4 **(a)** **(i)** State the *first law of thermodynamics*.

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.....[1]

(ii) Suggest why there is a considerable difference in magnitude between the specific latent heat of fusion and vaporisation.

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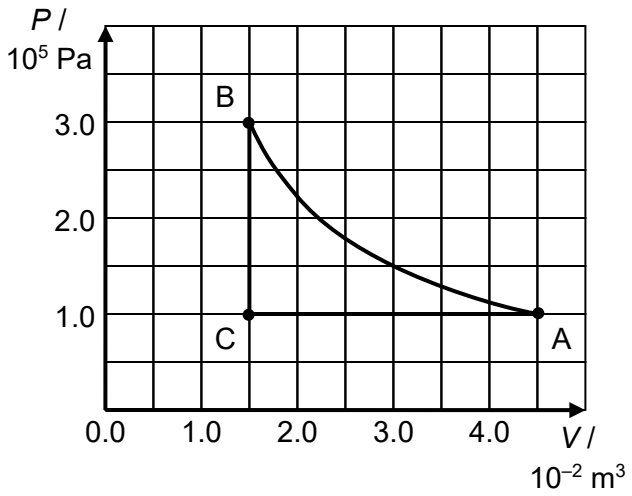
.....[3]

(b) The diagram below shows the *P*–*V* graph of a fixed mass of ideal gas undergoing changes between the three states A, B and C.



(i) Show that the change A → B is an isothermal (constant temperature) process.

[2]

(ii) Describe qualitatively, with reference to molecular movement, how the changes A → B and C → B differ in the manner the pressure of the gas is increased.

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.....[2]

(iii) Estimate the heat removed from the gas in the change A → B.

heat removed = ……. J [2]

[Total: 10]