17. For each of the following synthesis reactions, identify the missing reactant(s) or product(s), and then balance the resulting equation.
a. $Mg + \_\_\_\_\_ \longrightarrow MgO$
b. $\_\_\_\_\_ + O_2 \longrightarrow Fe_2O_3$
c. $Li + Cl_2 \longrightarrow \_\_\_\_\_$
d. $Ca + \_\_\_\_\_ \longrightarrow CaI_2$

Types of Chemical Reactions

SECTION 2 REVIEW

18. Define and give general equations for the five basic types of chemical reactions introduced in Chapter 8.
19. How are most decomposition reactions initiated?
20. A substance is decomposed by an electric current. What is the name of this type of reaction?
21. a. In what environment do many single-displacement reactions commonly occur?
b. In general, how do single-displacement reactions compare with synthesis and decomposition reactions in terms of the amount of energy involved?

PRACTICE PROBLEMS

22. Complete each of the following synthesis reactions by writing both a word equation and a chemical equation.
a. sodium + oxygen $\longrightarrow$ _____
b. magnesium + fluorine $\longrightarrow$ _____
23. Complete and balance the equations for the following decomposition reactions:
a. $HgO \xrightarrow{\Delta}$
b. $H_2O(l) \xrightarrow{\text{electricity}}$
c. $Ag_2O \xrightarrow{\Delta}$
d. $CuCl_2 \xrightarrow{\text{electricity}}$

24. Complete and balance the equations for the following single-displacement reactions:
a. $Zn + Pb(NO_3)_2 \longrightarrow \_\_\_\_\_$
b. $Al + Hg(CH_3COO)_2 \longrightarrow \_\_\_\_\_$
c. $Al + NiSO_4 \longrightarrow \_\_\_\_\_$
d. $Na + H_2O \longrightarrow \_\_\_\_\_$
25. Complete and balance the equations for the following double-displacement reactions:
a. $AgNO_3(aq) + NaCl(aq) \longrightarrow \_\_\_\_\_$
b. $Mg(NO_3)_2(aq) + KOH(aq) \longrightarrow \_\_\_\_\_$
c. $LiOH(aq) + Fe(NO_3)_3(aq) \longrightarrow \_\_\_\_\_$
26. Complete and balance the equations for the following combustion reactions:
a. $CH_4 + O_2 \longrightarrow \_\_\_\_\_$
b. $C_3H_6 + O_2 \longrightarrow \_\_\_\_\_$
c. $C_5H_{12} + O_2 \longrightarrow \_\_\_\_\_$
27. Write and balance each of the following equations, and then identify each by type.
a. hydrogen + iodine $\longrightarrow$ hydrogen iodide
b. lithium + hydrochloric acid $\longrightarrow$ lithium chloride + hydrogen
c. sodium carbonate $\longrightarrow$ sodium oxide + carbon dioxide
d. mercury(II) oxide $\longrightarrow$ mercury + oxygen
e. magnesium hydroxide $\longrightarrow$ magnesium oxide + water
28. Identify the compound that could undergo decomposition to produce the following products, and then balance the final equation.
a. magnesium oxide and water
b. lead(II) oxide and water
c. lithium chloride and oxygen
d. barium chloride and oxygen
e. nickel chloride and oxygen
29. In each of the following combustion reactions, identify the missing reactant(s), product(s), or both, and then balance the resulting equation.
a. $C_3H_8 + \_\_\_\_\_ \longrightarrow \_\_\_\_\_ + H_2O$
b. $\_\_\_\_\_ + 8O_2 \longrightarrow 5CO_2 + 6H_2O$
c. $C_2H_5OH + \_\_\_\_\_ \longrightarrow \_\_\_\_\_ + \_\_\_\_\_$
30. Complete and balance the equations for the following reactions, and then identify each by type.
a. zinc + sulfur $\longrightarrow$ _____
b. silver nitrate + potassium iodide $\longrightarrow$ _____
c. toluene, C_7H_8 + oxygen $\longrightarrow$ _____
d. nonane, C_9H_{20} + oxygen $\longrightarrow$ _____

Activity Series of the Elements

SECTION 3 REVIEW

31. a. What is meant by the *activity* of an element?
b. How does this description differ for metals and nonmetals?