Name	0		 

## Part 1 - Fill in the Blanks (1 pt. each)

STP:

Temperature: \_\_\_\_ °C

atm 760 torr Pressure:

R=0.0821 Latm/molK

Part 2 – Gas Laws:

Write the equation next to the gas law (2pts each):

Boyle's Law:

Charles' Law:

1= 10 on Vit= 15Ti

Gay-Lussac's Law:

 $\frac{P_1}{T_1} = \frac{P_2}{T_1} \quad \text{or} \quad P_1 T_2 = P_2 T_1$ 

Combined Gas Law:

P.V. = BV2 OR P.V.T = BV2T,

Dalton's Law of Partial Pressures: (must write both equations)

Ideal Gas Law:

## <u>Part 2: Relationships</u>

Remember the Ideal gas law and the demos you have seen. Please answer the following questions.

1. If you hold T constant and if P increases, what happens to V?

DECREASE

a. Is this an inverse or direct relationship?

TAVERSE

2. If you hold P constant and if V decreases, what happens to T?

DECNEASE

a. Is this an inverse or direct relationship?

DIRECT

3. If you hold P constant and if n increases, what happens to V?

INCREASE

a. Is this an inverse or direct relationship?

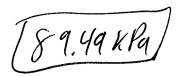
PIRECT.

## Part 3: Problems

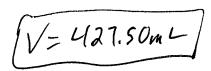
1. 2.50 L of a gas was at an unknown pressure. However, at standard pressure, its volume was determined to be 8.00 L. What was the unknown pressure in atmospheres? (harles ' low

2. The temperature of a 4.00 L sample of gas is changed from 10.0 °C to 20.0 °C. What will the volume of this gas be at the new temperature if the pressure is held constant? (hales Law)

3. An air sample at 107 kPa and  $-50.0^{\circ}\text{C}$  has an initial volume of 3.00 L. If the temperature is raised to  $100^{\circ}\text{C}$  and the volume expands to 6.00 L, what will the new pressure be?



4. The volume of hydrogen collected over water is 453 mL at 18° C and 780 mm Hg. What is the pressure dry gas alone? (vapor pressure of water at 18° C is 15.5 mmHg.)



5. A mixture of 2 moles of  $H_2$ , 3 moles of  $O_2$ , 5 moles of  $CO_2$  and 8 moles of  $N_2$  exerts a total pressure of 900 torr. What is the partial pressure of EACH gas?

$$P_{H_2} = 100 \text{ mm Hg}$$
 $P_{0_2} = 150 \text{ mm Hg}$ 
 $P_{co_2} = 250 \text{ mm Hg}$ 
 $P_{N_2} = 400 \text{ mm Hg}$ 

6. What pressure will be exerted by 30g of  $0_2$  at a temperature of 25° C and a volume of 500mL?

(45.87 atm)

1. 50.0 mL of gas at a pressure of 2 atm and temperature of 25°C are heated to 50.0°C and the pressure is allowed to rise to 2.5 atm. What is the new volume?

COMBINED GAS LAW

43.362

2. 50.0 mL of gas at a temperature of 15.0°C are cooled so that the new volume is 10.0 mL. What is the new temperature in Kelvin?

Charles' LAW

57.6K

3. 250. 0 mL of gas are at 100.0°C and 760.0 mm Hg. If the gas contracts to 125 mL, and the temperature is lowered to -20.0°C, what will be the new pressure?

COMBENED GASLAW

1031mmHg

4. What volume is occupied by 2 moles of gas 20.0°C and 400.0 kPa?

IDEAL GAS LAW

12.17L

5. If .25 moles of oxygen are collected **over water** at 298 K and 750 mm Hg what will be the volume of the oxygen gas? (Hint: Vapor Pressure of  $H_2O$  at 25°C is 23.76 mm Hg)

IDEAL GAS LAW

6.39 L

6. A 5.0 L balloon has the pressure of 650 mm Hg. If the pressure changes to 1 atm what is the new volume? BOYLE'S LAW

4.274

7. A balloon has the volume of 2.5 L indoors at 25°C. If the balloon is taken outside where the temperature is 0°C, what will be the new volume of the balloon?

CHARLES' LAW