CONCEPT: DALTON'S LAW: PARTIAL PRESSURE (SIMPLIFIED)

- Partial Pressure (P_{Gas}) is the pressure exerted by an individual gas within a mixture.
 - □ In a container of unreacting gases, *total pressure* of the container is the sum of the *partial pressures* of each gas.

EXAMPLE: A sample of neon gas exerts a pressure of 1.85 atm inside a cylinder. Some nitrogen gas is also present, at a pressure of 500 torr. What is the total pressure inside the cylinder?

Using moles to determine Partial Pressure

• If you assume that the gases behave ideally, then their partial pressures can be calculated from the Ideal Gas Law.

Partial Pressure (Ideal Gas Law)
$$P_{Gas} = \frac{n_RT}{V}$$

EXAMPLE: If 12.0 g helium and 20.0 g oxygen are placed inside a 5.0 L cylinder at 30 °C, what is the partial pressure of the helium gas?

CONCEPT: DALTON'S LAW: PARTIAL PRESSURE (SIMPLIFIED)

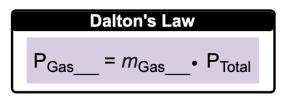
Fractional Composition to Partial Pressure

- When percent composition of a gas is given, first determine its *Fractional Composition*.
 - □ Fractional Composition (m): represents the percent composition of a gas divided by total percent.

Fractional Composition

Fractional Composition (m) =
$$\frac{\text{Gas}\%}{100\%}$$

□ Calculate the partial pressure of a gas using its fractional composition (m) and the total pressure.



EXAMPLE: A cylinder of a gas mixture used for calibration of blood gas analyzers in medical laboratories contains 5.0% CO₂, 12.0% O₂, and the remainder N₂ at a total pressure of 146 atm. What is the partial pressure of each component of this gas?

PRACTICE: A gas mixture contains 72.8% chlorine and 27.2% neon by mass. What is the partial pressure of neon in the mixture if the total pressure is recorded as 809 mmHg?

PRACTICE: The partial pressure of N_2 in the air is 593 mmHg at 1 atm. What is the partial pressure of N_2 in a bubble of air a scuba diver breathes when he is 66 ft below the surface of the water where the pressure is 3.00 atm?