

Ideal Gas Law

Combines all four gas variables into one uber equation!

$$PV = nRT$$

P = pressure (atm)

V = volume (L)

n = number of moles

R = universal gas constant (0.0821 L-atm/mole-K)

T = temperature (K)

Review

1 mole = 6.022×10^{23} "things"

1 mole = molecular mass in gram

1atm=760mmHg=760torr=14.7psi=101,325Pa=101.3KPa

STP = 0°C and 1atm

K = C + 273

Sample Problems

1. A sample of hydrogen gas, H_2 , has a volume of 8.56 L at a temperature of 273K and a pressure of 1.50 atm. Calculate the number of moles of H_2 present in this gas sample.

2. Calculate the pressure (in atm) of .456 mol of carbon dioxide in a 1.21 liter container at 312K.

3. How many moles of oxygen gas are in 5.00 L container at 25.0 °C and 760 torr? (NOTE: This problem has many conversions!)

4. Calculate the pressure of 1.65 g of helium gas at 16.0 °C and occupying 3.25 L.

5. What will be the volume of 0.70 g of nitrogen gas at standard temperature and 150 kPa pressure?

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