Worksheet 20 Applications of ideal gas law: Partial pressures

1. Define the term partial pressure. State Dalton's law of partial pressures.

2. Can the partial pressures of the components of an enclosed mixture of gases be measured with a manometer? If not, how are the partial pressures determined?

3. Consider a mixture of two gases, A and B, confined to a close vessel. A quantity of a third gas, C, is added to the same vessel at the same temperature. How does the addition of gas C affect the following: **a**. the partial pressure of gas **b**. the total pressure in the container **c**. the mole fraction of gas B?

4. A mixture containing 0.538 mol of He(g), 0.135 mol Ne(g), and 0.103 mol Ar(g) is confined in a 7.00 L vessel at 25°C. Calculate the partial pressure of each of the gases in the mixture. Calculate the total pressure of the mixture.

5. A mixture of 1.00 g H_2 and 1.00g He is placed in a 1.00 L container at 27°C. Calculate the partial pressure of each gas and the total pressure.

6. A mixture containing 4.00 g each of $CH_4(g)$, $C_2H_4(g)$ and $C_4H_{10}(g)$ is contained in a 1.50 L flask at a temperature of 0°C. Calculate the partial pressure of each of the gases in the mixture. Calculate the total pressure of the mixture.

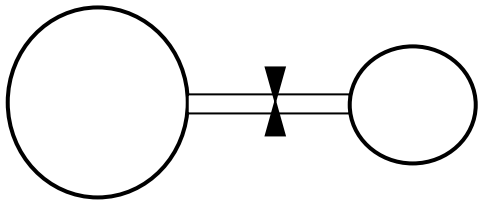
7. A mixture of gases contains 0.55 mol N_2, 0.20 mol O_2, and 0.10 mol CO_2. If the total pressure of the mixture is 1.32 atm, what is the partial pressure of each component?

8. A mixture of gases contains 3.50 g of N_2, 2.15 g of H_2, and 5.27 g of NH_3. If the total pressure of the mixture is 2.50 atm, what is the partial pressure of each component?

9. A 5.00 L vessel contains a mixture of 6.00 g $SO_2(g)$ and 7.50 g SO_3 (g) at 18°C. If the vessel is heated to 60°C, calculate the change (if any) in the following quantities: a. the partial pressure of SO_2 b. the total pressure of the mixture

c. the mole fraction of SO_3

10. Consider the flasks in the following diagram. What are the final partial pressures of H_2 and N_2 after the stopcock between the two flasks is opened? (Assume the final volume is 3.00 L) What is the total pressure (in torr)?



2.00 L H_2; 475 torr **1.00 L N_2; 0.200 atm**

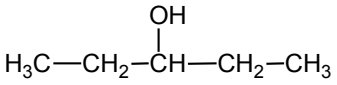
11. Consider the flask apparatus in Exercise 10, which now contains 2.00 L of H_2 at a pressure of 360. torr and 1.00 L of N_2 at an unknown pressure. If the total pressure in the flasks is 320. torr after the stopcock is opened, determine the initial pressure of N_2 in the 1.00 L flask.

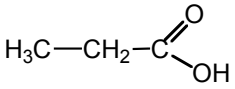
12. Helium is collected over water at 25°C and 1.00 atm total pressure. What total volume of gas must be collected to obtain 0.586 g of helium?

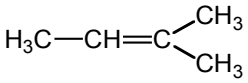
13. The hydrogen gas formed in a chemical reaction is collected over water at 30.0°C at a total pressure of 732 mm Hg. What is the partial pressure of the hydrogen gas collected in this way? If the total volume of gas collected is 722 mL, what mass of hydrogen gas is collected?

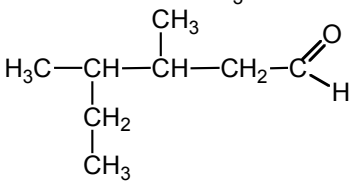
14. The air in a bicycle tire is bubbled through water and collected at 25°C. If the total volume of gas collected is 5.45 L at a temperature of 25°C and a pressure of 745 torr, how many moles of gas were in the bicycle tire?

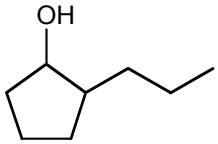
15. Give the names for the following chemical compounds:

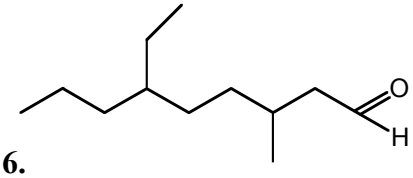
a). 

b). 

c). 

d). 

e). 

f). 

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