

## Equations and Conversions

Pressure conversions: 1 atm = 1.01325 x 10<sup>5</sup> Pa = 760 mm Hg = 760 torr

Ideal Gas Constant: R = 8.314 J K<sup>-1</sup> mol<sup>-1</sup> = 0.08206 L atm mol<sup>-1</sup> K<sup>-1</sup>

Gas Laws:  $PV = nRT$       $P + \frac{an^2}{V^2} (V - nb) = nRT$

$\Delta E = q + w$       $q = nC\Delta T$       $q = n\Delta H_{fus/vap}$

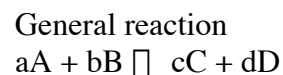
$w = Fd = -P_{ext}\Delta V$

$\Delta H = \Delta E + P\Delta V$       $\Delta H^\circ = \Delta H_f^\circ(pdt) - \Delta H_f^\circ(rct)$

$\Delta S = \frac{q_{rev}}{T}$       $\Delta S^\circ = S^\circ(pdt) - S^\circ(rct)$

$\Delta G = \Delta H - T\Delta S$       $\Delta G = \Delta G^\circ + RT\ln Q$  ;  $Q = \frac{[C]^c [D]^d}{[A]^a [B]^b} = \frac{P_C^c P_D^d}{P_A^a P_B^b}$

Average Rate =  $-\frac{1}{a} \frac{d[A]}{dt} = -\frac{1}{b} \frac{d[B]}{dt} = \frac{1}{c} \frac{d[C]}{dt} = \frac{1}{d} \frac{d[D]}{dt}$



Rate = k[A]<sup>m</sup>[B]<sup>n</sup>

Arrhenius equation:  $k = A \exp\left(-\frac{E_a}{RT}\right)$

$[A] = -kt + [A]_o$       $t_{1/2} = \frac{[A]_o}{2k}$

Integrated Rate Laws:  $\ln[A] = -kt + \ln[A]_o$       $t_{1/2} = \frac{\ln 2}{k}$

$\frac{1}{[A]} = kt + \frac{1}{[A]_o}$       $t_{1/2} = \frac{1}{[A]_o k}$