1) A gas occupies 150.-mL at 24.0°C and 740.-torr. What temperature is needed for the gas to occupy 0.250-L at 1.10- atm?

2) 256-mL at 25°C and 755-mm Hg of acetylene gas (C_2H_2) is burned with water vapor and carbon dioxide produced. What volume of oxygen is needed and what volume of each product is produced?

1) Calculate the molar mass of a gaseous substance if 0.480-g of the gas occupies 367-mL at 365 torr and 45.0^{o}C. Identify the element.

2) A) Calculate the density of oxygen gas at STP.

B) Calculate the density of oxygen gas at 25^{o}C and 750.mmHg.

3) A pure gas contains 85.63% carbon and 14.37% hydrogen by mass. Its density is 2.50 g/L at STP. What is its molecular formula?

4) During a collision, automobile air bags are inflated by the N_2 gas formed by the explosive decomposition of sodium azide, NaN_3. What mass of sodium azide would be needed to inflate a 30.0L bag to a pressure of 1.40-atm at 25.0^oC.

5) Calculate the volume of methane measured at 27.0^{o}C and 825 torr that can be produced by the bacterial breakdown of 1.00-kg of a simple sugar, $C_6H_{12}O_6$. (CO_2 is the other product)

6) The molecular formula of a hydrocarbon is to be determined by analyzing its combustion products.

A) The hydrocarbon burns completely, producing 7.20-g water and 7.20-L of carbon dioxide at standard conditions. What is the empirical formula of the hydrocarbon?

B) It is found that 0.7308-g of the gaseous hydrocarbon in a 300.-mL container at 25^{o}C has a pressure of 780.-mm Hg. What is the molecular formula of the gas.

C) Calculate the volume of oxygen gas at STP required for the complete combustion of the sample of the hydrocarbon described in Part A.

DALTON'S LAW OF PARTIAL PRESSURE:

- the total pressure of a gas mixture is the sum of the partial pressures of the components of the mixture.

1) A 10.0-L flask contains 0.200 mole of methane, 0.300 mole of hydrogen, and 0.400 mole of nitrogen at 25^{o} C.

A) What is the pressure, in atm, inside the flask?

B) What is the mole fractions of the 3 gases?

C) What is the partial pressure of each component of the mixture of gases?

2) A gaseous mixture contains 5.23-g $CHCl_3$ and 1.66-g of methane. What pressure is exerted by the mixture inside a 50.0-mL metal container at 275^{o} C? What pressure is contributed by the $CHCl_3$?

3) The mole fraction of oxygen in the atmosphere is 0.2094. Calculate the partial pressure of O_2 in air when the atmospheric pressure is 760.mm Hg

4) Two tanks are connected by a closed valve. Each tank is filled with gas : Tank A is 5.00-L of O_2 at 24.0 atm and Tank B is 3.00-L of N_2 at 32.0 atm. Both tanks are held at the same temperature. We open the valve and allow the gases to mix.

A) After the gases mix, what is the partial pressure of each gas, and what is the total pressure?

B) What is the mole fraction of each gas in the mixture?

5) Hydrogen gas is collected over water at 21.0° C on a day when the atmospheric pressure was 748 torr. The volume of the gas sample was 300.mL (The vapor pressure of water vapor at 21° C is 19 torr)

A) How many moles of H_2 were present?

B) How many moles of water vapor were present in the moist gas mixture?

C) What is the mole fraction of hydrogen in the moist gas mixture?

6) 30.0-g of propane gas, C_3H_8, is ignited in a 25.0-L container with 200.-g O_2 gas. If water and carbon dioxide gas is produced, what is the total pressure inside the container after the reaction occurs and cools to 25°C ? (assume the volume of the water is negligible)

1) Calculate the root-mean-square speed of hydrogen gas at 20^{o} C.

1) Which gas is faster and by how many times: CO_2 or Ne?

2) A gas travels 1.45 times faster than sulfur dioxide gas. What is its molar mass?

1) A compound containing the elements C, H, N, and O is analyzed.

When a 1.2359-g sample is burned in excess oxygen, 2.242-g of CO_2 (g) is formed. The combustion analysis also showed the sample contained 0.0648-g of H.

i) Determine the mass, in grams, of C in the 1.2359-g sample of the compound.

ii) When the compound is analyzed for N content only, the mass percent of N is found to be 28.84 percent. Determine the mass , in grams, of N in the original 1.2359-g sample of the compound.

iii) Determine the mass, in grams, of O in the original 1.2359-g sample of the compound.

iv) Determine the empirical formula of the compound.

2) A different compound, which has the empirical formula, CH_2Br, has a vapor density of 6.00 $g*L^{-1}$ at 375K and 0.983 atm. Using these data, determine the following.
i) The molar mass of the compound.
ii) the molecular formula of the compound.