STOICHIOMETRIC PROBLEMS

SHEET #2: MASS ➜ AMOUNT ➜ AMOUNT ➜ MASS

1. How many moles of sulphur will react with 9 mol of oxygen gas for the reaction shown?

   $2S(s) + 3O_2(g) \rightarrow 2SO_3(g)$

2. For the following reaction, what mass of FeS is needed to react with 7.81 g of oxygen? What amount of oxygen is needed to react with 6.79 mol of FeS?

   $4FeS(s) + 7O_2 \rightarrow 2Fe_2O_3(s) + 4SO_2(g)$

3. What mass of O_2 is needed to react with 6.4 g of methane according to the following equation? What mass of carbon dioxide forms?

   $CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(l)$

4. Sodium carbonate and hydrochloric acid react to give sodium chloride, carbon dioxide and water. How many grams of sodium carbonate and hydrochloric acid would be required to produce 286 g of carbon dioxide.

   $Na_2CO_3 + 2HCl \rightarrow 2NaCl + CO_2 + H_2O$

5. What amount of NaOH is required to produce 8.61 mol of sodium sulphate?

   $2NaOH(aq) + H_2SO_4(aq) \rightarrow Na_2SO_4(aq) + 2H_2O(l)$

   What mass of sulphuric acid is required to produce 4.77 mol of sodium sulphate?

6. If 20.0 g of zinc reacts with excess (more than you need) hydrochloric acid, what mass of zinc chloride and hydrogen gas is produced? What mass of hydrochloric acid is actually required for the reaction?

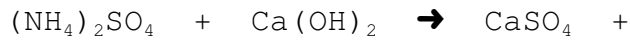
   $Zn + HCl \rightarrow ZnCl_2 + H_2$

7. What mass of oxygen is produced in the thermal decomposition of 5.0 g of potassium chlorate?

   $KClO_3 \rightarrow KCl + O_2$

8. What mass of copper metal is required to replace the silver in 4.0 g of silver nitrate which is dissolved in water.

9. Ammonium sulphate reacts with calcium hydroxide to produce calcium sulphate, ammonia gas and water. If 20.0 g of calcium hydroxide is reacted with excess ammonium sulphate, what mass of ammonia gas is produced?



10. Sulphuric acid reacts with sodium chloride to form hydrochloric acid and sodium sulphate. If 30.0 g of sodium chloride is allowed to react with sufficient sulphuric acid, what mass of hydrochloric acid will form?

Answers:

1. 6 mol S
2. 12.3 g FeS, 11.9 mol O_2
3. 25.5 g O_2, 17.5 CO_2 g
4. 689 g Na_2CO_3, 474 g HCl
5. 17.22 mol NaOH, 468 g H_2SO_4
6. 41.7 g $ZnCl_2$, 0.618 g H_2, 22.3 g HCl
7. 1.96 g O_2
8. 0.748 g Cu
9. 9.20 g NH_3
10. 18.7 g HCl