Code No: R101714

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

Answer any FIVE questions
All questions carry equal marks
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1.a) Define cohesive energy and calculate cohesive energy of ionic solids.
 b) Describe structures of ZnS and CsO in detail with neat diagram.   [10+10]

2.a) Explain about all planes in a cubic crystal with help of Miller indices.
 b) Write short notes on edge and screw dislocations.
 c) What is Burger's vector and its importance.   [7+7+6]

3.a) Explain band theory of solids with the help of Kronig and Penney model.
 b) Derive an expression for density of states and also explain electronic distribution in solids.   [10+10]

4.a) Write a note on Schottky and Frenkel defects.
 b) Estimate number of Frenkel defects at a given temperature.   [10+10]

5.a) Explain mechanism of conduction in semiconductors.
 b) Discuss about quantum free electron theory.
 c) Write short notes on classification of materials.   [7+7+6]

6.a) What is Clausius-Mosotti equation? Explain.
 b) Write short notes on complex dielectric constant and dielectric loss.
 c) Discuss about piezo and ferroelectricity with applications.   [7+7+6]

7.a) Discuss about generation and recombination of electrons in detail.
 b) Derive an expression for concentration of electrons in p-type semiconductor.
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8.   Write short notes on following
      a) Penetration depth
      b) Applications of superconductivity
      c) Properties of superconductors.   [7+7+6]

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