K.T.S.P. Mandal's

Sahebraoji Butte Patil Mahavidyalaya, Rajgurunagar

Department of Chemistry

Annual Teaching plan

A.Y. 2022-23

Sr. No.	**Class**	**Subject Name**
1	**F.Y.B.Sc**	1.. Physical Chemistry 2. Organic Chemistry 3.Inorganic Chemistry 4.Analytical Chemistry 3. Practical Paper
2	**S.Y.B.Sc.**	1. Physical & Analytical Chemistry 2. Organic & Inorganic Chemistry 3. Practical Paper

K.T.S.P. MANDAL'S
SAHEBRAOJI BUTTEPATIL MAHAVIDYALAYA, RAJGURUNAGAR
F. Y. B. Sc. Physical chemistry (Paper I)
Teaching plan - 2022-23 (SEM-I)
No. Of Lectures per week- 03
Name of Teacher : Prof. Kolhe M.P.

Month	Chapter	Topic Name	No.of lectures
August-September -2022	**Chemical Energetis**	Review of thermodynamics and the Laws of Thermodynamics. Important principles and definitions of thermochemistry. Concept of standard state and standard enthalpies of formations, integral and differential enthalpies of solution and dilution. Calculation of bond energy, bond dissociation energy and resonance energy from thermochemical data. Variation of enthalpy of a reaction with temperature – Kirchhoff's equation. Statement of Third Law of thermodynamics and calculation of absolute entropies of substances, problems. **Assignment No-1**	**11 L**
September-October 2022	**Chemical Equilibrium**	Introduction: Free Energy and equilibrium - Concept, Definition and significance The reaction Gibbs Energy, Exergonic and endergonic reaction. The perfect gas equilibrium, the general case of equilibrium, the relation between equilibrium constants, Molecular interpretation of equilibrium constant. The response of equilibria to conditions- response to pressure, response to temperature, Van't Haff equation, Value of K at different temperature, Problems **Assignment No-2** **Internal Exam**	**11 L**
October-November -2022	**Ionic Equilibria**	Strong, moderate and weak electrolytes, degree of ionization, factors affecting degree of ionization, ionization constant and ionic product of water. Ionization of weak acids and bases, pH scale, common ion effect. Salt hydrolysis-calculation of hydrolysis constant, degree of hydrolysis and pH for different salts. Buffer solutions. Solubility and solubility product of sparingly soluble salts– applications of solubility product principle. Learning Outcome 1. Chemical Energetics 1. Students will be able to apply thermodynamic principles to physical and chemical process. **Assignment No-3**	**14 L**

Prof. Kolhe M.P.

Department Of Chemistry

K.T.S.P. MANDAL'S
SAHEBRAOJI BUTTEPATIL MAHAVIDYALAYA,RAJGURUNAGAR
F. Y. B.Sc. Organic chemistry (Paper II)
Teaching plan - 2022-23 (SEM-I)
No. Of Lectures per week- 03
Name of Teacher : Prof. Kolhe M.P.

Month	Name of Chapter	Topic Covered	Lectures
August-2022	**Fundamentals of Organic Chemistry**	Physical Effects, Electronic Displacements: Inductive Effect, Electromeric Effect, Resonanceand Hyperconjugation. Cleavage of Bonds: Homolysis and Heterolysis. Structure, shape and reactivity of organic molecules: Nucleophiles andelectrophiles. Reactive Intermediates: Carbocations, Carbanions and free radicals. Strength of organic acids and bases: Comparativestudy with emphasis on factors affecting pK values. Aromaticity: Benzenoids and Hückel's rule. **Assignment No-1**	**09L**
September-2022	**Stereochemistry**	Introduction, classification, Interconversion of Wedge Formula, Newmann, Sawhorse and Fischer representations. Conformations with respect to ethane, butane and cyclohexane. Configuration: Geometrical - cis – trans, and E / Z Nomenclature (for upto two C=C systems). Optical isomerism Enantiomerism, Diastereomerism and Meso compounds). Concept of chirality (upto two carbonatoms).Threo and erythro; D and L; nomenclature;CIP Rules: R/ S (for upto 2 chiral carbon atoms) **Assignment No-2**	**14 L**
October-2022	**Aliphatic Hydrocar-bons**	Functional group approach for the following reactions (preparations & reactions) to be studiedin context to their structure. Alkanes: (Up to 5 Carbons) Preparation: Catalytic hydrogenation, Wurtz reaction, Kolbe's synthesis,from Grignard reagent. Reactions: Free radical Substitution: Halogenation. **Assignment No-3** **Internal Exam** Alkenes:(Up to 5 Carbons)Preparation: Elimination reactions: Dehydration of alkenes and dehydrohalogenation of alkyl halides (Saytzeff's rule); cis alkenes (Partial catalytic hydrogenation) and trans alkenes (Birch reduction). Reactions: cis-addition (alk. $KMnO_4$) and trans-addition (bromine), Addition of HX (Markownikoff's and anti-Markownikoff's addition), Hydration,	**13 L**

November-2022	**Alkanes** **Alkenes** **Alkynes**	Ozonolysis, oxymecuration-demercuration, Hydroboration-oxidation. Alkynes: (Upto 5 Carbons) Preparation: Acetylene from CaC2 and conversion into higher alkynes; by dehalogenation of tetra halides and dehydrohalogenation of vicinaldihalide Reactions: formation of metal acetylides, addition of bromine and alkaline KMnO4, ozonolysis and oxidation Learning Outcome 1. The students are expected to understand the fundamentals, principles, and recent development **Assignment No-4**	**13 L**

Prof. Kolhe M.P.

Department Of Chemistry

K.T.S.P. MANDAL'S
SAHEBRAOJI BUTTEPATIL MAHAVIDYALAYA, RAJGURUNAGAR
F. Y. B. Sc. Inorganic chemistry (Paper I)
Teaching plan - 2022-23 (SEM-II)
No. Of Lectures per week- 03 Name of Teacher : Prof. Kolhe M.P.
CH-201 : Inorganic Chemistry (2 credit , 36 L)

Month	Name of Chapter	Topic Covered	Lectures
March - 2023	**Atomic Structure**	**Origin of Quantum Mechanics:** Why study quantum mechanics? Quantum mechanics arose out of interplay of experiments and Theory Energy quantization- i) Black body radiation ii) The photoelectric effect iii) Wave particle duality-a) The particle character of electromagnetic radiation b) the wave character of particle, iv) diffraction by double slit v) atomic spectra, Review of-Bohr's theory and its limitations, Heisenberg Uncertainty principle. **Quantum mechanics:** Time independent Schrodinger equation and meaning of various terms in it, Significance of ψ and ψ^2, Schrödinger equation for hydrogen atom. Radial and angular parts of the hydogenic wavefunctions (atomic orbitals) and their variations for1*s*, 2*s*, 2*p*, 3*s*, 3*p* and 3*d* orbitals (Only graphical representation). Radial and angular nodes and their significance. Radial distribution functions and the concept of the most probable distance with special reference to 1*s* and 2*s* atomic orbitals. Significance of quantum numbers, orbital angular momentum and quantum numbers *ml* and *ms*. Shapes of *s*, *p* and *d* atomic orbitals, nodal planes. Discovery of spin, spin quantum number (*s*) and magnetic spin quantum number (*ms*). **Assignment No.1**	**14 L**
April-2023	**Periodic table and Periodicity of Elements**	Periodic table: periodic table after 150 years, review on the eve of international year of periodic table[IYPT]. Periodicity of elements: Rules for filling electrons in various orbitals, Electronic configurations of the atoms. Stability of half-filled and completely filled orbitals, concept of exchange energy. Relative energies of atomic orbitals, Anomalous electronic configurations Long form of periodic table-s, p, d and f block elements, Detailed discussion of following properties of elementswith reference to s and p block a) Effective nuclear charge, shielding or screening	**10 L**

		effect b) Atomic and ionic radii c) Crystal radii d) Covalent radii e) Ionization energies f) Electronegativity, Pauling's / electronegativity scale g) Oxidation states of elements **Assignment No.2** **Internal Exam**	
May-2023	**Chemical Bonding**	Attainment of stable electronic configurations, Types of Chemical bonds: Ionic, covalent, coordinate and metallic bonds Ionic Bond: General characteristics of ionic bonding, Types of ions, Energy considerations in ionic bonding, lattice energy and solvation energy and their importance in the context of stability and solubility of ionic compounds. Statement of Born-Landé equation for calculation of lattice energy, Born-Haber cycle and its applications, polarizing power and polarizability. Fajan's rules, ionic character in covalent compounds, bond moment, dipole moment and percentage ionic character. **Covalent bond:** Valence Bond Approach, Hybridization with suitable examples of linear, trigonal planar, square planar, tetrahedral, trigonal bipyramidal and octahedral arrangements. VSEPR theory, Assumptions, need of theory, application of theory to explain geometries of molecules such as **i) ClF_3 ii) Cl_2O iii) BrF_5 iv) XeO_3 v) $XeOF_4$** **Assignment No. 3**	**12 L**

Prof. Kolhe M.P.

Department Of Chemistry

K.T.S.P. MANDAL'S
SAHEBRAOJI BUTTEPATIL MAHAVIDYALAYA, RAJGURUNAGAR
F. Y. B. Sc. Analytical chemistry (Paper II)
Teaching plan – 2022-2023 (SEM-II)
No. Of Lectures per week- 03 Name of Teacher : Prof. Kolhe M.P.

CH- 202: Analytical Chemistry (2 Credits, 36 Lectures of 50 min.)

Month	Name of Chapter	Topic Covered	Lectures
March-2023	**Introduction to Analytical Chemistry**	What is analytical Chemistry, the analytical perspectives, Common analytical problems. **Assignment No.1**	**03 L**
April-2023	**Calculations used in Analytical Chemistry**	Some important units of measurements-SI units, distinction between mass and weight, mole,millimole and Calculations, significant figures Solution and their concentrations- Molar concentrations, Molar analytical Concentrations, Molarequilibrium concentration, percent Concentration, part per million, part per billion, part per thousand,Solution –dilatant volume ration, functions , density and specific gravity of solutions, problems Chemical Stoichiometry – Empirical and Molecular Formulas, Stoichiometric Calculations,Problems. **Assignment No.2**	**10 L**
April-2023	**Qualitative Analysis of Organic Compounds**	Types of organic compounds, characteristic tests and classifications, reactions of different functionalgroups, analysis of binary mixtures.Analysis – Detection of nitrogen, sulfur, halogen and phosphorous by Lassiagen's test. Purification of organic compounds- Introduction, recrystallization, distillation, sublimation **Assignment No.3** **Internal Exam**	**05 L**
May-2023	**Chromatographic Techniques – Paper and Thin**	**Introduction-** Introduction to chromatography, IUPAC definition of chromatography. History of Chromatography- paper chromatography, Thin	**14L**

	Layer Chromatography	Layer Chromatography, Ion exchange Chromatography, Gas permeation Chromatography, affinity chromatography, Gas chromatography, Supercritical fluid chromatography, High Performance Liquid Chromatography, Capillary electrophoresis, Classification of chromatographic methods – according to separation methods, according to development procedures. Thin Layer Chromatography: Theory and principles, outline of the method, surface adsorption and spot shape, Comparison of TLC with other forms of chromatography, adsorbents, preparation of plates, application of samples, development. **Paper Chromatography-** Origin, overview of technique, sample preparation, types of paper, solvents, equilibrium, development, sample application and detection, Identification, Quantitative methods, applications of paper chromatography **Assignment No.4**	
May-2023	**pH meter**	**Introduction,** pH meter, Glass pH electrode, combination of pH electrode-Complete Cell, Standard Buffer – reference for pH measurement, Accuracy of pH measurement, Using pH meter –How does it works? Applications of pH meter. **Assignment No.5**	**04 L**

Prof. Kolhe M.P.

Department Of Chemistry

K.T.S.P. MANDAL'S
SAHEBRAOJI BUTTEPATIL MAHAVIDYALAYA,RAJGURUNAGAR
S.Y.B.Sc. Physical & Analytical chemistry (Paper I)
Teaching plan - 2022-23 (SEM-I)
No. Of Lectures per week- 03
Name of Teacher : Prof. Kolhe M.P.

Month	Chapter	Topic Name	No.of lectures
August - 2022	**Chemical Kinetics**	Introduction to kinetics, the rates of chemical reactions – definition of rates, rate laws and rate constants, reaction order and molecularity, determination of rate law, factors affecting reaction rates, integrated rate laws – zeroth-order reactions, first-order reactions, second-order reactions (with equal and unequal initial concentration of reactants), half-life period, methods for determination order of a reactions, Arrhenius equation- temperature dependence of reaction rates, interpretation of Arrhenius parameters, reaction dynamics - collision theory and transition-state theory of bimolecular reactions, comparison of the two theories, Problems. **Assignment No.1**	**12 L**
September -2022	**Surface Chemistry**	Introduction to surface chemistry - some basic terms related to surface chemistry adsorption, adsorption materials, factors affecting adsorption, characteristics of adsorption, types of adsorption, classification of adsorption isotherms, Langmuir adsorption isotherm, Freundlich's adsorption isotherm, BET theory (only introduction), application of adsorption, problems. **Assignment No-2** **Internal Exam**	**06 L**
October-2022	**Errors in Quantitati-ve Analysis**	Introduction to errors, limitations of analytical methods, classifications of errors, accuracy, precision, minimization of errors, significant figures and computation, methods of expressing accuracy and precision: mean and standard deviations, reliability of results andnumerical. **Assignment No-4** **MCQ**	**05 L**

October-2023	**Volumetric Analysis**	Introduction to volumetric analysis, classification of reactions in volumetric analysis, standard solutions, equivalents, normalities, and oxidation numbers, preparation of standard solutions, primary and secondary standards. **Types of Volumetric Analysis methods:** **1. Neutralization titrations**: Theory of indicators, neutralization curves for strong acid strong base, weak acid strong base, weak base strong acid. Preparation of approximate 0.1 M HCl and standardization against anhydrous sodium carbonate, determination of Na_2CO_3 content in washing soda. **2. Complexometric Titrations:** Definition of complexing agent and complexometric titration, EDTA-as complexing agent (structure of EDTA and metal ion- EDTA complex), Types of EDTA titration (direct and back titration), pH adjustment and amount of indicator in EDTA titration, metal ion indicators (general properties, solochrome black – T, Patton and Reeder's indicator only), standard EDTA solution, determination of Ca(II) and Mg(II), total hardness of water. **3. Redox Titrations:** Definition of oxidizing agent, reducing agent, redox titration, $K_2Cr_2O_7$ and $KMnO_4$ as oxidizing agents, 1,10- phenanthroline as indicator in reduction titration, diphenyl amine as oxidation indicator, $KMnO_4$ as self-indicator, Standard $KMnO_4$ solution and standardization with sodium oxalate, Determination of H_2O_2. **4. Precipitation titrations:** precipitation reactions, determination of end point (formation of coloured ppt, formation of soluble coloured compound, adsorption indicator), standard $AgNO_3$ soln., standardization of $AgNO_3$ soln. – potassium chromate indicator- Mohr's titration, determination of chloride and bromide, determination of iodide. Problems based on analysis.	**13L**

Prof. Kolhe M.P.

Department Of Chemistry

K.T.S.P. MANDAL'S
SAHEBRAOJI BUTTEPATIL MAHAVIDYALAYA,RAJGURUNAGAR
S. Y. B.Sc. Physical & Analytical chemistry (Paper I)
Teaching plan - 2022-23(SEM-II)
No. Of Lectures per week- 03
Name of Teacher : Prof. Kolhe M.P.

Month	Chapter	Topic Name	No.of lectures
March -2023	**Phase equilibrium**	Introduction; definitions of phase, components and degrees of freedom of a system; stability of phases, criteria of phase equilibrium. Gibbs phase rule and its thermodynamic derivation, phase diagrams of one- component systems- water, carbon dioxide and sulphur systems, problems. **Assignment No-1**	**09 L**
April-2023	**Ideal and real solutions**	Introduction, chemical potential of liquids - ideal solutions, ideal dilute solutions - Raoult's and Henry's Law, liquid mixtures, phase diagram of binary systems : liquids - vapour pressure diagrams, temperature composition diagrams, liquid-liquid phase diagrams, solubility of partially miscible liquids-critical solution temperature, effect of impurity on partially miscible liquids, Problems. **Assignment No-2** **Internal Exam**	**09 L**
May-2023	**Conductometry**	Introduction, Electrolytic Conductance, Resistance, conductance, Ohm's law, cell constant, specific and equivalent conductance, molar conductance, variation of equivalent and specific conductance with concentrations, Kohlrausch's law and its applications, conductivity cell, conductivity meter, Whetstone Bridge, determination of cell constant, conductometric titrations (strong acid-strong base, strong acid-weak base, weak acid strong base) and Numericals. **Assignment No-3** **MCQ**	**06L**

May-2023	**Colorimetry:**	Introduction, interaction of electromagnetic radiation with matter, essential terms: radiant power, transmittance, absorbance, molar, Lamberts Law, Beer's Law, Lambert-Beer's Law, molar absorptivity, deviations from Beer's Law, Colorimeter: *Principle, Construction and components, Working*. Applications–unknown conc. By calibration curve method, Determination of unknown concentration of Fe(III) by thiocynate method, Numericals. **Assignment No-4**	**6L**
May-2023	**Column Chromatography**	Introduction, Principle of Column Chromatography, Ion Exchange Chromatography: Ion exchange resins, action of ion exchange resin (Ion exchange equilibria, Ion exchange capacity), Experimental technique, Application: i) Separation of Metal ions / non-metal ions on Ion Exchange Chromatography (*Zn(II) and Mg(II), Cl^- and Br^-),* ii) Purification of water, Adsorption Chromatography – Liquid solid chromatography: Introduction, the technique of conventional chromatography, column packing materials, Selection of solvent for adsorption chromatography, Adsorption column preparation and loading, Application – Purification of anthracene , Size Exclusion Chromatography **Assignment No- 5**	**6L**

Prof. Kolhe M.P.

Department Of Chemistry

K.T.S.P. MANDAL'S
SAHEBRAOJI BUTTEPATIL MAHAVIDYALAYA,RAJGURUNAGAR
S.Y.B.Sc. Inorganic & Organic chemistry (Paper II)
Teaching Plan- 2022-23 (SEM-I)
No. Of Lectures per week- 03
Name of Teacher : Prof. Kolhe M.P.

Month	Chapter	Topic Name	No.of lectures
August - 2022	**Molecular Orbital Theory of Covalent Bonding**	Introduction to Molecular Orbital Method (MOT) and postulates of MO theory, LCAO approximation, s-s combination of orbitals, s-p combination of orbitals, p-p combination of orbitals, p-d combination of orbitals, d-d combination of orbitals, non-bonding combination of orbitals, Rules for linear combination of atomic orbitals, example of molecular orbital treatment for homonuclear diatomic molecules: Explain following molecules with respect to MO energy level diagram, bond order and magnetism: *H_2^+ molecule ion, H_2 molecule, He_2^+ molecule ion, He_2 molecule, Li_2 molecule, Be_2 molecule, B_2 molecule, C_2 molecule, N_2 molecule, O_2 molecule, O_2^- and O_2^{2-} ion, F_2 molecule,* Heteronuclear diatomic molecules: *NO, CO, HF.* **Assignment No.1**	**13 L**
September -2022	**Introduction to Coordination Compounds**	Double salt and coordination compound, basic definitions: *coordinate bond, ligand, types of ligands, chelate, central metal ion, charge on complex ion, calculation of oxidation state of central metal ion, metal ligand ratio*; Werner's work and theory, Effective atomic number, equilibrium constant **Assignment No-2**	**05 L**
October-2022	**Aromatic Hydrocarbons**	Introduction and IUPAC nomenclature, preparation (Case benzene): from phenol, by decarboxylation, from acetylene, from benzene sulphonic acid. *Reactions* (Case benzene): Electrophilic substitution: nitration, halogenation and sulphonation. Friedel-Craft's reaction (alkylation and acylation) (up to 4 carbons on benzene). Side chain oxidation of alkyl benzenes (up to 4 carbons on benzene). **Assignment No-3** **Internal Exam**	**05 L**

October-2022	**Alkyl and Aryl Halides**	Alkyl Halides (up to 5 Carbons): Introduction and IUPAC nomenclature, Types of Nucleophilic Substitution (SN^1, SN^2 and SNi) reactions. *Preparation:* from alkenes *and* alcohols. *Reactions:* hydrolysis, nitrite & nitro formation, nitrile & isonitrile formation. Williamson's ether synthesis: Elimination vs. substitution. Aryl Halides: Introduction and IUPAC nomenclature, *Preparation:* (Chloro, bromo and iodo-benzene case): from phenol, Sandmeyer and Gattermann reactions. *Reactions (Chlorobenzene):* Aromatic nucleophilic substitution (replacement by –OH group) and effect of nitro substituent. Benzyne Mechanism: KNH_2/NH_3 (or $NaNH_2/NH_3$). Reactivity and Relative strength of C-Halogen bond in alkyl, allyl, benzyl, vinyl and aryl halides.	**7L**
November 2022	**Alcohols, Phenols and Ethers (Up to 5 Carbons)**	**Alcohols:** Introduction and IUPAC nomenclature, *Preparation:* Preparation of 1o, 2o and 3o alcohols: using Grignard reagent, ester hydrolysis, reduction of aldehydes, ketones, carboxylic acid and esters. *Reactions:* with sodium, HX (Lucas test), esterification, oxidation (with PCC, alc. KMnO4, acidic dichromate, conc. HNO_3). Oppeneauer oxidation *Diols:* (Up to 6 Carbons) oxidation of diols. Pinacol-Pinacolone rearrangement. **Phenols (Phenol case):** Introduction and IUPAC nomenclature, *Preparation:* Cumene hydroperoxide method, from diazonium salts. *Reactions:* Electrophilic substitution: Nitration, halogenation and sulphonation. Reimer-Tiemann Reaction, Gattermann Reaction, Houben– Hoesch Condensation, Schotten–Baumann Reaction. **Ethers (aliphatic and aromatic):** Cleavage of ethers with HI. **MCQ**	**6L**

Prof. Kolhe M.P.

Department Of Chemistry

K.T.S.P. MANDAL'S
SAHEBRAOJI BUTTEPATIL MAHAVIDYALAYA,RAJGURUNAGAR
S.Y.B.Sc. Organic & Inorganic chemistry (Paper II)
Teaching plan - 2022-23 (SEM-II)
No. Of Lectures per week- 03
Name of Teacher : Prof. Kolhe M.P.

Month	Chapter	Topic Name	No.of lectures
March -2023	**Isomerism in coordination complexes**	Introduction, polymerization isomerism, ionization isomerism, hydrates isomerism, linkage isomerism, coordination isomerism, coordination position isomerism, geometric isomerism, optical isomerism. **Assignment No-1**	**02L**
March -2023	**Valance Bond Theory of Coordination Compounds**	Aspects and assumptions of VBT, applications of VBT on the basis of hybridization to explain the structure and bonding in $[Ag(NH_3)_2]^+$, $[Ni(Cl_4)]^{2-}$, $[Ni(CN)_4]^{2-}$, $[Cr(H_2O_6)]^{3+}$, $[Fe(CN)_6]^{3-}$ (Inner orbital complex) and $[FeF_6]^{3-}$(outer orbital complex). Use of observed magnetic moment in deciding the geometry in complexes with C.N.4, limitations of VBT. **Assignment No-2** **Internal Exam**	**4 L**
April-2023	**Crystal Field Theory**	**Shapes of d-orbitals, Crystal field Theory (CFT): Assumptions, Application of CFT to** i) Octahedral complexes (*splitting of 'd' orbitals in Oh ligand field, effect of weak and strong ligand fields, colour absorbed and spectrochemical series, crystal splitting energy, Crystal field stabilization energy and factors affecting it, tetragonal distortion in Cu(II) complexes*) ii) Square planar complexes and iii) Tetrahedral complexes; spin only magnetic moment of Oh and Td complexes. **Assignment No-3** **MCQ**	**12L**

April-2023	**Aldehydes and Ketones (aliphatic and aromatic**)	**(Formaldehyde, acetaldehyde, acetone andbenzaldehyde)** Introduction and IUPAC nomenclature, *Preparation:* from acid chlorides and from nitriles. *Reactions* – Reaction with HCN, ROH, $NaHSO_3$, NH_2-G derivatives. Iodoform test, Aldol Condensation, Cannizzaro's reaction, Wittig reaction, Benzoin condensation, Clemenson reduction and Wolff Kishner reduction. Meerwein-Pondorff Verley reduction. **Assignment No-4**	**5 L**
April-2023	**Carboxylic acids and their derivatives**	**Carboxylic acids (aliphatic and aromatic):** Introduction and IUPAC nomenclature, *Preparation:* Acidic and Alkaline hydrolysis of esters. *Reactions:* Hell–Vohlard - Zelinsky Reaction. **Carboxylic acid derivatives (aliphatic):** (up to 5 carbons) *Preparation:* Acid chlorides, Anhydrides, Esters and Amides from acids and their inter conversion. Reaction: Comparative study of nucleophilicity of acyl derivatives. Reformatsky Reaction, Perkin condensation.	**5L**
May-2023	**Amines and Diazonium Salts**:	Amines (Aliphatic and Aromatic): Introduction and IUPAC nomenclature, *Preparation* from alkyl halides, Gabriel's Phthalimide synthesis, Hofmann Bromamide reaction. *Reactions:* Hofmann vs. Saytzeff elimination, Electrophilic substitution (Case Aniline): nitration, bromination, sulphonation. **Diazonium salts:** Preparation from aromatic amines.	**4L**
May-2023	**Stereochemistry of Cyclohexane**	Bayer's strain theory, heat of combustion of cycloalkanes, structure of cyclohexane, axial and equatorial H atoms, conformations of cycloalkane, stability of conformations of cyclohexane, methyl and t-butyl monosubstituted cyclohexane, 1,1 and 1,2 dimethyl cyclohexane and their stability**.**	**4L**

Prof. Kolhe M.P.

Department Of Chemistry