3 **(a)** **(i)** State what is meant by an ideal gas.

.....

.....

..... [2]

(ii) Use one of the basic assumptions of the kinetic theory to explain what can be deduced about the potential energy associated with the random motion of molecules in an ideal gas.

.....

.....

..... [2]

(b) A sample of 0.26 m^3 of an ideal gas is at pressure 2.0×10^5 Pa and temperature 290 K.

Determine:

(i) the number N of molecules of the gas

N = ... [2]

(ii) the average translational kinetic energy E_K of one molecule of the gas

E_K = ... J [2]

(iii) the internal energy of the gas. Explain your reasoning.

internal energy = ... J [2]

(c) The volume V of the gas in **(b)** is now varied, keeping its pressure constant.

On Fig. 3.1, sketch the variation with V of the internal energy U of the gas.

Fig. 3.1

[2]

[Total: 12]