VITEEE Syllabus for CHEMISTRY:-

Atomic Structure:

Bohr's atomic model-Sommerfeld's extension of atomic structure; Electronic configuration and Quantum numbers; Shapes of s,p,d,f orbitals – Pauli's exclusion principle – Hund's Rule of maximum multiplicity- Aufbau principle. Emission spectrum, absorption spectrum, line spectra and band spectra; Hydrogen spectrum – Lyman, Balmer, Poschen, Brakett and Pfund series; deBroglie's theory; Heisenberg's uncertainty principle – wave nature of electron – Schrodinger wave equation (No derivation). Eigen values and eigen functions. Hybridization of atomic orbitals involving s,p,d orbitals.

p,d and f – Block Elements:

P block elements – Phosphorous compounds; PCl3, PCl5– Oxides. Hydrogen halides, Inter halogen compounds. Xenon fluoride compounds. General Characteristics of d – block elements – Electronic Configuration – Oxidation states of first row transition elements and their colours; Occurrence and principles of extraction: Copper, Silver, Gold and Zinc. Preparation, properties of CuSO4, AgNO3 and K2Cr2O7.

Lanthanides – Introduction, electronic configuration, general characteristics, oxidation state – lanthanide contraction, uses, brief comparison of Lanthanides and Actinides.

Coordination Chemistry and Solid State Chemistry:

Introduction – Terminology in coordination chemistry – IUPAC nomenclature of mononuclear coordination compounds. Isomerism, Geometrical isomerism in 4-coordinate, 6-coordinate complexes. Theories on coordination compounds – Werner's theory (brief), Valence Bond theory. Uses of coordination compounds. Bioinorganic compounds (Hemoglobin and chlorophyll).

Lattice – unit cell, systems, types of crystals, packing in solids; Ionic crystals – Imperfections in solids – point defects. X-Ray diffraction – Electrical Property, Amorphous solids (elementary ideas only).

Thermodynamics, Chemical Equilibrium and Chemical Kinetics:

I and II law of thermodynamics – Spontaneous and non spontaneous processes, entropy, Gibb's free energy – Free energy change and chemical equilibrium – significance of entropy. Law of mass action – Le Chatlier's principle, applications of chemical equilibrium. Rate expression, order and molecularity of reactions, zero order, first order and pseudo first reaction – half life period. Determination of rate constant and order of reaction Temperature dependence of rate constant – Arrhenius equation, activation energy.

Electrochemistry:

Theory of electrical conductance; metallic and electrolytic conductance. Faraday's laws – theory of strong electrolytes – 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. Cells – Electrodes and electrode potentials – construction of cell and EMF values, Fuel cells, Corrosion and its prevention.

Isomerism in Organic Compounds:

Definition, Classification – structural isomerism, stereo isomerism – geometrical and optical isomerism. Optical activity- chirality – compounds containing chiral centres – R – S notation, D – L notation.

Alcohols and Ethers:

Nomenclature of alcohols – Classification of alcohols – distinction between 10, 20 and 30 alcohols – General methods of preparation of primary alcohols, properties. Methods of preparation of dihydric alcohols: Glycol – Properties – Uses. Methods of preparation of trihydric alcohols – properties – uses. Aromatic alcohols – preparation and properties of phenols and benzyl alcohol.

Ethers – Nomenclature of ethers – general methods of preparation of aliphatic ethers – Properties – Uses. Aromatic ethers – Preparation of Anisole – Uses.

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 and Uses. Ketones – general methods of preparation of aliphatic ketones (acetone) – Properties – Uses. Aromatic ketones – preparation of acetophenone – Properties – Uses, preparation of benzophenone – Properties. Name reactions; Clemmenson reduction, wolff – kishner reduction, cannizaro reaction, Claisen Schmidt reaction, Benzoin Condensation, aldol Condensation. Preparation and applications of Grignard reagents.

Carboxylic Acids and their derivatives:

Nomenclature – Preparation of aliphatic monobarboxylic acids – formic acid – Properties – Uses. Monohydroxy mono carboxylic acids; Lactic acid – synthesis of lactic acid. Aliphatic dicarboxylic acids; Preparation of oxalic and succinic acid. Aromatic acids; Benzoic and Salicylic acid – Properties – Uses. Derivatives of carboxylic acids; acetyl chloride (CH_3COCl) – Preparation – Properties – Uses. Preparation of acetamide, Properties – acetic anhydride – preparation, Properties. Preparation of esters – methyl acetate – Properties.

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 10, 20 and 30 amines. Aromatic amines – Synthesis of benzylamine – Properties, Aniline – Preparation – Properties – Uses. Distinction between aliphatic and aromatic amine. Aliphatic nitriles – Preparation – properties – Uses. Diazonium salts – Preparation of benzene diazoniumchloride – Properties.

Biomolecules:

Carbohydrates – distinction between sugars and non sugars, structure and formulae of glucose, fructose and sucrose, with their linkages, invert sugar – definition and examples of polysaccharides, amino acids, peptides.