SYLLABUS 2020-2021

SUBJECT: CHEMISTRY

STANDARD: 12

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
W	1.3.1 Conversion of ores into oxides
	Roasting
	Calcination
1	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
2	1.6.5 Vapour phase method
	Mond process for refining nickel
	Van-Arkel method for refining zirconium/
2. P-block	Introduction
elements -I	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
	1. 1

	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
0	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	Introduction
elements -II	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	Introduction
inner transition	4.1 Position of d- block elements in the periodic
elements	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
1	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
F. Coordination	
5. Coordination chemistry	Introduction
chemistry	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)

	177-777
	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
o. Jona State	Solids
	6.2. Classification of Solids
	6.3. Classification of Crystalline Solids
	6.3.1. lonic 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
1	6.7.4. Metal Deficiency defect
	6.7.5. Impurity defect

7. Chemical kinetics	7.	Introduction & Rate of Chemical reaction
	I .	Stoichiometry and rate of reaction
		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	Intro	duction
***	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	Introd	duction
	9.1	Conductivity of electrolytic solution
	9.1.1	Molar conductivity
	9.1.2	Equivalent conductance
	amount track process	Factors affecting Electrolytic conductance
	1	Measurement of conductivity of ionic
		solutions
	9.2	Variation of molar conductivity with
		concentration
	9.2.2	Kohlrausch's law and Applications
		Galvanic cell notation
	9.3.4	Measurement of electrode potential
	9.4	Thermodynamics of cell reactions

	9.4.1 N	ernst equation
	E	ectrolytic cell and Electrolysis
	F	araday's law of electrolysis First law,
	S	econd law
	E	lectrochemical series
10. Surface chemistry	Introduct	ion
	10.1 Ad	sorption and Absorption
	Ch	aracteristics 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]

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11. Hydroxy	11.1	Introduction Classification of Alcohols
compounds and	11.2	IUPAC Nomenclature
ethers		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
	l	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	15th 25th 1 425	ONYL COMPOUNDS
compounds and carboxylic acids	12.1	Nomenclature of Aldehyde and Ketones
carboxylic acids		Structure of carbonyl group
	12.3	General methods of preparation of
	12.4	Aldehydes and Ketones
	12.4	Physical properties of Aldehydes and Ketones
	12.5	chemical properties of Aldehydes and
	12.5	Ketones (Mechanism only for aldol and
50 Sept.		cannizaro reaction)
	12.6	Test for Aldehydes (First two test only)
	1	OXYLIC ACIDS
	-24541471745000000	Nomenclature of carboxylic acids
		structure of carboxyl group
	III	Methods of preparation of carboxylic acids
		except Sno 5
	12.11	Physical properties of carboxylic acids
	12.12	2 Chemical properties of carboxylic
		acids Test for carboxylic acid
		(except mechanism of esterification) 3 Acidity of carboxylic acids

13. Organic nitrogen	Introdu	ction to Nitro Compounds
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
	l	Nomenclature IUPAC system of Amines
	12	Structure of Amines
	10 mag 2 mg 2 mg	General Methods of Preparation of Amines
	13.2.4	** .
0		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	* *
	14.2.4	The state of the contraction of the state of
	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		
SI.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)		