Chemical Composition Practice (Volume)

Name Key

Chapter 8 Honors Chemistry

For the following problems, assume STP conditions for gases. Show set up, work and units.

1. Calculate the number of molecules in 7.8 L of N_2H_4 gas.

$$7.8\text{ L } N_2H_4 \left| \frac{6.02\times10^{23}}{22.4\text{ L}} \right. = 2.1\times10^{23}\text{ molec. } N_2H_4$$

2. How many moles are in 1.6 L of methane(CH_4) gas?

$$1.6\text{ L} \left| \frac{1\text{ mol}}{22.4\text{ L}} \right. = .071\text{ mol}$$

3. Calculate the volume of 10.0 g of oxygen gas.

$$10.0\text{ g } O_2 \left| \frac{22.4\text{ L}}{32.0\text{ g}} \right. = 7.00\text{ L } O_2$$

4. How many milliliters of carbon dioxide gas do 1.5×10^{25} molecules occupy?

$$1.5\times10^{25}\text{ molec. } CO_2 \left| \frac{22.4\text{ L}}{6.02\times10^{23}\text{ molec.}} \right| \frac{1000\text{ mL}}{1\text{ L}} = 5.6\times10^{5}\text{ mL}$$

5. What is the mass in grams of 75.0 L of ammonia (NH_3) gas?

$$75.0\text{ L } NH_3 \left| \frac{17.03\text{ g}}{22.4\text{ L}} \right. = 57.0\text{ g}$$

6. How many atoms of hydrogen are in 2.34 g of sulfuric acid?

$$2.34\text{ g } H_2SO_4 \left| \frac{6.02\times10^{23}\text{ molec } H_2SO_4}{98.08\text{ g } H_2SO_4} \right| \frac{2\text{ atoms H}}{1\text{ molec.}} = 2.87\times10^{22}\text{ atoms H}$$