

# **Govind Guru University**

## **B.Sc. Semester III**

### **Chemistry-202 [Physical Chemistry]**

#### **Unit I:**

##### **Thermodynamics: (14 marks)(Lec.-12)**

Zeroth law of thermodynamics, second law of thermodynamics, Physical significance of entropy; Entropy change during phase change- solid to liquid and liquid to vapor; Entropy of mixing of ideal gases; Entropy change in reversible and irreversible process; Work and free energy functions; Helmholtz function, Derivation of Gibb's-Helmoltz equation.

#### **Unit II:**

##### **Chemical Kinetics (14 marks)(Lec.-12)**

The concept of reaction rates; order and molecularity of a reaction; derivation of integrated rate of reactions for zero, first and second order reaction (both for equal and unequal concentration of reactants); Half life of a reaction, General methods for determination of order of a reaction, Collision theory of bimolecular reactions

#### **Unit III:**

##### **Conductance (14 marks)(Lec.-12)**

Conductivity, Equivalent and molar conductivity and their variation with dilution for weak and strong electrolytes; Kohlrausch law of independent migration of ions Transference number and its experimental determination using Hettorf and moving boundary methods Conductometric titrations (only acid-base)

#### **Unit IV**

##### **(A) Adsorption (7 marks)(Lec.-6)**

Definition of terms, types of adsorption (physical, chemical and their difference); derivation of freundlich adsorption isotherm, derivation of Langmuir adsorption isotherm; application of isotherm

**(B) Theory of gases and liquids**

**(7 marks)(Lec.-6)**

Postulates of kinetic theory of gases and derivation of the kinetic gas equation;  
derivation of real gases from ideal behavior

Surface tension and its determination using stalagmometer, viscosity of a liquid  
and determination of coefficient of viscosity using Ostwald viscometer

**References:**

1. Barrow, G.M. physical chemistry Tata McGraw-Hill (2007).
2. Castellan, G.W. physical chemistry 4<sup>th</sup> Ed. Narosa (2004).
3. Kotz, J.C. Treichel, P.M & Townsend, J.R. General Chemistry, Cengage Learning India Pvt. Ltd.: New Delhi (2009).
4. Mahan, B.H. University Chemistry, 3<sup>rd</sup> Ed., Narosa (1998).
5. Petrucci, R.H. General Chemistry, 5<sup>th</sup> Ed., Macmillan Publishing Co.: New York (1985).
6. B.R. Puri, L.R. Sharma, Madan S. Pathania, "Principles of physical chemistry", Vishak publishing-Jalandhar, 44<sup>th</sup> Edition-2010-2011.
7. S. Glasstone, "**Thermodynamics for chemistry**".
8. S. Glasstone, "**An introduction to electrochemistry**", Affiliated East-West press Pvt. Ltd, New Delhi, Madras.
9. B.S. Bahl, G.D. Tuli and Arun Bahl, "**Essential of physical chemistry**", S. Chand- New Delhi, Reprint, 2006.