

**Pt. J.L.N. Govt. P.G. College, Faridabad,
Department of Chemistry, Session 2023-24
Lesson Plan - Even Semester**

Dr. Ankita, Assistant Professor, Chemistry

<i>Month</i>	<i>Week</i>	<i>BSc I BT IC</i>	<i>BSc II BT IC</i>	<i>BSc III BT OC + BSc III M Sec-B OC</i>	
<i>January</i>	<i>1</i>	<i>Chemistry of Noble Gases</i>	<i>Lanthanides</i>	<i>Heterocyclic compounds-I</i>	
	<i>2</i>				
	<i>3</i>	<i>Hydrogen bonding & Van der Waals forces</i>			
	<i>4</i>				
	<i>5</i>				
<i>February</i>	<i>1</i>	<i>Metallic bond & semiconductors</i>	<i>Actinides</i>	<i>Organosulphur compounds Synthetic polymers Assignment</i>	
	<i>2</i>				
	<i>3</i>	<i>s-Block elements</i>			
	<i>4</i>	<i>Assignment</i>			<i>Assignment</i>
	<i>5</i>				
	<i>1</i>	<i>p-Block elements Boron family</i>	<i>Theory of qualitative & quantitative analysis-I</i>	<i>Heterocyclic compounds-II</i>	
	<i>2</i>				

March	3	<i>Carbon famiy Nitrogen family</i>		<i>Organic synthesis via enolates</i>
	4			<i>Unit test</i>
	5	<i>Unit test</i>	<i>Unit test</i>	
April	1	<i>p-Block elements Oxygen family Halogen family</i>	<i>Theory of qualitative & quantitative analysis-II</i>	<i>Amino acids, peptides & proteins</i>
	2			
	3			
	4	<i>Revision</i>	<i>Revision</i>	<i>Revision</i>
	5			

**Pt. J.L.N. Govt. P.G. College, Faridabad,
Department of Chemistry, Session 2023-24
Lesson Plan - Even Semester**

Dr. Deepika, Extension Lecturer, Chemistry

<i>Month</i>	<i>Week</i>	<i>BSc II BT PC</i>	<i>BSc III NM (A+B) PC</i>	<i>BSc III BT PC</i>
<i>January</i>	<i>1</i>	<i>Thermodynamics III</i>	<i>Electronic Spectrum</i>	<i>Electronic Spectrum</i>
	<i>2</i>			
	<i>3</i>			
	<i>4</i>			
	<i>5</i>			
<i>February</i>	<i>1</i>	<i>Thermodynamics IV</i>	<i>Photochemistry</i>	<i>Photochemistry</i>
	<i>2</i>			
	<i>3</i>			
	<i>4</i>	<i>Assignment</i>	<i>Assignment</i>	<i>Assignment</i>
	<i>5</i>			
	<i>1</i>	<i>Electrochemistry III</i>	<i>Dilute Solutions and Colligative Properties</i>	<i>Dilute Solutions and Colligative Properties</i>
	<i>2</i>			

<i>March</i>	<i>3</i>			<i>Unit test</i>
	<i>4</i>			
	<i>5</i>	<i>Unit test</i>	<i>Unit test</i>	
<i>April</i>	<i>1</i>	<i>Electrochemistry IV</i>	<i>Phase Equilibrium</i>	<i>Phase Equilibrium</i>
	<i>2</i>			
	<i>3</i>			
	<i>4</i>	<i>Revision</i>	<i>Revision</i>	<i>Revision</i>
	<i>5</i>			

**Pt. J.L.N. Govt. P.G. College, Faridabad,
Department of Chemistry, Session 2023-24
Lesson Plan - Even Semester**

Sh. Ankit Kaushik, Assistant Professor, Chemistry

<i>Month</i>	<i>Week</i>	<i>BSc II BT</i>	<i>BSc II Med (A+B)</i>	<i>BSc III Med (A)</i>
<i>January</i>	<i>1</i>	<i>Infrared Spectroscopy</i>	<i>Infrared Spectroscopy</i>	<i>Heterocyclic compounds-I</i>
	<i>2</i>			
	<i>3</i>			
	<i>4</i>			
	<i>5</i>			
<i>February</i>	<i>1</i>	<i>Amines</i>	<i>Amines</i>	<i>Organosulphur compounds</i>
	<i>2</i>	<i>Diazonium salt</i>	<i>Diazonium salt</i>	<i>Synthetic polymers</i>
	<i>3</i>			
	<i>4</i>			
	<i>5</i>	<i>Assignment</i>	<i>Assignment</i>	
	<i>1</i>	<i>Diazonium salt</i>	<i>Diazonium salt</i>	<i>Heterocyclic compounds-II</i>
	<i>2</i>			

<i>March</i>	<i>3</i>	<i>Nitro group</i>	<i>Nitro group</i>	<i>Organic synthesis via enolates</i>
	<i>4</i>	<i>Unit test</i>	<i>Unit test</i>	<i>Unit test</i>
	<i>5</i>			
<i>April</i>	<i>1</i>	<i>Aldehydes and ketones</i>	<i>Aldehydes and ketones</i>	<i>Amino acids, Peptides & protein</i>
	<i>2</i>			
	<i>3</i>			
	<i>4</i>	<i>Revision</i>	<i>Revision</i>	<i>Revision</i>
	<i>5</i>			

LESSON PLAN (EVEN SEMESTER)

Department:- Chemistry
Chemistry

Class:- B.Sc IV (Pass Course) Physical

Month	1st Week	2nd Week	3rd Week	4th Week
January	The second law of thermodynamics. Need of the law, different definitions of the law, Carnot Cycle, and its efficiency.	Carnot theorem, Thermodynamic scale of temperature, Concept of entropy, entropy as a state function of V and T, entropy as a function of P and T.	Entropy change in physical processes. Clausius inequality, Entropy as criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases, work function, Gibb, 's free energy function.	Gibbs function (G) and Helmholtz function (A) as thermodynamic function, Criteria of spontaneity of reversible processes in terms of enthalpy change, entropy change, work function and free energy function.
February	Variation of G and A with P,V and T. Gibb Helmholtz equation and its application, Clausius- Clapeyron equation Nernst heat theorem. Third law of thermodynamics.	Electrolytic and Galvanic cells, reversible & Irreversible cells , conventional Representation of electrochemical cells. EMF of cell and its measurement. Revision & Minor Test.	Weston standard cell, activity and activity coefficients. Calculation of thermodynamic quantities of cell reaction (G, H & K). Types of reversible electrodes – metal metal ion gas electrode, metal – insoluble salt- anion and redox electrodes.	Electrode Reactions, Nernst equations, derivation of cell EMF and single electrode potential.
March	Standard Hydrogen electrode, reference electrodes, standard electrodes potential, sign conventions, electrochemical series and its applications.	Concentration cells with and without transference, liquid junction potential.	Application of EMF measurement i.e. valency of ions, solubility product, activity coefficient.	Revision & Minor Test.

April	Potentiometric titration (acid-base and redox).	Determination of pH using Hydrogen electrode, Quinhydrone electrode and glass electrode by potentiometric methods.	Revision & Minor Test.	-----
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LESSON PLAN (EVEN SEMESTER)

Department:- Chemistry
Chemistry

Class:- B.Sc IV (Bio-Tech) Physical

Month	1st Week	2nd Week	3rd Week	4th Week
January	The second law of thermodynamics. Need of the law, different definitions of the law, Carnot Cycle, and its efficiency.	Carnot theorem, Thermodynamic scale of temperature, Concept of entropy, entropy as a state function of V and T, entropy as a function of P and T.	Entropy change in physical processes. Clausius inequality, Entropy as criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases, work function, Gibb, 's free energy function.	Gibbs function (G) and Helmholtz function (A) as thermodynamic function, Criteria of spontaneity of reversible processes in terms of enthalpy change, entropy change, work function and free energy function.
February	Variation of G and A with P,V and T. Gibb Helmholtz equation and its application, Clausius- Clapeyron equation Nernst heat theorem. Third law of thermodynamics.	Electrolytic and Galvanic cells, reversible & Irreversible cells , conventional Representation of electrochemical cells. EMF of cell and its measurement. Revision & Minor Test.	Weston standard cell, activity and activity coefficients. Calculation of thermodynamic quantities of cell reaction (G, H & K). Types of reversible electrodes – metal metal ion gas electrode, metal –insoluble salt- anion and redox electrodes.	Electrode Reactions, Nernst equations, derivation of cell EMF and single electrode potential.
March	Standard Hydrogen electrode, reference electrodes, standard electrodes potential, sign conventions, electrochemical series and its applications.	Concentration cells with and without transference, liquid junction potential.	Application of EMF measurement i.e. valency of ions, solubility product, activity coefficient.	Revision & Minor Test.

April	Potentiometric titration (acid-base and redox).	Determination of pH using Hydrogen electrode, Quinhydrone electrode and glass electrode by potentiometric methods.	Revision & Minor Test.	-----
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LESSON PLAN (EVEN SEMESTER)

Department:- Chemistry
Chemistry

Class:- B.Sc IV (Hons) Physical

Month	1st Week	2nd Week	3rd Week	4th Week
January	Second law of thermodynamics. Need of the law, different definitions of the law, Carnot Cycle and its efficiency. Carnot theorem, Thermodynamic scale of temperature.	Concept of entropy, entropy as a state function of V and T, entropy as a function of P and T. Entropy change in physical processes. Clausius inequality, Entropy as criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases	work function, Gibbs free energy function. Gibbs function (G) and Helmholtz function (A) as thermodynamic function, Criteria of spontaneity of reversible processes in terms of enthalpy change, entropy change, work function and free energy function.	Variation of G and A with P, V and T. Gibbs Helmholtz equation and its application, Clausius-clapeyron equation Nernst heat theorem. Third law of thermodynamics and its applications.
February	Partial molar quantities. Chemical potential. Gibbs Duhem equation. Gibbs adsorption equation and its application, variation of chemical potential with temperature and pressure.	Redox reactions, electrolytic and galvanic cells. Reversible and irreversible cells reversible electrodes, types of reversible electrodes. Revision & Minor Test.	Metal electrodes, gas metal electrode, metal insoluble salt on ions and redox electrodes. Electrode reactions, cell voltage, function of salt bridge, electrode potential and its determination.	Standard hydrogen electrode, reference electrode, standard cell, sign convention.
March	Electrochemical series and its significance. Nernst equation for a reversible electrode and cell. Calculation of thermodynamic quantities of a cell reaction 'G, 'H and K.	Polarization over potential and hydrogen over voltage. Definition of pH. Determination of pH using hydrogen, quinhydrone and glass electrode by potentiometric method.	Experimental methods of chemical kinetics: conductometric, potentiometric, optical method, polarimetry and spectrophotometer.	Theories of reaction rates, effect of temperature on rate of reaction. Simple collision theory based upon transition state, hard sphere model theory (equilibrium hypothesis).

April	Buffers solution, Buffer action, Henderson - Hazel equation. Hydrolysis of salts, corrosion, types, theories and methods of controlling it.	Expression for the rate constants based on equilibrium constant their thermodynamic aspect	Revision & Minor Test.	Revision & Minor Test.
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LESSON PLAN (EVEN SEMESTER)

**Department:- Chemistry
Chemistry**

Class:- B.Sc IV (Hons) Physical

Month	1st Week	2nd Week	3rd Week	4th Week
January	Planck's law, heat capacity of solids, Bohr's model of hydrogen atom (derivation excluded) and its defects. Compton effect.	Molecular orbital theory, basic idea, criteria for forming molecular orbital from atomic orbitals. Construction of molecular orbital by linear combination of atomic orbital, - H ₂ ion.	Calculation of energy levels from wave function, physical picture of bonding and antibonding wave function.	Concept of π , π^* orbitals and their characteristics. Hybrid orbital (Sp, Sp ² and Sp ³).
February	Revision & Minor Test.	Calculation of co-efficients of atomic orbitals used in these hybrid orbitals.	Introduction of valence bond model of H ₂ , Comparison of molecular orbital and valence bond Model.	Homogeneous and Heterogeneous catalysis, Enzyme catalysis. Revision & Minor Test.
March	Theory of catalysis - Intermediate compound formation theory, adsorption theory.	General characteristics of catalysis, positive catalysis, negative catalysis, autocatalysis, shape selective catalysis.	Classification of chromatographic methods, principle of differential migration, nature of differential migration.	Adsorption phenomenon, nature of adsorbent, solvent system. R _f values, application.
April	Basic principle of partition, paper, column, thin layer liquid-liquid partition and high performance.	Liquid chromatography, paper & column, thin layer liquid-liquid partition and high-performance liquid chromatography	Revision & Minor Test.

LESSON PLAN (EVEN SEMESTER)

Department:- Chemistry
Chemistry

Class:- B.Sc VI (Pass Course) Physical

Month	1st Week	2nd Week	3rd Week	4th Week
January	Concept of potential energy curves for bonding and antibonding molecular orbitals, qualitative description of selection rules.	Franck-Condon principle.	Qualitative description of sigma and pi and n molecular orbital (MO) their energy level and respective transitions.	Interaction of radiation with matter, the difference between thermal and photochemical processes. Laws of photochemistry: Grotthus-Draper law, Stark-Einstein law (law of photochemical equivalence)
February	Jablonski diagram depicting various processes occurring in the excited state, qualitative description of fluorescence, phosphorescence.	Non-radiative processes (internal conversion, intersystem crossing), quantum yield. Revision & Minor Test.	Photosensitized reactions-energy transfer processes (simple examples). Ideal and non-ideal solutions.	Methods of expressing concentrations of solutions, activity and activity coefficient. Dilute solution, Colligative properties, Raoult's law, relative lowering of vapour pressure, molecular weight determination.
March	Osmosis law of osmotic pressure and its measurement, determination of molecular weight from osmotic pressure. Elevation of boiling point and depression of freezing point.	Thermodynamic derivation of relation between molecular weight and elevation in boiling point and depression in freezing point. Experimental methods for determining various colligative properties.	Abnormal molar mass, degree of dissociation and association of solutes.	Statement and meaning of the terms—phase component and degree of freedom.

<p>April</p>	<p>Thermodynamic derivation of Gibbs phase rule, phase equilibria of one component system—Example—water and Sulphur systems.</p>	<p>Phase equilibria of two-component systems solid-liquid equilibria.</p>	<p>Simple eutectic Example Pb-Ag system, desilverisation of lead. Revision & Minor Test.</p>	<p>-----</p>
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TEACHING PLAN 2023-2024 (Even SEMESTER)

Department:- Chemistry

Class:-Bsc 3rd H, B.sc 3rdNM.,B.sc 1st Nm'A'

Month	1st Week	2nd Week	3rd Week	4th Week
		positions of signals and chemical shift,shielding and deshielding of protons, proton counting,splitting of signals and coupling constants,	1,1-dibromoethane, 1,1,2-tribromoethane, ethanol, acetaldehyde, ethyl acetate,	Simple problems on PMR spectroscopy for structure determination of organic compounds.
		magnetic equivalence of protons.Discussion of PMR spectra of the molecules: ethyl bromide, n-propyl bromide, isopropyl bromide,	toluene, benzaldehyde, acetophenone,p-anisidine and p-nitrotoluene.	Doubt class
	B.Sc III(H), P-2 Heterocyclic Compounds Introduction: Molecular orbital picture and aromatic characteristics of pyrrole, furan, thiophene and pyridine	Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution.	Mechanism of nucleophilic substitution reactions in pyridine derivatives. Comparison of basicity of pyridine, piperidine and pyrrole.	Introduction to condensed five and six- membered heterocycles. Preparation and reactions of indole, quinoline and isoquinoline
	NMR Spectroscopy-I Principle of nuclear magnetic resonance,.	, the PMR spectrum,number of signals, peak areas, equivalent and nonequivalent protons positions of signals and chemical	Fisher indole synthesis, Skraup synthesis and Bischler-Napieralski synthesis.	Mechanism of electrophilic substitution reactions of indole, quinoline and isoquinolin
			chemical shift,shielding and deshielding of protons, proton counti	splitting of signals and coupling constants, magnetic equivalence of protons.
	Mass Spectroscopy: Introduction, instrumentation, mass spectrum, determination of molecular formula, parent peak and base peak,	recognition of molecular ion peak, fragmentation pattern of alkanes, alkenes and benzene.	Nomenclature, structural features, Methods of formation and chemical reactions of thiols,	sulphaguanidine. Synthetic detergents alkyl and aryl sulphonates.
			thioethers, sulphonic acids, sulphonamides.	Doubt class.

Paper -2, 1.Organo Phosphorus Compounds: Nomenclature, Trivalent phosphorus compounds - trialkyl and triaryl phosphine	organic phosphoranes, phosphorus ylides, Wittig reaction. Biological role of phosphorus	Polymers: Brief history of macromolecular Science, Natural polymers: Starch, cellulose silk resin	methods of polymerisation - bulk suspension, emulsion and solution.
Penta valent phosphorus compounds,		.Classification, types of polymerisation: Addition, condensation and their mechanisms	Phenol formaldehydes resins. (II) Urea formaldehydes resins. (III) Polyesters (IV) Polyamides. (V) Natural and synthetic rubbers.
Discussion of PMR spectra of the molecules: e	e, isopropyl bromide, 1,1-dibromoethane, 1,1,2-tribromoethane, ethano	acetaldehyde, ethyl acetate, toluene, benzaldehyde and acetophenone.	Simple problems on PMR spectroscopy for structure determination of organic compounds
Carbohydrates: Classification and nomenclature. Monosaccharides, mechanism of osazone formation,	interconversion of glucose and fructose, chain lengthening and chain shortening of aldoses.	Conversion of glucose into mannose. Formation of glycosides, ethers and esters.	Open chain and cyclic structure of D(+)-glucose & D(-) fructose. Mechanism of mutarotation. Structures of ribose and deoxyribose.
	Configuration of monosaccharides. Erythro and threo diastereomers.	Determination of ring size of glucose and fructose.	An introduction to disaccharides (maltose, sucrose and lactose) and
Paper-2 © 1.Organic Synthesis via Enolates Acidity of α -hydrogens, alkylation of diethyl malonate and ethyl acetoacetate.	Keto-enol tautomerism of ethyl acetoacetate.	2.Synthetic Dyes Colour and constitution (electronic concept). Classification of dyes.	Congo red, Malachite green, Crystal violet,
Synthesis of ethyl acetoacetate: the Claisen condensation	Alkylation of 1,3-dithianes. Alkylation and acylation of enamines	Chemistry and synthesis of Methyl orange,	Phenolphthalein, Fluorescein, Alizarin and Indigo
Simple problems on PMR spectroscopy for structure determination of organic compounds			

	rconversion of glucose and fructose, chain lengthening and chain shortening of aldoses. Configuration of monosaccharides	Erythro and threo diastereomers. Conversion of glucose in to mannose. Formation of glycosides, ethers and esters	Determination of ring size of glucose and fructose. Open chain and cyclic structure of D(+)-glucose & D(-) fructose.	Mechanism of mutarotation. Structures of ribose and deoxyribose.
	Organometallic Compounds Organomagnesium compounds: the Grignard reagents-formation, structure and chemical reactions.	Organolithium compounds: formation and chemical reactions	Organocadmium compounds: formation and chemical reactions.	Doubt class
	Paper-2 (D): Classification, structure and stereochemistry of amino acids	Preparation and reactions of α -amino acids.	Peptide structure determination, end group analysis, selective hydrolysis of peptides.	Structures of peptides and proteins. Levels of protein structure. Protein denaturation/renaturation. Purines and pyrimidines: Introduction to purines and pyrimidines,
	Acid- base behavior, isoelectric point and electrophoresis.	Structure and nomenclature of peptides and proteins. Classification of proteins.	Classical peptide synthesis, solid – phase peptide synthesis.	preparation and reactions of adenine, guanine, cytosine, uracil, thymine, tautomerism in purines and pyrimidines. Nucleic acids: introduction. Constituents of nucleic acids. Ribonucleosides and ribonucleotides. The double helical structure of DNA.
	1. Carbohydrates-II An introduction to disaccharides (maltose, sucrose and lactose)	polysaccharides (starch and cellulose) without involving structure determination.	. Organometallic Compounds Organomagnesium compounds: the Grignard reagents-formation, structure and chemical reactions	Organozinc compounds: formation and chemical reactions. Organolithium compounds: formation and chemical reactions

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Department of Chemistry, Session 2023-24
Lesson Plan - Even Semester**

Month	Week	BSc III (H)	BSc II(M) Sec-A&B	BSc III M Sec-A&B
January	1	Analytical chemistry	Lanthanides	Organometallic Chemistry
	2			
	3			
	4			
	5			
February	1	Chromatography	Actinides	Acids and bases & HSAB concept Assignment
	2	Solvent Extraction	Assignment	
	3			
	4			
	5	Assignment		
	1	Ion Exchange		Theory of qualitative & quantitative analysis-I
	2			

March	3	Organic Reagents in inorganic analysis	Unit test	Unit test
	4			
	5			
April	1	Inorganic polymers	Theory of qualitative & quantitative analysis-II	Silicones and phosphazenes
	2			
	3			
	4	Revision	Revision	Revision
	5			

**Pt. J.L.N. Govt. P.G. College, Faridabad,
Department of Chemistry, Session 2023-24
Lesson Plan - Even Semester**

Dr. Pramila Extension lecturer Chemistry

<i>Month</i>	<i>Week</i>	<i>BSc 1st BT, Med. 'B'</i>	<i>BSc 2nd Hons., 2nd NM. 'B'</i>
<i>January</i>	<i>1</i>	<i>Introduction of alkanes Reaction of alkenes Chemical reactions of alkenes</i>	<i>Introduction of amines Chemical reactions of amines</i>
	<i>2</i>		
	<i>3</i>		
	<i>4</i>		
	<i>5</i>		
<i>February</i>	<i>1</i>	<i>Arenes and aromaticity</i>	<i>IR absorption spectroscopy Diazonium salts</i>
	<i>2</i>		
	<i>3</i>		
	<i>4</i>		
	<i>5</i>		
	<i>1</i>	<i>Dienes classification Alkyenes</i>	<i>Diazonium salts</i>
	<i>2</i>		

<i>March</i>	<i>3</i>	<i>Assignment</i>	<i>Assignment</i>
	<i>4</i>		
	<i>5</i>		
<i>April</i>	<i>1</i>	<i>Unit test</i> <i>Alkyl and aryl halides</i>	<i>Unit test</i> <i>Aldehydes and ketons</i>
	<i>2</i>		
	<i>3</i>		
	<i>4</i>	<i>Revision</i>	<i>Revision</i>
	<i>5</i>		

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Department of Chemistry, Session 2023-24
Lesson Plan - Even Semester**

<i>Month</i>	<i>Week</i>	<i>BSc I Nm sec A,B</i>	<i>BSc I med sec A</i>	<i>BSc 1st chem hons.</i>
<i>January</i>	<i>1</i>	<i>Chemical kinetics-1</i>	<i>Chemical kinetics-1</i>	<i>Chemical kinetics</i>
	<i>2</i>			
	<i>3</i>			
	<i>4</i>			
	<i>5</i>			
<i>February</i>	<i>1</i>	<i>Chemical kinetics-2</i>	<i>Chemical kinetics-2</i>	<i>Electrochemistry-1</i>
	<i>2</i>			
	<i>3</i>			
	<i>4</i>	<i>Assignment</i>	<i>Assignment</i>	<i>Assignment</i>
	<i>5</i>			
	<i>1</i>			

<i>March</i>	<i>2</i>	<i>Electrochemistry -1</i>	<i>Electrochemistry-1</i>	<i>Electrochemistry-2</i>
	<i>3</i>	<i>Unit test</i>	<i>Unit test</i>	<i>Unit test</i>
	<i>4</i>			
	<i>5</i>			
<i>April</i>	<i>1</i>	<i>Electrochemistry-1</i>	<i>Electrochemistry-1</i>	<i>Thermochemistry</i>
	<i>2</i>			
	<i>3</i>			
	<i>4</i>	<i>Revision</i>	<i>Revision</i>	<i>Revision</i>
	<i>5</i>			

**Pt. J.L.N. Govt. P.G. College, Faridabad,
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Lesson Plan - Even Semester**

<i>Month</i>	<i>Week</i>	<i>BSc II Hons IC</i>	<i>BSc III Hons OC</i>	<i>BSc III NM Sec-A+ B IC</i>
<i>January</i>	<i>1</i>	<i>Chemistry of Lanthanids elements</i>	<i>Terpenoids</i>	<i>Organometallic Chemistry</i>
	<i>2</i>			
	<i>3</i>			
	<i>4</i>	<i>Chemistry of Actinids</i>		
	<i>5</i>			
<i>February</i>	<i>1</i>	<i>Chemistry of elements of second and third transition series</i>	<i>Pesticides</i>	<i>Acids and Base, HSAB Concept</i>
	<i>2</i>			
	<i>3</i>			
	<i>4</i>	<i>Assignment</i>		<i>Assignment</i>
	<i>5</i>	<i>Assignment</i>		
	<i>1</i>	<i>General Principles of Metallurgy</i>	<i>Vitamins</i>	<i>Bioinorganic Chemistry</i>
	<i>2</i>			

<i>March</i>	<i>3</i>	<i>Unit test</i>	<i>Harmones</i>	<i>Unit test</i>
	<i>4</i>			
	<i>5</i>			
<i>April</i>	<i>1</i>	<i>Isopolyacids of Mo and W</i>	<i>Alkaloids</i>	<i>Silicones</i>
	<i>2</i>	<i>Acids and Base</i>		<i>Phosphazenes</i>
	<i>3</i>			
	<i>4</i>	<i>Revision</i>	<i>Revision</i>	<i>Revision</i>
	<i>5</i>			

**Pt. J.L.N. Govt. P.G. College, Faridabad,
Department of Chemistry, Session 2023-24
Lesson Plan - Even Semester**

Month	Week	BSc 1stMed.'A',NM -A & Hons	BSc 2nd NM-A
January	1	Introduction of alkanes Reaction of alkenes	Introduction of amines
	2		Chemical reactions of amines
	3	Chemical reactions of alkenes	
	4		
	5		
February	1	Arenes and aromaticity	IR absorption spectroscopy
	2	Arenes and aromaticity	Diazonium salts
	3		
	4		
	5		
March	1	Dienes classification Alkyenes	Diazonium salts
	2		
	3	Assignment	Assignment

	4		
	5		
April	1	Unit test Alkyl and aryl halides	Unit test Aldehydes and ketons
	2		
	3		
	4	Revision	Revision
	5		

LESSON PLAN (EVEN SEMESTER)

Department:- Chemistry
Physical Chemistry

Class:- B.Sc IVth sem (Pass Course)

Month	1st Week	2nd Week	3rd Week	4th Week
January	The second law of thermodynamics. Need of the law, different definitions of the law, Carnot Cycle, and its efficiency.	Carnot theorem, Thermodynamic scale of temperature, Concept of entropy, entropy as a state function of V and T, entropy as a function of P and T.	Entropy change in physical processes. Clausius inequality, Entropy as criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases, work function, Gibb, 's free energy function.	Gibbs function (G) and Helmholtz function (A) as thermodynamic function, Criteria of spontaneity of reversible processes in terms of enthalpy change, entropy change, work function and free energy function.
February	Variation of G and A with P,V and T. Gibb Helmholtz equation and its application, Clausius- Clapeyron equation Nernst heat theorem. Third law of thermodynamics.	Electrolytic and Galvanic cells, reversible & Irreversible cells , conventional Representation of electrochemical cells. EMF of cell and its measurement. Revision & Minor Test.	Weston standard cell, activity and activity coefficients. Calculation of thermodynamic quantities of cell reaction (G, H & K). Types of reversible electrodes – metal metal ion gas electrode, metal – insoluble salt- anion and redox electrodes.	Electrode Reactions, Nernst equations, derivation of cell EMF and single electrode potential.
March	Standard Hydrogen electrode, reference electrodes, standard electrodes potential, sign conventions, electrochemical series and its applications.	Concentration cells with and without transference, liquid junction potential.	Application of EMF measurement i.e. valency of ions, solubility product, activity coefficient.	Revision & Minor Test.

April	Potentiometric titration (acid-base and redox).	Determination of pH using Hydrogen electrode, Quinhydrone electrode and glass electrode by potentiometric methods.	Revision & Minor Test.	-----
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LESSON PLAN (EVEN SEMESTER)

Department:- Chemistry
Physical Chemistry

Class:- B.Sc IV th sem (Bio-Tech)

Month	1st Week	2nd Week	3rd Week	4th Week
January	The second law of thermodynamics. Need of the law, different definitions of the law, Carnot Cycle, and its efficiency.	Carnot theorem, Thermodynamic scale of temperature, Concept of entropy, entropy as a state function of V and T, entropy as a function of P and T.	Entropy change in physical processes. Clausius inequality, Entropy as criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases, work function, Gibb, 's free energy function.	Gibbs function (G) and Helmholtz function (A) as thermodynamic function, Criteria of spontaneity of reversible processes in terms of enthalpy change, entropy change, work function and free energy function.
February	Variation of G and A with P,V and T. Gibb Helmholtz equation and its application, Clausius- Clapeyron equation Nernst heat theorem. Third law of thermodynamics.	Electrolytic and Galvanic cells, reversible & Irreversible cells , conventional Representation of electrochemical cells. EMF of cell and its measurement. Revision & Minor Test.	Weston standard cell, activity and activity coefficients. Calculation of thermodynamic quantities of cell reaction (G, H & K). Types of reversible electrodes – metal metal ion gas electrode, metal –insoluble salt- anion and redox electrodes.	Electrode Reactions, Nernst equations, derivation of cell EMF and single electrode potential.
March	Standard Hydrogen electrode, reference electrodes, standard electrodes potential, sign conventions, electrochemical series and its applications.	Concentration cells with and without transference, liquid junction potential.	Application of EMF measurement i.e. valency of ions, solubility product, activity coefficient.	Revision & Minor Test.

April	Potentiometric titration (acid-base and redox).	Determination of pH using Hydrogen electrode, Quinhydrone electrode and glass electrode by potentiometric methods.	Revision & Minor Test.	-----
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LESSON PLAN (EVEN SEMESTER)

Department:- Chemistry
Physical Chemistry

Class:- B.Sc IVth sem (Hons)

Month	1st Week	2nd Week	3rd Week	4th Week
January	Second law of thermodynamics. Need of the law, different definitions of the law, Carnot Cycle and its efficiency. Carnot theorem, Thermodynamic scale of temperature.	Concept of entropy, entropy as a state function of V and T, entropy as a function of P and T. Entropy change in physical processes. Clausius inequality, Entropy as criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases	work function, Gibbs free energy function. Gibbs function (G) and Helmholtz function (A) as thermodynamic function, Criteria of spontaneity of reversible processes in terms of enthalpy change, entropy change, work function and free energy function.	Variation of G and A with P, V and T. Gibbs Helmholtz equation and its application, Clausius-clapeyron equation Nernst heat theorem. Third law of thermodynamics and its applications.
February	Partial molar quantities. Chemical potential. Gibb's Duhem equation. Gibb's adsorption equation and its application, variation of chemical potential with temperature and pressure.	Redox reactions, electrolytic and galvanic cells. Reversible and irreversible cells reversible electrodes, types of reversible electrodes. Revision & Minor Test.	Metal electrodes, gas metal electrode, metal insoluble salt on ions and redox electrodes. Electrode reactions, cell voltage, function of salt bridge, electrode potential and its determination.	Standard hydrogen electrode, reference electrode, standard cell, sign convention.
March	Electrochemical series and its significance. Nernst equation for a reversible electrode and cell. Calculation of thermodynamic quantities of a cell reaction 'G, 'H and K.	Polarization over potential and hydrogen over voltage. Definition of pH. Determination of pH using hydrogen, quinhydrone and glass electrode by potentiometric method.	Experimental methods of chemical kinetics: conductometric, potentiometric, optical method, polarimetry and spectrophotometer.	Theories of reaction rates, effect of temperature on rate of reaction. Simple collision theory based upon transition state, hard sphere model theory (equilibrium hypothesis).

April	Buffers solution, Buffer action, Henderson - Hazel equation. Hydrolysis of salts, corrosion, types, theories and methods of controlling it.	Expression for the rate constants based on equilibrium constant their thermodynamic aspect	Revision & Minor Test.	Revision & Minor Test.
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LESSON PLAN (EVEN SEMESTER)

Department:- Chemistry
Physical Chemistry

Class:- B.Sc IVth sem (Hons)

Month	1st Week	2nd Week	3rd Week	4th Week
January	Planck's law, heat capacity of solids, Bohr's model of hydrogen atom (derivation excluded) and its defects. Compton effect.	Molecular orbital theory, basic idea, criteria for forming molecular orbital from atomic orbitals. Construction of molecular orbital by linear combination of atomic orbital, - H ₂ ion.	Calculation of energy levels from wave function, physical picture of bonding and antibonding wave function.	Concept of π , π^* orbitals and their characteristics. Hybrid orbital (Sp, Sp ² and Sp ³).
February	Revision & Minor Test.	Calculation of co-efficients of atomic orbitals used in these hybrid orbitals.	Introduction of valence bond model of H ₂ , Comparison of molecular orbital and valence bond Model.	Homogeneous and Heterogeneous catalysis, Enzyme catalysis. Revision & Minor Test.
March	Theory of catalysis - Intermediate compound formation theory, adsorption theory.	General characteristics of catalysis, positive catalysis, negative catalysis, autocatalysis, shape selective catalysis.	Classification of chromatographic methods, principle of differential migration, nature of differential migration.	Adsorption phenomenon, nature of adsorbent, solvent system. R _f values, application.
April	Basic principle of partition, paper, column, thin layer liquid-liquid partition and high performance.	Liquid chromatography, paper & column, thin layer liquid-liquid partition and high-performance liquid chromatography	Revision & Minor Test.

LESSON PLAN (EVEN SEMESTER)

Department:- Chemistry
Physical Chemistry

Class:- B.Sc VIth sem (Pass Course)

Month	1st Week	2nd Week	3rd Week	4th Week
January	Concept of potential energy curves for bonding and antibonding molecular orbitals, qualitative description of selection rules.	Franck-Condon principle.	Qualitative description of sigma and pi and n molecular orbital (MO) their energy level and respective transitions.	Interaction of radiation with matter, the difference between thermal and photochemical processes. Laws of photochemistry: Grotthus-Draper law, Stark-Einstein law (law of photochemical equivalence)
February	Jablonski diagram depicting various processes occurring in the excited state, qualitative description of fluorescence, phosphorescence.	Non-radiative processes (internal conversion, intersystem crossing), quantum yield. Revision & Minor Test.	Photosensitized reactions-energy transfer processes (simple examples). Ideal and non-ideal solutions.	Methods of expressing concentrations of solutions, activity and activity coefficient. Dilute solution, Colligative properties, Raoult's law, relative lowering of vapour pressure, molecular weight determination.
March	Osmosis law of osmotic pressure and its measurement, determination of molecular weight from osmotic pressure. Elevation of boiling point and depression of freezing point.	Thermodynamic derivation of relation between molecular weight and elevation in boiling point and depression in freezing point. Experimental methods for determining various colligative properties.	Abnormal molar mass, degree of dissociation and association of solutes.	Statement and meaning of the terms—phase component and degree of freedom.

<p>April</p>	<p>Thermodynamic derivation of Gibbs phase rule, phase equilibria of one component system—Example—water and Sulphur systems.</p>	<p>Phase equilibria of two-component systems solid-liquid equilibria.</p>	<p>Simple eutectic Example Pb-Ag system, desilverisation of lead. Revision & Minor Test.</p>	<p>-----</p>
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Class: Inorganic Chem. (BSc I Chem. (H); Physical Chem. (BSc I MED (B), BSc I BT, BSc II NM (A)

Department:- CHEMISTRY

Month	Week-1	Week-2	Week-3	Week-4
JANUARY	PRACTICAL EXAMS	<p>s-block elements, Comparative study, diagonal relationships</p> <p>Electrolytic conduction, factors affecting electrolytic conduction</p> <p>Second law of thermodynamics Carnot's cycles and its efficiency, Carnot's theorem, Thermodynamics scale of temperature</p>	<p>Comparative study, diagonal relationships</p> <p>specific, conductance, molar conductance, equivalent conductance and relation among them</p> <p>Concept of entropy</p>	<p>Theory of Precipitation ASSIGNMENT-1</p> <p>Arrhenius theory of ionization, Ostwald's Dilution Law. Debye- Huckel – Onsager's equation for strong electrolytes</p> <p>Entropy change in ideal gases and mixing of gases.</p>
FEBRUARY	<p>Chemistry of analysis of various groups of basic and acidic radicals, chemistry of identification of acid radicals in typical combinations.</p> <p>Kohlarusch's Law, calculation of molar ionic conductance and effect of viscosity temperature & pressure on it.</p>	<p>Chemistry of interferences of acid radicals including their removal in the analysis of basic radicals.</p> <p>ASSIGNMENT 2</p> <p>Application of Kohlarusch's Law in calculation of conductance of weak electrolytes at infinite dilution. Applications of conductivity measurements</p> <p>Gibbs and Helmholtz functions;</p>	<p>Chemistry of interferences of acid radicals including their removal in the analysis of basic radicals.</p> <p>Chemistry of interferences of acid radicals including their removal in the analysis of basic radicals.</p> <p>conductometric titrations. Definition of pH and pKa, Buffer solution, Buffer action,</p>	<p>Chemistry of interferences of acid radicals including their removal in the analysis of basic radicals.</p> <p>Henderson – Hazel equation, Buffer mechanism of buffer action</p> <p>Variation of G and A with P, V and T</p>

	Third law of thermodynamics: Nernst heat theorem			
MARCH	Chemistry of fullerenes, carbides Rate of reaction, rate equation, factors influencing the rate of a reaction Electrolytic and Galvanic cells – reversible & Irreversible cells , conventional representation of electrochemical cells	fluorocarbons, silicates zero order, first order, second and third order reaction Types of reversible electrodes	tetrasulphur tetranitride, basic properties of halogens, interhalogens and polyhalides. Half life period of a reaction Standard Hydrogen electrode, reference electrodes, standard electrodes potential,	Test 1 Half life period of a reaction sign conventions, electrochemical series and its applications.
APRIL	tetrasulphur tetranitride, basic properties of halogens, interhalogens and polyhalides. Arrhenius equation. liquid junction potential	chemistry of xenon Theories of reaction rate – Simple collision theory for unimolecular and bimolecular collision. application of EMF measurement	ASSIGNMENT-3 potentiometric titration (acid- base and redox)	chemistry of xenon Transition state theory of Bimolecular reactions. potentiometric titration (acid- base and redox)