SECOND SEMESTER

Code : **CHT-201** Univ Code :201

Contact Hours :54 Work load : 4 hours per week

Credit Points :

Evaluation: Continuous Internal Assessment - 30 marks

Semester and Examination - 70 marks

PAPER-2

UNIT-I: INORGANIC CHEMISTRY-2 **18 Hours**

S-block elements **05 hours**

Comparative study of alkali & alkaline earth metals with respect to Physical properties: density, melting points & boiling points, flame coloration. Solubility of ionic compounds in relation to lattice energy and hydration energy. complexation tendencies of alkali metals. Characteristics of oxides and basicity of hydroxides.

P-block elements **05 Hours**

Some compounds of p-block elements: Halides of boron, relative strength of BF_3, BCl_3 & BBr_3 as Lewis acids, diborane-preparation, structure & bonding.

Halogens: Size of atoms & ions, ionization energy, electronegativity, oxidation states and oxidizing power. Types of interhalogen compounds-preparation and structure of ICl_3, IF_5 & IF_7.

Noble gases: structure & bonding in XeF_6 and XeO_3, Clathrates.

Chemical bonding -2 **08 Hours**

Valence bond theory: postulates, Concept of resonance, hybridization involving s, p & d atomic orbitals, Limitations of valence bond theory. VSEPR theory, structure of simple molecules like BF_3, NH_3, PCl_5 & ClF_3.

Molecular orbital theory (LCAO method), bonding and antibonding molecular orbitals, sigma & pi bonds. s-s, s-p, p-p, combination of orbitals**,** order of molecular orbital energy level configuration, bond order, molecular orbital energy level diagram for homonuclear H_2, He_2, N_2 & O_2 molecules.

Weak interactions: H-bonding and Van Der Waal's interactions.

UNIT-II: ORGANIC CHEMISTRY-2 **18 Hours**

Alkanes and cycloalkanes **06 hours**

Alkanes – Introduction, chain isomerism in alkanes up to C_5. General methods of synthesis of alkanes by Wurtz reaction, Kolbe reaction and Corey-House reaction. Free radical mechanism of halogenations (chlorination of methane may be taken as example).

Cycloalkanes – Definition with examples. Methods of synthesis of cycloalkanes (any two methods). Chemical properties. Bayer's strain theory – Salient features, angle of strain and its calculations, Limitations. Sachse-Mohr theory of strainless rings.

Alkenes, Dienes and Alkynes **06 hours**

Alkenes: Synthesis by dehydration of alcohols, dehydrohalogenation of alkyl halides and dehydrogenation of vicinal dihalides. Chemical reactions – Addition of hydrogen,

halogens, and hydrogen halides. Markovnikov's rule and peroxide effect with mechanism.

Dienes: definition of isolated, conjugated and cumulated dienes with examples. Diels-Alder reaction. Preparation & chemical reactions of 1,3-butadiene

Alkynes: synthesis of alkynes by dehydrohalogenation of vicinal dihalides and dehalogenation of tetrahalides. Acidity of alkynes and formation of metal acetylides.

Arenes and aromaticity **06 hours**

Arenes: Nomenclature of benzene derivatives. Modern concept of structure of benzene (MOT). Resonance energy. Directive orientation effect of substituents in monosubstituted benzene. Types of groups with examples . Ortho-para orientation (phenol) and meta orientation (nitrobenzene). Explanation with resonance structures. Aromaticity – Definition and criteria. Huckel's rule with examples.

UNIT-III: PHYSICAL CHEMISTRY-2 **18 Hours**

Liquid state **06 hours**

Inter molecular forces, structure of liquids (a qualitative description) structural differences between solids, liquids and gases. Liquid crystals: Differences between liquid crystals, solid and liquid structure. Properties of nematic and cholestric phases. Applications of liquid crystals.

Chemical kinetics **08 hours**

Revision of the concepts – the rate, order and molecularity of reaction and half life period. Second order reaction with examples. Derivation of specific rate constant of a second order reaction when $a = b$ and $a \neq b$. Methods of determination of order of a reaction – differential, half life and graphical method.

Theory of reaction rates – qualitative treatment of collision theory of bimolecular reactions. Theory of unimolecular reactions. Lindemann's hypothesis and steady state principle. An elementary account of transition state theory, activated complex its relation with thermodynamic functions (ΔG^*, ΔH^* and ΔS^*). Derivation of rate constant of a bimolecular reaction based on transition state theory. Parallel reactions with examples, consecutive reactions with examples. Numerical problems on second order reactions.

Colloids **04 hours**

Origin of charge on colloidal particle – electrical double layer, zeta potential. Electrophoresis & electro osmosis. Applications of colloids.

Code : **CHP-201** Univ Code :201

Contact Hours :84 Work load : 4 hours per week

Credit Points :

Evaluation: Continuous Internal Assessment - 10 marks

Semester and Examination - 40 marks (30 marks for examination,

05 marks for Practical record and 05 marks for viva-voce)

LABORATORY COURSE-2 **84 Hours**

Organic qualitative analysis of single compound with preparation of derivative. Note

- In the beginning two practical durations may be used for instructions & demonstration of single compound analysis with preparation of derivative.
- Instructions should include explanation of basis of scheme of analysis and each test with its use. For elements test and functional groups test chemical equations are to be given.
- Minimum 18 compounds are to be given for analysis.
- At least three compounds should be given from each group.
- The following compounds may be given for analysis
  - Acids: Benzoic, Salicylic, succinic, cinnamic & pthalic acid. o Phenols: α-naphthol, β-naphthol, p-cresol and o-cresol.
  - Bases: Aniline, p-Toluidine.
  - Neutrals: Urea, Nitrobenzene, m-Dinitrobenzene, naphthalene, Chlorobezene, Bromobenzene, Benzaldehyde, Acetone, Acetophenone & Biphenyl.