

Ch Bansilal Govt College Ioharu Bhiwani

Name Manjeet

Lesson plan 2022-23

Class BSc 3rd (5th semester)

PHYSICAL CHEMISTRY

Quantum Mechanics-I

(22-30 August)

Section-A

Black-body radiation, Plank's radiation law, photoelectric effect, heat capacity of solids, Compton effect, wave function and its significance of Postulates of quantum mechanics

(1-15 September)

quantum mechanical operator, 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,

(16-30 September)

Determination of wave function & energy of a particle in one dimensional box, Pictorial representation and its significance,

(1-15 November)

Section-B

Physical Properties and Molecular Structure

Optics 1 activity, polarization - (Clausius - Mossotti equation). Orientation of dipoles in an electric field,

(16-30 November)

dipole moment, included dipole moment, measurement of dipole moment- temperature method and refractivity method, dipole moment and structure of molecules, Magnetic permeability,

(1-15 December)

magnetic susceptibility and its determination. Application of magnetic susceptibility, magnetic properties - paramagnetism, diamagnetism and ferromagnetics.

Ch. Bansilal Govt College loharu (Bhiwani)

Lesson plan 2022-23

Name:- Manjeet

Semester-III

COORDINATION CHEMISTRY AND

CHEMICAL KINETICS

(Theory)

(22-30 September)

UNIT-I

Coordination Chemistry-I: Werner's theory of coordination compounds, nomenclature of coordination compounds, Isomerism in coordination compounds, valence bond theory of transition metal complexes, and its limitations.

(01-15 October)

Crystal field theory, crystal field splitting in octahedral, tetrahedral and square planar complexes, factors affecting the crystal field splitting.

(16-30 October)

UNIT-II

Coordination Chemistry-II: Types of magnetic behaviour, methods of determining magnetic susceptibility, spin-only formula. L-S coupling, orbital contribution to magnetic moments, application of magnetic moment data for 3d-metal complexes,

(01-15 November)

Types of electronic transitions, selection rules for d-d transitions, spectroscopic ground states, spectrochemical series, Orgel- energy level diagram for d¹ and d¹ states, discussion of the electronic spectrum of [Ti(H₂O)₆]³⁺ complex ion.

(16-30 November)

UNIT-III

Kinetics-I: Rate of reaction, rate equation, factors influencing the rate of a reaction: concentration, temperature, pressure, solvent, light, catalyst. Order of a reaction, integrated rate expression for zero order, first order, second and third order reaction. Half-life period of a reaction.

(01-15 December)

Methods of determination of order of reaction, Consecutive Reaction, Series reaction, Parallel reactions (Elementary idea).

(16-31 December)

UNIT-IV

Kinetics-II: Effect of temperature on the rate of reaction - Arrhenius equation. Theories of reaction rate Simple collision theory for unimolecular reaction, Transition state theory, Enzymatic reaction: Michaelis - Menton treatment, Acid-Base Catalysed reactions.

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Lesson plan 2022-23

Name:- Manjeet

Semester-III

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Ch Bansilal Govt College Loharu Bhiwani

Name :- Manjeet

Semester-IV

FUNCTIONAL GROUP ORGANIC CHEMISTRY-III

AND ELECTROCHEMISTRY

(6-15 April)

UNIT-I

Amines: Structure and nomenclature of amines, physical properties. Separation of a mixture of primary, secondary and tertiary amines. Structural features affecting basicity of amines. Preparation of alkyl and aryl amines (reduction of nitro compounds, nitriles, reductive amination of aldehydic and ketonic compounds).

(16-30 April)

Gabriel phthalimide reaction, Hoffmann bromamide reaction. electrophilic aromatic substitution in aryl amines, reactions of amines with nitrous acid.

UNIT-II

Diazonium Salts: Mechanism of diazotisation, structure of benzene diazonium chloride, Replacement of diazo group by H, OH, F, Cl, Br, I, NO₂ and CN groups, reduction of diazonium salts to hydrazines, coupling reaction and its synthetic application.

(1-15 May)

Nitro Compounds: Preparation of nitro alkanes and nitro arenes and their chemical reactions. Mechanism of electrophilic substitution reactions in nitro arenes and their reductions in acidic, neutral

and alkaline medium.

UNIT-III

Electrochemistry-I Electrolytic conduction, factors affecting electrolytic conduction, specific conductance, molar conductance, equivalent conductance and relation among them, their variation with concentration. Arrhenius theory of ionization,

(16-30 May)

Ostwald's Dilution Law. Debye Huckel- Onsager's equation for strong electrolytes (elementary treatment only)

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Kohlrausch's Law and its application in calculation of conductance of weak electrolytes at infinite

dilution. Applications of conductivity measurements: determination of degree of dissociation, determination of K_a of acids, determination of solubility product of sparingly soluble salts, conductometric titrations. Definition of pH and pKa, Buffer solution, Henderson - Hazel equation, Buffer mechanism of buffer action.

(1-15 June)

UNIT-IV

Electrochemistry-II: Electrolytic and Galvanic cells - reversible & Irreversible cells, conventional representation of electrochemical cells. EMF of cell and its measurement, activity and activity coefficients. Calculation of thermodynamic quantities of cell reaction (ΔG , ΔH & ΔS). Types of reversible electrodes - metal-metal ion gas electrode, metal-insoluble salt- anion and redox electrodes.

(16-30 June)

Nernst equation, derivation of cell EMF and single electrode potential. Standard Hydrogen electrode, reference electrodes, standard electrodes potential, sign conventions, electrochemical series and its applications.

(01-15 July)

Application of EMF measurement i.e., solubility product; potentiometric titration (acid-base).
Determination of pH using Hydrogen electrode and glass electrode.

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Lesson plan 2022-23

Name:- Manjeet
Semester-V

20UCHE502: CHEMISTRY OF POLYMERS

(22-30 August

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Unit I

Introduction and history of polymeric materials: Different schemes of classification of polymers, Polymer nomenclature, Molecular forces and chemical bonding in polymers, Texture of Polymers.

(1-15 September)

Functionality and its importance: Criteria for synthetic polymer formation, classification of polymerization processes, Relationships between functionality, extent of reaction and degree of polymerization.

(16-30 September)

Unit II

Kinetics of Polymerization: Mechanism and kinetics of step growth, radical chain growth, ionic chain (both cationic and anionic)

(1-15 October)

coordination polymerizations, Mechanism and kinetics of copolymerization, polymerization techniques.

(16-30 October)

Unit III

: structure, properties and application of the following polymers: polyacetylene, polyaniline, poly(p-phenylene sulphide), polypyrrole, polythiophene.

(1-15 November)

Unit IV

Brief introduction to preparation, structure, properties and application of the following polymers: polyolefins, polystyrene, poly(vinyl chloride), poly(vinyl acetate)

(16-31 November)

acrylic polymers, fluoro polymers, formaldehyde resins (Bakelite, Novalac), polyurethanes, silicone polymers.

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(Theory)

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UNIT-II

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orbital contribution to magnetic moments, application of magnetic moment data for 3d-metal complexes,

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(01-15 December)

Methods of determination of order of reaction, Consecutive Reaction, Series reaction, Parallel reactions (Elementary idea).

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CH. BANSILAL GOVT. COLLEGE LOHARU

LESSON PLAN 2022-23

NAME OF TEACHER - MR. MANJEET

CLASS - B.Sc 2nd (Med. \$N.M)

Subject - CHEMISTRY

Semester -4th

1 -15 April

. Amines Structure and nomenclature of amines, physical properties. Separation of a mixture of primary, secondary and tertiary amines. Structural features affecting basicity of amines. Preparation of alkyl and aryl amines (reduction of nitro compounds, nitriles, reductive amination of aldehydic and ketonic compounds. Gabrielphthalimide reaction, Hofmann bromamide reaction. electrophilic aromatic substitution in aryl amines, reactions of amines with nitrous acid

16-31 April

Diazonium Salts Mechanism of diazotisation, structure of benzene diazonium chloride, Replacement of diazo group by H, OH, F, Cl, Br, I, NO₂ and CN groups, reduction of diazonium salts to hydrazines, coupling reaction and its synthetic application. 21.2. Nitro Compounds Preparation of nitro alkanes and nitro arenes and their chemical reactions. Mechanism of electrophilic substitution reactions in nitro arenes and their reductions in acidic, neutral and alkaline medium.

1-15 May

Electrochemistry-I Electrolytic conduction, factors affecting electrolytic conduction, specific, conductance, molar conductance, equivalent conductance and relation among them, their variation with concentration. 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)

16-30 May

Electrochemistry-II Kohlrausch's Law, calculation of molar ionic conductance and effect of viscosity temperature & pressure on it. Application of Kohlrausch's Law in calculation of conductance of weak electrolytes at infinite dilution. Applications of conductivity measurements: determination of degree of dissociation, determination of K_a of acids determination of solubility product of sparingly soluble salts, conductometric titrations. Definition of pH and pKa, Buffer solution, Buffer action, Henderson - Hazel equation, Buffer mechanism of buffer action.

CH. BANSILAL GOVT. COLLEGE LOHARU

LESSION PLAN 2022-23

NAME OF TEACHER - MR. MANJEET

CLASS - B. Sc 3rd (Med. \$N. M)

Subject - CHEMISTRY

Semister -6th

1-31 April

Spectroscopy-III Electronic Spectrum Concept of potential energy curves for bonding and antibonding molecular orbitals, qualitative description of selection rules and Franck- Condon principle. Qualitative description of sigma and pie and n molecular orbital (MO) their energy level and respective transitions.

1-30 May

Photochemistry Interaction of radiation with matter, difference between thermal and photochemical processes. Laws of photochemistry: Grotthus-Draper law, Stark- Einstein law (law of photochemical equivalence) Jablonski diagram depicting various processes occurring in the excited state, qualitative description of fluorescence, phosphorescence, non-radiative processes (internal conversion, intersystem crossing), quantum yield, photosensitized reactions- energy transfer processes (simple examples).

CH. BANSILAL GOVT. COLLEGE LOHARU

LESSON PLAN 2022-23

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CLASS - B.Sc 2nd (Med. \$N. M)

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LESSION PLAN 2022-23

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Subject - CHEMISTRY (Coordination Chemistry & Chemical Kinetics.)

NAME - Mr. MANJEET

Class - B.Sc. 3rd Sem

M.M - 50 (Mod. & Proj)

Semester - III

(September - 2022)

Unit-I Werner's Theory of Co-ordination compound, Nomenclature & Isomerism in coordination compound. Valence Bond Theory & Its Limitation. Crystal field theory, CFS for octahedral, tetrahedral & sq. planar complex. Factors affecting the crystal field theory.

(October - 2022)

Unit-II Types of magnetic behaviour, method of determining magnetic susceptibility, spin only formula, L-S coupling, orbital magnetic moment contribution. Types of electronic transition, selection Rule, spectro-chemical series. Orgel - Energy level diagram, Electronic spectrum of $[Ti(H_2O)_6]^{3+}$ complex ion.

(November - 2022)

Unit-III Rate of Rx^n . Factor affecting rate of Rx^n . Order of Rx^n . Integrated rate expression for zero, first, 2nd & 3rd order of Rx^n . Half life period. Consecutive Rx^n . Series Rx^n , Parallel Rx^n .

(December - 2022)

Unit-IV Effect of Temp on rate of Rx^n . - Arrhenius Equation, Theories of Rx^n rate - Simple Collision theory for unimolecular Rx^n . Transition state theory, Enzymatic Rx^n , Michaelis - Menton treatment, Acid - Base Catalysed Rx^n .

Manjeet
18/09/2022

Ch Bansilal Govt College Loharu

Lesson plan 2022-23

Name -Manjeet,

.Class -B. Sc Vth Semester
Subject -Inorganic Chemistry

(September 2022)

Metal-ligand Bonding in Transition Metal Complexes

Limitations of valence bond theory, an elementary idea of crystal field theory, crystal field splitting in octahedral, tetrahedral and square planar complexes, factors affecting the crystal field parameters.

(October 2022)

Thermodynamic and Kinetic Aspects of Metal Complexes

A brief outline of thermodynamic stability of metal complexes and factors affecting the stability, substitution reactions of square planar complexes of Pt(II).

(November 2022)

Magnetic Properties of Transition Metal Complexes

Types of magnetic behaviour, methods of determining magnetic susceptibility, spin-only formula. L-S coupling, correlation of s and eff values, orbital contribution to magnetic moments, application of magnetic moment data for 3d metal complexes.

(December 2022)

Electron Spectra of Transition Metal Complexes

Types of electronic transitions, selection rules for d-d transitions, spectroscopic ground states, spectrochemical series. Orgel-energy level diagram for d^1 and d^9 states, discussion of the electronic spectrum of $[Ti(H_2O)_6]^{3+}$ complex ion.