

$$\begin{aligned}
 &= \sqrt{\frac{900 \times 1.38 \times 3.011 \times 10^3}{16}} \\
 &= \frac{30}{4} \sqrt{1.38 \times 3.011 \times 10^3} \\
 &= \frac{30}{4} \sqrt{4.155 \times 10^3} = \frac{30}{4} \sqrt{41.55 \times 10^2} \\
 &= \frac{30}{4} \times 6.45 \times 10 = 388.75 \text{ m/s} .
 \end{aligned}$$

Average Translational KE of a gas molecule :

$$\begin{aligned}
 P &= \frac{1}{3} \frac{mN}{V} \cdot \bar{v}^2 & \left| \begin{array}{l} \mu = \text{No. of moles of gas} \\ \\ \frac{R}{N_A} = k_B \end{array} \right. \\
 3PV &= (m\bar{v}^2) N \\
 3\mu RT &= (m\bar{v}^2) \mu N_A \\
 3\left(\frac{R}{N_A}\right)T &= m\bar{v}^2 & \left\{ \begin{array}{l} \frac{1}{2} m\bar{v}^2 = K_{av} \\ = \text{Av. KE of a gas molecule} \end{array} \right. \\
 3k_B T &= m\bar{v}^2 \\
 \frac{3}{2} k_B T &= \frac{1}{2} m\bar{v}^2
 \end{aligned}$$