Poll No	
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Total No. of Questions : 09

Total No. of Pages : 02

M.Sc. (Physics) (Sem.-2) STATISTICAL MECHANICS Subject Code : MSPH-422-21 M.Code : 91903 Date of Examination : 14-12-22

Time: 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

- 1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- 2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
- 3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

- 1. Write briefly :
 - a) State Gibbs paradox.
 - b) What is diffusion equation?
 - c) State Liouville's theorem.
 - d) What are thermodynamic fluctuations?.
 - e) Discuss phase transitions.
 - f) What do you understand by equilibrium state of a system?
 - g) Define partition function for a grand canonical ensemble.
 - h) Discuss the idea of phase space.
 - i) Define bosons and fermions.
 - j) Discuss the thermodynamic behaviour of an ideal Bose gas.

SECTION-B

- 2. Explain the concept of microstates and macrostates in detail giving suitable example.
- 3. Discuss equipartition and virial theorems.
- 4. Discuss the concept of Pauli paramagnetism.
- 5. Explain the concept of dynamical model of phase transitions.
- 6. Discuss the random walk problem and hence Brownian motion in detail.

SECTION-C

- 7. Explain Ising model in zeroth approximation.
- 8. Discuss heat capacity of a free electron gas at low temperatures.
- 9. Discuss in detail the application to ideal gas of monoatomic particles based on microcanonical ensemble.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.