7.   (a)   A container, the volume of which is 8.0×10^{-3} m^3, contains an ideal gas at a pressure of 1.14×10^5 Pa and temperature T. The lid of the container is opened, causing the gas to expand adiabatically until its pressure is 1.01×10^5 Pa. This results in a slight decrease in the mass of the gas in the container. The lid is then closed and the gas in the container is allowed to return to its initial temperature. Under this new equilibrium condition, the pressure of the gas is 1.06×10^5 Pa.

   (i)   What will be the volume of the gas left in the container under the initial equilibrium condition; i.e. at pressure 1.14×10^5 Pa and temperature T?

   (ii)   What is the value of γ, the ratio of the molar heat capacity of the gas at constant pressure to that at constant volume?

   (iii)   State, with reasons, what is the atomicity of the molecules of the gas?

[6 marks]