60986

Reg. No.

PHYSICS
Material Science
(CBCS Scheme) (Repeaters)
Paper : 403 d

Time : 3 Hours

Maximum Marks : 70

PART - A

Answer any Four questions. (4×5=20)

1. Give a brief introduction of material science.
2. Explain briefly imperfections in crystals.
3. Discuss behavior of materials based on atomic model of elastic behavior.
4. Mention main properties of matrix materials such as metals and ceramics.
5. Give an account of classification of polymers with examples.
6. What is polymerization? Explain.

PART - B

Answer any Four questions. (4×10=40)

7. Define Atomic packing factor (APF). Calculate the co-ordination number, atomic radius at APF for HCP crystal structure.
8. Classify the crystal defects. Explain how point defects affect the properties of the materials with neat sketches.
9. Differentiate between brittle fracture and ductile fracture. Explain how they are caused with neat sketches.
10. Contrast the mechanical characteristics of matrix and dispersed phase for fibre reinforce composite materials.
11. Explain the synthesis of polymers using step polymerization and Industrial polymerization methods.
12. What is microstructure of polymer? Discuss their types.

PART - C

Answer any Two questions. (2×5=10)

13. Determine the packing efficiency and density of sodium chloride from the following data radius of the sodium ion=$0.98 \overset{0}{A}$. ii) Radius of chlorine ion=$1.81 \overset{0}{A}$. and iii) atomic mass sodium=22.99 amu and for chlorine=35.45 amu respectively.
14. Derive an expression for Frenkel defect and find n/N ratio for sodium chloride crystal having pairing energy 2.02eV. Provided n<<N.
15. Explain briefly stereoisomerism.