



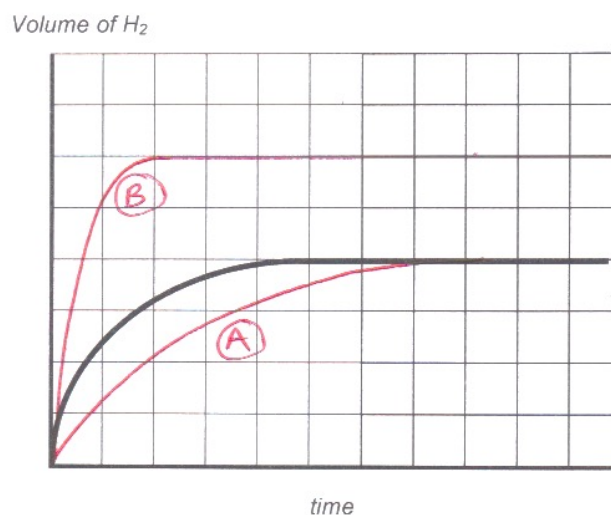
1 The Maxwell-Boltzmann distribution is shown for the particles in a gas at temperature  $T_1$

- Label both axes.
- Mark the most probable energy of the molecules at  $T_1$  (label this  $E_{mp1}$ )
- Sketch another distribution to show the same sample at a lower temperature  $T_2$
- Mark the most probable energy of the molecules at  $T_2$  (label this  $E_{mp2}$ )



2 Magnesium reacts with hydrochloric acid to form hydrogen gas. A graph is shown showing the volume of hydrogen varies with time when 25 cm<sup>3</sup> of 0.500 mol dm<sup>-3</sup> reacts with an excess of magnesium at 20°C.

- Sketch a line to show how the volume of hydrogen changes if a similar reaction was carried out but with 50 cm<sup>3</sup> of 0.250 mol dm<sup>-3</sup> (label this A)
- Sketch a line to show how the volume of hydrogen changes if a similar reaction was carried out but with 25 cm<sup>3</sup> of 0.750 mol dm<sup>-3</sup> at 40°C (label this B)



- Define the term *rate of reaction*. **change in concentration per unit time**
- Explain why rate of reaction increases with concentration.  
**at higher concentration the particles are closer together  
successful collisions are more frequent**
- Explain why rate of reaction increases with temperature.  
**at higher temperature the particles move faster  
collisions are more frequent**  
**at higher temperature the particles have more energy  
more of the collisions are successful**