Rates of Reaction

GCSE Chemistry · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

1. Worked example

Using the example data, calculate the mean rate of reaction in the first 20 seconds. (2 marks)

Step 1 · Formula

mean rate = quantity of product formed ÷ time taken

Step 2 · Substitute

32 cm^3 ÷ 20 s = 1.6 cm^3/s

Answer: 1.6 cm^3/s

Check: Units: volume per unit time.

2. Now try one with the steps

Describe and explain the shape of the volume–time graph. (3 marks)

Step 1 · Start

Step 2 · Middle

Step 3 · End

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. Give two ways of measuring the rate of a reaction that produces a gas. [2]

2. Write the equation for mean rate of reaction in terms of product. [1]

3. 32 cm^3 of gas is produced in 20 s. Calculate the mean rate in cm^3/s. [1]

4. The mass of a flask falls by 0.88 g in 40 s. Calculate the mean rate in g/s. [1]

5. State a suitable unit for rate when measuring gas volume in cm^3 and time in seconds. [1]

6. Explain why the mass of the flask decreases when marble reacts with acid in an open flask. [1]

7. Describe how a volume–time graph shows that a reaction has stopped. [1]

8. A reaction produces 56 cm^3 of gas in 70 s. Calculate the mean rate for the whole reaction in cm^3/s. [1]

9. Explain why the rate of reaction decreases reaction goes on. [2]

10. In a 'disappearing cross' reaction the cross disappears after 40 s. Calculate 1/time, in s^{-1}, measure of rate. [1]

11. In a reaction of marble chips with acid, the volume of gas rises and then stays at 56 cm^3. Explain why it stops increasing. [1]

12. A tangent to a volume–time curve passes through (5 s, 14 cm^3) and (35 s, 50 cm^3). Calculate the gradient (rate) in cm^3/s. [2]

13. 0.88 g of carbon dioxide is given off in 40 s. Calculate the mean rate in mol/s. (C = 12, O = 16) [2]

14. Explain why the rate at 20 s must be found using a tangent rather than by dividing the volume at 20 s by 20. [2]

4. Before you hand it in

Dividing time by volume

mean rate = quantity ÷ time.

Using the origin to find the rate at a point

Draw a tangent at the point and find its gradient.

"The reaction stops because the catalyst is used up."

The reaction stops when the limiting reactant is used up.