Solution Practice Sheet key

1. 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?

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

1. A 25.00 mL sample of vinegar, which is an aqueous solution of acetic acid, CH3COOH, requires 23.15 mL of 0.4587 M barium hydroxide, Ba(OH)2, to reach the endpoint in a titration. What is the molarity of the acetic acid solution? Given the unbalanced equation (10 points):

2 CH3COOH (aq) + Ba(OH)2 (aq) 🡪 Ba(C2H3O2)2 (aq) + 2 H2O (l)

$$23.15 mL Ba(OH)\_{2} soln×\frac{0.4587 mmol Ba(OH)\_{2}}{1 mL Ba(OH)\_{2} soln}×\frac{2 mmol CH\_{3}COOH}{1 mmol Ba(OH)\_{2}}×\frac{1}{25.00 mL CH\_{3}COOH soln }=0.8495 M CH\_{3}COOH $$

1. How many mL of a 1.747 M solution of silver nitrate, AgNO3, can be made from 74.83 g of silver nitrate?

$$?mL soln=74.83 g AgNO\_{3}×\frac{1 mol AgNO\_{3}}{169.9 g AgNO\_{3}}×\frac{1000 mL soln}{1.747 mol AgNO\_{3}}=$$