

### Lesson Plan, Session 2023-24

Name of the Assistant Professor:-Dr. Virender Kumar

Class:- B.Sc III (VI<sup>th</sup> Sem )

Subject:-Chemistry

Period	Topics to be covered	Topic of Assignments / Tests to be given to the students
05 -01-2024 to 15-01-2024	<p><b>Organic Chemistry; Organosulphur Compound :</b> Nomenclature, Structural feature, method of formation and chemical properties of Thiols, Thioether and Sulphonic acid. Structure, preparation, properties and uses of Sulphanamide. Sulphaguanidine and synthetic detergents.</p>	
16-01-2024 to 31-01-2024	<p><b>Heterocyclic Compounds:</b> Introduction: Molecular orbital picture and aromatic characteristics of pyrrole, furan, thiophene and pyridine. Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution. Mechanism of nucleophilic substitution reactions in pyridine derivatives. Comparison of basicity of pyridine, piperidine and pyrrole. Introduction to condensed five and six- membered heterocycles. Preparation and reactions of indole, quinoline and isoquinoline with special reference to Fisher indole synthesis, Skraup synthesis and Bischler-Napieralski synthesis. Mechanism of electrophilic substitution reactions of, quinoline and isoquinoline.</p>	

01-02-2024 to 15-02-2024	<p><b>Inorganic Chemistry; Acids and Bases:</b> Arrhenius, Bronsted-lowry, Lux-flood, solvent system and Lewis concept of acids and bases, relative strength of acids and bases, levelling solvents, hard and soft acids and bases(HSAB), Applications of HSAB principle.</p> <p><b>Organometallic chemistry:</b> Definition, classification and nomenclature of organometallic compounds, preparation, properties and bonding of alkyls of Li, Al, Hg and Sn, concept of hapticity of organic ligand, Structure and bonding in metal-ethylenic complexes, Structure of Ferrocene. classification in metal carbonyls, preparation, properties and bonding in mononuclear carbonyls.</p>	<p><b>Class Test:</b></p> <p>Chapter: Heterocyclic Compounds: <b>Assignments:</b> Organosulphur Compound</p>
16-02-2024 to 28-02-2024	<p><b>Organic Chemistry; Organic Synthesis via Enolates :</b> Acidity of <math>\alpha</math>- hydrogens, alkylation of diethyl malonate and ethyl acetoacetate. Synthesis of ethyl acetoacetate: the Claisen condensation. Keto- enol tautomerism of ethyl acetoacetate .</p> <p><b>Amino Acids, Peptides &amp; Proteins:</b> Classification, of amino acids. Acid- base behavior, isoelectric point and electrophoresis. Preparation of <math>\alpha</math>- amino acids. Structure and nomenclature of peptides and proteins. Classification of proteins. Peptide structure determination, end group analysis, selective hydrolysis of peptides. Classical peptide synthesis. solid- phase peptide synthesis. Structures of peptides and proteins: Primary &amp; Secondary structure.</p> <p><b>Synthetic Polymers:</b> Addition or chain- growth polymerization. Free radical vinyl polymerization,</p>	

	ionic vinyl polymerization, Ziegler- Natta polymerization and vinyl polymers. Condensation or step growth polymerization. Polyesters, polyamides, phenol formaldehyde resins. Natural and synthetic rubbers.	
01-03-2024 to 15-03-2024	<b>Inorganic Chemistry; Bio inorganic chemistry:</b> Metal ions present in biological system, classification on the basis of action (essential, non essential, trace, toxic), Metalloporphyrins with special reference to haemoglobin and myoglobin. Biological role of Na <sup>+</sup> , K <sup>+</sup> , Ca <sup>2+</sup> , Mg <sup>2+</sup> , Fe <sup>2+</sup> ions, Cooperative effect, Bohr effect. <b>Silicones and Phosphazenes:</b> Nomenclature, classification, preparation and uses of silicones, elastomers, polysiloxane copolymers, poly phosphazenes and bonding in triphosphazene.	<b>Class Test:</b> <b>Chapter:</b> Acids and Bases;; <b>Assignments:</b> Photochemistry
16-03-2024 to 31-03-2024	<b>Physical Chemistry:</b> Introduction to statistical mechanics: Need for statistical thermodynamics, thermodynamic probability, Maxwell Boltzmann distribution statistics, Born oppenheimer approximation. partition function and its physical significance. Factorization of partition function. Photochemistry: Interaction of radiation with matter, difference between thermal and photochemical processes. Laws of photochemistry: Grotthus-Drapper law, Stark- Einstein law (law of photochemical equivalence), Jablonski diagram depicting various processes occurring in the excited state, qualitative description of fluorescence, phosphorescence, non-radiative processes (internal	

	conversion, intersystem crossing), quantum yield, photosensitized reactions-energy transfer processes.	
01-04-2024 to 15-04-2024	<b>Solutions, Dilute Solutions and Colligative Properties:</b> Ideal and non-ideal solutions, methods of expressing concentrations of solutions, Dilute solutions, Raoult's law. Colligative properties: (i) relative lowering of vapour pressure (ii) Elevation in boiling point (iii) depression in freezing point (iv) osmotic pressure. Thermodynamic derivation of relation between amount of solute and elevation in boiling point and depression in freezing point.. Applications in calculating molar masses of normal, dissociated and associated solutes in solution.	
15-04-2024 to 30-04-2024	<b>Phase Equilibrium:</b> Statement and meaning of the terms – phase, component and degree of freedom, thermodynamic derivation of Gibbs phase rule, phase equilibria of one component system –Example – water system. Phase equilibria of two component systems solid-liquid equilibria, simple eutectic Example Pb-Ag system, desilverisation of lead.	

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