Satyaniketan’s

Adv. M. N. Deshmukh Arts, Science and Commerce College, Rajur.

Tal. Akole. Dist. Ahmednagar.

Department of Chemistry

**2016-2017**

**SYBSc-Physical Chemistry ( Prof. R. C. Muthe )**

**Sem- I**

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| **July** | **Chapter 1: Elementary Chemical Kinetics [10]**  - Introduction to Chemical kinetics,  - Molecularity and order of reaction ,  - Reaction rates,  - Rate laws,  - Rate constant and its significance,  - Integrated rate law expression and its characteristics–  - First order, second order (single reactant, two reactants  involved),  - examples of 1stand 2ndorder reaction, |
| **August** | - Pseudomolecular reactions,  - Factors affecting rate of reaction,  - measurement of rate of reaction,  - numericals.  **Chapter 2: Photochemistry [10]**  - Introduction,  - Thermal reactions and photochemical reactions, laws of  photochemistry,  - Quantum yield, measurement of quantum yield,  - Types of photochemical reactions-   * photosynthesis, * photolysis, * photocatalysis, * photosensitization, |
| **September** | -Photophysical process–   * fluorescence, * phosphorescence, * quenching, * chemiluminiscence,   -Numericals  **Chapter 3: Distribution law [04]**  -Nernst distribution law,  - Statement and thermodynamic proof for Nernst distribution law, |
| **October** | - Association and dissociation of solute in solvent,  - Application of distribution law,  - Numericals. |

**SYBSc-Physical Chemistry**

**Sem- II**

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| **December** | **Chapter 1: Free Energy and Equilibrium [12]**  -Introduction,  - Helmholtz free energy,  - Variation of Helmholtz free energy with volume and temperature,  - Helmholtz free change energy for chemical reaction,  - Gibb’s free energy,  - Variation of Gibb’s free energy with pressure and temperature,  - Gibb’s free energy change for chemical reaction,  - Free energy change for physical transitions,  - Free energy change for an ideal gas; standard free energy change, |
| **January** | - Gibb’s-Helmholtz equation,  - Properties and significance of Gibb’s free change,  - Van’t Hoff reaction isotherm,  - Thermodynamic equilibrium constants,  - Relation between Kp and Kc for gaseous reactions,  - Variation of equilibrium constant with temperature,  - Criteria forchemical equilibrium,  - Physical equilibrium,  - Clapeyron equation,  - Clausius–Clapeyron equation,  - Application of Clausius–  - Clapeyron equation,  - Numericals. |
| **February** | **Chapter 2: Solutions of Liquids in Liquids [12]**  -Types of solutions,  - Ideal solutions,  - Raoult’s law,  - Ideal and non ideal solutions,  - Henry’s law,  - Application of Henry’s law with example CS2in acetone,  - Problems based on Raoult’s law and Henry’s law,  - Vapor pressure–composition diagram of ideal and non ideal solution, |
| **March** | - Temperature composition diagram of miscible binary solutions,  - Distillation from temperature–composition diagram,  - Azeotropes, Partially immiscible liquids. |

**S. Y. B. Sc. Semester - Ist**

**Inorganic Chemistry Paper II (FIRST TERM) (Prof.H.M.Kakade)**

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| Sr. No. | Month | Topic | Periods |
| 1 | June | General principles of Metallurgy : introduction , occurance of metals, ores and minerals, types of ores, operations involved in Metallurgy- crushing, concentration, various methods of concentration ,such as –hand picking , | 03 |
| 2 | July | Gravity separation magnetic separation ,Froth floatation ,calcinations , rosting etc. Reduction – various methods of reduction such as- smelting,aluminothermic process and electrolytic reduction refining of metals various methods of refining such as poling, liquation, electrolytic and vapour phase refining (Van Arkel process) | 03 |
| 3 | August | Metallurgy of aluminium (electrometallurgy) Occurance ,physicochemical principles, extraction of Aluminium, Purification of Bauxite by Baeyer’s process, electrolysis of alumina, application of Aluminium and its alloys. | 04 |
| 4 | September | Metallurgy of Iron and steel (Pyrometallurgy) occurance,concentration , calcinations smelting,physio-chemical principles ,reactions in the Blast furnace, Wrought iron, manufacture of steel by Bessemer and L.D.pocess its composition and applications. | 08 |
| 5 | October | Corrosion and passivity ; Corrosion : definition of corrosion types of corrosion –atmospheric , Immersed. Mechanism of electrochemical corrosion factors affecting corrosion- position of metal in E.C.S. purity effect of moisture ,effectof oxygen, pH, physical state of metal, methods of protection of metal from corrosion- alloy formation, making metal cathodic ,controlling external condition ,coating- galvanizing ,tinning,electroplating metal cladding organic coating  Passivity: definition theories of passivity i) oxide film theory ii) gaseous film theory iii)physical film theory catalytic theory allotropic theory ,electrochemical theory. | 06 |

**S. Y. B. Sc. Semester - Ist**

**Inorganic Chemistry Paper II (SECOND TERM) (Prof.H.M.Kakade)**

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| Sr. No. | Month | Topic | Periods |
| 1 | December | Chemistry of d- block elements : position of d-block in periodic table, electronic configuration , trends in properties of these elements w.r.t. a) size of atoms and ions b) reactivity c) catalytic activity d) oxidation state e) complex formation ability f) colour g) magnetic properties h) non-stoichiometry i) density, melting and boiling point. | 06 |
| 2 | January | Organometallic chemistry :definition of organometallic compounds and organometallic chemistry,; CO as a pi acid donar ligand, binary metal carbonyls, methods of synthesis ,a) direct reaction b) reductive carbonylation c) photolysis and thermolysis. Molecular and electronic structures,  (18 electronic rule) of metal carbonyls. Homogeneous catalysis- Hydroformulation (oxo process 0 and wacker process. | 06 |
| 3 | February | Acids, Bases and Solvents  Defination of Acids and bases, Arrhenius theory, lowry- Bronsted theory, Lewis concept, Lux- Flood theory, streght of acids and bases, trends in the strength of hydracids and oxyacids, properties of solvents, M.P.-B.P range .dipole moment, dielectric constant ,Lewis acid-base character and types of solvents | 06 |
| 4 | March | Chemical toxicology :  i) Toxic chemicals in the environment ii) Impact of toxic chemistry on enzymes iii) biochemical effect of Arsenic ,Cadmium, Lead, Mercury iv) biochemical methylation. | 06 |

**SYBSc- Organic Chemistry ( Prof. M.S.Salunke )**

**Paper II CH-212**

**Semester –I Section I :**

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| **Month** | **Chapters** | **Lectures** |
| **June** | **TERM I**  **Chapter 1: Stereoisomerism**  1.Introduction to optical isomerism:  2.Chirality, optical activity and polarimetry, | **(02)** |
| **July** | 3.enantiomers, absolute configuration,  4.R/S system nomenclature with wedge  5.Fischer representation  of two chiral centres,  6.erythro, threo,  7.meso-diastereomers with R/S configuration.  8.Stereoisomerism Baeye’rs strain theory, heat of combustion, cycloalkanes, factors  9.affecting the stability of conformation, Conformation of 10.cyclohexane - equatorial and axial  bonds,  Test No 1, Home Work No 1, Home Assignment No 1. | **(08)** |
| **August** | 11.Monosubstituted cyclohexane stability with -CH3 and -C(CH3)3 substitutes.  12.Structures of geometrical isomers of dimetylcyclohexane only.  **Chapter 2: Organic reaction Mechanism**  1.Introduction,  2. Types of reagents–electrophile, nucleophile and free radical.  3.Types of organic reactions: Addition, Elimination (b-elimination 4.Hofmann elimination, substitution  5.Aliphatic electrophilic and nucleophilic, aromatic electrophilic  6.Rearrangement.  Test No 2, Home Work No 2, Home Assignment No 2. | **(02)**  **(06)** |
| **September** | 7.Mechanism: (i) Aldol condensation  8.(ii) Markovnikov  9.Anti-Markovnikov additionreaction  10.(iii) Saytzeff and Hoffmann elimination  11. (iv) SN1 and SN2 reactions  12.(v) Hofmann rearrangement.  Group Disscustion, PPT Presentation | **(06)** |
| **October** | 12.(v) Hofmann rearrangement.  With example  Topic Soulving of Problem | **(02)** |
| **December** | **TERM II**  **Paper 4: CH-222**  **Section – I**  **Organic Chemistry**  **Chapter 1: Reagents in Organic Synthesis**  1.Catalytic hydrogenation including  2.liquid phase hydrogenation,  3.Birch reduction, NaBH4,  4.LiAlH4, Sn/HCl  5.Oxidation reagents: KMnO4,  6.K2Cr2O7, Jones reagent,  7.PCC, Per acids,  8.OsO4.  Test No 1, Home Work No 1, Home Assignment No 1. | **[8]** |
| **January** | **Chapter 3: Introduction of Bio-molecules**  1.Carbohydrates: Definition,  2.classification,  3.reaction of monosaccharide (glucose)- oxidation,  reduction,  4.osazone and ester formation,  5.isomerization,  6.Killiani-Fischer synthesis and Ruff degradation,  7. Configuration of D/L configuration of (+) Glucose, | **(08)** |
| **February** | 8.Fischer-Haworth andchair formulae,  Test No 2, Home Work No 2, Home Assignment No 2.  9. Brief account of disaccharides: Sucrose, cellobiose, maltose and lactose.  10.Polysaccharides: Starch, cellulose and glycogen.  11.Amino acids: Fischer projection, relative configuration, classification, structures and  12.Reactions of amino acids, Properties and chemical reactions with amino and carboxylic group.  13.Proteins: Formation of Peptide linkage, | **(02)** |
| **March** | 14.a-helical conformation,  15.b-plated structure,  16.primary, secondary, tertiary and quaternary structure of proteins.  17.Group Disscustion,  18PPT Presentation  19.Question Paper solving and Practice of problem based on chapters | **(03)** |

**Analytical Chemistry Paper I Section II (Dr. V. N. Gite)**

Semester – Ist

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| Sr. No. | Month | Topic | Periods |
| 1 | June | Introduction to Analytical Chemistry | 04 |
| 2 | July | Errors in Quantitative Analysis  Inorganic Qualitative Analysis | 06  02 |
| 3 | August | Inorganic Qualitative Analysis  Analysis of Organic Compounds | 06  02 |
| 4 | September | Analysis of Organic Compounds | 08 |

**Semester – IInd**

**Analytical Chemistry**

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| Sr. No. | Month | Topic | Periods |
| 1 | December | Introduction to Volumetric Analysis | 02 |
| 2 | January | Introduction to Volumetric Analysis  Non Instrumental Volumetric Analysis | 06  02 |
| 3 | February | Non Instrumental Volumetric Analysis | 08 |
| 4 | March | Non Instrumental Volumetric Analysis | 08 |