Chemistry 115 Name

Dr. Cary Willard

Quiz 9a (20 points) May 15, 2013

1. (9 points) For each of the following pairs of molecules, choose the one that answers the question and explain why you made that choice.
	1. Which substance has the stronger London dispersion forces? NCl3 or NI3?

NI3 has the stronger London dispersion forces because it has a higher mass and is more polarizable.

* 1. Which substance is the more polar? CO2 or CO?

CO is more polar. Though both molecules have polar CO bonds, the dipole moments of the two polar bonds cancel each other out in CO2 making it an overall non-polar molecule.

* 1. Which substance is able to form hydrogen bonds? CH3CH2OH or CH3OCH3? Draw a picture showing the hydrogen bonding interactions.

CH3CH2OH will form hydrogen bonds

H bond



1. (2 points) If we say that two liquids are miscible, what does that mean?

Two liquids are miscible if they are soluble in each other in all proportions.

1. (3 points) A solution is made by dissolving 25.0 gram of sodium nitrate in 135.0 grams of water. What is the mass percent of sodium nitrate in the solution?

$$mass \%=\left(\frac{mass part}{mass whole}\right)×100=\left(\frac{25.0 g NaNO\_{3}}{25.0 g+135.0 g}\right)×100=15.6\% NaNO\_{3} $$

1. (3 points) A solution is made by dissolving 15.0 grams of potassium chloride in enough water to make 250.0 mL of solution. What is the molarity of the solution?

$$M=\frac{mol KCl}{L solution}=\frac{15.0 g KCl×\frac{1 mol KCl}{74.55 g KCl}}{250.0 mL×\frac{1 L}{1000 mL}}=\frac{0.201 mol KCl}{0.2500 L}=0.805 M KCl$$

1. (3 points) How many mL of a 5.36 M solution of sodium acetate are required to make 2.50 L of a 0.350 M solution of sodium acetate?

$$M\_{1}V\_{1}=M\_{2}V\_{2}$$

$$V\_{1}=V\_{2}\left(\frac{M\_{2}}{M\_{1}}\right)=2.50 L\left(\frac{0.350 M}{5.36 M}\right)=0.163 L or 163 mL$$

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Quiz 9b (20 points) May 15, 2013

1. (9 points) For each of the following pairs of molecules, choose the one that answers the question and explain why you made that choice.
	1. Which substance has the stronger London dispersion forces? CH4 or C8H18?

C8H18 has the stronger London dispersion forces because it has a higher mass and is more polarizable.

* 1. Which substance is the more polar? CO2 or CO?

CO is more polar. Though both molecules have polar CO bonds, the dipole moments of the two polar bonds cancel each other out in CO2 making it an overall non-polar molecule.

* 1. Which substance is able to form hydrogen bonds? CH3CH2OH or CH3OCH3? Draw a picture showing the hydrogen bonding interactions.

CH3CH2OH will form hydrogen bonds

H bond



1. (2 points) If we say that two liquids are immiscible, what does that mean?

Two liquids are immiscible if they are not soluble in each other and will form two distinct layers when mixed.

1. (3 points) A solution is made by dissolving 35.0 gram of sodium nitrate in 125.0 grams of water. What is the mass percent of sodium nitrate in the solution?

$$mass \%=\left(\frac{mass part}{mass whole}\right)×100=\left(\frac{35.0 g NaNO\_{3}}{35.0 g+125.0 g}\right)×100=21.9\% NaNO\_{3} $$

1. (3 points) A solution is made by dissolving 35.0 grams of potassium chloride in enough water to make 250.0 mL of solution. What is the molarity of the solution?

$$M=\frac{mol KCl}{L solution}=\frac{35.0 g KCl×\frac{1 mol KCl}{74.55 g KCl}}{250.0 mL×\frac{1 L}{1000 mL}}=\frac{0.469 mol KCl}{0.2500 L}=1.88 M KCl$$

1. (3 points) How many mL of a 7.34 M solution of sodium acetate are required to make 2.50 L of a 0.350 M solution of sodium acetate?

$$M\_{1}V\_{1}=M\_{2}V\_{2}$$

$$V\_{1}=V\_{2}\left(\frac{M\_{2}}{M\_{1}}\right)=2.50 L\left(\frac{0.350 M}{7.34 M}\right)=0.119 L or 119 mL$$