Chemistry I Name _____

Date _____ Per _____

Empirical Formula Lab: Zinc Metal in Hydrochloric Acid

Purpose: The purpose of this lab is to determine the empirical formula of a zinc (???) chloride compound made by reacting zinc metal with 6M hydrochloric acid (HCl). Hydrogen gas (H_2) will be given off as a by-product. The formula is:

$$Zn(s) + HCl\ (aq) \text{----> } ZnCl_{???}(aq) + H_2(g)$$

The goal of this lab is to figure out what the ??? is.

Procedure:

1. Obtain a 50 ml beaker. If the beaker seems dirty, clean the beaker with soapy water and dry it thoroughly.
2. Label the beaker with one person's name and weigh it. Record the weight below.
3. You will be given a paper cup that has about 0.15 grams of granular zinc. Add this to the beaker and weigh the beaker again to figure out exactly how much granular zinc you have.
4. Put on a pair of safety goggles.
5. Measure out about 5 ml of 6M HCl into a small graduated cylinder.
6. Add the HCl to the beaker containing the granular zinc. Record your observations:

_____

_____

7. Set the beaker aside (near the wall) and go back to your seat. It takes about 20 minutes for the zinc and the hydrochloric acid to completely react.
8. When you get back, heat the beaker on the hot plate in the fume hood.
9. When the white crystals form and the beaker seems dry, remove it from the hot plate using tongs. Allow the beaker to cool.
10. Determine the mass of the beaker and the crystals. Record it in your data table.
11. Wash and dry the beaker and place it back on the counter where you found it.

Data:

Item	Mass (grams)
empty beaker	
beaker + granular zinc	
beaker + dried crystals	

Calculations: Show your set up and use sig figs in every calculation. Don't forget units!

1. What was the mass of the zinc that you started with? _____

2. What is the mass of the white powder (zinc ???)chloride)? _____

3. Assumine that all the zinc ended up in the white powder. What is the mass of the chlorine in the white powder?

_____

4. Determine the empirical formula of the zinc (???) chloride. Show all your work. For this lab only, do NOT round off any of your answers in this step. Don't double or triple the formula either (leave it so there's only one zinc in the formula). If, for example, your final answer is $ZnCl_{5.3}$, leave it that way.

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5. The true formula for zinc chloride is $ZnCl_2$, so the ??? should have been 2.00. What was your percent error for this lab?

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