

## **CHEMISTRY** +2 (2024-2025)

### **RATIONAL**

Higher secondary is the most crucial stage of school education because at this juncture specialized discipline based, content-oriented courses are introduced. Students reach this stage after 10 years of general education and opt for chemistry with a purpose of pursuing their career in basic sciences or professional courses like medicine, engineering, technology and study courses in applied areas of science and technology at tertiary level. Therefore, there is a need to provide learners with sufficient conceptual background of Chemistry, which will make them competent to meet the challenges of academic and professional courses after the higher secondary stage.

The new and updated curriculum is based on disciplinary approach with rigor and depth taking care that the syllabus is not heavy and at the same time it is comparable to the international level. The knowledge related to the subject of chemistry has undergone tremendous changes during the past one decade. Many new areas like synthetic materials, bio-molecules, natural resources, industrial chemistry are coming in a big way and deserve to be an integral part of chemistry syllabus at senior secondary stage. At international level, new formulations and nomenclature of elements and compounds, symbols and units of physical quantities floated by scientific bodies like IUPAC and CGPM are of immense importance and need to be incorporated in the updated syllabus. The revised syllabus takes care of all these aspects. Greater emphasis has been laid on use of new nomenclature, symbols and formulations, teaching of fundamental concepts, applications of concepts in chemistry to industry/technology, logical sequencing of units, removal of obsolete content and repetition etc.

### **OBJECTIVES**

The board objectives of teaching Chemistry at Senior Secondary Stage are to help the learners:

- To promote understanding of basic facts and concepts in chemistry while retaining the excitement of chemistry.
- To make students capable of studying chemistry in academic and professional courses (such as medicine technology) at tertiary level.
- To expose the students to various emerging new areas of chemistry and apprise them with their relevance in their future studies and their application in various spheres of chemical sciences and technology.
- To equip students to face various, changes related to health, nutrition, environment, population, weather, industries and agriculture.
- To develop problem solving skills in students.
- To expose the students to different processes used in industries and their technological applications.
- To apprise students with interface of chemistry with other disciplines of science such as physics, biology, geology, engineering etc.
- To acquaint students with different aspects of chemistry used in daily life.
- To develop an interest in students to study chemistry as a discipline.

## COURSE STRUCTURE

Unit No.	Title
Chapter- I	Solutions
Chapter- II	Electrochemistry
Chapter-III	Chemical Kinetics
Chapter-IV	d- and f-Block Elements
Chapter-V	Coordination Compounds
Chapter-VI	Haloalkanes and Haloarenes
Chapter-VII	Alcohols, Phenols and Ethers
Chapter-VIII	Aldehydes, Ketones and Carboxylic acids
Chapter- IX	Amines
Chapter-X	Biomolecules

### PRACTICAL SYLLABUS

#### A. Surface Chemistry

- (a) Preparation of one lyophilic and one lyophobic sol.  
Lyophilic sol-Starch, egg albumin and gum.  
Lyophobic sol-aluminum hydroxide, ferric hydroxide, arsenious sulphide.
- (b) Study of the role of emulsifying agent in stabilizing the emulsions of different oils.

#### B. Chemical Kinetics

- (a) Effect of concentration and temperature on the rate of reaction between sodium thiosulphate and hydrochloric acid.
- (b) Study of reaction rates of any one of the following:
- Reaction of iodide ion and with hydrogen peroxide at room temperature using different concentration of iodide ions.
  - Reaction between potassium iodate,  $KIO_3$  and sodium sulphite : ( $Na_2 SO_3$ ) using starch solution as indicator (clock reaction).

#### C. Thermochemistry

- (a) Any one of the following experiments:
- Enthalpy of dissolution of copper sulphate or potassium nitrate.
  - Enthalpy of neutralization of strong acid (HCl) and strong base (NaOH)
  - Determination of enthalpy change during interaction (Hydrogen bond formation) between acetone and chloroform.

#### D. Electrochemistry

Variation of cell potential in  $\text{Zn}/\text{Zn}^{2+} \parallel \text{Cu}^{2+}/\text{Cu}$  with change in concentration of electrolytes ( $\text{CuSO}_4$  or  $\text{ZnSO}_4$ ) at room temperature.

#### E. Chromatography

- (i) Separation of pigments from extracts of leaves and flowers by paper chromatography and determination of  $R_f$  values.
- (ii) Separation of constituents present in an inorganic mixture containing cations only (constituents having wide difference in  $R_f$  values to be provided)

#### F. Preparation of Inorganic Compounds

- (i) Preparation of double salt of ferrous ammonium sulphate or potash alum.
- (ii) Preparation of potassium ferric oxalate.

#### G. Preparation of Organic Compounds

Preparation of any two of the following compounds

- (i) Acetanilide
- (ii) Di-benzal acetone
- (iii) p-Nitroacetanilide
- (iv) Aniline yellow or 2-Naphthol aniline dye.
- (v) Iodoform

#### H. Test for the functional groups present in organic compounds:

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

- I. Study of Carbohydrates, fats and proteins in pure form and detection of their presence in given food stuffs.
- J. 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)

#### K. Qualitative analysis

- Determination of one cation and one anion in a given salt  
**Cations-**  $\text{Pb}^{2+}$ ,  $\text{Cu}^{2+}$ ,  $\text{As}^{3+}$ ,  $\text{Al}^{3+}$ ,  $\text{Fe}^{3+}$ ,  $\text{Mn}^{2+}$ ,  $\text{Zn}^{2+}$ ,  $\text{Co}^{2+}$ ,  $\text{Ni}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{Sr}^{2+}$ ,  $\text{Ba}^{2+}$ ,  $\text{Mg}^{2+}$ ,  $\text{NH}_4^+$   
**Anions-**  $\text{CO}_3^{2-}$ ,  $\text{S}^{2-}$ ,  $\text{SO}_3^{2-}$ ,  $\text{SO}_4^{2-}$ ,  $\text{NO}_2^-$ ,  $\text{NO}_3^-$ ,  $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{I}^-$ ,  $\text{PO}_4^{3-}$ ;  $\text{C}_2\text{O}_4^{2-}$ ,  $\text{CH}_3\text{COO}^-$

(Note Insoluble salts excluded)