

DEPARTMENT OF CHEMISTRY ACADEMIC PLAN 2021-2022

ODD SEMESTER

Week		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Name	Sem/ paper	14/06/2021- 19/06/2021	21/06/2021- 26/06/2021	28/06/2021- 3/7/2021	5/7/2021-10/7/2021	12/7/2021- 17/07/2021	19/07/2021- 24/07/2021	26/07/2021- 31/07/2021-	2/8/2021-7/8/2021	9/8/2021- 14/08/2021	16/08/2021- 21/08/2021	23/08/2021- 28/08/2021	30/08/2021 4/9/2021	6/9/2021-12/9/2021	13/09/2021- 18/09/2021	20/09/2021- 26/09/2021
<i>Ms. Madhavi Kate</i>	Sem III Paper II Theory	Comparative Chemistry of main group elements introduction, trends in properties like ionization energy atomic and non-ionic radii,	Comparative Chemistry of main group elements Trends in properties : ionization energy electronegativity, metallic and non-metallic character	Comparative Chemistry of main group element trends in properties : oxidation state, inert pair effect	Comparative Chemistry of main group elements Trends in properties : covalency, catenation, allotropy	Chemistry of Boron compounds Boron hydrides: introduction, preparation and properties	Chemistry of Boron compounds introduction to electron deficient compounds : structure and bonding in them	Chemistry of Si & Ge: Compounds of silicon: silicates and zeolites	Chemistry of Si & Ge compounds of silicon : glass and silicones: Diff types, classification, applications	Chemistry of Si & Ge Preparation of extra pure Si/Ge. n type and p type semiconductors	Chemistry of N & O FAMILY oxides and oxyacids of nitrogen : diff oxides, oxyacids, names structure, oxidation state applications	Chemistry of N & O FAMILY oxides and oxyacids of sulphur : diff oxides, oxyacids, names structure, oxidation state application	Chemistry of N & O FAMILY Hydrides of N & O, trends in properties of hydrides based on hydrogen bonding			
	Sem V Paper II Theory.	metallic bonding: Introduction & Concept of band theory	metallic bonding: explain properties of conductors, semiconductors on the basis of band theory	metallic : bonding Intrinsic conductivity, extrinsic conductivity: n type and p type of conductivity	molecular symmetry: importance of molecular symmetry, symmetry elements, symmetry operation	molecular symmetry: symmetry elements 1) centre of symmetry 2) plane of symmetry 3) improper rotational axis of symmetry	molecular symmetry: elements of symmetry: 3) plane of symmetry 4) improper rotational axis 5) identity	molecular symmetry: concept of point group and study of different point groups : 1) C _{2v} 2) C _{3v} 3) C _{2h}	molecular symmetry: Point groups 3) D _{3h} 4) D _{∞h} C _{∞v}	MOT for polyatomic molecules : Recapitulation of MOT for diatomic molecules : homonuclear and heteronuclear	MOT for polyatomic molecules: application of MOT to polyatomic molecules concept of group orbitals and application of SALCs to draw MO diagram for Be H ₂	MOT for polyatomic molecules Molecular orbital diagram for H ₂ O and H ₃ ⁺ molecules	MOT for polyatomic molecules Walsh correlation diagram			
	Sem V Pract		Titrimetry experiment 1 Estimation of Zinc complexometrically using Eriochrome Black T indicator. Instructions	Titrimetry experiment 2 Estimation of Nickel complexometrically using murexide indicator	Titrimetry experiment 3 Estimation of copper complexometrically using Fast sulphone black F	Inorganic preparation 1 Preparation of Ferric Alum and estimation of Iron by complexometry. ration 1	Inorganic preparation 2) Preparation of Chloropentaamine cobalt (III) chloride and estimation of cobalt by complexometry.	Inorganic preparation i) Preparation of tris(ethylene diamine) nickel (II) sulphate and estimation of nickel by complexometry 3								
<i>Dr. Bright Phillip</i>	Sem III Paper II Theory	Mechanism of organic reactions Types of different intermediates, examples	Carbocations: Different types of carbocations SN1 reaction	Electrophilic addition across an olefinic double bond	Elimination reaction, Wagner-Meerwein rearrangement	Carbanions Concept of carbon acid, properties and reactions	Reactions of Grignard reagents, Aldol reaction	Carbon radicals properties preparation and reactions	Carbenes Generation of carbenes, Structure, stability and reactions, Keto-enol tautomerism	Aromatic Electrophilic Substitution Reaction Huckel's Rule of aromaticity.	Types of different compounds like aromatic, anti-aromatic non-aromatic compounds.	General mechanism of aromatic electrophilic substitution reaction	Activated and deactivated aromatic rings. Effect of electron donating and electron	Revision class Test		
	Sem V Paper II Theory.	Criteria for ideal organic synthesis	Synthesis of furans, pyrroles, and thiophenes	Retro synthesis Disconnection, Synthons, SE, FGI, TM, Defenitions	Examples Acetophenone, t-butyl alcohol, Crotonaldehyde, Cyclohexene	Cyclohexene-3-one, Benzoin, Cyclopentyl methanal, Benzyl benzoate	Carbohydrates Introduction: Classification, Sources	Structures of monosaccharides Fischer projection Haworth formula Furanose and pyranose forms	Interconversion of glucose and fructose	Anomers and epimers, examples	Chain lengthening and shortening reaction	Reactions of D-glucose and D-fructose	Applications of carbohydrates.	Revision class Test		
	Sem V Pract.	Organic Mixture Instructions	Organic Spotting Instructions	Organic Mixture No 1	Organic Mixture No 2	Organic Mixture No 3	Revision	Organic Mixture No 4	Organic Mixture No 5	Organic Mixture No 6	Revision	Viva Questions	Journal Submission			
<i>Dr. Chitra Kamath</i>	Sem III Paper II Module 2 Theory	asymmetric carbon atom, enantiomers, stereogenic centre, configuration	stereoisomerism (Geometrical & optical).	Representation of configuration by flying wedge formula & projection formula- Fischer,	Cahn-Ingold-Prelog (CIP) Rules of assigning absolute configuration (R and S) to stereogenic centres	Assigning absolute configuration to molecules having maximum two chiral carbon atoms.	enantiomers, diastereomers and racemic mixture and their properties	threo, erythro and meso isomers	Resolution of enantiomers: chemical and chromatographic	Diastereomers (geometrical isomerism) due to restricted rotation around carbon-carbon double bond	E and Z stereodescriptors to geometrical isomers	Diastereomers of disubstituted cyclopropanes	Diastereomers of disubstituted cyclobutanes	Revision		
	Sem V Paper III Module 1 Theory	addition of HX to butadiene; sulfonation of naphthalene.	Nucleophilicity / electrophilicity Vs Basicity / acidity.	Reaction of aldehydes and ketones with primary amines.	Acid catalysed esterification of carboxylic acids	base promoted hydrolysis of esters.	Pinacol, Benzilic acid.	Beckmann, Hofmann.	Bicyclic compounds- spiro, fused, and bridged (upto 11 carbon atoms)-saturated an	Biphenyls.	Cummulenes upto 3 double bonds, Monocyclic (5 and 6 membered) aromatic and	IUPAC of Heterocyclic compound	IUPAC of Heterocyclic compounds Contd	Revision		
	Sem V DSE2.	Motivation in Research,	Types of Research,	Significance of research	Research Approaches	Research Methods versus Methodology,	Research and Scientific Method Research Design	Importance of Knowing How Research is Done,	Research Process,	Criteria of Good Research	Ethical Issues: Plagiarism	Restriction to Plagiarism	concept of patents and trademarks	Revision		
	Sem V Pract.	Organic Mixture Instructions	Organic Spotting Instructions	Organic Mixture No1	Organic Mixture No2	Organic Mixture No3	Revision	Organic Mixture No4	Organic Mixture No 5	Organic Mixture No6	Revision	Viva Questions	Journal Submission			

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Dr. Sugandha Shetye	Sem III Paper I Module I	Introduction Photophysical phenomena- Jablonskii diagram	Laws of Photochemistry	Photon and Einstein - Numericals	Quantum Yield - Numericals	Mechanism of photochemical reactions	types of photosensitization, Chemiluminescence and Bioluminescence reactions	Photochemical Smog	Solar Cells	Introduction to UV Visible Spectroscopy	Beer Lamberts Law - Derivations, Limitations of the law	Numericals on Beer lamerts law	Introduction to Spectrophotometer and colourimetric method	Revision of Photochemistry /UV-Visible Spectroscopy numerical problems		
	Sem V Paper I Module 3	Nuclear radiations - Properties	Detectors - Principles of Radioactivity detection, Units of radioactivity	GM Counter	SCintillation counts	Kinetics of radioactivity decay,	Determination Half life , Numericals , C-dating	,Applications of tracers,Nuclear transmutations	Artificial Radioactivity	Q value and threshold energy numericals	Nuclear fission ,Numericals	Fissile and fertile materials , Chain reaction examples	Critical mass,Multiplication factor ,	Nuclear reactor - components and functions.		
	Sem V SEC I module I	Introduction - Chemical Industry ,Consumer products -Global and National Market	Research-chemical molecules ,Green Routes for Synthesis,Atom Economy	Process Development	Workshop on Material balance	Technology Transfer	Manufacturing operations	Financial aspects	Financial Aspects - Cost and price concept	Marketing Strategy	Digital Aspects of Marketing	Sales Process	How to prepare Project report Instructions	Project report Instructions		
	Sem V SEC I module2	Supply Chain	Supply Chain	End To End Supply Chain management	Introduction to IPR	Copyright	Market research	Introduction To patent Search	Integrated Marketing	Digital Aspects of Marketing	Case studies in Marketing	Case studies in Marketing	Marketing Concepts assignment discussion			
	DSE 2 Prac	Reading a research paper -	Presentations on Reading research paper	Reading a review paper -Cocoa	Reading a review paper -Cocoa presentations	Introduction to IPR	Introduction To patent Search - presentations	Writing a Research Proposal instructions	Writing a Research Proposal- individual Group discussion	evaluation of proposals	evaluation of proposals					
	Sem V Pract	Redox titration - Practical	Physical Chem Practical - Viscometry													
	Sem III Paper I Module 2	Electronic and Electrolytic Conductors, Definitions of different terms	Variation of Molar Conductance with Concentration	Debye Huckel Theory of strong electrolytes	Kohlrausch's Law of Independent migration of ions	First Application of Kohlrausch's Law of Independent migration of ions and Numericals	Second application of Kohlrausch's Law of Independent migration of ions and Numericals	Third application of Kohlrausch's Law of Independent migration of ions and Numericals	Transport Number or Transference Number	Dependence of Transport number on velocity of an ion	Hittorf's Rule - Cations and Anions moving with equal speed	Hittorf's Rule - Cations and Anions moving with unequal speed	Moving Boundary Method- Determination of Transport Number			
	Sem V Paper I Module 2	Activity, ionic Strength of Solutions, Numericals	Debye Huckel limiting Law and numericals	Classification of Electrochemical cells	Chemical cells without Transference	Electrode Concentration Cells without Transference-Reversible to cations and anions	Electrolyte Concentration Cells without Transference-Reversible to cations and anions	Electrolyte Concentration Cells with Transference-Reversible to cations and anions	Liquid Junction Potential and Factors affecting Liquid Junction Potential	Applied Electrochemistry- Polarisation, Decomposition Potential	Overvoltage, Relationship between Overvoltage and Decomposition potential	Tafel Equation and Simultaneous deposition of metals	Corrosion and its prevention, Super conductors			
Sem V Pract.	Chemical Kinetics	Chemical Kinetics	Viscometry	Viscometry	Potentiometric Titration	Potentiometric Titration	pHmetry-Isoelectric point determination	pHmetry-Isoelectric point determination	Colorimetry-Fluoride Content determination	Colorimetry-Fluoride Content determination	pHmetry-Determination of Vitamin c Content	pHmetry-Determination of Vitamin c Content				
Dr. Nishamol Kanat	Sem III Paper III Module III	Introduction to Chemical Industry	Basic terms-1	Basic terms-2	Basic terms-3	Manufacturing processes-1 Phenol	Manufacturing processes-2 DDB	Manufacturing processes-3 DDBS	Preparation of dye intermediates and dyes	Preparation of perfumes	Preparation of natural products	Preparation of artificial sweeteners	Preparation of drugs, nutraceuticals and flavors			
	Sem V Paper III Module III	Introduction to stereochemistry	Elements of symmetry	Cummulenes	Biphenyls	Spiranes	Strains in cycloalkanes	Conformations of cyclohexane	Conformations of monosubstituted cyclohexane	Conformations of di substituted cyclohexane	Conformations of di substituted cyclohexane	Stereoselectivity and stereospecificity	Enantiotopicity and distereotopicity			
	Sem V DSE I Pract	Introduction and instructions	Preparation of acetyl salicylic acid	Preparation of para nitroacetanilide	Preparation of para nitroaniline	Revision	Estimation of ibuprofen	Estimation of tincture iodine	Revision	Pharmacopeia information	Industrial visit- virtual	Viva questions answers	Record Book submission			
Dr. Yamita Kulkarni	Sem III Paper III Module I	Introduction to Titrimetric Analysis	Titration of SA v/s SB	Titration of SB v/s SA	Titration of WA v/s SB	Titration of WA v/s WB	Equivalence point WA v/s SB	Redox Titration	Theory of Redox Titration	Titration of Fe +2 v/s Ce +4	Instrumental methods of Analysis	Potentiometric Titrations	Conductometric Titrations			
	Sem V Paper I Mod I	Introduction to Chemical Thermodynamics	Gibbs and Helmholtz free energy	Gibbs and Helmholtz equation	Numericals	Partial Molal Properties	Gibbs-Duhem equation	Fugacity and activity	Variation of chemical potential with T & P	Introduction to chemical kinetics	Arrhenius equation	Collision Theory	Transition State theory			
	Sem V Pract	Conductometric Titration of SA v/s SB	Conductometric Titration of SA v/s SB	Conductometric Titration of acid Mixtur	Conductometric Titration of acid Mixtur	Ostwald's Dilution law	Ostwald's Dilution law	pH metry	pH metry	Colorimetry	Colorimetry	Repetition	Repetition			
Dr. Yogesh Ghalasasi	Sem III Paper II Mod III	Gravimetric analysis	Gravimetric analysis	Gravimetric analysis	Gravimetric analysis	Gravimetric analysis	Precipitation titration	Mohrs method	Volhards method	Complexometric titrations	Role of EDTA as an complexing agent	Types of EDTA titration	Revision			
	Sem V Paper IV Mod II	Redox titrations	Redox titrations end point	Redox titrations types	Redox titrations applications	Non aqueous titrations	Non aqueous titrations types	Non aqueous titration application	Introduction to chromatography	Therory of Chromatography	TLC	Paper chromatography	Revision			
	Sem V DSE 2 Mod II	Types of data collection	Types of data collection	Types of data collection	methods of classification of data	methods of statistical treatment of data	Primary methods of data distribution	methods of dispersion	measures of central tendency	multivariate analysis	multivariate analysis	Revision of statistical methods	Revision			
	Sem V Pract	Physical experiment intructions	Physical experiment no 1	Physical experiment no2	Physical experiment no3	Physical experiment no 4	Physical experiment no 5	Revision experiment	Revision	Revision						

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Dr. Saurabh Shetye	Sem V DSE 1 Mod III	Antibiotics	Antibiotics	Antimalarials	Antimalarials	Antimalarials	Anthelmintics	Anthelmintics	Antiamoebic Drugs	Antitubercular and Antileprotic Drugs	Antitubercular and Antileprotic Drugs	Anti-Neoplastic Drugs	Anti-Neoplastic Drugs	Anti HIV Drugs		
	Sem V DSE 2 Mod III	Safe working procedure	Protective apparel	First aid measure in lab	MSDS	Safe storage and use of hazardous chemicals	procedures for working with gases	Safe disposal of waste chemicals	recovery, recycling and reuse of laboratory chemicals	procedure for laboratory disposal of explosives	identification, verification and segregation of laboratory waste,	disposal of chemicals in the sanitary sewer system	incineration and transportation of hazardous chemicals.			
	Sem III Prac SY B	Nitration of Nitrobenzene	Hydrolysis of Ester	Picrate Formation	2,4-DNP	N-Acetylation of Amine	Osazone Formation									
	Sem III Prac SY C	Nitration of Nitrobenzene	Hydrolysis of Ester	Picrate Formation	2,4-DNP	N-Acetylation of Amine	Osazone Formation									
Dr. Trupti Tawde	Sem I Paper II Mod II										Aliphatic Hydrocarbons 2.1 Alkane - Introduction, Nomenclature, Natural Resources and Applications	2.1 Alkane Methods of Preparation	2.1 Alkane Chemical Reaction	2.1 Alkane Mechanism of halogenation		
	Sem III Prac SY B	Nitration of Nitrobenzene	Hydrolysis of Ester	Picrate Formation	2,4-DNP	N-Acetylation of Amine	Osazone Formation									
	Sem III Prac SY C	Nitration of Nitrobenzene	Hydrolysis of Ester	Picrate Formation	2,4-DNP	N-Acetylation of Amine	Osazone Formation									
Dr. Rohit S Chauhan	Sem V Paper II Mod III	The shapes of f-orbitals,	The position of f-block elements in the periodic table, Basic property	Electronic configuration of 4f and 5f block	Comparison between lanthanides and actinides and transition elements	lanthanide contraction,	oxidation states,	magnetic properties,	colour and spectra (f-f transition spectra) and	complex formation (types and stereochemistry of the complexes)	Occurrence, extraction and separation of lanthanides	ion- exchange (ii) solvent extraction methods	ion- exchange (ii) solvent extraction methods and applications			
	Sem I Paper I Mod II								The need for classification of elements Doberiner's triads,	Law of octaves, Mendeleev's periodic table.	Modern periodic Law, cause of periodicity, Long form of periodic table.	IUPAC nomenclature for elements with Z > 100 Division of periodic table into s, p, d & f blocks.	Periodic trends in properties. 1) Valency , 2) Atomic volume, 3) Ionization energy, 4) Electron affinity,	Effective nuclear charge and shielding effect, 2) Slater's rule (problems expected). Determination of Electronegativity using : 1) Mullikan's scale, 2) Pauling's scale.		
	Sem I Pract	Titrimetry experiment 1	Titrimetry experiment 1	Titrimetry experiment 2	Titrimetry experiment 2	Titrimetry experiment 3	Titrimetry experiment 3	Inorganic preparation1	Inorganic preparation1	Inorganic preparation2	Inorganic preparation2	Inorganic preparation3	Inorganic preparation3			
Dr. Aniket Pawnoji	Sem III Paper ii mod 2	Introduction, definition, position in the periodic table, electronic configuration and classification	Physical properties	Variable oxidation state, Colour and magnetic properties,	Catalytic activity and applications	Basic concepts	Terms involved in coordination chemistry, complex ion, ligands	Types of Ligands	Chelating ligands	Werner's theory of coordination compounds and EAN	Structural Isomerism	Stereo isomerism	Optical isomerism	Applications of coordination compounds		
	Sem V Paper II Mod 2	Basic tenets of Crystal Field Theory	2 Splitting of d orbitals in octahedral	Crystal field splitting energy	factors affecting the magnitude of Δ_o	calculation of CFSE for octahedral and tetrahedral complexes	Effect of Crystal field splitting on (i) ionic radius (ii) Lattice energy.	Experimental evidence for co- valence in co- ordination compounds	Merits and Demerits of CFT .	Application to octahedral complexes	Effect of π - bonding on ligand field splitting parameter	electronic configuration and electronic states, Term symbols	spin orbit coupling or Russell - Saunders coupling.	Terms and micro- stats for transition metal atoms/ions.		
	Sem III Pract.			Semi-micro Analysis - 1	Semi-micro Analysis - 1	Semi-micro Analysis - 2	Semi-micro Analysis - 3	Semi-micro Analysis - 4		Semi-micro Analysis - 5	Semi-micro Analysis - 6	Inorganic Preparation - 1	Inorganic Preparation - 2	Journal Submission and Correction		
Dr. Nanabhau Karanjule	Sem I Paper II Mod 2										Introduction, Functional groups in organic chemistry	Rules of IUPAC Nomenclature	Nomenclature of aliphatic compounds (examples)	Nomenclature of bifunctional compounds (examples)		
	Sem I Pract DIV A C											Organic Spotting No 1	Organic Spotting No 1	Organic Spotting No 2		
	Sem I Pract DIV D E											Organic Spotting No 1	Organic Spotting No 1	Organic Spotting No 2		

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<i>Mr. Sarang Gujar</i>	Sem I Paper I Mod 2										Need for periodic classification of elements, Division of periodic table into blocks, IUPAC nomenclature for elements with Z > 100	Periodic trends - Valency, atomic volume, atomic size, ionization energy	Periodic trends - electron affinity, melting & boiling point, electronegativity, electropositivity and metallic character	Effective nuclear charge and shielding effect Slater's rule and problems based on Slater's rule Determination of electronegativity - Mulliken and Pauling scales		
	Sem I Pract DIV A C											Organic Spotting No1	Organic Spotting No1	Organic Spotting No2		
	Sem I Pract DIV D E											Organic Spotting No1	Organic Spotting No1	Organic Spotting No2		
<i>Ms. Shital Somawane</i>	Sem Paper IV Mod 3	Basic introduction of optical methods.	Introduction of flame photometry concept.	Instrumentation & Application of flame photometry	General introduction of AAS .	Instrumentation & Application of AAS	Introduction of fluorescence spectroscopy	Brief introduction of Jablonski diagram	Introduction of Phosphorescence spectroscopy	Application of molecular and phosphorescence spectroscopy	Introduction of turbidimetry and Nephelometry	Application of turbidimetry and Nephelometry	Practice all the concepts and doubt solving session.			
	Sem V Pract	Estimation of K ₂ S ₂ O ₈ in the given solution.	Estimation of K ₂ S ₂ O ₈ in the given solution.	Determination of glucose in honey by Willstatter's method.	Determination of glucose in honey by Willstatter's method.	Determination of Aluminum by EDTA titration (Back titration). Detection of hardness of water.	Determination of Aluminum by EDTA titration (Back titration). Detection of hardness of water.	Determination of percentage assay of Mebendazole drug tablet by non aqueous titration.	Determination of percentage assay of Mebendazole drug tablet by non aqueous titration.	Detection of fluoride content in a tooth paste by colorimetry	Detection of fluoride content in a tooth paste by colorimetry	Detection of Vitamin C in a tablet by pH metry	Detection of Vitamin C in a tablet by pH metry			
	Sem I Pract DIV A C											Organic Spotting No1	Organic Spotting No1	Organic Spotting No2		
	Sem I Pract DIV D, E											Organic Spotting No1	Organic Spotting No1	Organic Spotting No2		
<i>Dr. Madhu Joshi</i>	Sem. I Paper I Mod 1	Introduction to gaseous behaviour of real gases	Deviations from ideal gas behaviour, Boyle temperature, compressibility factor, Z	Causes of deviation from ideal behaviour	Van der Waals equation	Effect of temperature on Liquefaction of gases	Importance of critical constants	Joule Thomson effect and inversion temperature	Linde's Experiment for liquefaction of gases.	Introduction to liquid state	Determination of surface tension	Surface active agents, viscosity	Numerical problems on surface tension and viscosity measurements			
<i>Mr. Rahul Hegishte</i>	Sem. I Paper I Mod 1	Introduction to gaseous behaviour of real gases	Deviations from ideal gas behaviour, Boyle temperature, compressibility factor, Z	Causes of deviation from ideal behaviour	Van der Waals equation	Effect of temperature on Liquefaction of gases	Importance of critical constants	Joule Thomson effect and inversion temperature	Linde's Experiment for liquefaction of gases.	Introduction to liquid state	Determination of surface tension	Surface active agents, viscosity	Numerical problems on surface tension and viscosity measurements			
	Sem I Pract DIV A C											Organic Spotting No1	Organic Spotting No1	Organic Spotting No 2		
	Sem I Pract DIV D, E											Organic Spotting No1	Organic Spotting No1	Organic Spotting No 2		