

LESSON PLAN (Session 23-24)

Semester -Odd

Department: Chemistry

Class : B.Sc. Ist Sem

Name of the faculty: Dr. Neena Goyal, Mrs. Seema Sharma, Dr. Prabjot Kaur

Paper code: B23-CHE-101

Nomenclature of the paper: Chemistry

Month	Week	Topics to be covered
July	21.07.23-22.07.23	Introduction to organic Chemistry: Definition, Characteristics of carbon, classification of carbon atoms, Nature of covalent bond Introduction and Gaseous state: States of matter and difference between types of states
	24.07.23-31.07.23	Gas Laws, Kinetic Molecular Theory of Gases, Concept of Hybridization in detail. Sp ³ , Sp ² and Sp hybridization by taking the examples of ethane, ethane and ethyne. Concept of Hybridization in detail. Sp ³ , Sp ² and Sp hybridization by taking the examples of ethane, ethane and ethyne. Atomic structure
August	01.08.23-05.08.23	Maxwell's distribution of velocities and energies, Effect of temperature on Maxwell's Distribution Debroglie Localised and delocalized bonds by taking suitable examples . What are the consequences of delocalized bonds. de-Broglie relation & uncertainty principle
	07.08.23-12.08.23	Derivation of root mean square velocity and average velocity Vander Waals forces of Interactions: definition, how these are generated, characteristics of vander Waals interactions, how these effect the physical properties of the molecules Numericals

	14.08.23-19.08.23	Derivation of Most probable velocity. Collision diameter, collision number, collision frequency and mean free path, Vander Waals forces of repulsive interactions: vander Waals radii. Why chair confirmation of cyclohexane is more stable than boat form. atomic orbitals
	21.08.23-26.08.23	Deviation of Real gases from ideal behavior. Their causes and effect on different Temp and Pressure Inductive effect: definition and explain I-Effect by taking suitable examples. Types of I-Effect +I and -I Effect . Applications of I-effect: Dipole moment of CCl ₄ , CHCl ₃ , CH ₂ Cl ₂ . O-dichlorobenzene, m-dichloro and p-dichloro benzene. quantum numbers
	28.08.23-2.09.23	Derivation of Van der Waal's Equation of State, its application in the calculation of Boyle's temperature with numericals Comparison of acidic strengths of various carboxylic acids on the basis of I-Effect & Basicity of amines
September	04.09.23-09.09.23	Critical temperature, critical pressure, critical volume and their determination. Their effect on Temp. and Pressure Resonance: Explain the definition of resonance by taking suitable examples. Rules for writing resonance structures. Explain with the help of examples Slater's rule
	11.09.23-16.09.23	PV isotherms of real gases, continuity of states, the isotherms of Van der Waal's equation. Resonance Energy, Resonance Effect : definition and its types by taking various examples. Applications of Resonance Effect: 1. Low reactivities of vinyl halide and aryl halides Problems
	18.09.23-23.09.23	Relationship between critical constants and Van der Waal's constants. Applications of Resonance Effect: 2. High reactivities of Allyl halides and benzyl halides 3. Acidic nature of carboxylic acids 4. Comparison of basicities of Aryl amines and aliphatic amines. Revision

	25.09.23-30.09.23	Numericals, Critical compressibility factor. The Law of corresponding states. Numericals, Critical compressibility factor. The Law of corresponding states. Problems
October	02.10.23-07-10.23	Liquid State: Definition of Liquids, Types of force of attractions Hyperconjugation : define and explain . What is Baker Nathan effect? Why hyperconjugation is also called No bond resonance, What is the condition for hyperconjugation? Applications of hyperconjugation Periodic table
	09.10.23-14.10.23	Sessional
	16.10.23-21.10.23	Structure of liquids. Properties of liquids- Vapour Pressure, Surface Tension Chapter2: Reaction mechanism in organic chemistry: Definition, arrow notations, hemolytic and heterolytic fission, difference between substrate and reagent. What are Electrophiles definition, types with examples. why called Lewis Acid. Atomic radius, ionization energy
	23.10.23-28.10.23	Viscosity, Refractive Index What are Nucleophiles definition, types with examples. why called Lewis Base.Types of chemical reactions by taking suitable examples. electron affinity
	30.10.23-04.11.23	Solids: Classification of solids, laws of crystallography, laws of constancy of interfacial angles. What are reaction Intermediates . Carbocations, carbanions: Definition, generation, Structure, types and stability electronegativity
	06.11.23-10.11.23	Ideal symmetry and symmetry elements, seven crystal systems and fourteen Bravais lattices Free Radicals, Carbenes: Definition, generation, Structure, types and stability
Vacations	10.11.23-16.11.23	Diwali Vacations
	17.11.23-18.11.23	X-ray diffraction, Bragg's law, a simple account of Laue method, rotating crystal method Revision of previous year question papers
	20.11.23- 25.11.23	Powder pattern method, law of rational indices,
	27.11.23-02.12.23	Miller indices and its numerical and revision
		Examination

LESSON PLAN (Session 23-24)

Semester -Odd

Department: Chemistry

Class : Bsc 3 sem

Name of the faculty: Seema Sharma

Paper code: CH -201

Nomenclature of the paper: Inorganic Chemistry m

Month	Week	Topics to be covered
August	31.08.23-05.08.23	Chemistry of d block elements
	07.08.23-12.08.23	General Characteristics
	14.08.23-19.08.23	Properties of d block elements
	21.08.23-26.08.23	Comparison of properties
	28.08.23-2.09.23	Properties of d block elements
September	04.09.23-09.09.23	Non aqueous solvents
	11.09.23-16.09.23	Types & general properties
	18.09.23-23.09.23	liquid ammonia as solvent
	25.09.23-30.09.23	liquid sulphur dioxide as solvent
October	02.10.23-07-10.23	Revision
	09.10.23-14.10.23	Conditional tests
	16.10.23-21.10.23	Co ordination compounds
	23.10.23-28.10.23	EAN & isomerism
	30.10.23-04.11.23	VBT
	06.11.23-10.11.23	Assignment & Group discussion
Vacations	10.11.23-16.11.23	Diwali Vacations

LESSON PLAN (Session 23-24)

Semester -Odd

Department: Chemistry

Class : B.Sc. IIIrd Sem

Name of the faculty: Dr. Prabjot Kaur

Paper code: CH-202

Nomenclature of the paper: Physical Chemistry

Month	Week	Topics to be covered
August	31.08.23-05.08.23	Introduction and revise the basics, Basics of thermodynamics, Definition of thermodynamic terms: system, surrounding etc.
	07.08.23-12.08.23	Types of systems, intensive and extensive properties. State and path functions and their differentials.
	14.08.23-19.08.23	Thermodynamic process. Thermodynamic equilibrium, Concept of heat and work.
	21.08.23-26.08.23	First law of thermodynamics: statement, concepts of internal energy and enthalpy
	28.08.23-2.09.23	Heat capacity, heat capacities at constant volume and pressure and their relationship
September	04.09.23-09.09.23	Joule Thomson coefficient for ideal gas and real gas. Joule–Thomson coefficient for ideal gas and real gas and inversion temperature.
	11.09.23-16.09.23	Calculation of w , q , dU & dH for the expansion of ideal gases under isothermal conditions for reversible process
	18.09.23-23.09.23	Calculation of w , q , dU & dH for the expansion of ideal gases under adiabatic conditions for reversible process
	25.09.23-30.09.23	Comparison of isothermal and adiabatic expansion, Chemical Equilibrium- Introduction of Chemical equilibrium, Equilibrium constant and free energy
October	02.10.23-07-10.23	Concept of chemical potential, Thermodynamic derivation of law of chemical equilibrium.
	09.10.23-14.10.23	Sessional
	16.10.23-21.10.23	Temperature dependence of equilibrium constant- Vant-Hoff reaction and isotherm
	23.10.23-28.10.23	Clausius–Clapeyron equation and its applications.

November	30.10.23-04.11.23	Distribution Law- Nerenst Distribution Law, conditions for law
	06.11.23-10.11.23	Applications of distribution law: (i) Determination of degree of hydrolysis and hydrolysis constant of aniline hydrochloride Numerical related to degree of hydrolysis
Vacations	10.11.23-16.11.23	Diwali Vacations
	17.11.23-18.11.23	Determination of equilibrium constant of potassium tri-iodide complex, Process of extraction.
	20.11.23-25.11.23	Numericals related to extraction, Revision
December	27.11.23-31.12.23	Examination

LESSON PLAN (Session 23-24)

Semester -Odd

Department: Chemistry

Class : B.Sc II

Name of the faculty: Dr. Neena Goyal

Paper code: CHE- 203

Nomenclature of the paper: Organic Chemistry

Month	Week	Topics to be covered
July	21.07.23-22.07.23	Introduction of the curriculum. Revision of basic concepts
	24.07.23-29.07.23	Definition and classification of alcohols. IUPAC nomenclature of alcohols, Carbinol system of nomenclature
August	31.07.23-05.08.23	Synthesis of alcohols: From carbonyl compounds, Use of LAH and NaBH ₄ with mechanism. Mechanism of reduction of Carboxylic acids and esters using LAH. Difference between LAH and NABH ₄ . What are chemoselective reagents. Reaction and mechanism of MPV reaction.
	07.08.23-12.08.23	Boveault Blac reduction and catalytic hydrogenation. Physical properties of alcohols : B.Pt, solubility . Effect of branching on solubility and b.pt of alcohols. Acidic nature of alcohols: rxn with active metals Comparison of acidic strengths of 1*, 2* and 3* alcohols. Alcohols are weaker acids even weaker than water.
	14.08.23-19.08.23	Chemical properties of alcohols: Reaction with Grignard reagent, carboxylic acids and acid chloride and anhydride (acylation of alcohols) Schotten Baumann reaction.
	21.08.23-26.08.23	Halogenation of alcohols: reactivities of 1*, 2*, 3* alcohols and different hydrogen halides. Lucas test / Grove's Process, Mechanism of halogenations: SN1 and SN2. Role of anh. ZnCl ₂ . Halogenation involving rearrangements.
	28.08.23-2.09.23	Dehydration of alcohols, Sayzeff rule and

		through rearrangement. Oxidation of 1°, 2° and 3° alcohols. What happens when vapours of primary, secondary, tertiary alcohols are passed through red hot Cu at 573K. discussion of past year question papers.
September	04.09.23-09.09.23	Epoxides: Definition and nomenclature and synthesis of epoxides : From alkenes. Ring cleavage in presence of water acid and base catalysed. With NH_3 and RMgX . Ring cleavage rxn of unsymmetrical epoxides acid and base catalysed.
	11.09.23-16.09.23	Glycols: definition, classification and nomenclature . Synthesis : Cis hydroxylation and trans hydroxylation, bimolecular reduction and from chlorohydrins. Physical and chemical properties. Reaction with Na, HCl, HBr and HI. With aldehydes and ketones, dehydration under different conditions, oxidation in presence of HNO_3 , Oxidative cleavage/ Malaprade reagent and Pinacol-Pinacolone rearrangement.
	18.09.23-23.09.23	TEST , Assignment . UNIT-II Carboxylic acids: definition. Importance, structure . How and why behave differently from carbonyl compounds? Synthesis: From alcohols, acid derivatives, Nitriles, carbonation of Grignard reagent, Malonic esters.
	25.09.23-30.09.23	Physical properties of alcohols : m.pt, b.pt, solubility Chemical properties: Acidic nature , effect of EWG . comparison of acidic strengths of CH_3COOH , HCOOH and $\text{C}_6\text{H}_5\text{COOH}$. Effect of substituents on the acidic strength of aromatic acids. Synthesis of all acid derivatives, Decarboxylation reaction , effect of substituent on the decarboxylation of aliphatic acids
October	02.10.23-07-10.23	Hunsdiecker reaction and HVZ reaction in detail. Abnormal behavior of Formic acid. Acid derivatives : synthesis and mechanism of S_N reactions of all acid derivatives their reactivity order and stability order.
	09.10.23-14.10.23	Hydrolysis, ammonolysis and alcoholysis reactions of all acid derivatives' Friedel craft acylation , trans esterification Acid and base hydrolysis, amphoteric nature of amides. Reaction with P_2O_5 , HNO_2 and Hoffmann bromamide

		degradation rxn of amides. Sessional exams. Phenols an introduction and synthesis.
	16.10.23-21.10.23	Synthesis from Cumene, physical properties of phenols. Chemical properties : Claissen and Fries rearrangements
	23.10.23-28.10.23	Kolbes rxn, Reimer-Tiemann rxn Electrophilic substitution reactions : How to get monosub. Product.
	30.10.23-04.11.23	UV spectroscopy
	06.11.23-10.11.23	UV spectroscopy
Vacations	10.11.23-16.11.23	Diwali Vacations

LESSON PLAN (Session 23-24)

Semester -Odd

Department: Chemistry

Class : B Sc 5 sem

Name of the faculty: Seema Sharma

Paper code: 301

Nomenclature of the paper: Inorganic Chemistry

Month	Week	Topics to be covered
August	31.08.23-05.08.23	VBT
	07.08.23-12.08.23	Geometries on basis of VBT
	14.08.23-19.08.23	CFT
	21.08.23-26.08.23	CFSE
	28.08.23-2.09.23	Test
September	04.09.23-09.09.23	Magnetic Properties of transition metals
	11.09.23-16.09.23	Magnetic susceptibility
	18.09.23-23.09.23	magnetic moments
	25.09.23-30.09.23	Thermodynamics of metals
October	02.10.23-07.10.23	revision
	09.10.23-14.10.23	Conditional tests
	16.10.23-21.10.23	kinetics of metals
	23.10.23-28.10.23	Electronic spectra
	30.10.23-04.11.23	spectrochemical series
	06.11.23-10.11.23	discussion of electronic spectra
Vacations	10.11.23-16.11.23	Diwali Vacations

LESSON PLAN (Session 23-24)

Semester -Odd

Department: Chemistry

Class : B.Sc. III

Name of the faculty: Dr. Prabjot Kaur

Paper code: CH-302

Nomenclature of the paper: Physical Chemistry (TH)

Month	Week	Topics to be covered
August	31.08.23-05.08.23	Introduction to Classical and Quantum Mechanics, Black-body radiation, Plank's radiation law, photoelectric effect,
	07.08.23-12.08.23	De-Broglie hypothesis, Bohr model, Heisenberg's Principle, Compton effect
	14.08.23-19.08.23	Significance of wave function, Schrodinger wave equation, postulates of quantum mechanics,
	21.08.23-26.08.23	mechanical operators, commutation relations, Hamiltonian operator, Hermitian operator, average value of square of Hermitian as a positive quantity, Role of operators in quantum mechanics
	28.08.23-2.09.23	Numericals related to operators
September	04.09.23-09.09.23	Determination of wave function & energy of a particle in one dimensional box.
	11.09.23-16.09.23	Optical activity, polarization – (Clausius – Mossotti equation - derivation.
	18.09.23-23.09.23	Orientation of dipoles in an electric field, dipole moment, induced dipole moment.
	25.09.23-30.09.23	Measurement of dipole moment -temperature method and refractivity method, dipole moment and structure of molecules.
October	02.10.23-07-10.23	Magnetic permeability, magnetic susceptibility and its determination. Application of magnetic susceptibility,
	09.10.23-14.10.23	Sessional magnetic properties – paramagnetism, diamagnetism and ferromagnetism,
	16.10.23-21.10.23	Spectroscopy-Electromagnetic radiation, regions of spectrum, basic features of spectroscopy,

		statement of Born -oppenheimer approximation,
	23.10.23-28.10.23	Degrees of freedom, Selection rules, Energy levels of rigid rotator (semi-classical principles), rotational spectra of diatomic molecules,
	30.10.23-04.11.23	spectral intensity distribution using population distribution (Maxwell-Boltzmann distribution), Determination of bond length and isotopic effect.
	06.11.23-10.11.23	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
Vacations	10.11.23-16.11.23	Diwali Vacations
	17.11.23-18.11.23	Concept of polarizability, pure rotational and pure vibrational Raman spectra of diatomic molecules, selection rules, Quantum theory of Raman spectra.
	20.11.23-25.11.23	Spectra of Raman Lines, Stoke and Anti-stoke lines, comparison of spectroscopy, Numerical on spectroscopy and Revision
	27.11.23	Examination

LESSON PLAN (Session 23-24)

Semester -Odd

Department: Chemistry

Class : B.Sc III

Name of the faculty: Dr. Neena Goyal

Paper code: CHE- 303

Nomenclature of the paper: Organic Chemistry

Month	Week	Topics to be covered
July	21.07.23-22.07.23	Unit-II Carbohydrates: Definition, Classification. Monosaccharides, Oligosaccharides and Polysaccharides on the basis of hydrolysis taking suitable examples. Sugars and Non sugars.
	24.07.23-29.07.23	What are reducing and non-reducing sugars. Glucose: Extraction, Chemical Properties due to C=O group, Osazone formation with mechanism. Why glucose and fructose form same osazone - CHO group: Oxidation in presence of mild and strong oxidizing reagent. Reducing properties of Glucose.
August	31.07.23-05.08.23	Reducing Properties of Glucose: Reaction with mild and strong reducing reagent, with Alcohol, Conc. H ₂ SO ₄ , dil. NaOH (Lobry-de Bruyn Van Ekenstein rearrangement) Fructose is a ketohexose still reducing Explain?
	07.08.23-12.08.23	Open chain structure of D(+) Glucose. Fructose: Fruit sugar, extraction and isolation
	14.08.23-19.08.23	Chemical Properties of D(-) Fructose and its Structure
	21.08.23-26.08.23	Interconversions: Glucose-Fructose, Fructose - Glucose, Killani-Fisher Synthesis and Ruff degradation (Glucose to Arabinose)
	28.08.23-2.09.23	Wolff degradation, Epimerisation (Glucose - Mannose) Revision . Discussion of question papers.
September	04.09.23-09.09.23	Limitations of open chain structure of D(+) Glucose. How ring structure overcomes all the limitations.?
	11.09.23-16.09.23	Establish ring size of D+ Glucose
	18.09.23-23.09.23	Writing of Haworth Projection formula of α and

		BD+ Glucose, Fructose, D- Arabinose, 2-deoxyribose . Note on 1.Glucosides and Glycosides 2. Glucose ethers (Purdie and Haworth method) 3. Glucose pentaacetate.
	25.09.23-30.09.23	Diasaccharides : Structure and Haworth projection formulas of Maltose, Sucrose . What is Invert sugar why it is so called? Lactose
October	02.10.23-07-10.23	Structures of Starch and Cellulose . revision .
	09.10.23-14.10.23	Revised Carbohydrates questions . Participation of students .
	16.10.23-21.10.23	UNIT-1 NMR Spectroscopy: Principal of NMR
	23.10.23-28.10.23	No of signals : Equivalent and Non equivalent protons, Isomer no. enantotopic and diastereotopic protons. Discuss by taking a no of examples.
	30.10.23-04.11.23	Ask students problems related to no of signals.2. Position of the signals: Shielding and deshielding , Chemical shift, TMS , δ and τ scale . Numerical problems. Factors affecting chemical shift
	06.11.23-10.11.23	Standard values of chemical shift in delta scale. Intensity of signals, spin-spin coupling and problems relatd to it.
Vacations	10.11.23-16.11.23	Diwali Vacations
2 nd Teaching term	17.11.23-24.11.23	Coupling constant , magnetic equivalence of protons. Spectra of ultra pure Ethanol, Spectra of some organic compounds Revision tests, revision of question papers
University exams	25.11.23-23.12.23	