**Ideal Gas Law Practice**

Temperature **MUST** be in **K** Pressure **MUST** be in **atm** Volume **MUST** be in **L**

**Sample Calculation:**

 A sample of gas at -33.0oC and 670 mmHg occupies a 0.128 L volume. How many moles of gas particles are in the container?

 670 mmHg x 1 atm/760 mmHg = 0.882 atm -33.0oC + 273 = 240 K

P V = nRT (0.882 atm)(0.128 L) = n (0.0821)(240 K) (0.882)(0.128) = n = 0.00573 mol

 (0.0821)(240)

**Calculations:**

1. What is the pressure in atmospheres exerted by a 0.500 mole sample of nitrogen gas in a 10.0 L container at 25.0°C?

2. What is the volume, in liters, of 0.250 mole of oxygen gas at 20.0°C and 0.974 atm of pressure?

3. What mass of chlorine gas, Cl2, in grams, is contained in a 10.0 L tank at 27.0°C and 3.50 atm of pressure? (*hint*: find moles first, then use the molar mass of Cl2 to find grams)

4. An engineer pumps 5.00 moles of carbon monoxide gas into a cylinder that has a capacity of 20.0 L. What is the pressure in atm of CO inside the cylinder at 25.0°C?

5. A student collects 425 mL of oxygen at a temperature of 24.0°C and a pressure of 0.899 atm. How many moles of oxygen did the student collect?

6. Determine the molar mass of an unknown gas that has a volume of 72.5 mL at a temperature of 68.0°C, and a pressure of 0.980 atm, and a mass of 0.207 g.

 (*hint*: find moles first and remember that molar mass is the “mass per mole”)

7. A sample of an unknown gas occupies a volume of 25.0 mL at a temperature of 127°C and has a pressure of 1.53 atm. Calculate the number of moles of gas.

8. Determine the mass of CO2 gas that has a volume of 7.10 L at a pressure of 1.11 atm and a temperature of 31.0°C.

9. A large balloon contains 1.00 mol of helium in a volume of 22.4 L at 0.00oC. What pressure will the helium exert on its container? Give your answer in atm and in mmHg.

10. What is the volume of 1.00 mol of N2O gas in a balloon when it is stored at STP?

11. What is the volume of 1 mol of ANY gas at STP? (called “molar volume” instead of “molar mass”)

 (*no calculations required, you’ve already done them*)

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