

Subject: Chemistry

Teacher's Name: Sunil Kumar

Class: BSc 6th Semester

Paper: Inorganic Chemistry

Semester (Odd/Even): 6th sem

Month	Week	Topics	Practical	Test/Assignment/Project/Seminar/Field Trip
April	1	Definition, nomenclature and classification of organometallic compound		
	2	Preparation, properties and bonding of alkyl of Li,Al,Hg and Sn		
		A brief account of Metal-ethylenic complexes and homogeneous hydrogenation		
	3	Mononuclear carbonyls and the nature of bonding in metal carbonyls		
		Arrhenius, Bronsted – Lowry, the Lux – Flood, Solvent system and Lewis concepts of acids & bases		Assignment 1
	4	relative strength of acids & bases		
May 23	1	Concept of Hard and Soft Acids & Bases. Symbiosis		
		electronegativity and hardness and softness		Class Test
		Essential and trace elements in biological processes		
	2	metallophorphyrin with Special reference to haemoglobin and myoglobin		
		Biological role of alkali and alkaline earth metal ions with special reference to Ca ²⁺		
		Nitrogen fixation		
	3	Silicones and their preparation, properties, structure and uses		Assignment 2
	4	Phosphazenes and their preparation, properties, structure and uses		
May 23	1	Problem discussion from last year question papers		
	2	Revision Syllabus		

Lesson Plan-1

Name of the Faculty : Mr. SUNIL KUMAR

Class : B.SC- III(M)

Semester-VI

Subject : ORGANIC SPECTROSCOPY-II

Lesson Plan duration: From feb to May2024

Paper Code : 20UCHE601

6Feb-15Feb

NMR spectroscopy-I: Basic principles of Nuclear Magnetic Resonance, chemical shift and its measurement, factors influencing chemical shift. Spin-spin coupling, mechanism of nuclear spin-spin interactions,

16Feb-28Feb

Different spin systems, coupling constant and factors effecting coupling constant. Anisotropic effects in alken alkyne, aldehydes and aromatics. Simplification of complex proton spectra with examples.

1March-15March

NMR spectroscopy-II: Interpretation of PMR Spectra of simple organic compounds. between geometrical isomers. CD NMR Spectroscopy: Basic principle, chemical shift and its calculations Applications of IR, UV and NMR for identification of simple organic molecules

16March-30March

Mass Spectrometry: Introduction, ion production EI, CI, FD and FAB, factors affecting fragmentation, McLafferty Nitrogen rule. Mass spectral fragmentation of organic

1April-15April

compounds having common functional groups. Combined problems relating to structure elucidation by UV, IR, NMR Spectroscopy and Mass Spectrometry.

Infrared Spectroscopy: Application of IR in structure elucidation of organic compounds- carbonyls

16April-30April

effect of substituents on it, C-H, N-H, O-H vibrations and H-bonding- unsaturated, mono- and disubstituted aromatic compounds,

1May -15May

metal-ligand vibrations, group frequencies of complex ligands-CN stretching and effect of coordination on it, nitro and nitrite and C-O ligands and effect of their coordination with metal ions. Applications of far and near IR.

Lesson Plan-1

Name of the Faculty : **Mr. Sunil Kumar**
Discipline : **B.SC- I**
Semester : **1st**
Subject. : **ATOMIC STRUCTURE & BONDING AND GENERAL ORGANIC CHEMISTRY-I**

Session: 2023-2024

Code: 20UCHE101

2Aug-15Aug

Atomic Structure: Review of: Bohr's theory and its limitations, dual behaviour of matter and radiation, de Broglie's relation, Heisenberg Uncertainty principle, Hydrogen atom Spectra What is Quantum mechanics? Time independent Schrodinger equation and meaning of various terms in it. Significance of w and w^2 , Schrödinger equation for hydrogen atom. Radial and angular parts of the hydrogenic wavefunctions (atomic orbitals) and their variations for 1s, 2s, 2p, 3s, 3p and 3d orbitals (Only graphical representation).

15Aug-30Aug

Radial and angular nodes and the significance. Radial distribution functions and the concept of the most probable distance with special reference to 1s and 2s atomic orbitals. Significance of quantum numbers, orbital angular momentum and quantum numbers m_l and m_s . Shapes of s, p and d atomic orbitals, nodal planes. Discovery of spin, spin quantum number (s) and magnetic spin quantum number (m_s).

1Sept -15Sept

Chemical Bonding: Review of Ionic Bonding: General characteristics and Energy considerations in ionic bonding, lattice energy and solvation energy and their importance in the context of stability and solubility of ionic compounds. Statement of Born-Landé equation for calculation of lattice energy, Born-Haber cycle and its applications, polarizing power and polarizability. Fajan's rules, ionic character in covalent compounds, bond moment, dipole moment and percentage ionic character.

16Sept-30 Sept

Covalent bonding: VB Approach: Shapes of some inorganic molecules and ions on the basis of VSEPR and hybridization with suitable examples of linear, trigonal planar, square planar, tetrahedral, trigonal bipyramidal and octahedral arrangements.

1Oct -15 Oct

MO Approach: Rules for the LCAO method, bonding and antibonding MOs and their characteristics for s-s, s-p and p-p combinations of atomic orbitals nonbonding combination of orbitals, MO treatment of homonuclear diatomic molecules of 1 and 2nd periods (including idea of s-p mixing) heteronuclear diatomic molecules such as CO, NO and NO'. Comparison of VB and MO approaches.

16Oct-30Oct

Fundamentals of Organic Chemistry: Physical Effects, Electronic Displacements: Inductive Effect, Electromeric Effect, Resonance and Hyperconjugation. Cleavage of Bonds: Homolysis and Heterolysis.

Structure, shape and reactivity of organic molecules: Nucleophiles and electrophiles.

1 Nov-15 Nov

Reactive Intermediates: Carbocations, Carbanions and free radicals. Strength of organic acids and bases: Comparative study with emphasis on factors affecting pK values.

Aromaticity: Benzenoids and Hückel's rule.

16 Nov-30 Nov

Stereochemistry: Conformations with respect to ethane, butane and cyclohexane.

Interconversion of Wedge Formula, Newmann, Sawhorse and Fischer representations.

Concept of chirality (upto two carbon atoms). Configuration: Geometrical and Optical isomerism; Enantiomerism, Diastereomerism

1 Dec-17 Dec

and Meso compounds). Threo and erythro; D and L; cis trans nomenclature; CIP Rules: R/S (for upto 2 chiral carbon atoms) and E/Z Nomenclature (for upto two C-C systems)