Gas Laws Review

Chapters 13 and 14 **Name:**_____ **Period:**_____

A. Match each example below with the appropriate gas property it illustrates.

____1. The fragrance of perfume spreads though the room.	a. Compressibilty
____2. A cylinder of oxygen used in a hospital room.	b. Diffuses through other gases
____3. A balloon is inflated with helium.	c. Exerts pressure
____4. A balloon is filled with air weighs more than an empty balloon	d. Fills container
	e. has mass

B. Match the variables used to describe gases (P,V,T) to the correct unit.

_____ kPa _____C _____mL _____K _____mm Hg _____atm _____L

C. Complete the following statements by writing "decreases," "increases," or "remains the same" on the line provided.

As a gas is compressed in a cylinder,

Its mass _____, the number of gas molecules_____ its pressure_____, its volume_____, the distance between the gas molecules_____, its density.

D. For a mole of ideal gas, sketch graphs of,

a. P vs. V at constant T. b. P vs. T at a constant V. c. V vs. T at a constant P.

E. What does the Kinetic molecular theory tell us?

F. Complete the following statements about the nature of gases as presented in the kinetic molecular theory by filling in the appropriate word(s) from the list below.

kinetic energy no force perfectly elastic weak potential energy
pressure random motion zero

1. _____ results due to the collision between gas particles.
2. Gas molecules are said to be in _____.
3. The collisions between gas particles are _____.
4. The temperature of a gas is a measure of the average _____ of the gas particles.
5. Absolute temperature is _____K.

G. 1. What is the effect of increasing temperature of a gas on its volume at constant pressure?

2. The initial pressure of a gas is 5 atm & its volume is 10 L. What will be the new volume if pressure is doubled? (temperature being constant)

3. At STP, equal volumes of different gases contain equal _____(mass, density, # of molecules. # of atoms. # of protons)

Problems

Formulas $\frac{P_1V_1}{T_1}=\frac{P_2V_2}{T_2}$	**PV=nRT**	**R=0.0821 L•atm / mol•K**	**R=8.314 L•kPa / mol•K**	**R=62.4 L•mmHg / mol•K**
1atm=760 mmHg=101.3 kPa				

1. A7.0 liter balloon at room temperature (22°C) contains hydrogen gas. If the balloon is carried outside to where the temperature is -3.0°C, what volume will the balloon occupy? **A=6.4L**

2. A 5.0-liter tank of oxygen gas is at a pressure of 3 atm. What volume of oxygen will be available if the oxygen is used at standard pressure? **A = 15 L**

3. A 500 ml volume of helium gas is at a pressure of 750 mmHg and has a temperature of 30°C. What is the volume of the same gas at STP? **A = 444.6 L**

4. Nitrogen (78 kPa), oxygen (21.0 kPa), carbon dioxide (0.03 kPa), and water vapor (2.0 kPa) are the usual atmospheric components. What is the total atmospheric pressure in kPa? **A = 101.3 kPa**

5. 90.0g of Fluorine gas occupies 1300 mL at 0°C. Find the pressure exerted by the gas. **A = 40.9 atm**

6. In a laboratory experiment, 85.3 mL of a gas are collected at 24°C and 733 mmHg pressure. Find the volume at STP. **A = 75.6 mL**

7. What is the volume occupied by 19 g of N_2 at STP? **A = 15.2 L**

8. How many molecules are there in 700 ml of CO_2 at STP? **A= 1.88×10^{22} molecules**

9. 0.279 moles of O_2 in a 1.85 L cylinder exert a pressure of 3.68 atm. What is the Celsius temperature in the cylinder? **A = 24.2 C**

10. What is the mass of 18.9 L of NH_3 at 31.0°C and 97.97 kPa? **A= 12.44 g**

11. Ethylene (C_2H_4) burns in oxygen to form carbon dioxide and water vapor. How many liters of water can be formed if 1.25 liters of ethylene are consumed in this reaction? (Write the balanced chemical reaction first). **A = 2.5 L**

12. How many liters of hydrogen gas at 23°C and 733 mmHg are released by the reaction between 0.09 moles of sodium and unlimited water by the following equation? **A = 1.09 L**

_____Na + _____H_2O → _____H_2 + _____NaOH