(FOR THE CANDIDATES ADMITTED DURING THE ACADEMIC YEAR 2024-25 ONLY)

SUBJECT CODE 24 PPS 206

REG.NO.

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI

END-OF-SEMESTER EXAMINATIONS : MAY - 2025

M.Sc. – PHYSICS **MAXIMUM MARKS: 75**

II SEMESTER **TIME : 3 HOURS**

CONDENSED MATTER PHYSICS

SECTION – A (10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS. (K1)

1. In other possible Bravais Lattices, there is no _____tetragonal arrangement is included in the 14 Bravais lattices.

   (a) fcc (b) sc (c) bcc (d) boc

2. An expression for the Specific heat of Solids may also be obtained from the_____theory.

   (a) Kinetic (b) Langevin (c) corpuscular (d) electromagnetic

3. According to F-D Statistics, particles are_____.

   (a) distinguishable (b) indistinguishable (c) weak (d) elementary

4. Para-magnetism is related to the tendency of a permanent magnet to align itself in the direction of magnetic field such that its dipole moment is _____to the field.

   (a) Perpendicular (b) anti-parallel (c) parallel (d) normal

5. Meissner showed that if a long cylindrical superconductor is cooled in a longitudinal magnetic field below its Transition temperature,the lines of induction will be pulled out of the material due to its infinite---------.

   (a) resistivity (b) emissivity (c) absorptivity (d) conductivity

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES. (K2)

6. What is called Wigner-Seitz Unit cell.

7. What do you mean by Anharmonicity?

8. Define: Effective Mass of an electron.

9. What are Ferroelectric crystals?

10. What is the effect of Critical current on Superconductivity?

(CONTD …. 2)

SECTION – B (5 X 5 = 25 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K3)

11. (a) What are Miller Indices? Explain in detail.

(OR)

(b) Discuss the formation of Metallic bonding and its Characteristics.

12. (a) Discuss the dynamics of the Chain of Identical atoms.

(OR)

b) Write a note on Umklapp process.

13. (a) Get Wiedemann-Franz relation.

(OR)

(b) Explain briefly the construction of Brillouin zones.

14. (a) Discuss ferroelectric domains with needed diagram.

(OR)

(b) Explain the Weiss theory of Ferromagnetism.

15. (a) Give a detailed note on high temperature Superconductors.

(OR)

(b) Derive London equation.

SECTION – C (5 X 8 = 40 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K4/K5)

16. (a) Get the Reciprocal Lattice for (i) bcc (ii)fcc lattices and (iii) List the characteristics of Reciprocal lattices.

(OR)

(b) Describe the basic ideas of Dislocations and Colour centres.

17. (a) Explain the experimental measurements of Dispersion relations.

(OR)

(b) Write a note on Einstein's Model of Specific heat of Solids.

18. (a) Obtain an expression for C_V in Electronic Specific heat.

(OR)

(b) State and prove Bloch Theorem.

19. (a) Describe the Quantum theory of Para-Magnetism.Discuss its cases.

(OR)

(b) With diagrams, explain the Ferrimagnetism and uses of Ferrites.

20. (a) Explain the Thermodynamics of Superconducting Transitions.

(OR)

(b) Give the theory of Josephson effect and get an expression for current density.