Chem 111 Name:_____

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Worksheet 10: Gases & The Equation of State

1. How many grams of carbon dioxide are in a 5.60 liter container at 0.00°C and 2.00 atmospheres pressure?

2. A piece of dry ice (solid carbon dioxide) with a mass of 28.8 g sublimes (converts from solid to gas) into a large balloon. Assuming that all of the carbon dioxide ends up in the balloon, what is the volume of the balloon at a temperature of 22.0 ˚C and a pressure of 742 mm Hg?

3. An ideal gas originally at 0.85 atm and 66 ˚C was allowed to expand until its final volume, pressure, and temperature were 94 mL, 0.60 atm, and 45 ˚C, respectively. What was its initial volume?

4. A sample of air has a volume of 550.0mL at 106ºC. At what temperature will its volume be 700.0mL at constant pressure?

5. A 2.766 g sample of a gas occupies a volume of 2.12 L at 23.6ºC and 755.1 mmHg. What is the molecular mass of the gas? What is the identity of the gas?

6. What is the density of helium gas at 22.4ºC and 57.6 atm?

7. When solid ammonium nitrite is heated, it decomposes to give nitrogen gas and water. This property is used to inflate some tennis balls. Write a balanced chemical equation for this reaction. Calculate the quantity (in g) of ammonium nitrite needed to inflate a tennis ball to a volume of 86.2 mL at 1.20 atm and 22.0˚C.

8. A piston containing a mixture of N_2, He, and Ne currently has a volume of 2.50 L at 15.0 ˚C. The partial pressures of the gases are 0.320 atm for N_2, 0.150 atm for He, and 0.420 atm for Ne.
    a. Calculate the total pressure of the mixture.

    b. Calculate the volume of the piston if the N_2 is removed selectively but the pressure and temperature remain constant.