

## Lesson Plan

Session: 2023-24

Name of the Assistant Professor: Dr. Som Sharma and Ms. Kusum

Class: B.Sc 1st Year

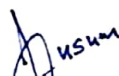
Subject: Chemistry Paper: Inorganic Chemistry, Organic Chem, Physical Chemistry

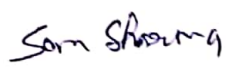
Date	Week	Topics
01.01.24 to 03.01.24	1	Inorganic Chemistry (CH-104). Hydrogen Bonding Definition, bonding on properties of substances
04.01.24 to 06.01.24 06.01	1	Physical chemistry, Kinetics: Rate of reaction, rate equation, factors influencing the rate of rate of a reaction concentration, temperature, pressure, solvent, light, catalyst.
08.01.24 to 10.01.24	2	Brief discussion of various types of Types and application Vander Waals Forces
11.1.24 to 13.01.24	2	Order of a reaction, integrated rate expression for zero order, first order
15.01.24 to 17-01.24	3	Metallic Bond- Brief introduction to metallic bond, band theory of metallic bond
18.01.24 to 20.01.24	3	integrated rate expression for second and third order reaction.
22.01.24 to 24.01.24 To	4	Semiconductors- Introduction, types and applications.
25.01.24 to 27.01.24	4	Kinetics: Rate of reaction, rate equation, factors influencing the rate of rate of a reaction concentration, temperature,
29.01.24 to 31.01.24	5	SESSIONAL TEST- Unit first, - s Block Elements Comparative study of the elements including, diagonal relationships,
01.02.24 to 03.02.24	5	factors influencing the rate of rate of a reaction pressure, solvent, light, Assignment, Revision
05.02.24 to 07.02.24	6	salient features of hydrides of s block elements (methods of preparation excluded), solvation and complexation tendencies including their function in biosystems
08.02.24 to 10.02.24	6	Half life period Of a reaction . Methods of determination of order of reaction, effect of temperature on the rate of reaction - Arrhenius equation.

	Week	Topics
12.02.24 to 14.02.24	7	solvation and complexation tendencies including their function in biosystems. Chemistry of Noble Gases Chemical properties of the noble gases with emphasis on, their low chemical reactivity,
15.02.24 to 17.02.24	7	Theories of reaction rate Simple collision theory for unimolecular and bimolecular collision. Transition state theory of Bimolecular reactions.
19.02.24 to 21.02.24	8	chemistry of xenon, structure and bonding of fluorides, oxides & oxyfluorides of xenon'
22.02.24 to 24.02.24	8	Electrolytic conduction. factors affecting electrolytic conduction, specific conductance.
26.02.24 to 28.02.24	9	P-Block Elements group 13, 14 in details, revision
29.02.24 to 02.03.24	9	molar conductance, equivalent conductance and relation among them, their variation with concentration. <b>ASSIGNMENT</b>
04.03.24 to 06.03.24	10	P-Block Elements group 15, 16 in details, revision
07.03.24 to 09.03.24	10	Arrhenius theory of ionization, Ostwald's Dilution Law. Debye-Huckel Onsager's equation for strong electrolytes (elementary treatment only) Transport number, definition and determination by Hittorf's methods, (numerical included)
11.03.24 to 13.03.24	11	P-Block Elements group 17 in details, revision
14.03.24 to 16.03.24	11	Kohlrausch's Law, calculation of molar ionic conductance and effect of viscosity temperature & pressure on it.

	Week	Topics
18.03.24 to 20.03.24 21.03.24 to	12	<b>Paper: Organic Chemistry</b> , Nomenclature of alkenes, mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halides, The Saytzeff rule, Nomenclature of alkenes,
21.03.24 to 22.03.24	12	<b>SESSIONAL TEST</b> Application of Kohlrausch's Law in calculation of conductance of weak electrolytes at infinite dilution. Applications of conductivity measurements: determination of -degree of dissociation, conductometric titrations. Definition of pH and pK <sub>a</sub> , Buffer
01.04.24 to 03.04.24	13	Chemical reactions of alkenes mechanisms involved in hydrogenation. electrophilic and free radical additions, Markovnikoff's rule, hydroboration-oxidation, oxymercuration-reduction ozonolysis, hydration, hydroxylation and oxidation with KMnO <sub>4</sub>
04.04.24 to 06.04.24	13	determination of K <sub>a</sub> of acids determination of solubility product of sparingly soluble salts, Applications of conductivity measurements: determination of -degree of dissociation, determination of K <sub>a</sub> of acids determination of solubility product of sparingly soluble salts, revision
08.04.24 to 10.04.24	14	Arenes and Aromaticity. Nomenclature of benzene derivatives: 'Aromatic nucleus and side chain. " Aromaticity: the Huckel rule, aromatic ions, annulenes carbon atoms, aromatic, anti - aromatic and non - aromatic

11.04.24- 13.04.24	14	Aromatic electrophilic substitution general pattern of the mechanism, mechanism of nitration, halogenation, sulphonation, and Friedel-Crafts reaction. Energy profile diagrams' Activating, deactivating substituents and orientation'. <b>ASSIGNMENT</b>
15.04.24 To 17.04.24	15	Dienes and Alkynes, Nomenclature and classification of dienes: isolated, conjugated and cumulated dienes. Revision
18.04.24 To	15	Structure of butadiene. Chemical reactions 1,2 and 1,4 additions (Electrophilic & free radical mechanism), Revision
22.04.24 to 24.04.24 25.04.24 to	16	<b>SESSIONAL TEST</b> , Nomenclature and classes of alkyl halides, methods of formation, chemical reactions. Mechanisms and stereochemistry of nucleophilic substitution reactions of alkyl halides, S <sub>N</sub> 2 and S <sub>N</sub> 1 reactions with energy profile diagrams.
25.04.24 to 30.04.24 24.04.24	16	Methods of formation and reactions of aryl halides, The addition-elimination and the elimination-addition mechanisms of nucleophilic aromatic substitution reactions. Relative reactivities of alkyl halides vs allyl, vinyl and aryl halides. Revision

  
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## Lesson Plan

Session: 2023-24

Name of the Assistant Professor: Dr. Som Sharma and Ms. Kusum

Class: B.Sc 3rd Year

Subject: Chemistry Paper: Inorganic Chemistry, physical chem, organic chemistry

Date	Week	Topics
01.01.24 to 03.01.24	1	Organometallic Chemistry Definition, nomenclature and classification of organometallic compounds. Preparation, properties, and bonding of alkyls of Li, Al, Hg, and Sn
04.01.24 to 06.01.24	1	Electronic Spectrum Concept of potential energy curves for bonding and antibonding molecular orbitals,
08.01.24 to 10.01.24	2	a brief account of metal-ethylenic complexes, mononuclear carbonyls and the nature of bonding in metal carbonyls.
11.1.24 to 13.01.24	2	qualitative description of selection rules and Franck-Condon principle Photochemistry
15.01.24 to 17-01.24 To	3	Acids and Bases, HSAB Concept, Arrhenius, Bronsted Lowry Lux - Flood
18.01.24 to 20.01.24	3	Interaction of radiation with matter, difference between thermal and photochemical processes. Laws of photochemistry
22.01.24 to 24.01.24 To	4	Solvent system and Lewis concepts of acid and base
12.02.24 to 14.02.24	4	Qualitative description of sigma and pi and n molecular orbital (MO) their energy level and respective transitions
29.01.24 to 31.01.24	5	Bioinorganic Chemistry Essential and trace elements in biological processes
01.02.24 to 03.02.24	5	Grotthus-Draper law, Stark-Einstein law, (law of photochemical equivalence
05.02.24 to 07.02.24	6	<b>metalloporphyrins, with special reference to haemoglobin and myoglobin</b>
08.02.24 to 10.02.24	6	Jablonski diagram depicting various processes occurring in the excited state, qualitative description of

	Week	Topics
12.02.24 to 14.02.24	7	Biological role of alkali and alkaline earth metal ions with special reference to Ca <sup>2+</sup> .
15.02.24 to 17.02.24	7	non-radiative processes (internal conversion, intersystem crossing
19.02.24 to 21.02.24	8	Nitrogen fixation

22.02.24 to 24.02.24	8	quantum yield, photosensitized reactions-energy transfer processes (simple examples).
26.02.24 to 28.02.24	9	Silicones and phosphazenes
29.02.24 to 02.03.24	9	Statement and meaning of the terms - phase component and degree of freedom, thermodynamic derivation of Gibbs phase rule, phase equilibria of one component
04.03.24 to 06.03.24	10	as examples of inorganic polymers, nature of bonding in triphosphazenes
07.03.24 to 09.03.24	10	system -Example - water and Sulphur systems. Phase equilibria of two component systems solid-liquid equilibria, simple eutectic Example Pb-Ag system, desilverisation of lead salts
11.03.24 to 13.03.24 To	11	Nomenclature" structural features, Methods of formation and chemical reactions of thiols, thioethers, sulphonic acids
14.03.24 to 16.03.24	11	<b>sulphonamides and sulphaguanidine. Synthetic detergents alkyl and ar,ylsulphonates</b>

	Week	Topics
18.03.24 to 20.03.24 21.03.24 to	12	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
21.03.24 to 22.03.24	12	Mechanism of nucleophilic substitution reactions in pyridine derivatives. Comparison of basicity of pyridine, piperidine and pyrrole.
01.04.24 to 03.04.24	13	Introduction to condensed five and six- membered heterocycles. Preparation and reactions of indole, quinoline and isoquinoline with special reference to Fisher indole synthesis, Skraup synthesis and Bischler-Napieralski, ASSIGNMENT
04.04.24 to 06.04.24	13	Organic Synthesis via Enolates Acidity of $\alpha$ -hydrogens, alkylation of diethyl malonate and ethyl acetoacetate. Synthesis of ethyl acetoacetate: the Claisen condensation. Keto-enol tautomerism of ethyl acetoacetate
08.04.24 to 10.01.24	14	Amino Acids, Peptides & Proteins Classification, of amino acids. Acid-base behavior, isoelectric point and electrophoresis
11.04.24- 13.04.24	14	SESSIONAL TEST . Preparation of $\alpha$ -amino acids. Structure and nomenclature of peptides and proteins. Classification of proteins. Peptide structure determination, end group analysis,

15.04.24 To 17.04.24	15	selective hydrolysis of peptides. Classical peptide synthesis, solidphase peptide synthesis. Structures of peptides and proteins: Primary & Secondary structure point and electrophoresis. Preparation of -amino acids.
18.04.24 To	15	Synthetic Polymers Addition or chain-growth polymerization' Free radical vinyl polymerization, ionic vinyl polymerization, Ziegler-Natta polymerization
22.04.24 to 24.04.2424.	16	and vinyl polymers. Condensation or step growth polymerization. Polyesters, polyamides, phenol formaldehyde resins, urea formaldehyde resins, epoxy resins and polyurethanes
25.04.24 to 30.04.24	16	Natural and synthetic rubtrers. of alkyl halides vsallyl, vinyl and aryl halides.

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Lesson Plan

Session: 2023-24

Name of the Assistant Professor: Dr. Som Sharma and Ms. Kusum

Class: B.Sc.2nd Year

Subject: Chemistry: Paper: Inorganic Chemistry, Physical, Organic Chemistry

Date	Week	Topics
01.01.24 to 03.01.24	1	Lanthanides Electronic structure, oxidation states and ionic radii and lanthanide contraction? e compounds complex formation.
04.01.24 to 06.01.24	1	Thermodynamics, Second law of thermodynamics, need for the law, different statements of the law, Carnot's cycles and its efficiency, Carnot's theorem, concept of entropy - entropy as a state function, entropy as a function of V & T, entropy as a function of P & T - entropy in physical change, entropy as a criteria
08.01.24 to 10.01.24	2	Actinides General features and chemistry of actinides, Comparison of properties of Lanthanides and Actinides and with
11.1.24 to 13.01.24	2	Entropy change in ideal gases and mixing of gas, Third law of thermodynamics: Nernst heat theorem, statement of concept of residual entropy, evaluation of absolute entropy from heat capacity data
15.01.24 to 17.01.24	3	Theory of Qualitative and Quantitative Inorganic Analysis
18.01.24 to 20.01.24	3	Gibbs and Helmholtz functions: Gibbs function (G) and Helmholtz function (A) as thermodynamic quantities, A & G as criteria for thermodynamic equilibrium, "ΔG" criterion: their advantage over entropy change. Variation of G and A with P, V and T
22.01.24 to 24.01.24	4	occurrence and isolation, lanthanide compounds.
25.01.24 to 27.01.24	4	Electrolytic and Galvanic cells - reversible & irreversible conventional representation cells, e of electrochemical cells.
29.01.24 to 31.01.24	5	chemistry of separation of Nb, Pu and Am from U.
01.02.24 to 03.02.24	5	EMF of cell and its measurement, Weston standard cell, activity and activity coefficient
05.02.24 to 07.02.24	6	Chemistry of analysis of various groups of basic and acidic radical
08.02.24 to 10.02.24	6	CHEMISTRY OF IDENTIFICATION OF ACID RADICALS IN TYPICAL COMBINATIONS SESSIONAL TEST Types of reversible electrodes: metal-metal ion gas electrode, metal-insoluble salt-anion and redox electrodes

Date	Week	Topics
12.02.24 to 14.02.24	7	Chemistry of interference of acid radicals including their removal in the analysis of basic radicals
15.02.24 to 17.02.24	7	Electrode reactions, Nernst equations, electrode potentials, standard electrode potential, sign conventions
19.02.24 to 21.02.24	8	Post-precipitation

22.02.24 to 24.02.24	8	derivation of cell EMF and single electrode potential. Standard Hydrogen electrode, reference
26.02.24 to 29.02.24	9	purification of precipitates
02.03.24 to 04.03.24	9	Concentration cells with and without transference.
06.03.24 to 07.03.24	10	Theory of precipitation, coprecipitation
09.03.24 to 11.03.24	10	Liquid junction potential, application of EMF measurement i.e. valency of ions, odds salts
13.03.24 to 14.03.24	11	Post-precipitation, purification of precipitates. REVISION
16.03.24 to 18.03.24	11	solubility product activity coefficient, potentiometric titration (acid base, Quinhydrone electrode and glass electrode by potentiometric method

Date	Week	Topics
18.03.24 to 20.03.24	12	Carboxylic Acids & Acid Derivatives Nomenclature of carboxylic acids, structure and bonding, physical properties, acidity of carboxylic acids
21.03.24 to 21.03.24	12	effects of substituents on acid strength. Preparation of amino acids. Reactions of carboxylic acids, Hell-Volhard-Zelinsky reaction, Reduction of carboxylic 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
22.03.24 to 01.04.24	13	Mechanisms of esterification and hydrolysis (acidic and basic). Infrared (IR) absorption spectroscopy
03.04.24 to 04.04.24	13	Molecular vibrations.
06.04.24 to 08.04.24	13	Hooke's law, selection rules, intensity and position of IR bands, measurement of IR spectrum, fingerprint region, characteristic absorptions of various functional groups and interpretation of IR, "p" "nu of simple organic n.
10.01.24 to 11.04.24	14	Amines, Structure and nomenclature of amines, physical properties.
13.04.24 to 13.04.24	14	Separation of a mixture of primary, secondary and tertiary amines. Structural features affecting basicity of amines: Preparation of alkyl and aryl amines reductive amination of aldehydic and ketonic compounds. Gabriel phthalimide reaction, Hofmann bromamide reaction.

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**Class:** B.Sc2nd Year

**Subject: Chemistry Paper:** Inorganic Chemistry ,Physicalchem,Organic Chemistry

Date	Week	Topics
01.01.24 to 03.01.24	1	Lanthanides Electronic structure, oxidation states and ionic radii and lanthanide contraction? e compounds.complex formation,
04.01.24 to 06.01.24 06.01	1	Thermodynamics , Second law of thermodynamics, need for the law, different statements of the law, carnot's cycles and its efficiency, carnot,theorm, concept of entropy - entropy as a state function, entropy as a function of v&T,entro p) as a function of p & T- entropy in physical change, entropy as a criteria
08.01.24 to 10.01.24	2	Actinides General features and chemistry of actinides, Comparison of properties of Lanthanides and Actinides and with
11.1.24 to 13.01.24	2	Entropy change in ideal gases and mixing of gas , Third law of thermodynamics: Nernst heat theorem, statement of co ncept of residual entropy, evaluation of absolute entropy from heat capacity data
15.01.24 to 17-01.24 To	3	Theory of Qualitative and Ouantitative Inorganic Analysis
18.01.24 to 20.01.24	3	Gibbs and Helmholtz functions; Gibbs iunction (G) and Helmholtz function (A) as thermodynamic quantities, A &G as criteria for thermodynamic equilibrium"u"Jrfo,rtaneity. their advantage over entropy change. Variation of G and A with P, V and T
22.01.24 to 24.01.24 To	4	occurrence and isolation, lanthanide compounds.
25.01.24 to 27.01.24	4	Electrolytic and Gar'anic ceils - revers,bre& Irreversible onv.entional representation ceils, c of electrochemical ceils.
29.01.24 to 31.01.24	5	, chemistry of separation of Np, Pu and Am from U,
01.02.24 to 03.02.24	5	. EMF of cell a nd its measurement, weston standard cell, activity and activity coefficient
05.02.24 to 07.02.24	6	<b>Chemistry of analysis of various groups of basic and acidic radical</b> <b>Chemistry of identification of acid radicals in typical combinati</b>
08.02.24 to 10.02.24	6	SESSIONAL TEST Types of reversible electrodes metal- metal ion gas electrode, metal -insoluble salt-anion and redox electrodes

Date	Week	Topics
12.02.24 to 14.02.24	7	Chemistry of interference of acid radicals including their removal in the analysis of basic radicals
15.02.24 to 17.02.24	7	Electrode re actions, Nernst equations, electr odes, standard electrodes potential, sign conventions
19.02.24 to 21.02.24	8	Post- precipitation



15.14.24 To 17.14.24	15	... electrophilic aromatic substitution in aryl amines, reactions of amines with nitrous acid
18.14.24 To	15	SESSIONAL TEST Diazonium Salts, Mechanism of diazotisation, structure of benzene diazonium chloride
22.14.24 to 24.14.24	16	Replacement of diazo group by H, OH, F, Cl, Br, I, NO <sub>2</sub> and CN groups, reduction of diazonium salts to byrines
25.14.24 to 31.14.24	16	coupling reaction and its synthetic application Relative reactivities of alkyl halides vs allyl, vinyl and aryl halides

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(Soni Sharma)