Chemistry 115 Name

Dr. Cary Willard

Quiz 8a (20 points) May 14, 2014

1. (8 points) Define the term viscosity.

Viscosity is a measure of resistance to flow. The more viscous something is the more thick it appears.

Which would be expected to have a higher viscosity, butane (C4H10) or dodecane (C12H26) and why?.

Dodecane would be expected to have a higher viscosity because it has a higher molecular mass. Higher molar mass means more polarizable and stronger intermolecular forces. The stronger the intermolecular forces the higher the viscosity because the molecules hold together more strongly thus sticking together and making the solution more viscous.

1. (8 points) A solution is made by mixing 35.2 g of sodium nitrate (NaNO3) with 492 g of water to make 500. mL of solution.
	1. What is the mass percent of sodium nitrate in the solution?

$$mass\%=\left(\frac{mass NaNO\_{3}}{mass solution}\right)×100=\left(\frac{35.2 g NaNO\_{3}}{35.2g+492 g}\right)×100$$

$$=\left(\frac{35.2 g NaNO\_{3}}{527 g}\right)×100=$$

* 1. What is the molarity of sodium nitrate in the solution?

$$M=\frac{mol NaNO\_{3}}{L soln}=\frac{35.2 g NaNO\_{3}×\frac{1 mol NaNO\_{3}}{85.01 g NaNO\_{3}}}{0.500 L }=\frac{0.414 g NaNO\_{3}}{0.500 L}=0.828 M NaNO\_{3}$$

1. (4 points) How many milliliters of a 4.25 M solution of acetic acid are required to prepare 750. mL of a 0.634 M solution of acetic acid?

$$M\_{1}V\_{1}=M\_{2}V\_{2}\rightarrow \rightarrow V\_{1}=V\_{2}\left(\frac{M\_{2}}{M\_{1}}\right)=750. mL\left(\frac{0.634 M}{4.25 M}\right)=112 mL$$

Chemistry 115 Name

Dr. Cary Willard

Quiz 8b (20 points) May 14, 2014

1. (8 points) Define the term viscosity.

Viscosity is a measure of resistance to flow. The more viscous something is the more thick it appears.

Which would be expected to have a higher viscosity, ethyl alcohol () or dimethyl ether () and why?.

Although both are polar molecules, ethyl alcohol would be expected to have a higher viscosity because it has the ability to form hydrogen bonds and dimethyl ether does not. The ability of ethyl alcohol to form H-bonds means it has stronger intermolecular forces. The stronger the intermolecular forces the higher the viscosity because the molecules hold together more strongly thus sticking together and making the solution more viscous.

1. (8 points) A solution is made by mixing 83.4 g of sodium nitrate (NaNO3) with 418 g of water to make 500. mL of solution.
	1. What is the mass percent of sodium nitrate in the solution?

$$mass\%=\left(\frac{mass NaNO\_{3}}{mass solution}\right)×100=\left(\frac{83.4 g NaNO\_{3}}{83.4g+418 g}\right)×100$$

$$=\left(\frac{83.4 g NaNO\_{3}}{501 g}\right)×100=$$

* 1. What is the molarity of sodium nitrate in the solution?

$$M=\frac{mol NaNO\_{3}}{L soln}=\frac{83.4 g NaNO\_{3}×\frac{1 mol NaNO\_{3}}{85.01 g NaNO\_{3}}}{0.500 L }=\frac{0.981 g NaNO\_{3}}{0.500 L}=1.96 M NaNO\_{3}$$

1. (4 points) How many milliliters of a 4.25 M solution of acetic acid are required to prepare 750. mL of a 0.499 M solution of acetic acid?

$$M\_{1}V\_{1}=M\_{2}V\_{2}\rightarrow \rightarrow V\_{1}=V\_{2}\left(\frac{M\_{2}}{M\_{1}}\right)=750. mL\left(\frac{0.499 M}{4.25 M}\right)=88.1 mL$$