



61501

V Semester B.Sc. Examination, March/April 2022
(CBCS Freshers Scheme) (2020 –21 and Onwards)

PHYSICS – V

Statistical Physics, Quantum Mechanics – I, Atmospheric Physics
and Nano-Materials

Time : 3 Hours

Max. Marks : 70

Instruction : Answer **any five** questions from **each** part.

PART – A

Answer **any five** of the following. **Each** question carries **8** marks. **(5×8=40)**

1. a) Define :
 - i) Micro state
 - ii) Phase space
- b) Derive the Maxwell-Boltzmann distribution law $n_i = g_i e^{-(\alpha + \beta E_i)}$. **2+6**
2. a) What is meant by Bose-Einstein condensation ?
- b) Explain Bose-Einstein condensation of liquid helium. Mention two special properties of liquid helium – II. **2+6**
3. What are fermions ? Arrive at Fermi-Dirac distribution for a system of fermions. **1+7**
4. Describe briefly the failure of classical mechanics to explain
 - i) Photo electric effect
 - ii) Atomic spectra. **4+4**
5. Describe with necessary theory G.P. Thomson's experiment for establishing the wave nature of light. **8**
6. a) What are matter waves ? Mention any two of its characteristics.
- b) Derive an expression for de-Broglie wavelength. Hence express it in terms of energy and temperature. **3+5**
7. Based on the vertical distribution of temperature, explain different layers in the earth's atmosphere. **8**
8. a) Write a short note on Carbon nano tube.
- b) Mention any four applications of nanomaterial. **4+4**

P.T.O.