

GAS LAW PROBLEMS

1. Calculate the ratio of the rates of diffusion of He to SO₂ at room temperature.

SET-UP

Which gas diffuses faster? _____

How much faster? _____

2. What is the density of fluorine gas at STP?

SET-UP

Answer _____

3. A given mass of CH₄ has a volume of 750.0 mL at 273K and 760.0 mm Hg. To what temperature in °C must the gas be heated in order to occupy a volume of 3.00 liters at 720.0 mm Hg?

SET-UP

Answer _____

4. CO₂ has a density of 1.96 g/L at STP. What will be the weight of 250.0 mL of CO₂ at 25.0°C and 700.0 mm Hg?

SET-UP

Answer _____

5. How many liters of oxygen collected over H_2O and measured at 27.0°C and 740.0 mm Hg can be prepared by decomposing 1.500 g KClO_3 ? The vapor pressure of H_2O at 27.0°C is 26.7 mm . Density of O_2 at STP = 1.43 g/L .

SET-UP

Answer _____

6. Calculate the volume of mL of $6.6\text{ g N}_2\text{O}$ at STP.

SET-UP

Answer _____

7. 1.225 g of volatile liquid hydrocarbon, containing 92.2% carbon and 7.76% hydrogen, are vaporized, giving 400.0 mL of vapor when measured over water at 30.0°C and 770.0 mm Hg . The vapor pressure of water at 30°C is 32.0 mm Hg . Determine the molecular weight and molecular formula of the hydrocarbon.

SET-UP

Answer _____

8. Given the all gas reaction: $2 \text{N}_2 + \text{O}_2 \rightarrow 2 \text{N}_2\text{O}$

If 14.0 g of N_2 are reacted with sufficient O_2 , calculate the following:

a. moles of N_2 reacted Answer _____
SET-UP

b. moles of O_2 reacted. Answer _____
SET-UP

c. moles of N_2O produced. Answer _____
SET-UP

d. liters of N_2 (STP) reacted. Answer _____
SET-UP

e. liters of O_2 (STP) reacted Answer _____
SET-UP

f. liters of N_2O (STP) produced. Answer _____
SET-UP

g. molecules of O_2 reacted. Answer _____
SET-UP

h. molecules of N_2O produced. Answer _____
SET-UP

9. Oxygen diffuses 2.00 times faster than gas Q. What is the formula weight of gas Q?

SET-UP

Answer _____

10. 0.500 g hydrogen, 12.0 g methane (CH_4), 16.0 g oxygen in a certain vessel exert a pressure of 3.00 atm at a certain temperature. Calculate the partial pressure of each gas in mm of Hg.

SET-UP

pp H_2 _____ mm Hg

pp CH_4 _____ mm Hg

pp O_2 _____ mm Hg