Name of Teacher: Ms. Rupali

Session (2023-24) Even Semester

B. Sc. IInd year (4^{th} Sem), Paper: Statistical Physics

January 2024

2^{nd} week: Microscopic and Macroscopic systems, events-mutually exclusive, dependent and independent. Probability, statistical probability, A- priori Probability and relation between them, probability theorems, some probability considerations

3^{rd} week: combinatios possessing maximum probability, combination possessing minimum probability, Tossing of 2,3 and any number of Coins, Permutations and combinations, distributions of N (for N= 2,3,4) distinguishable and indistinguishable particles in two boxes of equal size,

4^{th} week:
Micro and Macro states, Thermodynamical probability, Constraints and Accessible states.

February 2024

Ist week: Statistical fluctuations, general distribution of distinguishable particles in compartments of different sizes,

2^{nd} week: Condition of equilibrium between two systems in thermal contact-β parameter, Entropy and Probability (Boltzman's relation)

3^{rd} week: Unit 2- Statistical Physics-II Postulates of statistical physics, Phase space, Division of Phase space into cells, three kinds of statistics, basic approach in three statistics

4^{th} week: M. B. statistics applied to an ideal gas in equilibrium- energy distribution law (including evaluation of σ and β) ,speed distribution law & velocity distribution law. Expression for average speed, r.m.s. speed, average velocity, r. m. s. velocity

March 2024

Ist week: probable energy & mean energy for Maxwellian distribution.

Unit-III: Quantum Statistics Need for Quantum Statistics: Bose-Einstein energy distribution law

2^{nd} week: , Application of B.E. statistics to Planck's radiation law B.E. gas, Degeneracy and B.E. Condensation, FermiDirac energy distribution law, F.D. gas and Degeneracy.

3rd week: Fermi energy and Fermi temperature, Fermi Dirac energy distribution law, Fermi Dirac gas and degeneracy, Fermi energy and Fermi temperature

4th week: Fermi Dirac energy distribution law for electron gas in metals, Zero point energy, Zero point pressure and average speed (at 0 K) of electron gas, Specific heat anomaly of metals and its solution. M.B. distribution as a limiting case of B.E. and F.D. distributions

5th week: Holly Break

April 2024

1st week: Comparison of three statistics. Unit-IV: Theory of Specific Heat of Solids Dulong and Petit law. Derivation of Dulong and Petit law from classical physics. Specific heat at low temperature

2nd week: Derivation of Dulong and Petit law from classical physics. Specific heat at low temperature

3rd week: Einstein theory of specific heat, Criticism of Einstein theory, Debye model of specific heat of solids, success and shortcomings of Debye theory, comparison of Einstein and Debye theories.

4th week: Debye model of specific heat of solids,

success and shortcomings of Debye theory,

5th week: comparison of Einstein and Debye

theories Revision.