2 **(a)** State what is meant by *specific latent heat of vaporization*.

…………………………………………………………………………………………………

…………………………………………………………………………………………………

………………………………………………………………………………………………… [1]

(b) When a liquid is boiling, thermal energy must be supplied in order to maintain a constant temperature.

State two processes for which thermal energy is required during boiling.

1. …………………………………………………………………………………………

…………………………………………………………………………………………

2. …………………………………………………………………………………………

…………………………………………………………………………………………
[2]

(c) A styrofoam container of negligible heat capacity contains 900 g of water at 85 °C. 100 g of ice at 0 °C was then added to water. With reference to the data below,

Specific latent heat of fusion of water / J kg^{-1}	3.34×10^5
Specific heat capacity of water / J kg^{-1} K^{-1}	4200
Specific latent heat of vaporisation of water / J kg^{-1}	2.26×10^6

(i) Calculate the equilibrium temperature of the mixture.

temperature = …………………………….. °C [2]

(ii) Explain why exposure to steam at 100 °C produces a more severe burn than exposure to the same amount of hot water at 100 °C.

…………………………………………………………………………………………...

....

.... [1]

(d) A fixed mass of an ideal gas undergoes the cycle of changes XYZX as shown in Fig. 2.1. Referring to Fig. 2.1,

volume / 10⁻⁴ m³
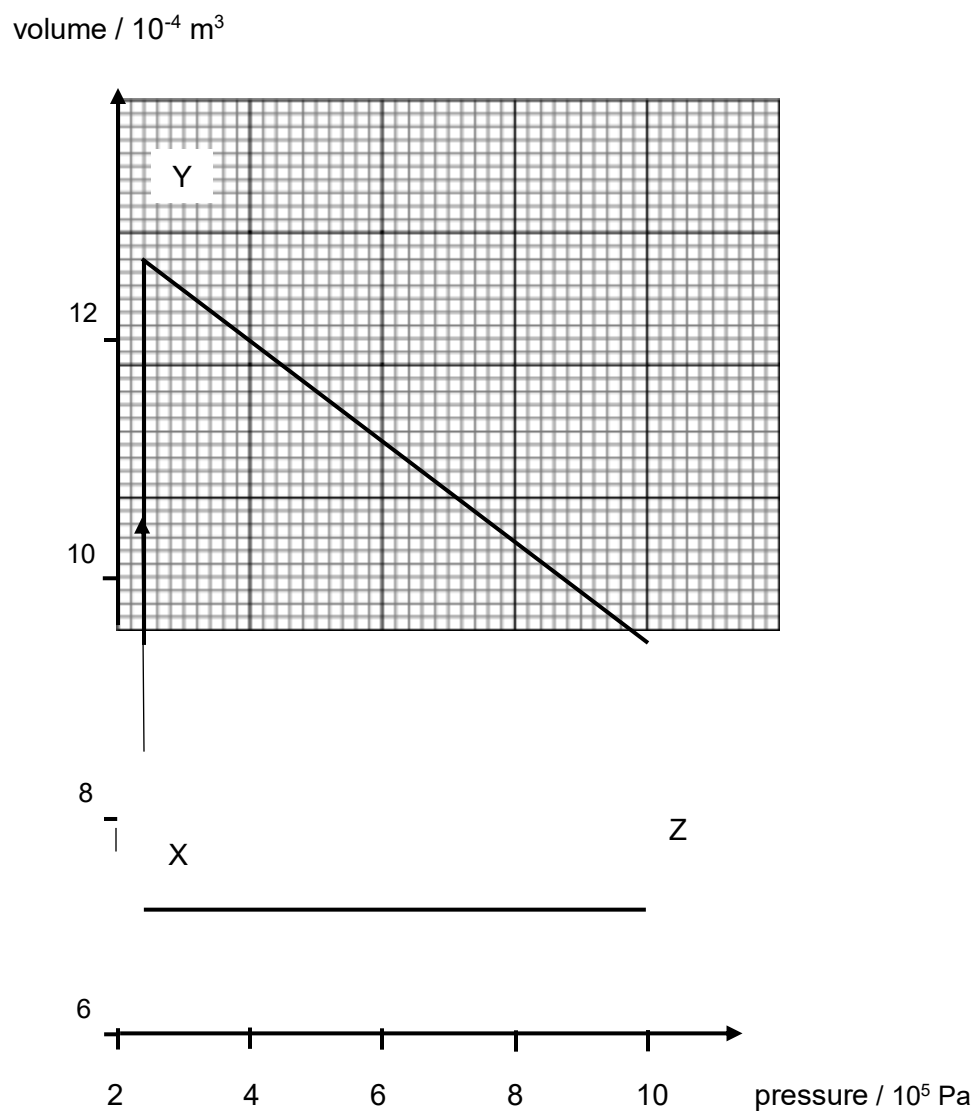

Fig. 2.1

(i) determine the work done *on* the gas in the process XY,

work done on gas = ………………………….. J [2]

(ii) explain why the process ZX must involve heat transfer.

………………………………………………………………………………………...

………………………………………………………………………………………...

……………………………………………………………………………………… [2]

(iii) On Fig. 2.1, mark an 'x' at the point where the gas has approximately the highest temperature.

Explain how you arrived at the answer.

………………………………………………………………………………………

……………………………………………………………………………….. [2]