PART A (10X 2 = 20)
Answer ALL   questions

1. Explain de Broglie's hypothesis.
2. State Heisenberg's uncertainty principle.
3. Write the relation between group velocity and phase velocity.
4. Write the steady state form of Schrodinger's equation.
5. What are Eigen functions and Eigen values?
6. Show that the Eigen values of Hermitian operator are real.
7. Define inertial and non–inertial frames of reference.
8. State the postulates of special theory of relativity.
9. State equivalence principle in general theory of relativity.
10. State Mach's principle.

PART B (4 x7. 5 = 30)
Answer any FOUR questions.

11. Explain photo electric effect based on quantum theory of radiation.
12. Obtain an expression for the energy of a particle in a one dimensional box with rigid walls.
13. Obtain the commutation relation between (i) position and momentum and (ii) Hamiltonian and position.
14. Deduce an expression for the law of addition of velocities relativistically.
15. Explain the postulates of the general theory of relativity.
16. Describe G.P.Thomson experiment.

PART C (4 x 12.5 = 50)
Answer any FOUR questions

17. (i)Explain the principle and working of electron microscope. (ii) Outline an idealised experiment to bring out the significance of Heisenberg's uncertainty principle.
18. State and prove Ehernfest's theorem.
19. Deduce expressions for the Eigen values of the square of the total angular momentum and its z – component.
20. Describe the Michelson- Morley experiment. Explain the physical significance of negative results.
21. What is General Theory of Relativity? Discuss the important conclusions derived from it. What are the experimental observations in favour of these conclusions?
22. Deduce the formula for relativistic variation of mass with velocity. Briefly explain its significance.

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