



UTTARAKHAND OPEN UNIVERSITY, HALDWANI (NAINITAL)

उत्तराखण्ड मुक्त विश्वविद्यालय, हल्द्वानी (नैनीताल)

M.Sc. Physics (MSCPHY12)

First Year Assignment

Last Date of Submission: 15 May 2013

Course Title: Solid State Physics

Course Code: PHY-503

Year : 2012-13

Maximum Marks : 40

Section A contains 08 short answer type questions of 5 marks each. Students are required to answer 4 questions only. Answers of short answer type questions should be 250 words approximately.

Section A

- 1- Define unit cell, primitive cell, crystal structure and translational symmetry operation.
- 2- Explain the concept of reciprocal lattice. And show that reciprocal of lattice of bcc is a fcc lattice.
- 3- What are Brillouin zones? Construct the first two Brillouin Zones for a two dimensional square lattice.
- 4- What are Schottky and Frenkel defects in metals and ionic solids?
- 5- Explain the working of GaAs basic semiconductor laser.
- 6- What are the refinements of Debye's theory over Einstein's theory of heat capacity of solids?
- 7- What is diamagnetism? Discuss the theory of diamagnetism.
- 8- What are type I and type II superconductor? Give BCS theory of superconductor.

Section B contains 04 long answers type question of 10 marks each and students are required to answers 02 questions only.

Section B

- 1- Define seven types crystal system (fourteen Bravais lattice), Miller indices and packing factor.
- 2- What are assumptions and conclusions of Kronig Penney model explain in detail.
- 3- Obtain expression for carrier concentration and Fermi level of intrinsic and extrinsic semiconductor.
- 4- Derive an expression for normal modes of a diatomic chain of atoms and explain the properties of acoustic and optical modes of vibrations.