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Fourth Semester B.E. Degree Examination, June/July 2016
Introduction to Material Science and Engineering

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer FIVE full questions, selecting at least TWO questions from each part.
2. No Handbook/chart etc required.

PART – A

- 1 a. Write a note on the classification of materials with proper examples. Explain the properties and application of that example of each category. (10 Marks)
- b. Explain Binding energy and interatomic spacing. (05 Marks)
- c. Write short notes on material properties in forms of carbon. (05 Marks)
- 2 a. Explains Wigner – Seitz cell and equivalent positions in a unit cell. (08 Marks)
- b. Explain the following with example and figures
 - i) Single crystals
 - ii) Polycrystalline materials
 - iii) Anisotropy
 (12 Marks)
- 3 a. What are point defects? Explain all types of point defects with diagrams. (12 Marks)
- b. State and explain Schmidt's law. (03 Marks)
- c. State and explain Fick's first law. (05 Marks)
- 4 a. What is X-ray diffraction (XRD)? Explain different diffraction methods with neat diagram. (15 Marks)
- b. Explain the concept of reciprocal lattice. (05 Marks)

PART – B

- 5 a. Explain the method of calculation of relaxation time for metals. (10 Marks)
- b. Write a note on phonon drag. (05 Marks)
- c. Explain the concept of thermal conductivity. (05 Marks)
- 6 a. Explain thermoelectric and magnetic effects in semiconductors. (10 Marks)
- b. Discuss about high frequency conductivity property in semiconductors. (10 Marks)
- 7 a. Explain macroscopic description of the static dielectric constant. (08 Marks)
- b. Describe electronic and ionic polarizabilities in atoms. (06 Marks)
- c. Explain complex dielectric constant and dielectric losses for alternating fields. (06 Marks)
- 8 a. Explain briefly intrinsic and extrinsic semiconductors. (12 Marks)
- b. Explain the experimental determination of resistivity of a semiconductor by four probe method. (08 Marks)

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