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Whatsapp No : 8076723805

Email : dm8076723805@gmail.com

Roll No. ..... Exam Code : J-21

Subject Code—53381

B. Sc. EXAMINATION

(Re-appear)

(Batch 2017)

(Fourth Semester)

PHYSICS

PH-401 (Paper–VII)

Statistical Physics

Time : 3 *Hours* *Maximum Marks :* 40

Note : Attempt *Five* questions in all. Q. No. **1** is compulsory. Use of Scientific (Non-programmable)calculator is allowed.

1. (a) Define the meaning of the term macrostate and microstate. **2**

(b) What is a Phase Space ? **1**

(c) Define Static and Dynamic System. **2**

(d) What are the assumptions of Debye Theory ? 1

(e) What is Fermi Energy ? 1

(f) Differentiate between Classical and Quantum Statistics. 1

Unit I

2. What is the probability in different cases when four distinguishable coins are tossed in two compartments ? Also find the probability when the coins are distinguishable. **8**

3. (a) Explain Priori and Statistical Probability and derive the relation between the two. **4**

(b) Four particles are to be distributed randomly in two boxes of equal size. Calculate probability of distribution for (3, 1) and (2, 2) distribution. **4**

Unit II

4. Derive an expression for Maxwell's Distribution law of speeds of molecules of a gas. **8**

5. Derive an expression for Maxwell's Boltzmann law of distribution of energies that gives the number of molecules energies between U and (U + dU) for an ideal gas under the condition of equilibrium. **8**

Unit III

6. Discuss the phenomena of Bose-Einstein condensation. **8**

7. (a) Calculate the total number of ways of distribution 3 particles obeying Bose-Einstein statistics among three cells. **4**

(b) Discuss Zero point pressure and average speed (at 0 K) of electron gas. **4**

Unit IV

8. Derive an expression for Dulong and Petit law for Classical Physics. **8**

9. Explain Debye Theory of specific heat of solids. What are its successes and failures ? **8**