

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

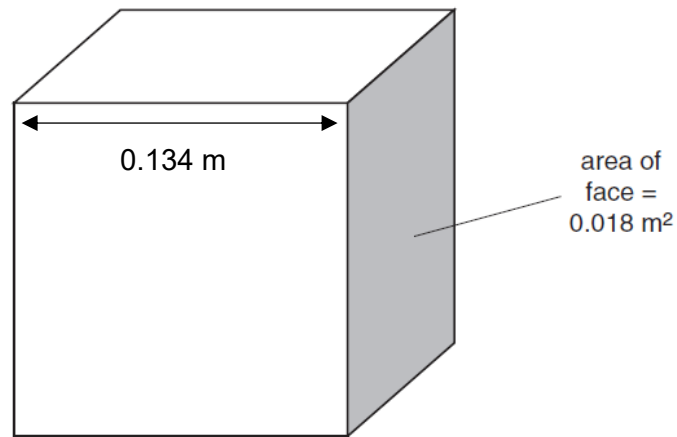


Fig. 7.1

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

- (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.

force = T [2]

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

pressure = Pa [1]

- (c) The temperature of the ideal gas in the container is $27\text{ }^{\circ}\text{C}$.

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

number of molecules = [2]

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

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

r.m.s. speed = m s^{-1} [2]

Section B

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