3

(a)

Explain why steam at 100 °C causes a more severe burn than the same mass of boiling water at 100 °C.

.....

.....

.....[2]

(b)

A fixed mass of monoatomic ideal gas undergoes a cycle of changes in pressure, volume and temperature, as shown in Fig. 3.1. The temperatures of the gas at A and D are 800 K and 226 K respectively.

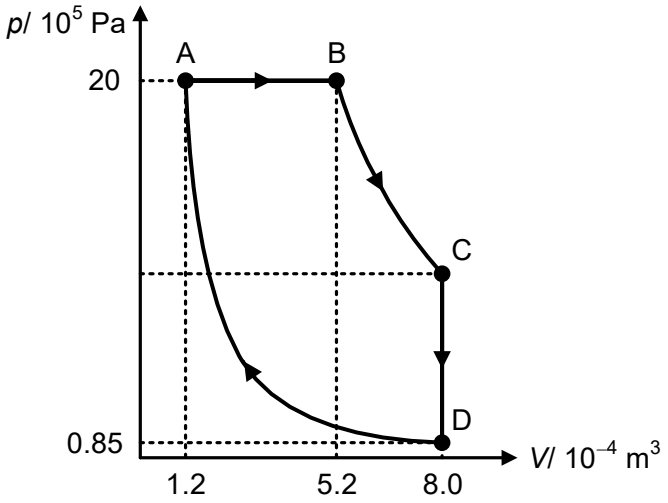

Fig. 3.1

(i)

Calculate the amount of gas, in moles.

amount of gas = ... mol

[2]

(ii)

For the constant-pressure expansion from A to B, calculate

1. the temperature at B,

temperature = ... K

[1]

2. the increase in internal energy,

increase in internal energy = ... J

[2]

3. the work done on the gas,

work done on gas = ... J

[2]

4. the heat supplied to the gas,

heat supplied to gas = ... J

[1]

(iii)

For each of the changes from B to C and from D to A, there is no heat exchange with the surrounding. The work done by the gas from B to C is 390 J. Calculate the net work done by the gas in one cycle.

net work done by the gas = ... J

[3]

[Total: 13]