M.Sc. DEGREE EXAMINATION,NOVEMBER 2018
II Year IV Semester
Core Major
CONDENSED MATTER PHYSICS

Time : 3 Hours **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. Name the symmetry element and write the allowed rotations.
2. State Bragg's law.
3. What is Umklapp process?
4. What is Brillouin zone?
5. What are semiconductors?
6. What do you mean by free electron gas?
7. State Hund's rule.
8. What are magnons?
9. What is a cooper pair?
10. What are SQUIDS?
11. What are inert gas crystals?
12. What is diamagnetism?

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. Explain SC and BCC crystal structure.
14. Explain group and phase velocities.
15. Give the band theory of metals and semiconductors.
16. Discuss about Quenching of orbital angular momentum.
17. Derive first London equation and explain its significance.
18. Explain Hall effect.
19. Explain Meissner effect.

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. Explain the construction of a reciprocal lattice to a direct lattice. Also obtain the reciprocal lattice to SC, BCC and FCC lattices.

21. Derive an expression for the lattice heat capacity of a solid based on Debye theory and discuss the high and low temperature limits.

22. Discuss Kronig-Penney model for the energy band structure of solids.

23. Explain the quantum theory of Ferromagnetism and Curie point.

24. Explain type I and type II superconductors.

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