

ACADEMIC PLAN: 2023-24**CARMEL CONVENT SR SEC SCHOOL, RATANPUR, BHOPAL.****STD: XII****SUBJECT: Chemistry**

Month / No of Working Days	Name of the Unit / Chapter/Topic	Learning Outcomes	Suggested Activities/ Projects under Internal Assessment/PRACTICALS	Assignment	Assessment
APRIL	<p><u>Unit II: Solutions</u> Types of solutions, expression of concentration of solutions of solids in liquids, solubility of gases in liquids, solid solutions, Raoult's law, colligative properties - relative lowering of vapour pressure, elevation of boiling point, depression of freezing point, osmotic pressure, determination of molecular masses using colligative properties, abnormal molecular mass, Van't Hoff factor.</p> <p><u>Unit X: Haloalkanes and Haloarenes.</u></p>	<ul style="list-style-type: none"> Students will be able to define and classify different types of solutions based on their concentration and properties. Students will understand the concept of solubility and factors that affect the solubility of solids, liquids, and gases in different solvents. Students will learn about colligative properties such as relative lowering of vapour pressure, Raoult's law, elevation of boiling point, depression of freezing point, and osmotic pressure. Students will be able to calculate the molecular mass of solutes using different colligative properties. Students will learn about the ideal and non-ideal solutions and how they differ from each other. Students will understand the concept of vapour pressure of solutions and deviations from Raoult's law. Students will learn about the determination of molecular mass using elevation in boiling point, depression in freezing point, and vapour pressure methods. Students will learn the application of solutions in daily life, such as in medical science, food preservation, and industrial processes. Understand the classification and nomenclature of haloalkanes and haloarenes. Describe the methods for the preparation of haloalkanes and haloarenes. 	SALT ANALYSIS SAMPLE 1,2,3,4	NUMERICAL BASED WORKSHEET	ORAL AND WRITTEN CLASS TEST
				WORKSHEET BASED ON COMPETENCY BASED QUESTIONS	WRITTEN CLASS TEST

	<p>Haloalkanes: Nomenclature, nature of C–X bond, physical and chemical properties, optical rotation mechanism of substitution reactions.</p> <p>Haloarenes: Nature of C–X bond, substitution reactions (Directive influence of halogen in monosubstituted compounds only). Uses and environmental effects of - dichloromethane, trichloromethane, tetrachloromethane, iodoform, freons, DDT</p> <p>Alcohols:</p>	<ul style="list-style-type: none"> Analyze the chemical reactions of haloalkanes and haloarenes, including nucleophilic substitution, elimination, and reduction reactions. Explain the mechanism of nucleophilic substitution reactions, including SN1 and SN2 mechanisms. Understand the biological and environmental significance of haloalkanes and haloarenes, including their use as pesticides, herbicides, and refrigerants. Analyze the physical properties of haloalkanes and haloarenes, including their boiling and melting points, solubility, and density. Describe the uses of haloalkanes and haloarenes in industry, such as in the manufacture of plastics and pharmaceuticals. 			
JUNE	<p><u>Unit XI: Alcohols, Phenols and Ethers</u></p> <p>Alcohols: Nomenclature, methods of preparation, physical and chemical properties (of primary alcohols only), identification of primary, secondary and tertiary alcohols, mechanism of dehydration, uses with special reference to methanol and ethanol.</p> <p>Phenols: Nomenclature, methods of preparation, physical and chemical properties, acidic nature of phenol, electrophilic substitution reactions, uses of phenols.</p> <p>Ethers: Nomenclature, methods of preparation, physical and chemical properties, uses.</p> <p><u>Unit III: Electrochemistry</u> Redox reactions, EMF of a cell, standard electrode potential,</p>	<ul style="list-style-type: none"> Understand the general formula and nomenclature of alcohols, phenols, and ethers. Understand the physical and chemical properties of alcohols, phenols, and ethers. Identify and differentiate between primary, secondary, and tertiary alcohols. Understand the formation and reactions of alcohols, phenols, and ethers. Understand the properties and uses of methanol, ethanol, and phenol. Understand the preparation of ethers using the Williamson synthesis method. Understand the physical and chemical properties of ethers. Identify and differentiate between symmetrical and unsymmetrical ethers. Understand the structure and properties of phenols. Understand the acidic nature of phenols and their reactions with metals and bases <ul style="list-style-type: none"> Students will understand the concept of redox reactions and the various types of 	SALT ANALYSIS SALT SAMPLE 5,6	WORKSHEET BASED ON CONVERSIONS & NAME REACTIONS	WRITTEN CLASS TEST
				WORKSHEET BASED ON NUMERICALS	WRITTEN & ORAL TEST

	<p>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 and law of electrolysis (elementary idea), dry cell-electrolytic cells and Galvanic cells, lead accumulator, fuel cells, corrosion.</p>	<p>electrochemical cells.</p> <ul style="list-style-type: none"> • Students will be able to calculate the standard electrode potential and understand the Nernst equation and its application in chemical cells. • Students will be able to calculate the EMF of a cell and understand the relation between Gibbs energy change and EMF of a cell. • Students will be able to understand the concept of conductance in electrolytic solutions, specific and molar conductivity, and variations of conductivity with concentration. • Students will be able to study the effect of temperature and concentration on the rate of electrolysis and the variation of conductance with temperature of electrolytes. • Students will be able to explain the process of electrolysis using an aqueous solution of CuSO₄ with copper electrodes. • Students will be able to understand the working of a dry cell, electrolytic cells, and Galvanic cells. • Students will be able to study the lead accumulator and fuel cells. • Students will be able to calculate the Van't Hoff factor and perform calculations involving it. • Students will be able to explain the applications of electrochemistry in various fields such as metallurgy, electroplating, and batterie 			
JULY	<p><u>Unit VIII: d and f Block Elements</u> 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,</p>	<ul style="list-style-type: none"> • Students will be able to identify the properties of transition elements and understand their electronic configurations. • Students will learn about the occurrence, isolation, and properties of some important compounds of transition elements. • Students will gain an understanding of the 	<p>Determination of concentration/ molarity of KMnO₄ solution by titrating it against a standard solution of: (a) Oxalic acid, (b) Ferrous Ammonium Sulphate</p>		<p>PT-1 UNIT- 2 & 10</p>

	<p>catalytic property, magnetic properties, interstitial compounds, alloy formation, preparation and properties of $K_2Cr_2O_7$ and $KMnO_4$.</p> <p>Lanthanoids – Electronic configuration, oxidation states, chemical reactivity and lanthanoid contraction and its consequences.</p> <p>Actinoids - Electronic configuration, oxidation states and comparison with lanthanoids.</p> <p><u>Unit IX: Coordination Compounds</u></p> <p>Coordination compounds - Introduction, ligands, coordination number, colour, magnetic properties and shapes, IUPAC nomenclature of mononuclear coordination compounds. Bonding, Werner's theory, VBT, and CFT; structure and stereoisomerism, the importance of coordination compounds (in qualitative analysis, extraction of metals and biological system).</p>	<p>preparation, properties, and uses of important alloys such as brass and stainless steel.</p> <ul style="list-style-type: none"> • Students will learn about the electronic configuration and oxidation states of lanthanides and actinides. • Students will understand the preparation, properties, and uses of important compounds of lanthanides and actinides. • Students will be able to distinguish between lanthanides and actinides based on their properties. <ul style="list-style-type: none"> • Understand the concept of coordination compounds and their formation. • Identify the types of ligands and their properties. • Describe the nomenclature and isomerism in coordination compounds. • Discuss the structures of coordination compounds and the different theories of their bonding. • Explain the importance of coordination compounds in biological and industrial processes. • Analyze the chemical reactions and properties of coordination compounds. • Interpret the colour and magnetic properties of coordination compounds. • Understand the application of coordination compounds in various fields, including medicine, agriculture, and environment. 			
AUGUST	<p><u>Unit XII: Aldehydes, Ketones and Carboxylic Acids</u></p> <p>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.</p>	<ul style="list-style-type: none"> • Understand the IUPAC nomenclature and structure of aldehydes, ketones and carboxylic acids. • Understand the preparation methods of aldehydes, ketones and carboxylic acids with their chemical equations. • Discuss the physical and chemical properties of 	<p>Tests for the functional groups present in organic compounds: Unsaturation, alcoholic, phenolic, aldehydic, ketonic, carboxylic and amino (Primary) groups.</p>	<p>WORKSHEET BASED ON REASONING QUESTION</p>	<p>WRITTEN CLASS TEST</p>

Carboxylic Acids:
Nomenclature, acidic nature, methods of preparation, physical and chemical properties; uses.

aldehydes, ketones and carboxylic acids, and compare them with each other.

- Explain the acidic nature of carboxylic acids and their reactions with metals, bases, and carbonates.
- Understand the reaction of aldehydes and ketones with hydrogen cyanide and sodium bisulfite.
- Discuss the nucleophilic addition reactions of aldehydes and ketones with hydrogen cyanide, sodium bisulfite, and alcohols.
- Understand the reactions of carboxylic acids with alcohols, ammonia, and amines to form esters, amides, and salts.
- Discuss the importance and uses of aldehydes, ketones, and carboxylic acids in our daily life.
- Relate the concept of aldehydes, ketones, and carboxylic acids with the formation and properties of different biomolecules.
- Perform various practical experiments related to the chapter such as the preparation of carboxylic acids, the detection of the presence of carbonyl compounds, and the test for the acidic nature of carboxylic acids.

Unit IV: Chemical Kinetics

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), concept of collision theory (elementary idea, no mathematical treatment), activation

- Understanding the concept of chemical kinetics, rate of reaction, and factors affecting the rate of reaction.
- Understanding the order and molecularity of a reaction, rate law, and the specific rate constant.
- Familiarity with the integrated rate equations and half-life for zero and first-order reactions.
- Understanding the collision theory, activation energy, and the effect of catalysts on the rate of

WORKSHEET
BASED ON
NUMERICALS

ORAL AND
WRITTEN
TEST

	energy, Arrhenius equation.	<p>reaction.</p> <ul style="list-style-type: none"> • Applying the knowledge of chemical kinetics to practical situations such as studying the effect of concentration and temperature on the rate of reaction. • Developing analytical and critical thinking skills to analyze and interpret experimental data related to chemical kinetics. <p>Appreciating the role of chemical kinetics in various fields, such as in the study of chemical reactions in biological systems, environmental chemistry, and industrial processes.</p>			
SEPTEMBER					TERM-1 2,3,4,8,9,10, 11,12
OCTOBER	<p><u>Unit XIV: Biomolecules</u></p> <p>Carbohydrates - Classification (aldoses and ketoses), monosaccharides (glucose and fructose), D-L configuration oligosaccharides (sucrose, lactose, maltose), polysaccharides (starch, cellulose, glycogen); Importance of carbohydrates. Proteins - Elementary idea of - amino acids, peptide bond, polypeptides, proteins, structure of proteins - primary, secondary, tertiary structure and quaternary structures (qualitative idea only), denaturation of proteins; enzymes. Hormones - Elementary idea excluding structure. Vitamins - Classification and functions. Nucleic Acids: DNA and RNA.</p>	<ul style="list-style-type: none"> • Understanding the classification of biomolecules into carbohydrates, proteins, nucleic acids, and lipids. • Understanding the structure and function of carbohydrates, including monosaccharides, disaccharides, and polysaccharides. • Understanding the structure and function of proteins, including primary, secondary, tertiary, and quaternary structures, and the role of proteins in various biological processes. • Understanding the structure and function of nucleic acids, including DNA and RNA, and their role in genetic information storage and transfer. • Understanding the structure and function of lipids, including fatty acids, phospholipids, and steroids, and their role in membrane structure and various metabolic processes. • Understanding the concept of enzymes as biological 	<p>Characteristic tests of carbohydrates, fats and proteins in pure samples and their detection in given foodstuffs.</p> <p>SALT ANALYSIS SALT SAMPLE 7, 8, 9, 10, 11, 12</p>	WORKSHEET	ORAL AND WRITTEN

	<p>Unit XIII: Amines Amines: Nomenclature, classification, structure, methods of preparation, physical and chemical properties, uses, identification of primary, secondary and tertiary amines. Diazonium salts: Preparation, chemical reactions and importance in synthetic organic chemistry.</p>	<p>catalysts and their role in various metabolic pathways.</p> <ul style="list-style-type: none"> • Understanding the importance of biomolecules in various biological processes, such as digestion, respiration & photosynthesis. • Appreciating the interdependence of different biomolecules in maintaining the integrity and function of living organisms • Understand the concept of amines & their classification based on their structures. • Describe the preparation methods of primary, secondary, and tertiary amines. • Learn the physical and chemical properties of amines, including basicity, solubility, and nucleophilic substitution reactions. • Understand the preparation, properties, and uses of some important amines such as aniline, benzylamine, and ethylamine. • Understand the role of amines in biological systems, including their structure and function in amino acids and proteins. • Understand the environmental impact of amines and their derivatives, including the harmful effects of nitrogen-containing pollutants. • Develop experimental skills in the preparation and identification of amines through laboratory experiments and analysis. 		WORKSHEET	ORAL AND WRITTEN
NOVEMBER	REVISION				
DECEMBER					FINAL EXAM PRE BOARD PRACTICALS
JANUARY					PRE BOARD EXAM
FEBRUARY & MARCH					FINALBOARD EXAM

NAME OF THE SUBJECT TEACHER: Mrs Bindu Dalal

SIGNATURE OF THE SUBJECT COORDINATOR: