Lesson Plan
Session: 2024-25

Name of the Assistant Professor: Dr SOM SHARMA

Class: B.Sc. 5th semester **Subject:** Chemistry

Paper 1: PHYSICAL CHEMISTRY

Dates	Week	Topic
22/07/2024 to 24/07/2024	1	**Unit 1:** Black-body radiation, Plank's radiation law, photoelectric effect, heat capacity of solids, Compton effect,wave function and significance of , postulates of quantum mechanics, quantum mechanical operator, commutation relations, Hamiltonial operator, Hermitian operator, average value of square of Hermitian as a positive quantity
29/07/2024 to 31/08/2024	2	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,
05/08/2024 to 07/08/2024	3	**Unit 2:**Optical activity, polarization – (clausius – Mossotti equation). Orientation of dipoles in an electric field, dipole moment, included dipole moment, measurement of dipole moment-temperature method 30 and refractivity method, d
12/08/2024 to 14/08/2024	4	dipole moment and structure of molecules, Magnetic permeability, magnetic susceptibility and its determination. Application of magnetic susceptibility, magnetic properties – paramagnetism, diamagnetism and ferromagnetics.
19/08/2024 to 21/08/2024	5	**Unit 3:**Introduction: Electromagnetic radiation, regions of spectrum, basic features of spectroscopy, statement of Born-oppenheimer approximation, Degrees of freedom. Rotational Spectrum Diatomic molecules.
26/08/2024 to 28/08/2024	6	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
02/09/2024 to 04/09/2024	7	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,
09/09/2024 to 11/09/2024	8	**Unit 4: ,**effects of anharmonic motion and isotopic effect on the spectra., idea of vibrational frequencies of different functional groups.Concept of polarizibility, pure rotational and pure vibrational Raman spectra of diatomic molecules, selectin rules, Quantum theory of Raman spectra.

PAPER - ORGANIC CHEMISTRY

Dates	Week	Topic
16/09/2024 to 18/09/2024	9	. Principle of nuclear magnetic resonance,
23/09/2024 to 25/09/2024	10	**Unit 1**the PMR spectrum,number of signals, peak areas,
30/09/2024 to 02/10/2024	11	equivalent and nonequivalent protons positions of signals and chemical shift,
07/10/2024 to 09/10/2024	12	**Unit 2:**shielding and deshielding of protons,
14/10/2024 to 16/10/2024	13	protoncounting,splitting of signals and coupling constants, magnetic equivalence of protons.,
21/10/2024 to 23/10/2024	14	**Unit 3:MID TERM EXAM**
04/11/2024 to 06/11/2024	15	.**Unit 4**Discussion of PMR spectra of the molecules: ethyl bromide, n-propyl bromide, isopropyl bromide, 1,1-dibromoethane, 1,1,2-tribromoethane, ethanol, acetaldehyde, ethyl acetate, toluene
11/11/2024 to 13/11/2024	16	benzaldehyde and acetophenone..Simple problems on PMR spectroscopy for structure determination of organic compounds
18/11/2024 to 20/11/2024	17	REVISION

Som Sharma

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Lesson Plan
Session: 2024-25

Name of the Assistant Professor: Dr Som Sharma

Class: B.Sc. 3rd semester **Subject:** CHEMISTRY

Paper 1: ORGANIC

Dates	Week	Topic
25/07/2024 to 27/07/2024	1	**Unit 1:** Monohydric alcohols – nomenclature, methods of formation by reduction of aldehydes, ketones, carboxylic acids and esters. Hydrogen bonding. Acidic nature. Reactions of alcohols.
01/08/2024 to 03/08/2024	2	Dihydric alcohols — nomenclature, methods of formation, chemical reactions of vicinal glycols, oxidative cleavage [Pb(OAc) 4 and HIO4] and pinacol-pinacolone rearrangement.
08/08/2024 to 10/08/2024	3	**Unit 2:**Nomenclature, structure and bonding. Preparation of phenols, physical properties and acidic character. Comparative acidic strengths of alcohols and phenols, resonance stabilization of phenoxide ion.
15/08/2024 to 17/08/2024	4	Reactions of phenols — electrophilic aromatic substitution, Mechanisms of Fries rearrangement, Claisen rearrangement, Reimer-Tiemann reaction, Kolbe's reaction and Schotten and Baumann reactions
22/08/2024 to 24/08/2024	5	**Unit 3:**Synthesis of epoxides. Acid and base-catalyzed ring opening of epoxides, orientation of epoxide ring opening, reactions of Grignard and organolithium reagents with epoxides
29/08/2024 to 31/08/2024	6	Absorption laws (Beer-Lambert law), molar absorptivity, presentation and analysis of UV spectra, types of electronic transitions, effect of conjugation. Concept of chromophore and auxochrome. Bathochromic, hypsochromic, hyperchromic and hypochromic shifts. UV spectra of conjugated enes and enones,
05/09/2024 to 07/09/2024	7	Woodward- Fieser rules, calculation of λ m a x of simple conjugated dienes and α,β-unsaturated ketones. Applications of UV Spectroscopy in structure elucidation of simple organic compounds.
12/09/2024 to 14/09/2024	8	**Unit 4:** 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

PAPER - PHYSICAL CHEMISTRY

Dates	Week	Topic
19/09/2024 to 21/09/2024	9	Structure , nomenclature and preparation of acid chlorides, esters, amides and acid anhydrides. Relative stability of acyl derivatives. Physical properties, interconversion of acid derivatives by nucleophilic acyl substitution. Mechanisms of esterification and hydrolysis (acidic and basic).
26/09/2024 to 28/09/2024	10	**Unit 1:** Joule's law – Joule – Thomson coefficient for ideal gass and real gas: and inversion temperature. Calculation of w.q. dU&dH for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process,
03/09/2024 to 05/10/2024	11	.Temperature dependence of enthalpy, Kirchoffs equation. Bond energies and applications of bond energies.
10/10/2024 to 12/10/2024	12	**Unit 2:** .Le-Chatetier's principle and its applications
17/10/2024 to 19/10/2024	13	Clapeyron equation and clausius – clapeyrou equation its applications
24/10/2024 to 26/10/2024	14	**Unit 3:MID TERM EXAM**
07/11/2024 to 09/11/2024	15	. **Unit 4** Applications of distribution law: (i) Determination of degree of hydrolysis and hydrolysis constant of aniline hydrochloride.
14/11/2024 to 16/11/2024	16	(ii) Determination of equilibrium constant of potassium tri-iodide complex and process of extraction
21/11/2024 to 22/11/2024	17	REVISION

Som Sharma

Lesson Plan

Session: 2024-25

Name of the Assistant Professor: Dr Som Sharma

Class: B.Sc. 1th semester**Subject:** CHEMISTRY

Paper 1: Skill Chemistry

Dates	Week	Topic
25/07/2024 to 27/07/2024	1	Review of energy sources (renewable and non-renewable). Classification of fuels and their calorific value.
01/08/2024 to 03/08/2024	2	Determination of calorific value by Bomb calorimeter and Junker's calorimeter. Coal: Analysis of coal,
08/08/2024 to 10/08/2024	3	Proximate and ultimate Analysis, Uses of coal (fuel and nonfuel) in various industries, its composition, carbonization of coal.
15/08/2024 to 17/08/2024	4	Coal gas, producer gas and water gas composition and uses.
22/08/2024 to 24/08/2024	5	Fractionation of coal tar, uses of coal tar-based chemicals, requisites of a good metallurgical coke,
29/08/2024 to 31/08/2024	6	Coal gasification (Hydrogasification and Catalytic gasification),
05/09/2024 to 07/09/2024	7	Coal liquefaction and Solvent Refining.
12/09/2024 to 14/09/2024	8	**Unit 2:** Petroleum and Petrochemical Industry: Composition of crude petroleum,

Dates	Week	Topic
19/09/2024 to 21/09/2024	9	Refining and different types of petroleum products and their applications.
26/09/2024 to 28/09/2024	10	Fractional Distillation (Principle and process),
03/09/2024 to 05/10/2024	11	Cracking (Thermal and catalytic cracking),
10/10/2024 to 12/10/2024	12	Reforming Petroleum and non-petroleum fuels (LPG, CNG, LNG, bio-gas, fuels derived from biomass),
17/10/2024 to 19/10/2024	13	fuel from waste, synthetic fuels (gaseous and liquids),
24/10/2024 to 26/10/2024	14	clean fuels. Petrochemicals: Vinyl acetate,
07/11/2024 to 09/11/2024	15	Propylene oxide, Isoprene, Butadiene,.
14/11/2024 to 16/11/2024	16	Toluene and its derivatives Xylene
21/11/2024 to 22/11/2024	17	REVISION

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