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Total No. of Pages : 02

Total No. of Questions : 07

B.Sc.(CS) (2013 & Onwards) (Sem.-3)
STATISTICAL PHYSICS & THERMODYNAMICS
Subject Code : BCS-304
Paper ID : [A3138]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SIX questions carrying TEN marks each and a student has to attempt any FOUR questions.

SECTION-A**1. Answer briefly :**

- a) Calculate the probability that in tossing a coin 5 times, we get 3 heads and 2 tails.
- b) What is meant by the term thermodynamic probability of a macrostate?
- c) Explain equilibrium state of a dynamic system.
- d) Find the number of ways in which three fermions may be distributed in four cells.
- e) Define Fermi energy.
- f) What is adiabatic expansion?
- g) What is the concept of reversible engine?
- h) Explain why Carnot's engine cannot be realized in actual practice?
- i) If a door of a refrigerator is kept open in the hall, will it make the hall warm or cool?
- j) Entropy increases during natural process. Explain.

SECTION-B

2. Define and explain the terms Macrostate and Microstate. Illustrate by distributing the four particles in two compartments.
3. Discuss Maxwell-Boltzmann's law of distribution of speeds for gas molecules. How can it be represented graphically?
4. Starting from Fermi-Dirac distribution law derive the expression for energy distribution of free electrons in a metal.
5. *A gas has two specific heats whereas a liquid has only one.* Explain. Explain why the specific heat of a gas at constant pressure is greater than at constant volume.
6. Discuss Carnot's reversible heat engine. What is Carnot's cycle? Show how the work done in each operation is represented on a pressure volume diagram.
7. What is temperature entropy diagram? Derive an expression for the efficiency of a Carnot's engine directly from it. Outline the importance of S.T. diagram.

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