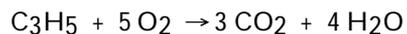


Stoichiometry Worksheet Chem 30A FALL 2016

Name _____

- 1) How many moles of CO₂ are produced when 2.5 moles of O₂ react according to the following equation?



- 2) Consider the reaction $\text{N}_2 (\text{g}) + \text{O}_2 (\text{g}) \rightarrow 2 \text{NO} (\text{g})$.

a. How many g NO can be produced when 25.0 g of nitrogen reacts?

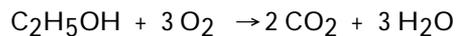
b. How many g NO can be produced when 25.0 g of oxygen reacts?

c. Based on your answers in a and b, predict the amount of NO that can be produced when 25.0 g nitrogen is reacted with 25.0 g of oxygen.

d. Explain the reasoning used in part c.

3) In the reaction $2 \text{C} + \text{O}_2 \rightarrow 2 \text{CO}$, how many moles of carbon are needed to produce 66.0 g of carbon monoxide?

4) Given the following balanced equation, answer the following:

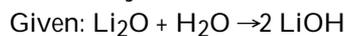


a) What is the theoretical yield of carbon dioxide in this reaction if 39.6 g of ethanol is burned in the presence of 54.8 g of oxygen?

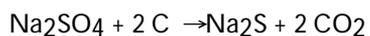
b) What is the percent yield for this reaction if the actual amount of carbon dioxide formed is 45.5 grams?

5) The reaction $\text{N}_2 + 3 \text{H}_2 \rightarrow 2 \text{NH}_3$ is used to produce ammonia. When 450. g of hydrogen was reacted with nitrogen, 1575 g of ammonia were produced. What is the percent yield of this reaction?

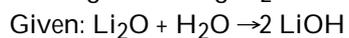
6) How many moles of water are needed to react with 2.2 moles of Li_2O ?



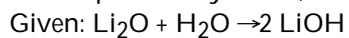
7) How many grams of C will be consumed when 5.00 grams of Na_2SO_4 react according to the balanced reaction shown?



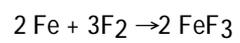
8) Starting with 156 g Li_2O and 33.3 g H_2O , decide which reactant is present in limiting quantities.



9) If the theoretical yield of the reaction below corresponds to 25.3 g and the percent yield of the reaction is known to be reproducibly 81.1%, calculate the actual yield.



10) How many grams of fluorine are required to produce 20.0 grams of FeF₃ from the reaction shown?



Answer Key

Testname: STOICHIOMETRY WORKSHEET CHEM 108 SP 2016

1) 1.5

$$2) \text{ a. } 25.0 \text{ g N}_2 \times \frac{1 \text{ mol N}_2}{28.02 \text{ g N}_2} \times \frac{2 \text{ mol NO}}{1 \text{ mol N}_2} \times \frac{30.01 \text{ g NO}}{1 \text{ mol NO}} = 53.55 \text{ g NO}$$

$$\text{ b. } 25.0 \text{ g O}_2 \times \frac{1 \text{ mol N}_2}{32 \text{ g O}_2} \times \frac{2 \text{ mol NO}}{1 \text{ mol O}_2} \times \frac{30.01 \text{ g NO}}{1 \text{ mol NO}} = 46.89 \text{ g NO}$$

c. 46.89 g NO

d. There is only enough oxygen to produce 46.89 g NO. Even though there is enough N₂ to produce more NO, there is not enough O₂ to react with all the N₂ available. Therefore, O₂ is the limiting reactant.

3) 2.36

4) a) This is a limiting reagent problem. First figure out which reagent is limiting.

$$39.6 \text{ g C}_2\text{H}_5\text{OH} \times 1 \text{ mol}/46.0 \text{ g} \times 2 \text{ mol CO}_2/1 \text{ mol C}_2\text{H}_5\text{OH} = 1.72 \text{ mol CO}_2$$

$$54.8 \text{ g O}_2 \times 1 \text{ mol}/32.0 \text{ g} \times 2 \text{ mol CO}_2/3 \text{ mol O}_2 = 1.14 \text{ mol CO}_2$$

Therefore O₂ is limiting and only 1.14 mol CO₂ can be formed.

$$1.14 \text{ mol CO}_2 \times 44.0 \text{ g}/1 \text{ mol} = 50.2 \text{ g CO}_2 \text{ is the theoretical yield.}$$

$$\text{ b) } 45.5 \text{ g}/50.2 \text{ g} \times 100 = 90.6\% \text{ yield}$$

5) 62.1%

6) 2.2

7) 0.844 g

8) water

9) 20.5 g

10) 10.1 g