Post-lab and Data Analysis:

1. How many moles of water were in the hydrated sample?

$$\text{grams experimental } H_2O \left| \frac{1 \text{ mol } H_2O}{18.02 \text{ g } H_2O} \right. = \_\_\_\_ \text{ mol } H_2O$$

2. How many moles of $CuSO_4$ were in the hydrated sample?

$$\text{grams exp. anhydrous} \left| \frac{1 \text{ mol } CuSO_4}{159.61 \text{ g } CuSO_4} \right. = \_\_\_\_ \text{ mol } CuSO_4$$

3. Determine the empirical formula of the hydrate.

MOLE Ratio

Mols $CuSO_4$: mols H_2O

4. The accepted formula of the hydrate is $CuSO_4 \cdot 5H_2O$. What is the theoretical percentage of water in this hydrate?

$$\%H_2O = \frac{(5)(18.02)}{249.71} \times 100 = 36.08\%$$

5. Based on the experimental results, what percentage of the hydrate is water?

$$\%H_2O = \frac{\text{mass } H_2O \text{ evolved}}{\text{mass hydrate}} \times 100 =$$

6. Using your answer to Question 4 as the theoretical water percentage and Question 5 as the experimental water percentage, calculate the percent error.

$$\%\text{ error} = \left| \frac{\text{Accepted} - \text{Experimental}}{\text{Accepted}} \right| \times 100$$

7. A student performing this experiment heats the hydrate too strongly at the beginning causing some of the solid hydrate to fly out of the crucible. What effect would this have on the calculated percentage of water in the compound? Would the determined percentage of water be too high or too low? Explain your reasoning.

Percentage of water would be too high because the mass of the hydrate that flew out of the crucible would be assumed to be water.

8. Why must objects be cooled before their mass is determined on a sensitive balance?

Hot objects increase the temperature of the air around it, causing the air to rise. Thus, the object would be measured to have a lower mass than it actually does.

9. For more accurate results, the crucible should have been preheated prior to measuring its initial mass. What is the purpose of preheating the crucible?