

Formula Sheet

$$P = \frac{dRT}{M}$$

$$PV = nRT$$

$$(K.E.)_{avg} = \frac{3RT}{2}$$

$$u_{rms} = \sqrt{\frac{3RT}{M}}$$

$$P_i = \frac{n_i}{n_{TOT}} \times P_{TOT}$$

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

$$K.E. = \frac{1}{2} mv^2$$

$$P.E. = mgh$$

$$\Delta E = q + w$$

$$w = -P\Delta V$$

$$q = mc\Delta T$$

$$\Delta H = \Delta E + P\Delta V$$

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

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

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

$$\Delta S_{surr} = -\frac{\Delta H_{sys}}{T}$$

$$\varepsilon = \varepsilon^\circ - \frac{RT}{nF} \ln Q$$

$$\varepsilon = \varepsilon^\circ - \frac{0.0591}{n} \log_{10} Q$$

$$[A] = -kt + [A]_0$$

$$[A] = [A]_0 e^{-kt}$$

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

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

$$\frac{1}{[A]} = kt + \frac{1}{[A]_0}$$

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

$$\Delta G^\circ = -nF\varepsilon^\circ$$

$$k = zpe^{-E_a/RT}$$

$$1 \text{ A} = 1 \text{ C s}^{-1}$$

$$f = e^{-E_a/RT}$$

$$k = Ae^{-E_a/RT}$$

$$\ln k = \ln A - E_a/R(1/T)$$

$$\Delta H^\circ_{rxn} = \sum n_p \Delta H^\circ_f(\text{product}) - \sum n_R \Delta H^\circ_f(\text{reactant})$$

$$\Delta H^\circ_{rxn} = \sum D(\text{bonds broken}) - \sum D(\text{bonds formed})$$

$$\Delta S^\circ_{rxn} = \sum n_p S^\circ(\text{product}) - \sum n_R S^\circ(\text{reactant})$$

$$\Delta G^\circ_{rxn} = \sum n_p G^\circ_f(\text{product}) - \sum n_R G^\circ_f(\text{reactant})$$