C. ABDUL HAKEEM COLLEGE (AUTONOMOUS),
MELVISHARAM - 632 509.
SEMESTER EXAMINATIONS, APRIL - 2018

B.Sc., PHYSICS **SEMESTER VI**

U15MPH603 / U14MPH603 - SOLID STATE PHYSICS

Time: Three Hours Maximum: 75 Marks

SECTION - A (10 X 2 = 20 Marks)

Answer **ALL** Questions.

1. Define unit cell.
2. What is Bravais lattice?
3. State Wiedemann Franz law.
4. What is brillouin zone?
5. Mention Debye's assumption on theory of specific heat capacity of solids.
6. State Meissner effect.
7. Why X-rays are used to diffract crystals?
8. What is line defect?
9. Define dipole moment.
10. Mention types of magnetic materials.

SECTION - B (5 X 5 = 25 Marks)

Answer **ALL** Questions.

11. a) Lead is a fcc with atomic radius of 1.746 ^{0}A. Find the spacing of (i) 220 plane (ii) 200 plane.

(Or)

b) What are Miller indices? Give the steps to find miller indices.

12. a) Distinguish between metals, insulators and semiconductors on the basis of band theory.

(Or)

b) Derive an expression for density of state for free electron gas in one dimension.

13. a) Give the characteristics of metallic bonds.

(Or)

b) Differentiate between types of superconductors.

14. a) State and derive Bragg's law.

(Or)

b) Distinguish between edge and screw dislocations.

15. a) Derive Clausius-Mosotti relation.

(Or)

b) Explain Weiss's theory of paramagnetism.

SECTION - C (3 X 10 = 30 Marks)

Answer **ANY THREE** Questions.

16. Classify and explain seven types of crystal system in detail.
17. Explain intrinsic and extrinsic semiconductors on the basis of bond structure.
18. What are superconductors? Explain briefly the general properties of superconductors.
19. What is XRD? How to find XRD by powder photograph method?
20. Derive an expression for volume susceptibility from classical theory of diamagnetism.

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