CBCS SCHEME

USN ☐☐☐☐☐☐☐☐☐☐   15NT42

Fourth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Material Science and Engineering

Time: 3 hrs.   Max. Marks: 80

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1 a. Discuss different types of atomic bondings with examples for each.   (08 Marks)
   b. Explain the following with necessary equations and diagrams :
      i)   Lattice Parameter   ii) Number of Atoms per unit cell
      iii) Co-ordination numbers   iv) Packing factor.   (08 Marks)

OR

2 a. Discuss the classification of materials based on functionality.   (08 Marks)
   b. Describe about the Electronic Structure of the Atom.   (08 Marks)

Module-2

3 a. Discuss the influence of high density planes on crystal behavior.   (08 Marks)
   b. Explain the following : i) Crystallographic point groups   ii) Space groups.   (08 Marks)

OR

4 a. Explain in detail about Bravais Lattius in two and three dimensional space.   (10 Marks)
   b. What is Wigner – Seitz cell? Explain its construction.   (06 Marks)

Module-3

5 a. Explain photon diffusion and four main kinds of passive transport.   (10 Marks)
   b. Describe the mechanism for diffusion in solids.   (06 Marks)

OR

6 a. Derive an expression for unsteady state diffusion with formulas and necessary diagrams.   (06 Marks)
   b. Describe the following :
      i) Atomic diffusion   ii) Eddy diffusion   iii) Effusion and Graham's law.   (10 Marks)

Module-4

7 a. Discuss about liquid crystalline behavior in any two homologous series.   (08 Marks)
   b. Describe about possible mesophasis in lyotropic liquid crystals.   (08 Marks)

OR

8 a. Explain about applications of chiral liquid crystals in thermography.   (10 Marks)
   b. Write about identification of liquid crystals.   (06 Marks)

Module-5

9 a. Write briefly about piezoelectric materials mechanism and applicaitons.   (08 Marks)
   b. Explain about Electro – rheological fluids (ER). ER effect and applications and limitations.   (08 Marks)

OR

10 a. Explain Mechanical and Electrical properties of Ceramics.   (08 Marks)
   b. What are Shape Memory Alloys? Explain.   (04 Marks)
   c. Mention applications of Ceramics.   (04 Marks)

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