

LESSON PLAN

Name of assistant / Associate professor: SARITA DEVI

Class and section : B.Sc 1st year

Subject lesson plan : CHEMISTRY (PHYSICAL)

Session : 2021-2022 (SEMESTER – II)

Week 1 :- KINETICS -1 (SECTION – A)

- Rate of Reaction, Rate Equation
- Factors influencing the rate of reaction.
Concentration, temperature, Pressure, solvent, Light, Catalyst.

Week 2 :- KINETICS – I (SECTION – A)

- Order of the Reaction
- Integrated Rate expression for zero order , First order 2nd and 3rd order Reaction.

Week 3 :- KINETICS – 1 (SECTION – A)

- Half Life Period of a reaction .
- Methods of Determination of order of Reaction .

Week 4 :- KINETICS – II (SECTION – B)

- Effect of temperature on the Rate of Reaction .
- Arrhenius equation.

Week 5 :- KINETICS – II (SECTION – B)

- Simple Collision theory of unimolecular and Biomolecular Collision .

Week 6 :- KINETICS – II (SECTION – B)

- Transition state theory of
Biomolecular reactions.

Week 7 :- ELECTRO CHEMISTRY – I (SECTION – C)

- Electrolytic Conduction , factors affecting electrolytic Conduction
- Specific Conductance , molar conductance , equivalent conductance and relation among Them. And their variation with concentration .

Week 8 :- ELECTRO CHEMISTRY –I (SECTION –C)

- Arrhenius theory of ionization .
- Ostwald's Dilution law
- Debye – Huckel Onsager equation for strong electrolytes.

Week 9 :- ELECTRO CHEMISTRY – I (section – c)

- Transport Number – Definition
- Determination by Hittorf's methods (numerical included)

Week 10 :- ELECTRO CHEMISTRY – II (SECTION – D)

- Kohlrausch's Law
- Calculation of molar ionic Conductance and effect of viscosity temperature and pressure on it.

Week 11 :- ELECTRO CHEMISTRY – II (SECTION – D)

- Application of Kohlrausch's law in calculation of conductance of weak electrolytes in infinite dilution .
- Applications of conductivity measurements.
- Determination of degree of dissociation .

Week 12 :- ELECTRO CHEMISTRY – II (SECTION – D)

- Determination of K_a of acids
- Determination of solubility product of sparingly soluble salts.
- Conductometric titrations.

Week 13 :- ELECTRO CHEMISTRY – II (SECTION – D)

- Definition of pH and pK_a
- Buffer solution , buffer action
- Henderson-Hasselbalch equation
- Buffer mechanism of buffer action.

Week 14 :- REVISION AND TEST

- Revision (Assignment)
- Test

LESSON PLAN

Name of assistant/ Associate professor : SARITA DEVI

Class and section : B.Sc IInd Year

Subject lesson plan : CHEMISTRY (INORGANIC)

Session : 2021 – 2022 (IVth SEMESTER)

Week 1 :- CHEMISTRY OF F- BLOCK ELEMENTS LANTHANIDES (SECTION –A)
<ul style="list-style-type: none">• Electronic structure of lanthanides.• Oxidation states and ionic radii
Week 2 :- LANTHANIDES (SECTION – A)
<ul style="list-style-type: none">• Lanthanide contraction.• Complex formation and isolation
Week 3 :- LANTHANIDES (SECTION – A)
<ul style="list-style-type: none">• Lanthanide Compounds .
Week 4 :- ACTINIDES (SECTION – B)
<ul style="list-style-type: none">• General features and chemistry of actinides
Week 5 :- ACTINIDES (SECTION – B)
<ul style="list-style-type: none">• Chemistry of separation of NP, PU, and AM from uranium
Week 6 :- ACTINIDES (SECTION – B)
<ul style="list-style-type: none">• Comparison of properties of lanthanides and actinides with transition element .
Week 7 :- THEORY OF QUALITATIVE AND QUANTITATIVE ANALYSIS – I (SECTION –C)
<ul style="list-style-type: none">• Chemistry of analysis of various acidic radicals .
Week 8 :- THEORY OF QUALITATIVE AND QUANTITATIVE ANALYSIS – II (SECTION – C)
<ul style="list-style-type: none">• Chemistry of identification of acid radicals in typical combinations .

Week 9 :- THEORY OF QUALITATIVE AND QUANTITATIVE ANALYSIS – I (SECTION – C

- Chemistry of interference of acid radicals including their removal in analysis of basic radicals.

Week 10 :- THEORY OF QUALITATIVE AND QUANTITATIVE ANALYSIS –II SECTION – D)

- Chemistry of analysis of various groups of basic radicals.

Week 11 :- THEORY OF QUALITATIVE AND QUANTITATIVE ANALYSIS –II SECTION – D)

- Theory of precipitation
- Theory of co – precipitation .

Week 12 :- THEORY OF QUALITATIVE AND QUANTITATIVE ANALYSIS –II SECTION – D)

- Theory of post precipitation .

Week 13 :- THEORY OF QUALITATIVE AND QUANTITATIVE ANALYSIS –II SECTION – D)

- Purification of precipitates .

Week 14 :- REVISION AND TESTS.

- Revision (Assignments)
- Tests .

LESSON PLAN

Name of assistant/ Associate professor : SARITA DEVI

Class and section : B.Sc IInd Year

Subject lesson plan : CHEMISTRY (PHYSICAL)

Session : 2021 – 2022 (IVth SEMESTER)

Week 1 :- THERMODYNAMICS – III (SECTION – A)

- Second law of thermodynamics .
- Need for the law and different statement .
- Carnot cycle and its efficiency .
- Carnot theorem .

Week 2 :- THERMODYNAMICS – III (SECTION – A)

- Thermodynamic scale of temperature .
- Concept of entropy, entropy as a state function .
- Entropy as a function of V&T and P&T
- Entropy change in physical change

Week 3 :- THERMODYNAMICS – III (SECTION – A)

- Entropy as a criteria of spontaneity and equilibrium
- Entropy change in ideal gases and mixing of gases

Week 4 :- THERMODYNAMICS – IV (SECTION – B)

- Third law of thermodynamics – Nernst heat theorem.
- Statement of concept of residual entropy.
- Evaluation of absolute entropy from heat capacity data

Week 5 :- THERMODYNAMICS – IV (SECTION – B)

- Gibbs and Helmholtz functions as thermodynamic quantities
- ΔG and ΔA as criteria for thermodynamic equilibrium and spontaneity.

Week 6 :- THERMODYNAMICS – IV (SECTION – B)

- Advantages over entropy change .
- Variation of G and A with P, V and T .

Week 7 :- ELECTROCHEMISTRY – III (SECTION – C)

- Electrolytic and galvanic cells .
- Reversible and irreversible cells.
- Conventional representation of electrochemical cells.

Week 8 :- ELECTROCHEMISTRY – III (SECTION – C)

- EMF of the cell and its measurements .
- Weston standard cell .
- Activity and activity co-efficients .
- Calculation of thermodynamic quantities of cell reaction .

Week 9 :- ELECTROCHEMISTRY – III (SECTION – C)

- Types of reversible electrodes-metal-metal ion gas electrode.
- Metal-insoluble salt-anion and redox electrodes
- Electrode reaction, Nernst equations .

Week 10 :- ELECTROCHEMISTRY – III (SECTION – C)

- Derivation of cell EMF and single electrode potential .
- Standard hydrogen electrode , reference electrodes.
- Standard electrode potential, sign conventions .
- Electrochemical series and its applications.

Week 11 :- ELECTROCHEMISTRY – IV (SECTION – D)

- Concentration cells with and without transference .
- Liquid junction potential .

Week 12 :- ELECTROCHEMISTRY – IV (SECTION – D)

- Application of EMF measurements i.e valency of ions ‘
- Solubility product .
- Activity coefficient .

Week 13 :- ELECTROCHEMISTRY – IV (SECTION – D)

- Potentiometric titration (Acid-Base and Redox)
- Determination of PH using H- electrode .
- Quinhydrone electrode and glass electrode by potentiometric methods .

Week 14 :- REVISION AND TESTS.

- Revision (Assignments)
- Tests

LESSON PLAN

Name of assistant/ Associate professor : SARITA DEVI

Class and section : B.Sc IIIrd Year

Subject lesson plan : CHEMISTRY (PHYSICAL)

Session : 2021 – 2022 (VIIth SEMESTER)

Week 1 :- SPECTROSCOPY-III ELETRONIC SPECTRUM (SECTION-A)

- Concept of potential energy curves for bonding and antibonding molecular orbitals.

Week 2 :- SPECTROSCOPY –III (SECTION-A)

- Qualitative description of sigma and II and n molecular orbital and their energy level and respective transitions.

Week 3 :- SPECTROSCOPY –III (SECTION-A)

- Qualitative description of sigma and II and n molecular orbital and their energy level and respective transitions .

Week 4 :- PHOTOCHEMISTRY (SECTION – B)

- Interaction of radiation with matter .
- Difference between thermal and photochemical processes .
- Law of photochemistry Grothaus drapper law law
- Stark Einstein law

Week 5 :- PHOTOCHEMISTRY (SECTION – B)

- Joblonski diagram depicting various processes occurring in the excited state .

Week 6 :- PHOTOCHEMISTRY (SECTION –B)

- Qualitative description of fluroscence , phosphorence
- Non radiative processes (Internal conversion , intersystem crossing)

Week 7 :- PHOTOCHEMISTRY (SECTION –B)

- Quantum yield
- Photosensitized reactions-energy transfer processes (simple examples)

Week 8 :- SOLUTION'S (DILUTE SOLUTIONS AND COLLIGATIVE PROPERTIES) (SECTION – C)

- Ideal and non ideal solutions .
- Methods of expressing concentrations of solutions
- Activity and activity co-efficient
- Dilute solution , colligative properties .

Week 9 :- SOLUTIONS (SECTION –C)

- Raoult's law
- Relative lowering of vapour pressure , molecular weight determination .
- Osmosis law of osmotic pressure and its measurements .

Week 10 :- SOLUTIONS (SECTION –C)

- Elevation of boiling point and depression of freezing point .
- Thermodynamic derivation of relation b/w molecular wt. And elevation in boiling point and depression in freezing point .

Week 11:- SOLUTIONS (SECTION –C)

- Experimental method for determining various colligative properties .
- Abnormal molar mass.
- Degree of dissociation and association of solutes .

Week 12 :- PHASE EQUILIBRIUM (SECTION – D)

- Statement and meaning of terms-phase component and degree of freedom .
- Thermodynamic derivation of Gibbs phase rule.

Week 13 :- PHASE EQUILIBRIUM (SECTION – D)

- Phase equilibria of one component system example-water and sulphur system .

Week 14 :- PHASE EQUILIBRIUM (SECTION – D)

- Phase equilibria of two component systems solid-liquid equilibria .
- Simple eutectic example-Pb-Ag SYSTEM
- Desilverisation of lead .

Week 15 :- Revision

- Revision
- Assignment
- Test

LESSON PLAN

Name of assistant/ Associate professor : SARITA DEVI

Class and section : B.Sc Ist Year

Subject lesson plan : PHYSICAL (CHEMISTRY)

Session : 2021 – 2022

Week 1 :- (GASEOUS STATE)

- Maxwell,s distribution of velocities and energies .
- Calculation of root mean square, Average velocity and most probable velocity .
- Collision diameter, collision number, collision frequency and mean free path .

Week 2 :-

- Derivation of vander waal,s equation of state . and its applications in calculation of boyle,s temperature .

Week 3 :-

- Explanation of behaviour of real gases using vander waal,s equation .

Week 4 :- (CRITICAL PHENOMENON)B

- Critical temperature, critical pressure and critical volume .
- PV isotherm of real gases and continuity of state .

Week 5 :-

- Relationship between critical constants and vander waal,s constants .

Week 6 :-

- Critical compressibility factor.
- Law of corresponding state .
- Liquefaction of gases

Week 7 :- (LIQUID STATES)

- Structure of liquids .

Week 8 :-

- Properties of liquids-surface tension , viscosity and vapour pressure .

Week 9 :-

- Optical rotations and their determination .

Week 10 :- (SOLID STATES)

- Classification of solids .
- Laws of crystallography .

Week 11 :-

- Symmetry element of crystals .
- Defination of unit cell, Space laltice, bravis lattice
- Crystal system .

Week 12 :-

- X-Ray diffraction by crystals .
- Derivation of bragg equation .
- Determination of crystal structure of nacl, KCL.

Week 13 :-

- Liquid crystals
- Difference b/w Salids, Liquids and liquid crystals .

Week 14 :-

- Types of liquid crystals .
- Applications of liquid crystals .

LESSON PLAN

Name of assistant/ Associate professor : SARITA DEVI

Class and section : B.Sc IIIrd Year

Subject lesson plan : CHEMISTRY (INORGANIC)

Session : 2021 – 2022 (VIth SEMESTER)

Week 1 :- ORGANOMETALLIC CHEMISTRY (SECTION – A)

- Definition, nomenclature and classification of organometallic compounds .

Week 2 :- ORGANOMETALLIC CHEMISTRY (SECTION – A)

- Preparation, properties and bonding of alkyls of Li, Al, Hg and Sn brief account of metal-ethylenic complexes .

Week 3 :- ORGANOMETALLIC CHEMISTRY (SECTION – A)

- Mononuclear carbonyls
- Nature of bonding in metal carbonyls .

Week 4 :- ACID AND BASE HSAB CONCEPT (SECTION – B)

- Arrhenius concept
- Bronsted-lowry concept
- Lux-flour concept

Week 5 :- ACID AND BASE HSAB CONCEPT (SECTION – B)

- Solvent system
- Lewis concept of acid acid and bases .
- Relative strength of acids and bases .

Week 6 :- HSAB CONCEPT (SECTION – B)

- Concept of hard and soft acids and bases .
- Symbiosis .

Week 7 :- HSAB CONCEPT (SECTION – B)

- Electronegativity
- Hardness and softness .

Week 8 :- BIOINORGANIC CHEMISTRY (SECTION –C)

- Essential and trace elements in biological processes .
- Metalloporphyrins with special reference to haemoglobin .

Week 9 :- BIOINORGANIC CHEMISTRY (SECTION –C)

- Metalloporphyrins with special reference to myoglobin .
- Biological role of alkali and alkaline earth metal ions with special reference to cazt .

Week 10 :- BIOINORGANIC CHEMISTRY (SECTION –C)

- Nitrogen fixation .

Week 11 :- SILICONES AND PHOSPHAZENES (SECTION – D)

- Silicones and phosphazenes .

Week 12 :- SILICONES AND PHOSPHAZENES (SECTION – D)

- Preparathion of silicones and phosphazenes .

Week 13 :- SILICONES AND PHOSPHAZENES (SECTION – D)

- Sturcture and uses .

Week 14 :- Revision and tests .

- Revision
- Tests

LESSON PLAN

Name of assistant/ Associate professor : SARITA DEVI

Class and section : B.Sc Ist Year

Subject lesson plan : CHEMISTRY (INORGANIC)

Session : 2021 – 2022 (IInd SEMESTER)

Week 1 :- HYDROGEN BONDING & VANDER WAALS FORCES (SECTION – A)

- Hydrogen bonding- definition, types, effect of hydrogen bonding on properties of substances .

Week 2 :- HYDROGEN BONDING & VANDER WAALS FORCES (SECTION – A)

- Application brief discussion of various types of vander waals forces .

Week 3 :- METALLIC BOND AND SEMICONDUCTORS (SECTION – A)

- Metallic bond-brief introduction to metallic bond
- Band theory of metallic bond .
- Semi conductors, introduction, types and applications .

Week 4 :- S-BLOCK ELEMENTS (SECTION – B)

- Comparative study of the elements including, diagonal relationship .
- Silent features of hydrides .

Week 5 :- S-BLOCK ELEMENTS (SECTION – B)

- Solvation and complexation-tendencies including their function in biosystem .
- Chemistry of noble gases- chemical properties of noble gases .

Week 6 :- CHEMISTRY OF NOBLE GASES (SECTION – B)

- Chemistry of xenon
- Structure and bonding of fluorides
- Oxides and oxyfluorides of xenon .

Week 7 :- P-BLOCK ELEMENTS (SECTION – C)

- Comparative study of properties of p-block element .
- Boron family-diborane (properties and structure)

Week 8 :- BOKON FAMILY (SECTION – C)

- Borazene
- Chemical properties and structure
- Trihalides of Boron

Week 9 :- BORON AND CARBON FAMILY (SECTION – C)

- Trends in acidic character structure of aluminium (III) chloride.
- Catenation, PII-DII bonding

Week 10 :- CARBON FAMILY (SECTION – C)

- Carbides, Fluorocarbons
- Silicates structure
- Silicons-General methods of preparation, properties and user .

Week 11 :- NITROGEN FAMILY (15th GROUP) (SECTION – D)

- Oxides-structures of oxides of N,P
- Oxyacids-structure and relative strengths of oxyacids of N and P .
- Structure of white, yellow and red phosphours .

Week 12 :- OXYGEN FAMILY (16 th GROUP) (SECTION – D)

- Oxyacids of sulphur .
- Structure and acidic strength of H₂O₂ – Structure .
- Properties and user .

Week 13 :- HALOGEN FAMILY (17 th GROUP) (SECTION – D)

- Basic properties of halogens, interhalogens
- Hydro and oxyacids of chlorine
- Structure and comparison of acidic strength .

Week 14 :- REVISION AND TEST (ASSIGNMENTS)

- Assignment
- Test

Week 15 :- REVISION AND TEST (ASSIGNMENTS)

- Assignment
- Test

