

**FACULTY OF SCIENCE**  
**M. Sc. I – Semester Examination, January 2018**

**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 Explain any one symmetry operation.
- 2 Write a note on Debye waller factor.
- 3 Sketch the dispersion relation for one dimensional lattice.
- 4 Write a note on thermal expansion.
- 5 Write a note on density of states in a band.
- 6 Define Hall effect and its applications.
- 7 Explain Schottky defect with a diagram.
- 8 State Ficks law of diffusion.

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

- 9 (a) Describe the crystal structures of CsCl and NaCl.  
**OR**  
(b) Explain the concept of reciprocal lattice and outline its properties.
- 10 (a) Discuss the elastic waves in one dimensional array of atoms.  
**OR**  
(b) Explain the Debye theory of Lattice heat capacity.
- 11 (a) State and explain Bloch theorem.  
**OR**  
(b) Obtain expressions for electron and hole concentrations in intrinsic semiconductors.
- 12 (a) Describe the various techniques of Crystal growth from melt.  
**OR**  
(b) Explain screw and edge dislocations. And dislocation multiplication.

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