2 **(a)** Explain qualitatively how molecular movement causes the pressure exerted by a gas.

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.....[3]

(b) The density of neon gas at a temperature of 273 K and a pressure of 1.02×10^5 Pa is 0.900 kg m^{-3}. Neon may be assumed to be an ideal gas.

Calculate the root-mean-square (r.m.s.) speed of neon atoms at

(i) 273 K,

speed = ... m s^{-1} [3]

(ii) 546 K.

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

(c) The calculations in **(b)** are based on the density for neon being 0.900 kg m^{-3}.
Suggest the effect, if any, on the root-mean-square speed of changing the density at constant temperature.

For Examiner's Use

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.....[2]