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Total Number of Pages : 01

M.Sc.I
FCYF605

6th Semester Regular/Back Examination 2018–19

SOLID STATE CHEMISTRY

BRANCH : M.Sc.I(AC)

Time : 3 Hours

Max Marks : 70

Q.CODE : F546

Answer Question No.1, which is compulsory, and any FIVE from the rest.

The figures in the right hand margin indicate marks.

- Q1 Answer the following questions : (2 x 10)**
- a) The cubic closepacked structure is based on an FCC unit cell. Explain it.
 - b) Briefly discuss the triclinic and monoclinic crystal systems with examples.
 - c) Calculate the number of atoms per unit cell of hexagonal lattice cell.
 - d) State the critical phenomena of solids.
 - e) Explain martensite-austenite phase transitions.
 - f) What do you mean by optical band gap?
 - g) What do you mean by tailoring of solids?
 - h) State superconductivity in solids.
 - i) What is the difference between four-probe and two-probe measurement method for electrical resistivity?
 - j) Why SQUID-VSM Magnetometer is suitable to measure magnetic properties of solids.
- Q2 a) Discuss packing in solids in details. Molybdenum (atomic mass = 95.94) has a density of 10.2 gm/cm³ and lattice parameter of 3.15 Å. Find the number of atoms per unit cell and predict the type of crystal structure. (5)**
- b) Derive expression for Born-Landé equation for the lattice energy of an ionic crystal. (5)**
- Q3 a) Explain stereographic projections in crystallography using suitable examples. (5)**
- b) Discuss the crystal structures of silicates. (5)**
- Q4 a) Describe different defects with schematic diagrams. (5)**
- b) Describe diffusion mechanisms in solids. (5)**
- Q5 a) Discuss the methods for single crystal growth and thin films depositions. (5)**
- b) Discuss spectroscopic characterization techniques (Mossbauer, IR, and UV-Vis) for solids. (5)**
- Q6 a) Explain bonding in solids based on band theory of solids. (10)**
- Q7 a) Describe electron microscopic (SEM, TEM, and AFM) characterization techniques for solids. (10)**
- Q8 Write short answer on any TWO : (5 x 2)**
- a) Color centres.
 - b) Powder processing.
 - c) Structure-property relations.