

Government College for Women, Hisar

Chemistry Department

LESSON PLAN (Odd semester, Session 2022-23)

Name of teacher: DR. Satyender Kumar Yadav

CLASS: B.Sc. 5th Semester Paper: Fuel Chemistry

<p>Week 1st & 2nd Sept. 2022 Renewable & non-renewable energy sources. Classification of fuels & their calorific value. Uses of coal. Carbonization of coal</p>
<p>Week 3rd&4th Sept. 2022 Coal gas, water gas & producer gas-composition & uses. Fractionation of coal tar &uses of coal tar based chemicals, metallurgical coke. Coal gasification, liquefaction & solvent refining</p>
<p>Week 1st&2nd Oct. 2022 Composition of crude petroleum. Refining & different types of petroleum products & their applications. Fractional distillation. Thermal & catalytic cracking</p>
<p>Week 3rd&4th Oct. 2022 Reforming.. Petroleum & non-petroleum fuels- LPG, CNG, LNG, Fuel from bio-mass, Fuel from waste, synthetic fuels, clean fuels</p>
<p>Week 1st&2nd Nov. 2022 Petrochemicals, vinyl acetate, propylene oxide, butadiene, toluene & its derivatives, Xylene Classification of Lubricants</p>
<p>Week 3rd&4th Nov. 2022 Lubricating oils, Solid, semi solid & synthetic lubricants. Properties of lubricants- viscosity index, cloud point, pour point & their determination</p>
<p>Week 1st&2nd Dec, 2022 Revision</p>

Name of teacher: Dr. Satyender Kumar Yadav

CLASS: B.Sc. 1st Semester Paper: Organic Chemistry

Week 1st & 2nd Sept. 2022 Physical displacements: Inductive, electromeric, resonance and hyper conjugative effects. Structure, shape & reactivity of organic molecules
Week 3rd&4th Sept. 2022 Nucleophiles, electrophiles. Reactive intermediates- carbocations, carbanions and free radicals. Strength of organic acid & bases. Factors affecting pK values. Aromaticity & Huckel rule
Week 1st&2nd Oct. 2022 Conformations- ethane, butane & cyclohexane. Interconversion of Wedge, Newmann, Sawhorse & Fischer representations. Chirality. Geometrical & Optical isomerism
Week 3rd&4th Oct. 2022 Enantiomers, Diastereomers, Threo & erythro, D & L, cis & trans, R & S, E & Z nomenclature. CIP rules
Week 1st&2nd Nov. 2022 Alkanes,: Preparation -Hydrogenation, Wurtz, Kolbe's & from Grignard reagent. Reactions- Free radical substitution, Halogenation
Week 3rd&4th Nov. 2022 Alkanes: Preparation- Elimination, dehydration, dehydrohalogenation, Birch reduction. Reactions- cis & trans addition, addition of HX, Hydration, ozonolysis, oxy-mercuration-demercuration, hydroboration-oxidation
Week 1st&2nd Dec, 2022 Alkynes: Preparation: from calcium carbide, dehalogenation, dehydrohalogenation. Reactions: metal acetylides, addition of bromine & alkaline KMnO ₄ , ozonolysis & oxidation.

Name: Dr.Priyanka

Department: Chemistry

Class: BSc- IIIrd NM (VthSem)

Paper: CCL-503 Chemistry of Main Group Elements, Theories of Acids and Bases-I

S.No	Date	Topics
1	September 2022	Acids and Bases: Bronsted–Lowry concept, conjugate acids and bases, relative strengths of acids and bases, effects of substituent and solvent, differentiating and levelling solvents. Lewis acid-base concept, classification of Lewis acids and bases, Lux-Flood concept and solvent system concept. Hard and soft acids and bases (HSAB concept), applications of HSAB process.
2	October 2022	General Principles of Metallurgy: Chief modes of occurrence of metals based on standard electrode potentials, Ellingham diagrams for reduction of metal oxides using carbon and carbon monoxide as reducing agents. Hydrometallurgy with reference to cyanide process for gold and silver. Methods of purification of metals (Al, Pb, Ti, Fe, Cu, Ni, Zn, Au): electrolytic refining, zone refining, van Arkel-de Boer process, Parting Process, Mond's process and Kroll Process.
3	November 2022	s- and p-Block Elements Periodicity in s- and p-block elements with respect to electronic configuration, atomic and ionic size, ionization enthalpy, electron gain enthalpy, electronegativity (Pauling scale). General characteristics of s-block metals like density, melting and boiling points, flame colour and reducing nature. Oxidation states of s- and p-block elements, inert-pair effect, diagonal relationships and anomalous behaviour of first member of each group. Allotropy in C, P and S.
4	December 2022	Complex forming tendency of s block elements and a preliminary idea of crown ethers and cryptates, structures of basic beryllium acetate, salicylaldehyde/ acetylacetonato complexes of Group 1 metals. Solutions of alkali metals in liquid ammonia and their properties. Common features, such as ease of formation, solubility and stability of oxides, peroxides, superoxides, sulphates and carbonates of s-block metals.

NAME: Dr Priyanka

CLASS: BSC- IIIRD NM (VTHSEM), PAPER: CCL-504(II) CHEMISTRY OF MAIN GROUP ELEMENTS-II

S.No	Date	Topics
1	September 2022	Structure, bonding and properties (acidic/ basic nature, oxidizing/ reducing nature and hydrolysis of the following compounds and their applications in industrial and environmental chemistry wherever applicable: Diborane and concept of multicentre bonding, hydrides of Groups 13 (EH ₃), 14, 15, 16 and 17. Oxides of N and P, Oxoacids of P, S and Cl. Solutions
2	October 2022	Halides and oxohalides of P and S (PCl ₃ , PCl ₅ , SOCl ₂ and SO ₂ Cl ₂) Interhalogen compounds. A brief idea of pseudohalides.
3	November 2022	Noble gases: Rationalization of inertness of noble gases, clathrates, preparation and properties of XeF ₂ , XeF ₄ and XeF ₆ , bonding in these compounds using VBT and shapes of noble gas compounds using VSEPR.
4	December 2022	Inorganic Polymers: Types of inorganic polymers and comparison with organic polymers, structural features, classification and important applications of silicates. Synthesis, structural features. applications of silicones. Borazines and cyclophosphazenes – preparation, properties and reactions. Bonding in (NPCl ₂) ₃ .

NAME: Dr Priyanka

CLASS: BSC- ISt NM , PAPER: CCL-105 GENERAL ORGANIC CHEMISTRY & ALIPHATIC HYDROCARBONS

S.No	Date	Topics
1	September 2022	Physical Effects, Electronic Displacements: Inductive Effect, Electromeric Effect, Resonance and Hyperconjugation. Cleavage of Bonds: Homolysis and Heterolysis. Structure, shape and reactivity of organic molecules: Nucleophiles and electrophiles. Reactive Intermediates: Carbocations, Carbanions and free radicals. Strength of organic acids and bases: Comparative study with emphasis on factors affecting pK values. Aromaticity: Benzenoids and Hückel's rule.
2	October 2022	Conformations with respect to ethane, butane and cyclohexane. Interconversion of Wedge Formula, Newmann, Sawhorse and Fischer representations. Concept of chirality (upto two carbon atoms). Configuration: Geometrical and Optical isomerism; Enantiomerism, Diastereomerism and Meso compounds). Threo and erythro; D and L; cis - trans nomenclature; CIP Rules: R/ S (for upto 2 chiral carbon atoms) and E / Z Nomenclature (for upto two C=C systems).
3	November 2022	Functional group approach for the following reactions (preparations & reactions) to be studied in context to their structure. Alkanes: (Upto 5 Carbons). Preparation: Catalytic hydrogenation, Wurtz reaction, Kolbe's synthesis, from Grignard reagent. Reactions: Free radical Substitution: Halogenation. Alkenes: (Upto 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: cisaddition (alk. KMnO ₄) and trans-addition (bromine), Addition of HX (Markownikoff's and anti-Markownikoff's addition), Hydration, Ozonolysis, oxymercuration-demercuration, Hydroboration-oxidation.
4	December 2022	Functional group approach for the following reactions (preparations & reactions) to be studied in context to their structure. Alkynes: (Upto 5 Carbons) Preparation: Acetylene from CaC ₂ and conversion into higher alkynes; by dehalogenation of tetra halides and dehydrohalogenation of vicinal-dihalides. Reactions: formation of metal acetylides, addition of bromine and alkaline KMnO ₄ , ozonolysis and oxidation with hot alk. KMnO ₄

Name: Virender Singh

Department: Chemistry

Class: BSc- IIIrd NM (VthSem)

Paper: CCL-503 Chemistry of Main Group Elements, Theories of Acids and Bases-I

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NAME: Virender Singh

CLASS: BSC- IIIRD NM (VTHSEM), PAPER: CCL-504(II) CHEMISTRY OF MAIN GROUP ELEMENTS-II

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NAME: Virender Singh

CLASS: B.Sc. I (1st Sem) Paper: INORGANIC CHEMISTRY

S. No	Date	Topic
1	September 2022	Atomic structure-I: Bohr's Theory, dual nature of atom, uncertainty principle, hydrogen spectrum, Quantum mechanics, Schrodinger wave equation, radial and angular parts of hydrogen wave functions and their variation along different orbitals. Atomic Structure-II: Radial distribution functions, significance of Quantum Numbers, shapes of different orbitals, nodal planes
2	October 2022	Atomic Structure-II: Discovery of spin, spin and magnetic spin quantum number, rules for filling various orbitals, E.C. of atoms, Relative energies of AO's, anomalous E.C's
3	November 2022	Chemical Bonding: Ionic bonding- characteristics, energy considerations. Born- Linde equation for calculation of Lattice energy
4	December 2022	Chemical Bonding: Covalent bonding- shapes of some inorganic molecules and ions on the basis of VSEPR & hybridization, concept of resonance, resonating structures in various inorganic and organic molecules. Molecular Structure: M.O. Approach- rules for LCAO method, bonding and antibonding MO and their characteristics for s-s, s-p 7p-p combination of AO's, Non bonding M.O's. Molecular Structure: MO treatment of homonuclear and heteronuclear diatomic molecules, comparison of VBT & MOT