CHEMISTRY : STANDARD XII
2020-21
Competency Statements

Area/ Unit/ Lesson	After studying the contents in Textbook students.....
Physical Chemistry	• Distinguish crystal structures illustrating unit cell and packing efficiency in cubic systems. • Gain information on point defects and band theory in relation to electric and magnetic behavior. • Define solubility and rationalise its dependence on various factors. • Explain Henry and Raoult's laws. • Derive expressions for colligative properties. • Learn van't Hoff factor and its correlation with dissociation constant. • Catagorize strong and weak acid bases. • Learn Ostwald's dilution law. • Derive Henderson Balch Hassel equation. • Explain the role of buffer solutions in controlling of pH. • Understand spontaneity of reactions. • Know reversible/irreversible processes and PV work. • Understand first and second laws of thermodynamics. • Work out change in enthalpy, entropy and Gibbs' functions in physical and chemical transformations. • Apply Hess's Law in thermochemical equations. • State what are strong and weak electrolytes. • Define Kohlrausch law and state its importance. • Understand functioning of electrolytic and galvanic cells. Write half cell reactions there in. • Describe type of electrodes. • Derive Nernst equation and understand its importance. • Know what are dry cell, lead strong batteries and fuel cells. • Describe the electrochemical series and its implications. • Define average and instantaneous rate, order and molecularity in kinetics • Formulate differential and integral rate laws for zero and first order reactions. • Understand basis of collision theory of reaction rates • Sketch qualitatively potential energy curve. Understand acceleration of reactions in the presence of catalyst. • Solve relevant numerical problems.
Inorganic chemistry	• Write electronic configuration of groups 16, 17, 18 and those of d and f blocks. • Correlate atomic properties of elements with electron configuration. • Explain the anomalous behaviour of 'O' and 'F'. • Understand allotropy in 'O' and 'S'. • Draw structures of oxyacids of 'sulfur' and 'halogens'. • Write reactions for preparation, chemical properties of O_2, O_3, SO_2, H_2SO_4, Cl_2, HCl, $KMnO_4$, $K_2Cr_2O_7$. • Draw structures of interhalogen and xenon compounds and illustrate their properties. State the methods of preparation with reaction. • Know chemistry of the elements belonging to groups 16, 17, 18. • Understand the principles of metallurgy in extraction of iron. • Compare lanthanoides and actinoides. • Enlist properties of the manmade post actinoide elements. • Understand Werner theory of coordination compounds. • Understand and apply EAN rule for stability of coordination compounds. • Understand diverse isomerism in coordination compounds. • Use the concept of hybridization for predicting structures and magnetic behaviour of complexes based on the V.B.T. • Understand C.F.T. Sketch qualitatively d-orbital splitting diagrams in octahedral and tetrahedral ligand field environments. • Distinguish between high spin and low spin complexes. • Predict structure, colour and magnetic properties of the complexes based on the C.F.T.

Organic Chemistry	• State common and IUPAC names of compounds and methods of preparation of halogen derivatives, alcohols, phenols, ethers, aldehydes, ketones, carboxylic acid and amines. • Understand structure, chemical properties, laboratory tests and reactions of the above functional groups. • Explain acid or base strength of alcohols, phenols, carboxylic acids and amines. • Explain trends in boiling point and solubility of compounds of above functional groups in terms of intermolecular forces. • Understand optical activity, recognize chiral molecules and represent with Fischer projection and wedge formulae. • Understand mechanism of nucleophilic substitution reactions and influencing factors.
Applied Chemistry	• Classify carbohydrates, amino acids, nucleic acids. • Represent monosaccharides using the Fischer projection formula. • Represent monosaccharides, disaccharides and polysaccharides using the Haworth formula. • Correlate properties of carbohydrates to the presence or absence of potential aldehyde group. • Learn four level structure of proteins and primary structures nucleic acid. • Represent primary structure of dipeptide and tripeptide from data on the terminals. • Understand enzyme catalysis and double strand DNA structure. • Understand classification of polymers on the basis of source, structure, intermolecular forces, polymerization, number of monomers and biodegradability. • Understand addition and condensation polymerization. • Know properties, structure and preparation of natural rubber, vulcanized rubber, Buna-S, viscose, LDP, HDP, teflon, polyacrylo nitrile, polyamide, polyesters, phenol-formaldehyde resin and PHBV. • Understand scope of green chemistry with reference to sustainable development. • Recognize twelve principles of green chemistry and their implementation. • Correlate the Chemistry knowledge gained so far as pro or counter to the principles of green chemistry. • Understand scope and applications of nanochemistry. • Gain knowledge of a synthetic method and properties of nanoparticles. • Know instrumental techniques for characterization of nanomaterials.

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