LESSON PLAN

(Even Semester) Session(2023-24) Class: B.Sc. (Sem:2nd) Subject: Chemistry

Name of Assistant / Associate Professor	*Period*	*Topics to be covered*	*Academic activities to be organized*	*Topic of Assignments / Tests to be given to the students*
Mr. Rajender Kumar	01 Jan 10. 15 Jan 2024	Alkene : Nomenclature of alkenes, mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halides,. The Saytzeff rule, Hofmann elimination, physical properties and relative stabilities of alkenes Chemical reactions of alkenes □ mechanisms involved in hydrogenation, electrophilic and free radical additions		
	16 Jan. 10. 30 Jan 2024	Markownikoff's rule, hydroboration–oxidation, oxymercuration- reduction, ozonolysis, hydration, hydroxylation and oxidation with KMnO4 Arene and Aromaticity: Nomenclature of benzene derivatives:. Aromatic nucleus and side chain		
	1 Feb. 10. 15 Feb. 2024.	Aromaticity: the Huckel rule, aromatic ions, annulenes up to 10 carbon atoms, aromatic, anti - aromatic and non - aromatic compounds Aromatic electrophilic substitution □ general pattern of the mechanism, mechansim of nitration, halogenation, sulphonation		*Assignment on topic* Aromaticity

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		and Friedel- Crafts reaction. Energy profile diagrams. Activating , deactivating substituents and orientation.		
	16 Feb. to 28 Feb. 2024 –	**Dienes and Alkynes:** Nomenclature and classification of dienes: isolated, conjugated and cumulated dienes. Structure of butadiene, Chemical reactions □ 1, 2 and 1, 4 additions (Electrophilic & free radical mechanism), Diels- Alder reaction, Nomenclature, structure and bonding in alkynes. Methods of formation. Chemical reactions of alkynes, acidity of alkynes. Mechanism of electrophilic and nucleophilic addition reactions, hydroboration- oxidation of alkynes		
	01 March to 15 March 2024 –	Alkyl Halides : Nomenclature and classes of alkyl halides, methods of formation, chemical reactions. Mechanisms and stereochemistry of nucleophilic substitution reactions of alkyl halides, S_N2 and S_N1 reactions with energy profile diagrams.		
	16 March to 31 March 2024 —	Aryl Halides: Methods of formation and reactions of aryl halides, The addition- elimination and the elimination- addition mechanisms of nucleophilic aromatic substitution reactions. Relative reactivities of alkyl halides vs allyl, vinyl and aryl halides.		

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	01 April to 15 April 2024	Kinetics - (Physical Chemistry) Rate of reaction, rate equation, factors influencing the rate of a reaction–concentration, temperature, pressure, solvent, catalyst. Order of a reaction, integrated rate expression for zero order, first order, second and third		Test.
	16 April to 30 April 2024	order reaction Half life period of a reaction. Methods of determination of order of reaction, effect of temperature on the rate of reaction – Arrhenius equation. Theories of reaction rate – Simple collision theory for unimolecular and bimolecular collision. Transition state theory of Bimolecular reactions.		

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LESSON PLAN

Class: B.Sc.(Sem: 6th) ,(Even Semester) Session(2023-24)

Subject: CHEMISTRY

Name of Assistant / Associate Professor	Period	Topics to be covered	Academic activities to be organized	Topic of Assignments / Tests to be given to the students
Mr. Rajender Kumar	01 Jan. to 15 Jan. 2024.	**Organometallic Chemistry :** Definition, nomenclature and classification of organometallic compounds. Preparation, properties, and bonding of alkyls of Li, Al, Hg, and Sn a brief account of metal-ethylenic complexes, mononuclear carbonyls and the nature of bonding in metal carbonyls.		
	16 Jan. to 31 Jan. 2024.	**Acids and Bases, HSAB Concept**: Arrhenius, Bronsted – Lowry, the Lux – Flood, Solvent system and Lewis concepts of acids & bases, relative strength of acids & bases, Concept of Hard and Soft Acids & Bases.		
	1 Feb. to 15 Feb. 2024	**Bioinorganic Chemistry:** Essential and trace elements in biological processes, metalloporphyrin's with special reference to hemoglobin and myoglobin. Biological role of alkali and alkaline earth metal ions with special reference to Ca^{2+}		Assignments of organo-metallic compounds.

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	16 Feb - 10 - 28 Feb 2024	**Bioinorganic Chemistry:** Nitrogen fixation **Silicones and Phosphazenes :** Silicones and phosphazenes as examples of inorganic polymers, nature of bonding in triphosphazenes		
	01 March - 10 - 15 March 2024	**Electronic Spectrum (Physical Chemistry) :** Concept of potential energy curves for bonding and antibonding molecular orbitals, qualitative description of selection rules and Franck-Condon principle. Qualitative description of sigma and pie and n molecular orbital (MO) their energy level and respective transitions.		
	16 March - 10 - 31 March 2024.	**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)	Test	
	01 April to 15 April 2024	**Photochemistry:** Jablonski diagram depiciting 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 (simple examples).		

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	-do-	**Organic Synthesis via Enolates** Acidity of α-hydrogens, alkylation of diethyl malonate and ethyl acetoacetate. Synthesis of ethyl acetoacetate: the Claisen condensation. Keto-enol tautomerism of ethyl acetoacetate.		
	16 April to 30 April 2024	**Heterocyclic Compounds** 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.		

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	4	Comparison of basicity of pyridine, piperidine and pyrrole. Introduction to condensed five and six- membered heterocycles. Prepration 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.		
	11	**Synthetic Polymers Addition or chain-growth polymerization.** Free radical vinyl polymerization, ionic vinyl polymerization, Ziegler-Natta polymerization and vinyl polymers. Condensation or step growth polymerization. Polyesters, polyamides, phenol formaldehyde resins. Natural and synthetic rubbers.		

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(Even Semester) Session(2023-24) Class: B.Sc.(Sem: 4th) **Subject: CHEMISTRY**

Name of Assistant / Associate Professor	Period	Topics to be covered	Academic activities to be organized	Topic of Assignments / Tests to be given to the students
Mr. Rajender Kumar	01 Jan. to 15 Jan. 2024	**Infrared (IR) absorption spectroscopy** Molecular vibrations, Hooke's law, selection rules, intensity and position of IR bands, measurement of IR spectrum, fingerprint region, characteristic absorptions of various functional groups and interpretation of IR spectra of simple organic compounds. Applications of IR spectroscopy in structure elucidation of simple organic compounds		
	16 Jan to. 31 Jan.	**Amines:** Structure and nomenclature of amines, physical properties. Separation of a mixture of primary, secondary and tertiary amines. Structural features affecting basicity of amines. Preparation of alkyl and aryl amines (reduction of nitro compounds, nitriles,		
	01 Feb. to. 15 Feb. 2024	**Amines:** reductive amination of aldehydic and ketonic compounds. Gabriel phthalimide reaction, Hofmann bromamide reaction. Electrophilic aromatic substitution in aryl amines, reactions of amines with nitrous acid and questions.		Assignment on topic Infrared (IR) absorption spectroscopy
	16 Feb. to. 28 Feb. 2024	**Diazonium Salts**: Mechanism of diazotisation, structure of benzene diazonium chloride, Replacement of diazo group by H, OH, F, Cl, Br, I, NO2 and CN groups, reduction of diazonium salts to hyrazines, coupling reaction and its synthetic application.		

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01 March to 15 March 2024	**Carboxylic Acids & Acid Derivatives** Nomenclature of Carboxylic acids, structure and bonding, physical properties, acidity of carboxylic acids, effects of substituents on acid strength. Preparation of carboxylic acids. Reactions of carboxylic acids. Hell-Volhard-Zelinsky reaction. Reduction of carboxylic acids. Mechanism of decarboxylation. Relative stability of acyl derivatives. Physical properties, interconversion of acid derivatives by nucleophilic acyl substitution. Mechanisms of esterification and hydrolysis (acidic and basic).		
16 March to 31 March	**Carboxylic Acids & Acid Derivatives** :Relative stability of acyl derivatives. Physical properties, interconversion of acid derivatives by nucleophilic acyl substitution. Mechanisms of esterification and hydrolysis (acidic and basic).		Test
01 April to 30 April	**Chemistry of f-Block elements Lanthanides:** Electronic structure, oxidation states, magnetic properties, complex formation, colour, ionic radii and lanthanide contraction, occurrence, separation of lanthanides, Lanthanide compounds. Actinides: General characteristics of actinides, chemistry of separation of Np, Pu and Am from uranium, Transuranic elements, comparison of properties of Lanthanides and actinides with transition elements. . Revision @ other problem.		

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