

CLASS - XII

SUBJECT : CHEMISTRY (CHEM)

SEMESTER – IV

FULL MARKS : 35

CONTACT HOURS : 60 HOURS

COURSE CODE : THEORY

Sub-topics

UNIT No.	TOPICS	CONTACT HOURS	MARKS
Unit - 1	Electrochemistry Redox reactions, conductance in electrolytic solutions, specific and molar conductivity, variation of conductivity with concentration, Kohlrausch's law, electrolysis and laws of electrolysis (elementary idea), dry cell – electrolytic cells and Galvanic cells, 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, Li-ion battery.	08	05
Unit - 2	Chemical Kinetics Rate of a reaction (average and instantaneous), factors affecting rate of reactions- concentration, temperature and 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); the concept of collision theory (elementary idea, no mathematical treatment) activation energy, Arrhenius equation Catalysis, homogeneous and heterogeneous catalysis, enzyme catalysis.	10	07
Unit - 3	d and f Block elements General introduction, electronic configuration, occurrence and characteristics of transition metals, general trends in properties of the first-row transition metals – ionic radii, ionization enthalpy, oxidation states, colour, catalytic property, magnetic property. Preparation and properties of $K_2Cr_2O_7$ and $KMnO_4$. Lanthanoids Electronic configuration, oxidation states, chemical reactivity, lanthanoid contraction and its consequences, uses. Actinoids Electronic configuration, oxidation states, comparison with lanthanoids, uses.	10	06
Unit - 4	Coordination compounds Introduction, ligands, classification of ligands based on denticity and field intensity, coordination number, colour, magnetic properties and shape, IUPAC nomenclature of mononuclear coordination compounds, EAN rule, Bonding (Werner's theory, VBT and CFT), CFSE, structural-isomerism and stereo-isomerism, importance of coordination compounds (in qualitative analysis, extraction of metals and biological systems)	08	05

UNIT No.	TOPICS	CONTACT HOURS	MARKS
Unit - 5	Aldehydes, Ketones and Carboxylic Acids 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	10	05
Unit - 6	Organic compounds containing Nitrogen Nitro compounds: General methods of preparation and reduction reactions. Amines: Nomenclature, classification, structure, methods of preparation, physical and chemical properties, uses, identification of primary, secondary and tertiary amines. Cyanides and Isocyanides – Nomenclature, structure, methods of preparation, chemical reactions (hydrolysis and reduction reactions only). Diazonium salts: Preparations, chemical reactions and importance in synthetic organic chemistry	14	07