

Kinetic Theory

Assumption

1. Gases are made up of small atom/molecules
2. incompressible, rigid (Atom/molecules)
3. All atom/molecules of gas are identical
4. Atoms/molecules not exert force on each other except during collision
5. All collisions are perfectly elastic
6. There are very large no. of atoms/molecules distributed uniformly throughout the entire volume in a container

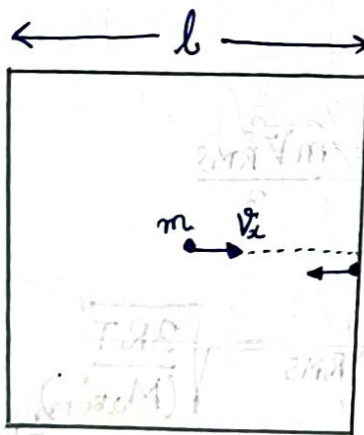
At STP : $p = 1 \text{ atm}$
 $T = 273 \text{ K}$

$V_m = 22.4 \text{ L}$

Contains: 6.023×10^{23}
 no. of atom/molecules

Preview from Notesale.co.uk
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Pressure Exerted by Gas



$$\Delta P = 2 m v_x$$

(momentum)

$$F = \frac{\Delta P}{\Delta t} = \frac{2 m v_x}{\frac{2l}{v_x}}$$

$$F = \frac{m v_x^2}{l} \rightarrow \text{Avg force due to one molecule}$$

Total no. of molecules = N

$$\begin{aligned} \therefore F &= F_1 + F_2 + F_3 + \dots \\ &= \frac{m}{l} (v_{x1}^2 + v_{x2}^2 + v_{x3}^2 + \dots) \\ F &= \frac{Nm}{l} v_{avg}^2 \end{aligned}$$