Molar Volume of Gases

1) What volume does 1 mole of a gas occupy? 22.414 L

2) A reaction produces 0.0680 mole of oxygen (O_2). How many liters will it occupy?

$.0680 \text{ mole} \times \frac{22.414 \text{ L}}{\text{mole}} = 1.52 \text{ L}$

3) How many moles of oxygen are in

a) $5.0 \text{ L} \times \frac{\text{mole}}{22.414 \text{ L}} = .233 \text{ mole}$

b) $0.0650 \text{ L} \times \frac{\text{mole}}{22.414 \text{ L}} = .0029 \text{ mole}$

c) $3.5 \text{ L} \times \frac{\text{mole}}{22.414 \text{ L}} = .156 \text{ mole}$

4) What is the volume of each of each of the following

a) $1.00 \text{ mole } O_2 \times \frac{22.414 \text{ L}}{\text{mole}} = 22.414 \text{ L}$

b) $0.0400 \text{ mole } CO_2 \times \frac{22.414 \text{ L}}{\text{mole}} = .897 \text{ L}$

c) $1.2 \text{ mole He} \times \frac{22.414 \text{ L}}{\text{mole}} = 26.9 \text{ L}$

5) What is the mass of SO_2 produced if 98.0 mL of the gas is produced?

$.098 \text{ L} \times \frac{\text{mole}}{22.414 \text{ L}} \times \frac{64.06 \text{ g}}{\text{mole}} = .28 \text{ g}$

6) What is the mass of each of the following

a) $11.2 \text{ L } H_2 \times \frac{\text{mole}}{22.414 \text{ L}} \times \frac{2.02 \text{ g}}{\text{mole}} = 1.00 \text{ g } H_2$

b) $2.8 \text{ L } Cl_2 \times \frac{\text{mole}}{22.414 \text{ L}} \times \frac{70.91 \text{ g}}{\text{mole}} = 8.86 \text{ g } Cl_2$

c) $3.4 \text{ L } F_2 \times \frac{\text{mole}}{22.414 \text{ L}} \times \frac{38 \text{ g}}{\text{mole}} = 5.76 \text{ g } F_2$

7) What is the volume of each of the following

a) $8.0 \text{ g } O_2 \times \frac{\text{mole}}{32.00 \text{ g}} \times \frac{22.414 \text{ L}}{\text{mole}} = 5.6 \text{ L } O_2$

b) $3.5 \text{ g CO} \times \frac{\text{mole}}{28.01 \text{ g}} \times \frac{22.414 \text{ L}}{\text{mole}} = 2.8 \text{ L CO}$

c) $0.0170 \text{ g } H_2S \times \frac{\text{mole}}{34.076 \text{ g}} \times \frac{22.414 \text{ L}}{\text{mole}} = .0112 \text{ L } H_2S$

8) 51.6 mL of hydrogen gas is collected over water at 23°C and a pressure of 776.8 mmHg. What is the partial pressure of the pure hydrogen gas?

$776.8 = P_G + 21 \qquad P_G = 756 \text{ mmHg}$

9) 75.3 mL of oxygen gas is collected over water at 27°C and 743.9 mmHg. What is the partial pressure of the oxygen gas?

$744 = P_G + 27 \qquad P_G = 717 \text{ mmHg}$

10) 41.6 mL of nitrogen gas is collected at 16°C and 721.6 mmHg. What is the partial pressure of the nitrogen gas?

$721.6 = P_G + 13.8 \qquad P_G = 708 \text{ mm Hg}$