Formulae and Possibly Useful Information

$P_A = X_A P^o_A$ $\qquad\qquad$ $P_A = K_A[A]$ $\qquad\qquad$ $\Pi = MRT$

$\Delta T_b = K_b m$ $\qquad\qquad$ $\Delta T_f = K_f m$ $\qquad\qquad$ $PV = nRT$

$\Delta S_{sys} = q_{rev}/T = \Delta H/T$ $\qquad\qquad\qquad\qquad$ $\Delta S_{surr} = -\Delta H/T$

$w = -P_{ext}V$ $\qquad\qquad$ $q_p = nC_p\Delta T$ $\qquad\qquad$ $\Delta E = q + w$

$\Delta H = \Delta E + P\Delta V$ $\qquad\qquad$ $\Delta H = \Delta E + RT\Delta n$ $\qquad\qquad$ $\Delta S_{univ} = \Delta S_{sys} + \Delta S_{surr}$

$\Delta G = \Delta H - T\Delta S$ $\qquad\qquad$ $\Delta G = \Delta G^o + RTLnQ$ $\qquad\qquad$ $\Delta G^o = -RTLnK$

$Ln(K_2/K_1) = -(\Delta H^o/R)[(1/T_2) - (1/T_1)]$ $\qquad\qquad$ $K_w = [H^+][OH^-]$

$pH = -Log[H^+]$ $\qquad\qquad$ $K_w = 1.0 \times 10^{-14}$ (at 25°C) $\qquad$ $K_a K_b = K_w$

$pH + pOH = pK_w$ $\qquad\qquad$ $K_p = K_c(RT)^{\Delta n}$ $\qquad\qquad$ $pH = pK_a + Log([A^-]/[HA])$

1 Joule = 1 Volt x 1 Coulomb $\qquad\qquad\qquad\qquad$ $\Delta G^o = -n\,FE^o_{cell}$

$E^o_{cell} = (0.0592/n)LogK$ (at 25°C) $\qquad\qquad$ $E_{cell} = E^o_{cell} - (0.0592/n)LogQ$ (at 25°C)

$[A]_t = -kt + [A]_0$ $\qquad$ $Log[A]_t = -(k/2.303)t + Log[A]_0$ $\qquad\qquad$ $t_{\frac{1}{2}} = 0.693/k$

$t = (2.303/k)Log([A]_0/[A]_t)$ $\qquad\qquad$ $1/[A]_t = kt + 1/[A]_0$ $\qquad\qquad$ $Ln(N/N_0) = -kt$

$Lnk = -(E_a/R)(1/T) + LnA$ $\qquad\qquad$ $Ln(k_2/k_1) = (E_a/R)[(1/T_1) - (1/T_2)]$

$E = mc^2$ $\qquad\qquad\qquad\qquad$ 1 Ampere = 1 Coulomb/second

1 calorie = 4.184 Joule $\qquad\qquad\qquad\qquad$ 1 Joule = 1 kg-m^2-s^{-2} = 1 N-m

$c = 2.99792458 \times 10^8$ m/s $\qquad\qquad$ $h = 6.62606876 \times 10^{-34}$ J-s

$\pi = 3.1415927$ $\qquad\qquad\qquad\qquad$ $N_0 = 6.02214199 \times 10^{23}$ mol^{-1}

$K = °C + 273.15$ $\qquad\qquad\qquad\qquad$ $°F = (9/5)°C + 32$ (exactly)

$R = 8.3145$ J/mol-K = 0.08206 L-atm/mol-K

1 atm = 760 torr = 101325 Pa $\qquad\qquad$ $F = 96,485.309$ C/mol e$^-$