Oxford Cambridge and RSA

# GCSE Chemistry B (Twenty First Century Science)

**J258/04** Depth in chemistry (Higher Tier)

## Question Set 9

1. Eve measures the volume of gas given off when solid calcium carbonate reacts with a dilute acid.

**Fig. 9.1** shows a graph of her results.

She draws a tangent at the start of her graph.

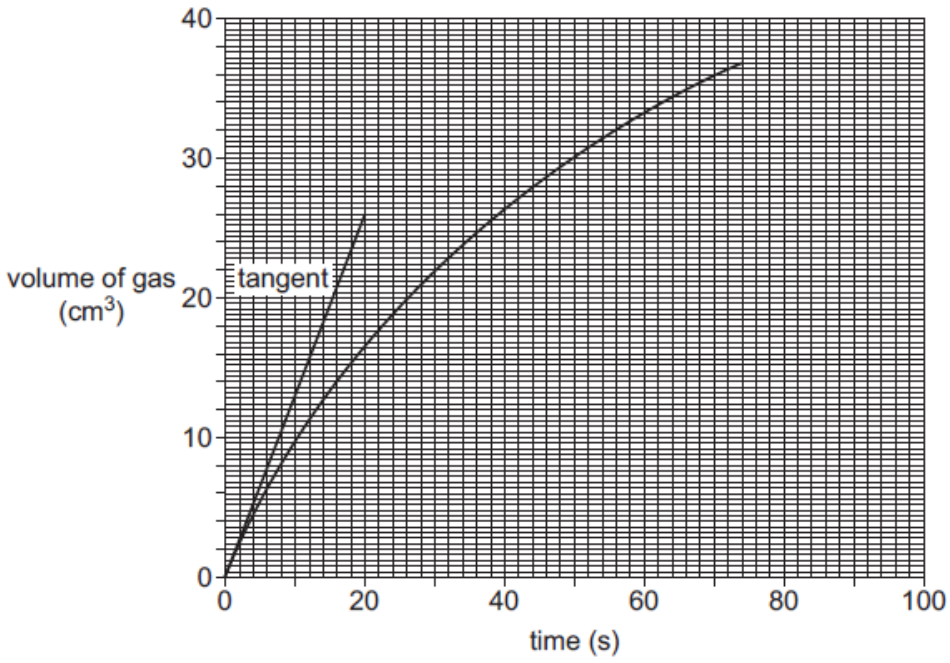


**Fig. 9.1**

**(a) (i)** Calculate the rate of reaction at the start by calculating the gradient of the tangent. **[3]**

Rate = ..... $cm^3/s$

**(ii)** Draw a new tangent on the graph at time = 60 s. **[1]**

**(iii)** How do the tangents show that the rate of reaction has changed from the start to 60 s? **[2]**

**(b)** Eve does some more experiments.

This time she finds out the rate of reaction at the start when she reacts different concentrations of acid with solid calcium carbonate.

She plots a graph of rate of reaction against concentration, as shown in **Fig. 9.2**

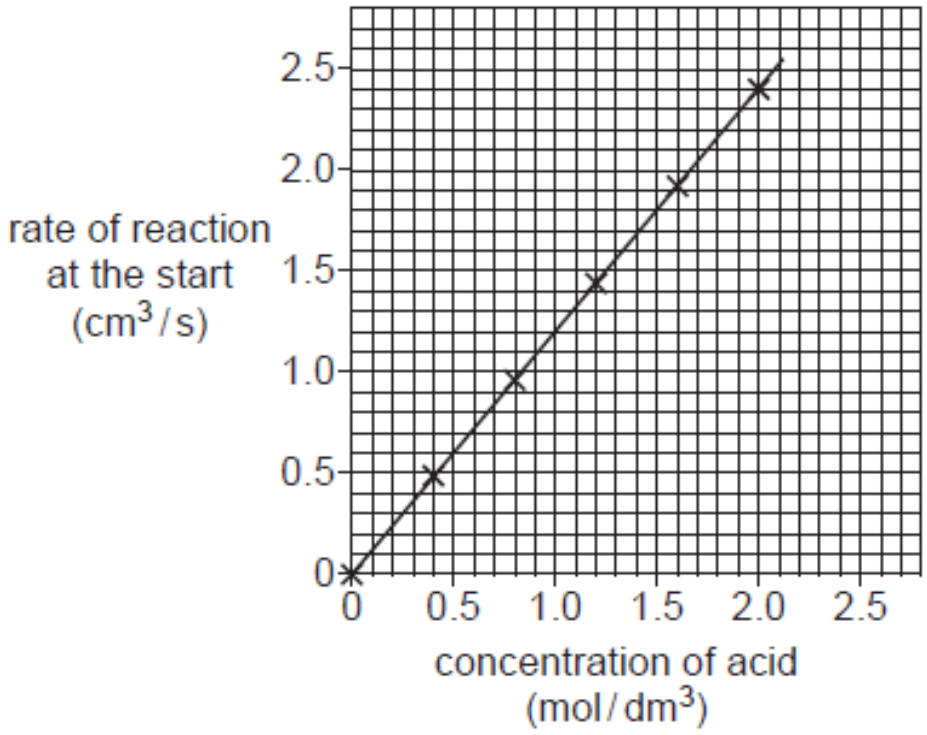


**Fig. 9.2**

**(i)** Eve thinks that the relationship between rate and concentration in the **graph** in **Fig. 9.2** can be shown using this equation:

rate $\propto$ concentration

Does the graph in **Fig. 9.2** agree with this equation?

Use the data to explain your reasons. **[2]**

**(ii)** Using the graph in **Fig. 9.2** estimate the rate of reaction when acid of concentration 3.0 mol / $dm^3$ is used.

Rate of reaction = ..... $cm^3$ / s **[2]**

## Total Marks for Question Set 9: 10