##### Section 9.2: Team Learning Worksheet

1. Consider the following unbalanced equation:

HCl + MnO2 → H2O + MnCl2 + Cl2

You have 5.00 grams of manganese(IV) oxide:

a. How many moles of manganese(IV) oxide do you have?

b. How many moles of HCl do you need for a complete reaction?

c. How many grams of HCl do you need for a complete reaction?

d. How many grams of each product (H2O, MnCl2, and Cl2) would be formed?

e. Prove that mass has been conserved in this reaction.

f. Is the number of atoms conserved? Support your answer.

g. Is the number of molecules conserved? Support your answer.

2. Consider the unbalanced equation:

\_\_\_\_\_ C6H14 + \_\_\_\_\_ O2 → \_\_\_\_\_ CO2 + \_\_\_\_\_ H2O

Balance the equation

What mass of O2 is required to react with 11.5 g of C6H14?

3. Consider the unbalanced equation:

\_\_\_\_\_ Na(*s*) + \_\_\_\_\_ Cl2(*g*) → \_\_\_\_\_ NaCl(*s*)

What mass of NaCl can be produced from 25.0 g of Cl2 and excess Na?

4. The mass of oxygen needed to completely react with 10.0 g of hydrogen to form water is reacted completely with methane to form carbon dioxide and water.

Write out and balance a reaction.

Determine the mass of carbon dioxide produced.

##### Section 9.2: Team Learning Worksheet - Answers

1. a. 0.0575 mol MnO2; b. 0.230 mol HCl; c. 8.39 g HCl; d. 2.07 g H2O, 7.24 g MnCl2, 4.08 g Cl2; e. 13.39 g = 13.39 g (8.39 + 5.00 = 2.07 + 7.24 + 4.08); f. yes; g. no

a. 500 g MnO2   = 0.0575 mol MnO2

b. 0.0575 mol MnO2   = 0.230 mol HCl

c. 0.230 mol HCl   = 8.39 g HCl

d. 0.0575 mol MnO2     = 2.07 g H2O

0.0575 mol MnO2     = 7.24 g MnCl2

0.0575 mol MnO2     = 4.08 g Cl2

2. 81.1 g O2 is required to react with 11.5 g of C6H14.

2C6H14 + 19O2  12CO2 + 14H2O

11.5 g C6H14       = 81.1 g O2

3. 41.2 g NaCl can be produced from 25.0 g of Cl2 and excess Na.

2Na + Cl2  2NaCl

25.0 g Cl2       = 41.2 g NaCl

4. 54.6 g carbon dioxide is produced. The students will have to determine and balance the equations, as well as think about how to set up the problem.

2H2 + O2  2H2O

10.0 g H2     = 2.48 mol O2

CH4 + 2O2  CO2 + 2H2O

2.48 mol O2     = 54.6 g CO2