Remember $P_T = P_A + P_B + \ldots$

since PV = nRT

$P_AV = n_ART$ or $\frac{P_A}{n_A} = \frac{RT}{V}$

And $P_TV = n_TRT$ or $\frac{P_T}{n_T} = \frac{RT}{V}$

So $\frac{P_A}{n_A} = \frac{P_T}{n_T}$

Or $P_A = \left[\frac{n_A}{n_T}\right] P_T$

1. A balloon contains 0.100 moles of oxygen and 0.400 moles of nitrogen. If the balloon is at standard temperature and pressure, what is the partial pressure of the nitrogen?

   $P_A = \left[\frac{n_A}{n_T}\right] P_T$

   $P_{N2} = \left[\frac{n_{N2}}{n_T}\right] P_T$

   = (0.400/0.500)(101.3 kPa) = 81.0 kPa

2. The pressure of a mixture of nitrogen, carbon dioxide, and oxygen is 150.0 kPa. What is the partial pressure of oxygen if the partial pressures of the nitrogen and carbon dioxide are 100.0 kPa and 24.0 kPa, respectively?

$$P_T = P_{N2} + P_{O2} + P_{CO2}$$
$$150.0 = 100.0 + 24.0 + P_{CO2}$$
$$P_{CO2} = 26.0\ kPa$$

---

3. A gaseous mixture made from 10.0 g of oxygen and 15.0 g of argon is placed in a 8.00 L vessel at 25.2°C. What is the partial pressure of each gas, and what is the total pressure in the vessel?

10.0 g O_2/(32.0g/mole)= 0.3125 mole O_2

15.0 g Ar/(39.9g/mole)= 0.376 mole Ar

$P_T V = n_T RT$

P_T(8.00)= (0.3125+0.376)*8.31(273+25.2)

P_T = 213 kPa

$$P_{O2} = \frac{0.3125}{0.6885} 213.26 = 96.8\ kPa$$

$P_{Ar=} P_T - P_{O2=}$213 - 96.8= 116 kPa

0.6885

4. a) 0. 888 L of "wet"oxygen (this implies that it's mixed with water vapour) are collected at a temperature of 25.0 °C. The total pressure of the gases is 99.8 kPa. What is the partial pressure of the dry O_2? The partial pressure of water at 25.0° C is 3.17 kPa.

b) How many grams of water are in the 0. 888 L mixture?

a) $P_{O2=}\ P_T - P_{H2O=}$99.8 – 3.17= 96.6 kPa

b) $P_TV = n_TRT$

99.8(0.888) = n_T(8.31)(25+273)

$n_{T=}$ 0.03578 moles

$$P_{H2O} = \frac{n_{H2O}}{n_T} P_T$$

$$3.17 = \frac{n_{H2O}}{0.03578} 99.8$$

n = 0.001136 moles of water(18g/mole) = 0.0204 g of water

Faster way: P_{H2O} V = n_{H2O} RT

n_{H2O} = 3.17 kPa(0.888L)/(8.31kPaL/(Kmole))/298K = 0.001136 moles ; = 0.0204 g of H2O