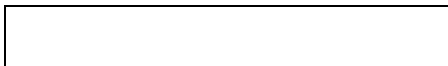


2

(a)

The variation with pressure p of the volume V of a fixed mass of ideal gas as it undergoes a cycle ABCA of changes is shown in Fig. 2.1.



6

2 (a) State what is meant by *internal energy*.

.....

 [2]

(b) The variation with volume V of the pressure p of an ideal gas as it undergoes a cycle ABCA of changes is shown in Fig. 2.1.

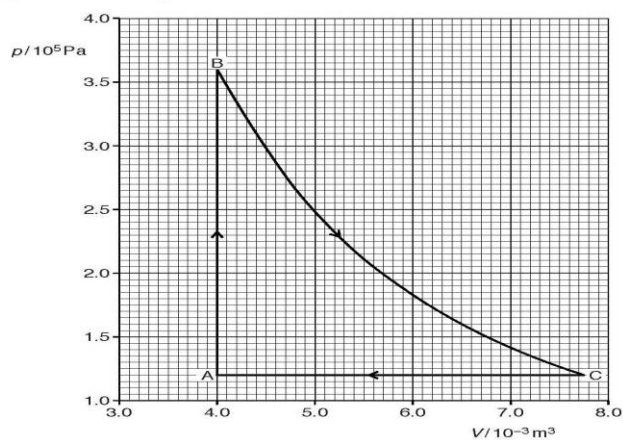


Fig. 2.1

The temperature of the gas at A is 290 K. The temperature at B is 870 K.

$p / 10^5 \text{ Pa}$

Fig. 2.1



The temperature of the gas at A is 290 K.

[Redacted]

(i)

Calculate the amount of gas.

[Redacted]

amount of gas = _____ mol

[2]

[Redacted]

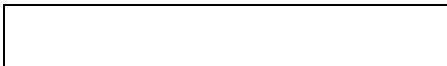
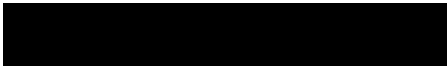
(ii)

Determine the temperature of the gas at C.

[Redacted]

temperature = _____ K

[2]



(iii)

Determine the work done on the gas during the change from C to A.



work done = _____ J

[1]



(b)

Explain whether heat is supplied to or removed from the gas during one complete cycle ABCA.



.....

.....

.....

.....

.....

.....

.....[3]

(c)

After one complete cycle ABCA, the gas in the fixed volume cylinder leaks slowly so that, after a time of 3.00 days, the pressure has reduced by 4.00%. The temperature remains constant.

Calculate the average rate, in atoms per second, at which gas atoms escape from the cylinder.



[3]

rate = _____ s⁻¹

[Total: 11]