SYLLABUS 2020-2021

STANDARD: 12 **SUBJECT : CHEMISTRY**

UNIT	CONTENT
1.Metallurgy	Introduction 1.1 Occurrence of metals 1.1.1 Mineral and ore 1.2 Concentration of ores 1.2.1 Gravity separation or Hydraulic wash 1.2.2 Froth flotation 1.2.3 Leaching Cyanide leaching Recovery of metal of interest from the complex by reduction Ammonia leaching Alkali leaching Acid leaching 1.2.4 Magnetic separation 1.3 Extraction of crude metal 1.3.1 Conversion of ores into oxides Roasting Calcination 1.3.2 Reduction of metal oxides Smelting 1.3.2 Reduction by carbon: Reduction by hydrogen Reduction by metal: Auto-reduction: 1.6 Refining process 1.6.1 Distillation 1.6.2 Liquation 1.6.3 Electrolytic refining 1.6.4 Zone Refining 1.6.5 Vapour phase method Mond process for refining nickel Van-Arkel method for refining zirconium/ titanium
2. P-block elements -I	Introduction 2.1 General trends in properties of p-block elements 2.1.1 Electronic configuration and oxidation state 2.1.2 Metallic nature: 2.1.3 Ionisation Enthalpy

	2.1.4 Electronegativity 2.1.5 Anomalous properties of the first elements 2.1.6 Inert pair effect 2.1.7 Allotropism in p-block elements 2.2 Group 13 (Boron group) elements 2.2.1 Occurrence 2.2.2 Physical properties 2.2.3 Chemical properties of boron Uses of boron 2.2.4 Borax [Na2B4O7.10H2O] Preparation Properties Uses of Borax 2.2.5 Boric acid [H3BO3 or B(OH)3] Preparation, Properties Structure of Boric acid Uses of boric acid 2.2.9 Alums Preparation Properties of Alum Uses of Alum 2.3 Group 14 (Carbon group) elements: 2.3.1 Occurrence 2.3.2 Physical properties 2.3.3 Tendency for catenation 2.3.4 Allotropes of carbon Graphite Diamond Fullerenes Graphene 2.3.8 Silicones Preparation Types of silicones Properties, Uses
3. P-block elements -II	Introduction 3.1 Group 15 (Nitrogen group) elements 3.1.1 Occurrence 3.1.2 Physical properties 3.1.3 Nitrogen Preparation Properties of Nitrogen Uses of nitrogen

	3.1.4 Ammonia (NH3) Preparation Properties of Ammonia Chemical Properties Structure of ammonia 3.1.7 Allotropic forms of phosphorus 3.1.8 Properties of phosphorus Uses of phosphorus Oxoacids of Phosphorus-Structure Group 16 (Oxygen group) elements Occurrence Physical properties 3.2 Oxygen Preparation: Properties Chemical properties Uses of Oxygen 3.2.1 Allotropic forms of sulphur 3.2.2 Sulphur dioxide Preparation Properties Uses of sulphur dioxide Structure of sulphur dioxide Structure of oxoacids of sulphur 3.3 Group 17 (Halogen group) elements: 3.3.1 Chlorine Occurrence: Physical properties of Chlorine 3.3.1 Manufacture of chlorine Physical properties Chemical properties Uses of chlorine 3.3.4 Inter halogen compounds: Properties of inter halogen compounds Structure of inter halogen compounds 3.4 Group 18 (Inert gases) elements: 3.4.1 Occurrence: Physical properties-Inert Gases Physical properties Properties of inert, gases Chemical Properties Uses of noble gases

4. Transition and inner transition elements	Introduction 4.1 Position of d- block elements in the periodic table 4.2 Electronic configuration 4.3 General trend in properties 4.3.1 Metallic behavior 4.3.2 Variation of atomic and ionic size 4.3.3 Ionization enthalpy 4.3.4 Oxidation state 4.3.5 Standard electrode potentials of transition metals 4.3.6 Magnetic properties 4.3.7 Catalytic properties 4.3.8 Alloy formation 4.3.9 Formation of interstitial compounds 4.3.10 Formation of complexes f-block elements – Inner transition elements The position of Lanthanoids in the periodic table Electronic configuration of Lanthanoids Oxidation state of lanthanoids Atomic and ionic radii Causes of lanthanoid contraction Consequences of lanthanoid contraction Actinoids: Th Pa U Np Pu Am Cm Bk Cf Es Fm Md No Lr Electronic configuration of actinoids Oxidation state of actinoids Differences between lanthanoids and actinoids
5. Coordination chemistry	Introduction 5.1 Coordination compounds and double salts 5.2 Werner's theory of coordination compounds Postulates Werner's theory 5.2.1 Limitations of Werner's theory 5.3 Definition of important terms pertaining to co-ordination compounds 5.3.1 Coordination entity 5.3.2 Central atom/ion 5.3.3 Ligands Coordination sphere, Coordination polyhedron, Coordination number, Oxidation state (number)

	Types of complexes Classification based on the net charge on the complex Classification based on kind of ligands 5.4 Nomenclature of coordination compounds a. Naming the ligands b.Naming the central metal More examples with names – IUPAC Nomenclature 5.6 Theories of coordination compound 5.6.1 Valence Bond Theory Main assumptions of VBT Illustration(1-4) Limitations of VBT
6. Solid state	6.1. Introduction General Characteristics of Solids 6.2. Classification of Solids 6.3. Classification of Crystalline Solids 6.3.1. Ionic solids 6.3.2. Covalent Solids 6.3.3. Molecular Solids 6.3.4. Metallic Solids 6.4. Crystal lattice and unit cell 6.5 Primitive and Non Primitive unit 6.5.1 Primitive (or) Simple Cube unit cell 6.5.2 Body Centered cubic unit cell 6.5.3 Face centered cubic unit cell 6.5.4 Calculations involving unit cell Dimensions 6.5.5 Calculation of density 6.6 Packing in Crystals 6.6.1 Linear arrangement of spheres in one direction 6.6.2 Two dimensional Close Packing 6.6.3 Simple Cubic arrangement 6.6.4. Body Centered Cubic arrangement 6.7. Imperfections in solids 6.7.1 Schottky defect 6.7.2. Frenkel defect 6.7.3. Metal Excess defect 6.7.4. Metal Deficiency defect 6.7.5. Impurity defect

7. Chemical kinetics	7. Introduction & Rate of Chemical reaction 7.1.1 Stoichiometry and rate of reaction 7.1.2 Average and instantaneous rate 7.3 Rate law and Rate Constant 7.4 Molecularity 7.5 Integrated Rate Equation 7.5.1 Integrated rate law for First order 7.5.2 Integrated rate law for a Zero order reaction 7.6 Half life period of a reaction 7.8 Arrhenius Equation
8.Ionic Equillibrium	Introduction 8.1. Acids and bases 8.1.1 Arrhenius concept 8.1.2 Lowry - Bronsted Theory 8.1.3 Lewis Concept 8.2 Strength Of Acids and Bases 8.3 Ionisation of water 8.4 The pH Scale 8.4.1 Relation between pH and pOH 8.5 Ionistion of Weak Acids 8.5.1 Ostwalds Dilution Law 8.6. Common ion effect 8.7 Buffer Solution 8.7.1 Buffer Action 8.7.3 Henderson Hasselbalch Equation 8.9 Solubility Product 8.9.1 Determination of solubility Product from Molar Solubility
9. Electro chemistry	Introduction 9.1 Conductivity of electrolytic solution 9.1.1 Molar conductivity 9.1.2 Equivalent conductance 9.1.3 Factors affecting Electrolytic conductance 9.1.4 Measurement of conductivity of ionic solutions 9.2 Variation of molar conductivity with concentration 9.2.2 Kohlrausch's law and Applications 9.3.2 Galvanic cell notation 9.3.4 Measurement of electrode potential 9.4 Thermodynamics of cell reactions

	9.4.1 Nernst equation Electrolytic cell and Electrolysis Faraday's law of electrolysis First law, Second law Electrochemical series
10. Surface chemistry	Introduction 10.1 Adsorption and Absorption Characteristics of adsorption 10.1.1 Types of Adsorption Physical and Chemical Adsorption 10.1.2 Factors affecting Adsorption 10.1.3 Adsorption isotherms and isobars 10.1.3.1 Freundlich adsorption isotherm and limitations 10.2 Catalysis Positive and Negative Catalysis 10.2.1 Characteristics of Catalysis Promoters and Catalytic poison Auto Catalysis, Negative Catalysis 10.2.2 Theories of Catalysis The Intermediate compound formation theory, Adsorption Theory & Active Centers 10.5 Colloid, dispersion Phase and dispersion medium 10.5.1 Classification of colloidal solution 10.5.2 Preparation of Colloids (1)Dispersion methods [mechanical dispersion, electro dispersion, ultrasonic dispersion, peptisation] (2)Condensation method [oxidation, reduction, hydrolysis, double decomposition, Decomposition] (3)By exchange of solvent 10.5.3 Purification of colloids (i) Dialysis (ii)Electrodialysis (iii)Ultrafiltration 10.5.4 Properties of colloids 14 points [colour, size, Heterogeneous nature, Filtrability, Non- Setting nature, Concentration & density, Diffusability, Colligative Properties, Shape of Colloidal Particles, Optical, Kinetic and Electrical properties, Coagulation,Protective action]

11. Hydroxy compounds and ethers	11.1 Introduction Classification of Alcohols 11.2 IUPAC Nomenclature Physical Properties of Alcohols Preparation of Alcohols Methods to differentiate primary,secondary,Tertiary Chemical Properties of Alchols (without mechanism) Uses of Alcohols Acidity of alcohols Acidity of phenols Preparation of phenol Physical Properties of Phenol Chemical properties of phenols Test to differentiate Alcohols & Phenols Uses of phenol ETHERS Ethers Classification IUPAC System Structure of funtional group Preparation of Ethers except mechanism Physical properties uses Chemical Properties of Ethers (except mechanism)
12. Carbonyl compounds and carboxylic acids	CARBONYL COMPOUNDS 12.1 Nomenclature of Aldehyde and Ketones 12.2 Structure of carbonyl group 12.3 General methods of preparation of Aldehydes and Ketones 12.4 Physical properties of Aldehydes and Ketones 12.5 chemical properties of Aldehydes and Ketones (Mechanism only for aldol and cannizaro reaction) 12.6 Test for Aldehydes (First two test only) CARBOXYLIC ACIDS 12.8 Nomenclature of carboxylic acids 12.9 structure of carboxyl group 12.10 Methods of preparation of carboxylic acids except Sno 5 12.11 Physical properties of carboxylic acids 12.12 Chemical properties of carboxylic acids Test for carboxylic acid (except mechanism of esterification) 12.13 Acidity of carboxylic acids

13. Organic nitrogen compounds	Introduction to Nitro Compounds 13.1 Classification of Nitro compounds 13.1.2 Nomenclature 13.1.3 Isomerism 13.1.4 Acidic Nature of Nitro Alkanes 13.1.5 Preparation of Nitro Alkane first 3 methods only 13.1.6 Preparation of Nitro Arenes first method only 13.1.7 Physical Properties of Nitro Alkanes 13.1.8 Electrophilic Substitution Reaction Chemical properties of Nitro Alkanes 13.2 Amines - Classification 13.2.1 Nomenclature IUPAC system of Amines 13.2.2 Structure of Amines 13.2.3 General Methods of Preparation of Amines 13.2.4 Physical properties of amines 13.2.5 Expression for basic strength of Amines 13.2.6 chemical properties of Amines
14. Bio molecules	14.1 Carbohydrate Introduction 14.1.2 classification of carbohydrate 14.1.3 Glucose,preparation structure 14.1.4 Fructose preparation and structure 14.1.5 Disaccharides 14.1.7 Importance of carbohydrates 14.2 Proteins 14.2.1 Amino acids 14.2.3 properties of Amino acids 14.2.4 peptide bond formation 14.5 Nucleic acids 14.5.1 Composition and structure of nucleic acid 14.5.3 Types of RNA molecules

PRACTICALS	
CLASS: 12	SUBJECT: CHEMISTRY
Sl.No	Topic
Organic compounds	
1	Benzophenone
2	Cinnamic Acid
3	Urea
4	Glucose
5	Aniline
Volumetric analysis	
1	Estimation of Ferrous Sulphate (Permanganometry)
2	Estimation of FAS (Permanganometry)
3	Estimation of Oxalic acid (Acid Base Titration)