6 A cylinder that contains a fixed amount of an ideal gas is shown in Fig. 6.1.

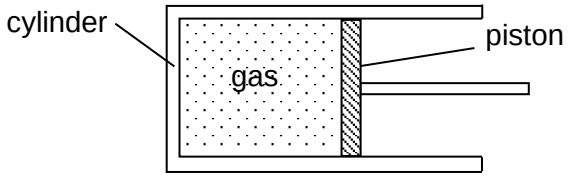

Fig. 6.1

The cylinder is fitted with a piston that moves freely.

(a) Use the kinetic theory of gases to explain

(i) the origin of the pressure of the gas in the cylinder,

……

……

……

……

……

……

……

……

…… [3]

(ii) why the mean velocity of the atoms of the gas is zero.

……

……

……

……

…… [2]

[Turn over

(b) Fig. 6.2 shows the variation of pressure and volume of the monoatomic ideal gas in the cylinder. The gas is initially at state W.

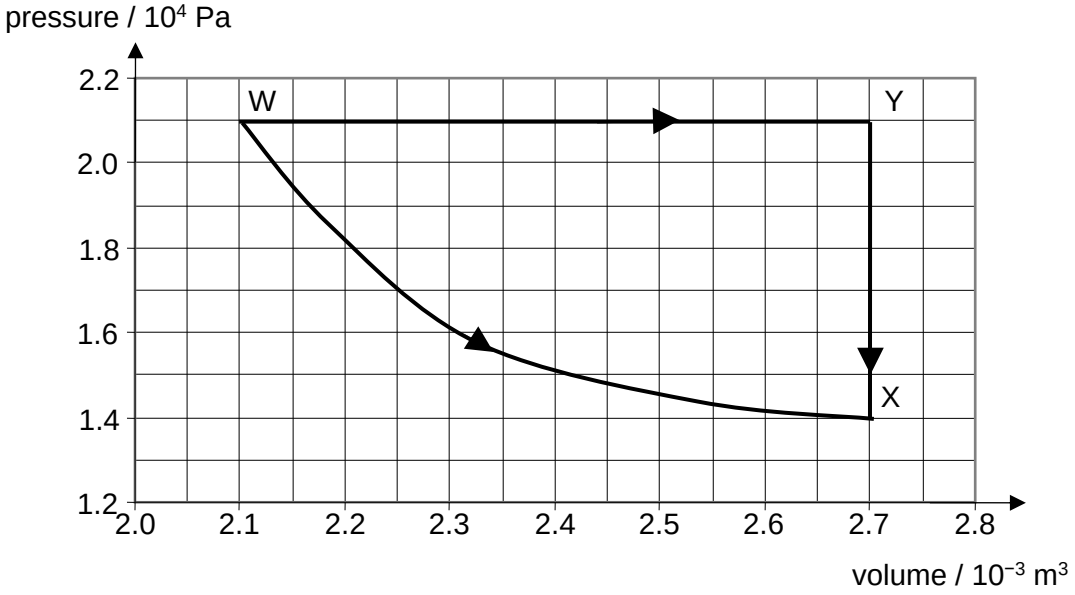

Fig. 6.2

(i) Determine the change in internal energy of the gas when it is taken from state W to state X along the curved path.

change in internal energy =…… J [2]

(ii) The same resultant change in state of the gas may be achieved by stages WY and YX.

Determine the net heat supplied to the gas during the change from W to Y to X.

heat supplied =…… J [4]

[Total: 11]