2 **(a)** State the assumption of the kinetic theory of gases that relates to forces between molecules.

.....

..... [1]

(b) With reference to molecular energies, state what is meant by the internal energy of an ideal gas.

.....

.....

..... [1]

(c) A cylinder contains 2.50×10^{23} molecules of an ideal gas. The cylinder is sealed by a freely moving piston, as shown in Fig. 2.1.

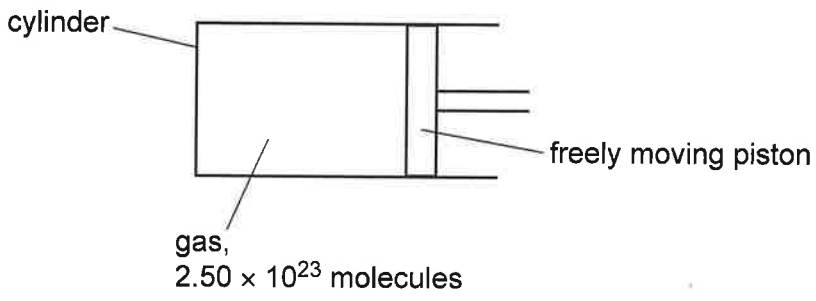

Fig. 2.1

The initial temperature of the gas is 21 °C.

(i) Show that the total kinetic energy of the molecules of the gas is 1520 J.

[2]

(ii) Thermal energy is supplied to the gas and its temperature increases by 15 °C. The volume of the gas changes by $6.3 \times 10^{-4}\,m^3$.

Atmospheric pressure is $1.0 \times 10^5\,Pa$.

Determine the thermal energy supplied to the gas.

thermal energy = ... J [3]

[Total: 7]