Chemical Equations and Reactions

Practice Problems B

1. **a.** calcium + sulfur ⟶ calcium sulfide; $8Ca(s) + S_8(s) \longrightarrow 8CaS(s)$

   b. hydrogen + fluorine ⟶ hydrogen fluoride; $H_2(g) + F_2(g) \longrightarrow 2HF(g)$

   c. aluminum + zinc chloride ⟶ zinc + aluminum chloride; $2Al(s) + 3ZnCl_2(aq) \longrightarrow 3Zn(s) + 2AlCl_3(aq)$
2. **a.** Liquid carbon disulfide reacts with oxygen gas to produce carbon dioxide gas and sulfur dioxide gas.

   b. Aqueous solutions of sodium chloride and silver nitrate react to produce aqueous sodium nitrate and a precipitate of silver chloride.
3. $N_2H_4(l) + O_2(g) \longrightarrow N_2(g) + 2H_2O(l)$

Practice Problems C

1. **a.** Word: magnesium + hydrochloric acid ⟶ magnesium chloride + hydrogen
   Formula: $Mg + HCl \longrightarrow MgCl_2 + H_2$
   Balanced: $Mg + 2HCl \longrightarrow MgCl_2 + H_2$

   b. Word: nitric acid + magnesium hydroxide ⟶ magnesium nitrate + water
   Formula: $HNO_3(aq) + Mg(OH)_2(s) \longrightarrow Mg(NO_3)_2(aq) + H_2O(l)$
   Balanced: $2HNO_3(aq) + Mg(OH)_2(s) \longrightarrow Mg(NO_3)_2(aq) + 2H_2O(l)$
2. $Ca(s) + 2H_2O(l) \longrightarrow Ca(OH)_2(aq) + H_2(g)$

Practice Problems E

1. **a.** $2Na(s) + Cl_2(g) \longrightarrow 2NaCl(s)$

   b. $Cu(s) + 2AgNO_3(aq) \longrightarrow Cu(NO_3)_2(aq) + 2Ag(s)$

   c. $Fe_2O_3(s) + 3CO(g) \longrightarrow 2Fe(s) + 3CO_2(g)$

Practice Problems F

1. **a.** no

   b. no

   c. yes; $Cd(s) + 2HBr(aq) \longrightarrow CdBr_2(aq) + H_2(g)$

   d. yes; $Mg(s) + 2H_2O(g) \longrightarrow Mg(OH)_2(aq) + H_2(g)$
2. Pb
3. Mn

Math Tutor Practice

1. $C_3H_8 + 5O_2 \longrightarrow 3CO_2 + 4H_2O$
2. **a.** $2KI(aq) + Cl_2(g) \longrightarrow 2KCl(aq) + I_2(s)$

   b. $2Al(s) + 3H_2SO_4(aq) \longrightarrow Al_2(SO_4)_3(aq) + 3H_2(g)$

Stoichiometry

Practice Problems A

1. 4 mol NH_3
2. 10. mol $KClO_3$

Practice Problems C

1. 80.6 g MgO
2. 300 g $C_6H_{12}O_6$

Practice Problems D

1. 7.81 mol HgO
2. 7.81 mol Hg

Practice Problems E

1. **a.** 60.0 g NH_4NO_3

   b. 27.0 g H_2O
2. 339 g Ag
3. 2.6 kg Al

Practice Problems F

1. **a.** H_2O_2

   b. 0.500 mol N_2H_4

   c. 0.250 mol N_2, 1.00 mol H_2O

Practice Problems G

1. **a.** Zn

   b. 0.75 mol S_8 remains

   c. 2.00 mol ZnS
2. **a.** carbon

   b. 2.40 mol H_2 and 2.40 mol CO

   c. 4.85 g H_2 and 67.2 g CO

Practice Problems H

1. 79.7%
2. 3.70 g Cu

Math Tutor Practice

1. 24.48 mol SO_3
2. 30.75 g O_2

States of Matter

Practice Problems A

1. 169 kJ
2. 2.19×10^5 g

Math Tutor Practice

1. 11.65 kJ/mol
2. 74.7 kJ