

- (a)** Explain why the internal energy of the gas is equal to the total kinetic energy of the molecules of the gas.

(b) A container with 1.2 mol of an ideal gas. The gas has a mass of 0.0384 kg.

- the volume of the gas increases (the container does not have a fixed volume)
- the pressure of the gas remains constant
- the temperature of the gas changes from 280K to 460K
- the gas does 1.3×10^3 J of work.

- [3]

- (ii) Use the first law of thermodynamics to determine the specific heat capacity of the gas.

specific heat capacity = $\text{J kg}^{-1} \text{K}^{-1}$ [4]

- (c) The container in (b) is now replaced with one that has a fixed volume. Thermal energy is supplied to the gas to increase its temperature from 280K to 460K.

Suggest, with a reason, how the specific heat capacity of the gas would now compare with the value in (b)(ii).

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 [2]

[Total: 12]