NAME: **HONORS CHEMISTRY**

SECTION: Ideal Gas Law Problems

The ideal gas law is even more useful than the combined gas law! It not only states a relationship among pressure, volume, and temperature of a gas (as does the combined gas law), but it also relates these quantities to the number of gas particles present.

 PV = n R T

where R is the universal gas constant

 R = 0.0821 L atm /mol K (If your pressure is not in atm, then convert it)

1 atm = 760 mm Hg = 760 torr = 101.3 kPa

n = numbers of moles of gas $n= \frac{grams}{molar mass}$

T in Kelvin! K = oC + 273.15

The volume of the gas must be in liters 1000 mL = 1L

This relationship allows us to solve a wide variety of problem types.

Show all your work! When you are finished, enter your answers in the Google form to check your work and to get credit for completing this assignment.

1. How many moles of a gas will a 1250 mL flask hold at 35.0oC and a pressure of 95.4 kPa?
2. Calculate the density of carbon dioxide at 15oC and 1.2 atm. Assume you have 1 mole of the gas.
3. How many moles of oxygen are present in a 750.0 cm3 flask at 27oC and a pressure of 99.0 kPa?
4. Calculate the volume occupied by 6.06 g H2 at 24oC and a pressure of 100.5 kPa.
5. What mass of carbon dioxide is contained in a 3.00 L flask at –15oC and 103.1 kPa?
6. 150.0 g of chlorine gas are stored at –12.5oC and a pressure of .972 atm. What is the volume of the gas?
7. A flask has a volume of 258 cm3. A gas with a mass of 1.475 g is introduced into the flask at a temperature of 302.0 K and a pressure of 9.86 x 104 Pa. What is the molar mass of the gas?
8. A 0.670 gram sample of an unknown gas filled a 0.500 L flask at 0oC and 1.00 atm. Which of the following could be the identity of the gas, and why? N2, O2, NO or CO

KEY

1. 0.0466 moles

2. 2.2 g/L

3. 0.0298 mol
4. 73.7 L

5. 6.34 g

6. 46.5 L

7. 146 g/mol

8. NO