

Lesson Plan 2024-25 (Odd Semester)

(July to Dec 2024) Chemistry–B.Sc III Sem and V sem

Faculty: - Ms. Dr Varsha Sharma Department: -Chemistry

Month	July-August	August	September	October- November
BSc -III semester	<p>Inorganic chemistry Structures & properties of some compounds of transition elements – TiO₂, VOCl₂, FeCl₃, CuCl₂ and Ni (CO)₄</p> <p>Organic Chemistry Section A: Alcohols Epoxides</p> <p>Physical chemistry Thermodynamics-I Definition of thermodynamic terms: system, surrounding etc. Types of systems, intensive and extensive properties. State and path functions and their differentials. Thermodynamic process. Concept of heat and work.</p>	<p>Inorganic chemistry Coordination Compounds Werner's coordination theory, effective atomic number concept, chelates, nomenclature of coordination compounds,</p> <p>Organic Chemistry Section B: Phenols</p> <p>Physical chemistry Zeroth Law of thermodynamics, First law of thermodynamics: statement, definition of internal energy and enthalpy. Heat capacity, heat capacities at constant volume and pressure and their relationship. Joule's law – Joule – Thomson coefficient for ideal gas and real gas: and inversion temperature.</p>	<p>Inorganic chemistry Isomerism in coordination compounds, valence bond theory of transition metal complexes</p> <p>Organic Chemistry Section C: Ultraviolet (UV) absorption spectroscopy</p> <p>Physical chemistry Thermodynamics II Calculation of w.q. dU & dH for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process</p>	<p>Inorganic chemistry Non-aqueous Solvents Physical properties of a solvent, types of solvents and their general characteristics, reactions in non aqueous solvents with reference to liquid NH₃ and liquid SO₂</p> <p>Organic Chemistry Section D: Ultraviolet (UV) absorption spectroscopy</p> <p>Physical chemistry Temperature dependence of enthalpy, Kirchoff's equation. Bond energies and applications of bond energies</p>
B.Sc V semester	<p>Physical chemistry Quantum Mechanic s-I Black-body radiation, Planck's radiation law, photoelectric effect, heat capacity of solids, Compton effect, wave function and its significance of Postulates of quantum mechanics, quantum mechanical operator, commutation relations, Hamiltonian operator,</p>	<p>Physical chemistry Physical Properties and Molecular Structure Optical activity, polarization – (Clausius – Mossotti equation). Orientation of dipoles in an electric field, dipole moment, induced dipole moment, measurement of dipole moment- temperature method and refractivity method, dipole moment and</p>	<p>Physical chemistry Spectroscopy-I Introduction: Electromagnetic radiation, regions of spectrum, basic features of spectroscopy, statement of Born-Oppenheimer approximation, Degrees of freedom. Rotational Spectrum Diatomic molecules.</p>	<p>Physical chemistry Spectroscopy-II Vibrational spectrum Infrared spectrum: Energy levels of simple harmonic oscillator, selection rules, pure vibrational spectrum, intensity, determination of force constant and qualitative relation of force constant and bond energies, effects</p>

	<p>Hermitian operator, average value of square of Hermitian as a positive quantity, Role of operators in quantum mechanics, To show quantum mechanically that position and momentum cannot be predicated simultaneously, Determination of wave function & energy of a particle in one dimensional box, Pictorial representation and its significance</p>	<p>structure of molecules, Magnetic permeability, magnetic susceptibility and its determination. Application of magnetic susceptibility, magnetic properties – paramagnetism, diamagnetism and ferromagnetics.</p>	<p>Energy levels of rigid rotator (semi-classical principles), selection rules, spectral intensity distribution using population distribution (Maxwell-Boltzmann distribution), determination of bond length, qualitative description of non-rigid rotor, isotope effect</p>	<p>of anharmonic motion and isotopic effect on the spectra., idea of vibrational frequencies of different functional groups. Raman Spectrum: Concept of polarizability, pure rotational and pure vibrational Raman spectra of diatomic molecules, selection rules, Quantum theory of Raman spectra.</p>
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