**LESSON PLAN (Organic chemistry, Inorganic Chemistry)**

**B.Sc 2nd (4rth Semester), (Medical, Non-medical) Session 2023-24**

**By: Dr. Vandna Nishal, Asst. Professor of Chemistry, Govt. College Kosli.**

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| Month/Week/Date | Particular | Remark |
| **January**  3rd Week  4th Week | Molecular vibrations, Hook’s law, election rules, intensity and position of IR bands, fingerprint region, measurement of IR spectrum.  Interpretation of IR spectra, applications of IR spectroscopy. | Test of infrared spectroscopy |
| **February**  1st Week  2nd Week  3rd Week  4th Week | Structure, nomenclature and physical properties of amines, Distinguish between primary, secondary and tertiary amines like hinsberg reagent test, carbylamine reaction, Hoffman reaction, fractional distillation.  Structural features affecting basicity of amines. Effect of substituents on aliphatic and aromatic amines.  Synthesis of alkyl and arylamines (reduction of nitro compounds, nitriles, Gabriel pthallamide reaction, Hofmann bromamide reaction, reductive amination etc. Electrophillic aromatic substitutions and reaction of amines with nitrous acid.  Explanation about diazonium salts, Mechanism, Replacement of diazo groups by H, OH, Cl, Br, CN, NO2, reduction of diazonium salts, Coupling reactions of diazonium salts, synthetic utility of diazonium salts | Test of amines  Test of diazonium salts |
| **March**  1st Week  2nd Week  3rd Week  4th Week | Preparation of nitroalkanes and nitroarenes, chemical reactions, mechanism of electrophillic substitution reactions in nitro arenes.  Reduction of nitro compounds in acidic, neutral and alkaline medium,  Nomenclature and structures of carbonyl compounds, synthesis of aldehydes and ketones. Advantage of oxidation of carbonyl compounds by Sarett reagent, PCC, pyridinium dichromate, physical properties, comparision of reactivity between aldehydes and ketones, physical properties.  Nucleophillic additions including benzoin, Aldol, Perkin, Knoevenagel condensations, condensation with ammonia and its derivatives, Wittig reaction, Mannich reaction, oxidation of aldehydes, Baeyer-Villiger oxidation of ketones, Cannizaro reaction, MPV, Clemmenson, Wolff Kishner, reduction reactions. | Test of nitro compounds  Test of aldehydes and ketones |
| **April**  1st Week  2nd Week  3rd Week  4th Week | Chemistry of f – block elements - Lanthanides Electronic structure, oxidation states and ionic radii.  Lanthanide contraction, complex formation, occurrence and isolation, lanthanide compounds.  Chemistry of f – block elements - Actinides General features and chemistry of actinides,  Chemistry of separation of Np, Pu and Am from U, Comparison of properties of Lanthanides and Actinides and with transition elements. | Assignment on Lanthanides |
| **May**  1st and 2nd week | Revision | Quiz |

**LESSON PLAN (Organic chemistry, Inorganic Chemistry)**

**B.Sc 3rd (6th Semester), Session 2022-23**

**By: Sh. Jaswant, Faculty of Chemistry, Govt. College Kosli.**

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| Month/Week/Date | Particular | Remark |
| **January**  3rd Week  4th Week | Heterocyclic Compounds-I - Introduction: Molecular orbital p icture and aromatic characteristics of pyrrole, furan, thiophene and pyridine. Methods of synthesis.  Chemical reactions of Heterocyclic Compounds with particular emphasis on the mechanism of electrophilic substitution. Mechanism of nucleophilic substitution reactions in pyridine derivatives. | Oral test |
| **February**  1st Week  2nd Week  3rd Week  4th Week | Comparison of basicity of pyridine, piperidine and pyrrole.  Heterocyclic Compounds-II - Introduction to condensed five and six- membered heterocycles. Prepration and reactions of indole, quinoline and isoquinoline.  Fisher indole synthesis, Skraup synthesis and Bischler-Napieralski synthesis. Mechanism of electrophilic substitution reactions of, quinoline and isoquinoline.  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. . 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.  Synthetic Polymers Addition or chain-growth polymerization. Free radical vinyl polymerization, ionic vinyl polymerization, | Test of Heterocyclic Compounds |
| **March**  1st Week  2nd Week  3rd Week  4th Week | Ziegler-Natta polymerization and vinyl polymers. Condensation or step growth polymerization. Polyesters ,polyamides, phenol formaldehyde resins, urea formaldehyde resins,  Epoxy resins and polyurethanes. Natural and synthetic rubbers.  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. | Test of Polymers |
| **April**  1st Week  2nd Week  3rd Week  4th Week | Organometallic Chemistry Definition, nomenclature and classification of organometallic compounds. Preparation, properties, and bonding of alkyls of Li, Al.  Preparation, properties, and bonding of alkyls Hg, and Sn a brief account of metal-ethylenic complexes, mononuclear carbonyls and the nature of bonding in metal carbonyls.  Acids and Bases, HSAB Concept Arrhenius, Bronsted – Lowry, the Lux – Flood, Solvent system and Lewis concepts of acids & bases,  Relative strength of acids & bases, Concept of Hard and Soft Acids & Bases. Symbiosis, electronegativity and hardness and softness | Test of Amino acids  Assignment |
| **May**  1st and 2nd week | Revision | Quiz |

**LESSON PLAN (Physical chemistry, Inorganic Chemistry)**

**B.Sc 2nd (4th Semester), Session 2023-24**

**By: Sh. Sandeep Yadav,Faculty of Chemistry, Govt. College Kosli.**

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| Month/Week/Date | Particular | Remark |
| **January**  3rd Week  4th Week | 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, | Oral test of thermodynamics |
| **February**  1st Week  2nd Week  3rd Week  4th Week | Entropy change in physical change, entropy as a criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases.  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 and T.  Electrochemistry-III Electrolytic and Galvanic cells – reversible & Irreversible cells, conventional representation of electrochemical cells. EMF of cell and its measurement | Test of thermodynamics-III |
| **March**  1st Week  2nd Week  3rd Week  4th Week | Weston 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 series and its applications.  Electrochemistry-IV Concentration cells with and without transference, liquid junction potential, | Test of thermodynamic-IV |
| **April**  1st Week  2nd Week  3rd Week  4th Week | Application of EMF measurement i.e. valency of ions, solubility product activity 20 coefficient, potentiometric titration (acid- base and redox). Determination of pH using Hydrogen electrode, Quinhydrone electrode and glass electrode by potentiometric methods.  Theory of Qualitative and Quantitative Inorganic Analysis-I Chemistry of analysis of various acidic radicals, Chemistry of identification of acid radicals in typical combinations,  Chemistry of interference of acid radicals including their removal in the analysis of basic radicals.  Theory of Qualitative and Quantitative Inorganic Analysis-II Chemistry of analysis of various groups of basic radicals,  Theory of precipitation, coprecipitation, Post- precipitation, purification of precipitates. | Test of Electrochemistry- III  Assignment |
| **May**  1st and 2nd week | Revision | Quiz |

**LESSON PLAN (Physical chemistry, Inorganic Chemistry)**

**B.Sc 3rd (6th Semester), Session 2023-24**

**By: Sh. Sandeep Yadav, Faculty of Chemistry, Govt. College Kosli.**

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| Month/Week/Date | Particular | Remark |
| **January**  3rd Week  4th Week | Spectroscopy-III - Electronic Spectrum - Concept of potential energy curves for bonding and anti bonding molecular orbitals, qualitative description of selection rules  Franck- Condon principle. Qualitative description of sigma and pie and n molecular orbital (MO) their energy level and respective transitions. | Oral test of Spectroscopy |
| **February**  1st Week  2nd Week  3rd Week  4th Week | Photochemistry - Interaction of radiation with matter, difference between thermal and photochemical processes. Laws of photochemistry: Grotthus-Drapper law, Stark- Einstein law (law of photochemical equivalence)  Jablonski diagram depiciting 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)  Solutions: Dilute Solutions and Colligative Properties Ideal and non-ideal solutions, methods of expressing concentrations of solutions, activity and activity coefficient. Dilute solution,  Colligative properties, Raolut’s law, relative lowering of vapour pressure, molelcular weight determination, Osmosis law of osmotic pressure and its measurement, determination of molecular weight from osmotic pressure. | Test of Spectroscopy-III |
| **March**  1st Week  2nd Week  3rd Week  4th Week | Elevation of boiling point and depression of freezing point, Thermodynamic derivation of relation between molecular weight and elevation in boiling point and depression in freezing point.  Experimental methods for determining various colligative properties.  Abnormal molar mass, degree of dissociation and association of solutes.  Phase Equillibrium - Statement and meaning of the terms – phase component and degree of freedom, thermodynamic derivation of  Gibbs phase rule, phase equilibria of one component system –Example – water and Sulpher systems. | Test of Solutions and Photochemistry |
| **April**  1st Week  2nd Week  3rd Week  4th Week | Phase equilibria of two component systems solid-liquid equilibria, simple eutectic Example Pb-Ag system, desilverisation of lead.  Bioinorganic Chemistry - Essential and trace elements in biological processes, metalloporphyrins with special reference to haemoglobin and myoglobin.  Biological role of alkali and alkaline earth metal ions with special reference to Ca2+. Nitrogen fixation.  Silicones and Phosphazenes- Preparation of Silicones and phosphazenes,  Properties, structure and uses of Silicones and phosphazenes. | Test of Phase Equillibrium  Assignment |
| **May**  1st and 2nd week | Revision | Quiz |

**LESSON PLAN (Inorganic Chemistry, Physical chemistry, Organic Chemistry)**

**B.Sc 1st (2nd Semester), Session 2023-24**

**By: Dr. Vandna Nishal, Assistant Professor of Chemistry, Govt. College Kosli.**

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| Month/Week/Date | Particular | Remark |
| **January**  3rd Week &  4th Week | Hydrogen Bonding & Vander Waals Forces - Hydrogen Bonding – Definition, Types, effects of hydrogen bonding on properties of substances, application Brief discussion of various types of Vander Waals Forces. Metallic Bond and Semiconductors Metallic Bond- Brief introduction to metallic bond, | Oral Test of Hydrogen bonding |
| **February**  1st Week  2nd Week  3rd Week  4th Week | Band theory of metallic bond Semiconductors- Introduction, types and applications.  s-Block-Elements 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.  Chemistry 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.  p-Block Elements Emphasis on comparative study of properties of p-block elements (including diagonal relationship and excluding methods of preparation). | Test of Hydrogen Bonding & Vander Waals Forces |
| **March**  1st Week  2nd Week  3rd Week  4th Week | Boron family (13th gp):- Diborane – properties and structure (as an example of electron – deficient compound and multicentre bonding), Borazene – chemical properties and structure Trihalides of Boron – Trends in fewis acid character structure of aluminium (III) chloride.  Carbon Family (14th group) - Catenation, p π– d π bonding (an idea), carbides, fluorocarbons, silicates structural aspects), silicons – general methods of preparations, properties and uses.  Nitrogen Family (15th group) 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 (16th group) Oxyacids of sulphur – structures and acidic strength H2O2–structure, properties and uses. Halogen Family (17th group)  Basic properties of halogen, interhalogens types properties ,hydro and oxyacids of chlorine – structure and comparison of acid strength.  Kinetics-I - Rate of reaction, rate equation. | Test of Boron and Carbon family elements |
| **April**  1st Week  2nd Week  3rd Week  4th Week | 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. Methods of determination of order of reaction.  Kinetics-II - Effect of temperature on the rate of reaction – Arrhenius equation. Theories of reaction rate – Simple collision theory for uni molecular and bimolecular collision. Transition state theory of Bimolecular reactions.  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 ionization, 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)  Electrochemistry-II - Kohlarausch’s Law, calculation of molar ionic conductance and effect of viscosity temperature & pressure on it. Application of Kohlarausch’s Law in calculation of conductance of weak electrolytes at infinite diloution. 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 action. | Test of Kinetics- I  Test of Electrochemistry- I |
| **May**  1st week  2nd week  3rd week  4th week | Alkenes - Nomenclatu re of alkenes, , mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halides,. The Saytzeff rule, Hofmann elimination, physical p roperties and relative stabilities of alkenes. Chemical reactions of alkenes mechanisms involved in hydrogenation, electrophilic and free radical additions, Markownikoff’s rule, hydroboration–oxidation, oxymercurationreduction, ozonolysis, hydration, hydroxylation and oxidation with KMnO4,  Arenes and Aromaticity - Nomenclature of benzene derivatives:. Aromatic nucleus and side chain. Aromaticity: the Huckel rule, aromatic ions, annulenes up to 10 carbon atoms, aromatic, anti - aromatic and non – aromatic compounds. Aromatic electrophilic substitution general pattern of the mechanism, mechansim of nitration, halogenation, sulphonation, and Friedel-Crafts reaction. Energy profile diagrams. Activating , deactivating subs tituents and orientation.  Dienes and Alkynes - Nomenclature and classification of dienes: isolated, conjugated and cumulated dienes. Structure of butadiene,. Chemical reactions 1,2 and 1,4 additions (Electrophilic & free radical mechanism), Diels-Alder reaction, Nomenclature, structure and bonding in alkynes. Methods of formation. Chemical reactions of alkynes, acidity of alkynes. Mechanism of electrophilic and nucleophilic addition reactions, hydroboration oxidation of alkynes  Alkyl and Aryl Halides Nomenclature and classes of alkyl halides, methods of formation, chemical reactions. Mechanisms and stereochemistry of nucleophilic substitution reactions of alkyl halides, SN2 and SN1reactions with energy profile diagrams. Methods of formation and reactions of aryl halides, The addition elimination and the elimination-addition mechanisms of nucleophilic aromatic substitution reactions. Relative reactivities of alkyl halides vs allyl, vinyl and aryl halides. | Test of Alkenes  Assignment  Quiz |

**LESSON PLAN (Inorganic Chemistry, Physical chemistry, Organic Chemistry)**

**B.Sc 3rd (6th Semester), Session 2023-24**

**By: Sh. Jaswant, Faculty of Chemistry, Govt. College Kosli.**

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| Month/Week/Date | Particular | Remark |
| **January**  3rd Week  4th Week | Organometallic Chemistry - Definition, nomenclature and classification of organometallic compounds. Preparation, properties, and bonding of alkyls of Li, Al, Hg, and Sn a brief account of metal-ethylenic complexes, mononuclear carbonyls and the nature of bonding in metal carbonyls.  Acids and Bases- HSAB Concept Arrhenius, Bronsted – Lowry, the Lux – Flood, Solvent system and Lewis concepts of acids & bases, relative strength of acids & bases, Concept of Hard and Soft Acids & Bases. Symbiosis, electronegativity and hardness and softness | Test of Organometallic Chemistry |
| **February**  1st Week  2nd Week  3rd Week  4th Week | Bioinorganic Chemistry - Essential and trace elements in biological processes, metallo porphyrins with special reference to haemoglobin and myoglobin. Biological role of alkali and alkaline earth metal ions with special reference to Ca2+. Nitrogen fixation.  Silicones and Phosphazenes - Silicones and phosphazenes, their preparation, properties, structure and uses.  Spectroscopy-III - Electronic Spectrum - Concept of potential energy curves for bonding and anti bonding 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.  Photochemistry - Interaction of radiation with matter, difference between thermal and photochemical processes. Laws of photochemistry: Grotthus- Drapper law, Stark- Einstein law (law of photochemical equivalence) Jablonski diagram depiciting 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). | Test of Spectroscopy-III |
| **March**  1st Week  2nd Week  3rd Week  4th Week | Solutions: Dilute Solutions and Colligative Properties Ideal and non-ideal solutions, methods of expressing concentrations of solutions, activity and activity coefficient. Dilute solution, Colligative  properties, Raolut’s law, relative lowering of vapour pressure, molelcular weight determination,  Osmosis law of osmotic pressure and its measurement, determination of molecular weight from osmotic pressure. Elevation of boiling point and depression of freezing point, Thermodynamic derivation of relation between molecular weight and elevation in boiling point and depression in freezing point. Experimental methods for determining various colligative properties. Abnormal molar mass, degree of dissociation and association of solutes.  Phase Equillibrium Statement and meaning of the terms – phase component and degree of freedom, thermodynamic derivation of Gibbs phase rule, phase equilibria of one component system –Example – water and Sulpher systems. Phase equilibria of two component systems solid-liquid equilibria, simple eutectic Example Pb-Ag system, desilverisation of lead.  Heterocyclic Compounds-I - Introduction: Molecular orbital picture 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 pyrrole. | Test of Solutions and Photochemistry |
| **April**  1st Week  2nd Week  3rd Week  4th Week | 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.  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.  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.  Synthetic Polymers - Addition or chain-growth polymerization. Free radical vinyl polymerization, ionic vinyl polymerization, Ziegler-Natta polymerization and vinyl polymers. Condensation or step  growth polymerization. Polyesters, polyamides, phenol formaldehyde resins, urea formaldehyde resins, epoxy re sins and polyurethanes. Natural and synthetic rubbers.  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. | Test of Heterocyclic Compounds-I  Assignment |
| **May**  1st week  2nd week | 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 | Test of polymers  Quiz |

**LESSON PLAN (Inorganic Chemistry, Physical chemistry, Organic Chemistry)**

**B.Sc 1st (2nd Semester), Session 2023-24**

**By: Sh. Jaswant, Faculty of Chemistry, Govt. College Kosli.**

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| Month/Week/Date | Particular | Remark |
| **January**  3rd Week &  4th Week | Hydrogen Bonding & Vander Waals Forces - Hydrogen Bonding – Definition, Types, effects of hydrogen bonding on properties of substances, application Brief discussion of various types of Vander Waals Forces. Metallic Bond and Semiconductors Metallic Bond- Brief introduction to metallic bond, | Oral Test of Hydrogen bonding |
| **February**  1st Week  2nd Week  3rd Week  4th Week | Band theory of metallic bond Semiconductors- Introduction, types and applications.  s-Block-Elements 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.  Chemistry 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.  p-Block Elements Emphasis on comparative study of properties of p-block elements (including diagonal relationship and excluding methods of preparation). | Test of Hydrogen Bonding & Vander Waals Forces |
| **March**  1st Week  2nd Week  3rd Week  4th Week | Boron family (13th gp):- Diborane – properties and structure (as an example of electron – deficient compound and multicentre bonding), Borazene – chemical properties and structure Trihalides of Boron – Trends in fewis acid character structure of aluminium (III) chloride.  Carbon Family (14th group) - Catenation, p π– d π bonding (an idea), carbides, fluorocarbons, silicates structural aspects), silicons – general methods of preparations, properties and uses.  Nitrogen Family (15th group) 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 (16th group) Oxyacids of sulphur – structures and acidic strength H2O2–structure, properties and uses. Halogen Family (17th group)  Basic properties of halogen, interhalogens types properties ,hydro and oxyacids of chlorine – structure and comparison of acid strength.  Kinetics-I - Rate of reaction, rate equation. | Test of Boron and Carbon family elements |
| **April**  1st Week  2nd Week  3rd Week  4th Week | 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. Methods of determination of order of reaction.  Kinetics-II - Effect of temperature on the rate of reaction – Arrhenius equation. Theories of reaction rate – Simple collision theory for uni molecular and bimolecular collision. Transition state theory of Bimolecular reactions.  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 ionization, 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)  Electrochemistry-II - Kohlarausch’s Law, calculation of molar ionic conductance and effect of viscosity temperature & pressure on it. Application of Kohlarausch’s Law in calculation of conductance of weak electrolytes at infinite diloution. 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 action. | Test of Kinetics- I  Test of Electrochemistry- I |
| **May**  1st week  2nd week  3rd week  4th week | Alkenes - Nomenclatu re of alkenes, , mechanisms of dehydration of alcohols and dehydrohalogenation of alkyl halides,. The Saytzeff rule, Hofmann elimination, physical p roperties and relative stabilities of alkenes. Chemical reactions of alkenes mechanisms involved in hydrogenation, electrophilic and free radical additions, Markownikoff’s rule, hydroboration–oxidation, oxymercurationreduction, ozonolysis, hydration, hydroxylation and oxidation with KMnO4,  Arenes and Aromaticity - Nomenclature of benzene derivatives:. Aromatic nucleus and side chain. Aromaticity: the Huckel rule, aromatic ions, annulenes up to 10 carbon atoms, aromatic, anti - aromatic and non – aromatic compounds. Aromatic electrophilic substitution general pattern of the mechanism, mechansim of nitration, halogenation, sulphonation, and Friedel-Crafts reaction. Energy profile diagrams. Activating , deactivating subs tituents and orientation.  Dienes and Alkynes - Nomenclature and classification of dienes: isolated, conjugated and cumulated dienes. Structure of butadiene,. Chemical reactions 1,2 and 1,4 additions (Electrophilic & free radical mechanism), Diels-Alder reaction, Nomenclature, structure and bonding in alkynes. Methods of formation. Chemical reactions of alkynes, acidity of alkynes. Mechanism of electrophilic and nucleophilic addition reactions, hydroboration oxidation of alkynes  Alkyl and Aryl Halides Nomenclature and classes of alkyl halides, methods of formation, chemical reactions. Mechanisms and stereochemistry of nucleophilic substitution reactions of alkyl halides, SN2 and SN1reactions with energy profile diagrams. Methods of formation and reactions of aryl halides, The addition elimination and the elimination-addition mechanisms of nucleophilic aromatic substitution reactions. Relative reactivities of alkyl halides vs allyl, vinyl and aryl halides. | Test of Alkenes  Assignment  Quiz |