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Code No. 4182 / CBCS / NONCBCS / N

FACULTY OF SCIENCE

M.Sc. II-Semester (CBCS/NON-CBCS) (New) Examination, May / June 2015

Subject : Physics and Applied Electronics

Paper : IV

General Solid State Physics

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 unit cell. Draw unit cells for fcc and bcc structures.
- 2 Write about concept of Brillouin zones.
- 3 What is Gmneisen law and discuss Gmneisen relation.
- 4 Write about infrared absorption in ionic crystals.
- 5 Discuss E Vs K relation in K-P model.
- 6 Write about hall effect in semiconductors.
- 7 Classify imperfections in crystalline materials.
- 8 Write about dislocation multiplication.

PART – B (4 x 12 = 48 Marks)

(Essay Answer Type)

- 9 a) Define crystal structure. What are the properties of a unit cell? How many crystal systems are there? What are they? What are their lattice properties in terms of lattice constants?
b) Distinguish between crystal planes and crystal directions.
OR
c) Discuss the various experimental methods available to study crystals using x-ray diffraction.
- 10 a) Discuss the case of lattice dynamics of a monoatomic linear chain of atoms.
OR
b) Discuss the case of lattice dynamics of a diatomic linear chain of atoms.
- 11 a) State and prove Bloch's theorem.
OR
b) Derive an expression for the concentration of charge carriers in an intrinsic semiconductor.
- 12 a) Derive an expression for the equilibrium concentration of Schottky defects in metals.
OR
b) What are color centres? Classify colour centres and discuss their models and explain how their concentration is experimentally measured.
