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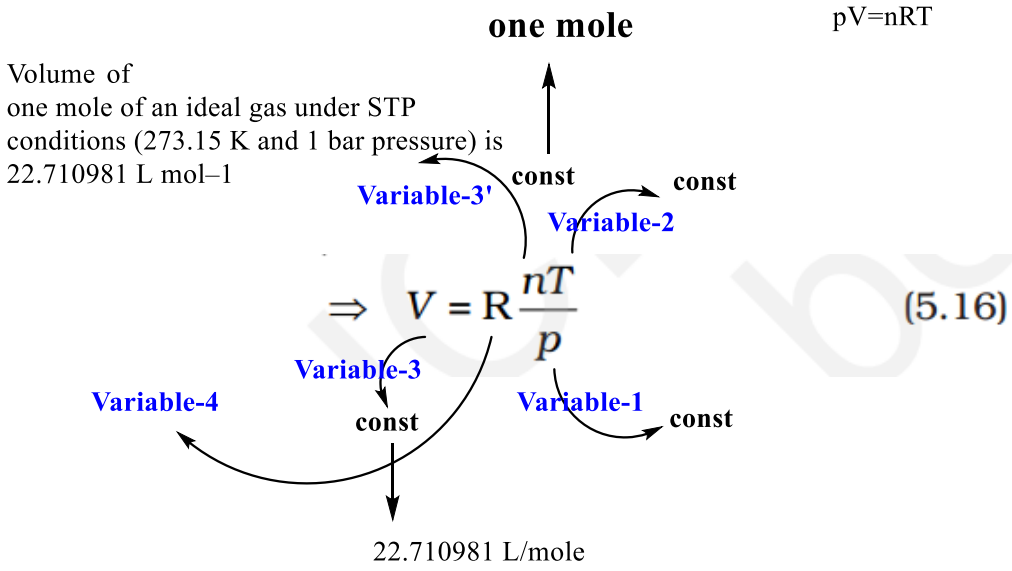
# Ideal Gas Equation-2

pV=nRT




**Variable-1, 2, 3 and 3' are known then** Variable-4 can be calculated

$$\Rightarrow R = \frac{pV}{nT}$$

## Calculation

**Value of R for one mole of an ideal gas**

$$R = \frac{(10^5\ \text{Pa})(22.71 \times 10^{-3}\ \text{m}^3)}{(1\ \text{mol})(273.15\ \text{K})}$$

$= 8.314\ \text{Pa m}^3\ \text{K}^{-1}\ \text{mol}^{-1}$

$= 8.314\ \ 10^{-2}\ \text{bar L K}^{-1}\ \text{mol}^{-1}$

$= 8.314\ \text{J K}^{-1}\ \text{mol}^{-1}$

**= 8.314J/k mol**

**Ideal gas equation is a relation between four variables and it describes the state of any gas, therefore, it is also called equation of state**

Pascal x $m^3$= joules

**1 Bar =100000Pa=$10^5$Pa**

1 Pa=1/100000=1x$10^{-5}$ bar

In class you were asked to prove that **Pascal** X meter3 = **Joules**. ... Recalling Einstein's equation E = m c2 → Since energy is measured in **Joules**, m stands for mass (kg) and c is the speed of light (m/sec), then a **Joule** must be the same thing as kg-m2/sec2.