Name _____
Date _____
Due Date _____

Mark _____/33
Correct and Hand in Again by _____

Chemistry 11

Hand In Assignment # 11 – Molarity, Excess and Percent Yield Problems

This Assignment will be marked and you are allowed to do one set of corrections. Show all of your work, including units in your work and answers.

1. Given the following balanced chemical equation, answer the question below it.

$$MgCO_{3\,(s)} + 2HCl_{\,(aq)} \rightarrow CO_{2\,(g)} + H_2O_{\,(l)} + MgCl_{2(aq)}$$

a. What mass of $MgCO_3$ will react completely with 25.0 mL of 3.0 M HCl? (2 marks)

Answer _____

b. Calculate the volume of 0.60 M HCl which would be needed to react completely with 122.235 grams of magnesium carbonate. (2 marks)

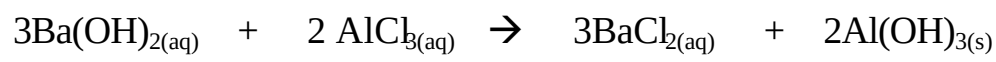
Answer _____

c. If 150.0 mL of 0.50 M HCl reacts with an excess of $MgCO_3$, what volume of CO_2 would be produced at STP? (2 marks)

Answer _____

___
6

2. Given the following balanced equation, answer the questions below it.



$$3Ba(OH)_{2(aq)} + 2\,AlCl_{3(aq)} \rightarrow 3BaCl_{2(aq)} + 2Al(OH)_{3(s)}$$

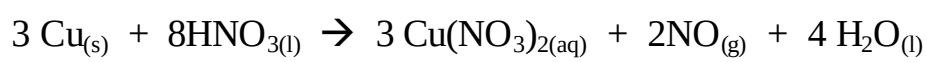
a. If 16.5 mL of 0.200 M $Ba(OH)_2$ is required to react completely with 25.0 mL of a solution of $AlCl_3$, find the $[AlCl_3]$. (2 marks)

Answer _____

b. What volume of 0.200 M $Ba(OH)_2$ would be required to produce 171.6 grams of aluminum hydroxide? (2 marks)

Answer _____

3. Given the following balanced equation, answer the questions below it.



$$3\,Cu_{(s)} + 8HNO_{3(l)} \rightarrow 3\,Cu(NO_3)_{2(aq)} + 2NO_{(g)} + 4\,H_2O_{(l)}$$

a. If 254.0 grams of Cu are placed into 609.0 grams of HNO_3, determine which reactant is in excess. (2 marks)

Answer _____

b. If the reaction in 3(a) is carried out, what mass of NO will be formed? (2 marks)

Answer _____

___
8

4. Given the following balanced equation, answer the questions below it.

$$2C_6H_{14(l)} + 19O_{2(g)} \rightarrow 12CO_{2(g)} + 14H_2O_{(l)}$$

a. If 306.16 g of C_6H_{14} is mixed with 1120.0 grams of oxygen gas, which reactant is in excess? (2 marks)

Answer _____

b. If the reaction in 4(a) is carried out, what volume of CO_2 would be formed assuming conditions were brought to STP? (2 marks)

Answer _____

c. If the reaction in 4(a) is carried out, what mass of H_2O would be formed? (2 marks)

Answer _____

5. Given the balanced equation: $N_{2(g)} + 3H_{2(g)} \rightarrow 2NH_{3(g)}$,

When 190.4 grams of N_2 are added to an excess of H_2, a reaction occurs in which 104.04 grams of NH_3 are formed.

a. Calculate the *theoretical* yield of NH_3 in grams. (2 marks)

Answer _____

b. Calculate the *percentage* yield of NH_3. (2 marks)

10

Answer _____

6. Consider the balanced equation: $3LiAlH_4 + 4BF_3 \rightarrow 3LiF + 3AlF_3 + 2B_2H_6$

Under certain conditions, reacting 227.4 g of $LiAlH_4$ with an excess of BF_3 yields 93.84 g of B_2H_6.

a. Calculate the *theoretical yield* of B_2H_6. (2 marks)

Answer _____

b. What is the *actual yie*ld of B_2H_6? (1 mark)

Answer _____

c. Calculate the *percentage yield* of B_2H_6. (2 marks)

Answer _____

7. When reacting NH_3 with O_2 according to the reaction:

$$4\ NH_3 + 5\ O_2 \rightarrow 4\ NO + 6\ H_2O$$

Using 92.48 grams of NH_3 with an excess of O_2 produces a 70% yield of NO.

a. Calculate the *theoretical yield* of NO in grams. (2 marks)

Answer _____

b. Calculate the *actual yield* of NO in grams. (2 marks)

___
9

Answer _____