FOR QUESTIONS 1-4 (20 PTS): **74 pt test: GASES**

Make a drawing for each problem (2 pts)

Give the equation and show work (3 pts)

1. A gas sample is attached to an open arm manometer. The height in the open arm is 43 mm higher than the arm attached to the gas sample. What is P_{gas}? The P_{atm} = 800 mm Hg.

2. A barometer has a height of 600 mm hg. What is the P_{atm}?

3. A closed arm manometer has a height of 10 mm Hg. The P_{atm} is 762 mm Hg. What is the P_{gas}?

4. An open arm manometer has a height in the arm attached to the gas sample that is 26 mm Hg higher than the open arm. The P_{atm} = 600 mm Hg. What is P_{gas}?

5. (5 pts) What is the kinetic energy of 1 mole of CO_2 gas at 300^0C? SHOW WORK.

6. (5 pts) By what factor is the speed of a CO_2 molecule greater than the speed of an N_2 molecule? SHOW WORK.

7. (10 pts=2 pts each) Convert the following to **atm** (SHOW WORK):

   •765 torr

   •300 kPa

   •450,000 N/m^2

   •49 cm Hg

   •20,000 Pa

R= 0.0821 L-atm/ mol-K or 8.314 J/ mol-K

8. (4 pts) What are two conditions that make a gas ideal?

   a)

   b)

9. (2 pts) Gases act most ideally at _____ (lo/hi) pressure and

   _____ (lo/ hi) temperature.

10. (6 pts) What is the speed of an H_2 molecule at 100^0C? SHOW WORK.

11. (6 pts) What is the partial pressure of each gas in a mixture of 2 mol He, 4 mole He, and 7 mole O_2 if the total pressure is 23 atm? SHOW WORK.

12. (3 pts) List the following from slowest to fastest: He, Ne, Ar, O_2, F_2, Cl_2, Kr

13. (4 pts) What is the temperature of the gas, in ^{0}C, if P is 4 atm, V is 650 mL and the # of moles is 2.7 moles? SHOW WORK.

14. (3 pts) A piston at 10 atm and 1 L expands to 4 L, what is the new P? (no gas is added or removed, the temperature is constant) SHOW WORK.

15. (3 pts) An air conditioning unit compresses 200 L of gas at 30^{0}C to 50 L, what is the resulting temperature of the gas if the pressure is to remain the same? SHOW WORK.

16. (3 pts) 2.7 moles of gas occupy 16 L of space at a certain temperature and pressure. If the pressure and temperature are kept constant and I add 2 more moles of gas, what will the new volume be? SHOW WORK.

4 pts X.C. Give the names and formulas of all the formulas derived from the ideal gas law.

a)

b)

c)

d)