

Summary of Lesson Plans of College Faculty for Academic Session 2020 - 2021

GOVT. COLLEGE ISRANA (PANIPAT)

Name of Ext. Lecturer: Pooja Jaglan Subject : Chemistry (inorganic & physical)

Class: B.Sc. 2<sup>nd</sup> year 3<sup>rd</sup> semester

For the Month of Oct. 2020 to Feb. 2021

| months     | Topics/Chapters to be Covered  |
|------------|--|
| oct. 2020  | <b>Chemistry of d-Block elements</b><br>Definition of transition elements, position in the periodic table, General characteristic properties of d-Block elements, Comparison of properties of 3d elements with 4d and 5d elements with reference only to ionic radii, oxidation state, magnetic and spectral properties and stereo chemistry.<br>Stability of various oxidation states and e.m.f (Latimer and Frost diagrams), Structure and properties of some compounds of transition elements- $\text{TiO}_2$ , $\text{VOCl}_2$ , $\text{FeCl}_3$ , $\text{CuCl}_2$ and $\text{Ni}(\text{CO})_4$ .  |
| Nov.. 2020 | <b>Coordination Compounds</b><br>Werner's theory of coordination compounds, effective atomic number, chelates, nomenclature of coordination compounds, Isomerism in coordination compounds, valence bond theory of transition metal complexes.<br><b>Non-aqueous solvents</b> Physical properties of solvents, types of solvents and their general characteristics, reactions in non aqueous solvents with reference to liquid $\text{NH}_3$ and liquid $\text{SO}_2$ .  |
| Dec. 2020  | <b>Thermodynamics</b><br>Definition of thermodynamic terms : system, surrounding etc. Types of systems, intensive and extensive properties. State and path functions and their differentials. Thermodynamic process.<br>Thermodynamic equilibrium, Concept of heat and work.<br>First law of thermodynamics: statement, concepts of internal energy and enthalpy. Heat capacity, heat capacities at constant volume and pressure and their relationship. Joule-Thomson coefficient for ideal gas and real gases and inversion temperature.<br>Calculation of $w, q, dU$ & $dH$ for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process |
| Jan. 2021  | Nernst distribution law – its thermodynamic derivation,<br>Applications of distribution law: (i) Determination of degree of hydrolysis and hydrolysis constant of aniline hydrochloride (ii) Determination of equilibrium constant of potassium tri-iodide complex and (iii) Process of extraction. More stress on numerical problems.   |
| Feb. 2021  | Equilibrium constant and free energy, concept of chemical potential, Thermodynamic derivation of law of chemical equilibrium. Temperature dependence of equilibrium constant.<br>Clausius-Clapeyron equation and its applications  |

  
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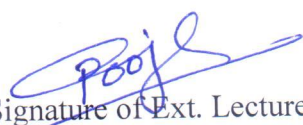
Name of Ext. Lecturer: Pooja Jaglan

Subject : Chemistry (inorganic & physical)

Class: B.Sc. 1<sup>st</sup> year 1<sup>st</sup> semester

For the Month of Nov. 2020 to feb. 2021.

| months    | Topics/Chapters to be Covered  |
|-----------|--|
| Nov. 2020 | <b>Atomic Structure</b><br>Idea of de Broglie matter waves, Heisenberg's uncertainty principle, atomic orbitals, quantum numbers, radial and angular wave functions, normal and orthogonal wave functions, significance of $\Psi$ and $\Psi^2$ , probability distribution curves, shapes of s, p, d, f orbitals, Aufbau and Pauli exclusion principles, Hund's multiplicity rules, Electronic configuration of elements, effective nuclear charge, Slater's rules.   |
| Dec. 2020 | <b>Periodic table and atomic properties</b><br>Classification of periodic table into s, p, d, f blocks, atomic and ionic radii, ionisation energy, electron affinity and electronegativity definition, methods of determination or evaluation, trend in periodic table (in s and p-block elements), Pauling, Mulliken, Allred Rachow and Mulliken Jaffe's electronegativity scale, Sanderson's electron density  |
| Jan. 2020 | <b>Covalent Bond</b><br>Valence bond theory (Heitler-London and Pauling approach) and its limitation, directional characteristics of covalent bond, various type of hybridisation and shapes of simple inorganic molecules and ions ( $\text{BeF}_2$ , $\text{BF}_3$ , $\text{CH}_4$ , $\text{PF}_5$ , $\text{SF}_6$ , $\text{IF}_7$ , $\text{SO}_4$ , $\text{ClO}_4$ , $\text{NO}_3$ , valence shell electron pair repulsion (VSEPR) theory to $\text{NH}_3$ , $\text{H}_3\text{O}^+$ , $\text{SF}_4$ , $\text{ClF}_3$ , $\text{H}_2\text{O}$ , $\text{SnCl}_2$ , $\text{ClO}_3$ and $\text{ICl}_2$ . Molecular orbital theory of homonuclear ( $\text{N}_2$ , $\text{O}_2$ ) heteronuclear (CO and NO) diatomic molecules and ions, bond energy, bond angle, bond length and dipole moments, percentage ionic character from dipole moment and electronegativity difference. |
| Feb. 2021 | <b>Ionic Solids</b><br>Ionic structures ( $\text{NaCl}$ , $\text{CsCl}$ , $\text{ZnS}$ (Zinc blende), $\text{CaF}_2$ ) size effects, radius ratio rule and its limitations, Madelung constant, Stoichiometric and Non stoichiometric defects in crystals, Lattice energy (mathematical derivation excluded) and Born-Haber cycle, Solvation energy and its relation with solubility of Ionic solids, Polarizing power and Polarisability of ions, Fajan's rule. <b>Liquid States, Solid State</b>  |

  
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