What is the Ideal Gas Law?

Worksheet

The ideal gas law states that PV = nRT, where P is pressure, V is volume, n is the number of moles, R is the gas constant, and T is absolute temperature - meaning pressure and volume together scale directly with the amount of gas and its temperature.

PV = nRT

Questions

1. In PV = nRT, what does 'n' represent?

A) Number of moles
B) Newtons
C) Normal force
D) Neutron count

2. If temperature doubles at constant volume and moles, what happens to pressure?

A) It doubles
B) It halves
C) It stays the same
D) It quadruples

3. What are the correct SI units of R?

A) J/(molK)
B) Pam
C) J/K
D) mol/K

4. A gas has n = 0.5 mol, T = 400 K, V = 0.01 m. What is P?

A) 166.3 kPa
B) 16.63 kPa
C) 1663 kPa
D) 1.663 kPa

5. 2 mol of gas at 300 K occupies 0.05 m. Find the pressure.

6. A gas at pressure 101325 Pa and volume 0.025 m is at 273 K. How many moles does it contain?

7. 1 mol of gas at constant volume 0.02 m is heated from 250 K to 500 K. Find the pressure change.

8. Define: What is the ideal gas law?

9. Define: What are the units of R?

10. Define: What unit must T be in?

Answer Key

1. A) Number of moles - n is the amount of substance in moles.
2. A) It doubles - P is directly proportional to T when n and V are constant.
3. A) J/(molK) - R = 8.314 joules per mole-kelvin in SI units.
4. A) 166.3 kPa - P = nRT/V = 0.5 8.314 400 / 0.01 166280 Pa 166.3 kPa.
5. P = nRT/V = 2 8.314 300 / 0.05 = 4988.4 / 0.05 P 99768 Pa 99.77 kPa
6. n = PV/RT = (101325 0.025) / (8.314 273) = 2533.125 / 2269.7 n 1.12 mol
7. P1 = nRT1/V = 1 8.314 250 / 0.02 = 103925 Pa P2 = nRT2/V = 1 8.314 500 / 0.02 = 207850 Pa Pressure doubles when temperature doubles at constant n and V.
8. PV = nRT, relating pressure, volume, moles, and temperature.
9. 8.314 J/(molK).
10. Absolute temperature - Kelvin.