



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – PHYSICS
SIXTH SEMESTER – NOVEMBER 2016
PH 6610/PH 6606 – SOLID STATE PHYSICS
(UP TO 11-BATCH)

Date: 15-11-2016
Time: 09:00-12:00

Dept. No.

Max. : 100 Marks

PART A (10X 2 = 20)

Answer ALL questions

1. Define lattice and basis.
2. What is a space group?
3. Determine the glancing angle on the cube face(1 0 0) of a rock salt crystal corresponding to second order reflection. Given $a=2.814\text{\AA}$ and $\lambda=0.701\text{\AA}$.
4. Define reciprocal lattice?
5. What is the Drawback of Einstein's model of specific heat capacity?
6. Define thermal conductivity.
7. State Wiedemann Franz law.
8. Explain Hall Effect.
9. What is Magnetic levitation?
10. What is a cooper pair? Mention the characteristics.

PART B (4 x7.5 = 30)

Answer any FOUR questions.

11. What are Miller indices? Explain the procedure for finding the Miller indices of a plane.
12. Derive Laue equations.
13. How is thermal expansion explained by including the anharmonic contribution to lattice vibrations?
14. Derive an expression for density of electron states for a free electron gas in 3 dimensions.
15. What is (i) Meissner effect? (ii) Vortex states? Distinguish between Type I and Type II super conductivity.

PART C (4 x 12.5 = 50)

Answer any FOUR questions

16. What are Bravais lattices? List them with the specifications on the unit cell dimensions.
17. Describe any one method for crystal structure determination by X –ray diffraction.
18. Derive an expression for specific heat capacity using Debye's model.
19. Explain Sommerfeld theory of electrical conductivity.
20. Explain (a) BCS theory of superconductivity (b) Josephson effect.
