

JEE PREVIOUS YEARS QUESTION-3

According to kinetic theory of gases, for a diatomic molecule
(1991 - 1 Mark)

- (a) the pressure exerted by the gas is proportional to mean velocity of the molecule
- (b) the pressure exerted by the gas is proportional to the root mean velocity of the molecule
- (c) the root mean square velocity of the molecule is inversely proportional to the temperature
- (d) the mean translational kinetic energy of the molecule is proportional to the absolute temperature.

(d) Pressure exerted by the gas, $P = \frac{1}{3} \frac{mnu^2}{V}$... (1)

Here, u = root mean square velocity

m = mass of a molecule, n = No. of molecules of the gas

Hence (a) & (b) are clearly wrong.

Again $u^2 = \frac{3RT}{M}$ [explained from (1)]

Here, M = Molecular wt. of the gas;

Hence (c) is wrong

Further, Average K.E. = $\frac{3}{2} KT$; Hence (d) is true.