Class11-Chemistry-JEE-Mains-Formulas

October 18, 2025

Chapter	Concept	Formula / Key Point
Some Basic Concepts of Chemistry	Mole Concept	1 mole = 6.022×10^{23} particles (Avogadro's Number)
	—	—
	Molar Mass	Molar mass (g/mol) = Mass of 1 mole of substance
	—	—
	Mole Fraction	$X_A = \frac{n_A}{\sum n_i}$
	—	—
	Molarity	$M = \frac{\text{moles of solute}}{\text{liters of solution}}$
	—	—
	Molality	$m = \frac{\text{moles of solute}}{\text{kg of solvent}}$
	—	—
Atomic Structure	Bohr's Model	$E_n = -\frac{13.6}{n^2}$ eV, $r_n = n^2 a_0$
	—	—
	de Broglie Wavelength	$\lambda = \frac{h}{mv}$
	—	—
	Heisenberg Uncertainty	$\Delta x \Delta p \geq \frac{h}{4\pi}$
	—	—
	Quantum Numbers	n, l (0 to n-1), m_l ($-l$ to $+l$), m_s ($\pm\frac{1}{2}$)
	—	—
Chemical Bonding and Molecular Structure	Ionic Bonding	Transfer of electrons, formation of ions
	—	—
	Covalent Bonding	Sharing of electron pairs
	—	—
	VSEPR Theory	Shape predicted by repulsion of electron pairs
	—	—
	Hybridization	sp, sp2, sp3 explained by orbital mixing
	—	—
	Bond Order	Bond Order = $\frac{(\text{bonding electrons} - \text{antibonding electrons})}{2}$
	—	—

Chapter	Concept	Formula / Key Point
	Dipole Moment	$\mu = Q \times r$ (Charge $\times$ distance)
	—	—
States of Matter	Ideal Gas Equation	$PV = nRT$
	—	—
	Van der Waals Equation	$\left(P + \frac{an^2}{V^2}\right)(V - nb) = nRT$
	—	—
	Critical Constants	$P_c = \frac{a}{27b^2}$, $V_c = 3nb$, $T_c = \frac{8a}{27bR}$
	—	—
	Kinetic Molecular Theory	$KE = \frac{3}{2}RT$ per mole
	—	—
Thermodynamics	Internal Energy	$\Delta U = q + W$
	—	—
	First Law	$\Delta U = Q - P\Delta V$
	—	—
	Enthalpy	$H = U + PV$
	—	—
	Hess's Law	Total enthalpy change = sum of individual changes
	—	—
	Heat Capacity	$C = \frac{q}{\Delta T}$
	—	—
	Entropy	$\Delta S = \frac{q_{rev}}{T}$
	—	—
Equilibrium	Law of Mass Action	$K_c = \frac{[C]^c[D]^d}{[A]^a[B]^b}$
	—	—
	Relation between K_p and K_c	$K_p = K_c(RT)^{\Delta n}$, where $\Delta n = (c + d) - (a + b)$
	—	—
	Le Chatelier's Principle	System shifts to counteract changes in conditions
	—	—
Redox Reactions	Oxidation Number	Change in oxidation state indicates electron transfer
	—	—
	Balancing Redox Reactions	Using ion-electron method in acidic/basic medium

Chapter	Concept	Formula / Key Point
	—	—
Hydrogen	Properties	Most abundant, forms H2 molecule, reducing agent
	—	—
	Isotopes	Protium, Deuterium, Tritium
	—	—
The s-Block Elements	General Properties	Group 1 and 2 elements, reactive metals
	—	—
	Reaction with Water	Alkali metals react vigorously
	—	—
The p-Block Elements	Group 13 to 18	Properties and trends (e.g. Boron family, Carbon family, etc.)
	—	—
	Allotropy	Different forms of same element (e.g. P4 and Pn)
	—	—
The Organic Chemistry - Some Basic Principles and Techniques	IUPAC Nomenclature	Rules to name organic compounds systematically
	—	—
	Functional Groups	Alcohol (-OH), Aldehyde (-CHO), Ketone (C=O), etc.
	—	—
	Isomerism	Structural and stereoisomerism
	—	—
Hydrocarbons	Alkanes, Alkenes, Alkynes	General formulas and reactions (e.g. combustion, substitution)
	—	—
	Benzene	Aromaticity, resonance energy, substitution reactions