What are the Gas Laws?

Worksheet

The gas laws state that pressure, volume, and temperature of a gas are all connected through the amount of gas present; combined, they give the Ideal Gas Law PV = nRT.

$$\frac{PV}{T} = nR$$

Questions

1. A gas at 4 atm and 6 L is compressed to 3 L at constant temperature. What is the new pressure?

A) 8 atm
B) 2 atm
C) 6 atm
D) 12 atm

2. Which variable does the Ideal Gas Law add to Boyle's and Charles's Laws?

A) Amount of gas (n)
B) Density
C) Mass
D) Color

3. In PV = nRT, temperature must be measured in

A) Celsius
B) Kelvin
C) Fahrenheit
D) Any unit

4. At constant pressure, heating a gas causes its volume to

A) Decrease
B) Stay the same
C) Increase
D) Become zero

5. A gas at 2 atm occupies 5 L. It is compressed to 2 L at constant temperature using Boyle's Law. Find the new pressure.

6. 0.50 mol of gas at 300 K occupies 12.3 L. Find its pressure using the Ideal Gas Law.

7. A gas occupies 400 mL at 300 K. At constant pressure, it is heated to 600 K. Find the new volume using Charles's Law.

8. Define: What is Boyle's Law?

9. Define: What is Charles's Law?

10. Define: What is the Ideal Gas Law?

Answer Key

1. A) 8 atm - Boyle's Law: P1V1=P2V2 46=P23 P2=8 atm.
2. A) Amount of gas (n) - The Ideal Gas Law introduces moles (n) and the constant R, linking all four variables.
3. B) Kelvin - Gas law equations require absolute temperature in Kelvin.
4. C) Increase - Charles's Law: volume increases directly with temperature at constant pressure.
5. PV = PV 2 5 = P 2 P = 10/2 = 5 atm
6. PV = nRT P = nRT/V P = (0.50 0.0821 300) / 12.3 P = 12.315/12.3 1.00 atm
7. V/T = V/T 400/300 = V/600 V = 400 600/300 = 800 mL
8. At constant temperature, pressure and volume of a gas are inversely proportional: PV = PV.
9. At constant pressure, volume and temperature are directly proportional: V/T = V/T.
10. PV = nRT - it combines pressure, volume, moles, and temperature into one equation.