Hamilton-Jacobi theory to harmonic oscillator problem.

12. Apply relativistic Lagrangian and Hamiltonian for a freeparticle.

Part B

Compulsory question $(1 \times 10 = 10$ Marks)

13. Obtain the frequencies of normal modes for linear triatomic molecule.

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