

Dalton's Law Problems

STP = "Standard Temperature and Pressure"

Standard Temperature = 273 K

Standard Pressure = 1.00 atm = 101.325 kPa = 760 mm Hg = 760 torr

1 mL = 1 cm³ = 1 cc

Kelvin = Celsius + 273

The Universal Gas Constant R = 8.314 L·kPa/mol·K = 0.0821 L·atm/mol·K = 62.4 L·Torr/mole·K

These problems should be done on a separate sheet of paper.

1. What is Dalton's Law of Partial Pressures?
2. What is a wet gas?
3. You have a container that contains hydrogen gas at 1.5 atm, nitrogen gas at 2.5 atm, and helium gas at 0.75 atm all at the same temperature. What is the total pressure in the container?
4. A gas collection tube contains hydrogen gas and water vapor both at the same temperature. If the total pressure in the tube is 760 torr and the pressure of the hydrogen is 733 torr what is the pressure of the water vapor in the tube?
5. The vapor pressure of water at 25°C is 23.8 torr. If you collect nitrogen gas over water at a total pressure of 755 torr what is the pressure of the nitrogen gas in the sample?
6. Three gases are all in the same container. Each gas produces the same pressure. If the total pressure in the container is 750 torr what is the partial pressure of each gas?
7. You have a mixture of three gases. One at 1.00 atm, one at 2.00 atm, and one at 3.00 atm all in the same container and all at the same temperature and volume. What can you tell me about the number of molecules of each gas?
8. You have a mixture of 1.0 moles of nitrogen, 2.0 moles of helium, and 3.0 moles of hydrogen all at standard temperature. Which gas exerts the highest pressure? The lowest?
9. You have a 5.00L container that contains 5.00 g of helium and 5.00 g of neon both at 25°C. What is the partial pressure of each gas in the container and the total pressure in the container?
10. The vapor pressure of water at 20°C is 17.5 torr. You collect 36.0 mL of hydrogen gas (H₂) over water at 20°C and a total pressure of 750 torr. How many moles of hydrogen gas did you collect?