Ch 16 Review

- **The molarity of a solution that has 1.5 moles of NaCl in 2.0 L of an aqueous solution is:**
- 0.75 M
  1.33 M
  3.00 M

$$M = \frac{mol}{L}$$

$$M = \frac{1.5 mol}{2L}$$

$$M = 0.75M$$

- **The molarity of a solution that has 28.0 g of N_2 in 2.0 L of a solution is:**
- 0.5 M
  2.0 M
  14.0 M

$$\frac{28g N_2}{1} \times \frac{1 mol N_2}{28g N_2} = 1 mol N_2$$

$$\frac{1 mol}{2L} = 0.5M$$

- **If a 0.2 M HCl solution contains 0.3 mole HCl, what is the volume of the solution?**
- 0.06 L
  0.67 L
  1.5 L

$$L \times 0.2M = \frac{0.3 mol}{L} \times L$$

$$L = \frac{0.3 mol}{0.2M}$$

$$L = 1.5L$$

$0.4M = \frac{mol}{0.3L}$ $0.12\,mol$

$0.2M = \frac{mol}{0.4L}$ $0.08\,mol$

$HCl + NaOH \rightarrow NaCl + H_2O$

Bonus

- How many grams of NaCl are produced when 300 mL of 0.4 M HCl is reacted with 400 mL 0.2 M NaOH to produce NaCl and H_2O?
- 1.3 g NaCl are produced.
  3.2 g NaCl are produced.
  7.0 g NaCl are produced.

NaOH limiting. 0.08 mol NaCl made

$\frac{0.08\,mol\,NaCl}{1} \times \frac{58\,g\,NaCl}{1\,mol\,NaCl} = 4.7g$

- If I make a solution by adding 83 grams of sodium hydroxide to 750 mL of water...
- a) What is the molality of sodium hydroxide in this solution?
- b) What is the percent by mass of sodium hydroxide in this solution?

$83/833 = 9.96\%$

$\frac{83g\,NaOH}{1} \times \frac{1\,mol\,NaOH}{40g\,NaOH} = 2.08\,mol$

$.75L = .75Kg$

$\frac{2.08\,mol}{.75\,Kg} = 2.77\,m$

- Which will have the lowest freezing point?
- $C_{12}H_{22}O_{11}$
- $Pb(NO_3)_2$
- BaO
- K_3N

- If I make a solution by adding water to 35 mL of methanol (CH_3OH) until the final volume of the solution is 275 mL...
- What is the percent by volume of methanol in this solution?

$\frac{35mL}{275mL} \times 100 = 12.7\%$

NH_3

- How many grams of ammonia are present in 5.0 L of a 0.050 M solution?

$5L \times 0.05M = \frac{mol}{5L} \times 5L$

$\frac{0.25 mol\ NH_3}{1} \times \frac{17g\ NH_3}{1 mol\ NH_3}$

$4.25g\ NH_3$

- How many mL of 5.00 M Li_2CrO_4 are needed to prepare 3.00 liters of 0.250 M Li_2CrO_4?
- b) How much water is added to prepare this solution?

$3L \times 0.250M = 5M \times V_2$

$V_2 = 0.15L = 150mL$

b. $3 - 0.15 = 2.85L$

- How many grams of glucose ($C_6H_{12}O_6$) are required to prepare 1.75 liters of 0.233 *m* glucose solution?

$0.233m = \frac{mol}{1.75L}$

$0.408 mol\ C_6H_{12}O_6 \times \frac{180g\ C_6H_{12}O_6}{1 mol}$

$73.4g\ C_6H_{12}O_6$

- What will the volume of a 0.50 M solution be if it contains 25 grams of calcium hydroxide?

$\frac{25g\ Ca(OH)_2}{1} \times \frac{1 mol\ CaOH_2}{74g\ Ca(OH)_2} = .338\ mol$

$L \times 0.50M = \frac{0.338 mol}{L} \times L$

$\frac{L \times 0.50M}{0.50M} = \frac{0.338 mol}{0.50M}$

$L = 0.676L$

- What usually occurs to solubility as temperature *increases*?

solubility increases

- What *units* are generally used to express solubility?

mol/L

- What factors will usually make a substance *dissolve faster* in a solvent?

agitation
heat
particle size (smaller)

- What are the three *colligative properties* of a solution we have studied?

Vapor pressure reduction
boiling point elevation
freezing point depression