

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

$$M = \frac{\text{mol}}{L}$$
$$M = \frac{1.5 \text{ mol}}{2L}$$
$$M = 0.75M$$

- 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

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

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

- If a 0.2 M HCl solution contains 0.3 mole HCl, what is the volume of the solution?

- 0.06 L

$$0.67 L \times 0.2M = \frac{0.3 \text{ mol}}{L}$$

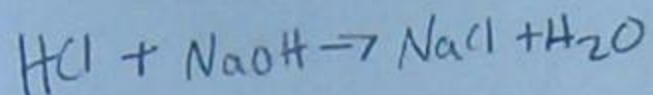
$$L = \frac{0.3 \text{ mol}}{0.2M}$$

$$L = 1.5L$$

$$0.4M = \frac{\text{mol}}{0.3L} \quad 0.2M = \frac{\text{mol}}{0.4L}$$

$$0.12 \text{ mol}$$

$$0.08 \text{ mol}$$



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 H₂O?
- 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

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

- 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?

$$\frac{83}{833} = 9.96\%$$

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

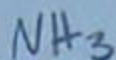
$$\frac{2.08 \text{ mol}}{0.75 \text{ kg}} = 2.77 \text{ m}$$

$$.75 \text{ L} = .75 \text{ kg}$$

- Which will have the lowest freezing point?
- C₁₂H₂₂O₁₁
- Pb(NO₃)₂
- BaO
- K₂N

- If I make a solution by adding water to 35 mL of methanol (CH₃OH) until the final volume of the solution is 275 mL...
- What is the percent by volume of methanol in this solution?

$$\frac{35 \text{ mL}}{275 \text{ mL}} \times 100 = 12.71$$



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

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

$$\frac{0.25\text{mol NH}_3}{1} \times \frac{17\text{g NH}_3}{1\text{mol NH}_3}$$

$$4.25\text{g NH}_3$$

- 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?

$$3\text{L} \times 0.250\text{M} = 5\text{M} \times V_2$$

$$V_2 = 0.15\text{L} = 150\text{mL}$$

$$3.0 - 0.15 = 2.85\text{L}$$

- How many grams of glucose ($\text{C}_6\text{H}_{12}\text{O}_6$) are required to prepare 1.75 liters of 0.233 M glucose solution?

$$0.233\text{M} = \frac{\text{mol}}{1.75\text{L}}$$

$$\frac{0.408\text{mol C}_6\text{H}_{12}\text{O}_6}{1} \times \frac{180\text{g C}_6\text{H}_{12}\text{O}_6}{1\text{mol C}_6\text{H}_{12}\text{O}_6}$$

$$73.4\text{g C}_6\text{H}_{12}\text{O}_6$$

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

$$\frac{25\text{g Ca(OH)}_2}{1} \times \frac{1\text{mol Ca(OH)}_2}{74\text{g Ca(OH)}_2} = 0.338\text{mol}$$

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

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

$$L = 0.676\text{L}$$

- 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