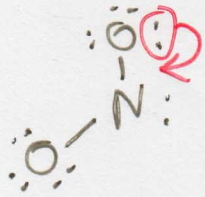
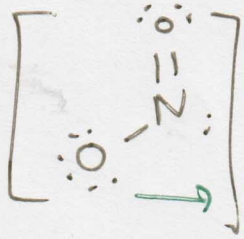
5/16/19

NO_2^- $\quad 1\times N + 2\times O + \text{charge}$

$1\times 5 + 2\times 6 + 1 = 18e^-$





$\rightarrow 6-4-2=0$

$\rightarrow 5-2-3=0$

$\rightarrow 6-6-1=-1$

6. $Ca(NO_3)_2$ ← 100.0 g → 750 mL solution

$M = \frac{n}{V}$ $\quad$ molar mass $= 1\times Ca + 2\times N + 6\times O$

$= 40.08 + 2\times 14.01 + 6\times 16.00$

$= 164.1$ g/mol

$n = 100.0\text{ g } Ca(NO_3)_2 / 164.1\text{ g/mol } Ca(NO_3)_2$

$= 0.609$ mol

$M = n/V = \frac{0.609\text{ mol}}{0.750\text{ L}} = 0.813\ \underline{M}$

H_2O

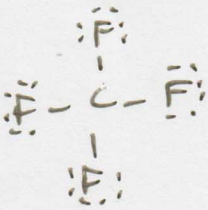
bent

polar

high IMF

CF_4

tetrahedral



non-polar

low IMF

Exam #2 — Includes quiz topics from 5/7

Chapter 6 – Gasses (no section 6.2)

- Ideal gas (3 assumptions)
- balloon vs metal can
- $PV = nRT$
- $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$
- STP (stand temprature + pressure)

Chapter 7 – acids + bases
- definitions – Arrhenius + Bronsted-Lowry
- neutral $[H^+] = [OH^-]$
- strong + weak acids + bases
- neutralization moles acid = moles base
- $pH \equiv -\log_{10}[H^+]$; pH = 7 neutral
  pH < 7 acidic pH > 7 basic

no buffers

STP – Standard temperature + pressure
→ 1 atm pressure, 0°C temperature
@ STP 1 mol of any gas has a volume of 22.4 L

Remember, gas laws always use Kelvin

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neutral vs neutralized

$$HCN + NaOH \rightleftharpoons NaCN + H_2O$$

weak acid — strong base — basic salt

Since HCN is a weak acid, only a fraction of H^+ is generated in solution for each mole of HCN. But, since NaOH is a strong base, one mole of OH^- is generated for every mole of NaOH in solution. This means that once equal moles of HCN + NaOH react, the resulting solution will have an imbalance of H^+ versus OH^-. So, the solution will be neutralized, but not neutral. Neutralization of an acid and base will only result in a neutral solution if the strengths of the acid and base are the same.

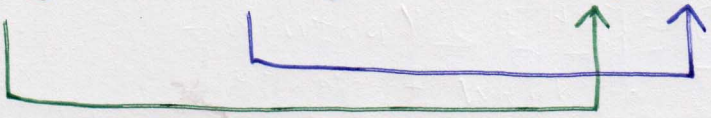
$$H_2O_{(\ell)} \rightleftharpoons H^+_{(aq)} + OH^-_{(aq)}$$

$$K_w = [H^+][OH^-]$$

In water, there is a constant relationship between H^+ and OH^-. When H^+ concentration increases, OH^- concentration decreases, and vice versa.

Oxidation-reduction reactions

$$2\,\overset{0}{Mg}(s) + \overset{0}{O_2}(g) \longrightarrow 2\,\overset{+2\ -2}{MgO}(s)$$



Magnesium loses two electrons when it reacts
→ magnesium is oxidized

Oxygen gains two electrons when it reacts
→ oxygen is reduced

oxidizing agents (oxidizers)
- substances that naturally tend to gain electrons
- $O_2, F_2, Cl_2, Br_2, I_2$
- O_2 is such a good oxidizer because oxygen is the second most electronegative element
- Oxidizers are reduced when they react

reducing agents (reducers)
- substances that naturally tend to lose electrons
- H_2, Li, Na, K, Ca