

**Government College for Women, Hisar**

**Lesson Plan (2020-2021)**

**Chemistry Department**

**LESSON PLAN (Odd semester, Session 2020-21)**

**NAME OF ASSOCIATE PROFESSOR : DR. SATYENDER KUMAR**

**CLASS: B.Sc. I (1stSemester) Paper: INORGANIC CHEMISTRY**

<p><b>Week 3<sup>rd</sup> &amp; 4<sup>th</sup> Nov. 2020</b> Chapter: Atomic structure-1: 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.</p>
<p><b>Week 1<sup>st</sup> &amp; 2<sup>nd</sup> Dec. 2020</b> Chapter :Atomic Structure-II: Radial distribution functions, significance of Quantum Numbers, shapes of different orbitals , nodal planes</p>
<p><b>Week 3<sup>rd</sup> &amp; 4<sup>th</sup> Dec. 2020</b> Chapter: 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</p>
<p><b>Week 1<sup>st</sup> &amp; 2<sup>nd</sup> Jan.2021</b> Chapter: Chemical Bonding: Ionic bonding- characteristics, energy considerations. Born-Linde equation for calculation of Lattice energy</p>
<p><b>Week 3<sup>rd</sup> &amp; 4<sup>th</sup> Jan.2021</b> Chapter: Chemical Bonding: Born- Haber cycle and its applications, Polarizing power and polarizability, Fajan's rules, Ionic character in covalent compounds, Dipole moment.</p>
<p><b>Week 1<sup>st</sup> &amp; 2<sup>nd</sup> week of Feb.2021</b> Chapter: Chemical Bonding: Covalent bonding- shapes of some inorganic molecules and ions on the basis of VSEPR&amp; hybridization, concept of resonance, resonating structures in various inorganic and organic molecules.</p>
<p><b>Week 3<sup>rd</sup> &amp; 4<sup>th</sup> Feb.2021</b> Chapter: 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.</p>
<p><b>Week 1<sup>st</sup> &amp; 2<sup>nd</sup> March,2021</b> Chapter: Molecular Structure: MO treatment of homonuclear and heteronuclear diatomic molecules, comparison of VBT&amp;MOT</p>

**Name of Teacher: Parveen Rani**

**Class : B.Sc.I and B.Sc.II**

**Paper: Organic Chemistry**

S.No	Date	Topics
1	November 2020	B.Sc.II Carboxylic Acids B.Sc. I(NM) Fundamentals of Organic Chemistry
2	December 2020	B.Sc.II Carboxylic Acid Derivatives B.Sc.I(NM) Fundamentals of Organic Chemistry & Stereochemistry of Organic Compounds Assignment1 and Test1
3	January 2021	B.Sc.I(NM) Stereochemistry of Organic Compounds B.Sc.I(Med.) Fundamentals of Organic Chemistry
4	February 2021	B.Sc.I(Med.) Stereochemistry of Organic Compounds and Alkanes B.Sc.I(NM) Alkanes and Alkenes
5	March 2021	B.Sc.I(NM) Alkynes B.Sc.I(Med.) Alkenes and Alkynes Assignment2 and Test2

**NAME OF TEACHER: Dr. PRIYANKA**  
**CLASS: B.Sc. III NON MEDICAL (V<sup>th</sup> SEM)**  
**PAPER-I: CHEMISTRY OF MAIN GROUP ELEMENTS, THEORIES OF ACIDS AND BASES-I**  
**PAPER-II: FUEL CHEMISTRY**

<b>Week 1</b>	PAPER I
17.11.2020 To 21.11.2020	Acids and Bases: Bronsted–Lowry concept, conjugate acids and bases.
<b>Week 2</b>	
23.11.2020 To 28.11.2020	Relative strengths of acids and bases, effects of substituent and solvent, differentiating and levelling solvents.
<b>Week 3</b>	
01.12.2020 To 05.12.2020	Lewis acid-base concept, classification of Lewis acids and bases, Lux-Flood concept and solvent system concept.
<b>Week 4</b>	
07.12.2020 To 12.12.2020	Hard and soft acids and bases (HSAB concept), applications of HSAB process.
<b>Week 5</b>	General Principles of Metallurgy
14.12.2020 To 19.12.2020	General Principles of Metallurgy: Chief modes of occurrence of metals based on standard electrode potentials <b>Assignment I</b>
<b>Week 6</b>	
21.12.2020 To 26.12.2020	Ellingham diagrams for reduction of metal oxides using carbon and carbon monoxide as reducing agents.
<b>Week 7</b>	
28.12.2020 To 02.01.2021	Hydrometallurgy with reference to cyanide process for gold and silver. Methods of purification of metals (Al, Pb, Ti, Fe, Cu, Ni, Zn, Au)
<b>Week 8</b>	
04.01.2021 To 09.01.2021	electrolytic refining, zone refining, van Arkel-de Boer process, Parting Process, Mond’s process and Kroll Process.
	<b>Class Test</b>
<b>Week 9</b>	
11.01.2021 To 16.01.2021	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).
<b>Week 10</b>	
18.01.2021 To 23.01.2021	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,
<b>Week 11</b>	
25.01.2021 To 30.01.2021	Inert-pair effect, diagonal relationships and anomalous behaviour of first member of each group. Allotropy in C, P and S

	<b>Assingment II</b>
<b>Week 12</b>	
01.02.2021 To 06.02.2021	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.
<b>Week 13</b>	<b>(SEC) FUEL CHEMISTRY</b>
08.02.2021 To 13.02.2021	Review of energy sources (renewable and non-renewable). Classification of fuels and their calorific value. Coal:Uses of coal (fuel and nonfuel) in various industries, its composition, carbonization of coal. Coal gas, producer gas.
	<b>Assignment I</b>
<b>Week 14</b>	
15.02.2021To 20.02.2021	water gas—composition and uses. Fractionation of coal tar, uses of coal tar bases chemicals, requisites of a good metallurgical coke, Coal gasification (Hydro gasification and Catalytic gasification), Coal liquefaction and Solvent Refining. Petroleum and Petrochemical Industry: Composition of crude petroleum, Refining and different types of petroleum products and their applications.
<b>Week 15</b>	
22.02.2021 To 26.02.2021	Fractional Distillation (Principle and process), Cracking (Thermal and catalytic cracking), Reforming Petroleum and non-petroleum fuels (LPG, CNG, LNG, bio-gas, fuels derived from biomass), fuel from waste, synthetic fuels (gaseous and liquids), clean fuels.
	<b>CLASS TEST</b>
<b>Week 16</b>	
01.03.2021 To 05.03.2021	Petrochemicals: Vinyl acetate, Propylene oxide, Isoprene, Butadiene, Toluene and its derivatives Xylene. Lubricants: Classification of lubricants, lubricating oils (conducting and nonconducting) Solid and semisolid lubricants, synthetic lubricants. Properties of lubricants (viscosity index, cloud point, pore point) and their determination <b>ASSINGMENT II</b>
<b>Week 17</b>	
08.03.2021 To 12.03.2021	Revision
	Class Test
<b>Week 18</b>	
15.03.2021 To 19.03.2021	Revision
	Class Test
<b>Week 19</b>	
22.03.2021 To 23.03.2021	Revision

**NAME: VIRENDER SINGH**

**CLASS: BSC- III<sup>RD</sup> NM (V<sup>TH</sup>SEM), BSC-2NDNM (3<sup>RD</sup>SEM)**

**PAPER: CCL-504(II) CHEMISTRY OF MAIN GROUP ELEMENTS-II**

**CCL-304 - PHYSICAL CHEMISTRY-II:**

S.No	Date	Topics
1	September 2020	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 <sub>3</sub> ), 14, 15, 16 and 17. Oxides of N and P, Oxoacids of P, S and Cl. Solutions Thermodynamics of ideal solutions: Ideal solutions and Raoult's law, deviations from Raoult's law – non-ideal solutions. Vapour pressure-composition and temperature composition curves of ideal and non-ideal solutions. Distillation of solutions. Azeotropes. Colligative properties of solutions. Thermodynamic derivations of relation between amount of solute and elevation in boiling point and depression in freezing point.
2	October 2020	Halides and oxohalides of P and S (PCl <sub>3</sub> , PCl <sub>5</sub> , SOCl <sub>2</sub> and SO <sub>2</sub> Cl <sub>2</sub> ) Interhalogen compounds. A brief idea of pseudohalides. Partial miscibility of liquids: (Bsc2nd year 3 <sup>rd</sup> sem) Critical solution temperature; effect of impurity on partial miscibility of liquids. Immiscibility of liquids- Principle of steam distillation.
3	November 2020	Noble gases: Rationalization of inertness of noble gases, clathrates, preparation and properties of XeF <sub>2</sub> , XeF <sub>4</sub> and XeF <sub>6</sub> , bonding in these compounds using VBT and shapes of noble gas compounds using VSEPR. (Bsc2nd 3 <sup>rd</sup> sem) Phase Equilibrium Phases, components and degrees of freedom of a system, criteria of phase equilibrium. Gibbs Phase Rule and its thermodynamic derivation. Derivation of Clausius – Clapeyron equation and its importance in phase equilibria. Phase diagrams of one-component systems (water and sulphur) and two component systems involving eutectics, congruent and incongruent melting points (lead-silver, and Na-K only).
4	December 2020	Inorganic Polymers: Types of inorganic polymers and comparison with organic polymers, structural features, classification and important applications of silicates. Synthesis, structural features. Conductance Conductivity, equivalent and molar conductivity and their variation with dilution for weak and strong electrolytes. Kohlrausch law of independent migration of ions. Transference number, ionic

		mobility. Applications of conductance measurements: determination of degree of ionization of weak electrolyte, solubility and solubility products of sparingly soluble salts, ionic product of water, hydrolysis constant of a salt. Conductometric titrations (only acidbase). Concept of pH and pKa, buffer solution, buffer action, Handerson Hazel Blac equation.
5	January 2021	applications of silicones. Borazines and cyclophosphazenes – preparation, properties and reactions. Bonding in $(\text{NPCl}_2)_3$ .
6	February 2021	(Bsc2nd year 3 <sup>rd</sup> sem) Reversible and irreversible cells. Concept of EMF of a cell. Measurement of EMF of a cell. Nernst equation and its importance. Types of electrodes. Standard electrode potential. Electrochemical series. Thermodynamics of a reversible cell, calculation of thermodynamic properties: $\Delta G$ , $\Delta H$ and
7	March 2021	Revision