

Chemistry Notes and Equations - 8/9/2013 www.askmath.weebly.com

Sig-Fig Rules : Decimal \implies Start on the right; No decimal \implies Start on the left.

Specific Heat capacity : $q = m \cdot c \cdot \Delta T \implies (g)(\frac{J}{g^{\circ}C})(^{\circ}C)$

$$c \text{ of water} = 4.184 \frac{J}{g^{\circ}C}$$

$$1 \text{ calorie} = 4.184 J$$

$c = \lambda \cdot v$, where v is the frequency of light.

$$c = 3.00 \times 10^8 \frac{m}{s}$$

$E = h \cdot v$, where h is Planck's constant : $6.626 \times 10^{-34} Js$ and v is frequency.

Visible light wavelength in nanometers:

Red 650 – 710

Green 490 – 549

Violet 390 – 429

Acid suffixes and Prefixes \implies Anion name

Hydro—ic \implies —ide

Hypo—ous \implies Hypo—ite

—ous \implies —ite

—ic \implies —ate

Per—ic \implies Per—ate

Empirical Formula

1. Divide the percent by the atomic mass to get moles
2. Divide all the moles by the smallest mole
3. Multiply to get whole #

$$q = m \cdot c \cdot \Delta T + (H_f)(mol) + m \cdot c \cdot \Delta T + (H_v)(mol) + m \cdot c \cdot \Delta T$$

$$\begin{aligned} & 1 \text{ atm pressure} \\ & = 760 \text{ mm Hg and torr} \\ & = 101.3 \text{ kPa} \end{aligned}$$

$$\text{Boyle : } P_1V_1 = P_2V_2$$

$$\text{Charles : } \frac{V_1}{T_1} = \frac{V_2}{T_2}$$

$$\text{Gay-Lussac : } \frac{P_1}{T_1} = \frac{P_2}{T_2}$$

Ideal Gas Law :

$$\boxed{P \cdot V = n \cdot R \cdot T}$$
$$\text{kPa} \implies 8.31 \frac{\text{kPa} \cdot \text{L}}{\text{mol} \cdot \text{K}}$$
$$\text{atm} \implies .0821 \frac{\text{atm} \cdot \text{L}}{\text{mol} \cdot \text{K}}$$
$$\text{mmHg} \implies 62.4 \frac{\text{mmHg} \cdot \text{L}}{\text{mol} \cdot \text{K}}$$

Graham's Law : Rate of effusion $\propto \frac{1}{\sqrt{m}}$

$$\frac{R_a}{R_b} = \sqrt{\frac{MM_b}{MM_a}}$$

Molarity : $\frac{\text{moles of solute}}{\text{L of solvent}}$

Molality : $\frac{\text{moles of solute}}{\text{kg of solvent}}$

$$M_1 V_1 = M_2 V_2$$

$$\Delta T_{BP} = k_{BP} \cdot m \cdot i \implies (\text{BP constant})(\text{molality})(\text{van Hoff Factor})$$

$$\text{BP constant} : .512 \frac{^\circ\text{C}}{m}$$

$$\text{MP constant} : 1.86 \frac{^\circ\text{C}}{m}$$

$$q_{H_2O} = m \cdot c \cdot \Delta T$$

$$q_c = C \cdot \Delta T$$

$$q_{\text{reaction}} = q_{H_2O} + q_c$$

Heat of Formation and others

$$\text{Enthalpy} : \Delta H = \sum \text{Products} - \sum \text{Reactions} \implies H_f \text{ in kJ}$$

$$\text{Entropy} : \Delta S = \sum \text{Products} - \sum \text{Reactions} \implies > 0 = \text{endothermic}$$

$$\text{Gibbs Free energy} : \Delta G = \Delta H - T \cdot \Delta S$$

ΔG :

$< 0 \implies$ spontaneous

$> 0 \implies$ non spontaneous

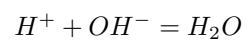
$= 0 \implies$ reaction is at equilibrium

For $aA + bB \rightleftharpoons cC + dD$:

$$K_{eq} = \frac{[C]^c \cdot [D]^d}{[A]^a \cdot [B]^b}$$

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

$$pOH = -\log[OH^-]$$



$$k_w = 1 \times 10^{-14} = [H^+] \cdot [OH^-]$$

logs : sig-fig in M becomes decimals on the answer

$$\text{Ex. } -\log(1.5 \times 10^{-12}) = 11.82$$