

11-2 Practice Problems

- Determine the mass of lithium hydroxide produced when 0.38 g of lithium nitride reacts with water according to the following equation:
$$\text{Li}_3\text{N} + 3\text{H}_2\text{O} \rightarrow \text{NH}_3 + 3\text{LiOH}$$
- What mass of sodium chloride is produced when chlorine reacts with 0.29 g of sodium iodide?
$$2\text{NaI} + \text{Cl}_2 \rightarrow 2\text{NaCl} + \text{I}_2$$
- Determine the mass of carbon dioxide produced when 0.85 g of butane reacts with oxygen according to the following equation:
$$2\text{C}_4\text{H}_{10} + 13\text{O}_2 \rightarrow 8\text{CO}_2 + 10\text{H}_2\text{O}$$
- Determine the mass of antimony produced when 0.46 g of antimony(III) oxide reacts with carbon according to the following equation:
$$\text{Sb}_2\text{O}_3 + 3\text{C} \rightarrow 2\text{Sb} + 3\text{CO}$$
- What mass of hydrogen peroxide (H_2O_2) must decompose to produce 0.77 g of water?
$$2\text{H}_2\text{O}_2 \rightarrow 2\text{H}_2\text{O} + \text{O}_2$$
- What mass of carbon monoxide must react with oxygen to produce 0.69 g of carbon dioxide?
$$2\text{CO} + \text{O}_2 \rightarrow 2\text{CO}_2$$
- Determine the mass of sodium nitrate produced when 0.73 g of nickel(II) nitrate reacts with sodium hydroxide according to the following equation:
$$\text{Ni}(\text{NO}_3)_2 + 2\text{NaOH} \rightarrow \text{Ni}(\text{OH})_2 + 2\text{NaNO}_3$$
- Determine the mass of calcium hydroxide produced when calcium carbide reacts with 0.64 g of water according to the following equation:
$$\text{CaC}_2 + 2\text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2 + \text{C}_2\text{H}_2$$
- How many grams of ozone (O_3) must decompose to produce 0.87 g of oxygen?
$$2\text{O}_3 \rightarrow 3\text{O}_2$$
- Find the mass of sugar ($\text{C}_6\text{H}_{12}\text{O}_6$) required to produce 1.82 L of carbon dioxide gas at STP from the reaction described by the following equation:
$$\text{C}_6\text{H}_{12}\text{O}_6 \rightarrow 2\text{C}_2\text{H}_6\text{O} + 2\text{CO}_2$$
- 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 $\text{S} + \text{O}_2 \rightarrow \text{SO}_2$.
- 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:
$$2\text{C}_6\text{H}_6 + 15\text{O}_2 \rightarrow 6\text{H}_2\text{O} + 12\text{CO}_2$$

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:
$$2\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2$$
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
$$2\text{CO} + \text{O}_2 \rightarrow 2\text{CO}_2$$
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
$$2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}$$
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:
$$2\text{Al} + 3\text{H}_2\text{SO}_4 \rightarrow \text{Al}_2(\text{SO}_4)_3 + 3\text{H}_2$$
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
$$\text{Fe} + 2\text{HCl} \rightarrow \text{FeCl}_2 + \text{H}_2$$
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:
$$\text{S}_8 + 8\text{O}_2 \rightarrow 8\text{SO}_2$$
19. Propane (C_3H_8) burns in oxygen to produce carbon dioxide and water vapor. The balanced equation for this reaction is $\text{C}_3\text{H}_8 + 5\text{O}_2 \rightarrow 4\text{H}_2\text{O} + 3\text{CO}_2$. 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
$$2\text{H}_2\text{S} + 3\text{O}_2 \rightarrow 2\text{SO}_2 + 2\text{H}_2\text{O}$$
21. What volumes of sulfur dioxide and dihydrogen sulfide gases are necessary to produce 11.4 L of water vapor? The balanced equation is
$$\text{SO}_2 + 2\text{H}_2\text{S} \rightarrow 3\text{S} + 2\text{H}_2\text{O}$$
22. Glucose ($\text{C}_6\text{H}_{12}\text{O}_6$) burns in oxygen to produce carbon dioxide and water vapor as described in the following equation: $\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \rightarrow 6\text{H}_2\text{O} + 6\text{CO}_2$. 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
$$2\text{C}_7\text{H}_5(\text{NO}_2)_3 \rightarrow 2\text{C} + 12\text{CO} + 5\text{H}_2 + 3\text{N}_2$$
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
$$4\text{C}_3\text{H}_5(\text{NO}_3)_3 \rightarrow 12\text{CO}_2 + 10\text{H}_2\text{O} + \text{O}_2 + 6\text{N}_2$$
25. Acetylene (C_2H_2) burns in oxygen to produce carbon dioxide and water. The balanced equation for this reaction is $2\text{C}_2\text{H}_2 + 5\text{O}_2 \rightarrow 2\text{H}_2\text{O} + 4\text{CO}_2$. What volume of carbon dioxide is produced when 1.6 L of oxygen are consumed?