**Summary of Lesson Plans of College Faculty**

**Name of College: Dr. B. R. A. Govt. College Kaithal**

**Academic Session: 2023-2024 Semester: Even**

**Name of Asstt./Ass. Prof:** Dr. Poonam

**Class:** B.Sc. Ist year (2nd sem) Inorganic Chemistry

**Subject Lesson Plan:** From Jan 2024-May 2024

|  |  |
| --- | --- |
| Month | Topics |
| Jan | Covalent Bond- Valence bond theory and its limitation, directional characteristics of covalent bond |
| Various type of hybridisation and shapes of simple inorganic molecules and ions (BeF2, BF3, CH4, PF5) |
| Feb | Various type of hybridisation and shapes of simple inorganic molecules and ions (SF6, IF7, SO42-, ClO4 -1 , NO3 -1 ) |
| Valence shell electron pair repulsion (VSEPR) theory to NH3, H3O+ , SF4, ClF3, H2O, SnCl2, ClO3 -and ICl2 -1 . |
| Molecular orbital theory of homonuclear (N2, O2) |
| Molecular orbital theory of heteronuclear (CO and NO) diatomic molecules |
| March | Ionic Solids: Ionic structures (NaCl, CsCl) |
| Ionic Solids: Ionic structures (ZnS (Zinc blende), CaF2) |
| Size effects, radius ratio rule and its limitations, Madelung constant, Lattice energy |
| April | Born-Haber cycle, Solvation energy and its relation with solubility of Ionic solids |
| Polarizing power, polarisability of ions, Fajan’s Rule |
| Valance bond and band theories of Metallic conductor |
| Semiconductors its type and application |
| May | Revision |

**Summary of Lesson Plans of College Faculty**

**Name of College: Dr. B. R. A. Govt. College Kaithal**

**Academic Session: 2023-2024 Semester: Even**

**Name of Asstt./Ass. Prof:** Dr. Indu Ravish

**Class:** B.Sc. Ist year (2nd sem) Organic Chemistry

**Subject Lesson Plan:** From Jan 2024-May 2024

|  |  |
| --- | --- |
| Month | Topics |
| Jan | Alkanes: Nomenclature, Classification of C atoms in alkanes and its structure |
| Isomerism in alkanes, sources, method of preparations : Wurtz reaction, Kolbe reaction |
| Feb | Corey-House reaction and decarboxylation of carboxylic acids, physical properties |
| Mechanism of free radical halogenation of alkanes, reactivity and selectivity. |
| Nomenclature of Cycloalkanes |
| Baeyer's strain theory and its limitations, theory of strainless rings |
| March | Alkenes**-**Introduction, Structure and isomerism of alkene |
| Nomenclature and relative stability of alkenes, Dehydrohalogenation of alkyl-halide |
| Dehydration of alcohals, Saytzeff rule Hoffmann elimination, Physical Properties |
| April | Mechanism involved in hydrogenation, Electrophilic addition reaction, free radical mechanism, Markownikoff rule |
| Hydroxylation and oxidation, Hydrogen Bonding- Defination, types, |
| Effect of hydrogen bonding , applications |
| Discussion of vander waals forces |
| May | Revision |

**Summary of Lesson Plans of College Faculty**

**Name of College: Dr. B. R. A. Govt. College Kaithal**

**Academic Session: 2023-2024 Semester: Even**

**Name of Asstt./Ass. Prof:** Dr. Poonam

**Class:** B.Sc. IInd year (4th sem) Organic Chemistry

**Subject Lesson Plan:** From Jan 2024-May 2024

|  |  |
| --- | --- |
| Month | Topics |
| Jan | Infrared (IR) absorption spectroscopy-Molecular vibrations, Hooke 's law**,** selection rules, intensity and position of IR bands, measurement of IR spectrum, fingerprint region |
| characteristic absorptions of various functional groups , interpretation of IR spectra of simple organic compounds |
| Applicat ions of IR spectroscopy in structure elucidation of simple  Organic compounds |
| Diazonium Salts-Mechanism of diazotisation, structure of benzene diazonium chloride |
| Feb | Replacement of diazo group by Br, I, NO2, H, OH, F, Cl and CN groups, reduction of diazonium salts to hyrazines, Coupling reaction and its synthetic application. |
| Nomenclature and structure of carbonyl groups  Synthesis of aldehyde and ketone |
| Benzoin, Aldol, Perkin reaction, Knoevenagel, witting, Mannich reaction |
| Baeyer-Villiger oxidation, Cannizaro, MPV reaction |
| March | Clemmensen, Wolff-Kishner, LiAlH4 and NaBH4 reaction |
| Structure and nomenclature of amines, physical properties |
| Separation of primary, secondary and tertiary amines, Structural features |
| April | Preparation of alkyl and aryl amines, Gabriel-phthalimide and Hoffmann broamide reaction |
| Electrophilic aromatic substitution in aryl amines, Reactions of amines |
| Test of amines  Test of diazonium salt |
| Revision |

**Summary of Lesson Plans of College Faculty**

**Name of College: Dr. B. R. A. Govt. College Kaithal**

**Academic Session: 2023-2024 Semester: Even**

**Name of Asstt./Ass. Prof:** Dr. Indu Ravish

**Class:** B.Sc. IInd year (4th sem) Inorganic Chemistry

**Subject Lesson Plan:** From Jan 2024-April 2024

|  |  |
| --- | --- |
| Month | Topic |
| Jan/ Ist Week | Lanthanides: Electronic structure |
| IInd Week | Lanthanides: oxidation states |
| IIIrd Week | Lanthanides: magnetic properties |
| IV Week | Lanthanides: complex formation Lanthanides: colour  Assignment |
| Feb/ Ist Week | Ionic radii and lanthanide contraction, occurrence |
| IIIrd Week | Separation of lanthanides, Lanthanide compounds. Test |
| IV Week | Actinides: General characteristics of actinides |
| March/Ist Week | Chemistry of separation of Np, Pu and Am from uranium, |
| IInd Week | Comparison of properties of Lanthanides and actinides with transition elements  Test |
| IIIrd Week | Theory of Qualitative and Quantitative Analysis  Chemistry of analysis of various groups of basic and acidic radicals  Chemistry of identification of acid radicals in typical combination. |
|  |
| April/ Ist Week | Chemistry of interference of acid radicals including their removal in the analysis of basic radicals. |
| IInd Week | Common ion effect, Solubility product. |
| IIIrd Week | Theory of precipitation, Co-precipitation, Post precipitation |
| IV Week | Revision |

Summary of Lesson Plans

Name of College: Dr. B.R.A. Govt College Kaithal

Name of Assist. Prof : Dr Indu Ravish

Class/ Subject: B.Sc. IIIrd year (6th sem)/ Organic Chemistry

Lesson Plan: Jan 2024-April 2024

|  |  |
| --- | --- |
| Date | Topics |
| Jan | Organic synthesis via enolates: acidity of α-hydrogen**,** Alkylation of diethyl malonate |
| Alkylation of ethyl acetoacetate**,** Synthesis of ethyl acetoacetate**,** Keto-enol tautomerism of ethyl acetoaetate |
| Heterocyclic compounds: molecular orbital picture and aromatic character, Method of synthesis of pyrrole |
| Method of synthesis of furan, synthesis of thiophene, Electrophilic substitution reaction of pyrrole |
| Feb | Electrophilic substitution reaction of thiophene and furan, Nucleophilic substitution reaction of pyridine derivative |
| Basicity of pyridine. Piperidine and pyrrole, Introduction to condensed five and six membered heterocycle compounds, Preparation of indole |
| Preparation of quinolone and iso-quinoline  Assignment |
| Electrophilic substitution reactions of quinoline and iso-quinoline  Classification of amino acids, acid-base behaviour |
| March | Isoelectric point and electrophoresis, Preparation of amino acids  Test |
| Structure, nomenclature, classification of proteins and peptides, peptide structure determination |
| End group analysis, selective hydrolysis, lassical peptide, solid phase peptide synthesis |
| April | Structure of peptide and proteins, Addition, free radical, ionic, Zieglar-Natta polymerization |
| Vinyl polymers, condensation polymerization, polyester, polyamides, Phenol-formaldehydes resins, natural and synthetic rubber |
| Revision |

**Summary of Lesson Plans of College Faculty**

**Name of College: Dr. B. R. A. Govt. College Kaithal**

**Academic Session: 2023-2024 Semester: Even**

**Name of Asstt./Ass. Prof:** Dr. Poonam

**Class:** B.Sc. IIIrd year (6th sem) Inorganic Chemistry

**Subject Lesson Plan:** From Jan 2024-April 2024

|  |  |
| --- | --- |
| Month | Topics |
| Jan/Ist Week | Acids and Bases: Arrhenius, Bronsted-lowry, Lux-flood levelling solvents |
| IInd Week | Solvent system and Lewis concept of acids and bases, relative strength of acids and bases |
| IIIrd Week | Hard and soft acids and bases (HSAB), Applications of HSAB principle. |
| IV Week | Organometallic chemistry: Definition, classification and nomenclature of organometallic compounds, |
| Feb/Ist week | preparation, properties and bonding of alkyls of Li, Al, Hg and Sn, |
| IInd Week | concept of hapticity of organic ligand, Structure and bonding in metal-ethylenic complexes |
| IIIrd Week | Test |
| IV Week | Structure of Ferrocene, classification in metal carbonyls, preparation, properties and bonding in mononuclear carbonyls. Assignment and test |
| March/Ist Week | Bio inorganic chemistry: Metal ions present in biological system, classification on the basis of action (essential, non-essential, trace, toxic |
| IInd Week | Metalloporphyrins with special reference to haemoglobin and myoglobin.  Assignment |
| IIIrd Week | Biological role of Na+, K+, Ca+2, Mg+2 ions, Cooperative effect, Bohr effect |
| April/Ist week | Preparation and uses of elastomers,polysiloxane copolymers |
| IInd Week | Preparation and uses of polyphosphazenes  Test |
| IIIrd Week | bonding in triphosphazene |
| IV Week | Revision |