BOARD OF SCHOOL EDUCATION HARYANA

Syllabus and Chapter wise division of marks (2024-25)

Class- 12th **Subject: Chemistry** **Code:856**

General Instructions:

1. There will be an Annual Examination based on the entire syllabus.
2. The annual examination (Theory) will be of 70 Marks whereas Practical examination will be of 30 marks (Internal). Therefore, Total annual evaluation (70+30) will be of 100 marks.
3. For Practical examination the criteria are as follows:

Total Time: 3 Hours

Evaluation Scheme	**Marks**
Marks allocated for Internal Assessment 1. Student Assessment Test Weightage of marks (04 marks of SAT, 02 marks of half yearly test, 02 marks for pre-board test, 02 marks for attendance and classroom participation) 2. Practical file/ Record 3. Project Record	**15** 10 03 02
Marks allocated for External Examination	**15**
One experiment	05
Salt Analysis	04
Activity (One from Syllabus)	03
Viva Voce	03
Total marks	**30**

Course Structure (2024-25)

Class- 12th **Subject: Chemistry** **Code:856**

Sr. No.	Name of Chapter	Marks
1	Unit 1: Solutions	8
2	Unit 2: Electro Chemistry	8
3	Unit 3: Chemical Kinetics	7
4	Unit 4: d & f Block Elements	7
5	Unit 5: Co-ordination Compounds	7
6	Unit 6: Halo Alkanes & Halo Arenes	6
7	Unit 7: Alcohols, Phenols and Ethers	6
8	Unit 8: Aldehydes, Ketones and Carboxylic Acids	8
9	Unit 9: Amines	6
10	Unit 10: Biomolecules	7
	Total	**70**
	Practical	**30**
	Grand Total	**100**

Unit 1: Solutions

1.1 Types of Solutions

1.2 Expressing Concentration of Solutions

1.3 Solubility: Solubility of a Solid in a Liquid, Solubility of a Gas in a Liquid,

1.4 Vapour Pressure of Liquid Solutions: Vapour Pressure of Liquid-Liquid Solutions, Raoult's Law as a special case of Henry's Law, Vapour Pressure of Solutions of Solids in Liquids

1.5 Ideal and Non-ideal Solutions: Ideal Solutions, Non-ideal Solutions

1.6 Colligative Properties and Determination of Molar Mass: Relative Lowering of Vapour Pressure, Elevation of Boiling Point, Depression of Freezing Point, 4 Osmosis and Osmotic Pressure, Reverse Osmosis and Water Purification

1.7 Abnormal Molar Masses

Unit 2: Electrochemistry

2.1 Electrochemical Cells

2.2 Galvanic Cells: Measurement of Electrode Potential,

2.3 Nernst Equation: Equilibrium Constant from Nernst Equation, Electrochemical Cell and Gibbs Energy of the Reaction,

2.4 Conductance of Electrolytic Solutions: Measurement of the Conductivity of Ionic Solutions, Variation of Conductivity and Molar Conductivity with Concentration,

2.5 Electrolytic Cells and Electrolysis: Products of Electrolysis,

2.6 Batteries: Primary Batteries, Secondary Batteries

2.7 Fuel Cells

2.8 Corrosion

Unit 3: Chemical Kinetics

3.1 Rate of a Chemical Reaction

3.2 Factors Influencing Rate of a Reaction: Dependence of Rate on Concentration, Rate Expression and Rate Constant, Order of a Reaction Molecularity of a Reaction,

3.3 Integrated Rate Equations: Zero Order Reactions, First Order Reactions, Half-Life of a Reaction,

3.4 Temperature Dependence of the Rate of a Reaction: Effect of Catalyst.

3.5 Collision Theory of Chemical Reactions

Unit 4: The d-and f-Block Elements

4.1 Position in the Periodic Table

4.2 Electronic Configurations of the d-Block Elements

4.3 General Properties of the Transition Elements (d-Block): Physical Properties, Variation in Atomic and Ionic Sizes of Transition Metals, Ionisation Enthalpies, Oxidation States, Trends in the M^{2+}/M Standard Electrode Potentials, Trends in the M^{3+}/M^{2+} Standard Electrode Potentials, Trends in Stability of Higher Oxidation State, Chemical Reactivity and E^{o} Values, Magnetic Properties, Formation of Coloured Ions, Formation of Complex Compounds, Catalytic Properties, Formation of Interstitial Compounds, Alloy Formation,

4.4 Some Important Compounds of Transition Elements

4.5 The Lanthanoids: Electronic Configurations, Atomic and Ionic Sizes, Oxidation States, General Characteristics,

4.6 The Actinoids: Electronic Configurations, Ionic Sizes, Oxidation States, General Characteristics and Comparison with Lanthanoids,

4.7 Some Applications of d- and f-Block Elements

Unit 5: Coordination Compounds

5.1 Werner's Theory of Coordination Compounds

5.2 Definitions of Some Important Terms Pertaining to Coordination Compounds

5.3 Nomenclature of Coordination Compounds: Formulas of Mononuclear Coordination Entities, Naming of Mononuclear Coordination Compounds,

5.4 Isomerism in Coordination Compounds: Geometric Isomerism, Optical Isomerism, Linkage Isomerism, Coordination Isomerism, Ionisation Isomerism, Solvate Isomerism, ,

5.5 Bonding in Coordination Compounds: Valence Bond Theory, Magnetic Properties of Coordination Compounds, Limitations of Valence Bond Theory, Crystal Field Theory, Colour in Coordination Compounds, Limitations of Crystal Field Theory,

5.6 Bonding in Metal Carbonyls

5.7 Importance and Applications of Coordination Compounds

Unit 6: Haloalkanes and Haloarenes

6.1 Classification: On the Basis of Number of Halogen Atoms, Compounds Containing sp^3 C—X Bond (X= F, Cl, Br, I), Compounds Containing sp^2 C—X Bond .

6.2 Nomenclature

6.3 Nature of C–X Bond

6.4 Methods of Preparation of Haloalkanes: From Alcohols, From Hydrocarbons, Halogen Exchange, Reactions of Haloalkanes

6.5 Preparation of Haloarenes

6.6 Physical Properties

6.7 Chemical Reactions: Reactions of Haloarenes

6.8 Polyhalogen Compounds: Dichloromethane (Methylene chloride, Trichloromethane (Chloroform), Triiodomethane (Iodoform), Tetrachloromethane (Carbon tetrachloride) Freons, p, p'-Dichlorodiphenyltrichloroethane (DDT)

Unit 7 Alcohols, Phenols and Ethers

7.1 Classification: Alcohols— Mono, Di, Tri or Polyhydric alcohols,

7.2 Nomenclature

7.3 Structures of Functional Groups

7.4 Alcohols and Phenols: Preparation of Alcohols, Preparation of Phenols, Physical Properties, Chemical Reactions,

7.5 Some Commercially Important Alcohols

7.6 Ethers: Preparation of Ethers, Physical Properties, Chemical Reactions

Unit 8 Aldehydes, Ketones and Carboxylic Acids

8.1 Nomenclature and Structure of Carbonyl Group: Nomenclature, Structure of the Carbonyl Group,

8.2 Preparation of Aldehydes and Ketones: Preparation of Aldehydes and Ketones, Preparation of Aldehydes, Preparation of Ketone,

8.3 Physical Properties

8.4 Chemical Reactions

8.5 Uses of Aldehydes and Ketones

8.6 Nomenclature and Structure of Carboxyl Group: Nomenclature, Structure of Carboxyl Group,

8.7 Methods of Preparation of Carboxylic Acids

8.8 Physical Properties

8.9 Chemical Reactions: Reactions Involving Cleavage of O–H Bond, Reactions Involving Cleavage of C–OH Bond, Reactions Involving –COOH Group, Substitution Reactions in the Hydrocarbon Part,

8.10 Uses of Carboxylic Acids

Unit 9 Amines

9.1 Structure of Amines

9.2 Classification

9.3 Nomenclature

9.4 Preparation of Amines

9.5 Physical Properties

9.6 Chemical Reactions

9.7 Method of Preparation of Diazonium Salts

9.8 Physical Properties

9.9 Chemical Reactions

9.10 Importance of Diazonium Salts in Synthesis of Aromatic Compounds

Unit 10 Biomolecules

10.1 Carbohydrates: Classification of Carbohydrates, Monosaccharides, Glucose, Fructose, Disaccharides, Polysaccharides, Importance of Carbohydrates.

10.2 Proteins: Amino Acids, Classification of Amino Acid, Structure of Proteins,

10.3 Enzymes: Mechanism of Enzyme Action.

10.4 Vitamins: Classification of Vitamins

10.5 Nucleic Acids: Chemical Composition of Nucleic Acid, Structure of Nucleic Acid, Biological Functions of Nucleic Acids,

10.6 Hormone Elementary idea (excluding structure)

PRACTICALS:

1. Determine the enthalpy change for the interaction between acetone and chloroform (hydrogen bond formation).
2. Study the variation in cell potential of the cell $Zn/Zn^{2+}||\ Cu^{2+}/Cu$ with change in concentration of electrolytes ($CuSO_4$ or $ZnSO_4$) at room temperature.
3. Study the effect of concentration and temperature variation respectively on the rate of reaction between sodium thiosulphate and hydrochloric acid.

4. Detect one cation and one anion in the given salt from the following ions:

   Cation: Pb^{2+}, $Cu^{2+,}$ As^{3+}, Al^{3+}, Fe^{3+}, Mn^{2+}, Zn^{2+}, Ni^{2+}, Ca^{2+}, Sr^{2+}, Ba^{2+}, Mg^{2+}, NH_4^+

   Anions:

   $(CO_3)^{2-}$, S^{2-}, $(SO_3)^2$, $(NO_2)^-$,$(SO_4)^{2-}$,Cl^- ,Br^-, I^-, $(PO_4)^{3-}$, $(C_2O_4)^{2-}$, CH_3COO^-, NO^{3-}

   (Note: Insoluble salts excluded)
5. Determine the concentration/molarity of $KMnO_4$ solution by titrating it against a 0.1 M standard solution of oxalic acid.
6. Prepare double salts: ferrous ammonium sulphate (Mohr's salt) and potash alum.
7. Identify the functional groups present in an organic compound.
8. Prepare aniline yellow (p-amino-azobenzene).
9. Prepare acetanilide.
10. Detection of carbohydrates, fats and proteins in the given foodstuffs.

Monthwise Syllabus Teaching Plan (2024-25)

Class- 12th **Subject: Chemistry** **Code:856**

Month	Chapter / Topic	Teaching Periods	Revision periods	Practical Periods
April	Unit 1: Solutions Practical: Determine the enthalpy change for the interaction between acetone and chloroform (hydrogen bond formation).	20	4	2
May	Unit 2: Electrochemistry Practical: Study the variation in cell potential of the cell $Zn/Zn^{2+}\|\|Cu^{2+}/Cu$ with change in concentration of electrolytes ($CuSO_4$ or $ZnSO_4$) at room temperature.	20	5	4
June	Summer Vacations:- Investigatory Projects, charts and working innovative models should be given during the summer vacations			
July	Unit 3 : Chemical Kinetics Practical: Study the effect of concentration and temperature variation respectively on the rate of reaction between sodium thiosulphate and hydrochloric	12	2	2

	acid. Unit 4: d & f- block elements Practical: Detect one cation and one anion in the given salt. Practical: Determine the concentration/molarity of $KMnO_4$ solution by titrating it against a 0.1 M standard solution of oxalic acid.	14	2	2 2
August	Unit 5 : Coordination compounds Practical: Prepare double salts: ferrous ammonium sulphate (Mohr's salt) and potash alum	18	5	4
September	Unit 6 : Halo Alkanes & Halo Arenes	18	4	
	Half Yearly Exam			
October	Unit 7: Alcohols, Phenols and Ethers	20	4	
November	Unit 8: Aldehydes, Ketones and Carboxylic Acids	24	4	
December	Unit 9: Amines Practical: Prepare aniline yellow (p-amino-azobenzene). Practical: Prepare acetanilide. Practical: Identify the	12	2	2 2

	functional groups present in an organic compound. Unit 10: Biomolecules Practical: Detection of carbohydrates, fats and proteins in the given foodstuffs.	10	2	4 4
January	Revision	--	--	--
February	Revision and Annual Practical Exams	--	--	--
March	Annual Exams			

Note:

- **Subject teachers are advised to direct the students to prepare notebook of the Terminology/Definitional Words used in the chapters for enhancement of vocabulary for clarity of the concept.**
- **The NCERT textbooks present information in boxes across the book. These help students to get conceptual clarity. However, the information in these boxes would not be assessed in the year-end examination.**

Prescribed Books:

1. Chemistry Part-I and Part II, Class XII , BSEH Publications © NCERT

2. Laboratory Manual of Chemistry, Class XII published by (NCERT)

Question Paper Design(2024-25)

Class- 12th **Subject: Chemistry** **Code: 856**

Time: 3 Hours

Type of Question	Marks	Number of Question	Description	Total Marks
Objective Questions	1	18	09 Multiple Choice Questions, 03 Fill in the blanks 03 One Word Answer based. 03 Assertion-Reason Questions	18
Very Short Answer Type Question	2	7	Internal choice will be given in any 3 questions	14
Short Answer Type Question	3	5	Internal choice will be given in any 2 questions	15
Case Study	4	2	Internal choice will be given only in one part of both questions	8
Long Answer Type Question	5	3	Internal choice will be given in all the questions and may be given in the parts	15
Total		35		70