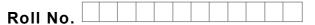


www.FirstRanker.com

www.FirstRanker.com



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.



www.FirstRanker.com

#### **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.

www.firstRanker.com