

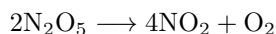
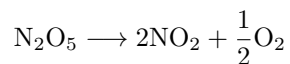
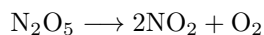
# Non Sibi High School

## Andover's Chem 250: Introductory/Basic Chemistry

### Chapter 4, Review Quiz 1 Answers

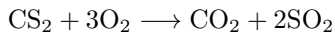
#### 1

Balance the equation  $\text{N}_2\text{O}_5 \rightarrow \text{NO}_2 + \text{O}_2$  using the smallest possible whole-number coefficients.



#### 2

Given the unbalanced equation  $\text{CS}_2 + \text{O}_2 \rightarrow \text{CO}_2 + \text{SO}_2$ , if 265 grams of  $\text{CS}_2$  react, how many grams of  $\text{SO}_2$  will be produced?



$$265 \text{ g CS}_2 \left( \frac{1 \text{ mol CS}_2}{76.15 \text{ g CS}_2} \right) \left( \frac{2 \text{ mol SO}_2}{1 \text{ mol CS}_2} \right) \left( \frac{64.07 \text{ g SO}_2}{1 \text{ mol SO}_2} \right) = 446 \text{ g SO}_2$$

#### 3

Given the unbalanced equation  $\text{CaCO}_3 + \text{HC}_2\text{H}_3\text{O}_2 \rightarrow \text{Ca}(\text{C}_2\text{H}_3\text{O}_2)_2 + \text{CO}_2 + \text{H}_2\text{O}$ , if 16.8 grams of  $\text{CaCO}_3$  is mixed with 11.0 grams of  $\text{HC}_2\text{H}_3\text{O}_2$ :

- a. Which is the limiting reagent and what maximum mass of  $\text{CO}_2$  can form?



$$16.8 \text{ g CaCO}_3 \left( \frac{1 \text{ mol CaCO}_3}{100.1 \text{ g CaCO}_3} \right) \left( \frac{1 \text{ mol CO}_2}{1 \text{ mol CaCO}_3} \right) \left( \frac{44.01 \text{ g CO}_2}{1 \text{ mol CO}_2} \right) = 7.39 \text{ g CO}_2$$

$$11.0 \text{ g HC}_2\text{H}_3\text{O}_2 \left( \frac{1 \text{ mol HC}_2\text{H}_3\text{O}_2}{60.05 \text{ g HC}_2\text{H}_3\text{O}_2} \right) \left( \frac{1 \text{ mol CO}_2}{2 \text{ mol HC}_2\text{H}_3\text{O}_2} \right) \left( \frac{44.01 \text{ g CO}_2}{1 \text{ mol CO}_2} \right) = 4.03 \text{ g CO}_2$$

HC<sub>2</sub>H<sub>3</sub>O<sub>2</sub> produces less CO<sub>2</sub>, so HC<sub>2</sub>H<sub>3</sub>O<sub>2</sub> is the limiting reagent and 4.03 g of CO<sub>2</sub> maximum can form.

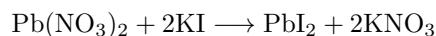
b. What mass of the excess reagent remains when the reaction is complete?

$$4.03 \text{ g CO}_2 \left( \frac{1 \text{ mol CO}_2}{44.01 \text{ g CO}_2} \right) \left( \frac{1 \text{ mol CaCO}_3}{1 \text{ mol CO}_2} \right) \left( \frac{100.1 \text{ g CaCO}_3}{1 \text{ mol CaCO}_3} \right) = 9.17 \text{ g CaCO}_3 \text{ used up}$$

$$16.8 \text{ g} - 9.17 \text{ g} = 7.6 \text{ g CaCO}_3 \text{ excess}$$

#### 4

Given the unbalanced equation  $\text{Pb}(\text{NO}_3)_2 + \text{KI} \rightarrow \text{PbI}_2 + \text{KNO}_3$ , if 4.1 grams of KI react with an excess of  $\text{Pb}(\text{NO}_3)_2$  and then 4.9 grams of  $\text{PbI}_2$  are actually collected, what is the percent yield of the reaction?



$$4.1 \text{ g KI} \left( \frac{1 \text{ mol KI}}{166.0 \text{ g KI}} \right) \left( \frac{1 \text{ mol PbI}_2}{2 \text{ mol KI}} \right) \left( \frac{461.0 \text{ g PbI}_2}{1 \text{ mol PbI}_2} \right) = 5.7 \text{ g PbI}_2 = \text{theoretical yield}$$

$$\frac{4.9 \text{ g}}{5.7 \text{ g}} \times 100\% = 86\% \text{ yield}$$



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