Gas Stoichiometry Worksheet

1. A sample of methane gas having a volume of 2.80 L at 25 C and 1.65 atm was mixed with a sample of oxygen gas having a volume of 35.0 L at 31 C and 1.25 atm. The mixture was then ignited to form carbon dioxide and water. Calculate the volume of CO2 formed at a pressure of 2.50 atm and a temperature of 125 C.

2. If 4.000 grams of hydrogen peroxide is placed within a sealed 250 milliliter container at 500 K. What is the pressure of the oxygen gas produced in atmospheres?

   $2H_2O_2 \rightarrow 2H_2O + O_2$

3. A 450 mL container of oxygen gas is at STP. Hydrogen gas is pumped into the container, producing water. What is the least amount of mL of Hydrogen gas needed in order to react the oxygen to completion?

   $2H_2\,(g) + O_2\,(g) \rightarrow 2H_2O\,(l)$

4. This reaction occurred at 427 Kelvin, with 37 g of CH_4 and an excess of oxygen. The carbon dioxide produced was captured in a 30L sealed container. What is the pressure of the carbon dioxide within the container?

   $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$

5. Three gases (8.00 g of methane, CH_4, 18.0 g of ethane, C_2H_6, and an unknown amount of propane, C_3H_8) were added to the same 10.0 L container. At 23.0 °C, the total pressure in the container was measured to be 4.43 atm. Calculate the partial pressure of each gas in the container.

6. A 1.50 L bulb containing He at 155 torr is connected by a valve to a 2.00 L bulb containing CH_4 at 245 torr. The valve between the two bulbs is opened and the two gases mix.

   (a) What is the partial pressure (torr) of He and CH_4?
   (b) What is the mole fraction of He?