

Question 3

The root mean square velocity of one mole of a monoatomic gas having molar mass M is $u_{\text{r.m.s.}}$. The relation between the average kinetic energy (E) of the gas and $u_{\text{r.m.s.}}$ is
(2004S)

(a) $u_{\text{r.m.s.}} = \sqrt{\frac{3E}{2M}}$ (b) $u_{\text{r.m.s.}} = \sqrt{\frac{2E}{3M}}$

(c) $u_{\text{r.m.s.}} = \sqrt{\frac{2E}{M}}$ (d) $u_{\text{r.m.s.}} = \sqrt{\frac{E}{3M}}$

(e) Average KE = $E = \frac{1}{2} M u_{\text{rms}}^2$

$$\therefore u_{\text{rms}}^2 = \frac{2E}{M} \text{ or } u_{\text{rms}} = \sqrt{\frac{2E}{M}}$$