

WEST BENGAL COUNCIL OF HIGHER SECONDARY EDUCATION

SYLLABUS FOR CLASSES XI AND XII

SUBJECT : CHEMISTRY (CHEM)

CLASS - XI

SEMESTER – I

SUBJECT : CHEMISTRY (CHEM)

FULL MARKS : 35

CONTACT HOURS : 70 Hours

COURSE CODE : THEORY

Sub-topics

UNIT No.	TOPICS	CONTACT HOURS	MARKS
Unit - 1	Some Basic Concepts of Chemistry: Laws of chemical combination. 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. Different concentration terms of solutions and related calculations.	07	03
Unit - 2	Structure of Atom: Bohr's model and its limitations, concept of shell and sub-shells, the dual nature of matter and light, de Broglie's relationship. Heisenberg uncertainty principle, Schrödinger wave equation (elementary idea only). Concept of orbitals, quantum numbers, shapes of <i>s</i> , <i>p</i> and <i>d</i> orbitals, rules for filling electrons in orbitals: Aufbau principle, Pauli exclusion principle and Hund's rule, exchange energy, electronic configuration of atom, stability of half-filled, completely filled orbitals.	12	06
Unit - 3	Classification of Elements and Periodicity in Properties: Modern periodic law and the present form of the periodic table, periodic trends in properties of elements – atomic radii, ionic radii, van der Waals' radii, ionization enthalpy, electron gain enthalpy, electronegativity, valency. Nomenclature of elements with atomic number greater than 100.	07	04
Unit - 4	Chemical Bonding and Molecular Structure: Valence electrons, ionic bond, bond parameters, covalent bond, Lewis structure, polar character of covalent bond, covalent character of ionic bond, valence bond theory, resonance, geometry of covalent molecules, VSEPR theory, concept of hybridisation, involving <i>s</i> , <i>p</i> and <i>d</i> orbitals and shapes of some simple molecules, intermolecular interactions, Hydrogen bonding, Molecular orbital theory of homonuclear diatomic molecules (H_2 , He_2 , O_2 , N_2 , F_2 – qualitative idea only)	13	06

UNIT No.	TOPICS	CONTACT HOURS	MARKS
Unit - 5	States of Matter — Solids and Gases: Classification of solids (elementary idea): molecular, ionic, covalent and metallic solids, amorphous and crystalline solids (elementary idea), unit cell in two-dimensional and three-dimensional lattices, packing efficiency, calculation of density of unit cell, packing in solids, voids, number of atoms per unit cell in a cubic unit cell, point defects. Kinetic theory of gas, molecular speeds, Dalton's law of partial pressure, Graham's law, deviation of ideal behaviour and van der Waals' equation, Liquefaction of gases, critical temperature.	09	04
Unit - 6	s-Block Elements (Group 1 and Group 2 elements): Electronic configuration, occurrence, trends in the variation of properties (such as ionization enthalpy, atomic and ionic radii), trends in chemical reactivity with oxygen, water, hydrogen and halogens, hydrides (ionic, covalent and interstitial), hydrogen peroxide (preparation, properties, structure & use.), hydrogen as a fuel. Biological importance of Na, K, Mg, Ca.	10	05
Unit - 7	p-Block Elements (Group 13 and Group 14 elements): General introduction to <i>p</i> -block elements, electronic configuration, occurrence, variation in properties, oxidation states, and trends in chemical reactivity of group 13 and 14 elements. Group 13: Boron: physical and chemical properties of compounds of Boron: Boron oxides, boric acid, borates and B_2H_6 Aluminium: Reactions of Al with acid and alkali, uses of Al, Preparation and uses of $LiAlH_4$ and Al_2O_3 . Group 14: Carbon: catenation, allotropic forms, nano carbon, graphene, physical and chemical properties of two oxides of carbon- CO and CO_2 , Silicon: some compounds of silicon and their important uses – Silicon tetrachloride (Structure, preparation, hydrolysis and reduction reaction only), silicates [structure of open chain silicates constructing of $(SiO_3)_n^{2n-}$ ions], use of zeolites,	12	07