Conversions

1 lb = 453.6 g 1 in = 2.54 cm (exactly) 1 nm = 1×10^{-9} m 1 J = $\frac{1\ \text{kg}\cdot\text{m}^2}{\text{s}^2}$

K = °C + 273 1 atm = 760 mmHg = 14.7 psi = 101.325 kPa

Standard Temperature and Pressure (STP): 1 atm and 0°C; 1 mol of an ideal gas has a volume of 22.4 L @ STP

Constants

electron charge = 1.6022×10^{-19} C Avogadro's number (N_A) = 6.022×10^{23} particles/mole

Planck's constant (h) = 6.626×10^{-34} J·s speed of light (c) = 3.00×10^{8} m/s

Gas Constant (R) = 0.0821 $\frac{\text{L}\cdot\text{atm}}{\text{mol}\cdot\text{K}}$

Formulas

$\text{density} = \frac{\text{mass}}{\text{volume}}$ $\text{molar mass} = \frac{\text{grams of substance}}{\text{moles of substance}}$ $\text{Molarity } (M) = \frac{\text{mol solute}}{\text{L of solution}}$

$q_p = \Delta H$ $q = mC_s\Delta T$ $q = n\Delta H_{fus}$ $q = n\Delta H_{vap}$

$\Delta H_{rxn} = \Sigma\ \text{BE(reactants)} - \Sigma\ \text{BE(products)}$

$\Delta H_{rxn} = \Sigma\ n_p\ \Delta H_f°\text{(products)} - \Sigma\ n_r\ \Delta H_f°\text{(reactants)}$

$E = h\nu = \frac{hc}{\lambda}$ $c = \lambda\nu$

$\lambda = \frac{h}{mv}$ $\text{KE} = \frac{1}{2}mv^2$

$\Delta E = -2.18 \times 10^{-18}\ \text{J}\left(\frac{1}{n_f^2} - \frac{1}{n_i^2}\right)$ $u_{rms} = \sqrt{\frac{3\,RT}{molar\ mass}}$

$PV = nRT$ $P_{total} = P_a + P_b + P_c + \ldots$

$P_A = X_A P_{total}$ $X_A\ \text{(mole fraction)} = \frac{n_A}{n_{total}}$

$\text{Molarity } (M) = \frac{\text{mol solute}}{\text{L of solution}}$ $\text{molality } (m) = \frac{\text{mol solute}}{\text{kg solvent}}$

$\Delta T_b = K_b m$ $\Delta T_f = K_f m$

$\Delta T_b = iK_b m$ for electrolytes $\Delta T_f = iK_f m$ for electrolytes

$\pi = iMRT$

Solubility Characteristics of Ionic Compounds in Water at 25°C

SOLUBLE COMPOUNDS	EXCEPTIONS
Compounds containing alkali metal ions (Li^+, Na^+, K^+, Rb^+, Cs^+) and the ammonium ion (NH_4^+)	
Nitrates (NO_3^-), bicarbonates (HCO_3^-), and chlorates (ClO_3^-)	
Halides (Cl^-, Br^-, I^-)	Halides of Ag^+, Hg_2^{2+}, and Pb^{2+}
Sulfates (SO_4^{2-})	Sulfates of Ag^+, Ca^{2+}, Sr^{2+}, Ba^{2+}, and Pb^{2+}
INSOLUBLE COMPOUNDS	**EXCEPTIONS**
Carbonates (CO_3^{2-}), phosphates (PO_4^{3-}), chromates (CrO_4^-), and sulfides (S^{2-})	Compounds containing alkali metal ions and the ammonium ion
Hydroxides (OH^-)	Compounds containing alkali metal ions and the Ba^{2+} ion