4 **(a)** Explain what is meant by the *internal energy* of an ideal gas.

For Examiner's Use

.....

.....[1]

(b) An oven contains air at a pressure of 1.0×10^5 Pa and a temperature of 25 °C. The volume of the air in the oven is 0.075 m^3.

The mass of one mole of air is 0.030 kg.

Air may be considered as an ideal gas.

(i) Calculate the mass of air in the oven.

mass = ... kg [3]

(ii) The oven is heated to 200 °C and the pressure is constant at 1.0×10^5 Pa.

Calculate the ratio

$$\frac{\text{density of air at 25 °C}}{\text{density of air at 200 °C}}$$

Explain your working.

ratio = ... [2]