$$= \sqrt{3\times 1.013\times 11.2\times 10^5}\ m/s$$

$$= \sqrt{34\times 10^5} = \sqrt{3.4\times 10^6} = 1.84\times 10^3\ m/s$$

$$v_{rms} = \underline{\underline{1.84}}\ km/s. = 1840\ m/s$$

Relation Between v_{rms} and T :

$$P = \frac{1}{3}\frac{mN}{V}\cdot\overline{v^2}$$

$$\left\{ \begin{aligned} v_{rms} &= \sqrt{\overline{v^2}} \\ v_{rms}^2 &= \overline{v^2} \end{aligned} \right.$$

$$PV = \frac{1}{3}\cdot m(\mu N_A)\, v_{rms}^2$$

{ Let No. of moles of gas $= \mu$

$$N = \mu N_A$$

$$\cancel{\mu} RT = \frac{1}{3}\, m\, \cancel{\mu} N_A \cdot v_{rms}^2$$

$$3RT = (mN_A)\cdot v_{rms}^2$$

$$mN_A = M \text{ (molar mass)}$$

$$3RT = M v_{rms}^2$$

$$\text{or} \quad v_{rms}^2 = \frac{3RT}{M} \Rightarrow \boxed{v_{rms} = \sqrt{\frac{3RT}{M}}} \quad \text{— (5)}$$

For a given gas $\quad v_{rms} \propto \sqrt{T}$

i.e $\quad T\uparrow,\ v_{rms}\uparrow$