Exam 3 Equation Sheet

Chapter 6

$1 cal = 4.184 J$

$c_{H_2O} = 4.187 \frac{J}{g\,K}$

$q = mc\Delta T$

$q = n\Delta H_{rxn}$

$\Delta H_{rxn} = \frac{-mc\Delta T}{n_{rxn}} \qquad \left(n_{rxn} = \frac{n_{limiting}}{\nu_{limiting}} \right)$

$\Delta U_{rxn} = \frac{-C\Delta T}{n_{rxn}}$

$\Delta H_{rxn} = \sum_{products} \nu\Delta H_f - \sum_{reactants} \nu\Delta H_f$

Chapter 7

$PV = nRT$

$R = 0.08206 \frac{L\,atm}{mol\,K} = 8.314 \frac{J}{mol\,K}$

$1 atm = 760 torr = 760 mmHg$

$\overline{KE} = \frac{3}{2}RT$

$\frac{rate_1}{rate_2} = \sqrt{\frac{M_2}{M_1}} \quad$ or $\quad \frac{time_1}{time_2} = \sqrt{\frac{M_1}{M_2}}$

$P = \frac{nRT}{V-nb} - a\left(\frac{n}{V}\right)^2$

$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$

$P_{total} = \sum_{components} P_i$

$P_i = \frac{n_i RT}{V}$

$v_{rms} = \sqrt{\frac{3RT}{M}} \qquad \left(M \text{ in } \frac{kg}{mol} \right)$

$\left[P + a\left(\frac{n}{V}\right)^2 \right] (V - nb) = nRT$

Chapter 8

$c = 2.998 \times 10^8 \, m/s$

$\nu\lambda = c$

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

$KE_{photoelectron} = h\nu - \Phi$

$\frac{1}{\lambda} = R_H \left(\frac{1}{n_1^2} - \frac{1}{n_2^2} \right)$

$h = 6.626 \times 10^{-34} \, J\,s$

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

$R_H = 2.179 \times 10^{-18} \, J$

$R_H = 1.097 \times 10^7 \, m^{-1}$