

SUPPLEMENTAL INFORMATION**CONSTANTS**

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

$$R = 0.0821 \text{ L-atm/mol-K}$$

$$N_A = 6.022 \times 10^{23} / \text{mol}$$

$$0^\circ\text{C} = 273.15 \text{ K}$$

$$1 \text{ atm} = 760 \text{ mm Hg} = 760 \text{ torr}$$

$$K_f(\text{H}_2\text{O}) = 1.86^\circ\text{C}/m$$

$$K_b(\text{H}_2\text{O}) = 0.51^\circ\text{C}/m$$

$$1 \text{ F} = 96,485 \text{ J/V}\cdot\text{mol} = 96,485 \text{ C/mol e}^-$$

$$1 \text{ V} = 1 \text{ J/C}$$

EQUATIONS

$$[A] = [A]_0 - kt \quad \ln[A] = \ln[A]_0 - kt$$

$$\frac{1}{[A]} = kt + \frac{1}{[A]_0} \quad t_{\frac{1}{2}} = \frac{[A]_0}{2k}$$

$$t_{\frac{1}{2}} = \frac{0.693}{k} \quad t_{\frac{1}{2}} = \frac{1}{k[A]_0}$$

$$\ln\left(\frac{k_1}{k_2}\right) = \frac{E_a}{R}\left(\frac{1}{T_2} - \frac{1}{T_1}\right)$$

$$P_{\text{solution}} = x_{\text{solvent}} P_{\text{solvent}}^\circ$$

$$\Delta T_f = -iK_f m$$

$$\Delta T_b = iK_b m$$

$$\pi = iMRT$$

$$\text{Quadratic equation solution} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\% \text{ ionization} = \left(\frac{[\text{H}_3\text{O}^+]_{\text{eq}}}{[\text{HA}]_0} \right) * 100\%$$

$$K_p = K_c(RT)^{\Delta n}$$

$$\text{pH} = \text{p}K_a + \log\left(\frac{[\text{base}]}{[\text{acid}]}\right)$$

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

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

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

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

$$E = E^\circ - \frac{0.0592 \text{ V}}{n} \log Q$$

$$\ln\left(\frac{K_2}{K_1}\right) = \frac{\Delta H^\circ}{R}\left(\frac{1}{T_1} - \frac{1}{T_2}\right)$$