

**Unit 10 – Chapter 5: Gas Laws**

Name \_\_\_\_\_

**Determination of the Molar Mass of Volatile Liquids Pre-Lab**

Period \_\_\_\_\_

- 1) Calculate the number of molecules in a deep breath of air whose volume is 2.50 L at body temperature, 37°C, and a pressure of 735 torr.
  
- 2) An aerosol spray can with a volume of 250 mL contains 2.30 g of propane gas (C<sub>3</sub>H<sub>8</sub>) as a propellant.
  - a. If the can is at 23°C, what is the pressure in the can?
  - b. What volume would the propane occupy at STP?
  - c. The can states the exposure to temperatures above 130°F may cause the can to burst. What is the pressure in the can at this temperature?
  
- 3) Chlorine is widely used to purify municipal water supplies and to treat swimming pool waters. Suppose that the volume of a particular sample of Cl<sub>2</sub> gas is 8.70 L at 895 torr and 24°C.
  - A) How many grams of Cl<sub>2</sub> are in the sample?
  - B) What volume will the Cl<sub>2</sub> occupy at STP?
  - C) At what temperature will the volume be 15.00 L if the pressure is 8.76 X 10<sup>2</sup> torr?
  - D) At what pressure will the volume equal 6.00 L if the temperature is 58°C?
  
- 4) In an experiment reported in scientific literature, male cockroaches were made to run at different speeds on a miniature treadmill while their oxygen consumption was measured. In one hour, the average cockroach running at 0.08 km/hr consumed 0.8 mL of O<sub>2</sub> per gram of insect weight at 1 atm of pressure and 24°C.
  - A) How many moles of O<sub>2</sub> would be consumed in 1 hour by a 5.2 g cockroach moving at this speed?
  - B) This same cockroach is caught by a child and placed in a 1 qt fruit jar with an airtight lid. Assuming the same level of continuous activity as in the research, will the cockroach consume more than 20% of the available O<sub>2</sub> in a 48-hour period? (Air is 21 mol % O<sub>2</sub>)