Code No: R101714

PHYSICS OF SOLIDS

Time: 3 hours **Max.Marks:100**

Answer any FIVE questions
All questions carry equal marks
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1.a) Discuss the characteristics and stability considerations of Ionic and covalent Bonds, and mention the properties of ionic and covalent crystals.
b) Derive an expression for cohesive energy of an ionic solid. [10+10]

2.a) Define Schottky defect. Derive an expression for equilibrium concentration of Schottky defect in an ionic solid at a given temperature.
b) Derive an expression for inter planar spacing in cubic crystal. [10+10]

3.a) What are the drawbacks of classical theory? Explain about Relaxation time, collision time and mean free path.
b) Explain in detail about Kronig-Penney Model. [10+10]

4.a) Discuss the microscopic concept of polarization. Explain in detail about different Sources of polarization.
b) Explain behaviour of dielectric materials when subjected to AC fields. [10+10]

5.a) Obtain an expression for conductivity in an intrinsic semiconductor.
b) Derive an expression for Hall coefficient. [10+10]

6. Write a note on
a) Phenomenon of superconductivity outlining the different properties of super conductors.
b) Discuss the applications of superconductors.
c) BCS theory of super conductivity [7+7+6]

7. Write a note on
a) Complex dielectric constant
b) Miller indices
c) Diamond structure [7+7+6]

8. Discuss the following
a) Bravias lattices
b) Burger's Vector
c) Quantum free electron theory
d) Clausius – Mosotti equation [20]

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