4 **(a)** State what is meant by bodies are in thermal equilibrium.

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……

……[2]

(b) Some gas, assumed to behave ideally, is contained within an insulated gas cylinder to prevent loss of heat as shown in Fig. 4.1.

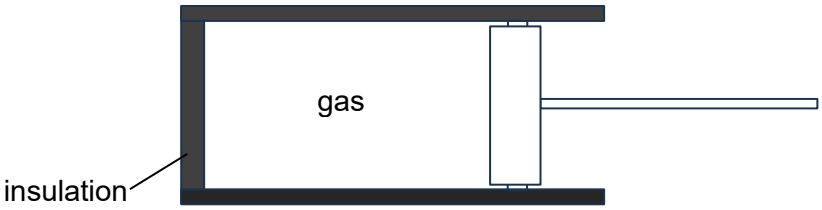

Fig. 4.1

The gas has a volume of 2.9×10^{-4} m^3, pressure of 1.04×10^5 Pa and temperature of 314 K.

(i) Determine the amount of gas in the cylinder in moles.

amount of gas = …… mol [2]

(ii) The gas is then compressed to a volume of 2.9×10^{-5} m^3 and its temperature rises to 790 K.

Calculate the pressure of the gas after compression.

pressure = …… Pa [2]

[Turn over

(iii) State the assumption of the kinetic theory of gases that relates to the time of collision of particles with the walls.

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……[1]

(iv) Explain how the ideal gas exerts a pressure on the walls of the cylinder in terms of molecular movement.

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……[3]

[Total: 10]