

URUMU DHANALAKSHMI COLLEGE

TIRUCHIRAPPALLI - 620 019

**Model Exam / III B.Sc., Physics / Theoretical Physics / 75 Marks / 3 Hours / April
2020**

Part - A

Answer the all the questions

10 x 2 = 20

1. Write principle of virtual work.
2. Write D'Alembert's principle.
3. Define cyclic co-ordinates.
4. Define vibrational principle.
5. Define group and wave velocity.
6. Write Heisenberg uncertainty principle.
7. Write basic postulates of wave mechanics.
8. Write down the time independent wave equation.
9. What is tunnel effect?
10. Write and explain the zero point energy of a linear harmonic Oscillator.

Part - B

Answer the all the questions (either or).

5 x 5 = 25

11. a. Describe conservation law of particle. (or)
b. Explain Isotropy of space conservations of angular momentum.
12. a. Derive Hamilton's canonical equation of motion. (or)
b. Explain conservation theorem for generalized momentum.
13. a. Describe electron Microscope. (or)
b. Explain gamma ray microscope.
14. a. Write physical significance of wave function. (or)
b. Derive time dependent Schrodinger wave equation.
15. a. Describe the problem of a particle in a one dimensional box. (or)
b. Write a short on (i) Eigen Function and Eigen value (ii) Ehrenfest theorem.

Part - C

Answer the any three of the following questions

3 x 10 = 30

- c. Derive Lagrange's equation from D'Alembert's principle.
- d. Derive Hamilton's equation from vibrational principle.
- e. Explain Davison and Germer experiments.
- f. Obtain Schrodinger equation of Hydrogen atom in radial and polar form.
- g. Solve the Schrodinger equation of rigid rotator with free axis and obtain the energy Eigen Value and the Eigen functions.

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