Gas Stoichiometry

Chem Worksheet 14-5

Name _____

Use your knowledge of *Stoichiometry* and the *Ideal Gas Law* to solve the following problems. The chemical equations given are all balanced.

1. What volume of O_2 is produced when 28.5 g of hydrogen peroxide (H_2O_2) decomposes to form water and oxygen at 150°C and 2.0 atm?

   $2H_2O_2$ (aq) → $2H_2O$ (l) + O_2 (g)

2. This reaction uses 18.2 g of copper (I) sulfide (Cu_2S). What volume of sulfur dioxide gas would be collected at 237°C and 10.7 atm?

   $2Cu_2S$ (s) + $3O_2$ (g) → $2Cu_2O$ (s) + $2SO_2$ (g)

3. When 62.7-g nitrogen and excess oxygen react they generate nitrogen dioxide. If the NO_2 is collected at 625 K and 0.724 atm, what volume will it occupy?

   N_2 (g) + $2O_2$ (g) → $2NO_2$ (g)

4. What volume of hydrogen gas is evolved from a reaction between 0.52 g of Na and water? The gas is collected at 20.°C and 745 mmHg.

   2Na (s) + $2H_2O$ (l) → 2NaOH (aq) + H_2 (g)

5. At what pressure is the nitrogen gas sample that is collected when 48.4 g of NaN_3 decomposes? The temperature of the gas is 25°C and the volume is 18.4 L.

   $2NaN_3$ (s) → 2Na (s) + $3N_2$ (g)

6. When 2.4-g zinc is added to hydrochloric acid, 450 mL of hydrogen gas forms at a temperature of 32°C. What is the pressure of the gas?

   Zn (s) + 2HCl (aq) → $ZnCl_2$ (aq) + H_2 (g)

7. The following reaction forms 6.41 L of oxygen at a temperature of 18.7°C and a pressure of 731 torr, what mass of $KClO_3$ must have decomposed?

   $2KClO_3$ (s) → 2KCl (s) + $3O_2$ (g)

8. What mass of $CaSO_3$ must have been present initially to produce 14.5 L of SO_2 gas at a temperature of 12.5°C and a pressure of 1.10 atm?

   $CaSO_3$ (s) → CaO (s) + SO_2 (g)