

- 6 Two containers A and B contain ideal gases, as shown in Fig. 6.1.

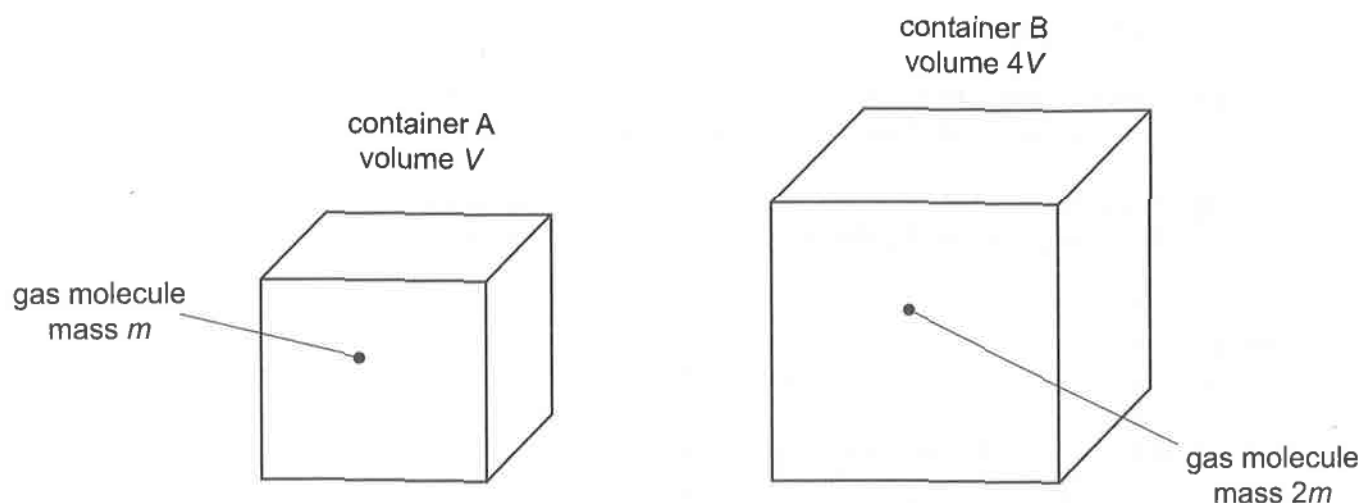


Fig. 6.1 (not to scale)

The volume of container A is V , and the volume of container B is $4V$.

The molecules of the gas in container A each have mass m and those in container B each have mass $2m$.

The gases in the containers are at the same temperature and pressure.

(a) Deduce a value for the ratio:

- (i)
$$\frac{\text{mean kinetic energy of a gas molecule in container A}}{\text{mean kinetic energy of a gas molecule in container B}}$$

ratio = [1]



(ii)

$$\frac{\text{number of gas molecules in container A}}{\text{number of gas molecules in container B}}$$

$$\text{ratio} = \dots\dots\dots [1]$$

(iii)

$$\frac{\text{root-mean-square (r.m.s.) speed of gas molecules in container A}}{\text{r.m.s. speed of gas molecules in container B}}$$

$$\text{ratio} = \dots\dots\dots [2]$$

(b) There are 1.6 moles of gas in container A. The gas in container A has a molar mass of 4.0g.

The r.m.s. speed of the molecules in container B is 940 ms^{-1} .

Calculate the temperature of the gases.

$$\text{temperature of gases} = \dots\dots\dots \text{ K } [4]$$

[Total: 8]

