

Govt.College,Ropar

Distribution Of Syllabus & Lesson Plan/Teaching Plan (2021-22)

Name of Department: Chemistry

Class: B.Sc-1st Yr (Sem-1)

Paper: A (Inorganic Chemistry)

Two weeks left for MST tentative and one week for revision /queries for MST

| TIME PERIOD | TOPICS TO BE COVERED |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Week 1 | Atomic Structure Idea of De Broglie matter waves, Heisenberg uncertainty principal, atomic orbitals, Schrodinger wave equation, Significance of ψ and ψ^2 quantum numbers |
| Week 2 | radial and angular wave functions and probability distribution curve shapes of s, p, d orbitals. Aufbau and Pauli exclusion principles, Hund's multiplicity rule |
| Week 3 | Electronic configurations of the elements and ions. Periodic Properties Position of element in the periodic table effective nuclear charge and its calculations. |
| Week 4 | trends in periodic table and applications in predicting and explaining the chemical behaviour |
| Week 5 | Chemistry of Noble gases Chemical properties of the noble gases, chemistry of xenon, |
| Week 6 | structure and bonding in xenon compounds. |
| Week 7 | Chemical Bonding - I Covalent Bond-Valence bond theory and its limitations, directional characteristics of covalent bond. |
| Week 8 | various types of hybridization and shapes of simple inorganic molecules and ions. BeF_2 , BF_3 , CH_4 , PF_5 , SF_6 , IF_7 , SnCl_4 , XeF_4 , BF_4^- , PF_6^- , Snell . |
| Week 9 | Chemical Bonding - II Valence shell electron pair repulsion (VSEPR) theory to NH_3 , H_3O^+ , SF_4 , ClF_3 , ICl_2 , and H_2O |
| Week 10 | MO theory, homonuclear (elements and ions of 1st and 2nd row), and heteronuclear (BO , CN , CO^+ , NO^+ , CO , CN), diatomic molecules |
| Week 11 | multicenter bonding in electron deficient molecule (Boranes) percentage ionic character from dipole moment and electronegativity difference |
| Week 12 | Revision and class Test |

Julanda Singh

Principal
Govt. College, ROPAR

Ajay Kumar
(AJAY KUMAR)

Head Of Deptt. of Chemistry

Govt.College,Ropar

Distribution Of Syllabus & Lesson Plan/Teaching Plan (2021-22)

Name of Department: Chemistry

Class: B.Sc-Ist Yr (Sem-I)

Paper: B (Organic Chemistry)

Two weeks left for MST tentative and one week for revision /queries for MST

| TIME PERIOD | TOPICS TO BE COVERED |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Week 1 | Structure and Bonding Hybridization, bond lengths and bond angles, bond energy, localized and delocalized chemical bond |
| Week 2 | Van der Waals interactions, resonance, hyperconjugation, aromaticity, inductive and field effects, hydrogen bonding |
| Week 3 | Mechanism of Organic Reactions Curved arrow notation, drawing electron movements with half-headed and double-headed arrows, |
| Week 4 | homolytic and heterolytic bond breaking. Types of reagents of organic reaction. Energy considerations Reactive intermediates-ocations, carbanions, free radicals, carbenes, arynes and nitrenes (with examples). |
| Week 5 | Assigning formal charges on intermediates and other ionic species |
| Week 6 | Methods of determination of reaction mechanism (product analysis, intermediates, isotope effect, kinetic and stereo-chemical studies). |
| Week 7 | Alkanes Isomerism in alkanes, sources, methods of formation (with special reference to Wurtz reaction, Kolbe reaction, Corey-House reaction and decarboxylation of carboxylic acids), |
| Week 8 | physical properties and Mechanism of free radical halogenation of alkanes: orientation, reactivity and selectivity. |
| Week 9 | Cyclo alkanes Cycloalkanes--nomenclature, chemical reactions, Baeyer's strain theory and its limitations. Ring strain in small rings (cyclopropane and cyclobutane), theory of strain less rings. The case of cyclopropane ring: banana bonds. |
| Week 10 | Dienes And Alkynes Nomenclature and classification of dienes: isolated, conjugated and cumulated dienes. Structure of allenes and butadiene, methods of formation, polymerization. Chemical reactions-1,2 and 1,4 additions, Diels-Alder reaction. |
| Week 11 | 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. metal-catalyzed reactions, oxidation and polymerization |
| Week 1 | Structure and Bonding Hybridization, bond lengths and bond angles, bond energy, localized and delocalized chemical bond |
| Week 2 | Van der Waals interactions, resonance, hyperconjugation, aromaticity, inductive and field effects, hydrogen bonding |

Principal

ROPAR

(AJAY KUMAR)

Head of Dept. Of Chemistry

Govt.College, Ropar

Distribution Of Syllabus & Lesson Plan/Teaching Plan (2021-22)

Name Of Department: Chemistry

Class: B.Sc-1st Yr (Sem-1)

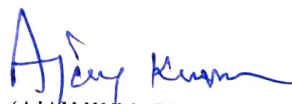
Paper: C (Physical Chemistry)

Two weeks left for MST tentative and one week for revision /queries for MST

| TIME PERIOD | TOPICS TO BE COVERED |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Week 1 | Mathematical Concepts Logarithmic relations, curve sketching, linear graphs and calculation of slopes, differentiation of functions like kx , e^x , x^n , $\sin x$, $\log x$, |
| Week 2 | maxima and minima, partial differentiation and reciprocity relations. Integration of some useful/relevant functions permutations and combinations. |
| Week 3 | Factorials. Probability . Evaluation of Analytical Data Terms of mean and median, precision and accuracy in chemical analysis, determining accuracy of methods |
| Week 4 | improving accuracy of analysis, data treatment for series involving relatively few measurements, linear least squares curve fitting, types of errors, standard deviation, confidence limits, |
| Week 5 | Liquid State Intermolecular forces, structure of liquids (a qualitative description) Structural differences between solids, liquids and gases Liquid crystals: |
| Week 6 | Difference between liquid crystal, solid and liquid, Classification, structure of nematic and eholestric phases. Thermography and seven segment cell |
| Week 7 | Gaseous State Postulates of kinetic theory of gases, deviation from ideal behaviour, van der Waals equation of states, the isotherms of van der Waals equation |
| Week 8 | relationship between critical constants and van der Waals constants, the law of corresponding states, reduced equation of state. |
| Week 9 | Molecular velocities: Root mean <u>square, average</u> and most probable velocities. Qualitative discussion of the Maxwell's dis- of molecu:u.--veincities, collision number, mean free path and collision diameter, Liquifacation of gases (based on Joule-Thomson effect). |
| Week 10 | Physical Properties and Molecular Structure Optical activity, polarization-(Clausius-Mossotti equation), orientation of dipoles in an electric field, dipole moment. Induced dipole moment, measurement of dipole moment temperature method and refractivity method |
| Week 11 | Dipole moment and structure of molecules, magnetic properties-paramagnetism, diamagnetism and ferromagnetism. |
| Week 12 | Revision |

Jatinder Singh

Principal
Govt. College, ROPAR


(AJAY KUMAR)

Head of Dept Of Chemistry

Govt.College,Ropar

Distribution Of Syllabus & Lesson Plan/Teaching Plan (2021-22)

Name Of Department: Chemistry

Class:B.Sc-1st Yr (Sem 2)

Paper: A (Inorganic Chemistry)

Two weeks left for MST tentative and one week for revision /queries for MST

| TIME PERIOD | TOPICS TO BE COVERED |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Week1 | Ionic Solids- Concept of close packing, Ionic structures, (NaCl type, Zinc blende, Wurzite, CaF ₂ , and antifluorite |
| Week2 | radius ratio rule and coordination number, Limitation of radius ratio rule, lattice defects, semiconductors, lattice energy and Born-Haber cycle |
| Week3 | solvation energy and solubility of ionic solids, polarizing power and polarisability of ions, Fajan's rule. Metallic bond-free electron, valence bond and bond theories |
| Week4 | S-Block Elements Comparative study, diagonal relationships, salient features of hydrides |
| Week5 | solvation and complexation tendencies including their function in biosystems, an introduction to alkyls and aryls. |
| Week6 | Group No. 13 Comparative study (including diagonal relationship) of groups 13 elements, compounds like hydrides, oxides, oxyacids and halides of groups 13; |
| Week7 | hydrides of boron-diborane and higher boranes, borazine, borohydrides. |
| Week8 | p - Block Elements Comparative study (including diagonal relationship) of groups 14-17 elements, |
| Week9 | compounds like hydrides, oxides, oxyacids and halides of groups 14-17; fullerenes, carbides,. |
| Week10 | fluorocarbons, silicates (structural principle), tetrasulphur tetranitride, basic properties of halogens, interhalogens and polyhalides. |
| Week11 | Revision test |

Ajay Kumar
(AJAY KUMAR)

Head of Deptt of Chemistry

Jatinder Singh

Principal

Govt. College, ROPAR

Govt.College,Ropar

Distribution Of Syllabus & Lesson Plan/Teaching Plan (2021-22)

Name Of Department: Chemistry


Class: B.Sc-1st Yr (Sem 2)

Paper: B (Organic Chemistry)

Two weeks left for MST tentative and one week for revision /queries for MST

| TIME PERIOD | TOPICS TO BE COVERED |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Week1 | 1. Stereochemistry of Organic Compounds Concept of isomerism. Types of isomerism, Optical isomerism-elements of symmetry, molecular chirality, enantiomers, stereogenic centre, optical activity, properties of enantiomers, chiral and achiral molecules with two stereogenic centres, diastereomers, threo and erythro diastereomers, meso compounds, resolution of enantiomers, inversion, retention and racemization. |
| Week2 | Relative and absolute configuration, sequence rules, D & L and R & S systems of nomenclature. Geometric isomerism-determination of configuration of geometric isomers, E & Z system of nomenclature |
| Week3 | geometric isomerism in oximes and alicyclic compounds. Conformational isomerism-conformational analysis of ethane and n-butane |
| Week4 | conformations of cyclohexane, axial and equatorial bonds, conformation of mono substituted cyclohexane derivatives |
| Week5 | Newman projection and Sawhorse formulae, Fischer and flying wedge formulae. Difference between configuration and conformation |
| Week6 | Nomenclature of benzene derivatives. Aromatic nucleus and side chain. Structure of benzene: molecular formula and Kekule structure. Stability and carbon-carbon bond lengths of benzene, resonance structure, pi structure. |
| Week7 | Aromaticity: the Huckel rule, aromatic ions. Aromatic electrophilic substitution-general pattern of the mechanism, role of carbocation complexes. Mechanism of nitration, halogenation, sulphonation, mercuration and Friedel-Crafts reaction. Energy profile diagrams. Activating and deactivating substituents, orientation and ortho/para ratio. Side chain reactions of benzene derivatives. |
| Week8 | Methods of formation and chemical reaction of alkylbenzenes and arylbenzenes. |
| Week9 | Alkyl and aryl halides Nomenclature and classes of alkyl halides, methods of formation chemical reactions. Mechanisms of nucleophilic substitution reactions of alkyl halides, S _N ¹ and S _N ² reactions with energy profile diagrams. |
| Week10 | Methods of formation of aryl halides, nuclear and side chain reactions. The addition elimination and the elimination-addition mechanisms of nucleophilic aromatic substitution reactions. Relative reactivities of alkyl halides vs allyl, vinyl and aryl halides. |
| Week11 | Revision |


Principal
• College, ROPAR


(AJAY KUMAR)
Head of Deptt. Of Chemistry

Govt.College,Ropar

Distribution Of Syllabus & Lesson Plan/Teaching Plan (2021-22)

Name Of Department: Chemistry

Class: 1st Yr (Sem 2)

Paper: C (PhysicalChemistry)

Two weeks left for MST tentative and one week for revision /queries for MST

| TIME PERIOD | TOPICS TO BE COVERED |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Week1 | Colloidal State Definition of colloids, classification of colloids Solids in liquids (sols): properties-kinetic, optical and electrical; stability of colloids protective action, Hardy-Schulze law, gold number. |
| Week2 | Liquids in liquids (emulsions) types of emulsions, preparation, Emulsifiers. Liquids in solids, (gels) classification, preparation and properties inhibition. General applications of colloids. |
| Week3 | Chemical Kinetics and catalysis Chemical kinetics and its scope, rate of a reaction, factors influencing the rate of a reaction- concentration, temperature, pressure, solvent, light, catalyst. Concentration dependence of rates, mathematical characteristics of simple chemical reactions-zero order, |
| Week4 | first order, second order, pseudo order, half life and mean life. Determination of the order of reaction-s-differential method, method of integration, method of half life period and isolation method. |
| Week5 | Radioactive decay as a first order phenomenon. Theories of chemical kinetics, |
| Week6 | effect of temperature on rate of reaction. Arrhenius equation, concept of activation energy. |
| Week7 | Simple collision theory based on hard sphere model, transition state theory (equilibrium hypothesis). Expression for the rate constant based on equilibrium constant and thermodynamic aspects. |
| Week8 | Catalysis and general characteristics of catalytic reactions. Homogeneous catalysis, acid base catalysis and enzyme catalysis including their mechanisms, Michaelis Menten equation for enzyme catalysis and its mechanism. |
| Week9 | Solutions, Dilute Solutions and Colligative Properties Ideal and non-ideal solutions, methods of expressing concentration of solutions, activity and activity coefficients. Dilute solution, colligative properties, Raoult's law, relative lowering of vapour pressure, molecular weight determination. Osmosis, law of osmotic pressure and its measurement, determination molecular weight from osmotic pressure |
| Week10 | 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. |
| Week11 | Revision Test |

Jatinder Singh
Head of Deptt Of Chemistry
College, ROPAR

Ajay Kumar
(AJAY KUMAR)
Head of Deptt Of Chemistry