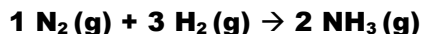


**MUST SHOW WORK FOR CREDIT**

- 1.) What volume of hydrogen gas at 580. mm Hg and 127°C is required to produce 0.895 g of NH<sub>3</sub>?  
(R = 0.0821 L atm/ mol K)



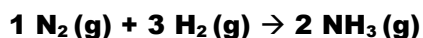
Step 1: Covert grams of NH<sub>3</sub> to Moles of H<sub>2</sub>

Step 2: Look at the Gas Law constant to determine units.

Step 3: Convert Temperature and Pressure to match the units of the Gas Law constant.

Step 4: Now rearrange the Ideal Gas Law equation to solve for Volume and substitute in the values.

- 2.) What volume of N<sub>2</sub> would be required to produce the NH<sub>3</sub> under the same conditions of temperature and pressure? (R = 0.0821 L atm/ mol)



Step 1: Covert grams of NH<sub>3</sub> to Moles of N<sub>2</sub>. (Note everything stays the same except for moles N<sub>2</sub>.)

Step 2: Look at the Gas Law constant to determine units.

Step 3: Convert Temperature and Pressure to match the units of the Gas Law constant.

Step 4: Now rearrange the Ideal Gas Law equation to solve for Volume and substitute in the values.

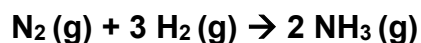
- 3.) What is the molar mass of a gas if 1.45 g occupies 830. mL at 735 mm Hg and 22.0 °C? (R = 0.0821 L atm/ mol K)

Step 1: Since R has units of atm, L, and K. You must convert Pressure, Volume, and Temperature.

Step 2: Since molar mass = grams/ mole, rearrange the Ideal Gas Law to solve for moles.

Step 3: Now take the number of grams from the word problem and divide by the number of moles to calculate the grams/mole for Molar Mass.

- 4.) What volume of hydrogen gas at STP is required to produce 85.0 g of NH<sub>3</sub>? (R = 8.314 kPa L/ mol K)



Step 1: Covert grams of NH<sub>3</sub> to Moles of H<sub>2</sub>. (Note everything stays the same except for moles N<sub>2</sub>.)

Step 2: Look at the Gas Law constant to determine units.

Step 3: Convert Temperature and Pressure to match the units of the Gas Law constant.

Step 4: Now rearrange the Ideal Gas Law equation to solve for Volume and substitute in the values.

- 5.) A sample of nitrogen gas,  $\text{N}_2$ , is collected in a 100 mL container at a pressure of 688 mm Hg and a temperature of  $565^\circ\text{C}$ . How many grams of nitrogen gas are present in this sample? ( $R = 8.314 \text{ kPa L / mol K}$ )

Step 1: Look at the Gas Law constant to determine units.

Step 2: Convert the Volume, Temperature, and Pressure to match the units of the Gas Law constant.

Step 3: Solve Ideal Gas Law for number of moles.

Step 3: Use the molar mass of nitrogen gas to convert to grams.

- 6.) Determine the molar mass of a gas that has a density of  $2.18 \text{ g/L}$  at  $66^\circ\text{C}$  and 720 mm Hg. ( $R = 8.314 \text{ kPa L / mol K}$ )

Step 1: Look at the Gas Law constant to determine units.

Step 2: Convert the Volume, Temperature, and Pressure to match the units of the Gas Law constant.

Step 3: Solve Ideal Gas Law for number of moles.

Step 3: Use the grams from the density and the moles from above to solve for molar mass.

**Challenge: What is the density of chlorine gas at STP?**