CH101 Chemical sciences (Effective till Session 2014-15)

L-T-P-Cr: 3-1-0-4

Unit 1. Chemical bonding: Ionic bonding, Factors which governs ionic bonding. Lattice energy, Born Haber cycle. Covalent bond Hybridisation, VSPER theory, bond order, bonding in coordination compounds .Molecular orbital theory of homo- and Hetero-Nuclear diatomic molecules. Bonding in coordination compound, Ligand field theory and crystal field theory. 6 Lecture

Unit 2. Stereochemistry: Stereoisomerism, optical activity, geometrical isomerism, enantiomers, diastereomers, optical activity without asymmetric carbon atom. Conformational isomerism. Geometrical and optical isomerism in coordination compounds. 8 Lecture

Unit 3. Unit 3 Electrochemistry: Ionic conductivity and its measurements. Conductivity of electrolytes, Kohlrausch’s law. Galvanic cell, electrode potential, Nernst equation, galvanic series, Fuel cells. 6 Lecture

Unit 4. Gases: Kinetic theory of gases, kinetic gas equation, most probable velocity, average velocity, root- mean square velocity, Vander-Walls gas equation. Liquefaction of gases. 6 Lecture

Unit 5. Chemical kinetics: Reaction rates, order of reaction, molecular of reaction, first and second order reaction, pseudo-order reaction. Reversible reaction, consecutive reactions and parallel reaction. Homogeneous and heterogeneous catalysts and its applications in chemical industries. 8 Lectur

e Unit 6. Chemical thermodynamics: First law : statement, work done in isothermal, adiabatic, conditions work and heat path dependent function, heat changes, isochoric and isobaric conditions, heat capacity, Cp and Cv relations, Kirchoffs relation. Second Law: Need of 2nd Law, spontaneous process, Reversible process, Carnot cycle, Concept of energy, Entropy changes as function of temperature, entropy changes during the phase transformation, Gibbs free energy, free energy changes under various conditions, free energy change as reversible and irreversible process, Gibbs Helmholtz equation. 8 Lecture

Suggested Readings: 1. Peter Atkin & Julio De Paula, Element of Physical Chemistry, Oxford University Press, 2009 2. Bruce M. Mahan & Rollie J Meyers, University Chemistry, 4th Edition, Pearson, 2009 3. Puri, Sharma & Pathania, |Principle of Physical Chemistry, Vishal Publication, 2008 4. H. K. Moudgil, Text Book of Physical Chemistry, PHI Learning Pvt Ltd, 2010