**Government PG College for Women, Rohtak**

**Lesson plan, Odd Semester Session**

**2022-2023**

**Department of Chemistry**

**Name of Assistant Professor: Dr.AartiDalal**

**B.Sc.Istsemester (Sections A,B & C)**

**September 2022**

First week—Introduction of Basic Organic Chemistry (GOC).

Second week--localized and delocalized chemical bonds.

Third week-- Van der wall interactions, Resonance effect and its applications, Resonance conditions.

Fourth week -- Hyperconjugation, Inductive effect & Problem discussion.

**October2022**

First week -- Electromeric effect & comparison with Inductive effect and Resonance Effect.

Second week -- Concept of isomerism, Types of isomerism.

Third week -- Elements of symmetry, Molecular chirality, Enantiomers, Stereogenic centres, Optical activity.

Fourth week -- Property of enantiomers, chiral and achiral molecules with two stereogenic centres, Diasteromers, Meso compounds.

**November 2022**

First Week -- Resolution of Enatiomers, Inversion, Retension and Racemisation, Relative and absolute configuration, Sequence rule, R and S system of nomenclature.

Second Week -- Determination of configuration of geometrical isomers, E and Z system of nomenclature of organic molecules.

Third Week -- Conformational analysis of ethane and n-butane, conformations of cyclohexane, Newman projection and Sawhorse projection formulae.

Fourth Week -- Curved arrow notions, drawing electron movements with arrows, half headed and double headed arrows, homolytic and heterolytic bond breaking, types of reagents-electrophiles and nucleophiles. **Test**, Assignment & Viva.

**December 2022**

First Week –Types of Organic Reactions- Addition Reactions, Substitution Reactions,Elimination reactions.Carbocations,Carboanions, Free Radicals Carbenes, Arynes, and Nitrenes.Test & Viva.

Second Week – Isomerism in alkanes, source and methods of formation.CycloalkaneNomenclature,IUPAC nomenclature of alkanes,classification of carbon atoms in alkanes.

Synthesis of cycloalkanes and their derivatives- photochemical cycloaddition reactions, Baeyer’s strain theory and its limitations, Theory of strainless rings.

**Government PG College for Women, Rohtak**

Department of Chemistry Session: 2022-2023

Lesson Plan Semester - V

Name of Faculty : Dr. Anita Singhal

B.Sc. III Inorganic Chemistry

 Section – A, C & D

**August 2022**

Fourth week **Unit I- Metal Ligand Bonding in Transition Metal Complexes**

Limitations of valence bond theory.

**September 2022**

**Inorganic**

First week- **Unit I- Metal Ligand Bonding in Transition Metal Complexes**

An elementary idea of crystal field theory.

Second week - Crystal field splitting in octahedral complexes.

Third week – Crystal field splitting in tetrahedral and square planar complexes.

Fourth week – Factors affecting crystal field parameters.

 **October 2022**

**Inorganic Unit II - Thermodynamic & Kinetic aspects of Metal Complexes**

First week- A brief outline of thermodynamic stability of metal complexes.

Factors affecting the stability of metal complexes.

Second week- Substitution reactions in Square planar complexes of Pt(II). (Assignment)

Trans effect .

Third week – **Unit – III Magnetic Properties of Transition Metal Complexes**

Types of magnetic behaviour, methods of determining magnetic susceptibility, spin only formula.

Fourth week – LS coupling, correlation of μs and μeff values. Orbital contribution to magnetic moments.

**November 2022**

**Inorganic**

First week- Application of magnetic moment data for 3d- metal complexes.

Revision of Unit –III.

Second week-  **Unit- IV Electronic Spectra of Transition Metal complexes**

Types of electronic transitions, selection rules for d-d transitions, spectroscopic ground states.

Third week – Spectrochemical series.

Fourth week – Orgel energy level diagram of d1-d9 states.

**December 2022**

**Inorganic**

First week - Discussion of electronic spectrum of [Ti(H2O)6]3+ complex ion.

Second week - Revision of Unit- IV

Third week – Problem solving.

**Government College For Women, Rohtak**

**Department of Chemistry**

Name of the Faculty – **Dr. Deepak**

Section - **A, C & D**

Subject - **Organic Chemistry**

**August 2022**

NMR spectroscopy – I

Introduction, Magnetic properties of nuclei, Nuclear spin states.Principle of nuclear magnetic resonance, PMR spectrum, NMR spectrometer.,number of signals, peak areas, equivalent and nonequivalent protons, position of signals. chemical shift, shielding and deshielding of protons, proton counting.

**September 2022**

**First Week-** splitting of signals, coupling constants. magnetic equivalence of protons.

**SECOND Week**- Applications of PMR spectroscopy., Limitations of PMR spectroscopy.

**Third week**: Discussion of PMR spectra of the molecules, ethyl bromide, n-propyl bromide, isopropyl bromide.

**Fourth week**: 1,1-dibromoethane, 1,1,2-tribromoethane, ethanol.,acetaldehyde, ethyl acetate, toluene, benzaldehyde and acetophenone

**OCTOBER 2022**

**First week** - Simple problems on PMR spectroscopy for structure determination of organic compounds. **(Assignment and Test)**

**Second week:** Organomagnesium compounds- the Grignard Reagents-formation, structure.

**Third week**: Chemical reaction, Group revision and Problem solving.

**Fourth week**: organo zinc compounds, formation, - chemical reactions of organozinc compounds organolithium compounds chemical reactions of organolithium compounds

**NOVEMBER 2022**

**First week**: -Classification and nomenclature. - Monosaccharides, Mechanism of osazone formation, interconversion of glucose and fructose.

**Second week**. Chain lengthening and shortening of aldoses, Configuration of monosacharides

**Third week** – Erythro and threo diastereomers.,Open chain and cyclic structure of D (+)-glucose Open chain and cyclic structure of D (-) - fructose

**Fourth week** - Mechanism of mutarotation. Structures of ribose and deoxyribose

**DECEMBER 2022**

**First week** – Introduction to disaccharides and polysaccharides without involving structure determination.

**Second week -** Introduction to disaccharides and polysaccharides without involving structure determination.

**LESSON PLAN**

Name of the EXTENSION LECTURER: **NIDHI**

Class and Section**: B.Sc II Medical Sec-B**,C,D

Subject**: Organic Chemistry**

 **AUGUST 2022**

**Week3 Organic chem.** Alcohols-nomenclature, methods of formation , acidic nature, reactions

**SEPTEMBER 2022**

**Week1 -org. - dihydric alcohols**-nomenclature, methods of formation, chemical reac. of glycols, pinacol pinacolone rearrangement

**Week 2 org-**phenols-nomenclature, structure and bonding, preparation, physical properties, acidic character

**Week 3- org-** Reactions of phenol, mech. of fries rearrangement,clasion rearrangement reimer tiemann reaction

**Week- 4SEC-A org-** Kolbes reaction,schotten baumann reac.,epoxides(synthesis,ring opening and reac. With Grignard and organolithium reagents

**OCTOBER 2022**

**Week 1SEC A- org-**Test and Assignment from unit 1and 2

**Week 2 SECA –org-**UV spectroscopy absorption laws, types of transitions, concept of chromophore and auxochrome

WEEK 3: DIWALI BREAK

.

**Week -4SEC-Aorg.-** bathochromic, hypsochromic, hyperchromic, hypochromic shifts

 **NOVEMBER 2022**

**Week- 1SEC-Aorg-** Woodward fieser rules,calculation of lambda max of conjugated dienes,alpha-beta usaturated ketones

**Week-2SEC-A org-** Application of UV spectroscopy in str. Elucidation of org comp.,revision of **unit3**

**Week-3SEC-A org-**carboxylic acids(nomenclature,str. And bonding physical properties,acid strength comparision)

**Week-4SEC-A org-**Prep. Of carboxylic acids, reactions, reduction of carboxylic acids, mechanism of decarboxylations, introduction to acid derivatives.

 **DECEMBER 2022**

**Week- 1SEC-A Organic** Preparation of acid chlorides, esters, amides, acid anhydrides, relative stability of acid derivatives, interconversion of acid derivatives

**Week 2**Mechanism of esterification and hydrolysis, **Test** and **Assignment** on **Unit 4**

**BSC 1ST SEC E**

**INORGANIC CHEMISTRY**

**SEPTEMBER-2022**

**First week** - Probability of angular wave function , shape of s,p,d and f-orbital

**Second week**- Aufbau and pauli exclusionprinciple, hunds multiplicityrule.

**Third week** - Electronic configuration of elements

**Fourth Week -** effective nuclear charge, slater’s rule.

OCTOBER2022-

FIRST WEEK- **Periodic table**: Classification of periodic table, atomicand ionic radii,perioc trends in ionic radii

,**Second Week –** Ionisation energy and its variation in periodic table, electronic affinity Elecronegativity definition, methodof determination.

 **Third week - DIWALI BREAK**

**Fourth Week –-** Trend in periodic table, Pauling, Mulliken , Allerd and Mullikan’s, Electronegativity scale, Sanderson’s electron density ratiovarious types of hybridisation

 **NOVEMBER 2022**

**First week** **Covalent Bond –** Trend in periodic table, Pauling, Mulliken , Allerd and Mullikan’s, Electronegativity scale, Sanderson’s electron density ratiovarious types of hybridisationValance bond theory and its limitations ,

**Second week** -Shape of inorganic molecules and ions

 **Third Week** - VSEPR Theory andits applications, Molecular orbital diagram of homonuclear

Molecular orbital diagram of heteronuclear diatomic molecules and ions. Bond energy, bond angle

 **Fourth Week** - Molecular orbital diagram of heteronuclear diatomic molecules and ions. Bond energy, bond angle

 Percentage ionic character,dipole moment and electronegativity difference.

**DECEMBER2022**

Percentage ionic character,dipole moment and electronegativity difference

- Assignment and viva, test

**Government PG College for Women, Rohtak**

**Lesson plan, Odd Semester Session**

**2022-2023**

**Department of Chemistry**

**Name of Assistant Professor: MEENA**

 **B.Sc. I Medical (Sections A, B and C) 1st Semester**

 **September 2022 First Week** **- Atomic stucture**: Idea of de Broglie matter waves, Heisenberg uncertainity Principle.  **Second Week** - Atomic orbital,quantum number,radial and angular wave

**Third week** - Probability of angular wave function , shape of s,p,d and f-orbital

**Fourth week** - Aufbau and pauli exclusion principle, hunds multiplicity rule.

  **October 2022**

**First week** - Electronic configuration of elements , effective nuclear charge, slater’s rule.

**Second Week -** **Periodic table**: Classification of periodic table, atomicand ionic radii,perioc trends in ionic radii,

**Third week** –DIWALI BREAK

 **Fourth Week –** Ionisation energy and its variation in periodic table, electronic affinity Elecronegativity definition, method of determination.

 **November 2022 First week -**  Trend in periodic table, Pauling, Mulliken , Allerd and Mullikan’s, Electronegativity scale, Sanderson’s electron density ratiovarious types of hybridisation

**Second Week -** **Covalent Bond –**Valance bond theory and its limitations , Shape of inorganic molecules and ions

**Third week** -, VSEPR Theory and its applications, Molecular orbital diagram of homonuclear

**Fourth Week** - Molecular orbital diagram of heteronuclear diatomic molecules and ions. Bond energy, Percentage ionic character,dipole moment and electronegativity difference.

**December 2022**

 **First Week** – Ionic solid ,lattice Energy,Born Haber cycle

**Second week** - Assignment and viva, test

**GOVERNMENT P.G COLLEGE FOR WOMEN, ROHTAK**

Lesson plan, Odd Semester Session

**2022-23**

DEPARTMENT OF **CHEMISTRY**

 **Physical Chemistry**

B.Sc. **2nd** Year, Semester 3rd (Sections **B, C** and **D**)

**AUGUST 2022**

**INTRODUCTION TO THERMODYNAMICS**

**SEPTEMBER2022**

**First week-** Thermodynamic process, concept of heat and work

**Second week-** Oxidation state,magnetic and spectral properties

**Third week-** Zeroth law of thermodynamics

**Fourth week-** 1st law of thermodynamics concept of heat capacities

**OCTOBER2022**

**First Week -** joules law, Joule-thomson coefficient for real and ideal gas

**Second Week -** calculation of w,q du,dH for the expansion of IDEAL GASES under isothermal condition

**Third Week -** calculation of w,q du,dH for the expansion of IDEAL GASES under adiabatic conditions for reversible process

**Fourth Week –** temperature dependence of enthalpy,

**NOVEMBER 2022**

**First Week -** kirchoffs equation, Bond energies and applications of bond energies

**Second week -** Chemical equilibrium constant and free energy

**Third Week --** concept of chemical potential, law of chemical equilibrium, vant hoff rxn isotherm and isochore.

**Fourth Week—** concept of chemical potential, law of chemical equilibrium, vant hoff rxn isotherm and isochore.

**DECEMBER 2022**

**First Week--**  Le-chatlier principle and clausius clapeyron equation

**Second week—** Nernst distribution law, modification of distribution law, **–** Application of distribution law.

**-** Test and assignments

B.SC IST SEC. D,E

 september2022

**First week** - introduction of gaseous state,kinetic gas equation, Maxwell distribution of velocities and energies. calculation of root mean square velocity, average velocity and most probable velocity

**second week** – relation between velocities ( M.S.V, A.V, M.P.V) collision diameter , collision number , collision frequency ,mean free path

**Thirdweek**- ideal gas, real gas, derivation of real gas from ideal behavior derivation vander walls , equation of state , application of vanderwall eqation of state

equation of state , application of vanderwall eqation of state

**Fourth week**- - critical phenomena- critical temperature, critical volume, critical pressure, relation between critical constants and vanderwall constant

 ocotober 2022

**First week**- - PV isotherm of real gases, continuity of States, the isothermal of vanderwall equations - critical compressibility factor, law of compressibility state, liquefaction of gases

**secondweek-** Introduction, Intermolecular forces of attraction*Structure of liquidstheories of liquid state structure* **third week**-diwali vacation

**fourthweek**- Properties of liquids--   Surface tension and chemical constitution -

 **November 2022 first Week** -**Liquid State -** -   Viscosity, measurement of viscosity and its chemical constitution , Vapour pressure, measurement of vapour pressure

***secondWeek****-* , Optical Rotation, measurement and optical activity **–**. Refractive index, measurement and chemical constitution

**thirdweek** – solid state- introduction law of crystallography Symmetry element of crystals

- unit cell, space lattice, bravais lattice, crystal system X rays di fraction of crystals

**Fourthweek-** derivation of bragg's equation determination of crystal structure of NACL, KCL,cscl liquid crystals-difference between solid liquid,liquid crystals

-     **December 2022**

**firstweek**-  –type of liquid crystal, application of liquid crystal,

**second Week –** discussion of last year question papers

**Government College For Women, Rohtak**

**Department of Chemistry**

Name of the Faculty **– Pooja Chahal**

Section – **A, C, D**

Subject -**Physical Chemistry**

**AUGUST 2022**

**Quantum Mechanics**

 Week 4: Black body radiation, Planks radiation Law, Photoelecric effect.

**SEPTEMBER 2022**

Week 1: Heat capacity of solids, Comptons effect. Wave function and its significance postulates of quantum mechanics.

Week 2: Quantum mechanical operator, commutation relations, Hamiltonian operators, Hermitian operators.

Week 3: Average value of square of hermitian as a positive quantity, Role of operator in quantum mechanics

Week 4: to show quantum mechanically that position and momentum can not be predicted simultaneously.

**OCTOBER 2022**

**Quantum Mechanics**

 Week1 : determination of wave function and energy of particle in one dimensional box Second Week- pictorial representation and its significance.Numerical problems.

**(Assignment & Test).**

Week 2: Optica l activity, clausius – Mossotti equation. Orientation of dipoles in an electric field, dipole moment, included dipole moment

WEEK 3: measurement of dipole moment-temperature method and refractivity method, dipole moment and structure of molecules,

WEEK 4: Magnetic permeability, magnetic susceptibility and its determination. Applica tion of magnetic susceptibility, magnetic properties – paramagnetism, diamagnetism and ferromagnetics.

**November 2022**

WEEK 1: Spectroscopy-ntroduction: Electromagnetic radiation, regions of spectrum, basic features of spectroscopy, statement of Bornoppenheimer approximation, Degrees of freedom.

WEEK 2: Rotational Spectrum Diatomic molecules. Energy levels of rigid rotator (semi-classical principles), selection rules

WEEK 3: Test of unit 2, spectral intensity distribution using population distribution (Maxwell-Boltzmann distribution), determination of bond length,

WEEK 4: qualitative description of non-rigid rotor, isotope effect, Vibrational spectrum Infrared spectrum: Energy levels of simple harmonic oscillator, selection rules, pure vibrational spectrum, intensity

**DECEMBER 2022**

 WEEK 1: determination of force constant and qualitative relation of force constant and bond energies, effects of anharmonic motion and isotopic effect on the spectra. idea of vibrational frequencies of different functional groups. Raman Spectrum: Concept of polarizibility,

WEEK 2: pure rotational and pure vibrational Raman spectra of diatomic molecules, selectin rules, Quantum theory of Raman spectra

**Government College For Women, Rohtak**

**Department of Chemistry**

Name of the Faculty **– Pooja Rani**

Section – **A & B**

Subject -**Physical & Organic Chemistry**

**August 2022**

**Quantum Mechanics**

 Week 4 : Black body radiation, Planks radiation Law, Photoelecric effect.

**SEPTEMBER 2022**

Week 1: Heat capacity of solids, Comptons effect. Wave function and its significance postulates of quantum mechanics.

Week 2: Quantum mechanical operator, commutation relations, Hamiltonian operators, Hermitian operators.

NMR- Principle of nuclear magnetic resonance, the PMR spectrum,number of signals, peak areas

Week 3: Average value of square of hermitian as a positive quantity, Role of operator in quantum mechanics to show quantum mechanically that position and momentum can not be predicted simultaneously.

Week 4 equivalent and nonequivalent protons positions of signals and chemical

shift,shielding and deshielding of protons,

**OCTOBER 2022**

**Quantum Mechanics**

 Week1 : determination of wave function and energy of particle in one dimensional box Second Week- pictorial representation and its significance.Numerical problems.

**(Assignment & Test).**

Week 2: Optica l activity, clausius – Mossotti equation. Orientation of dipoles in an electric field, dipole moment, included dipole moment

WEEK 3: measurement of dipole moment-temperature method and refractivity method, dipole moment and structure of molecules,

NMR- proton counting,splitting of signals and coupling constants, magnetic equivalence of protons

WEEK 4: Magnetic permeability, magnetic susceptibility and its determination. Application of magnetic susceptibility, magnetic properties – paramagnetism, diamagnetism and ferromagnetics.

NMR Spectroscopy-II Discuss ion of PMR spectra of the molecules: ethyl bromide, npropyl bromide, Simple problems on PMR

**November 2022**

WEEK 1: Spectroscopy-ntroduction: Electromagnetic radiation, regions of spectrum, basic features of spectroscopy, statement of Bornoppenheimer approximation, Degrees of freedom.

WEEK 2: Rotational Spectrum Diatomic molecules. Energy levels of rigid rotator (semi-classical principles), selection rules

WEEK 3: Test of unit 2, spectral intensity distribution using population distribution (Maxwell-Boltzmann distribution), determination of bond length,

 isopropyl bromide, 1,1-dibromoethane, 1,1,2-tribromoethane, ethanol, acetaldehyde, ethyl acetate, toluene, benzaldehyde and acetophenone..

WEEK 4: qualitative description of non-rigid rotor, isotope effect, Vibrational spectrum Infrared spectrum: Energy levels of simple harmonic oscillator, selection rules, pure vibrational spectrum, intensity

spectroscopy for structure determination of organic compounds **(Assignment & Test).**

**DECEMBER 2022**

 WEEK 1: determination of force constant and qualitative relation of force constant and bond energies, effects of anharmonic motion and isotopic effect on the spectra. idea of vibrational frequencies of different functional groups. Raman Spectrum: Concept of polarizibility,

**Organometallic Compounds**

Organomagnesium Compounds, the Grignard reagent formation and structure chemical reaction of Grignard Reagent

WEEK 2: pure rotational and pure vibrational Raman spectra of diatomic molecules, selectin rules, Quantum theory of Raman spectra

Third Week- organo zinc compounds, formation, - chemical reactions of organozinc compounds organolithium compounds chemical reactions of organolithium compounds.

Fourth week- Revision and question discussion

Government PG College for Women, Rohtak

Lesson plan, Odd Semester Session

2022-2023

Department of Chemistry

**INORGANIC CHEMISTRY**

B.Sc. II (Medical and Non Medical) 3rd semester (Sections B, C and D)

ASSISTANT PROFESSOR-Preeti

AUGUST, 2022

Introduction to d-bock elements Definition of transition elements

SEPTEMBER 2022

FIRST WEEK- Definition of transition elements

Second Week – position in the periodic table

Third Week – General characteristics and properties of d-block elements

Fourth Week – Comparison of properties of 3d elements with 4d and 5d elements in reference to atomic radii.

october, 2022

First Week – Oxidation state

Second Week – magnetic properties of transition elements

Third Week diwali break

Fourth Week -- Spectral properties and stereochemistry of d-block elements

 Structures and properties of some compounds of transition elements – TiO2, VOCl2,

november, 2022

First Week – and properties of some compounds of transition elements – TiO2, VOCl2,

 Second week- Structures and properties of some compounds of transition elements

 FeCl3, CuCl2 and Ni(CO)4

third Week – Physical Properties of solvents and their types, general characteristics of solvents

fourth week-test

December 2022

firstWeek -- Reactions with reference to liquid NH3

second Week -- Reactions with reference to liquid SO2

**BSC 1ST SEC D**

**INORGANIC CHEMISTRY**

**SEPTEMBER-2022**

**First week** - Probability of angular wave function , shape of s,p,d and f-orbital

**Second week**- Aufbau and pauli exclusionprinciple, hunds multiplicityrule.

**Third week** - Electronic configuration of elements

**Fourth Week -** effective nuclear charge, slater’s rule.

OCTOBER2022-

FIRST WEEK- **Periodic table**: Classification of periodic table, atomicand ionic radii,perioc trends in ionic radii

,**Second Week –** Ionisation energy and its variation in periodic table, electronic affinity Elecronegativity definition, methodof determination.

 **Third week - DIWALI BREAK**

**Fourth Week –-** Trend in periodic table, Pauling, Mulliken , Allerd and Mullikan’s, Electronegativity scale, Sanderson’s electron density ratiovarious types of hybridisation

 **NOVEMBER 2022**

**First week** **Covalent Bond –** Trend in periodic table, Pauling, Mulliken , Allerd and Mullikan’s, Electronegativity scale, Sanderson’s electron density ratiovarious types of hybridisationValance bond theory and its limitations ,

**Second week** -Shape of inorganic molecules and ions

 **Third Week** - VSEPR Theory andits applications, Molecular orbital diagram of homonuclear

Molecular orbital diagram of heteronuclear diatomic molecules and ions. Bond energy, bond angle

 **Fourth Week** - Molecular orbital diagram of heteronuclear diatomic molecules and ions. Bond energy, bond angle

 Percentage ionic character,dipole moment and electronegativity difference.

**DECEMBER2022**

Percentage ionic character,dipole moment and electronegativity difference

- Assignment and viva, test

Government College for Women, Rohtak

Lesson plan, Odd Semester Session

2022-2023

Department of Chemistry

Name of extension lecturer: **Sangita**

B.Sc. 1 (Physics Hons.) 1st semester

**September 2022**

First week – Bonding: Qualitative approach to valence bond theory and its limitations.

Second week- Hybridisation, equivalent and non-equivalent orbitals, Bent’s rule and applications.

Third week-Molecular orbital theory, symmetry and overlap. Molecular orbitals diagrams of diatomic and simple polyatomic systems.

Fourth Week-Organisation of solids: Packing of ions in crystals, close packed structures, spinels

**October 2022**

First week--- ilmenite and perovskite structures of mixed metal oxides. Size effects, radius ratio rules and theirs limitations.

Second week-Lattice energy, Born equation, Madelung constant, Kapustinskii equation and its applications, Born Haber cycle and its application.

Third week-- Solvation energy, Packing of atoms in metals, qualitative idea of valence bond and band theories, semiconductors Fourth Week-Defects in solids, conductance in ion solids. Introduction to superconductors.

**November 2022**

Forst week-- Weak chemical forces: Vander wall forces, Hydrogen Bonding, Effects of chemical forces on m.p.,b.p. and solubility, energetic of dissolution process.

Second week- Crystal field theory- measurement of 10 Dq CFSE in weak and strong fields, Pairing energies, factors affecting the magnitude of 10 Dq.

Third week – Octahedral vs. Tetrahedral coordination, tetragonal distortions from octahedral symmetryTheJahn-teller theorem, square-planar coordination ligand field and molecular orbitals theories.

Fourth Week- Trans effect, Thermodynamic and kinetic stability of coordination compounds. Labile and inert complexes.Mechnism of octahedral complexes substitution reactions.

**December 2022**

**First** week- Mechanism of electron transfer reaction in octahedral complexes.

Second week- Revision

Government College for Women, Rohtak

Lesson plan, Odd Semester Session

2022-2023

Department of Chemistry

Name of extension lecturer: **SANGITA**

B.Sc. 1 (Home Science) 1st semester

**September 2022**

First week -Concept of element, mixture and compound, atomic and molecular masses, mole concept and molecular masses

Second week- Normality, molarity and mass percentage. Simple numerical problems based on the

Third week – Subatomic particles: Electrons, protons and neutrons. Atomic no., Atomic weight, Bohr’s Model of an Atom

Fourth WeekModern periodic law and periodic table. Electronic configuration of elements (Na, Mg, C, N, O, F, Cl, H)

**October 2022**

First week- Periodic properties: atomic size, ionisation energy ,Electron affinity,Electronegativity.

Second week-- Chemical bonding: Ionic Bonding, Covalent Bonding, Coordinate, H-Bonding. Chemical Bonding.

Third week-- Concepts of acids, base and salt, pH and pH scale. Numerical based on pH and buffer solutions.

Fourth Week- Carbon and its characteristics-Tetravalency, catenation Electronegativity, tendency to form multiple bonds.

 Organic compounds, classification of organic compounds, Functional groups

**November 2022**

First week -- IUPAC nomenclature of aliphatic compounds (alkanes, alkenes, alkynes) IUPAC nomenclature of aliphatic compounds (alcohols, carboxylic acids, aldehydes and ketones).

Second week- Classification of carbon atoms in alkanes.Soap and Synthetic Detergents, Advantages and Disadvantages.

Third week – Synthetic polymer: Structure and uses of the following polymers (PVC, Teflon, PAN, Nylon-6, 6).

Fourt week- Chemical composition in cosmetics-creams, perfumes, talcum powder, deodorants, lipstics, nailpolish, shampoo and hair dye.

**December 2022**

Firsy week -- Paints and Varnishes their composition and uses.

Second week- Revision

 **Government PG College for women rohtak**

 Lesson plan( odd semester) 2022-2023

 Department of chemistry

 Name of teacher: seema

 BSc first medical (section a b c first semester)

 september2022

**First week** - introduction of gaseous state,kinetic gas equation, Maxwell distribution of velocities and energies. calculation of root mean square velocity, average velocity and most probable velocity

**second week** – relation between velocities ( M.S.V, A.V, M.P.V) collision diameter , collision number , collision frequency ,mean free path

**Thirdweek**- ideal gas, real gas, derivation of real gas from ideal behavior derivation vander walls , equation of state , application of vanderwall eqation of state

equation of state , application of vanderwall eqation of state

**Fourth week**- - critical phenomena- critical temperature, critical volume, critical pressure, relation between critical constants and vanderwall constant

 ocotober 2022

**First week**- - PV isotherm of real gases, continuity of States, the isothermal of vanderwall equations - critical compressibility factor, law of compressibility state, liquefaction of gases

**secondweek-** Introduction, Intermolecular forces of attraction*Structure of liquidstheories of liquid state structure* **third week**-diwali vacation

**fourthweek**- Properties of liquids--   Surface tension and chemical constitution -

 **November 2022 first Week** -**Liquid State -** -   Viscosity, measurement of viscosity and its chemical constitution , Vapour pressure, measurement of vapour pressure

***secondWeek****-* , Optical Rotation, measurement and optical activity **–**. Refractive index, measurement and chemical constitution

**thirdweek** – solid state- introduction law of crystallography Symmetry element of crystals

- unit cell, space lattice, bravais lattice, crystal system X rays di fraction of crystals

**Fourthweek-** derivation of bragg's equation determination of crystal structure of NACL, KCL,cscl liquid crystals-difference between solid liquid,liquid crystals

-     **December 2022**

**firstweek**-  –type of liquid crystal, application of liquid crystal,

**second Week –** discussion of last year question papers

**LESSON PLAN OF ODD SEMESTER 2022-23**

**Name of the lecturer: SHAMMY LAJ**

**Class and Section: B.Sc II Medical Sec-A and B**

**Subject: Organic and Physical Chemistry**

 **AUGUST 2022**

**Week 3 : Org.** Alcohols-nomenclature, methods of formation, acidic nature, reactions

**Week 4:** **Dihydric alcohols**-nomenclature, methods of formation, chemical reac. of glycols, pinacol pinacolone rearrangement

**Revision of unit 1**

**SEPTEMBER 2022**

**Week 1**:**org-**phenols-nomenclature, structure and bonding, preparation, physical properties, acidic character, Reactions of phenol, mech. of fries rearrangement

**Week 2:**clasion rearrangement reimer tiemann reaction, Kolbes reaction,schotten baumann reac.,

**Week 3:** epoxides(synthesis,ring opening and reac. With Grignard and organolithium reagents

**Week 4:** UV spectroscopy absorption laws, types of transitions, concept of chromophore and auxochrome

**OCTOBER 2022**

**Week 1:** bathochromic, hypsochromic, hyperchromic, hypochromic shifts, Woodward fieser rules

**Week 2:** calculation of lambda max of conjugated dienes,alpha-beta usaturated ketones Application of UV spectroscopy in str. Elucidation of org comp.

**Revision of unit3**

**Week 3:** **DIWALI BREAK**

**Week 4:** **org-**carboxylic acids(nomenclature,str. And bonding physical properties,acid strength comparision), Prep. Of carboxylic acids, reactions, reduction of carboxylic acids,

**NOVEMBER 2022**

**Week 1:** mechanism of decarboxylations, introduction to acid derivatives, Preparation of acid chlorides, esters, amides, acid anhydrides,

 **Week 2:** relative stability of acid derivatives, interconversion of acid derivatives, Mechanism of esterification and hydrolysis, **Test** and **Assignment** **of** **Unit 4**

 **Week 3: Physical-** Chemical equilibrium constant and free energy, concept of chemical potential

**Week 4:** law of chemical equilibrium, vant hoff rxn isotherm and isochore.Le-chatlier principle and clausius clapeyron equation.

**DECEMCER 2022**

**Week 1: Physical-**Nernst distribution law, modification of distribution law, Application of distribution law.

**Week 2:** determination of degree of hydrolysis, Determination of equilibrium tri-iodide complex and process of extraction

**Physical-Revision and group discussion.**

**Government PG College for Women, Rohtak**

Department of Chemistry Session: 2022-2023

Lesson Plan Semester - III

Name of Faculty : Dr. Sonika

Subject : Inorganic, Organic Physical Chemistry

B.Sc. II (Medical)

 Section – A

**August 2022**

Fourth week **Chemistry of Elements of Ist transition series:**

Definition of transition elements, position in the periodic table.

**September 2022**

**Inorganic**

First week- General characteristics & properites of Ist transition elements

Second week - Structures & properties of some compounds of transition elements – TiO2, VOCl2, CuCl2 and Ni (CO)4

Third week – Revision and Problem solving

Fourth week – Section-B Chemistry of Elements of IInd & IIIrd transition series

 General characteristics, Comparison of properties of 3d elements with 4d & 5d elements with reference only to ionic radii, oxidation state, magnetic and Spectral properties

**October 2022**

First week- stereochemistry

**Organic**

Second week- Ultraviole t (UV) absorption spectroscopy: Absorption laws (Beer-Lambert law), molar absorptivity, presentation and analysis of UV spectra

Third week – Ultraviole t (UV) absorption spectroscopy

types of electronic transitions, effect of conjugation. Concept of chromophore and auxochrome. Bathochromic, hypsochromic, hyperchromic and hypochromic shifts.

Fourth week - . . UV spectra of conjugated enes and enones,Woodward- Fieser rules, calculation of max of simple conjugated dienes and , -unsaturated ketones

**November 2022**

**Organic**

First week- Applications o f UV Spectroscopy in structure elucidation of simple organic compounds. Assignment & Test

Second week- Carboxylic Acids & Acid Derivatives

Nomenclatu re of Carboxylic acids, structure and bonding, physical properties, acidity of carboxylic acids, effects of substituents on acid strength. Preparation of carboxylic acids. Reactions of carboxylic acids.

Third week – Hell-Volhard-Zelinsky reaction. Reduction of carboxylic acids. Mechanism of decarboxylation, Structure , nomenclature and preparation of acid chlorides, esters, amides and acid anhydrides.

Fourth week – Relative s tability o f acyl derivatives. Phys ical properties, interconvers ion of acid derivatives by nucleophilic acyl substitution. Mechanisms of es ter ifica tion and hydrolysis (acidic and basic).

**December 2022**

**Organic**

First week – Defition of thermodynamic terms: system,surrounding etc. Types of systems, intensive and extensive properties. State and path functions and their differentials. Thermodynamic process. Concept of heat and work. Zeroth Law of thermodynamics

Second week- – First law of thermodynamics: statement, definition of internal energy and enthalpy. Heat capacity, heat capacities at constant volume and pressure and their relationship. Joule’s law – Joule – Thomson coefficient for ideal gass and real gas: and inversion temperature.

Third week – Thermodynamics-II Calculation of w.q. dU & dH for the expansion of ideal gases under isothermal and adiabatic conditions for reve rsible process, Temperature dependence of enthalpy, Kirchoffs equation. Bond energies and applications o f bond energies.

**Government PG College for Women, Rohtak**

Department of Chemistry Session: 2022-2023

Lesson Plan Semester - V

Name of Faculty : Dr. Suman Sheoran

Subject : Inorganic and Organic Chemistry

B.Sc. III (Medical)

 Section – A & B

**August 2022**

Fourth week **Unit I- Metal Ligand Bonding in Transition Metal Complexes**

Limitations of valence bond theory.

**September 2022**

**Inorganic**

First week- An elementary idea of crystal field theory.

Second week - Crystal field splitting in octahedral complexes.

Third week – Crystal field splitting in tetrahedral and square planar complexes.

Fourth week – Factors affecting crystal field parameters.

**Organic Unit- II Carbohydrates**

First week -Classification and nomenclature.

Second week- Monosaccharides.

Third week – Mechanism of osazone formation, interconversion of glucose and fructose.

Fourth week - Chain lengthening and shortening of aldoses.

 **October 2022**

**Inorganic Unit II - Thermodynamic & Kinetic aspects of Metal Complexes**

First week- A brief outline of thermodynamic stability of metal complexes.

Factors affecting the stability of metal complexes.

Second week- Substitution reactions in Square planar complexes of Pt(II) & (Assignment)

Trans effect

Third week – **Unit – III Magnetic Properties of Transition Metal Complexes**

Types of magnetic behaviour, methods of determining magnetic susceptibility, spin only formula.

Fourth week – LS coupling, correlation of μs and μeff values. Orbital contribution to magnetic moments.

**Organic**

First week- Configuration of monosacharides

Second week- Erythro and threo diastereomers.

Third week – Open chain and cyclic structure of D (+)-glucose

Fourth week -- Open chain and cyclic structure of D (-) - fructose.

**November 2022**

**Inorganic**

First week- Application of magnetic moment data for 3d- metal complexes.

Revision of Unit –III.

Second week-  **Unit- IV Electronic Spectra of Transition Metal complexes**

Types of electronic transitions, selection rules for d-d transitions, spectroscopic ground states.

Third week – Spectrochemical series.

Fourth week – orgel- energy level diagram of d1-d9 states.

**Organic**

First week- Mechanism of mutarotation.

Second week- Structures of ribose and deoxyribose.

Third week – Introduction to disaccharides and polysaccharides without involving structure determination.

Fourth week -- Introduction to disaccharides and polysaccharides without involving structure determination.

**December 2022**

**Inorganic**

First week - Discussion of electronic spectrum of [Ti(H2O)6]3+ complex ion.

Second week - Revision of Unit- IV

Third week –Problem solving.

**Organic**

First week - Revision of Unit Carbohydrates.

Second week - Group Discussion

Third week – Problem Solving

**Government PG College for Women, Rohtak**

**Lesson plan, Odd Semester Session**

**2022-2023**

**Department of Chemistry**

**Name of Assistant Professor: VIJAITA**

**B.Sc.Istsemester (Sections D,E)**

**September 2022**

First week—Introduction of Basic Organic Chemistry (GOC).

Second week--localized and delocalized chemical bonds.

Third week-- Van der wall interactions, Resonance effect and its applications, Resonance conditions.

Fourth week -- Hyperconjugation, Inductive effect & Problem discussion.

**October2022**

First week -- Electromeric effect & comparison with Inductive effect and Resonance Effect.

Second week -- Concept of isomerism, Types of isomerism.

Third week -- Elements of symmetry, Molecular chirality, Enantiomers, Stereogenic centres, Optical activity.

Fourth week -- Property of enantiomers, chiral and achiral molecules with two stereogenic centres, Diasteromers, Meso compounds.

**November 2022**

First Week -- Resolution of Enatiomers, Inversion, Retension and Racemisation, Relative and absolute configuration, Sequence rule, R and S system of nomenclature.

Second Week -- Determination of configuration of geometrical isomers, E and Z system of nomenclature of organic molecules.

Third Week -- Conformational analysis of ethane and n-butane, conformations of cyclohexane, Newman projection and Sawhorse projection formulae.

Fourth Week -- Curved arrow notions, drawing electron movements with arrows, half headed and double headed arrows, homolytic and heterolytic bond breaking, types of reagents-electrophiles and nucleophiles. **Test**, Assignment & Viva.

**December 2022**

First Week –Types of Organic Reactions- Addition Reactions, Substitution Reactions,Elimination reactions.Carbocations,Carboanions, Free Radicals Carbenes, Arynes, and Nitrenes.Test & Viva.

Second Week – Isomerism in alkanes, source and methods of formation.CycloalkaneNomenclature,IUPAC nomenclature of alkanes,classification of carbon atoms in alkanes.

Synthesis of cycloalkanes and their derivatives- photochemical cycloaddition reactions, Baeyer’s strain theory and its limitations, Theory of strainless rings.