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Code No. 8722 / CBCS / NON-CBCS

FACULTY OF SCIENCE

M.Sc. II-Semester Examination, May / June 2016

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 Write a note on symmetry operations in crystals.
2 Write a short note on NaCl crystal structure.
3 Write short notes on acoustic and optical vibrations in a crystal lattice.
4 Mention briefly about atomic structure factor.
5 Distinguish between metals, insulators and semiconductors using band theory.
6 Write a note on Bloch theorem.
7 Write a short note on classification of color centers in ionic crystals.
8 Write short note on ionic conductivity.

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

9 a) Write briefly on the concept of reciprocal lattice. Show that reciprocal of the reciprocal lattice vector is identical to original lattice vector.

OR

b) Briefly describe powder method of X-ray diffraction.

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

OR

b) Discuss Einstein's theory of specific heat of solids and mention how this theory was improved by Debye.

11 a) Describe briefly Kronig-Penny model and its consequences.

OR

b) Discuss in detail Hall Effect in semiconductors with relevant theory.

12 a) Derive the expression for the equilibrium concentration of Schottkey defects in metals.

OR

b) Give brief account of i) Edge dislocation ii) Screw dislocation and iii) Frank-Read mechanism.

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