Conversions

1 1b = 453.6 g

1 nm = 1 x 10^{-9} m

1 in = 2.54 cm (exactly)

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

$N_A = 6.022 \times 10^{23}$ 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 $\frac{\text{L}\cdot\text{atm}}{\text{mol}\cdot\text{K}}$

Rydberg Constant (R_H) = 2.18 x 10^{-18} J

Formulas

density = $\frac{\text{mass}}{\text{volume}}$

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

$c = \lambda\nu$

$\lambda = \frac{h}{mu}$

$q_p = \Delta H$ $\quad$ $q = ms\Delta T$

$q = n\Delta H_{fus}$ $\quad$ $q = n\Delta H_{vap}$

$\Delta H^\circ_{rxn} = \Sigma n\Delta H_f°(\text{products}) - \Sigma m\Delta H_f°(\text{reactants})$

$\Delta H^\circ_{rxn} = \Sigma BE(\text{reactants}) - \Sigma BE(\text{products})$

molar mass = $\frac{\text{grams of substance}}{\text{moles of substance}}$

$KE = \frac{1}{2}mu^2$

$PV = nRT$

$P_{total} = P_1 + P_2 + \ldots + P_n$

$P_A = X_A P_{total}$

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

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

molality (m) = $\frac{\text{mol solute}}{\text{kg solvent}}$

$\Delta T_b = iK_b m$

$\Delta T_f = iK_f m$

$\Delta E = -R_H\left(\frac{1}{n_f^2} - \frac{1}{n_i^2}\right)$

$\pi = iMRT$

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