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Physical equilibria and Henry law

Formulas and units, JEE Main. Status: Reviewed on 2026-11-20.

Result	Formula	Units or note
Henry's law	p = K_H x Valid when: Dilute solution of a gas in a liquid; p is partial pressure of that gas	p and K_H in bar (or kPa); x dimensionless
Mole fraction of dissolved gas	x = n/(n + n_solvent); dilute: x = n/n_solvent Valid when: Dilute solutions only; use full form when n is not small	dimensionless
Moles of solvent in 1000 g water	n_solvent = 1000/18.0 = 55.5 mol Valid when: Water as solvent; molar mass 18.0 g per mol	mol
Partial pressure in a mixture	p_A = y_A x P_total Valid when: Ideal mixture of gases; y_A is the mole fraction in the gas phase	bar
Moles of vapour at vapour pressure	n = pV/RT (liquid still present) Valid when: Vapour treated as ideal gas, liquid still present, temperature in kelvin	p in Pa, V in m^3, R = 8.314 J/(mol K), T in K
Boiling	vapour pressure = external pressure	bar or kPa
Temperature effect on gas solubility	K_H increases as T increases, so x at fixed p decreases Valid when: Gases that dissolve with release of heat; compared at the same partial pressure	n/a (qualitative)
Comparing two conditions	x2/x1 = (p2/p1)(K_H1/K_H2) Valid when: Same gas and solvent; K_H taken at each temperature	dimensionless

Full lesson with worked examples:
https://www.engineeringrise.in/learn/learn/jee-main/chemistry/equilibrium/physical-equilibria-and-henry-law

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