

SSARDAR PATEL UNIVERSITY
Programme & Subject: M.Sc (Physical Chemistry)
Semester: IV
Syllabus with Effect from: June - 2013

Paper Code: PS04CPHC02	Total Credit: 4
Title Of Paper: Solid State Chemistry	

Unit	Description in detail	Weightage (%)
I	<p>Crystal Structure : Forms of solids, law of constancy of interfacial angles, crystal systems, crystal classes, lattice structure, unit cell, designation of crystal faces, law of rational indices, planes of cubic lattice, types of lattices.</p> <p>Crystal Defects and Non-Stoichiometry : Perfect and imperfect crystals, intrinsic and extrinsic defects – point defects, line and plane defects, Vacancies – Schottky defects and Frenkel defects. Thermodynamics of Schottky and Frenkel defect formation, defects and nonstoichiometry</p>	25%
II	<p>Electronic Properties and Band Theory : Metals, insulators and semi conductors, electric structure of solids – band theory, Free electron theory, band structure of metals, insulators and semi conductors, intrinsic and extrinsic semi conductors, doping of semi conductors, <i>p</i>- and <i>n</i>- type semiconductors, <i>p-n</i> junctions, super conductors</p>	25%
III	<p>Optical Properties : Optical reflectance, photoconduction and photoelectric effects, Lasers, Organic solids – electrically conducting solids, organic charge transfer complex, organic metals, new superconductors, Solid State Reactions : General Principles, types of solid state reactions, experimental procedures, co-precipitation as a precursor to solid state reactions, Wagner mechanism of solid state reactions, sol-gel method, kinetics of solid state reactions</p>	25%
IV	<p>Diffraction Methods for Crystal Structure : X-ray diffraction – Diffraction and Intensities of diffracted beam, Laue and Bragg methods and conditions, Miller Indices, Index reflections, relation to inter planer spacings, diffraction experiments, powder photographs – Weissenberg and Debye Scherrer method of X-ray structure analysis, identification of unit cells, Structure of simple lattices, structure factor and its relation to intensity and electron density, procedure for an X-ray structure analysis, Electron Diffraction – Wieri equation, measurement technique, elucidation of structure, Neutron Diffraction – Scattering of neutrons by solids, measurement techniques</p>	25%

Basic Text & Reference Books:-

- Introduction to Solids L. V. Azaroff Mc.Graw Hill Co., New York
- Principles of the Solid State H. V. Kheer Wiley Eastern
- Solid State Chemistr D. K. Chakrabarthy New Age International
- Solid State Chemistry and Its Applications Anthony R. West John Willey & Sons
- Crystal – Structural Analysis M. J. Buerger John Wiley and Sons, New York
- Elements of X-ray Diffraction B. D. Cullity Addison – Wesley Publ. Co., London

