24. (a) Discuss briefly the phenomenon of Bose-Einstein condensation.

Or

(b) Compare M.B., B.E. and F.D. Statistics.

25. (a) Obtain Einstein's relation between momentum and energy.

Or

(b) Write a note on relativistic generalization of Newton's laws.

SECTION C — (5 × 10 = 50 marks)

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

26. (a) For what values of m and n do the transformation equations

$$Q = q^m \cos n p$$
$$P = q^m \sin n p$$

Present a canonical transformation?

Or

(b) Solve Kepler's problem by Action-Angle variable.

27. (a) Discuss the motion of a symmetrical top with one point fixed. Explain clearly what are nutational and precessional motion.

Or

(b) Illustrate the technique of normal coordinates analysis with a linear triatomic molecule.

28. (a) State Maxwell-Boltzmann distribution law. Establish Maxwell's law of distribution of velocities.

Or

(b) Obtain the relations connecting the partition function and the various thermodynamical quantities such as energy E, Helmholtz free energy F, entropy S and specific heat.

29. (a) State Bose-Einstein distribution law. Deduce Planck's law from Bose-Einstein law.

Or

(b) Deduce Richardson-Dushmann equation of thermionic emission.