CHM 1010 REVIEW PROBLEMS BASED ON GAS LAWS I Gage

1. A sample of nitrogen has a volume of 460 mL at 50^{o}C and 800 mmHg. What is its volume at STP?

2. What is the molar mass of a gas if the volume of a 0.568 g sample is 143 mL at 35^{o}C and 950 mmHg?

3. A helium tank has a volume of 522 L at 22^{o}C and 151 atm. What is the volume at 22^{o}C and 760 mmHg?

4. What is the pressure of a gas at 200^{o}C if its pressure is 1600 mmHg at 400^{o}C?

5. How many liters of chlorine gas at 25^{o}C and 1.88 atm are needed to react with 12.0 grams of phosphorus according to the following reaction?

$$P_4\,(s) + Cl_2\,(g) \text{ ------> } PCl_3$$

6. What is the density of sulfur hexafluoride at 90^{O}C and 850 torr?

7. If you were standing 10 yards away from a person and he simultaneously opened two containers with hydrogen sulfide (rotten egg odor) and dinitrogen oxide (laughing gas), which would you detect first and why?

8. A gas mixture has a total pressure of 2.35 atm and is 46% ammonia. What is the pressure of the ammonia in the mixture?

9. The box below has a semipermeable membrane that allows gases to flow across from one side of the box to the other. The values represent partial pressures of gases that are put into the box on each side of the membrane. In the second box, write the values of each components after the system has had a chance to equilibrate. Indicate the total pressures for each part of both systems.

200 mm N_2	150 mm N_2
75 mm O_2	175 mm O_2
380 mm CO_2	380 mm CO_2
500 mm Ar	530 mm Ar

1. 409 mL
2. 80.4 g/mol
3. 7.88 x 10^4 L
4. 1120 mmHg
5. 7.56 L
6. 5.48 g/L
7. hydrogen sulfide
8. 1.1 atm

(Over)

11. Answer each of the following using the relationships between gas variables:

a. Why does hot air rise?
b. Why do aerosol cans have the warning, “Do not incinerate”?
c. Explain 2 ways to decrease the volume of a sealed balloon without manually squeezing it.
d. Explain why your car tires look more inflated after a long road trip than they do first thing in the morning.

12. Explain why you will eventually smell a person=s perfume or aftershave even though she or he is sitting some distance from you.

13. Explain when and why gases deviate from ideal behavior.