Unit 10 – Chapter 5: Gases **Name _____**

Assignment #1: Combined Gas Laws & PV=nRT **Period _____**

1) A gauge on a compressed gas cylinder reads 2200 psi (pounds per square inch; 1 atm = 14.7 psi). Express this pressure in each of the following units
    a. standard atmospheres
    b. megapascals (MPa)
    c. torr

2) A balloon is filled to a volume of 7.00 X 10^2 mL at a temperature of 20.0^{0}C. The balloon is then cooled at constant pressure to a temperature of 1.00 X 10^2 K. What is the final volume of the balloon?

3) Consider the following chemical equation: 2 $NO_{2(g)} \rightarrow N_2O_{4(g)}$
If 25.0 mL of NO_2 gas is completely converted to N_2O_4 gas under the same conditions, what volume will the N_2O_4 occupy?

4) Complete the following table for an ideal gas:

	P	V	N	T
a.	7.74 X 10^3 Pa	12.2 mL		25^{0}C
b.		43.0 mL	0.421 mol	223 K
c.	455 torr		4.4 X 10^{-2} mol	331^{0}C
d.	745 mm Hg	11.2 L	0.401 mol	

5) A flask that can withstand an internal pressure of 2500 torr, but no more, is filled with a gas at 21.0^{0}C and 758 torr and heated. At what temperature will it burst?

6) A person accidentally swallows a drop of liquid oxygen, $O_{2(l)}$, which has a density of 1.149 g/ml. Assuming the drop has a volume of 0.050 mL, what volume of gas will be produced in the person's stomach at body temperature (37^{0}C) and a pressure of 1.0 atm?

7) A container is filled with an ideal gas to a pressure of 40.0 atm at 0^{0}C.
    a. What will be the pressure in the container if it is heated to 45^{0}C?
    b. At what temperature would the pressure be 1.50 X 10^2 atm?
    c. At what temperature would the pressure be 25.0 atm?

8) A compressed gas cylinder contains 1.00×10^3 g of argon gas. The pressure inside the cylinder is 2050.0 psi (pounds per square inch) at a temperature of 18^0C. How much gas remains in the cylinder if the pressure is decreased to 650.0 psi at a temperature of 26^0C?

9) A hot air balloon is filled with air to a volume of 4.00×10^3 m^3 at 745 torr and 21^0C. The air in the balloon is then heated to 62^0C, causing the balloon to expand to a volume of 4.20×10^3 m^3. What is the ratio of the number of moles of air in the heated balloon to the original number of moles of air in the balloon? (Hint: Openings in the balloon allow air to flow in and out. Thus the pressure in the balloon is always the same as that of the atmosphere.)