2 A sample of an ideal monatomic gas has a volume of $4.2 \times 10^{-3}\,m^3$ at a pressure of $3.6 \times 10^5\,Pa$ and a temperature of 70 °C.

(a) Explain why the mean velocity of the atoms of the gas is zero.

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..... [2]

(b) Show that the sample of gas contains 3.2×10^{23} atoms.

[3]

(c) Each atom of the gas has a diameter of approximately $2 \times 10^{-10}\,m$.

Estimate the volume of the gas atoms.

volume = ... m^3 [1]

(d) Explain why your answer in **(c)** provides evidence to support the assumption that the gas is ideal.

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..... [2]

[Total: 8]