

Topic / Sub: - Science / Physics By VKS  
Degree Freedom :-

The total no. of independent quantities which must be known for describing complete state of motion of a body are called degree of freedom.

Law of equipartition of energy:-

The kinetic theory of gases has assumed that in its steady state

$$u^2 = v^2 = w^2$$

where  $u, v, & w$  are the average velocities of its components

$$\therefore \frac{1}{2} m u^2 = \frac{1}{2} m v^2 = \frac{1}{2} m w^2$$

$$= \frac{1}{3} \frac{1}{2} m c^2 = \frac{1}{3} \frac{3}{2} k T = \frac{1}{2} k T$$

Here  $\frac{1}{2} k T$  is the K.E. per molecule per degree of freedom. Hence, K.E. per gram molecule per degree of freedom

$$= \frac{1}{2} N k T = \frac{1}{2} R T$$

The result is true for any number of degree of freedom and it is known as the law of equipartition of energy.