

# **Chemistry - II**

## **UNIT – I (Inorganic Chemistry)**

### **Chemistry of d-block elements:**

1. Catalytic properties of d-block elements & ability to form complexes.
2. Stability of various oxidation states & emf.
3. Ti, Cr & Cu triads.

### **Chemistry of f-block elements:**

1. Lanthanide contraction, (Consequences).
2. Oxidation state, magnetic properties of lanthanides.
3. Actinides comparison with lanthanides.

### **Theories of bonding in metals:**

1. 3 theories (a) Free electron theory (b) VBT & (c) Band theory
2. Conductors, insulators & semiconductors.

### **Metal carbonyls & related compounds:**

1. EAN rule – EAN for  $[\text{Fe}(\text{NO})_4]$ ,  $[\text{V}(\text{NO})(\text{CO})_5]$ ,  $[\text{Ni}(\text{CO})_4]$  &  $[\text{Cr}(\text{CO})_6]$
2. Metallocenes (ferrocene).

## **UNIT – II (Organic Chemistry)**

### **Halogen compounds:**

1.  $\text{S}_\text{N}1$ ,  $\text{S}_\text{N}2$  reactions with E<sub>2</sub> & stereo chemistries.
2. Reactivity of halogen compounds.

### **Carbonyl Compounds:**

1. Keto – enol tautomerism.
2. Nucleophilic addition reaction.
3. Base catalysed reactions (a) Aldol (b) Cannizzaro (c) Perkin (d) Benzoin (e) Haloform (f) Knoevenagel.
4. Baeyer – Villiger oxidation of ketones.

### **Carboxylic acids:**

1. Huns – Diecker reaction, Schmidt reaction, Arndt – Eistert reaction, HVZ reaction.

### **Active methylene compounds:**

1. Acidic & ketonic hydrolysis.
2. Preparation of (a) monocarboxylic acids (b) Dicarboxylic acids
3. Malonic ester applications.
4. Aceto acetic ester.

## **UNIT – III (Physical Chemistry)**

### **Phase Rule:**

1. Phase diagram of one component system (water system).
2. Two component system Ag-Pb & NaCl – H<sub>2</sub>O system.
3. Eutectic point & triple point.

### **Dilute solutions:**

1. Raoult's law.
2. Osmosis & osmotic pressure
3. Van't Hoff factor.

### **Electrochemistry:**

1. Kohlrausch's law
2. Arrhenics theory
3. Ostwald's dilution law.
4. Debye – Huckel – Onsagar's equation.
5. Determination of transport no. by Hittorf's method.
6. Nernst equation.
7. Single electrode potential, standard H-electrode, reference cells.
8. EMF of a cell.
9. Reversible & irreversible cells.
10. Conductometric titrations.

## **Unit – IV (General Chemistry)**

### **Molecular symmetry:**

1. Different types of symmetry elements.

### **Theory of quantitative analysis:**

1. Principles of volumetric analysis. Theories.
2. Principles of gravimetric analysis, precipitation, coagulation, peptization, coprecipitation, post precipitation, digestion, filtration, drying & ignition.

### **Evaluation of analytical data:**

1. Significant figures.
2. Accuracy & precision.
3. Types of errors.

### **Introductory treatment to Pericyclic reactions:**

1. Types of pericyclic reactions.
2. Concerted reaction & symmetry properties.

### **Synthetic strategies:**

1. Terminology - (a) FGI (b) Synthons (c) TM (d) disconnections
2. Retrosynthesis (1) Acetophenone (2) Cyclohexene (3) Phenyl ethyl bromide.

### **Asymmetric synthesis:**

1. Enantiomeric & diastereomeric excess.
2. Stereospecific & Stereo selective reactions.