

CHEMISTRY EQUATIONS AND CONSTANTS

ATOMIC STRUCTURE

$$E = h\nu$$

$$c = \lambda\nu \quad \text{slope} = \frac{\Delta y}{\Delta x}$$

ACIDS / BASES

$$\text{pH} = -\log [\text{H}^+], \quad \text{pOH} = -\log [\text{OH}^-]$$

$$14 = \text{pH} + \text{pOH}$$

$$[\text{H}^+] = \text{antilog}(-\text{pH}), \quad [\text{OH}^-] = \text{antilog}(-\text{pOH})$$

$$[\text{H}^+] = [\text{H}_3\text{O}^{+1}]$$

$$\text{Speed of light, } c = 3.00 \times 10^8 \text{ m sec}^{-1}$$

$$\text{Planck's constant, } h = 6.626 \times 10^{-34} \text{ J sec}$$

$$\text{Avogadro's number} = 6.02 \times 10^{23} \text{ mol}^{-1}$$

$$\text{Hertz} = \text{sec}^{-1}$$

$$K_w = [\text{OH}^-][\text{H}^+] = 1.00 \times 10^{-14} \text{ @ } 25^\circ\text{C}$$

THERMOCHEMISTRY / KINETICS

$$\Delta H^0 = \sum H_{(\text{products})} - \sum H_{(\text{reactants})}$$

$$q = m c \Delta T$$

$$\ln[A]_f - \ln[A]_0 = -kt \quad \text{for a First Order Reaction}$$

$$\frac{1}{[A]_f} - \frac{1}{[A]_0} = kt \quad \text{for a Second Order Reaction}$$

$$H^0 = \text{standard enthalpy}$$

$$T = \text{temperature}$$

$$m = \text{mass}$$

$$q = \text{heat}$$

$$c = \text{specific heat capacity}$$

$$t = \text{time}$$

$$k = \text{rate constant}$$

$$c_{\text{H}_2\text{O}} = 4.184 \text{ J g}^{-1} \text{ } ^\circ\text{C}^{-1}$$

GASES AND SOLUTIONS

$$PV = nRT$$

$$P_{\text{Total}} = P_A + P_B + P_C + \dots$$

$$n = \frac{m}{M}$$

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

$$\frac{r_1}{r_2} = \sqrt{\frac{M_2}{M_1}}$$

$$D = \frac{m}{V}$$

$$J = \text{kg} \cdot \frac{\text{m}^2}{\text{sec}^2}$$

$$\Delta T_f = iK_f \times \text{molality}$$

$$\Delta T_b = iK_b \times \text{molality}$$

$$r = \text{rate of effusion}$$

$$m = \text{mass}$$

$$M = \text{molar mass}$$

$$i = \text{van't Hoff factor}$$

$$K_f = \text{molal freezing-point depression constant}$$

$$K_b = \text{molal boiling-point depression constant}$$

$$u_{\text{rms}} = \text{root-mean-square-speed}$$

$$\text{Gas constant, } R = 8.31 \text{ J mol}^{-1} \text{ K}^{-1}$$

$$R = 0.0821 \text{ L atm mol}^{-1} \text{ K}^{-1}$$

$$K_f \text{ for H}_2\text{O} = 1.86 \text{ K kg mol}^{-1}$$

$$K_b \text{ for H}_2\text{O} = 0.512 \text{ K kg mol}^{-1}$$

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

$$= 760 \text{ torr}$$