Useful Constants

Avogadro’s Number:	$6.02214179 \times 10^{23}\ mol^{-1}$
Standard Pressure:	1 atm = 760 torr = 101325 Pa = 760 mmHg (approx.)
Gas Constant:	R = 0.0820575 L-atm/mol-K = 8.314472 J/mol-K
	= 62.3637 L-torr/mol-K
Acceleration due to gravity:	$9.80665\ m/s^2$
Faraday Constant:	1 mole electrons = 96485.3399 coulombs
Water Hydrolysis Constant:	$K_w = 1.00 \times 10^{-14}$ at 25^oC

Useful formulae

$$X^o = \sum_{i=1}^{k} n_i X^o_{f,i}(products) - \sum_{l=1}^{m} n_l X^o_{f,l}(reactants)$$ (where X is the state function ΔH, ΔG)

$$\Delta X^o = \sum_{i=1}^{k} n_i X^o_{f,i}(products) - \sum_{l=1}^{m} n_l X^o_{f,l}(reactants)$$ (where X is the state function S)

$$\Delta E = q + w;\ w = -P\Delta V;\ \Delta H = \Delta E + P\Delta V = \Delta E + \Delta nRT$$

$$\Delta G^o = \Delta H^o - T\Delta S^o = -RTlnK = -nF\epsilon^o$$ (where K is the equilibrium constant)

$$K_p = K_c(RT)^{\Delta n};\ \ln \frac{K_2}{K_1} = \frac{\Delta H^o}{R}\ x(\frac{T_2 - T_1}{T_2T_1});\ \ln \frac{P_2}{P_1} = \frac{\Delta H^o_{vap}}{R}\ x(\frac{T_2 - T_1}{T_2T_1})$$

$$\Delta G = \Delta G° + RTlnQ$$ (where Q is the reaction quotient)

Raoult’s Law: $P_{tot} = X_A P^*_A + X_B P^*_B$; Trouton’s rule: $\Delta S^o_{vap} = \frac{\Delta H^o_{vap}}{T_{nbp}} \approx 88 \frac{J}{mol \cdot K}$

Nernst Equation:	$\epsilon_{cell} = \epsilon^o_{cell} - \frac{RT}{nF} lnQ$
	$\epsilon_{cell} = \epsilon^o_{cell} - \frac{0.059159}{n} logQ$ at 25°C
Zero Order Reaction:	$[A]_o - [A]_t = kt$
1st Order Reaction:	$\ln \frac{A_o}{A_t} = kt$
2nd Order Reaction:	$\frac{1}{A_t} = \frac{1}{A_o} + kt$
Arrhenius Equation:	$k = Ae^{\frac{-E_a}{RT}}$ (A is the pre-exponential factor)
	$\ln \frac{k_2}{k_1} = \frac{E_a}{R}\ x(\frac{T_2 - T_1}{T_1T_2})$
Freezing Point Depression/Boiling Point elevation:	$\Delta T = iK_f m$[1]$/ \Delta T = iK_b m$

[1] “i” is the van’t Hoff factor