24. (a) Establish Planck's law of radiation from Bose–Einstein distribution law.

Or

(b) Compare Maxwell–Boltzmann, Bose–Einstein and Fermi–Dirac statistics.

25. (a) Explain Relativistic Doppler's effect.

Or

(b) Write a note on Minkowski force.

SECTION C — (5 × 10 = 50 marks)

Answer ALL questions, choosing either (a) or (b).

26. (a) What are Poisson brackets? Derive the equations of motion in Poisson bracket form.

Or

(b) What are action and angle variables? Discuss the Kepler problem in action angle variables.

27. (a) Discuss the motion of a symmetric top under the action of gravity.

Or

(b) Explain the free vibrations of a linear triatomic molecule and obtain expressions for its normal modes and normal frequencies of vibration.

28. (a) Using Maxwell's law of distribution velocities, obtain expressions for (i) most probable sp (ii) mean speed (iii) mean square speed and (iv) r mean square speed.

Or

(b) Explain partition function. Discuss its correlation with thermodynamic quantities.

29. (a) Explain fully the phenomenon of Bose–Einstein condensation.

Or

(b) Deduce Richardson–Dushman equation of thermionic emission.

30. (a) Discuss Lorentz transformations of electric and magnetic field components.

Or

(b) Give an account of the Lagrangian formulation of the relativistic mechanics.

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