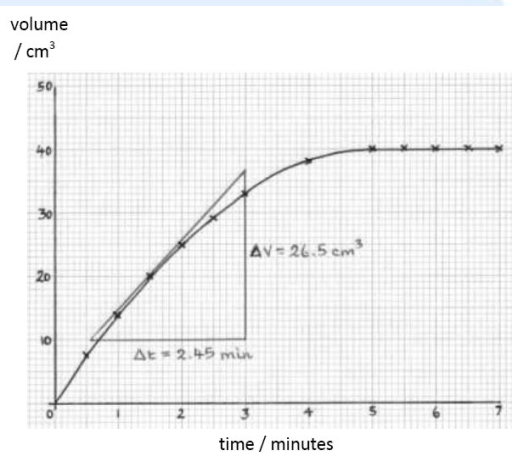


SL & HL Answers to Rates of reaction questions

1. The *rate of reaction* is the change in the concentration of one of the products or of one of the reactants divided by time.
2. The rate of the reaction depends upon the concentration of the reactants. As the reaction proceeds the concentration of the reactants decreases so there are less particles present to react.

3.



i. By taking the gradient at time $t = 1.5$ minutes the rate = $26.5 / 2.45 = 10.8 \text{ cm}^3 \text{ min}^{-1}$

ii. Volume of hydrogen produced when the reaction was complete = 40.0 cm^3

One mole of gas occupies 22700 cm^3 at STP (273 K and 100 kPa)

Amount of magnesium used = $40 / 22700 = 1.76 \times 10^{-3} \text{ mol}$

Mass of magnesium used = $1.76 \times 10^{-3} \times 24.31 = 4.28 \times 10^{-2} \text{ g}$

iii. The graph will rise more steeply and reach 40.0 cm^3 in less time but will still reach a maximum at 40.0 cm^3 .

4. By taking the gradient at time $t = 0$ seconds, the rate (with respect to [reactant])
= $-0.200 / 12.0 = -1.67 \times 10^{-2} \text{ mol dm}^{-3} \text{ s}^{-1}$.

