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 APRIL - 2022
SEMESTER - I
08PPHCT1002 - Classical Mechanics And Relativity

Total Duration : 3 Hrs. **Total Marks : 60**

Section A

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

1. Explain Hamilton's variational principle shortly.
2. Apply Poisson bracket formalism to obtain the equation of motion in Poisson bracket form.
3. Illustrate the normal modes and frequency of small oscillation.
4. Explain the concept of energy momentum four vectors.
5. Illustrate the Euler's angles briefly.
6. Compute and show that the transformation $P = \frac{1}{2}(P^2 + Q^2)$, $Q = \tan^{-1}(q/p)$ is canonical.
7. Apply formulation of the problem to obtain equations of motion.
8. Criticize that Maxwell's equations are invariant under Lorentz transformation.

Section B

Part A

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

9. Compute Lagrange's equation of motion with appropriate expressions.
10. Ascertain the theory of symmetrical top in detail.
11. Outline Hamilton-Jacobi theory and apply it to solve the problem of one-dimensional Harmonic Oscillator.
12. Criticize the possible mode of vibration of linear triatomic molecule.

Part B

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

13. Apply the concept of relativity and obtain the Lorentz transformation equation.

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