

**5**

**(a)**

State two basic assumptions of the kinetic theory of gases.

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[2]

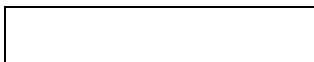


**(b)**

By considering the random motion of the gas molecules in a cubic container of length  $L$ , show that the pressure  $p$  exerted by an ideal gas is given by the equation

$$p = \frac{1}{3} \rho \langle c^2 \rangle$$

where  $\rho$  is the density of the ideal gas and  $\langle c^2 \rangle$  is the mean-square speed of the gas atoms or molecules.



[4]

(c)

(i)

Explain what is meant by *specific latent heat of fusion*.

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[1]

(ii)

A thermally insulated vessel containing liquid water and water vapour is connected to a vacuum pump that removes water vapour continuously. When the temperature reaches freezing point of water, the vessel contains 120 g of liquid water. The specific latent heat of fusion of water is  $3.40 \times 10^5 \text{ J kg}^{-1}$  and the specific latent heat of vaporisation of water is  $2.52 \times 10^6 \text{ J kg}^{-1}$ .

Calculate the mass of ice formed when no liquid remains.

mass of ice = ..... g

[3]