

- 2** A large container of volume 85 m^3 is filled with 110 kg of an ideal gas. The pressure of the gas is $1.0 \times 10^5\text{ Pa}$ at temperature T .

The mass of 1.0 mol of the gas is 32 g .

- (a)** Show that the temperature T of the gas is approximately 300 K .

[3]

- (b)** The temperature of the gas is increased to 350 K at constant volume. The specific heat capacity of the gas for this change is $0.66\text{ J kg}^{-1}\text{ K}^{-1}$.

Calculate the energy supplied to the gas by heating.

energy = J [2]

- (c)** Explain how movement of the gas molecules causes pressure in the container.

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..... [3]

- (d) The temperature of a gas depends on the root-mean-square (r.m.s.) speed of its molecules.

Calculate the ratio:

$$\frac{\text{r.m.s. speed of gas molecules at 350 K}}{\text{r.m.s. speed of gas molecules at 300 K}} .$$

ratio = [2]