CHM 1045 CH 5 Homework

1. Review example 5.04. Suppose 10.0 L of a gas at 1.10 atm and 25.0 ^{o}C is heated to 100.0 ^{o}C and allowed to expand until a final pressure of 1.20 atm is reached. Rearrange the combined gas law and use it to determine the final volume. Write the complete equation with all units. Count the number of significant digits. (2 pts)

2. Review example 5.01. Convert the final pressure for problem #1 into mmHg, Pa (equivalent to $\frac{kg}{m \bullet s^2}$), kPa, and psi (pounds per square inch). Refer to the conversion factor chart on page 1 of the chapter 5 notes. Write complete equations with all units and conversion factors. Count the number of significant digits. (2 pts)

3. Review examples 5.05 and 5.07. Suppose there are 2.00 moles of O_2 at 1528 mmHg and 27.0 ^{o}C. Rearrange the ideal gas law and use it to determine the volume (L) of the gas. Then, find the density (g/L) by rearranging the equation: P(Mm) = dRT. Write complete equations with all units. (2 pts)

4. Review example 5.14. Find the constants (a and b) for O_2 in Table 9.3. Use the Van der Waals equation to determine the pressure of 1.000 mole of O_2 if the gas occupies 22.50 liters at 27.00 ^{o}C. First, find the value for each of the two terms in the equation. The first term has four significant digits, and the second term has three. Show the equation with the difference between the two values to find P, which has three significant decimal places. Write complete equations with all of the units. (2 pts)

5. Review example 5.10. Suppose 1.582 moles of N_2 and 0.418 moles of O_2 occupy 22.41 L at a total pressure of 3.000 atm.

   Use $X_A = \frac{n_A}{n_{total}}$ to determine the (decimal) mole fractions (X_{N2} and X_{O2}).
   Then, rearrange $X_A = \frac{P_A}{P_{total}}$ to determine the partial pressures (P_{N2} and P_{O2}).

   Write complete equations with all applicable units.
   Use the equations provided. Do not use the ideal gas law. (2 pts)