

**Cambridge International School, Mohal, Kullu**

**Class-XI ,Subject – Chemistry**

**Session – 2020-21**

UNIT	LEARNING OBJECTIVES	PRACTICALS	MONTH	ASSESSMENT/ ASSIGNMENT
I Some Basic Concepts of Chemistry.	General Introduction: Importance and scope of chemistry. Nature of matter, laws of chemical combination, Dalton's atomic theory: concept of elements, atoms and molecules. Atomic and molecular masses, mole concept and molar mass, percentage composition, empirical and molecular formula, chemical reactions, stoichiometry and calculations based on stoichiometry.		April	Knowledge based questions Conceptual questions HOTS SKLLS Analytical skills Numerical solving skills. Pen Paper test after the completion of unit
II Structure of Atom.	Discovery of Electron, Proton and Neutron, atomic number, isotopes and isobars. Thomson's model and its limitations. Rutherford's model and its limitations, Bohr's model and its limitations, concept of shells and subshells, dual nature of matter and light, de Broglie's relationship, Heisenberg uncertainty principle, concept of orbitals, quantum numbers, shapes of s, p and d orbitals, rules for filling electrons in orbitals - Aufbau principle, Pauli's exclusion principle and Hund's rule, electronic configuration of atoms, stability of half filled and completely filled orbitals	Experiments based on pH (a) Any one of the following experiments: <ul style="list-style-type: none"> <li>Determination of pH of some solutions obtained from fruit juices, solution of known and varied concentrations of acids, bases and salts using pH paper or universal indicator.</li> <li>Comparing the pH of solutions of strong and weak acids of same concentration.</li> <li>Study the pH change in the titration of a strong base using universal indicator.</li> </ul> (b) Study the pH change by common-ion in case of weak acids and weak bases.		Group discussion Conceptual questions Pen paper test Numerical solving skills.
III Classification of Elements and Periodicity in Properties.	Significance of classification, brief history of the development of periodic table, modern periodic law and the present form of periodic table, periodic trends in properties of elements -atomic radii, ionic radii, inert gas radii Ionization enthalpy, electron gain enthalpy, electro negativity, valency. Nomenclature of elements with atomic number greater than 100.		May	Knowledge based questions HOTS. Conceptual understanding of the subject matter

<p>IV. Chemical Bonding and Molecular structure.</p>	<p>Valence electrons, ionic bond, covalent bond; bond parameters, Lewis structure, polar character of covalent bond, covalent character of ionic bond, valence bond theory, resonance, geometry of covalent molecules, VSEPR theory, concept of hybridization, involving s,p and d orbitals and shapes of some simple molecules, Molecular orbital theory of homonuclear diatomic molecules (qualitative idea only), hydrogen bond.</p>	<p>. Quantitative Estimation</p> <ul style="list-style-type: none"> <li>• Using a chemical balance.</li> <li>• Preparation of standard solution of Oxalic acid.</li> <li>• Determination of strength of a given solution of Sodium Hydroxide by titrating it against standard solution of Oxalic acid.</li> <li>• Preparation of standard solution of Sodium Carbonate.</li> <li>• Determination of strength of a given solution of Hydrochloric acid by titrating it against standard Sodium Carbonate solution</li> </ul>		<p>SA/VSA questions. Group discussion Conceptual questions Pen paper test.</p>
<p>V States of Matter: Gases and Liquids.</p>	<p>Three states of matter, intermolecular interactions, types of bonding, melting and boiling points, role of gas laws in elucidating the concept of the molecule, Boyle's law, Charles law, Gay Lussac's law, Avogadro's Law, ideal behaviour, empirical derivation of gas equation, Avogadro's number, ideal gas equation. Deviation from ideal behaviour, liquefaction of gases, critical temperature, kinetic energy and molecular speeds (elementary idea), Liquid State- Vapour pressure, viscosity and surface tension (qualitative idea only, no mathematical derivations)</p>		<p>June</p>	<p>Knowledge based questions. MCQ's Numerical solving skills Analytical skills Pen Paper test after the completion of unit</p>
<p>VI. Chemical Thermodynamics .</p>	<p>Concepts of System and types of systems, surroundings, work, heat, energy, extensive and intensive properties, state functions. First law of thermodynamics -internal energy and enthalpy, heat capacity and specific heat, measurement of U and H, Hess's law of constant heat summation, enthalpy of bond dissociation, combustion, formation, atomization, sublimation, phase transition, ionization, solution and dilution. Second law of Thermodynamics (brief introduction)</p>		<p>June</p>	<p>MCQ's test of various concepts of theory. Numerical solving skill. Conceptual questions. Pen paper test.</p>

	Introduction of entropy as a state function, Gibb's energy change for spontaneous and non-spontaneous Processes, criteria for equilibrium. Third law of thermodynamics (brief introduction).			
VII: Equilibrium	Equilibrium in physical and chemical processes, dynamic nature of equilibrium, law of mass action, equilibrium constant, 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, concept of pH, Henderson Equation, hydrolysis of salts (elementary idea), buffer solution, Solubility product, common ion effect (with illustrative examples).		July	Knowledge based questions MCQ's test of numericals Skill Reasoning and understanding Pen paper test.  Half Yearly Examination
VIII: Redox Reactions.	Concept of oxidation and reduction, redox reactions, oxidation number, balancing redox reactions, in terms of loss and gain of electrons and change in oxidation number, applications of redox reactions		July	VSA/SA questions Knowledge based questions. MCQ's Numerical solving skills. Pen Paper test after the completion of unit
IX: Hydrogen	Position of hydrogen in periodic table, occurrence, isotopes, preparation, properties and uses of hydrogen, hydrides-ionic covalent and interstitial; physical and chemical properties of water, heavy water, hydrogen Peroxide -preparation, reactions and structure and use; hydrogen as a fuel.		August	VSA/SA questions Knowledge based questions. MCQ's Numerical solving skills
X s-Block Elements (Alkali and Alkaline Earth Metals)	Group 1 and group 2 elements general introduction, electronic configuration, occurrence, anomalous properties of the first element of each group, diagonal relationship, trends in the variation of properties (such as ionization enthalpy, atomic and ionic radii), trends in chemical reactivity with oxygen, water, hydrogen and halogens, uses. Preparation and Properties of Some Important Compounds: Sodium Carbonate, Sodium Chloride, Sodium Hydroxide and Sodium Hydrogencarbonate, Biological Importance of Sodium and Potassium.	PROJECT Scientific investigations involving laboratory testing and collecting information from other sources. A few suggested Projects ·Checking the bacterial contamination in drinking water by testing sulphide ion. <ul style="list-style-type: none"><li>• Study of the methods of purification of water.</li><li>• Testing the hardness, presence</li></ul>	August	Pen paper test of theory Assignment on logical reasoning. Understanding and knowledge.

	<p>Calcium Oxide and Calcium Carbonate and their industrial uses, Biological importance of Magnesium and calcium.</p>	<p>of Iron, Fluoride, Chloride, etc., depending upon the regional variation in drinking water and study of causes of presence of these ions above permissible limit (if any).</p> <ul style="list-style-type: none"> <li>• Investigation of the foaming capacity of different washing soaps and the effect of addition of Sodium Carbonate on it.</li> <li>• Study the acidity of different samples of tea leaves.</li> <li>• Determination of the rate of evaporation of different liquids.</li> <li>• Study the effect of acids and bases on the tensile strength of fibers.</li> <li>• Study of acidity of fruit and vegetable juices.</li> </ul>		
<p>XI Some p -Block Elements</p>	<p>General Introduction to p -Block Elements Group 13 Elements: General introduction, electronic configuration, occurrence, variation of properties, oxidation states, trends in chemical reactivity, anomalous properties of first element of the group, Boron - physical and chemical properties, some important compounds, Borax, Boric acid, Boron Hydrides, Aluminum: Reactions with acids and alkalis, uses. Group 14 Elements: General introduction, electronic configuration, occurrence, variation of properties, Oxidation states, trends in chemical reactivity, anomalous behaviour of first elements. Carbon-catenation, Allotropic forms, physical and chemical properties; uses of some important</p>		<p>September</p>	<p>MCQ. SA/VSA logical reasoning questions. Group discussion Conceptual questions. Pen Paper test after the completion of unit</p>

	compounds: oxides. Important compounds of Silicon and a few uses: Silicon Tetrachloride, Silicones, Silicates and Zeolites, their uses.			
XII Organic Chemistry - Some Basic Principles and Technique	General introduction, methods of purification, qualitative and quantitative analysis, classification and IUPAC nomenclature of organic compounds. Electronic displacements in a covalent bond: inductive effect, electromeric effect, resonance and hyper conjugation. Homolytic and heterolytic fission of a covalent bond: free radicals, carbocations, carbanions, electrophiles and nucleophiles, types of organic reactions.			Group discussion Skills. Practice to enhance their Numerical solving/Thinking/Reasoning skill. Pen paper test.
Unit- XIII Hydrocarbons	Classification of Hydrocarbons Aliphatic Hydrocarbons: Alkanes - Nomenclature, isomerism, conformation (ethane only), physical properties, chemical reactions including free radical mechanism of halogenation, combustion and pyrolysis. Alkenes - Nomenclature, 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. Alkynes - Nomenclature, 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. Aromatic Hydrocarbons: Introduction, IUPAC nomenclature, benzene: resonance, aromaticity, chemical properties: mechanism of electrophilic substitution. Nitration, sulphonation, halogenation, Friedel Craft's alkylation and acylation, directive influence of functional group in monosubstituted benzene. Carcinogenicity and toxicity.	Qualitative Analysis Determination of one anion and one cation in a given salt Cations- $Pb^{2+}$ , $Cu^{2+}$ $As^{3+}$ , $Al^{3+}$ , $Fe^{3+}$ , $Mn^{2+}$ , $Ni^{2+}$ , $Zn^{2+}$ , $Co^{2+}$ , $Ca^{2+}$ , $Sr^{2+}$ , $Ba^{2+}$ , $Mg^{2+}$ Anions - $CO_3^{2-}$ , $S^{2-}$ , $SO_4^{2-}$ , $NO_3^-$ , $Cl^-$ , $Br^-$ , $I^-$ , $PO_4^{3-}$ , $CO_3^{2-}$ , $CH_3COO^-$ (Note: Insoluble salts excluded)	October	Group discussion Skills. Practice to enhance their Numerical solving/Thinking/Reasoning skill. Pen paper test.

XIV Environmental Chemistry	Environmental pollution - air, water and soil pollution, chemical reactions in atmosphere, smog, major atmospheric pollutants, acid rain, ozone and its reactions, effects of depletion of ozone layer, greenhouse effect and global warming- pollution due to industrial wastes, green chemistry as an alternative tool for reducing pollution, strategies for control of environmental pollution.		November	Knowledge based questions MCQ's . Reasoning and Understanding questions. Pen Paper test after the completion of unit
-----------------------------	---	--	----------	--

#### PRACTICALS

##### Evaluation Scheme for Examination Marks

Volumetric Analysis -	08
Salt Analysis -	08
Content Based Experiment -	06
Project Work -	04
Class record and viva -	04
Total	30