Densities and Molar Masses of Gases

STP = "Standard Temperature and Pressure"
Standard Temperature = 273 K
Standard Pressure = 1.00 atm = 101.325 kPa = 760 mm Hg = 760 torr
1 mL = 1 cm^3 = 1 cc
Kelvin = Celsius + 273
The Universal Gas Constant R = 8.314 L·kPa/mol·K = 0.0821 L·atm/mol·K = 62.4 L·Torr/moleK

These problems should be done on a separate sheet of paper.

1. Find the density of HCl gas at STP to three significant figures.

2. Find the density of HCl gas at 127 °C and 0.500 atm to three significant figures.

3. The mass of 1.00 L of a certain gas at STP is 2.75g. Calculate the molecular weight (molar mass) of this gas.

4. What is the density of uranium hexafluoride at STP?

5. The density of an unknown gas is 0.556 g/L at 373 K and 1.00 atm. What is the molar mass of the gas?

6. The density of a different unknown gas at 373 K and 1.00 atm is 1.04 g/L. What is the molar mass of this gas?

7. The density of a gas is found to be 0.441 g/L at 750 torr and 100 °C. What is the molar mass of the gas?

8. Try to identify the gases in questions 5,6, and 7.

9. You have data showing that a gas is 92.24% C and 7.76% H. If 632 mL of the gas at 750 Torr and 27°C has a mass of 0.65 g what is the molecular formula of the gas?

10. The mass of 1.00 L of nitrogen gas at STP is 1.25g.
    A) Use these data to calculate the molecular mass of nitrogen gas.
    B) From this calculated molecular mass and the given data, determine the number of *atoms* in a *molecule* of nitrogen.