2 **(a)** Define specific heat capacity.

.....

.....

..... [2]

(b) An ideal gas of mass 0.35 kg is heated at a constant pressure of 2.0×10^5 Pa so that its internal energy increases by 7600 J. During this process, the volume of the gas increases from 0.038 m^3 to 0.063 m^3 and the temperature increases by 56 °C.

(i) Show that the magnitude of the work done on the gas is 5000 J.

[1]

(ii) Explain whether the work done on the gas is positive or negative.

.....

.....

..... [2]

(iii) Determine the magnitude of the thermal energy q transferred to the gas.

q = ... J [2]

(iv) Calculate the specific heat capacity of the gas for this process. Give a unit with your answer.

specific heat capacity = ... unit ..... [2]

(c) The gas in **(b)** is now heated at constant volume rather than at constant pressure. The increase in internal energy of the gas is the same as in **(b)**.

Use the first law of thermodynamics to explain whether the specific heat capacity of the gas for this process is less than, the same as, or greater than the answer in **(b)(iv)**.

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..... [3]