



Date: 15-06-2022

Dept. No.

Max. : 100 Marks

Time: 01:00 PM - 04:00 PM

PART- A

Answer ALL the Questions

(10x2=20 Marks)

1. Define Unit cell.
2. State Bragg's law.
3. What are phonons?
4. What are the merits and demerits of Einstein's model?
5. State Hall effect in semiconductors.
6. Classify conductors, semiconductors and insulators using energy band diagram.
7. Define magnetisation.
8. What is hysteresis in magnetic materials?
9. Define Meissner effect.
10. What are called high temperature superconductors (HTS)?

PART- B

Answer Any Four Questions

(4x7.5=30 Marks)

11. What are Miller indices? Derive an expression for the interplanar spacing for (hkl) planes of a cubic structure.
12. Deduce vibration modes of a finite one dimensional monoatomic lattice.
13. Explain the elementary band theory of solids.
14. Distinguish between the characteristic features of diamagnetism, paramagnetism and ferromagnetism.
15. Explain Type I and Type II superconductors.
16. Explain the occurrence of superconductivity based on BCS theory.

PART- C

Answer Any Four Questions

(4x12.5=50 Marks)

17. With neat diagram describe the fourteen Bravais lattices within the seven crystal system.
18. Discuss the Debye's theory of specific heat capacity.
19. (a) Differentiate between intrinsic and extrinsic semiconductors.
(b) Explain the conduction process in p-type and n-type semiconductors
20. Explain in detail Langevin's classical theory of diamagnetism.
21. Derive London equations and discuss their significance.
22. Describe powder method in X-ray diffraction to find crystal structure.

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