2 **(a)** The kinetic theory of gases is based on a number of assumptions about the molecules of a gas.

State the assumption that is related to the volume of the molecules of the gas.

.....

.....

..... [2]

(b) An ideal gas occupies a volume of $2.40 \times 10^{-2}\,m^3$ at a pressure of $4.60 \times 10^{5}\,Pa$ and a temperature of 23 °C.

(i) Calculate the number of molecules in the gas.

number = ... [3]

(ii) Each molecule has a diameter of approximately $3 \times 10^{-10}\,m$.

Estimate the total volume of the gas molecules.

volume = ... m^3 [3]

(c) By reference to your answer in **(b)(ii)**, suggest why the assumption in **(a)** is justified.

.....

..... [1]

[Total: 9]

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