Constants, Conversion Factors and Equations (Exam III)

Constants and Conversion Factors:

$h = 6.626 \times 10^{-34}$ J·s

$c = 2.9979 \times 10^8 \frac{m}{s}$

$1 \text{ J} = 1 \frac{kg*m^2}{s^2}$

$N_A = 6.022 \times 10^{23}$

$R = 0.08206 \frac{L*atm}{mol*K} = 8.31451 \frac{J}{mol*K}$

1 cal = 4.184 J = 1×10^{-3} Cal

1 atm = 760 Torr = 760 mm Hg = 1.013 bar

Equations:

$d = \dfrac{m}{V}$

$\nu = \dfrac{c}{\lambda}$

$E_{photon} = h\nu$

$E_K \text{ (ejected electron)} = E_{photon} - \phi$

$\Delta E = -2.178 \times 10^{-18} J \left(\dfrac{1}{n_f^2} - \dfrac{1}{n_i^2} \right)$

$E_{photon} = |\Delta E|$

$\lambda_{matter} = \dfrac{h}{mv}$

$M_i V_i = M_f V_f$

$PV = nRT$

$PM = dRT$

$P_A = \chi_A P_{total}$

$\chi_A = \dfrac{n_A}{n_{total}}$

$E_K = \dfrac{1}{2} mv^2$

$\overline{E_K} = \dfrac{3}{2} RT$

$v_{rms} = \sqrt{\dfrac{3RT}{M}}$

$\Delta G = \Delta H - T\Delta S$

$\Delta S°_{rxn} = \Sigma[nS°_m \text{ (products)}] - \Sigma[nS°_m \text{ (reactants)}]$ (similar for $\Delta G°_f$, $\Delta H°_f$)

$q = mC_s\Delta T$

$q_{rxn} = -q_{soln}$

$\Delta H = q_P$