Bal Bharati PUBLIC SCHOOL

# SYLLABUS (2025-2026)

**CLASS: XI**
**SUBJECT: CHEMISTRY**

**TEXTBOOKS:**

1. NCERT PART 1
2. NCERT PART 2

| EXAMINATION | UNIT/ CHAPTER / TOPIC | SUBTOPICS | WEIGHTAGE ( MARKS) |
|---|---|---|---|
| **HALF YEARLY** | SOME BASIC CONCEPTS OF CHEMISTRY | General Introduction: Importance and scope of Chemistry, Nature of matter, laws of chemical combination, Dalton's atomic theory: concept of elements, atoms and molecules, atomic and molecular masses, mole concept and molar mass, percentage composition, empirical and molecular formula, chemical reactions, stoichiometry and calculations based on stoichiometry. *** Ways to calculate the concentration of solution( mass percentage , mole fraction, molarity, molality) are excluded.** | 12 |
| | STRUCTURE OF ATOM | Discovery of Electron, Proton and Neutron, atomic number, | 18 |

| | | | |
|---|---|---|---|
| | | isotopes and isobars. Thomson's model and its limitations. Rutherford's model and its limitations, Bohr's model and its limitations, concept of shells and subshells, dual nature of matter and light, de Broglie's relationship, Heisenberg uncertainty principle, concept of orbitals, quantum numbers, shapes of s, p and d orbitals, rules for filling electrons in orbitals - Aufbau principle, Pauli's exclusion principle and Hund's rule, electronic configuration of atoms, stability of half-filled and completely filled orbitals. | |
| | CLASSIFICATION OF ELEMENTS AND PERIODICITY IN PROPERTIES | Significance of classification, brief history of the development of periodic table, modern periodic law and the present form of periodic table, periodic trends in properties of elements -atomic radii, ionic radii, inert gas radii, Ionization enthalpy, electron gain enthalpy, electronegativity, valiancy, Nomenclature of elements with atomic number greater than 100. | 13 |
| | CHEMICAL BONDINGAND MOLECULAR STRUCTURES | Valence electrons, ionic bond, covalent bond, bond parameters, Lewis structure, polar character of covalent bond, covalent character of ionic bond, valence bond theory, resonance, geometry | 17 |

| | | | |
|---|---|---|---|
| | | of covalent molecules, VSEPR theory, concept of hybridization, involving s, p and d orbitals and shapes of some simple molecules, molecular orbital theory of homonuclear diatomic molecules (qualitative idea only), Hydrogen bond. | |
| | REDOX REACTIONS | Concept of oxidation and reduction, redox reactions, oxidation number, balancing redox reactions, in terms of loss and gain of electrons and change in oxidation number, applications of redox reactions. ***Applications of redox reaction are not included** | 10 |
| **TOTAL MARKS** | | | 70 |

| EXAMINATION | UNIT/ CHAPTER / TOPIC | SUBTOPICS | WEIGHTAGE ( MARKS) |
|---|---|---|---|
| **ANNUAL** | SOME BASIC CONCEPTS OF CHEMISTRY | General Introduction: Importance and scope of Chemistry, Nature of matter, laws of chemical combination, Dalton's atomic theory: concept of | 7 |

| | | | |
|---|---|---|---|
| | | elements, atoms and molecules, atomic and molecular masses, mole concept and molar mass, percentage composition, empirical and molecular formula, chemical reactions, stoichiometry and calculations based on stoichiometry.<br>*** Ways to calculate the concentration of solution( mass percentage , mole fraction, molarity, molality) are excluded.** | |
| | STRUCTURE OF ATOM | Discovery of Electron, Proton and Neutron, atomic number, isotopes and isobars. Thomson's model and its limitations. Rutherford's model and its limitations, Bohr's model and its limitations, concept of shells and subshells, dual nature of matter and light, de Broglie's relationship, Heisenberg uncertainty principle, concept of orbitals, quantum numbers, shapes of s, p and d orbitals, rules for filling electrons in orbitals - Aufbau principle, Pauli's exclusion principle and Hund's rule, electronic configuration of atoms, stability of half-filled and completely filled orbitals. | 9 |

| | | | |
|---|---|---|---|
| | CLASSIFICATION OF ELEMENTS AND PERIODICITY IN PROPERTIES | Significance of classification, brief history of the development of periodic table, modern periodic law and the present form of periodic table, periodic trends in properties of elements -atomic radii, ionic radii, inert gas radii, Ionization enthalpy, electron gain enthalpy, electronegativity, valiancy, Nomenclature of elements with atomic number greater than 100. | 6 |
| | CHEMICAL BONDINGAND MOLECULAR STRUCTURES | Valence electrons, ionic bond, covalent bond, bond parameters, Lewis structure, polar character of covalent bond, covalent character of ionic bond, valence bond theory, resonance, geometry of covalent molecules, VSEPR theory, concept of hybridization, involving s, p and d orbitals and shapes of some simple molecules, molecular orbital theory of homonuclear diatomic molecules (qualitative idea only), Hydrogen bond. | 7 |
| | CHEMICAL THERMODYNAMICS | Concepts of System and types of systems, surroundings, work, heat, energy, extensive and intensive properties, state functions. First law of thermodynamics -internal energy and enthalpy, heat capacity and specific heat, measurement of ΔU and | 9 |

| | | | |
|---|---|---|---|
| | | ΔH, Hess's law of constant heat summation, enthalpy of bond dissociation, combustion, formation, atomization, sublimation, phase transition, ionization, solution and dilution. Second law of Thermodynamics (brief introduction), Introduction of entropy as a state function, Gibb's energy change for spontaneous and non- spontaneous processes, criteria for equilibrium, Third law of thermodynamics (brief introduction). | |
| | EQUILIBRIUM | Equilibrium in physical and chemical processes, dynamic nature of equilibrium, law of mass action, equilibrium constant, factors affecting equilibrium – Le Chatelier's principle, ionic equilibrium-ionization of acids and bases, strong and weak electrolytes, degree of ionization, ionization of poly basic acids, acid strength, concept of pH, hydrolysis of salts (elementary idea), buffer solution, Henderson Equation, solubility product, common ion effect (with illustrative examples). | 7 |
| | REDOX REACTIONS | Concept of oxidation and reduction, redox reactions, oxidation | 4 |

| | | | |
|---|---|---|---|
| | | number, balancing redox reactions, in terms of loss and gain of electrons and change in oxidation number, applications of redox reactions. ***Applications of redox reaction are not included** | |
| | ORGANIC CHEMISTRY:SOME BASIC PRINCIPLES AND TECHNIQUES | General introduction, methods of purification, quantitative analysis ***(of carbon, hydrogen and sulphur only)** classification and IUPAC nomenclature of organic compounds. Electronic displacements in a covalent bond: inductive effect, electrometric effect, resonance and hyper conjugation. Homolytic and heterolytic fission of a covalent bond: free radicals, carbocations, carbanions, electrophiles and nucleophiles, types of organic reactions. ***Qualitative analysis is not included** | 11 |
| | HYDROCARBONS | Aliphatic Hydrocarbons Alkanes - Nomenclature, isomerism, conformation (ethane only), physical properties, chemical reactions including free radical mechanism of halogenation, combustion and pyrolysis. Alkenes - Nomenclature, structure of | 10 |

| | | | |
|---|---|---|---|
| | | double bond (ethene), geometrical isomerism, physical properties, methods of preparation, chemical reactions: addition of hydrogen, halogen, water, hydrogen halides (Markovnikov's addition and peroxide effect), ozonolysis, oxidation, mechanism of electrophilic addition. Alkynes - Nomenclature, structure of triple bond (ethyne), physical properties, methods of preparation, chemical reactions: acidic character of alkynes, addition reaction of - hydrogen, halogens, hydrogen halides and water. Aromatic Hydrocarbons Introduction, IUPAC nomenclature, benzene: resonance, aromaticity, chemical properties: mechanism of electrophilic substitution. Nitration, sulphonation, halogenation, Friedel Craft's alkylation and acylation, directive influence of functional group in mono substituted benzene, carcinogenicity and toxicity | |
| **TOTAL MARKS** | | | 70 |

**NOTE:** The following topics are included in the syllabus but will be assessed only formatively to reinforce understanding without adding to summative assessments. This reduces academic stress while ensuring meaningful learning. Schools can integrate these with existing chapters as they align well. Relevant NCERT textual material is enclosed for reference.

1. **s & p Block Elements**

Electronic configuration, atomic & Ionic radii, Ionization Enthalpy, Hydration Enthalpy and general trends in physical and chemical properties of s and p block elements across the periods and down the groups; unique behavior of the first element in each group.

2. **The Gaseous State**

Qualitative treatment of Gas laws, Ideal gas equation and deviations from it.