| **Government College for Women, Lakhanmajra****Lesson Plan** |
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| Class : 2nd Semester Subject : Inorganic ChemistrySession : 2023-24 Assistant Professor : Dr. Naveen |
|  | Syllabus |
| **January****2024** | Hydrogen Bonding & Vander Waals Forces Hydrogen Bonding– Definition, Types, effects of hydrogen bonding on properties of substances, applicat ion Brief discussion of various types of Vander Waals Forces. Metallic Bond and Semiconductors Metallic Bond- Brie f introduction to meta llic bond, band theory of meta llic bond Semiconductors- Introduction, types and applications. Revision and Test |
| **February 2024** | s-Block Eleme nts Comparative study of the elements including, diagonal relationships, salient features of hydrides (methods of preparation excluded), solvation and complexation tendencies including their function in biosystems. Chemis try of Noble Gases Chemical properties of the noble gases with emphasis on their low chemical reactivity, chemistry of xenon, structure and bonding of fluorides, ox ides & oxyfluorides of xenon. Revision and Test |
| **March 2024** | p-Block Elements Emphasis on comparative study of properties of p-block elements (including diagonal relationship and excluding methods of preparation). Boron family (13thgp): Diborane– properties and structure (as an example of electron– deficient compound and multicentre bonding), Borazene– chemical properties and structure Trihalides of Boron– Trends in lewis acid character structure of aluminium (III) chloride. Carbon Family (14thgroup) Catenation, p π– d π bonding (an idea), carbides, fluorocarbons, silicates structural aspects), silicons– general methods of preparations, properties and uses. Revision and Test |
| **April****2024** | Nitrogen Family (15thgroup) Oxides– structures of oxides of N,P. oxyacids– structure and relative acid strengths of oxyacids of Nitrogen and phosphorus. Structure of white, yellow and red phosphorus. Oxygen Family (16thgroup) Oxyacids of sulphur– structures and acidic strength H2O2–structure, properties and uses. Halogen Fami l y (17thgroup) Basic prope r ties of ha logen, interha logens types propert ies, hydro and oxyacids of chlorine– structure and compari son of acid strength.Revision and Test |

| **Government College for Women, Lakhanmajra****Lesson Plan** |
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| Class : 2nd Semester Subject : Physical ChemistrySession : 2023-24 Assistant Professor : Dr. Naveen |
|  | Syllabus |
| **January****2024** | Electrochemistry-I Electrolytic conduction, factors affecting electrolytic conduction, specific, conductance, molar conductance,equivalent conductance and relation among them, their vartion with concentration.Arrhenius theory of ionizationRevision and Test |
| **February 2024** | Ostwald’s Dilution Law. Debye- Huckel– Onsager’s equation for strong electrolytes (elementary treatment only) Transport number, definition and determination by Hittorfs methods, (numerical included)Revision and Test |
| **March 2024** | Electrochemistry-II Kohlarausch’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. Revision and Test |
| **April****2024** | Applications of conductivity measurements: determination of degree of dissociation, determination of Ka of acids determination of solubility product of spa ringly soluble salts, conductometric titrations. Definition of pH and pKa, Buffer solution, Buffer action, Henderson Hazel equation, Buffer mechanism of buffer actionRevision and Test |
| **Government College for Women, Lakhanmajra****Lesson Plan** |
| Class : 4th Semester Subject : Organic ChemistrySession : 2023-24 Assistant Professor : Dr. Naveen |
|  | Syllabus |
| **January****2024** | 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 and interpretation of IR spectra of simple organic compounds. Applications of IR spectroscopy in structure e lucidation of simple organic compounds.Revision and Test |
| **February 2024** | Amines Structure and nomenclatu re of amines, phys ical properties. Separation of a mixture of primary, secondary and tertiary amines.Structural featu res affecting basicity of amines. Prepa ration 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. Revision and Test |
| **March 2024** | 1. 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 hyrazines, coupling reaction and its synthetic application. 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.Revision and Test |
| **April****2024** | Aldehydes and Ketones Nomenclature and structure of the carbonyl group. Synthesis of aldehydes and ketones with particular reference to the synthesis of aldehydes from acid chlorides, advantage of oxidation of alcohols with chromium trioxide (Sarett reagent) pyridinium chlorochromate (PCC) and pyridinium dichromate., Physical properties. Comparison of reactivities of aldehydes and ketones. Mechanism of nucleophilic additions to carbonyl group with particular emphasis on benzoin, aldol, Perkin and Knoevenagel condensations. Condensation with ammonia and its derivatives. Wittig reaction. Mannich reaction.Oxidation of aldehydes, Baeyer–Villiger oxidation of ketones, Cannizzaro reaction. MPV, Clemmensen, Wolff-Kishner, LiAlH4and NaBH4reductions. Revision and Test |

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| Class : 4th Semester Subject : Physical ChemistrySession : 2023-24 Assistant Professor : Dr. Naveen |
|  | Syllabus |
| **January****2024** | Thermodynamics-III Second law of thermodynamics, need for the law, different statements of the law, Carnot’s cycles and its efficiency, Carnot’s theorm, Thermodynamics scale of temperature. Concept of entropy– entropy as a state function, entropy as a function of V & T, entropy as a function of P & T, entropy change in physica l change, entropy as a criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases.Revision and Test |
| **February 2024** | Thermodynamics-IV Third law of thermodynamics: Nernst heat theorem, statement of concept of residual entropy, evaluation of absolute entropy from heat capacity data. Gibbs and Helmholtz functions; Gibbs function (G) and Helmholtz function (A) as thermodynamic quantities, A & G as criteria for thermodynamic equilibrium and spontaneity, their advantage over entropy change. Variation of G and A with P, V, T Revision and Test |
| **March 2024** | Electrochemistry-III Electrolytic and Galvanic cells– reversible & Irreversible cells, conventional representation of electrochemical cells. EMF of cell and its measurement, Wes ton standard cell, activity and activity coefficients. Calculation of thermodynamic quantities of cell reaction (G, H & K). Types of reversible electrodes– metal metal ion gas electrode, metal–insoluble salt- anion and redox electrodes. Electrode reactions, Nernst equations, derivation of cell EMF and single electrode potential. Standard Hydrogen electrode, reference electrodes, standard electrodes potential, sign conventions, electrochemical se ries and its applications.Revision and Test |
| **April****2024** | Electrochemistry-IV Concentration cells with and without transference, liquid junction potential, application of EMF measurement i.e. valency of ions, solubility product activitys coefficient, potentiometric titration (acid- base and redox). Determination of pH using Hydrogen electrode, Quinhydrone electrode and glass electrode by potentiometric methods Revision and Test |

| **Government College for Women, Lakhanmajra****Lesson Plan** |
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| Class : 6th Semester Subject : Organic ChemistrySession : 2023-24 Assistant Professor : Dr. Naveen |
|  | Syllabus |
| **January****2024** | Heterocyclic Compounds-I Introduction: Molecular orbital p icture and aromatic characteristics of pyrrole, furan, thiophene and pyridine. Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution. Mechanism of nucleophilic substitution reactions in pyridine derivatives. Comparison of basicity of pyridine, piperidine and pyrroleRevision and Test |
| **February 2024** | 1. Heterocyclic Compounds-II Introduction to condensed five and six- membered heterocycles. Prepration and reactions of indole, quinoline and isoquinoline with special reference to Fisher indole synthesis, Skraup synthesis and Bischler-Napieralski synthesis. Mechanism of electrophilic substitution reactions of, quinoline and isoquinoline 2. Organosulphur Compounds Nomenclature, structural features, Methods of formation and chemical reactions of thiols, thioethers, sulphonic acids, sulphonamides and sulphaguanidine. Synthetic detergents alkyl and aryl sulphonates Revision and Test |
| **March 2024** | 1. Organic Synthesis via Enolates Acidity of-hydrogens, alkylation of diethyl malonate and ethyl acetoacetate. Synthesis of ethyl acetoacetate: the Claisen condensation. Keto-enol tautomerism of ethyl acetoacetate. 2. Synthetic Polymers Addition or chain-growth polymerization. Free radical vinyl polymerization, ionic vinyl polymerization, Ziegler-Natta polymerization and vinyl polymers. Condensat ion or step growth polymerization. Polyeste rs, polyamides, phenol formaldehyde resins, urea formaldehyde resins, epoxy resins and polyurethanes. Natural and synthetic rubbers Revision and Test |
| **April****2024** | Amino Acids, Peptides& Proteins Classification, of amino acids. Acid-base behavior, isoelectric point and electrophoresis. Preparation of-amino acids.Structure and nomenclature of peptides and proteins. Classification of proteins. Peptide structure determination, end group analysis, selective hydrolysis of peptides. Classical peptide synthesis, solid phase peptide synthesis. Structures of peptides and proteins: Primary & Secondary structure Revision and Test |