## Answer on Question #66236, Chemistry / General Chemistry

**Partial Pressure:**

**Part A:**

Three gases (8.00 g of methane, $CH_4$, 18.0 g of ethane, $C_2H_6$, and an unknown amount of propane, $C_3H_8$) were added to the same 10.0-L container. At 23.0 ∘C, the total pressure in the container is 4.10 atm . Calculate the partial pressure of each gas in the container. Express the pressure values numerically in atmospheres, separated by commas. Enter the partial pressure of methane first, then ethane, then propane.

**Solution:**

We use the Mendeleev-Clapeyron equation
PV = nRT
Find the pressure
P = nRT / V
((8.00 g $CH_4$) / (16.04 g $CH_4$/mol)) x (0.082 L atm/K mol) x (296 K) / (10.0 L) = 1.21 atm $CH_4$
((18.00 g $C_2H_6$) / (30.07 g $C_2H_6$/mol)) x (0.082 L atm/K mol) x (296 K) / (10.0 L) = 1.45 atm $C_2H_6$
(4.10 atm) - (1.21 atm) - (1.45 atm) = 1.44 atm $C_3H_8$

**Answer: 1.21 atm, 1.45 atm, 1.44 atm**

**Part B:**

A gaseous mixture of O2 and N2 contains 36.8 % nitrogen by mass. What is the partial pressure of oxygen in the mixture if the total pressure is 805 mmHg ? Express you answer numerically in millimeters of mercury.

**Solution:**

Then partial pressure $O_2$ = mole fraction $O_2$ x total pressure
Mass $N_2$ in 100 g = 36.8 % x 100 g = 36.8 g
Moles $N_2$ = mass / molar mass = 36.8 g / 28.02 g/mol = 1.31335 mol
Mass $O_2$ = 100 % - 36.8 % = 63.2 %
Mass $O_2$ in 100 g = 63.2 g
Moles $O_2$ = 63.2 g / 32.00 g/mol = 1.975 mol
Total moles gas = 1.31335 mol + 1.975 mol = 3.28835 mol
Mole fraction $O_2$ = 1.975 mol / 3.28835 mol
= 0.6006
Partial pressure $O_2$ = 0.6006 x 805 mmHg = 483 mmHg

**Answer:** 483 mmHg

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