

VN #6.10 The Ideal Gas Law

A. Ideal Gas Law

1. The ideal gas law combines

- combined gas law (which combines Charles', Boyle's, and Gay-Lussac's)
- Avogadro's law

2. To make the equation:

- a. The ideal gas law allows you to calculate _____ where the combined gas law does not

3. The Variables for the Ideal Gas Law Equation include:

- P= pressure (____)
- T= temperature (____)
- V= volume (____)
- n = _____
- R = _____

R value: 0.0821 $\frac{\text{atm} \cdot \text{L}}{\text{mol} \cdot \text{K}}$

- R is calculated using ideal conditions: _____ mole of gas, the molar volume of a gas at STP _____
- Other values for R are available with different units for _____
- For our purposes, we will convert all units of pressure to _____ and use the R above

B. Real Vs Ideal Gases

- An ideal gas is a gas that follows all of the postulates of the _____ under all conditions of temperature and pressure
 - _____ do not take up space
 - No _____ attractive forces
- In the _____, no gas is truly ideal. Under the right conditions of temperature and pressure, calculations made using the ideal gas law are close to the actual measurements.
- Gases deviate from ideal behavior when pressure is _____ and temperature is _____

C. Calculations using Ideal Gas Law

Ex: Find the volume of 85.0g of O₂ at 25.0°C and 104.5 kPa.

Givens: Known and Unknown	Work:

D. Ideal using Molar mass

- The ideal gas law can be rearranged to solve for Molar mass or density by substituting n (moles) with m/M (mass/molar mass)
- M = molar mass (g/mol) m= mass (g)
 D = density (m/v = mass/volume) (g/L)

E. Molar Mass Example

What is the molar mass of a pure gas with a density of 1.40 g/L at STP?

Givens: Known and Unknown	Work: