Unit 3 review Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Golden Rain**

Purpose: To observe the effects of temperature on solubility based on the reaction between
lead (II) nitrate and potassium iodide, to use the limiting reactant to calculate the percent yield of a reaction

Procedure:

1. Mass 0.35 g of lead (II) nitrate and 0.3 g of potassium iodide into separate 250 mL beakers. Record mass.
2. Add 50 mL of water to the beaker with potassium iodide and stir. Potassium iodide is very soluble and should dissolve quickly. Observe.
3. Add 50 mL of water to the beaker with lead (II) nitrate and stir. You may need to add a few drops of acetic acid (HCH3COO) to acidify the solution and dissolve all of the solid. Make sure it is completely dissolved before continuing. Observe.
4. Slowly mix the two solutions in a 250 mL Erlenmeyer flask. Observe the reaction.
5. Place the flask on a hot plate and turn the heat all the way up. Heat until all solid is dissolved (approx. 15 minutes)
6. Carefully remove the flask from the hot plate and allow it to cool to room temperature. Observe. It can take up to 20 minutes to see any changes occur, and placing the flask on a piece of blank paper can help. Allow the solution to cool for at least 35 minutes.
7. Set up the filtration apparatus. Mass and label a piece of dry filter paper.
8. After the solution has cooled, carefully filter the mixture to collect the solid.
9. Place the solid and filter paper on a weighing dish and allow it to dry overnight. Observe and mass the next day.
10. Answer all questions today except for percent yield question (tomorrow)

Data Table:

|  |  |
| --- | --- |
| Mass of Pb(NO3)2 |  |
| Mass of KI |  |
| Initial observations of Pb(NO3)2 and KI |  |
| Observations of reaction between Pb(NO3)2 and KI |  |
| Observations during heating |  |
| Observations during cooling |  |
| Mass of filter paper |  |
| Observations of product (PbI2) next day |  |
| Mass of filter paper and product (PbI2) |  |
| Mass of product (PbI2) – ACTUAL YIELD |  |
| Theoretical Yield of PbI2 |  |
| Percent Yield |  |
|  |  |

Post Lab Questions:

1. What **type of reaction** is occurring between lead (II) nitrate and potassium iodide?
2. Write a **balanced chemical equation** for this reaction.
3. Is it necessary to use the **activity series** to determine if an actual chemical reaction took place?

1. When would you use the **activity series**? What does it mean?
2. What is the name of the **precipitate** formed by this reaction? Look at **solubility rules** to determine this answer.
3. What is the difference between a solution that is **saturated** versus a solution that is **supersaturated**?
4. Simply based on observations, is PbI2 more **soluble** in a solution at room temperature (25°C) or a 100°C solution? Why?
5. What is the molarity of the solution from step 2?
6. What is the molarity of the solution from step 3?
7. How many moles of potassium nitrate do you expect to make in this reaction? (stoichiometry)
8. How many grams of lead iodide would you expect to make in this reaction? (stoichiometry)

12. Day 2: Weigh your dried product (rememeber to zero out the balance with a piece of filter paper). What

 was your percent yield? Actual / theoretical(#11) x 100%