Dougherty Valley HS Chemistry - AP
Gas Laws – Gas Law Problems

Worksheet #9

Name: **Period:** **Seat#:**

Directions: Show work for all problems.

1) A mixture of nitrogen and neon gases contains equal moles of each gas and has a total mass of 10.0 g. What is the density of this gas mixture at 500 K and 15.0 atm? Assume ideal gas behavior. *8.8 g/L*

2) What is height (in mm) of a column of ethanol if the pressure at the base of the column is 1.50 atm? (The density of Hg is 13.534 g/cm^3 and ethanol is 0.789 g/cm^3.) *19,555 mm C_2H_5OH*

3) 1.0 L of liquid nitrogen is kept in a closet measuring 1.0 m by 1.0 m by 2.0 m. Assuming the container is completely full, and the temperature is 25.0 °C, and the atmospheric pressure is 1.0 atm, calculate the percent (by volume) of air that would be displaced if all the liquid nitrogen evaporated. (Liquid nitrogen has a density of 0.807 g/mL.) *35.2%*

4) A humidifier is used in a bedroom kept at 22.0 °C. The bedroom's volume is 4.0 x 10^4 L. Assume that the air is originally dry and no moisture leaves the room while the humidifier is operating.

a. If the humidifier has a capacity of 3.00 gallons of H_2O, will there be enough to saturate the room with water vapor (Vp of H_2O at 22. °C = 19.83 mmHg)? *yes, prove it*
b. What is P_{final} of water vapor in the room when the humidifier has vaporized 2/3 of its water supply? *0.254 atm*

5) 20.0 g each of helium and an unknown diatomic gas are combined in a 1500. mL container. If the temperature is 298 K, and the pressure inside is 86.11 atm, what is the unknown gas? *Cl_2*