Name _____ Date _____ Class _____

11–2 Practice Problems

1. Determine the mass of lithium hydroxide produced when 0.38 g of lithium nitride reacts with water according to the following equation:
   $Li_3N + 3H_2O \rightarrow NH_3 + 3LiOH$

2. What mass of sodium chloride is produced when chlorine reacts with 0.29 g of sodium iodide?

3. Determine the mass of carbon dioxide produced when 0.85 g of butane reacts with oxygen according to the following equation:
   $2C_4H_{10} + 13O_2 \rightarrow 8CO_2 + 10H_2O$

4. Determine the mass of antimony produced when 0.46 g of antimony(III) oxide reacts with carbon according to the following equation:
   $Sb_2O_3 + 3C \rightarrow 2Sb + 3CO$

5. What mass of hydrogen peroxide (H_2O_2) must decompose to produce 0.77 g of water?

6. What mass of carbon monoxide must react with oxygen to produce 0.69 g of carbon dioxide?

7. Determine the mass of sodium nitrate produced when 0.73 g of nickel(II) nitrate reacts with sodium hydroxide according to the following equation:
   $Ni(NO_3)_2 + 2NaOH \rightarrow Ni(OH)_2 + 2NaNO_3$

8. Determine the mass of calcium hydroxide produced when calcium carbide reacts with 0.64 g of water according to the following equation:
   $CaC_2 + 2H_2O \rightarrow Ca(OH)_2 + C_2H_2$

9. How many grams of ozone (O_3) must decompose to produce 0.87 g of oxygen?

10. Find the mass of sugar ($C_6H_{12}O_6$) required to produce 1.82 L of carbon dioxide gas at STP from the reaction described by the following equation:
    $C_6H_{12}O_6 \rightarrow 2C_2H_6O + 2CO_2$

11. How many liters of oxygen are necessary for the combustion of 425 g of sulfur, assuming that the reaction occurs at STP? The balanced equation is $S + O_2 \rightarrow SO_2$.

12. Find the mass of benzene (C_6H_6) required to produce 2.66 L of carbon dioxide gas at STP from the reaction described by the following equation:
    $2C_6H_6 + 15O_2 \rightarrow 6H_2O + 12CO_2$

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11–2 Practice Problems (continued)

13. Find the mass of sodium required to produce 5.68 L of hydrogen gas at STP from the reaction described by the following equation:

$$2Na + 2H_2O \rightarrow 2NaOH + H_2$$

14. How many liters of oxygen are necessary for the combustion of 277 g of carbon monoxide, assuming that the reaction occurs at STP? The balanced equation is

$$2CO + O_2 \rightarrow 2CO_2$$

15. How many liters of oxygen are necessary for the combustion of 134 g of magnesium, assuming that the reaction occurs at STP? The balanced equation is

$$2Mg + O_2 \rightarrow 2MgO$$

16. Find the mass of aluminum required to produce 4.72 L of hydrogen gas at STP from the reaction described by the following equation:

$$2Al + 3H_2SO_4 \rightarrow Al_2(SO_4)_3 + 3H_2$$

17. How many liters of hydrogen are produced if 225 g of iron reacts with hydrochloric acid, assuming that the reaction occurs at STP? The balanced equation is

$$Fe + 2HCl \rightarrow FeCl_2 + H_2$$

18. Find the mass of S_8 required to produce 2.47 L of sulfur dioxide gas at STP from the reaction described by the following equation:

$$S_8 + 8O_2 \rightarrow 8SO_2$$

19. Propane (C_3H_8) burns in oxygen to produce carbon dioxide and water vapor. The balanced equation for this reaction is $C_3H_8 + 5O_2 \rightarrow 4H_2O + 3CO_2$. What volume of carbon dioxide is produced when 2.8 L of oxygen are consumed?

20. What volumes of H_2S gas and oxygen are necessary to produce 14.2 L of sulfur dioxide gas? The balanced equation is

$$2H_2S + 3O_2 \rightarrow 2SO_2 + 2H_2O$$

21. What volumes of sulfur dioxide and dihydrogen sulfide gases are necessary to produce 11.4 L of water vapor? The balanced equation is

$$SO_2 + 2H_2S \rightarrow 3S + 2H_2O$$

22. Glucose ($C_6H_{12}O_6$) burns in oxygen to produce carbon dioxide and water vapor as described in the following equation: $C_6H_{12}O_6 + 6O_2 \rightarrow 6H_2O + 6CO_2$. What volume of carbon dioxide is produced when 3.7 L of oxygen are consumed?

23. The compound TNT (trinitrotoluene) decomposes explosively into carbon, carbon monoxide, hydrogen, and nitrogen. What volumes of hydrogen and nitrogen are produced if 5.8 L of CO is produced? The balanced equation is

$$2C_7H_5(NO_2)_3 \rightarrow 2C + 12CO + 5H_2 + 3N_2$$

24. Nitroglycerin decomposes explosively to produce carbon dioxide, water, nitrogen, and oxygen. What volumes of nitrogen and oxygen are produced if 4.3 L of carbon dioxide is produced? The balanced equation is

$$4C_3H_5(NO_3)_3 \rightarrow 12CO_2 + 10H_2O + O_2 + 6N_2$$

25. Acetylene (C_2H_2) burns in oxygen to produce carbon dioxide and water. The balanced equation for this reaction is $2C_2H_2 + 5O_2 \rightarrow 2H_2O + 4CO_2$. What volume of carbon dioxide is produced when 1.6 L of oxygen are consumed?