

- 7 A cubical container, shown in Fig. 7.1, is filled with an ideal gas.

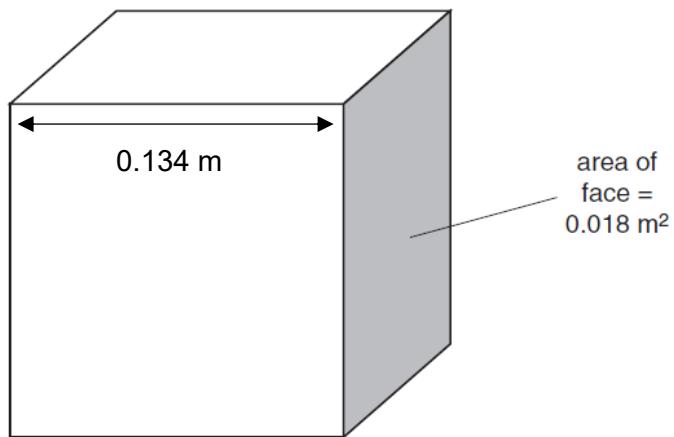


Fig. 7.1

When an ideal gas atom makes an elastic collision perpendicular to a face of the container, it experiences a change of momentum of 1.85×10^{-23} N s.

- (a) In one second there are the equivalent of 1.49×10^{24} collisions perpendicular to each face of the container.

Calculate the force exerted by the gas on one face of the container.

$$\text{force} = \dots \text{N} [2]$$

- (b) Calculate the pressure exerted by the gas.

$$\text{pressure} = \dots \text{Pa} [1]$$

- (c) The temperature of the ideal gas in the container is 27 °C.

Determine the number of ideal gas molecules present in the container.

$$\text{number of molecules} = \dots \quad [2]$$

- (d) The mass of one ideal gas molecule is 6.86×10^{-27} kg .

Calculate the root-mean-square (r.m.s.) speed of the gas molecules.

$$\text{r.m.s. speed} = \dots \text{ m s}^{-1} \quad [2]$$

Section B

Answer **one** question from this Section in the spaces provided.