

Curriculum
Subject: Chemistry (043)
Class: XI
Session: 2024-25

EVALUATION SCHEME		
Theory		
Units	Title	Marks
I	Some Basic Concepts of Chemistry	7
II	Structure of Atom	9
III	Classification of Elements and Periodicity in Properties	6
IV	Chemical Bonding and Molecular Structure	7
V	Chemical Thermodynamics	9
VI	Equilibrium	7
VII	Redox Reactions	4
VIII	Organic Chemistry: Some basic Principles and Techniques	11
IX	Hydrocarbons	10
	Total	70

UNIT/ MONTH	LEARNING OUTCOMES	PRACTICAL AND COMPETENCY SKILL BASED ACTIVITIES / EXPERIENTIAL LEARNING	SKILLS	ASSESSMENT
Unit I: Some Basic Concepts of Chemistry April-May	Students will be able to <ul style="list-style-type: none"> ● Understand the Importance and scope of Chemistry. ● Know the nature of matter. ● Mathematically understand the laws of chemical combination ● Have detailed understanding of Dalton's atomic theory: concept of elements, atoms and molecules. ● Define Atomic and molecular masses. ● Understand and solve the numericals based on mole concept and molar mass. ● Depict the percentage composition, empirical and molecular formula of the given compound. ● Write the chemical reactions, stoichiometry and calculations based on stoichiometry. 	Preparation of standard solution of Oxalic acid. Field trip to Bio Fermenta.	Knowledge, Understanding, Application, Analysis and Evaluation	Diagram based analysis. Pen paper test Solving Numerical
Unit II: Structure of Atom May - June	Students will be able to <ul style="list-style-type: none"> ● Know the discovery of Electron, Proton and Neutron. ● Define atomic number, isotopes and isobars. ● Understand Thomson's model and its limitations. Rutherford's model and its limitations, Bohr's model and its limitations. ● Know about the concept of shells and subshells ● Understand dual nature of matter and light ● Derive de-Broglie's relationship, Heisenberg uncertainty principle ● Understand the concept of orbitals, quantum numbers. ● Draw the shapes of s, p and d orbitals ● Apply the rules for filling electrons in orbitals w.r.t. Aufbau principle, Pauli's exclusion principle and Hund's rule ● Depict the electronic configuration of atoms ● Explain the stability of half-filled and completely filled orbitals. 	Determination of strength of a given solution of Sodium hydroxide by titrating it against the standard solution of Oxalic acid.	Knowledge, Understanding, Application, Analysis and Evaluation	Logical reasoning. Conceptual questions. SA/ VSA questions pen paper test.

Unit III: Classification of Elements and Periodicity in Properties July	<p>Students will be able to</p> <ul style="list-style-type: none"> ● Signify the classification, brief history of the development of periodic table ● Learn modern periodic law and the present form of periodic table ● Understand the periodic trends in properties of elements -atomic radii, ionic radii, inert gas radii, ionization enthalpy, electron gain enthalpy, electronegativity and valency. ● Name the elements with atomic number greater than 100. 	<p>Preparation of standard solution of Sodium carbonate.</p>	<p>Knowledge, Understanding, Application, Analysis and Evaluation</p>	<p>MCQ. Numerical solving skills. Pen paper test.</p>
Unit IV: Chemical Bonding and Molecular Structure July -Aug	<p>Students will be able to</p> <ul style="list-style-type: none"> ● Understand Valence electrons, ionic bond, covalent bond and bond parameters ● Draw the Lewis's structure of compounds. ● Explain polar character of covalent bond and covalent character of ionic bond ● Understand valence bond theory ● Define resonance ● Draw the geometry of covalent molecules ● Understand VSEPR theory and concept of hybridization, involving s, p and d orbitals and shapes of some simple molecules ● Understand molecular orbital theory of homonuclear diatomic molecules (qualitative idea only) ● Define Hydrogen bond. 	<p>Qualitative analysis Determination of one cation and one anion in a given salt. Cation - Pb^{2+}, Cu^{2+}, As^{3+}, Al^{3+}, Fe^{3+}, Mn^{2+}, Zn^{2+}, Cu^{2+}, Co^{2+}, Ni^{2+}, Ca^{2+}, Sr^{2+}, Ba^{2+}, Mg^{2+}, NH_4^+. Anions - S^{2-}, SO_4^{2-}, NO_3^-, CO_3^{2-}, Br^-, Cl^-, I^-, PO_4^{3-}, $CHCOO^-$, $C_2O_4^{2-}$, CH_3COO^-, NO_3^-.</p>	<p>Knowledge, Understanding, Application, Analysis and Evaluation</p>	<p>Equation based. Logical reasoning based questions. Conceptual questions.</p>
Unit V: Chemical Thermodynamics August	<p>Students will be able to</p> <ul style="list-style-type: none"> ● Understand Concepts of System ● Define the types of systems, surroundings, work, heat, energy, extensive and intensive properties, state functions. ● Understand First law of thermodynamics ● Define internal energy and enthalpy, heat capacity and specific heat ● Measure ΔU and ΔH ● Understand Hess's law of constant heat summation, enthalpy of bond dissociation, combustion, formation, atomization, sublimation, phase transition, ionization, solution and dilution. ● Define Second law of Thermodynamics (brief introduction) ● Explain entropy as a state function ● Write Gibb's energy change for spontaneous and non- spontaneous processes ● Explain criteria for equilibrium. ● Define Third law of thermodynamics (brief introduction). 	<p>Perform different exothermic and endothermic reaction with examples.</p> <p>Collaboration with Bio Fermenta trip.</p>	<p>Knowledge, Understanding, Application, Analysis and Evaluation</p>	<p>MCQ. Logical reasoning based questions. Conceptual questions. Pen paper test</p>

Unit VI: Equilibrium September	<p>Students will be able to</p> <ul style="list-style-type: none"> ● Define Equilibrium in physical and chemical processes ● Explain dynamic nature of equilibrium ● Understand law of mass action, equilibrium constant ● Understand factors affecting equilibrium - Le Chatelier's principle, ionic equilibrium- ionization of acids and bases, strong and weak electrolytes, degree of ionization, ionization of poly basic acids, acid strength ● Calculate the pH ,hydrolysis of salts (elementary idea) ● Explain buffer solution, Henderson Equation, solubility product, common ion effect (with illustrative examples). 	<p>Determination of strength of a given solution of Hydrochloric acid by titrating it against the standard Sodium Carbonate solution.</p> <p>Visit to Catch Factory</p>	<p>Knowledge, Understanding , Application, Analysis and Evaluation</p>	<p>Equation based worksheet. MCQ. Logical reasoning based questions. Conceptual questions.</p>
Unit VII: Redox Reactions September	<p>Students will be able to</p> <ul style="list-style-type: none"> ● Understand concept of oxidation and reduction, redox reactions. ● Calculate the oxidation number ● Balance the redox reactions, in terms of loss and gain of electrons and change in oxidation number ● Know the applications of redox reactions. 	<p>Perform different oxidation and reduction reactions.</p>	<p>Knowledge, Understanding , Application, Analysis and Evaluation</p>	<p>Equation based worksheet. MCQ. Logical reasoning based questions. Conceptual questions. Pen paper test</p>
Unit VIII: Organic Chemistry: Some basic Principles and Techniques October	<p>Students will be able to</p> <ul style="list-style-type: none"> ● Understand methods of purification, qualitative and quantitative analysis of organic compounds. ● Classify and write IUPAC nomenclature of organic compounds. ● Understand electronic displacements in a covalent bond: inductive effect, electrometric effect, resonance and hyperconjugation. ● Differentiate homolytic and heterolytic fission of a covalent bond: free radicals, carbocations, carbanions, electrophiles and nucleophiles ● Classify the types of organic reactions. 	<p>Collaboration with visit to Catch Factory</p>	<p>Knowledge, Understanding , Application, Analysis and Evaluation</p>	<p>VS/ VSA questions Equation based worksheet. MCQ. Logical reasoning based questions. Conceptual questions. Pen paper test</p>

Unit IX: Hydrocarbons November	<p>Aliphatic Hydrocarbons: Students will be able to</p> <ul style="list-style-type: none"> Understand Alkanes - Nomenclature, isomerism, conformation (ethane only), physical properties, and chemical reactions including free radical mechanism of halogenation, combustion and pyrolysis. Understand Alkenes - Nomenclature, the structure of double bond (ethene), geometrical isomerism, physical properties, methods of preparation, chemical reactions: addition of hydrogen, halogen, water, hydrogen halides (Markovnikov's addition and peroxide effect), ozonolysis, oxidation, mechanism of electrophilic addition. Understand Alkynes - Nomenclature, the structure of triple bond (ethyne), physical properties, methods of preparation, chemical reactions: acidic character of alkynes, addition reaction of -hydrogen, halogens, hydrogen halides and water. <p>Aromatic Hydrocarbons: Students will be able to</p> <ul style="list-style-type: none"> Write IUPAC nomenclature Understand benzene: resonance, aromaticity, chemical properties: mechanism of electrophilic substitution. Nitration, sulphonation, halogenation, Friedel Crafts alkylation and acylation, directive influence of the functional group in monosubstituted benzene. Explain Carcinogenicity and toxicity. 	<p>Scientific investigations involving laboratory testing and collecting information from other sources. A few suggested Projects.</p> <p>*To Study the presence of oxalate ions in guava fruit at different stages of ripening.</p> <p>*To Study the quantity of casein present in different samples of milk.</p> <p>*Preparation of soyabean milk and its comparison with the natural milk with respect to curd formation, effect of temperature, etc.</p> <p>*Study of the effect of Potassium Bisulphate as food preservative under various conditions (temperature, concentration, time, etc.)</p> <p>*Study of digestion of starch by salivary amylase and effect of pH and temperature on it.</p> <p>*Comparative study of the rate of fermentation of following materials: wheat flour, gram flour, potato juice, carrot juice, etc.</p> <p>*Extraction of essential oils present in Saunf (aniseed), Ajwain (carum), Illaichi (cardamom).</p> <p>*Study of common food adulterants in fat, oil, butter, sugar, turmeric powder, chili powder and pepper.</p>	<p>Knowledge, Understanding, Application, Analysis and Evaluation</p>	<p>Equation based worksheet. MCQ. Logical reasoning based questions. Conceptual questions.</p>
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PRACTICAL

Sr. No.	Evaluation Scheme	Marks
1	Volumetric Analysis	8
2	Salt Analysis	8
3	Content Based Experiment	6
4	Project Work	4
5	Class record and viva	4
	Total	30

Sr. No.	Books	Publisher
1	Chemistry - I	NCERT
2	Chemistry - I	NCERT
3	Lab Manual	Evergreen

