KINETIC THEORY

MEAN FREE PATH

FREE PATH

The distance travelled by a gas molecule between two successive collisions is known as the free path.

For a gas molecule having n number of collisions, there are n number of free paths:
$\lambda_1, \lambda_2, \lambda_3, \lambda_4, \lambda_5 \ldots \ldots . \lambda_n$

Mean Free Path

The average distance travelled by a gas molecule between two successive collisions is known as the mean free path.

$\lambda_{mean} = \frac{\lambda_1+\lambda_2+\lambda_3+\lambda_4+\lambda_5+\cdots+\lambda_n}{n}$

The mean free path depends on two factors:

1. $\lambda_{mean} \propto \frac{1}{Density\ of\ the\ molecules}$

Also, density of molecules $= \frac{N}{V}$

Therefore, $\lambda_{mean} \propto \frac{1}{\frac{N}{V}}$

2. $\lambda_{mean} \propto \frac{1}{Size\ of\ the\ molecules}$

$\lambda_{mean} \propto \frac{1}{d^2}$