Chapter 5: Gas Laws Worksheet #2

1. Styrene oxide is a fairly simple aromatic organic compound that has a pleasant odor and is often used in the perfume industry. If 2.07 g of the compound is vaporized completely into a closed 1.04 L flask at 435 ºC, the pressure in the flask is found to be 735 torr. Calculate the formula weight of styrene oxide.

   120. g/mole

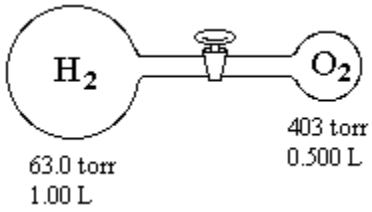
2. a. A sample of dichloroethane, a dry cleaning solvent, is vaporized into a 266.4 mL flask at 99.8 °C. Some of the sample leaves the flask through a pinhole through the stopper until the pressure in the flask is the same as the outside pressure. A barometer shows the pressure to be 745.3 torr. When the flask is cooled, the mass of dichloroethane in the flask if measured to be 0.8447 g. Calculate the formula weight of dichloroethane.

      98.95 g/mole

   b. The elemental analysis of dichloroethane is 24.27% C, 4.07% H, and 71.65% Cl.. What is the molecular formula of dichloroethane?

      $C_2H_4Cl_2$

3. Consider the diagram shown below.



   a. What will be the partial pressure of each gas when the stopcock is opened?

      176 torr Total

   b. What will be the pressure in the flasks when the stopcock is opened?

      42.0 torr H_2, 134 torr O_2

4. 1.00 mole of O_2 and 2.00 moles of NH_3 are placed in a container and allowed to react at 850 °C according to the equation:

   $$4\ NH_3(g) + 5\ O_2(g) \longrightarrow 4\ NO(g) + 6\ H_2O(g)$$

   If the total pressure in the container is 5.00 atm, what are the partial pressures for the **three** gases remaining?

   1.88 atm NH_3, 1.25 atm NO, 1.88 atm H_2O