



B.Sc. V Semester Degree Examination, Sept./Oct. - 2024

PHYSICS

DSC 5 : Classical Mechanics and Quantum Mechanics-I

(NEP)

Time : 2 Hours

Maximum Marks : 60

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- Note :** (i) Answer **all** questions.
(ii) Non-programmed Scientific Calculators are Allowed.
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I. Answer all the Sub-questions : 10x1=10

1. (a) Define Non-Inertial Frame of Reference.
(b) State Law of conservation of Angular Momentum.
(c) State D'Alembert's principle.
(d) What is Fictitious Force ?
(e) Mention the relation of variation of mass with velocity.
(f) What are matter waves ?
(g) State Heisenberg's Uncertainty principle.
(h) What is phase velocity ?
(i) What is Zero point Energy ?
(j) State Ehrenfest theorem.

II. Answer any four of the following questions : 4x5=20

2. State and explain the law of conservation of linear momentum of a system of particle.
3. Derive an expression for time Dilation.
4. Explain the Debroglie Hypothesis.
5. Write a note on Normalisation and orthogonality of wave function.
6. State and explain law of conservation of Energy.
7. Derive an expression for apparent frequency in case of longitudinal Doppler.



III. Answer **any three** of the following questions :

3x10=30

- 8.** (a) Explain Linear Harmonic Oscillator with neat diagram. **7+3**
(b) What are Holonomic and Non-holonomic constraints.
- 9.** With a neat diagram explain Michelson's Morley experiment and write its negative results. **10**
- 10.** What is Compton Effect. Derive an expression for Compton Shift. **10**
- 11.** Derive an expression for Energy Eigen Value of a particle in an one dimensional Box. **10**
- 12.** (a) Derive an expression for time independent Schrodinger wave equation. **8+2**
(b) What are Eigen value and Eigen functions.

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