ANSWER KEY

EXTRA PRACTICE: Partial Pressure Practice #2

Name:_____

1. What is the partial pressure of methane gas in a mixture of methane and helium if the total pressure is 345 mm Hg and the partial pressure of helium is 136 mm Hg?

$P_{Total} = P_{He} + P_{CH_4} \rightarrow P_{CH_4} = P_{Total} - P_{He}$

$P_{CH_4} = (345\ mmHg) - (136\ mmHg) \rightarrow \boxed{P_{CH_4} = 209\ mm\ Hg}$

2. Find the total pressure for a mixture that contains five gases with partial pressures of 3.50 kPa, 2.53 kPa, 3.45 kPa, 5.32 kPa and 2.34 kPa.

$P_{Total} = P_1 + P_2 + P_3 + P_4 + P_5$

$P_{Total} = (3.50\ kPa) + (2.53\ kPa) + (3.45\ kPa) + (5.32\ kPa) + (2.34\ kPa)$

$\boxed{P_{Total} = 17.1\ kPa}$

3. Find the partial pressure of helium in a three-gas mixture with a total pressure of 54.3 kPa if the partial pressure of the other two gases in the mixture is 23.3 kPa and 7.7 kPa.

$P_{Total} = P_1 + P_2 + P_{He} \rightarrow P_{He} = P_{Total} - P_1 - P_2$

$P_{He} = (54.3\ kPa) - (23.3\ kPa) - (7.7\ kPa)$

$\boxed{P_{He} = 23.3\ kPa}$

4. The total pressure in a closed container of three mixed gases is 100.0 kPa. The partial pressure of hydrogen in the mixture is 43.4 kPa and the partial pressure of oxygen is 23.2 kPa. The third gas in the mixture is methane, what is its partial pressure?

$P_{Total} = P_{H_2} + P_{O_2} + P_{CH_4} \rightarrow P_{CH_4} = P_{Total} - P_{H_2} - P_{O_2}$

$P_{CH_4} = (100.0\ kPa) - (43.4\ kPa) - (23.2\ kPa)$

$\boxed{P_{CH_4} = 33.4\ kPa}$

5. What is the partial pressure of oxygen **(in mm Hg)** in a mixture of helium and oxygen if the total pressure is 650 mm Hg and the partial pressure of helium is 335 kPa?

$P_{Total} = P_{He} + P_{O_2} \rightarrow P_{O_2} = P_{Total} - P_{He}$

$\frac{335\ kPa}{1} \left| \frac{1\ atm}{101.325\ kPa} \right| \frac{760\ mmHg}{1\ atm} = 2513.3\ mmHg$

$P_{O_2} = (650\ mmHg) - (2513.3\ mmHg) \rightarrow \boxed{P_{O_2} = -1863\ mmHg}$

6. Find the partial pressure of carbon monoxide in a gas mixture with a total pressure of 75.3 torr if the partial pressure of the other two gases in the mixture is 43.2 torr and 23.4 torr.

$P_{Total} = P_1 + P_2 + P_{CO} \rightarrow P_{CO} = P_{Total} - P_1 - P_2$

$P_{CO} = (75.3\ Torr) - (43.2\ Torr) - (23.4\ Torr)$

$\boxed{P_{CO} = 8.70\ Torr}$

7. Find the total pressure **(in atm)** for a mixture that contains six gases with partial pressure of 5.45 kPa, 3.56 kPa, 2.45 kPa, 4.95 kPa, 8.34 kPa, and 7.34 kPa.

$P_{Total} = P_1 + P_2 + P_3 + P_4 + P_5 + P_6$

$P_{Total} = (5.45\ kPa) + (3.56\ kPa) + (2.45\ kPa) + (4.95\ kPa) + (8.34\ kPa) + (7.34\ kPa)$

$P_{Total} = 32.09\ kPa \rightarrow \frac{32.09\ kPa}{1} \left| \frac{1\ atm}{101.325\ kPa} \right. \rightarrow \boxed{P_{Total} = 0.317\ atm}$

8. The total pressure in a closed container of four mixed gases is 231.5 kPa. The partial pressure of helium in the mixture is 23.2 torr, the partial pressure of oxygen is 43.3 torr, and the partial pressure of argon is 54.3 torr. The fourth gas in the mixture is carbon dioxide, what is its partial pressure in kPa?

$P_{Total} = P_{He} + P_{O_2} + P_{Ar} + P_{CO_2} \rightarrow P_{CO_2} = P_{Total} - P_{He} - P_{O_2} - P_{Ar}$

$P_{CO_2} = (231.5\ kPa) - [(23.2\ Torr) - (43.3\ Torr) - (54.3\ Torr)]$

$P_{CO_2} = (231.5\ kPa) + (-120.8\ Torr) \rightarrow \frac{-120.8\ Torr}{1} \left| \frac{1\ atm}{760\ Torr} \right| \frac{101.325\ kPa}{1\ atm} = -16.10\ kPa$

$P_{CO_2} = (231.5\ kPa) + (-16.10\ kPa) = \boxed{P_{CO_2} = 215\ kPa}$

9. Find the total pressure **(in atm)** for a mixture that contains two gases with partial pressures of 95.2 kPa and 67.4 kPa.

$P_{Total} = P_1 + P_2$

$P_{Total} = (95.2\ kPa) + (67.4\ kPa) \rightarrow P_{Total} = 162.6\ kPa$

$\frac{162.6\ kPa}{1} \left| \frac{1\ atm}{101.325\ kPa} \right. \rightarrow \boxed{P_{Total} = 1.61\ atm}$

10. What is the partial pressure **(in torr)** of oxygen in a mixture of helium and oxygen if the total pressure is 456 mm Hg and the partial pressure of helium is 633 mm Hg?

$P_{Total} = P_{He} + P_{O_2} \rightarrow P_{O_2} = P_{Total} - P_{He}$

$P_{O_2} = (456\ mmHg) - (633\ mmHg) \rightarrow P_{O_2} = -177\ mmHg$

$\frac{-177\ mmHg}{1} \left| \frac{1\ atm}{760\ mmHg} \right| \frac{760\ Torr}{1\ atm} \rightarrow \boxed{P_{O_2} = -177\ Torr}$