

B.Sc. CHEMISTRY-SECOND SEMESTER**Major Core Paper -II****Paper Code: 17UCH02****Internal assessment Marks: 25****External Marks :75****GENERAL CHEMISTRY – II (75 Hours)****UNIT – I CHEMICAL BOND**

1.1. Ionic bond-mode of formation – properties of ionic compounds-inert pair effect-Born Haber cycle-polarisation of ions- factors affecting polarisation-importance of polarization of ions-Fajan's rules and applications.

1.2. Covalent Bond-mode of formation-properties of covalent compounds-Valence Bond theory-Postulates of Pauling-Slater's theory-Different types of overlapping. Molecular orbital theory-Postulates-Bonding and antibonding molecular orbitals-Tabulation of various M.Os formed from atomic orbitals-Energy level diagrams for M.Os-Bond order-Electronic configuration of Hetero nuclear diatomic molecules - CO, NO and HF. A comparative study of V.B and M.O. Methods.

UNIT-II HYDRIDES AND CARBIDES

2.1. Hydrides-Classification-Types of Hydrides and periodic Table -Ionic Hydrides-LiH and NaH-Preparation, properties, uses and structure. Covalent Hydrides – silanes - General study - Chemistry of monosilanes and disilanes-Differences between silanes and alkanes. Metallic Hydrides-Preparation, properties, structure and uses (A brief study.). Complex Hydrides-NaBH₄ and LiAlH₄-preparation, properties, uses and structure.

2.2. Carbides-Preparation, properties and technical applications.

UNIT-III REACTION MECHANISM I

3.1. Reaction intermediates : carbocation, carbanion, free radicals-formation and stability .

3.2. Aliphatic nucleophilic substitution- SN₁, SN₂ and SN_i reactions – mechanism and stereochemistry. Relative reactivity of ethyl, isopropyl,tertiary butyl, vinyl and benzyl halides-competition between substitution and elimination.

3.3. Elimination reactions-mechanisms of E₁ and E₂ reactions- Hofmann and Saytzeff rule.

3.4. Dienes-isolated and conjugated dienes- 1,2 and 1,4-addition.

UNIT-IV CYCLOALKANES AND AROMATIC HYDROCARBONS

- 4.1. Cycloalkanes- methods of formation-Wurtz reaction, Dieckmann ring closure and Baeyer's strain theory and its limitations.
- 4.2. Aromatic hydrocarbons and aromaticity-resonance in benzene-delocalised cloud in benzene-aromaticity-Huckel's $(4n+2)$ rule and its simple applications.
- 4.3. Electrophilic substitution reactions in aromatic compounds- general mechanism -Nitration, Halogenation, Sulphonation, Friedel- Crafts acylation and alkylation. Orientation and reactivity in monosubstituted benzene - nuclear and side chain halogenation.
- 4.4. Polynuclear aromatic hydrocarbons- naphthalene, anthracene -isolation, synthesis, properties and uses.

UNIT-V THE LIQUID STATE AND LIQUID CRYSTALS

- 5.1. The liquid state:
Structure of liquids-Vapour-pressure-Trouton's rule-surface tension-surface energy-some effects of surface tension-viscosity-effect of temperature on viscosity (Experimental determination of surface tension and viscosity not necessary)-Refractive index-specific refraction-molar refraction. Physical properties and chemical constitution- Molar volume and chemical constitution-Parachor and chemical constitution. Viscosity and chemical constitution- Molar refraction and chemical constitution.
- 5.2. Liquid crystals - (The mesomorphic state) - Thermography-classification of Thermotropic liquid crystals- Smectic liquid crystals-Nematic liquid crystals-Cholesteric liquid Crystals.