Roll No.							

25-PH-22

M.Sc. II SEMESTER [MAIN/ATKT] EXAMINATION MAY - JUNE 2025

PHYSICS

Paper - II

[Statistical Mechanics]

[Max. Marks : 75] *[Time : 3:00 Hrs.]* *[Min. Marks : 26]*

Note : Candidate should write his/her Roll Number at the prescribed space on the question paper.
Student should not write anything on question paper.
Attempt all five questions. Each question carries an internal choice.
Each question carries **15 marks.**

Q. 1 What is Gibb's Paradox and explain how its resolved ?

OR

Define -

i) Probability.

ii) Phase Space.

iii) Phase space Trajectories and

iv) Density of States.

Q. 2 Derive the Bose - Einstein distribution function. What is Bose-Einstein condensation ?

OR

Why density matrix formulation is introduced. Explain the properties of density matrix.

Q. 3 Explain the energy fluctuations in canonical ensemble and prove the equivalence between cannonical ensemble and micro cannonical ensemble based on above concept.

OR

Explain the motion due to fluctuating force and derive the Fokker-Plank equation.

Q. 4 What is Phase Transition. Explain first and second order phase transition also give one example for each type of transition.

P.T.O.

OR

Explain the mean field theory of Ising model in one dimension. Also give reason why ferro magnetism does not exists in one dimensional model.

Q. 5 Write short note on **any two** -

i) Partition function.

ii) Electron gas in metals.

iii) Virial equation of state.

iv) Clausius - Clapeyron equation.