CHEMISTRY

(HIGHER SECONDARY STANDARD)

SUBJECT CODE: 321

I - INORGANIC CHEMISTRY

UNIT - I: ATOMIC STRUCTURE-II

Dual properties of electrons - de-Broglie relation – Heisenberg's uncertainty principle – Wave nature of an electron – Schrodinger wave equation (only equation, no derivation) – Eigen values and Eigen function – significance only – molecular orbital method. Application to Homo diatomic and Hetero diatomic molecules – Metallic Bond – Hybridization of atomic orbital's Hybridization involving s, p and d Orbital's – Types of forces between molecules.

UNIT- II: PERIODIC CLASSIFICATION-II

Review of periodic properties – Calculation of atomic radii – Calculation of ionic radii – Method of determination of Ionisation potential – Factors affecting ionisation potential – Method to determine the electron affinity – Factors affecting EA – Various scales on electro negativity values.

UNIT- III: p- BLOCK ELEMENTS – II

Group-13 General trends – Potash alum – Preparation, Properties and uses – Group-14 General trends – Silicates – Types and structure – Silicones – Structure and uses – Extraction of lead – Group-15 General trends – Phosphorous – Allotropes and extraction – Compounds of phosphorous – Group-16 General trends – H_2SO_4 – Manufacture and properties – Group-17 General characteristics. Physical and Chemical properties – Isolation of fluorine and its properties – Interhalogen compounds Group 18 Inert gases – Isolation, properties and uses.

UNIT- IV: d- BLOCK ELEMENTS

General characteristics of d-block elements – First transition series – Occurrence and principles of extraction – chromium, copper and zinc – Alloys – Second transition series – Occurrence and principles of extraction of silver – Third transition

series – Compounds – $K_2Cr_2O_7$, $CuSO_4.5H_2O$, $AgNO_3$, Hg_2Cl_2, $ZnCO_3$, Purple of cassius.

UNIT-V: f- BLOCK ELEMENTS

General characteristics of f-block elements and extraction – Comparison of Lanthanides and Actinides – Uses of lanthanides and actinides.

UNIT-VI: COORDINATION COMPOUNDS AND BIO-COORDINATION COMPOUNDS

An introduction – Terminology in coordination chemistry – IUPAC nomenclature of mononuclear coordination compounds – Isomerism in coordination compounds – Structural isomerism – Geometrical isomerism in 4-coordinate, 6-coordinate complexes – Theories on coordination compounds – Werner's theory (brief) – Valence Bond theory – Crystal field theory – Uses of coordination compounds – Bio-coordination compounds. Haemoglobin and chlorophyll.

UNIT - VII: NUCLEAR CHEMISTRY

Nuclear energy, nuclear fission and fusion – Radio carbon dating – Nuclear reaction in sun – Uses of radioactive isotopes.

II.PHYSICAL CHEMISTRY

UNIT-VIII: SOLID STATE II

Types of packing in crystals – X-Ray crystal structure – Types of ionic crystals – Imperfections in solids – Properties of crystalline solids – Amorphous solid.

UNIT- IX:THERMODYNAMICS – II

Review of first law – Need for the second law of thermodynamics – Spontaneous and non spontaneous processes – Entropy – Gibb's free energy – Free energy change and chemical equilibrium – Third law of thermodynamics.

UNIT-X: CHEMICAL EQUILIBRIUM II

Applications of law of mass action – Le Chatlier's principle.

UNIT-XI: CHEMICAL KINETICS –II

First order reaction and pseudo first order reaction – Experimental determination of first order reaction – method of determining order of reaction – temperature dependence of rate constant – Simple and complex reactions.

UNIT-XII – SURFACE CHEMISTRY

Adsorption – Catalysis – Theory of catalysis – Colloids – Preparation of colloids – Properties of colloids – Emulsions.

UNIT-XIII – ELECTROCHEMISTRY – I

Conductors, insulators and semi conductors – Theory of electrical conductance – Theory of strong electrolytes – Faraday's laws of electrolysis – Specific resistance, specific conductance, equivalent and molar conductance – Variation of conductance with dilution – Kohlraush's law – Ionic product of water, pH and pOH – Buffer solutions – Use of pH values.

UNIT-XIV – ELECTROCHEMISTRY – II

Cells – Electrodes and electrode potentials – Construction of cell and EMF – Corrosion and its preventions – commercial production of chemicals – Fuel cells.

UNIT-XV: ISOMERISM IN ORGANIC CHEMISTRY

Geometrical isomerism – Conformations of cyclic compounds – Optical isomerism – Optical activity – Chirality – Compounds containing chiral centres – D-L and R-S notation – Isomerism in benzene.

UNIT- XVI: HYDROXY DERIVATIVES

Nomenclature of alcohols – Classification of alcohols – General methods of preparation of primary alcohols – Properties Methods of distinction between three classes of alcohols 1^o,2^o and 3^o – Methods of preparation of dihydric alcohols(glycol) – Properties – Uses – Methods of preparation of trihydric alcohols – Properties – Uses – Aromatic alcohols - Methods of preparation of benzyl alcohol – Properties – Uses – Phenols – Manufacture of phenols – Properties – Chemical properties – Uses of Phenols.

UNIT- XVII: ETHERS

Ethers – General methods of preparation of aliphatic ethers – Properties – Uses – Aromatic ethers – Preparation of anisole – Reactions of anisole – Uses.

UNIT- XVIII: CARBONYL COMPOUNDS

Nomenclature of carbonyl compounds – Comparison of aldehydes and ketones – General methods of preparation of aldehydes – Properties – Uses – Aromatic aldehydes – Preparation of benzaldehyde – Properties – Uses – Ketones – General Methods of preparation of aliphatic ketones (acetone) – Properties – Uses – Aromatic ketones – Preparation of acetophenone – Properties – Uses – Preparation of benzophenone – Properties.

UNIT- XIX: CARBOXYLIC ACIDS

Nomenclature – Preparation of aliphatic monocarboxylic acids –formic acid – Properties – Uses – Tests for carboxylic acid – Monohydroxy mono carboxylic acids – Lactic acid – Sources – Synthesis of lactic acid – Aliphatic dicarboxylic acids – Preparation of dicarboxylic acids – oxalic and succinic acids – Properties – Strengths of carboxylic acids – Aromatic acids – Preparation of benzoic acid – Properties – Uses – Preparation of salicylic acid – Properties – Uses – Derivatives of carboxylic acids – Preparation of acid chloride – acetyl chloride (CH_3COCl) – Preparation – Properties – Uses – Preparation of acetamide – Properties – Preparation of acetic anhydride – Properties – Preparation of esters – methyl acetate – Properties.

UNIT-XX – ORGANIC NITROGEN COMPOUNDS

Aliphatic nitro compounds – Preparation of aliphatic nitroalkanes – Properties – Uses – Aromatic nitro compounds – Preparation – Properties – Uses – Distinction between aliphatic and aromatic nitro compounds – Amines – Aliphatic amines – General methods of preparation – Properties – Distinction between 1^{o},2^{o} and 3^{o} amines – Aromatic amines – Synthesis of benzylamine – Properties – Aniline – Preparation – Properties – Uses – Distinction between aliphatic and aromatic amines – Aliphatic nitriles – Preparation – Properties – Uses – Diazonium salts – Preparation of benzene diazoniumchloride – Properties.

UNIT-XXI – BIOMOLECULES

Carbohydrates – Structural elucidation – Disaccharides and polysaccharides – Proteins – Amino acids – Structure of Proteins – Nucleic acids – Lipids.

UNIT- XXII :CHEMISTRY IN ACTION

Medicinal Chemistry – Drug abuse – Dyes – Classification and uses – Cosmetics – creams perfumes, talcum powder and deodorants – Chemicals in food – Preservatives artificial sweetening agents, antioxidants and edible colours – Insect repellent – Pheromones and sex attractants – Rocket fuels – Types of polymers, preparation and uses.