Stoichiometry – Sheet #1: Mass - Mass Problems

1. When 142 g of calcium fluoride are reacted with an excess of sodium bromide, calculate the mass of calcium bromide formed.
2. How many grams of sodium aluminate can be obtained from 7.71 g of aluminum chloride according to the reaction:

   $AlCl_3(aq) + 4NaOH(aq) \rightarrow NaAlO_2(aq) + 3NaCl(aq) + 2H_2O(l)$
3. How many grams of carbon dioxide are obtained when 2.96 g of cerium(III) oxalate are formed according to the reaction:

   $2Ce(IO_3)_4(aq) + 24H_2C_2O_4(aq) \rightarrow Ce_2(C_2O_4)_3(aq) + 4I_2(aq) + 42CO_2(g) + 24H_2O(l)$
4. Calculate the mass of sodium permanganate that can be prepared from 1.27 g of sodium bismuthate according to the reaction:

   $2Mn(NO_3)_2 + 5NaBiO_3 + 14HNO_3 \rightarrow 2NaMnO_4 + 5Bi(NO_3)_3 + 3\ NaNO_3 + 7H_2O$
5. If excess sulfuric acid is reacted with sodium hydroxide, 15.0 g of water is formed. What mass of sodium hydroxide was used?
6. 50.0 g of calcium carbonate was added to excess phosphoric acid. What mass of calcium phosphate was formed?
7. Calculate the mass of barium nitrate that must decompose in order to produce 112 g of oxygen.
8. Calculate the mass of potassium chloride that is produced when 17.0 g of potassium carbonate reacts with hydrochloric acid.
9. When "x" grams of calcium chloride was reacted with an excess of bromine, 14.0 kg of a gas was formed. Calculate "x".
10. How many grams of zinc oxide are formed when 10.0 g of zinc reacts with oxygen?
11. Sodium nitrate decomposes to give 3.00 g of oxygen. Calculate the mass of sodium nitrate used.
12. Potassium metal reacts with 70.0 g of chlorine. Calculate the mass of product.
13. Calculate the mass of magnesium oxide that must be decomposed in order to produce 48.0 g of oxygen.
14. Sodium chloride was reacted with an excess of sulfuric acid to give hydrochloric acid and 142 g of a second product. What is the product, and how much sodium chloride was reacted?
15. What mass of copper(I) sulfide can be produced from 9.90 g of copper(I) chloride reacting with an excess of hydrogen sulfide gas?
16. How many grams of calcium hydroxide will be needed to react completely with 10.0 g of phosphoric acid?
17. How many grams of hydrogen can be produced from the reaction of 72.0 g of sodium with an excess of water?
18. An excess of nitrogen reacts with 6.57 g of hydrogen. How many grams of ammonia are produced?
19. How many grams of oxygen are required to burn completely 84.9 g of carbon? $C(s) + O_2(g) \rightarrow CO_2(g)$
20. In the decomposition of potassium chlorate, 82.6 g of oxygen are formed. How many grams of potassium chloride are produced?
21. The action of carbon monoxide can be expressed by the equation,

    $Fe_2O_3(cr) + 3CO(g) \rightarrow 2Fe(s) + 3CO_2(g)$

    What would be the minimum amount of carbon monoxide used if 80.3 g of iron were produced?
22. How many grams of hydrochloric acid are required to react completely with 44.7 g of calcium hydroxide?
23. How many grams of hydrogen are produced when 4.77 g of aluminum react with excess hydrochloric acid?
24. Calculate the mass of lithium carbonate that must decompose to produce 78.0 g of carbon dioxide.
25. How many grams of oxygen gas are formed when 100.0 g of magnesium chlorate are decomposed?
26. Hydrochloric acid was reacted with zinc to produce 137 g of hydrogen gas. What mass of zinc did you begin with?