**Quiz 7A**

# Directions: Answer each of the following questions. Be sure to use complete sentences where appropriate. For full credit be sure to show all of your work. Where appropriate answers should be boxed for clarity, written to the correct number of significant figures, and, include the proper units.

1. Answer the following questions about the reaction (2 points):

C (s) + 2 H2 (g) → CH4 (g) + 74.8 kJ

* 1. Is this reaction exothermic or endothermic? \_\_\_\_\_\_exothermic
	2. What type of reaction is taking place? \_\_\_\_\_\_Synthesis reaction
1. Hydrochloric acid and zinc metal are mixed; the total ionic reaction is shown below (5 points): 2 H+ (aq) + 2 Cl- (aq) + Zn (s) → H2 (g) + Zn2+ (aq) + 2 Cl- (aq)
	1. What type of reaction is taking place? \_\_\_\_\_\_\_single replacement\_\_\_\_\_\_\_\_\_\_\_\_
	2. What are the spectator ion(s)? \_\_\_\_\_\_\_Cl-\_\_\_\_\_\_\_\_\_\_\_\_\_
	3. Write the balanced net ionic equation:

2 H+ (aq) + Zn (s) → H2 (g) + Zn2+ (aq)

1. Are the following statements true or false (3 points)?

|  |  |  |
| --- | --- | --- |
|  | If is an acceptable lab technique to use your scoopula to dispense chemicals from the reagent bottle.  | False |
|  | When you are finished with your experiment you may remove your safety goggles even if all other students are finished experimenting.  | True |
|  | Broken glass may be disposed of in the sink.  | False  |

1. A chromium(VI) oxide is a strong oxidizer and suspected carcinogen that is commonly used for electroplating (10 points).
	1. If 5.43 g of chromium(VI) oxide is decomposed by heating and 2.82 of chromium is collected, what mass of oxygen gas was evolved?

$$m\_{"CrO"}=m\_{Cr}+m\_{o}⇌m\_{o}=m\_{"CrO"}-m\_{Cr}=5.43 g-2.82 g=2.61 g$$

* 1. Classify this reaction as a double displacement reaction, single displacement reaction, synthesis reaction, or a decomposition reaction.

Decomposition reaction

* 1. What is the empirical formula of chromium(VI) oxide? Use calculations to support your answer.

$$2.82 g Cr×\frac{1 mol Cr}{51.996 g Cr}=0.05423941 mol Cr$$

$$2.61 g O×\frac{1 mol O}{15.999 g O}=0.163135196 mol O$$

$$Cr\_{\frac{0.05423941}{0.05423941}}O\_{\frac{0.163135196}{0.05423941}}=Cr\_{1}O\_{3.007687509}=CrO\_{3}$$