Code No. 9240 / CBCS / Non-CBCS / N

FACULTY OF SCIENCE

M.Sc. II – Semester (New)(CBCS / Non-CBCS) Examination, April / May 2014

Subject: Physics & Applied Electronics
Paper – IV: General Solid State Physics – I

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 (8 x 4 = 32 Marks)
[Short Answer Type]

1 Define a point group.
2 Write a short note on diamond structure.
3 Explain lattice thermal conductivity.
4 Write about infrared absorption in ionic crystals.
5 Distinguish between metals, insulators and semiconductors using band theory.
6 State and explain Bloch theorem.
7 What are color centers in ionic crystals? Explain.
8 Write short note on ionic conductivity.

PART – B (4 x 12 = 48 Marks)
[Essay Answer Type]

9 (a) Explain the concept of reciprocal lattice. Show that reciprocal of the reciprocal lattice vector is identical to original lattice vector.
(b) Explain the notation used for description of point groups.

OR

(c) Describe how Laue method of X-ray diffraction useful in evaluating the crystal structure.

10 (a) Derive the dispersion relation for one dimensional diatomic lattice vibrations.

OR

(b) Discuss Debye's theory of specific heat of solids and show that $C_v \alpha\ T^3$.

11 (a) Describe Kronig-Peny model and its consequences.

OR

(b) Explain Hall effect in semiconductors with relevant theory.
(c) What is the difference in Hall effect of metals and semiconductors.

12 (a) Derive the expression for the concentration of point defects in ionic crystals.

OR

(b) Give an account of (a) Edge dislocation (b) Screw dislocation and (c) Frank-Read mechanism.

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