

**Cambridge International School, Mohal**  
**Subject – Chemistry**  
**Subject Code(043)**  
**Class +2(science)**  
**Session-2020-21**

UNIT	LEARNING OBJECTIVES	PRACTICALS	MONTH	ASSESSMENT
<b>Unit I Solutions</b>	Types of solutions, expression of concentration of solutions of solids in liquids, solubility of gases in liquids, solid solutions, colligative properties - relative lowering of vapor pressure, Raoult's law, elevation of boiling point, depression of freezing point, osmotic pressure, determination of molecular masses using colligative Properties, abnormal molecular mass, Van't Hoff factor.	Determination of concentration/ molarity of $\text{KMnO}_4$ solution by titrating it against a standard solution of: i) Oxalic acid, ii) Ferrous Ammonium Sulphate (Students will be required to prepare standard solutions by weighing themselves).	<b>March</b>	Knowledge based questions Conceptual questions Numerical solving skills. MCQ.
<b>Unit II Electrochemistry</b>	Redox reactions, 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, EMF of a cell, standard electrode potential, Nernst equation and its application to chemical cells, Relation between Gibbs energy change and EMF of a cell, fuel cells, corrosion.		<b>March April</b>	Diagram based analysis. Pen paper test Solving Numerical
<b>Unit III Chemical Kinetics.</b>	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 energy, Arrhenius equation.		<b>April</b>	MCQ. Numerical solving skills. Pen paper test.

<b>Unit IV Surface Chemistry.</b>	<b>Adsorption</b> - physisorption and chemisorptions, factors affecting adsorption of gases on solids, catalysis, homogenous and heterogeneous, activity and selectivity of solid catalysts, enzyme catalysis, colloidal state distinction between true solutions, colloids and suspension; lyophilic, lyophobic multi-molecular and macromolecular colloids; properties of colloids; Tyndall effect, Brownian movement, electrophoresis, coagulation, emulsion - types of emulsions.	. Surface Chemistry Preparation of one lyophilic and one lyophobic sol Lyophilic sol - starch, egg albumin and gum Lyophobic sol - aluminium hydroxide, ferric hydroxide, arsenousulphide.	<b>May</b>	MCQ. Practical skills-viva. Conceptual questions.
<b>Unit V Solid State.</b>	<b>Classification of solid based on different binding forces:</b> molecular, ionic, covalent and metallic solids, amorphous and crystalline solids (elementary idea). Unit cell in two dimensional and three dimensional lattices, calculation of density of unit cell, packing in solids, packing efficiency, voids, number of atoms per unit cells in a cubic unit cell, point defects, electrical and magnetic properties. Band theory of metals, conductors, semi conductors and insulators and n and p-type semi conductors	Preparation of double salt of ferrous ammonium sulphate or potash alum. Preparation of Potassium Ferric Oxalate.	<b>May</b>	
<b>Unit-VI General Principles and Processes of Isolation of Elements</b>	<b>Principles and methods of extraction</b> - concentration, oxidation, reduction - electrolytic method and refining; Occurrence and principles of extraction of aluminum, copper, zinc and iron.		<b>June</b>	Knowledge based question. HOTS. Short questions
<b>Unit-VII p- Block elements.</b>	<b>Group-15 Elements: General introduction, electronic configuration, occurrence, oxidation states, trends in physical and chemical properties, Nitrogen preparation properties and uses; compounds of nitrogen: preparation and properties of Ammonia and Nitric acid,</b>	Preparation of Organic Compounds Preparation of any one of the following compounds i) Acetanilide ii) Di-benzal Acetone iii) p-Nitroacetanilide iv) Aniline yellow or 2-Naphthol Aniline dye.	<b>June-July</b>	Logical reasoning. Conceptual questions. SA/VSA questions per paper test.

	<p><b>Oxides of Nitrogen( structure only); Phosphorous – allotropic forms, compounds of Phosphorous: preparation and properties of Phosphine, Halides and Oxoacids (elementary idea only)</b></p> <p><b>Group 16 Elements:</b> General introduction, electronic configuration, oxidation states, occurrence, trends in physical and chemical properties, dioxygen: Preparation, Properties and uses, classification of Oxides, Ozone, Sulphur -allotropic forms; compounds of Sulphur: Preparation Properties and uses of Sulphur-dioxide, Sulphuric Acid: industrial process of manufacture, properties and uses; Oxoacids of Sulphur (Structures only).</p> <p><b>Group 17 Elements:</b> General introduction, electronic configuration, oxidation states, occurrence, trends in physical and chemical properties; compounds of halogens, Preparation, properties and uses of Chlorine and Hydrochloric acid, inter-halogen compounds, Oxoacids of halogens (structures only).</p> <p><b>Group 18 Elements:</b> General introduction, electronic configuration, occurrence, trends in physical and Chemical properties, uses.</p>	<p>Tests for the functional groups present in organic compounds:          Unsaturation, alcoholic, phenolic, aldehydic, ketonic, carboxylic and amino (Primary) groups.</p> <p>Characteristic tests of carbohydrates, fats and proteins in pure samples and their detection in given food stuffs.</p>		
<p><b>Unit-VIII: d and f Block elements</b></p>	<p>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, color, catalytic property, magnetic properties, interstitial compounds, alloy formation, Preparation and properties of <math>K_2Cr_2O_7</math> and <math>KMnO_4</math>.</p>	<p>Qualitative analysis          Determination of one cation and one anion in a given salt.          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>.</p> <p>PROJECT</p>	<p><b>July</b></p>	<p>Equation based.          Logical reasoning based questions.          Conceptual questions.</p>

	<p>Lanthanides - Electronic configuration, oxidation states, chemical reactivity and lanthanide contraction and its consequences.</p> <p>Actinoids - Electronic configuration, oxidation states and comparison with lanthanoids.</p>			
<b>Unit IX: Coordination Compounds.</b>	<p>Coordination compounds - Introduction, ligands, coordination number, color, magnetic properties and shapes, IUPAC nomenclature of mononuclear coordination compounds. Bonding, Werner's theory, VBT, and CFT; structure and stereoisomerism, importance of coordination compounds (in qualitative inclusion, Extraction of metals and biological system).</p>		<b>August</b>	<p>MCQ. Logical reasoning based questions. Conceptual questions. Pen paper test.</p>
<b>Unit X Haloalkanes and Haloarenes</b>	<p><b>Haloalkanes:</b> Nomenclature, nature of C -X bond, physical and chemical properties, mechanism of substitution reactions, optical rotation.</p> <p><b>Haloarenes:</b> Nature of C -X bond, substitution reactions (Directive influence of halogen in mono-substituted Compounds only). Uses and environmental effects of - dichloromethane, trichloromethane, tetra chloromethane, iodoform, Freons, DDT.</p>		<b>August</b>	<p>Equation based worksheet. MCQ. Logical reasoning based questions. Conceptual questions.</p>
<b>Unit XI Alcohols, Phenols and Ethers.</b>	<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</p>		<b>August- September</b>	<p>Equation based worksheet. MCQ. Logical reasoning based questions. Conceptual questions. Pen paper test</p>

	phenol, Electrophilic substitution reactions, uses of phenols. Ethers: Nomenclature, methods of preparation, physical and chemical properties, uses.			
<b>Unit XII: Aldehydes, Ketones and Carboxylic Acids.</b>	<b>Aldehydes and Ketones:</b> Nomenclature, nature of carbonyl group, methods of preparation, physical and chemical properties, mechanism of nucleophilic addition, reactivity of alpha hydrogen in aldehydes, uses.  <b>Carboxylic Acids:</b> Nomenclature, acidic nature, methods of preparation, physical and chemical properties; uses.		<b>September</b>	VS/VSA questions Equation based worksheet. MCQ. Logical reasoning based questions. Conceptual questions. Pen paper test.
<b>Unit XIII Amines</b>	<b>Amines:</b> Nomenclature, classification, structure, methods of preparation, physical and chemical properties, uses, identification of primary, secondary and tertiary amines.  <b>Diazonium salts:</b> Preparation, chemical reactions and importance in synthetic organic chemistry.	Scientific investigations involving laboratory testing and collecting information from other sources. A few suggested Projects. To Study of the presence of oxalate ions in guava fruit at different stages of ripening. To Study of quantity of casein present in different samples of milk. ☑Preparation of soybean 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 preservative under various conditions (temperature, concentration, time, etc.) ☑Study of digestion of starch by salivary amylase and effect of pH and temperature on it. ☑Comparative study of the rate of fermentation of following materials: wheat flour, gram flour, potato juice, carrot juice, etc. ☑Extraction of essential oils	<b>September- October</b>	Equation based worksheet. MCQ. Logical reasoning based questions. Conceptual questions.

		present in Saunf (aniseed), Ajwain (carum), Illaichi (cardamom). 2 Study of common food adulterants in fat, oil, butter, sugar, turmeric powder, chilli powder and pepper.		
<b>Unit XIV Biomolecules</b>	<p><b>Carbohydrates</b> - Classification (aldoses and ketoses), monosaccharides (glucose and fructose), D-L configuration oligosaccharides (sucrose, lactose, maltose), polysaccharides (starch, cellulose, glycogen); Importance of carbohydrates.</p> <p><b>Proteins</b> -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.</p> <p><b>Vitamins</b> - Classification and functions.</p> <p><b>Nucleic Acids:</b> DNA and RNA.</p>	.	<b>October</b>	VSA/Conceptual questions to enhance their reasoning and structural skill.
<b>Unit XV Polymers.</b>	Classification - natural and synthetic, methods of polymerization (addition and condensation), copolymerization, some important polymers: natural and synthetic like polythene, nylon polyesters, bakelite, rubber. Biodegradable and non-biodegradable polymers.		<b>October-November</b>	MCQ. SA/VSA. Equation based.
<b>Unit XVI Chemistry in Everyday life.</b>	<p><b>Chemicals in medicines</b> - analgesics, tranquilizers antiseptics, disinfectants, antimicrobials, antifertility drugs, antibiotics, antacids, antihistamines.</p> <p><b>Chemicals in food</b> - preservatives, artificial sweetening agents, elementary idea of antioxidants.</p> <p><b>Cleansing agents</b>- soaps and</p>		<b>November</b>	MCQ. Equation cum diagram based.

	detergents, cleansing action.			
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**PRACTICALS**

<b>Evaluation Scheme for Examination Marks</b>	<b>Marks</b>
Volumetric Analysis	08
Salt Analysis	08
Content Based Experiment	06
Project Work	04
Class record and viva	04
<b>Total</b>	<b>30</b>