4 A cylinder of constant volume 3.8×10^4 cm^3 contains an ideal gas at pressure 2.5×10^5 Pa and temperature 181 °C. The gas is heated with 2700 J of the thermal energy. The final temperature and pressure of the gas are T and p.

(a) Calculate

(i) the number of molecules N in the cylinder,

$N =$ ………………….. [2]

(ii) the change in internal energy of the ideal gas.

Explain your working.

change in internal energy = ………………….. J [2]

(b) Use your answer in **(a)** to determine the final temperature T, in Kelvin, of the gas in the cylinder.

$T =$ ………………….. K [2]

[Total: 6]