

# Syllabus

## CHEMISTRY

CLASS XII (Code No. 043)

Syllabus for Session 2021-22 Term II

### THEORY

Time: 90 Minutes

Max Marks: 35

S.No	UNIT	Periods	MARKS
1	Electrochemistry	7	13
2	Chemical Kinetics	5	
3	Surface Chemistry	5	
4	The <i>d</i> - and <i>f</i> -Block Elements	7	9
5	Coordination Compounds	8	
6	Aldehydes, Ketones and Carboxylic Acids	10	13
7	Amines	7	
TOTAL		49	35

#### Chapter-1: Electrochemistry

7 Periods

Redox reactions, EMF of a cell, standard electrode potential, Nernst equation and its application to chemical cells, Relation between Gibbs energy change and EMF of a cell, conductance in electrolytic solutions, specific and molar conductivity, variations of conductivity with concentration, Kohlrausch's Law, electrolysis.

#### Chapter-2: Chemical Kinetics

5 Periods

Rate of a reaction (Average and instantaneous), factors affecting rate of reaction: concentration, temperature, catalyst, order and molecularity of a reaction, rate law and specific rate constant, integrated rate equations and half-life (only for zero and first order reactions).

#### Chapter-3: Surface Chemistry

5 Periods

Adsorption - physisorption and chemisorption, factors affecting adsorption of gases on solids, colloidal state: distinction between true solutions, colloids and suspension; lyophilic, lyophobic, multi-molecular and macromolecular colloids; properties of colloids; Tyndall effect, Brownian movement, electrophoresis, coagulation.

#### Chapter-4: The *d*- and *f*-Block Elements

7 Periods

General introduction, electronic configuration, occurrence and characteristics of transition metals, general trends in properties of the first row transition metals – metallic character, ionization enthalpy, oxidation states, ionic radii, colour, catalytic property, magnetic properties, interstitial compounds, alloy formation.



Lanthanoids - Electronic configuration, oxidation states and lanthanoid contraction and its consequences.

### Chapter-5: Coordination Compounds

8 Periods

Coordination compounds - Introduction, ligands, coordination number, colour, magnetic properties and shapes, IUPAC nomenclature of mononuclear coordination compounds. Bonding, Werner's theory, VBT, and CFT.

### Chapter-6: Aldehydes, Ketones and Carboxylic Acids

10 Periods

Aldehydes and Ketones: Nomenclature, nature of carbonyl group, methods of preparation, physical and chemical properties, mechanism of nucleophilic addition, reactivity of alpha hydrogen in aldehydes, uses. Carboxylic Acids: Nomenclature, acidic nature, methods of preparation, physical and chemical properties; uses.

### Chapter-7: Amines

7 Periods

Nomenclature, classification, structure, methods of preparation, physical and chemical properties, uses, identification of primary, secondary and tertiary amines.

#### PRACTICALS

**Term II:** At the end of Term II, a **15-mark Practical** would be conducted under the supervision of Board appointed external examiners. This would contribute to the overall practical marks for the subject.

#### Evaluation Scheme

S. No	Practical	Marks
1.	Volumetric Analysis	4
2.	Salt Analysis	4
3.	Content Based experiment	2
4.	Project Work and Viva (Internal and External Both)	5
TOTAL		15

**1. Volumetric analysis (4 marks)**

Determination of concentration/ molarity of  $\text{KMnO}_4$  solution by titrating it against a standard solution of:

- (i) Oxalic acid,
- (ii) Ferrous Ammonium Sulphate

(Students will be required to prepare standard solutions by weighing themselves).

**2. Salt analysis (Qualitative analysis) (4 marks)**

Determination of one cation and one anion in a given salt.

Cations-  $\text{Pb}^{2+}$ ,  $\text{Cu}^{2+}$ ,  $\text{As}^{3+}$ ,  $\text{Al}^{3+}$ ,  $\text{Fe}^{3+}$ ,  $\text{Mn}^{2+}$ ,  $\text{Ni}^{2+}$ ,  $\text{Zn}^{2+}$ ,  $\text{Co}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{Sr}^{2+}$ ,  $\text{Ba}^{2+}$ ,  $\text{Mg}^{2+}$ ,  $\text{NH}_4^+$

Anions -  $(\text{CO}_3)^{2-}$ ,  $\text{S}^{2-}$ ,  $\text{NO}_2^-$ ,  $\text{SO}_3^{2-}$ ,  $\text{SO}_4^{2-}$ ,  $\text{NO}_3^-$ ,  $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{I}^-$ ,  $\text{PO}_4^{3-}$ ,  $\text{C}_2\text{O}_4^{2-}$ ,  $\text{CH}_3\text{COO}^-$

(Note: Insoluble salts excluded)

**3. Content Based Experiments (2 marks)**

**A. Preparation of Inorganic Compounds**

Preparation of double salt of Ferrous Ammonium Sulphate or Potash Alum.

Preparation of Potassium Ferric Oxalate.

**B. Tests for the functional groups present in organic compounds:**

Unsaturation, alcoholic, phenolic, aldehydic, ketonic, carboxylic and amino (Primary) groups.