M.Sc.DEGREE EXAMINATION,APRIL 2020
II Year IV Semester
Condensed Matter Physics

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

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

Answer any **TEN** questions

1. What are Miller indices?
2. Define Cohesive energy.
3. Write an expression for phonon momentum.
4. Give the relation between group and phase velocities.
5. State the Wiedemann Franz law.
6. Draw the diagram for indirect band semiconductors.
7. What are magnons?
8. State Hund's rule.
9. Define the isotopic effect in superconductivity.
10. Write about "SQUIDS".
11. The Lattice constant of copper is 0.38nm. Calculate the distance between (110) planes.
12. Give the London equations for super conductors.

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

Answer any **FIVE** questions

13. Sketch the diagram to show (100) and (110) planes.
14. Explain the Umkalapp process in thermal conductivity.
15. Derive an expression for free electron gas in three dimensions.
16. Discuss the Heisenberg's interpretation of Weiss field.
17. Distinguish between Type I and Type II super conductors.
18. Construct and explain the first Brillouin Zone for a two dimensional oblique lattice.
19. Describe the BCS theory of superconductivity.

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

Answer any **THREE** questions

20. Discuss in detail about the Laue method of X-ray diffraction.
21. Describe the Debye's theory of lattice heat capacity.
22. Explain the Kronig-Penney Model.
23. In detail, discuss about the Quantum theory of paramagnetism.
24. Explain AC and DC Josephson effect in a superconductors.

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