# *Chemistry*

*Useful Equations and Constants*

## Matter & Energy

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

## Accuracy, Precision & Error

$$\%\ \text{error} = \left|\frac{\text{theoretical - actual}}{\text{theoretical}}\right| \text{x } 100\%$$

$$\%\ \text{yield} = \frac{\text{actual}}{\text{theoretical}} \text{x } 100\%$$

## Stoichiometry

$6.02 \text{ x } 10^{23}$ *particles* = 1 *mole*

1 *mole* of gas at STP = 22.4 *L*

## Thermochemistry

$q = Cm\Delta T$

1 *cal* = 4.184 J

$C_{H2O} = 4.184\ {}^{J}\!/\!_{g^\circ C}$

## Concentration of Solutions

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

$$M_1V_1 = M_2V_2$$

$$\%({}^{m}\!/\!_{v}) = \frac{\text{g solute}}{\text{mL solution}} \text{x } 100\%$$

$$\%({}^{v}\!/\!_{v}) = \frac{\text{mL solute}}{\text{mL solution}} \text{x } 100\%$$

## Gas Laws

$^\circ C = K - 273;\ K = {}^\circ C + 273$

1 *atm* = 101.3 *kPa* = 760 *mmHg* = 14.7 PSI

$$R = 8.314\frac{L \cdot kPa}{K \cdot mol} = 0.0821\frac{L \cdot atm}{K \cdot mol}$$

STP = 0° C at 1 *atm*

$$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$$

$$PV = nRT$$

## Nuclear Chemistry

$$n = \frac{t_{total}}{T_{1/2}}$$

$$\text{fraction remaining} = \frac{1}{2^n} = \frac{A_f}{A_i}$$

$$A_f = A_i \times \left(\frac{1}{2}\right)^n$$

$$n = \frac{\log\left(\frac{A_f}{A_i}\right)}{\log\left(\frac{1}{2}\right)}$$

## Acids & Bases

$$pH = -\log[H^+]$$

$$[H^+] = 10^{-pH}$$