

Name: \_\_\_\_\_

### *Review Test #3: Chapters 1-3*

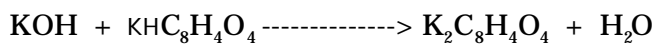
1. Calculate the percent water (by weight) in the hydrated salt magnesium sulfate heptahydrate,  $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ .



2. Determine the molecular formula for a compound which is 74.9% barium and 25.1% sodium. The molecular weight is 366. What is the identity of this material.

3. Determine the mass of lead (II) iodide produced when 10 ml of 0.1M lead (II) nitrate is mixed with 10 ml of 0.1M potassium iodide.

4. A solution of potassium hydroxide was standardized with potassium acid phthalate,  $\text{KHC}_8\text{H}_4\text{O}_4$ .



Determine the concentration of the KOH solution from the following data:

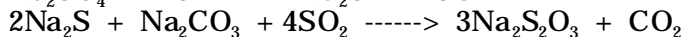
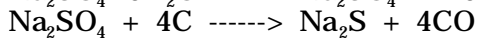
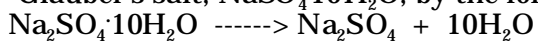
mass of filter paper:-----	0.546 g.
mass of filter paper + potassium hydrogen phthalate:-----	1.664 g
initial reading of KOH soln in buret:-----	10.00 ml
final reading of KOH soln in buret-----	32.50 ml
volume of water used to dissolve the potassium hydrogen phthalate:-----	50. ml

5. The density of water is  $\frac{1 \text{ G}}{\text{cc}}$  at 4 °C. Express this in  $\frac{\text{lbs}}{\text{ft}^3}$

6. Sodium bicarbonate, or baking soda,  $\text{NaHCO}_3$ , can be purified by dissolving in hot water (60 °C), filtering to remove any insoluble impurities, cooling to 0 °C to precipitate solid  $\text{NaHCO}_3$ , and then filtering to remove the solid sodium bicarbonate leaving soluble impurities in solution. Any sodium carbonate remaining in solution is not recovered. The solubility of sodium bicarbonate in hot water at 60 °C is 164 g/l. Its solubility in cold water at 0 °C is 69 g/l. What is the percent yield of baking soda by this method?

One Step Beyond (Extra Credit):

Sodium thiosulfate,  $\text{Na}_2\text{S}_2\text{O}_3$ , a photographic fixing agent known as hypo, can be prepared from Glauber's salt,  $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$ , by the following series reactions:



What mass of Glauber's salt is required to prepare 50.0 grams of sodium thiosulfate?

Twilight Zone (Extra Credit):

While studying for his chem2 test Snoopy decided to make himself 300 mL of mild stimulant called coffee. The coffee was much too hot for his delicate lips so he added 50 cc of tap water at 25 °C. The resultant temperature was 85 °C. What was the original temperature of the coffee?

(Heat = mass \* SpH \* T. The specific heat (SpH) of water is 1 cal per gram•°C).