3 **(a)** State the first law of thermodynamics.

....

....

[2]

....

(b) A fixed mass of an ideal gas undergoes a cycle of changes ABCA, as shown in Fig. 3.1.
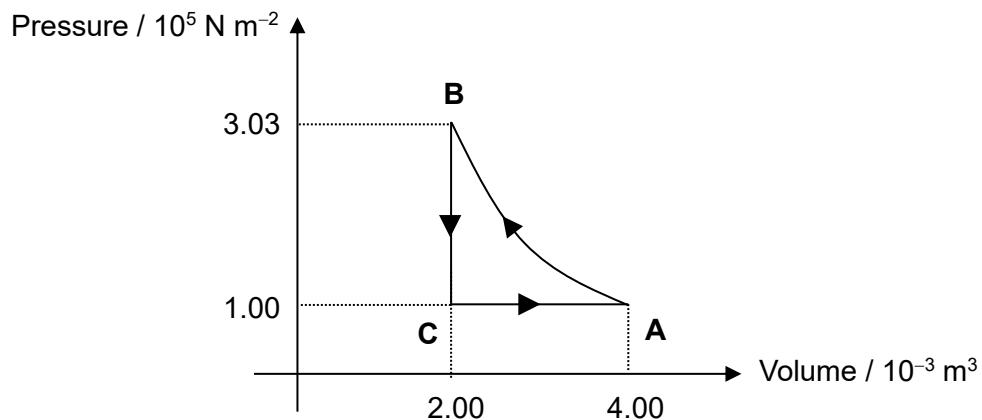
Fig. 3.1

(i) Calculate the work done by the gas during the change C to A.

work done by the gas = ... J   [2]

(ii) Some energy changes during one cycle ABCA are shown in Fig. 3.2.

change	work done on gas / J	heat supplied to gas / J	increase in internal energy / J
A to B	310	0	
B to C		− 610	
C to A			

Fig. 3.2

Use your answer in **(i)** to complete Fig. 3.2.   [3]