

## CONSTANTS

$$R = 8.3145 \text{ J mol}^{-1}\text{K}^{-1}$$

$$R = 0.08206 \text{ L atm mol}^{-1}\text{K}^{-1}$$

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

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

$$c = 3 \times 10^8 \text{ m/s}$$

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

## CONVERSION FACTORS

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

$$1 \text{ A} = 1 \text{ C/sec}$$

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

$$1 \text{ L atm} = 101.3 \text{ J}$$

## EQUATIONS

$$E = E^\circ - \left( \frac{RT}{nF} \right) \ln Q$$

$$E = E^\circ - \left( \frac{0.0257}{n} \right) \ln Q \text{ at } 25^\circ\text{C}$$

$$E = E^\circ - \left( \frac{0.0592}{n} \right) \log Q \text{ at } 25^\circ\text{C}$$

$$E^\circ = \left( \frac{RT}{nF} \right) \ln K$$

$$I = \frac{nF}{t}$$

zero order:  $[A] = -k t + [A]_0$

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

first order:  $\ln [A] = -k t + \ln [A]_0$

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

second order:  $\frac{1}{[A]} = k t + \frac{1}{[A]_0}$

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

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

$$\Delta G = -nFE$$

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

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

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

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

$$k = A e^{-E_a/RT}$$

$$\ln k = \frac{-E_a}{R} \left( \frac{1}{T} \right) + \ln A$$

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

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