Code No. 696 / CBCS / Non CBCS / N

FACULTY OF SCIENCE

M.Sc. II-Semester (CBCS / Non-CBCS) Examination, April / May 2013

Subject: Physics & Applied Electronics

Paper – II (202)

Statistical Mechanics

Time: 3 Hours **Max.Marks: 80**

Note: Answer all questions from Part – A and Part – B.

Each question carries 4 marks in Part-A and 12 marks in Part-B.

PART – A (8x4 = 32 Marks)

[Short Answer Type]

1. Distinguish between micro and macro states.
2. Explain the features of micro canonical ensemble.
3. Distinguish between classical and quantum statistical mechanics.
4. Obtain the relationship between entropy and partition function.
5. Comment on electronic specific heat
6. Discuss two-fluid model of liquid helium.
7. Discuss fluctuations in energy
8. Write a short note on one dimensional Ising model.

PART – B (4x12 = 48 Marks)

[Essay Answer Type]

9.(a) Explain phase space. Discuss the principle of conservation of density in phase space.

OR

(b) Obtain the expressions for the conditions of thermal and mechanical equilibrium.

10.(a) Deduce an expression for Maxwell-Boltzmann distribution for molecular speeds.

OR

(b) Define partition function and obtain an expression for translational partition functions.

11.(a) Discuss the properties of Boson gas. Explain the phenomenon of Bose-Einstein condensation.

OR

(b) Obtain an expression for energy and pressure of an ideal Bose-Einstein gas.

12.(a) Discuss the spontaneous magnetization applicable to ferromagnetic systems on the basis of Bragg-Williams approximation.

OR

(b) Explain the phase transitions of first and second kind with examples. Discuss on concentration fluctuations.