Chapter 8 key 8.1

22) a. The reactants are C_4H_{10} and O_2. The products are CO_2 and H_2O. The coefficient for C_4H_{10} is 2; The coefficent for O_2 is 13; the coefficent for CO_2 is 8; the coefficent for H_2O is 10. All the reactants and products are in the gaseous state.

23) conservation of matter.

24) a. $2N_2H_{4(l)} + N_2O_{4(l)} \longrightarrow 3N_{2(g)} + 4H_2O_{(l)}$

c. $3H_{2(g)} + N_{2(g)} \longrightarrow 2NH_{3(g)}$

25) a. $C_2H_5OH_{(l)} + 3O_{2(g)} \longrightarrow 2CO_{2(g)} + H_2O_{(l)}$

b. $2C_6H_{14(l)} + 19O_{2(g)} \longrightarrow 12CO_{2(g)} + 14H_2O_{(l)}$

26) a. $CO_{(g)} + 2H_{2(g)} \longrightarrow CH_4O_{(g)}$

b. $N_{2(g)} + O_{2(g)} \longrightarrow 2NO_{(g)}$

27) $\underset{15.0g}{C_6H_{12}O_{6(aq)}} + 6O_{2(g)} \longrightarrow \underset{?}{6CO_{2(g)}} + 6H_2O_{(l)}$

$$15.0g\,C_6H_{12}O_6 \times \frac{1\,mol\,C_6H_{12}O_6}{180.2g\,C_6H_{12}O_6} \times \frac{6\,mol\,CO_2}{1\,mol\,C_6H_{12}O_6} \times \frac{44.01g\,CO_2}{1\,mol\,CO_2} = \boxed{22.0g\,CO_2}$$

28) $\underset{10.5g}{2Al_{(s)} + 3CuO_{(s)}} \longrightarrow Al_2O_{3(s)} + \underset{?}{3Cu_{(s)}}$

$$10.5g\,CuO \times \frac{1\,mol\,CuO}{79.55g\,CuO} \times \frac{3\,mol\,Cu}{3\,mol\,CuO} \times \frac{63.55g\,Cu}{1\,mol\,Cu} = \boxed{8.39g\,Cu}$$