**MONTHLY LESSON PLAN**

**B.SC. 5TH SEMESTER**

**SUBJECT: PHYSICAL CHEMISTRY, SESSION 2022-2023**

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| **CMG GCW BHOIA KHERA, FATEHABAD** | |
| **NAME OF THE ASSISTANT PROFESSOR** | **MR. SATISH CHANDER** |
| **CLASS AND SECTION:** | **BSC III rd SEMESTER** |
| **SUBJECT:** | **CHEMISTRY** |
| **NOMENCLATURE:** | **PHYSICAL CHEMISTRY (CH-302)** |
| **MONTH** | **TOPICS** |
| **22 AUGUST 2022** | **Quantum Mechanics-I**  Black-body radiation, Plank’s radiation law, photoelectric effect, postulates of quantum mechanics, quantum mechanical operators, |
| **September 2022** | **Quantum Mechanics-I**  commutation relations, Hamiltonian operator, 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  **Assignment** |
| October **2022** | **Physical Properties and Molecular Structure**  Optical activity, polarization – (Clausius – Mossotti equation derivation excluded). Orientation of dipoles in an electric field, dipole moment, induced dipole moment, measurement of dipole moment -temperature method and refractivity method, dipole moment and structure of molecules, Magnetic permeability, magnetic susceptibility and its de termination. Application of magnetic susceptibility, magnetic properties – paramagnetism, diamagnetism and ferromagnetism.  **Unit Test** |
| **November 2022** | **Spectroscopy**  Introduction: Electromagnetic radiation, regions of spectrum, basic features of spectroscopy, statement of Born-oppenheimer approximation, Degrees of freedom.  **Rotational Spectrum**  Selection rules, Energy levels of rigid rotator (semi-classical principles), rotational spectra of diatomic molecules, spectral intensity distribution using population distribution (Maxwell-Boltzmann distribution), determination of bond length andisotopic effect.  **Vibrational spectrum** Selection rules, Energy levels of simple harmonic oscillator, pure vibrational spectrum of diatomic molecules, determination of force constant and qualitative relation of force constant and bond energy, idea of vibrational frequencies of different functional groups.  **Raman Spectrum**  Concept of polarizibility, pure rotational and pure vibrational Raman spectra of diatomic molecules, selection rules, Quantum theory of Raman spectra.  **Give more stress on numerical problems of all spectroscopy.** |
| **December 2022** | REVISION AND DOUBTS: COMPLETE SYLLABUS  REVISION WORK |

**(MR. SATISH CHANDER)**

**MONTHLY LESSON PLAN**

**B.SC. 3rd SEMESTER**

**SUBJECT: PHYSICAL CHEMISTRY, SESSION 2022-2023**

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| **CMG GCW BHOIA KHERA, FATEHABAD** | |
| **NAME OF THE ASSISTANT PROFESSOR** | **MR. SATISH CHANDER** |
| **CLASS AND SECTION:** | **BSC IInd 4TH SEMESTER** |
| **SUBJECT:** | **CHEMISTRY** |
| **NOMENCLATURE:** | **PHYSICAL CHEMISTRY (CH-202)** |
| **WEEK** | **TOPICS** |
| **22 August 2022** | **Thermodynamics**  Definition of thermodynamic terms: system, surrounding etc. Types of systems, intensive and extensive properties. State and path functions and their differentials. |
| **September 2022** | **Thermodynamics**  Thermodynamic process. Thermodynamic equilibrium, Concept of heat and work First law of thermodynamics: statement, concepts of internal energy and enthalpy. Heat capacity, heat capacities at constant volume and pressure and their relationship. Joule–Thomson coefficient for ideal gas 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.  **Assignment** |
| **October 2022** | **Chemical Equilibrium**  Equilibrium constant and free energy, concept of chemical potential, Thermodynamic derivation of law of chemical equilibrium. Temperature dependence of equilibrium Clausius–Clapeyron equation and its applications.  **Distributioln Law**  Nernst distribution law – its thermodynamic derivation,  **Unit Test** |
| **November 2022** | **Distributioln Law**  Applications of distribution law: (i) Determination of degree of hydrolysis and hydrolysis constant of aniline hydrochloride (ii) Determination of equilibrium constant of potassium tri –iodide complex and (iii) Process of extraction. More stress on numerical problems |
| **December 2022** | REVISION AND DOUBTS: COMPLETE SYLLABUS  REVISION WORK |

**(MR. SATISH CHANDER)**

**MONTHLY LESSON PLAN**

**B.SC. 1st SEMESTER**

**SUBJECT: ORGANIC CHEMISTRY, SESSION 2022-2023**

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| **CMG GCW BHOIA KHERA, FATEHABAD** | |
| **NAME OF THE ASSISTANT PROFESSOR** | **MR. SATISH CHANDER** |
| **CLASS AND SECTION:** | **B.SC. Ist SEMESTER** |
| **SUBJECT:** | **CHEMISTRY** |
| **NOMENCLATURE:** | **ORGANIC CHEMISTRY(CH-103)** |
| **MONTH** | **TOPICS** |
| **22 August 2022** | **Structure and Bonding**  Localized and delocalized chemic al bond, Van der Waal’s Interactions. |
| **September 2022** | **Structure and Bonding**  Resonance: conditions, resonance effect and its applications, hyperconjugation, inductive effect, Electromeric effect & their comparison.  **Stereochemistry of Organic Compounds**  Concept of isomerism. Types of isomerism.Optical isomerism, elements of symmetry, molecular chirality, enantiomers, stereogenic centre, optical activity, properties of enantiomers, chiral and achiral molecules with two stereogeniccentres, diastereomers, threo and erythro diastereomers, mesocompounds, resolution of enantiomers, inversion, retention and racemization.Relative and absolute configuration, sequence rules, R & S systems of nomenclature. Geometric isomerism, determination of configuration of geometric isomers. E & Z system of nomenclature,  **Assignment** |
| **October 2022** | **Stereochemistry of Organic Compounds**  Conformational isomerism  conformational analysis of ethane and n-butane, conformations of cyclohexane, axial and equatorial bonds. Newman projection and Sawhorse formulae, Difference between configuration and conformation.  **Mechanism of Organic Reactions**  Curved arrow notation, drawing electron movements with arrows, half-headed and double-headed arrows, homolytic and heterolytic bond breaking. Types of reagents – electrophiles and nucleophiles. Types of organic reactions.Reactive intermediates  carbocations, carbanions, free radicals,carbenes,(formation, structure & stability).  **Unit Test** |
| **November 2022** | **Alkanes and Cycloalkanes**  IUPAC nomenclature of branched and unbranched alkanes, classification of carbon atoms in alkanes. Isomerism in alkanes, sources, methods of formation: Wur tz reaction, Kolbe reaction, Corey-House reaction and de carboxylation of carboxylic acids, physical properties.Mechanism of free radical halogenation of alkanes: reactivity and selectivity.Cycloalkanes :- nomenclature, synthesis of cycloalkanes and their derivatives –photochemical (2+2) cycloaddition reactions, , dehalogenation of Alpha –omega dihalides, pyrolysis of calcium or barium salts of dicarboxylic acids, Baeyer's strain theory and its limitations., theory of strainless rings. |
| **December 2022** | REVISION AND DOUBTS: COMPLETE SYLLABUS  REVISION WORK |

**(MR. SATISH CHANDER)**