Syllabus

Class-11th

Subject-Chemistry(2022-23)

मास	पुस्तक का नाम	विषय वस्तु	शिक्षण के पीरियड	दोहराई के पीरियड	प्रयोगात्मक कार्य
अप्रैल		Unit -1 Some Basic Concepts of Chemistry	18		A(4) B(8)
मई		Unit – 2 Structure of Atom	20		C(7) D(7)
जुलाई		Unit – 3 Classification of Elements and periodicity in properties	12		 E(16)
अगस्त		Unit – 4 Chemical Bonding and Molecular Structure	23		E(10)
सितम्बर		Unit – 6 Chemical Thermodynamics	20		
अक्तूबर		Unit – 7 Equilibrium	20		F(8)
नवम्बर		Unit – 8 Redox reactions Unit – 12 Organic Chemistry - Some Basic Principles and Techniques	12 05		 F(10) (Cont.)
दिसम्बर		Unit – 12 Organic Chemistry - Some Basic Principles and Techniques (Contd.) Unit – 13 Hydrocarbons	15 05		
जनवरी		Unit – 13 Hydrocarbons (Cont.)	10		
फरवरी		Revision			
मार्च		Exam			

Detailed Syllabus

Unit Ist: Some Basic Concepts of Chemistry:

(i) Importance of Chemistry.

(ii) Nature of matter: - classification of matter.

(iii) Properties of matter and their measurement: - Physical and chemical properties, SI units, mass and weight, volume, density, temperature.

(iv) Uncertainty in measurement: - Scientific notation, multiplication and division, addition and subtraction, significant figures, precision and accuracy, dimensional analysis.

(v) Laws of Chemical combinations: - Law of conservation of mass, law of definite proportions, law of multiple proportions, Gay Lussac's law of gaseous volumes, Avogadro's law.

(vi) Dalton's atomic theory.

(vii) Atomic and molecular Masses: - atomic mass, average atomic mass, molecular mass, formula mass.

(viii) Mole concept and molar masses.

(ix) Percentage Composition: - empirical Formula and molecular formula.

(x) Stoichiometry and calculations: - Balancing of chemical equations, limiting reagent, mass percentage, mole fraction, molarity, molality.

Unit 2nd :- Structure of Atom:

(i) Sub. atomic particles: - Discovery of electrons, charge to mass ratio of electron, charge on the electron. discovery of protons and neutrons.

(ii) Atomic Models: - Thomson's model of atom and its limitations, Rutherford's nuclear model of atom and its limitations, atomic number and mass number, isobars and isotopes, Drawbacks of Rutherford's model.

(iii) Developments leading to the Bohr's model of atom: - Wave nature of electromagnetic radiations, electromagnetic spectrum, particle nature of electromagnetic radiation, Planck's quantum theory, photo electric effects. Dual behavior of electromagnetic radiations, atomic spectra, emission and absorption spectrum.

(iv) Bohr's Model for Hydrogen atom: - Explaination of line spectrum of hydrogen Limitations of Bohr's Model.

(v) Quantum mechanical model of the atom: - Dual nature of matters and light, Heisenberg's uncertainty principle, it's significance de-Broglie's relationship, failure of Bohr's model, hydrogen atom and the Schrodinger equation.

(vi) Orbital and quantum numbers: - Shapes of atomic s,p,d and f orbitals energies of orbitals rules for filling of electrons in orbitals Aufbau principle pauli exclusion principle and Hund's rule, electronic configuration. of atoms, stability of half filled and full filled orbitals.

Unit 3rd :- Classification of elements and periodicity in properties:-

(i) Need of Classification of elements, basis of periodic Classification, Newlands law of Octaves, mendeleve's periodic Law and its periodic table.

(ii) Modern periodic law and long form of periodic table

Nomenclature of elements with atomic number>100, electronic configuration of elements and the periodic table. Group wise electronic configuration.

(iii) Electronic configurations and types of elements: -

s, p, d, f – Blocks, metals, non metals and metalloids.

(iv) Periodic trends in properties of elements: -

Trends in physical properties, atomic radii, Ionic radii, ionization enthalpy, electron gain enthalpy, electro negativity,

(v) Periodic trends in chemical properties: - Periodicity of valence or oxidations states, anamolous properties of second period elements. Periodic trends and chemical reactivity.

Unit 4th :- Chemical Bonding and Molecular structure:

(i) Kossel-Lewis Approach to chemical bonding:

Octet rule

Covalent Bond

Lewis representation of simple molecules (Lewis structure)

Formal Charge

Limitation of the octet rule

(ii) Ionic OR Electrovalent Bond: -

Lattice enthalpy

(iii) Bond Parameters: - Bond length, bond angle, bond enthalpy, bond-order, resonance structures, polarity of bonds, dipole moment.

(iv) The Valence Shell Electron Pair Repulsion (VSEPR) Theory (v) Valence Bond Theory: - Orbital overlap concept, directional properties of bonds, overlapping of atomic orbitals, types of overlapping and nature of covalent bond, sigma (σ) bond and pi (π) bond.

(vi) Hybridisation: - Types of hybridsation and shapes of molecules

(vii) Molecular orbital theory:- Formation of molecular orbitals Linear combination of atomic orbital (LCAO), conditions for the combination of atomic orbital, types of molecular orbitals, energy level diagram for molecular orbitals, electronic configuration and molecular behaviour. Bonding in some homo nuclear diatomic molecules. (qualitative idea only)

(viii) Hydrogen Bonding: - Cause of formation of hydrogen bond types of hydrogen bond.

Unit 6th :- Thermodynamics: (i) Thermodynamic state: - system and surroundings, types of systems, open, closed and isolated system, state function and path functions. Internal energy as a state function, work, heat, isothermal and free expansion of an ideal gas.

(ii) Enthalpy, extensive and intensive properties, heat capacity, relationship between Cp and Cv for Ideal gas.

(iii) Calorimetry:- Measurement of ΔU and ΔH, bomb calorimeter.

(iv) Enthalpy Change- reaction enthalpy, standard enthalpy of reactions, enthalpy changes during phase trans formations, standard enthalpy of formation Hess's law of constant heat summation.

(v) Enthalpies for different types of reactions:- Standard enthalpy of combustion, enthalpy of atomization, bond enthalpy, enthalpy of solution, lattice enthalpy.

(vi) Spontaneity – Factors governing spontaneity of process, Change in enthalpy and change in entropy, Gibb's free energy, effect of temp on spontaneity of process, Gibb's free energy change and equilibrium.

Unit-7 Equilibrium: (i) Equilibrium in physical process Solid- equilibrium, equilibrium involving dissolution of solid or gases in liquids, general characteristics of equilibrium involving physical processes.

(ii) Equilibrium in chemical processes- dynamic equilibrium.

(iii) Law of Chemical equilibrium and equilibrium constant – relation between equilibrium constant for a general reaction and its multiple.

(iv) Homogeneous equilibrium:- relationship between equilibrium constant in terms of pressure(Kp) and equilibrium constant in terms concentration(Kc).

(v) Heterogeneous equilibrium

(vi) Application of equilibrium constant, predicting the extent of a reaction, predicting the direction of the reaction, calculating equilibrium concentration.

(vii) Relationship between equilibrium constant (K), reaction quotient (Q) and Gibb's energy (G).

(viii) Factors affecting equilibrium:- Le- Chatelier's principle, effect of changing Concentration, effect of pressure change, effect of temp change, effect of inert Gas addition, effect of catalyst.

(ix) Ionic equilibrium in solutions- acids, bases and salts, Arrhenius concept of acids and bases, Bronsted- Lowry acids and bases ,Lewis acids and bases.

(x) Ionization of acids and bases.

(xi) Ionization constant of water and its ionic product:- pH Scale, ionization of weak acids, ionization of weak bases, relation ship between Ka and Kb, di and ply basic acids & strength, Common ion effect, hydrolysis of salts and pH of their solution.

(xii) Buffer solutions

(xiii) Solubility equilibrium of sparingly soluble salts, solubility product common ion effect on solubility of ionic salts.

Unit-8: Redox Reactions(i) Oxidation and reduction reactions.

(ii) Redox reactions in terms of electron transfer reactions.

(iii) Oxidation reactions by oxidactin number method and half reaction method, redox reactions as the basis for titractions.

(iv) Redox reactions and electode processes: standard electrode potential

Unit- 12 Organic Chemistry –Some Basic Principles and Techniques.

(i) Introduction, shapes of Carbon compounds.

(ii) Complete, Condensed and bond line structural formulas three dimensional representation of organic molecules.

(iii) Classification of organic compounds: Functional groups. homologous series

(iv) Nomenclature of Organic Compounds: IUPAC system of nomenclature of organic compounds, nomenclature of substituted benzene compounds.

(v) Isomerism :-structural, stereoisomerism.

(vi) Concepts in organic reaction mechanism:-Fission of a covalent bond, nucleophiles and electrophiles, electron movement in organic reactions, iInductive effect, resonance structures, resonance effect, electromeric effect, hyperconjugation, types of organic reactions and mechanisms.

(vii) Methods of purification of organic Compounds:- sublimation crystallisation, distillation, fractional distillation, steam distillation, differential extraction chromatography.

(viii) Qualitative analysis of organic compounds:- Detection of carbon and hydrogen, Nitrogen, Sulphur, Halogens, Phosphorus.

(ix) Quantitative Analysis:- Carbon and Hydrogen, Nitrogen, Halogens, Sulphur, Phosphorus, Oxygen.

Unit-13 (Hydrocarbons)

(i) Classfication

(ii) Alkanes: Nomenclature and isomerism, preparation of alkanes, physical and chemical properties of alkanes: substitution reactions, combustion, controlled oxidation, isomerisation aromatization, Pyrolysis; confirmations: Sawhorse projections, Newman projections,

(iii) Alkenes: Structure, nomenclature, isomerism, preparation of alkenes, physical properties and chemical properties: addition of hydrogen, halogen, water, hydrogen halides (Markovnikov's addition and peroxide effect) oxidation, ozonolysis, polymerization.

(iv) Alkynes: Nomenclature isomerism, structure of triple bond, methods of preparation, physical properties, chemical reactions:- acidic character of alkynes, addition reactions of hydrogen, halogens, hydrogen halides, water, polymerization.

(v) Aromatic hydrocarbons Introduction IUPAC nomenclature; Isomerism , Benzene: Physical Properties and chemical paroperties: electrophilic substitution: nitration halogenation, sulphonation, Friedel- Craft's alkylation and acylation, mechanism of electrophilic substitution

reacton; deirective influence of functinal group in mono substituted benzene; Carcinogenicity and toxicity.

Class: 11th

Syllabus for practical

Total Periods= 60

(A) I) Basic Laboratory Techniques:-

(i) Cutting glass tube and glass rod. 02 period

(ii) Bending a glass tube.

(iii) Drawing out a glass jet.

(iv) Boring a cork

(B) II) Characterisaton and purification of chemical substance 06 period

(i) Determination of melting point of organic compound.

(ii) Determination of Boiling point of organic compound

(iii) Crystallization involving impure sample of any one of the following:- Alum.Copper Sulphate, Benzoic acid.

(C) III) Experiments Related to PH 06 period

(i) Any one of the following experiments:

a) Determination of PH of Some solutions obtained from fruit juices, solutions of known and varied concentration of acids, bases and salts using PH paper or universal indicator.

b) Comparing the PH of solutions of strong acid and weak acid of same concentration

c) Study of PH change by common ion effect in case of weak acid and weak bases.

(D) IV) Chemical Equilibrium:- 04 period

- One of the following experiments:

a) Study of the shift in equilibrium between ferric ions and thiocynate ions by increasing /decreasing the concentration of either of the ions.

b) Study of the shift in equilibrium between $[(co(H_2O)_6]^2$ and Chloride ions by changing the concertration of either of the ions.

(E) V) Quantitative Estimation:- 16 periods

(i) Using a chemical balance.

(ii) Preparation of Standard solution of oxalic acid.

(iii) Determination of strength of a given solution of sodium hydroxide by titrating it against standard solution of oxalic acid.

(iv) Preparation of standard solution of sodium carbonate.

(v) Determination of strength of a given solution of hydrochloric acid by titrating it against- standard sodium carbonate solution.

(F) VI) Qualitative Analysis 16 periods

Determination of One anion and one Cation in given salt

Cations: Pb^{2+}, CU^{2+}, As^{3+}, Al^{3+}, Fe^{3+}, Mn^{2+}, Ni^{2+}, Zn^{2+}, Co^{2+}, Ca^{2+}, Sr^{2+}, Ba^{2+}, Mg^{2+}, NH_4^{+}

Anions: CO_3^{2-}, S^{2-}, SO_3^{2-}, NO_2^{-}, NO_3^{-}, Cl^{-}, Br^{-}, I^{-}, PO_4^{3-}, $C_2O_4^{3-}$, CH_3COO^{-},

(Note: Insoluble Salts excluded).

VII) Any one project 10 periods