

## Final Exam Equation Sheet

$$PV = nRT$$

$$R = 0.08206 \text{ L-atm/mol-K or } 8.314 \text{ J/mol-K}$$

$$T (\text{Kelvin}) = ^\circ\text{C} + 273.15$$

$$R = 8.314 \text{ J/mol-K}$$

$$E = E^0 - \frac{0.0257 \text{ V}}{n} \ln Q \quad \text{at } 25^\circ\text{C}$$

$$\text{Volts (V)} = 1 \text{ J/C}$$

$$\text{Amps (A)} = \text{C/s}$$

$$F = 96,485 \text{ C/mol}$$

$$\Delta G^\circ = -nFE^\circ$$

$$\Delta G^\circ = -RT \ln K$$

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

$$\Delta G = \Delta G^\circ + RT \ln (Q)$$

$$\ln (N_t/N_0) = -kt$$

$$t_{1/2} = 0.693/k$$

$$\text{pH} = \text{pK}_a + \log \frac{[\text{conjugate base}]}{[\text{acid}]}$$

$$K_w \text{ at } 25^\circ\text{C} = 1.00 \times 10^{-14}$$

$$\Pi = MRT$$

$$\Delta T_f = k_f m$$

$$\Delta T_b = k_b m$$

$$K_w = 1.00 \times 10^{-14}$$

\*any relevant  $K_a$ ,  $K_b$  or  $K_f$  will be given in the problems

$$K_w = K_a \times K_b$$

$$E^\circ_{\text{cell}} = E^\circ_{\text{cathode}} - E^\circ_{\text{anode}}$$