Chemistry 115 Name key

Dr. Cary Willard

Quiz 8a (20 points) November 21, 2012

1. (5 points) Calculate the mass percent for the solute if 35.0 g of KCl are added to 375 g of water.

$$mass \%=\left(\frac{mass KCl}{mass solution}\right)×100=\left(\frac{35.0 g KCl}{35.0 g KCl+375 g H\_{2}O}\right)×100=8.54\% KCl$$

1. (5 points) Calculate the molarity of a solution prepared by dissolving 74.3 grams of glucose (C6H12O6) in enough wáter to make 3.59 L of solution.

$$M=\frac{mol glucose}{L solution}=\frac{0.426 mol C\_{6}H\_{12}O\_{6}}{3.59 L soln}=0.115 M C\_{6}H\_{12}O\_{6}$$

$$74.3 g C\_{6}H\_{12}O\_{6}×\frac{1 mol C\_{6}H\_{12}O\_{6}}{180.1 g C\_{6}H\_{12}O\_{6}}=0.426 mol C\_{6}H\_{12}O\_{6}$$

1. (5 points) Calculate the mass of sodium nitrate required to prepare 425 mL of a 0.377 M NaNO3 solution.

$$ ¿g NaNO\_{3}=425 mL×\frac{1 L}{1000 mL}×\frac{0.377 mol NaNO\_{3} }{1 L}×\frac{85.00 g NaNO\_{3}}{1 mol NaNO\_{3}}=13.6 g NaNO\_{3}$$

1. (5 points) A 45.0 mL sample of 3.92 M potassium sulfate is diluted to a final volume of 626 mL. What is the molarity of K2SO4 in the final solution?

$$M\_{1}V\_{1}=M\_{2}V\_{2}\rightarrow M\_{2}=M\_{1}\left(\frac{V\_{1}}{V\_{2}}\right)=3.92 M\left(\frac{45.0 mL}{626 mL}\right)=0.282 M K\_{2}SO\_{4}$$

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Quiz 8b (20 points) November 21, 2012

1. (5 points) Calculate the mass percent for the solute if 65.0 g of KCl are added to 875 g of water.

$$mass \%=\left(\frac{mass KCl}{mass solution}\right)×100=\left(\frac{65.0 g KCl}{65.0 g KCl+875 g H\_{2}O}\right)×100=6.91\% KCl$$

1. (5 points) Calculate the molarity of a solution prepared by dissolving 67.4 grams of glucose (C6H12O6) in enough wáter to make 2.88 L of solution.

$$M=\frac{mol glucose}{L solution}=\frac{0.374 mol C\_{6}H\_{12}O\_{6}}{2.88 L soln}=0.130M C\_{6}H\_{12}O\_{6}$$

$$67.4 g C\_{6}H\_{12}O\_{6}×\frac{1 mol C\_{6}H\_{12}O\_{6}}{180.1 g C\_{6}H\_{12}O\_{6}}=0.374 mol C\_{6}H\_{12}O\_{6}$$

1. (5 points) Calculate the mass of sodium nitrate required to prepare 725 mL of a 0.377 M NaNO3 solution.

$$ ¿g NaNO\_{3}=725 mL×\frac{1 L}{1000 mL}×\frac{0.377 mol NaNO\_{3} }{1 L}×\frac{85.00 g NaNO\_{3}}{1 mol NaNO\_{3}}=23.2 g NaNO\_{3}$$

1. (5 points) A 75.0 mL sample of 3.92 M potassium sulfate is diluted to a final volume of 626 mL. What is the molarity of K2SO4 in the final solution?

$$M\_{1}V\_{1}=M\_{2}V\_{2}\rightarrow M\_{2}=M\_{1}\left(\frac{V\_{1}}{V\_{2}}\right)=3.92 M\left(\frac{75.0 mL}{626 mL}\right)=0.470 M K\_{2}SO\_{4}$$

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Quiz 8c (20 points) November 21, 2012

1. (5 points) Calculate the mass percent for the solute if 22.8 g of AgNO3 are added to 942 g of water.

$$mass \%=\left(\frac{mass AgNO\_{3}}{mass solution}\right)×100=\left(\frac{22.8 g AgNO\_{3}}{22.8 g AgNO\_{3}+942 g H\_{2}O}\right)×100=2.36\% AgNO\_{3}$$

1. (5 points) Calculate the molarity of a solution prepared by dissolving 83.4 grams of fructose (C6H12O6) in enough wáter to make 5.77 L of solution.

$$M=\frac{mol fructose}{L solution}=\frac{0.463 mol C\_{6}H\_{12}O\_{6}}{5.77 L soln}=0.0803 M C\_{6}H\_{12}O\_{6}$$

$$83.4 g C\_{6}H\_{12}O\_{6}×\frac{1 mol C\_{6}H\_{12}O\_{6}}{180.1 g C\_{6}H\_{12}O\_{6}}=0.463 mol C\_{6}H\_{12}O\_{6}$$

1. (5 points) Calculate the volume (mL) of 1.37 M NaNO3 solution that will contain 82.5 g of sodium nitrate.

$$ ¿mL NaNO\_{3}=82.5 g NaNO\_{3}×\frac{1 mol NaNO\_{3}}{85.00 g NaNO\_{3}}×\frac{1 L}{1.37 mol NaNO\_{3}}×\frac{1000 mL}{1 L}=704 mL$$

1. (5 points) To what volume must 25.0 mL of a 8.15 M solution potassium sulfate be diluted to make a solution with a final concentration of 2.85 M?

$$M\_{1}V\_{1}=M\_{2}V\_{2}\rightarrow V\_{2}=V\_{1}\left(\frac{M\_{1}}{M\_{2}}\right)=25.0 mL\left(\frac{8.15 M}{2.85 M}\right)=71.5 mL total volume$$

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Quiz 8d (20 points) November 21, 2012

1. (5 points) Calculate the mass percent for the solute if 38.4 g of AgNO3 are added to 942 g of water.

$$mass \%=\left(\frac{mass AgNO\_{3}}{mass solution}\right)×100=\left(\frac{38.4 g AgNO\_{3}}{38.4 g AgNO\_{3}+942 g H\_{2}O}\right)×100=3.92\% AgNO\_{3}$$

1. (5 points) Calculate the molarity of a solution prepared by dissolving 97.3 grams of fructose (C6H12O6) in enough wáter to make 5.77 L of solution.

$$M=\frac{mol fructose}{L solution}=\frac{0.540 mol C\_{6}H\_{12}O\_{6}}{5.77 L soln}=0.0936 M C\_{6}H\_{12}O\_{6}$$

$$97.3 g C\_{6}H\_{12}O\_{6}×\frac{1 mol C\_{6}H\_{12}O\_{6}}{180.1 g C\_{6}H\_{12}O\_{6}}=0.540 mol C\_{6}H\_{12}O\_{6}$$

1. (5 points) Calculate the volume (mL) of 2.16 M NaNO3 solution that will contain 82.5 g of sodium nitrate.

$$ ¿mL NaNO\_{3}=82.5 g NaNO\_{3}×\frac{1 mol NaNO\_{3}}{85.00 g NaNO\_{3}}×\frac{1 L}{2.16 mol NaNO\_{3}}×\frac{1000 mL}{1 L}=449 mL$$

1. (5 points) To what volume must 25.0 mL of a 9.15 M solution potassium sulfate be diluted to make a solution with a final concentration of 2.85 M?

$$M\_{1}V\_{1}=M\_{2}V\_{2}\rightarrow V\_{2}=V\_{1}\left(\frac{M\_{1}}{M\_{2}}\right)=25.0 mL\left(\frac{9.15 M}{2.85 M}\right)=80.3 mL total volume$$