

<b>EVALUATION SCHEME</b>		
<b>Theory</b>		
<b>S.No.</b>	<b>TITLE</b>	<b>Marks</b>
1	Some Basic Concepts of Chemistry	7
2	Structure of Atom	9
3	Classification of Elements and Periodicity in Properties	6
4	Chemical Bonding and Molecular Structure	7
5	Chemical Thermodynamics	9
6	Equilibrium	7
7	Redox Reactions	4
8	Organic Chemistry: Some basic Principles and Techniques	11
9	Hydrocarbons	10
	<b>TOTAL</b>	<b>70</b>

UNIT	MONTH	LEARNING OBJECTIVES	PRACTICAL AND COMPETENCY SKILL BASED ACTIVITIES / EXPERIENTIAL LEARNING	Skills	ASSESSMENT
<b>Unit I: Some Basic Concepts of Chemistry</b>	May	Students will be able to <ul style="list-style-type: none"> <li>● Understand the Importance and scope of Chemistry.</li> <li>● Know the nature of matter.</li> <li>● Mathematically understand the laws of chemical combination</li> <li>● Have detailed understanding of Dalton's atomic theory: concept of elements, atoms and molecules.</li> <li>● Define Atomic and molecular masses.</li> <li>● Understand and solve the numericals based on mole concept and molar mass.</li> <li>● Depict the percentage composition, empirical and molecular formula of the given compound.</li> <li>● Write the chemical reactions, stoichiometry and calculations based on stoichiometry.</li> </ul>	Preparation of standard solution of Oxalic acid.	Knowledge, Understanding, Application, Analysis and Evaluation	Diagram based analysis. Pen paper test Solving Numerical
<b>Unit II: Structure of Atom</b>	MAY - June	Students will be able to <ul style="list-style-type: none"> <li>● Know the discovery of Electron, Proton and Neutron.</li> <li>● Define atomic number, isotopes and isobars.</li> <li>● Understand Thomson's model and its limitations. Rutherford's model and its limitations, Bohr's model and its</li> </ul>	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.

		<p>limitations.</p> <ul style="list-style-type: none"> <li>● Know about the concept of shells and subshells</li> <li>● Understand dual nature of matter and light</li> <li>● Derive de-Broglie's relationship, Heisenberg uncertainty principle</li> <li>● Understand the concept of orbitals, quantum numbers.</li> <li>● Draw the shapes of s, p and d orbitals</li> <li>● Apply the rules for filling electrons in orbitals w.r.t. Aufbau principle, Pauli's exclusion principle and Hund's rule</li> <li>● Depict the electronic configuration of atoms</li> <li>● Explain the stability of half-filled and completely filled orbitals.</li> </ul>			
<b>Unit III: Classification of Elements and Periodicity in Properties</b>	July	<p>Students will be able to</p> <ul style="list-style-type: none"> <li>● Signify the classification, brief history of the development of periodic table</li> <li>● Learn modern periodic law and the present form of periodic table</li> <li>● Understand the periodic trends in properties of elements -atomic radii, ionic radii, inert gas radii, Ionization enthalpy, electron gain enthalpy, electronegativity, valency.</li> <li>● Name the elements with atomic number greater than 100.</li> </ul>	Preparation of standard solution of Sodium carbonate.	Knowledge, Understanding, Application, Analysis and Evaluation	MCQ. Numerical solving skills. Pen paper test.
<b>Unit IV: Chemical Bonding and Molecular Structure</b>	July -Aug	<p>Students will be able to</p> <ul style="list-style-type: none"> <li>● Understand Valence electrons, ionic bond, covalent bond and bond parameters</li> <li>● Draw the Lewis's structure of compounds.</li> <li>● Explain polar character of covalent bond and covalent character of ionic bond</li> <li>● Understand valence bond theory</li> <li>● Define resonance,</li> <li>● Draw the geometry of covalent molecules</li> <li>● Understand VSEPR theory and concept of hybridization, involving s, p and d orbitals and shapes of some simple molecules</li> <li>● Understand molecular orbital theory of homonuclear diatomic molecules (qualitative idea only)</li> <li>● Define Hydrogen bond.</li> </ul>	<p>Qualitative analysis Determination of one cation and one anion in a given salt.</p> <p>Cation - <math>Pb^{2+}</math>, <math>Cu^{2+}</math>, <math>As^{3+}</math>, <math>Al^{3+}</math>, <math>Fe^{3+}</math>, <math>Mn^{2+}</math>, <math>Zn^{2+}</math>, <math>Cu^{2+}</math>, <math>Co^{2+}</math>, <math>Ni^{2+}</math>, <math>Ca^{2+}</math>, <math>Sr^{2+}</math>, <math>Ba^{2+}</math>, <math>Mg^{2+}</math>, <math>NH_4^+</math>.</p> <p>Anions - <math>S^{2-}</math>, <math>SO_4^{2-}</math>, <math>NO_3^-</math>, <math>CO_3^{2-}</math>, <math>Br^-</math>, <math>Cl^-</math>, <math>I^-</math>, <math>PO_4^{3-}</math>, <math>CHCOO^-</math>, <math>C_2O_4^{2-}</math>, <math>CH_3COO^-</math>, <math>NO_3^-</math>.</p>	Knowledge, Understanding, Application, Analysis and Evaluation	Equation based. Logical reasoning based questions. Conceptual questions.
<b>Unit V: Chemical Thermodynamics</b>	August	<p>Students will be able to</p> <ul style="list-style-type: none"> <li>● Understand Concepts of System</li> <li>● Define the types of systems, surroundings, work, heat, energy, extensive and intensive properties, state functions.</li> <li>● Understand First law of thermodynamics</li> <li>● Define internal energy and enthalpy, heat capacity and specific heat</li> <li>● Measure <math>\Delta U</math> and <math>\Delta H</math></li> <li>● Understand Hess's law of constant heat summation, enthalpy of bond dissociation, combustion, formation, atomization, sublimation, phase transition, ionization, solution and dilution.</li> <li>● Define Second law of Thermodynamics (brief introduction)</li> <li>● Explain entropy as a state function</li> <li>● Write Gibb's energy change for spontaneous and non-spontaneous processes</li> <li>● Explain criteria for equilibrium.</li> <li>● Define Third law of thermodynamics (brief introduction).</li> </ul>		Knowledge, Understanding, Application, Analysis and Evaluation	MCQ. Logical reasoning based questions. Conceptual questions. Pen paper test

<b>Unit VI: Equilibrium</b>	September	Students will be able to <ul style="list-style-type: none"> <li>Define Equilibrium in physical and chemical processes</li> <li>Explain dynamic nature of equilibrium</li> <li>Understand law of mass action, equilibrium constant</li> <li>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</li> <li>Calculate the pHKnow hydrolysis of salts (elementary idea)</li> <li>Explain buffer solution, Henderson Equation, solubility product, common ion effect (with illustrative examples).</li> </ul>	Determination of strength of a given solution of hydrochloric acid by titrating it against the standard Sodium Carbonate solution.	Knowledge, Understanding, Application, Analysis and Evaluation	Equation based worksheet. MCQ. Logical reasoning based questions. Conceptual questions.
<b>Unit VII: Redox Reactions</b>	September	Students will be able to <ul style="list-style-type: none"> <li>Understand Concept of oxidation and reduction, redox reactions.</li> <li>Calculate the oxidation number</li> <li>Balance the redox reactions, in terms of loss and gain of electrons and change in oxidation number</li> <li>Know the applications of redox reactions.</li> </ul>		Knowledge, Understanding, Application, Analysis and Evaluation	Equation based worksheet. MCQ. Logical reasoning based questions. Conceptual questions. Pen paper test
<b>Unit VIII: Organic Chemistry: Some basic Principles and Techniques</b>	October	Students will be able to <ul style="list-style-type: none"> <li>Understand methods of purification, qualitative and quantitative analysis of organic compounds.</li> <li>Classify and write IUPAC nomenclature of organic compounds.</li> <li>Understand Electronic displacements in a covalent bond: inductive effect, electromeric effect, resonance and hyperconjugation.</li> <li>Differentiate Homolytic and heterolytic fission of a covalent bond: free radicals, carbocations, carbanions, electrophiles and nucleophiles</li> <li>Classify the types of organic reactions.</li> </ul>		Knowledge, Understanding, Application, Analysis and Evaluation	VS/VSA questions Equation based worksheet. MCQ. Logical reasoning based questions. Conceptual questions. Pen paper test
<b>Unit IX: Hydrocarbons</b>	November	<b>Aliphatic Hydrocarbons:</b> Students will be able to <ul style="list-style-type: none"> <li>Understand Alkanes - Nomenclature, isomerism, conformation (ethane only), physical properties, chemical reactions including free radical mechanism of halogenation, combustion and pyrolysis.</li> <li>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.</li> <li>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.</li> </ul> <b>Aromatic Hydrocarbons:</b> Students will be able to <ul style="list-style-type: none"> <li>Write IUPAC nomenclature</li> <li>Understand benzene: resonance,</li> </ul>	Scientific investigations involving laboratory testing and collecting information from other sources. A few suggested Projects. *To Study the presence of oxalate ions in guava fruit at different stages of ripening. *To Study the quantity of casein present in different samples of milk. *Preparation of soyabean milk and its comparison with the natural milk with respect to curd formation, effect of temperature, etc. *Study of the effect of Potassium Bisulphate as food	Knowledge, Understanding, Application, Analysis and Evaluation	Equation based worksheet. MCQ. Logical reasoning based questions. Conceptual questions.

		<p>aromaticity, chemical properties: mechanism of electrophilic substitution. Nitration, sulphonation, halogenation, Friedel Crafts alkylation and acylation, directive influence of the functional group in monosubstituted benzene.</p> <ul style="list-style-type: none"> <li>• Explain Carcinogenicity and toxicity.</li> </ul>	<p>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>		
--	--	---	---	--	--

**Practical Evaluation Scheme:**

S.No.	Practical	Marks
1	Volumetric Analysis	08
2	Salt Analysis	08
3	Content Based Experiment	06
4	Project Work	04
5	Class record and viva	04
	<b>Total</b>	<b>30</b>