NAVODAYA VIDYALAYA SAMITI

CLASS: XII **SUBJECT: Chemistry** **SUBJECT CODE: 043**

Unit No	Name of The Chapter/ unit	Marks	Periods
1	Solutions	7	15
2	Electrochemistry	9	18
3	Chemical kinetics	7	15
4	d and f block elements	7	18
5	Coordination compounds	7	18
6	Haloalkanes and Haloarenes	6	15
7	Alcohols, Phenols and Ethers	6	14
8	Aldehydes, Ketones and Carboxylic acids	8	15
9	Amines	6	14
10	Biomolecules	7	18
	Total	70	160
	Practical Assessment	30	--
	Grand Total	100	--

PRACTICALS

Time Allowed: 03 Hours **Max.Marks:30**

Evaluation Scheme	**Marks**
I. Volumetric Analysis	08 Marks
II. Salt Analysis	08 Marks
III. Content based experiment	06 Marks
IV. Record + Viva	04 Marks
V. Project + Viva	04 Marks
Total	30 Marks

MONTH	NO OF DAYS	NO. OF PERIODS	Weightage of Marks for the Unit/ Chapter	Main Topic and Sub-Topics to be Covered	Activities/Projects/ Practical Experiments to be Held/ Specific Assessment Tool(s) (Suggested)	TESTS Periodic / Term /Pre-Board/ Revision/ Annual Exam
APRIL	26	15 18	**7** **9**	**Unit I:Solutions** 15 Periods 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. **Unit II:Electrochemistry18 Periods** Redox reactions, 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, 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.	1. Determination of concentration/ molarity of $KMnO_4$ solution by titrating it against a standard solution of: (a) Oxalic acid, (b) Ferrous Ammonium Sulphate (Students will be required to prepare standard solutions by weighing themselves). 2. Variation of cell potential in $Zn/Zn^{2+}//Cu^{2+}/Cu$ with change in concentration of electrolytes ($CuSO_4$ or $ZnSO_4$) at room temperature. 3. (a) Preparation of one lyophilic and one lyophobic sol Lyophilic sol - starch, egg albumin and gum Lyophobic sol - aluminium hydroxide, ferric hydroxide, arsenous sulphide.	**PWT 1 / UT 1** **(26-29 APRIL 2024)**

JULY	24	15 18	**7** **7**	**Unit III:Chemical Kinetics15 Periods** 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. **Unit IV: d and f Block Elements** 18 Periods 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, catalytic property, magnetic properties, interstitial compounds, alloy formation, preparation and properties of $K_2Cr_2O_7$ and $KMnO_4$. Lanthanoids – Electronic configuration, oxidation states, chemical reactivity and lanthanoid contraction and its consequences. Actinoids - Electronic configuration, oxidation states and comparison with lanthanoids.	4 (a) Effect of concentration and temperature on the rate of reaction between Sodium Thiosulphate and Hydrochloric acid. (b) Study of reaction rates of any one of the following: (i) Reaction of Iodide ion with Hydrogen Peroxide at room temperature using different concentrations of Iodide ions. (ii) Reaction between Potassium Iodate, (KIO_3) and Sodium Sulphite: (Na_2SO_3) using starch solution as an indicator (clock reaction). 5. Qualitative analysis Determination of one anion and one cation in a given salt (03 salts per month or more) Cation: Pb^{2+}, Cu^{2+} As^{3+}, Al^{3+}, Fe^{3+}, Mn^{2+}, Zn^{2+}, Ni^{2+}, Ca^{2+}, Sr^{2+}, Ba^{2+}, Mg^{2+}, NH_4^+ Anions: CO_3^{2-}, S^{2-}, SO_3^{2-} ,NO_2^{-1}, SO_4^{2-} , Cl^{-1} , Br^{-1} , I^{-1} , PO_4^{3-} , $C_2O_4^{2-}$, CH_3COO^{-1} , NO_3^{-1} (Note: Insoluble salts excluded)	

AUGUST	27	18 15	07 06	**Unit V: Coordination Compounds** 18 Periods 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). **Unit VI: Haloalkanes and Haloarenes.** 15 Periods **Haloalkanes:** Nomenclature, nature of C–X bond, physical and chemical properties, optical rotation mechanism of substitution reactions. **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.	6. Preparation of Inorganic Compounds Preparation of double salt of Ferrous Ammonium Sulphate or Potash Alum. Preparation of Potassium Ferric Oxalate. 7. Tests for the functional groups present in organic compounds: Unsaturation, alcoholic, phenolic, aldehydic, ketonic, groups.	**PWT 2 / UT 2 (8-10 AUGUST 2024)**

SEPTEMBER	24	14 15	**06** **08**	**Unit VII: Alcohols, Phenols and Ethers** 14 Periods **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. **Phenols:** Nomenclature, methods of preparation, physical and chemical properties, acidic nature of phenol, electrophilic substitution reactions, uses of phenols. **Ethers:** Nomenclature, methods of preparation, physical and chemical properties, uses. **Unit VIII: Aldehydes, Ketones and Carboxylic Acids** 15 Periods **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. **Carboxylic Acids:** Nomenclature, acidic nature, methods of preparation, physical and chemical properties; uses.	8. Tests for the functional groups present in organic compounds: Carboxylic and amino (Primary) groups. 9. Chromatography (a) Separation of pigments from extracts of leaves and flowers by paper chromatography and determination of Rf values. (b) Separation of constituents present in an inorganic mixture containing two cations only (constituents having large difference in Rf values to be provided).	**Revision & Exams- Term I 23 Sep- 04 0ct 2024**
OCTOBER	21	14	**06**	**Unit IX: Amines** 14 Periods **Amines:** Nomenclature, classification, structure, methods of preparation, physical properties and Identification. **Diazonium salts:** Preparation, chemical reactions and importance in synthetic organic chemistry.	10. Any one of the following experiments: (a) Enthalpy of dissolution of copper sulphate or potassium nitrate. (b) Enthalpy of neutralization of strong acid (HCl) and strong base (NaOH). (c) Determination of enthalpy change during interaction (Hydrogen bond formation) between acetone and chloroform.	

NOVEMBER	15	18	**7**	**Unit X: Biomolecules Carbohydrates** 18 Periods 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.	11. Characteristic tests of carbohydrates, fats and proteins in pure samples and their detection in given foodstuffs.	
DECEMBER	24			**REVISION & EXAMS**	**Investigatory Project**	**Pre-Board-I 04-14 Dec 2024**
JAN	31	--		**REVISION & EXAMS**	**----------**	**Pre-Board II 20-30 Jan 2025**
FEB	28	--		**REVISION & Annual Examinations**	----------	
FEB & MARCH	31			**Annual Examinations**		

Art integrated learning must be invariably adopted for clarifying scientific concepts.

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