

# **B.Sc. Part-II: PHYSICAL CHEMISTRY**

## **PAPER-THIRD**

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### **1. THERMODYNAMICS**

Spontaneous processes, Carnot cycle, statement of second law, concept of entropy, combined form of the first and second law of thermodynamics, enthalpy and entropy. Entropy change in isolated system.. Variation of entropy with temperature and volume, Variation of entropy with temperature and pressure. Helmholtz and Gibbs free energies, properties of Gibbs function, Gibbs-Helmholtz equation. Thermodynamic criteria of equilibrium, Clapeyron-Clausius equation and its application.

### **2. PHASE EQUILIBRIA**

Explanation of phase, component and degree of freedom. Phase rule and its application to one component system (water and sulphur) and two component (single eutectics) systems. Nernst distribution law, Limitations and applications of the distribution law.

### **3. ELECTROCHEMICAL CELLS:**

Reversible and irreversible cells, EMF of a cell and free energy change, Nernst equation. EMF and equilibrium constant. Concept of concentration cell without transference. Applications of EMF measurements (determination of solubility product, pH, dissociation constant of acids, hydrolysis constant, solubility of sparingly soluble salts).

### **4. SURFACE PHENOMENON:**

Physical and chemical adsorption, Freundlich adsorption isotherm, Gibbs adsorption equation, Langmuir monomolecular theory.

### **5. COLLOIDAL STATE:**

Stability of colloids, determination of size of colloidal particles, Electrokinetic potential (Zeta potential). Donnan membrane theory and its applications.

**SYLLABUS FOR B. Sc.-II**  
**CHEMISTRY PRACTICAL**

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| 1. Gravimetric Analysis:                                 | 10 Marks         |
| (i) Ba as BaSO <sub>4</sub>                              |                  |
| (ii) Zinc as ZnO   |                  |
| (iii) Cu as CuO  |                  |
| 2. Organic Preparation (one step and crystallization)    | 15 Marks         |
| (i) Osazone formation                                    |                  |
| (ii) Azo-dye formation                                   |                  |
| (iii) Picrate formation                                  |                  |
| 3. Physical Chemistry Experiments                        | 15 Marks         |
| (i) Experiments of surface tension (using stalagmometer) |                  |
| (ii) Experiments on viscosity (using viscometer)         |                  |
| (iii) Partition coefficient determination                |                  |
| 4. Record and viva-voce                                  | (5+5) = 10 Marks |