Useful Constants

Avogadro's Number:	$6.022\ 140\ 76 \times 10^{23}$ mol^{-1}
Standard Pressure:	1 atm = 760 torr = 101325 Pa = 760 mmHg (approx.)
	1 bar = 100,000 Pa (exactly)
Gas Constant:	R = 0.082057366 L·atm/mol·K = 8.314462618 J/mol·K
	= 62.36359822 L·torr/mol·K = 0.08314462618 L·bar/mol·K
Acceleration due to gravity:	9.80665 m/s^2
Faraday Constant:	1 mole electrons = 96485.33212 coulombs
Water Hydrolysis Constant:	K_w = 1.00 x 10^{-14} at 25°C

Useful formulae

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

$$\Delta H = \Delta E + P\Delta V = \Delta E + \Delta nRT$$

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

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

$$\Delta G = \Delta G^\circ + RTlnQ$$ (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:	$\ln\left(\frac{[A]_o}{[A]_t}\right) = kt$
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) $\ln\left(\frac{k_2}{k_1}\right) = \left(\frac{E_a}{R}\right) x \left(\frac{T_2 - T_1}{T_1 T_2}\right)$
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