

2 The pressure  $p$  of an ideal gas is given by the expression

$$p = \frac{1}{3} \frac{Nm}{V} \langle c^2 \rangle.$$

(a) Explain the meaning of the symbol  $\langle c^2 \rangle$ .

.....  
 ..... [2]

(b) The ideal gas has a density of  $2.4 \text{ kg m}^{-3}$  at a pressure of  $2.0 \times 10^5 \text{ Pa}$  and a temperature of  $300 \text{ K}$ .

(i) Determine the root-mean-square (r.m.s.) speed of the gas atoms at  $300 \text{ K}$ .

r.m.s. speed = .....  $\text{m s}^{-1}$  [3]

(ii) Calculate the temperature of the gas for the atoms to have an r.m.s. speed that is twice that calculated in (i).

temperature = .....  $\text{K}$  [3]