AQA GCSE Chemistry

Chemical changes · Foundation tier

Questions only

The newest questions on the Foundation papers, about an hour. All 14 are in the exam generator.

Questions	Total marks	Time allowed
5	**55**	**58 min**

Name _____ Class or teacher _____ Date _____

Instructions

- Answer all questions in the spaces provided.
- Use black ink. Show your working for every calculation.
- You may use a scientific calculator and the periodic table insert.
- Print the separate mark scheme when you are ready to mark your answers.

For marking

Q	Source	Marks	Score
1	2024 P1F Q2	10	
2	2024 P1F Q6	10	
3	2024 P1F Q8 / P1H Q1	10	
4	2025 P1F Q4	10	
5	2025 P1F Q5	15	

Total _____ / 55 **Percentage** _____ %

Questions from AQA GCSE past papers, 2024–2025, reproduced for revision. Practise these topics online, with instant marking:
`whiteboardchemistry.com/revision/gcse-chemistry/exam-questions?topics=c4-chemical-changes&demand=low,standard&len=0`

Questions

Chemical changes · Foundation tier · 5 questions · 55 marks · time allowed 58 min

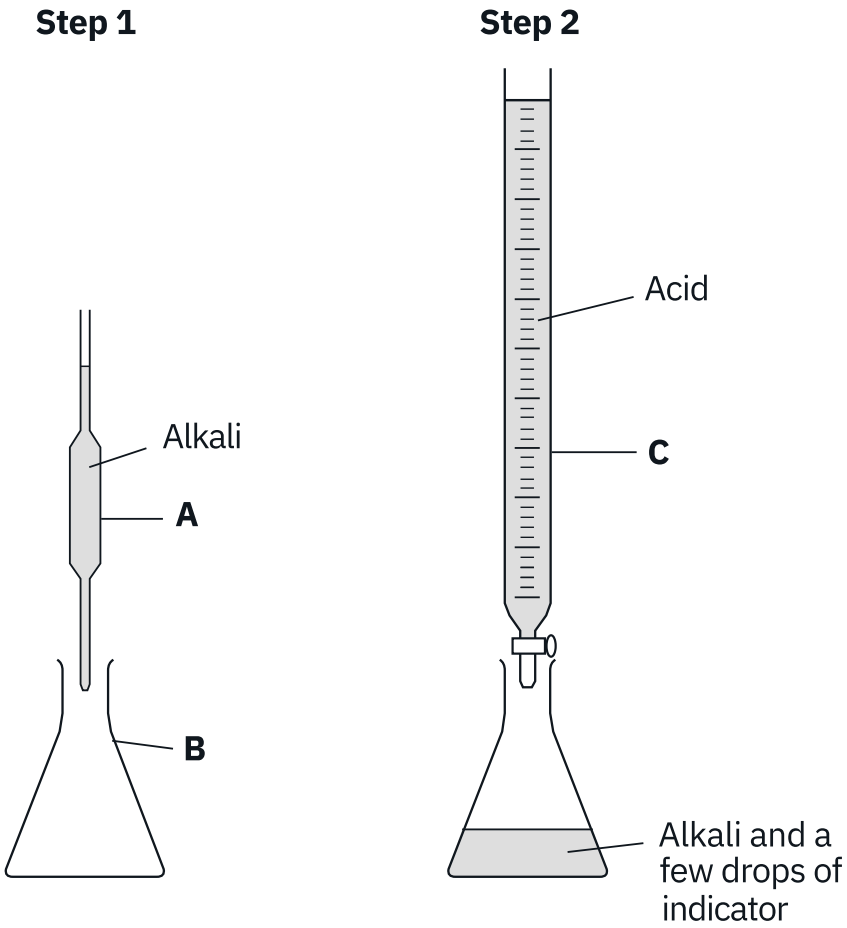
Q1 · June 2024 · Paper 1 Foundation · Q2 · [10 marks]

This question also needs Atomic structure and the periodic table.

A titration measures the volumes of an acid and an alkali that neutralise each other.

Figure 4 shows the apparatus used.

Figure 4



02.1 Name the pieces of equipment labelled A, B and C in Figure 4.

Choose answers from the box.

[3 marks]

beaker burette conical flask

measuring cylinder pipette test tube

A

B

C

02.2 In Step 2 in Figure 4 the acid is added to the alkali until the solution is neutralised.

The volume of acid added is then read from equipment C.

Name a suitable indicator for use in Step 2 of the titration.

[1 mark]

02.3 Give **one** observation that shows the alkali is neutralised.

[1 mark]

02.4 Give **two** ways to make sure that the volume of acid added is accurate.

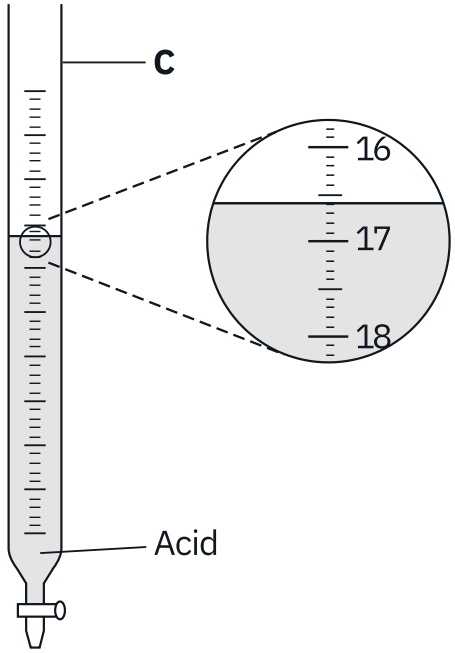
[2 marks]

1

2

02.5 Figure 5 shows the reading on equipment C at the end of Step 2.

Figure 5



What is the reading on equipment C in Figure 5?

Tick (✓) **one** box.

16.4 cm^3	☐
16.6 cm^3	☐
17.4 cm^3	☐
17.6 cm^3	☐

[1 mark]

02.6 A student did a different titration.

Table 1 shows the results.

Table 1

	Trial 1	**Trial 2**	**Trial 3**
Volume of acid added in cm^3	25.3	23.7	23.6

Which **two** results should be used to calculate the mean volume of acid added?

Tick (✓) **one** box.

Trial 1 and Trial 2	☐
Trial 1 and Trial 3	☐
Trial 2 and Trial 3	☐

[1 mark]

02.7 A salt is produced when an acid neutralises an alkali.

Barium chloride is a salt containing the ions Ba^{2+} and Cl^{-}

What is the formula of barium chloride?

Tick (✓) **one** box.

BaCl	☐
$BaCl_2$	☐
Ba_2Cl	☐
Ba_2Cl_2	☐

[1 mark]

Q2 · June 2024 · Paper 1 Foundation · Q6 · [10 marks]

This question also needs Atomic structure and the periodic table and Quantitative chemistry.

This question is about electrolysis and the extraction of metals.

06.1 Why can some molten substances be electrolysed?

Tick (✓) **one** box.

Electrons can move through the molten substance to the electrodes.	☐
Ions can move through the molten substance to the electrodes.	☐
Protons can move through the molten substance to the electrodes.	☐

[1 mark]

06.2 Table 3 shows the products of the electrolysis of some molten compounds.

Complete Table 3.

Table 3

Molten compound	Product at negative electrode	Product at positive electrode
Lead chloride		Chlorine
Potassium iodide	Potassium	
	Zinc	Bromine

[3 marks]

06.3 Aluminium is extracted by electrolysing molten aluminium oxide.

Balance the equation for the reaction.

Choose numbers from the box.

2 3 4 5

$2Al_2O_3 \rightarrow$ _____ Al + _____ O_2

[2 marks]

06.4 Calculate the relative formula mass (M_r) of aluminium oxide (Al_2O_3).

Relative atomic masses (A_r): O = 16 Al = 27

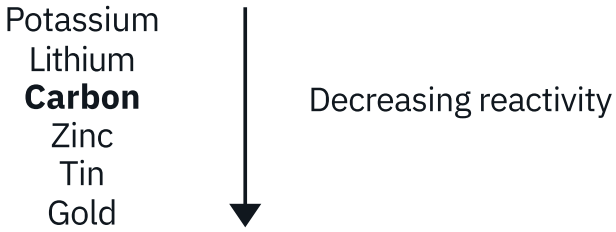
Relative formula mass (M_r) = _____

[2 marks]

06.5 Figure 13 shows part of the reactivity series of metals.

The non-metal carbon has been included.

Figure 13



Metals can be extracted from their compounds by:

- electrolysis
- reduction with carbon.

Electrolysis is more expensive than reduction with carbon.

Predict one metal that would be extracted by each method.

Use Figure 13.

[2 marks]

Extracted by electrolysis

Extracted by carbon reduction

Q3 · June 2024 · Paper 1 Foundation · Q8 · Paper 1 Higher · Q1 · [10 marks]

This question also needs Quantitative chemistry.

A student produced a salt by reacting copper carbonate with sulfuric acid.

This is the method used.

1. Measure 50 cm^3 of sulfuric acid into a beaker.

2. Add copper carbonate powder.

3. Stir the mixture.

4. Repeat steps 2 and 3 until copper carbonate is in excess.

5. Filter the mixture.

6. Warm the filtrate gently until crystals start to appear.

7. Leave the solution to cool and crystallise.

08.1 Complete the word equation for the reaction.

copper carbonate + sulfuric acid → _____ + _____ + carbon dioxide

[2 marks]

08.2 Give **one** observation the student could make during Step 4 which shows that the copper carbonate is in excess.

[1 mark]

08.3 Give **one** reason for filtering the mixture in Step 5.

[1 mark]

08.4 Name the equipment that can be used to warm the filtrate **gently** in Step 6.

[1 mark]

08.5 The maximum theoretical mass of the salt that could be produced using 50 cm^3 of the sulfuric acid is 12.5 g.

The percentage yield of the salt is 92.8%.

Calculate the mass of salt actually produced.

Use the equation:

$$\% \text{ yield} = \frac{\text{mass of salt actually produced}}{\text{maximum theoretical mass of salt that could be produced}} \times 100$$

Mass of salt actually produced = _____ g

[3 marks]

08.6 Some salts can be produced by reacting sulfuric acid with a metal.

Neither copper nor sodium is used to produce a salt with sulfuric acid.

Give **one** reason why each metal is **not** used.

[2 marks]

Copper

Sodium

Q4 · June 2025 · Paper 1 Foundation · Q4 · [10 marks]

A student did an experiment to find the volume of an acid that neutralised 25.0 cm^3 of an alkali.

This is the method used.

1. Measure 25.0 cm^3 of the alkali into a conical flask.

2. Add a few drops of substance X to the alkali.

3. Place the conical flask on a white tile.

4. Add the acid to the alkali until a colour change is seen.

5. Measure the volume of acid added.

6. Repeat steps 1 to 5 three more times.

04.1 What is the name of this experiment?

Tick (✓) **one** box.

Crystallisation	☐
Distillation	☐
Electrolysis	☐
Titration	☐

[1 mark]

04.2 Substance X is used in step 2 of the method.

What type of substance is X?

[1 mark]

04.3 Which piece of equipment is used to add the acid to the alkali in step 4?

Tick (✓) **one** box.

Beaker	☐
Burette	☐
Test tube	☐

[1 mark]

04.4 Suggest **one** improvement to step 4 of the method.

[1 mark]

04.5 Table 3 shows the results.

Table 3

	Trial 1	**Trial 2**	**Trial 3**	**Trial 4**
Volume of acid in cm^3	8.95	9.00	8.85	8.45

Calculate the mean volume of the acid needed to neutralise 25.0 cm^3 of the alkali.

Give your answer to 3 significant figures.

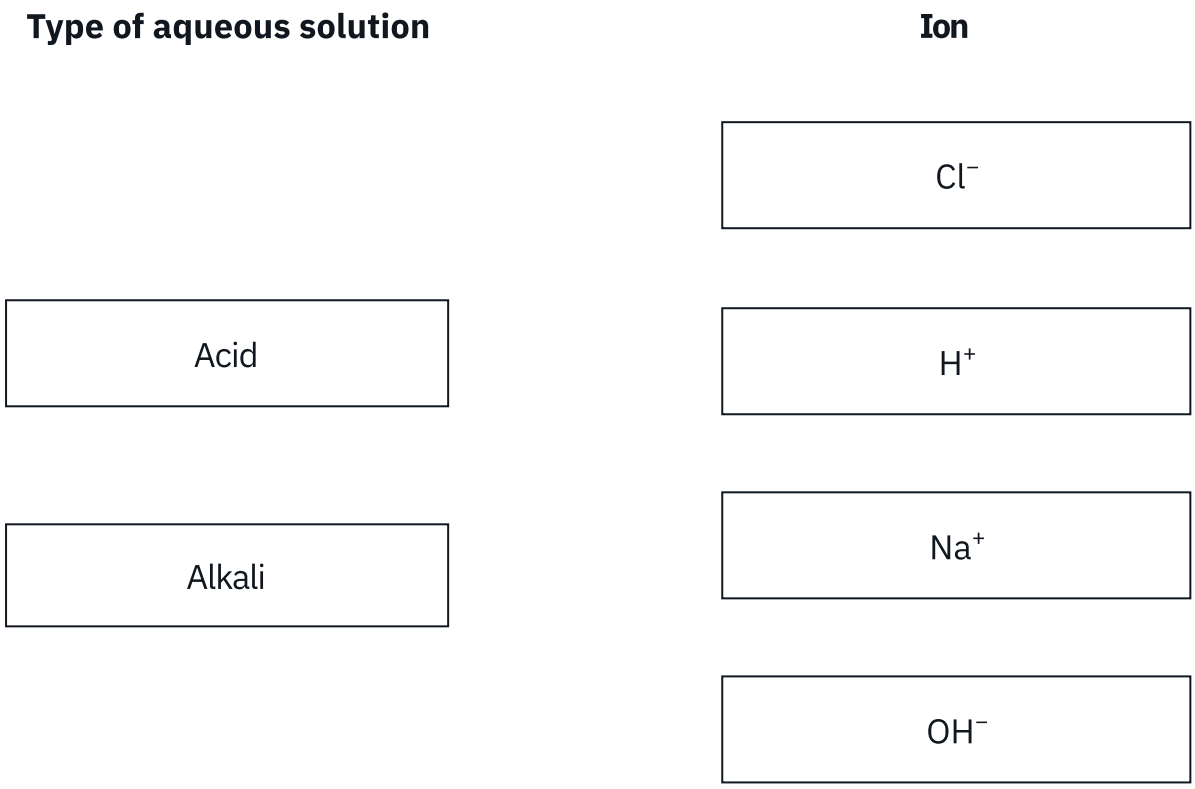
Do **not** include the anomalous result.

Mean volume (3 significant figures) = _____ cm^3

[4 marks]

04.6 Aqueous solutions of acids and alkalis contain ions.

Draw **one** line from each type of aqueous solution to the ion that is **always** in the aqueous solution.



[2 marks]

Draw your answer on the figure above.

Q5 · June 2025 · Paper 1 Foundation · Q5 · [15 marks]

This question also needs Atomic structure and the periodic table and Bonding, structure, and the properties of

matter.

This question is about electrolysis.

05.1 Table 4 shows some of the products of electrolysis of two molten compounds.

Complete Table 4.

Table 4

Molten compound	Product at the negative electrode	Product at the positive electrode
Copper chloride		Chlorine
Potassium bromide	Potassium	

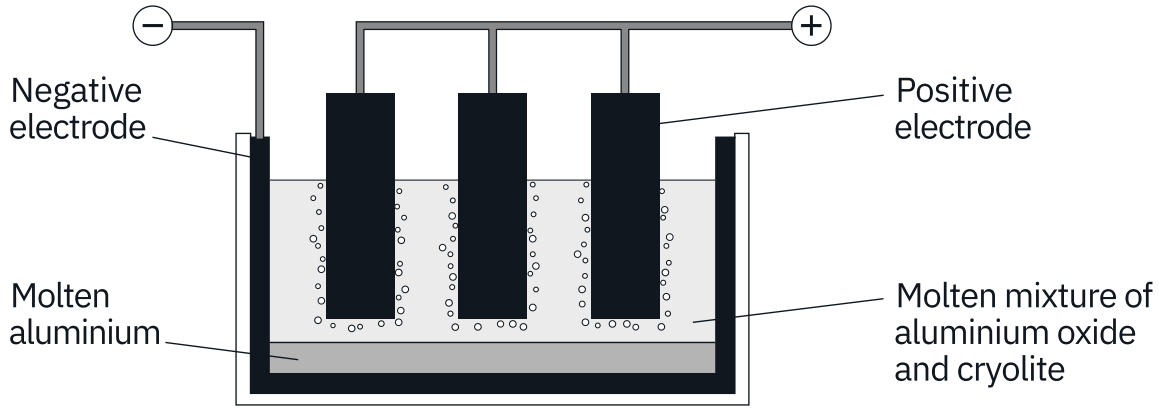
[2 marks]

05.2 Aluminium is extracted by electrolysis of a molten mixture of aluminium oxide and cryolite.

The products are molten aluminium and oxygen gas.

Figure 4 shows the electrolysis cell.

Figure 4



What is the formula of oxygen gas?

Tick (✓) **one** box.

O	☐
O_2	☐
O^2	☐
2O	☐

[1 mark]

05.3 Aluminium oxide contains the ions Al^{3+} and O^{2-}

Explain why aluminium is produced at the **negative** electrode.

[2 marks]

05.4 The melting point of aluminium oxide is 2045 °C.

The melting point of the mixture of aluminium oxide and cryolite is 950 °C.

Explain why the electrolysis uses the mixture instead of pure aluminium oxide.

[2 marks]

05.5 The positive electrodes in the electrolysis cell are made of carbon.

Why do the positive electrodes need to be continually replaced?

Tick (✓) **one** box.

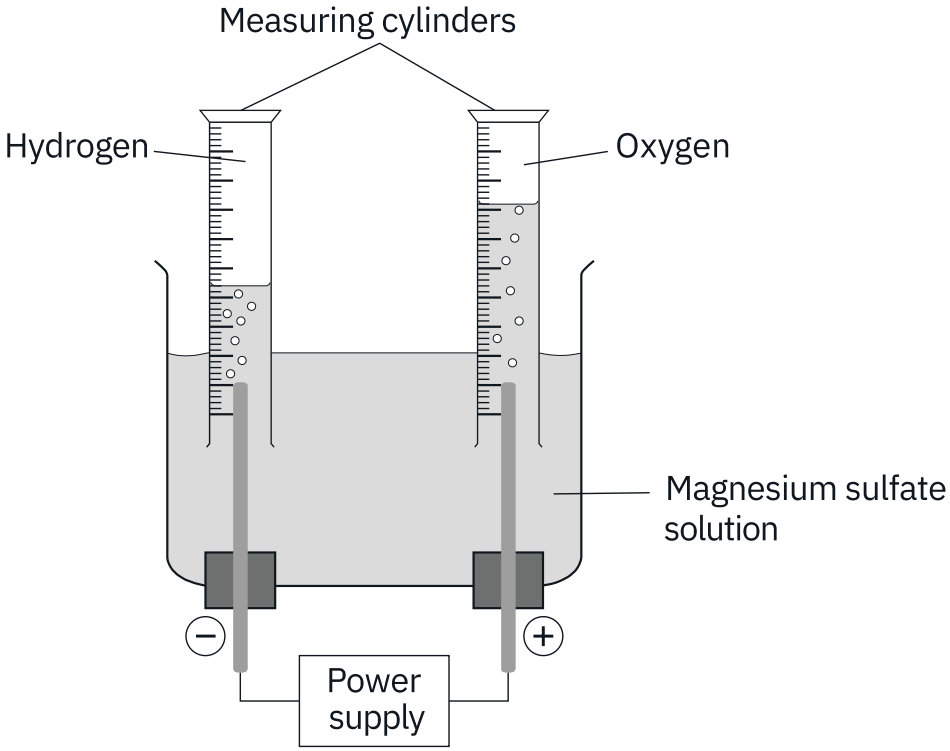
Carbon reacts with the aluminium oxide.	☐
Carbon reacts with the aluminium produced.	☐
Carbon reacts with the oxygen produced.	☐

[1 mark]

05.6 A student investigated the electrolysis of magnesium sulfate solution.

Figure 5 shows the apparatus.

Figure 5



This is the method used.

1. Set the power supply to give a current of 0.05 A.

2. Measure the volume of each gas every minute for 5 minutes.

3. Repeat steps 1 and 2 using a current of 0.10 A in step 1.

Figure 6 shows a measuring cylinder during the electrolysis.

Figure 6



What is the volume of gas in the measuring cylinder?

Tick (✓) **one** box.

2.7 cm^3	☐
3.4 cm^3	☐
4.6 cm^3	☐

[1 mark]

05.7 Hydrogen is produced instead of magnesium at the negative electrode.

Why is hydrogen produced at the negative electrode?

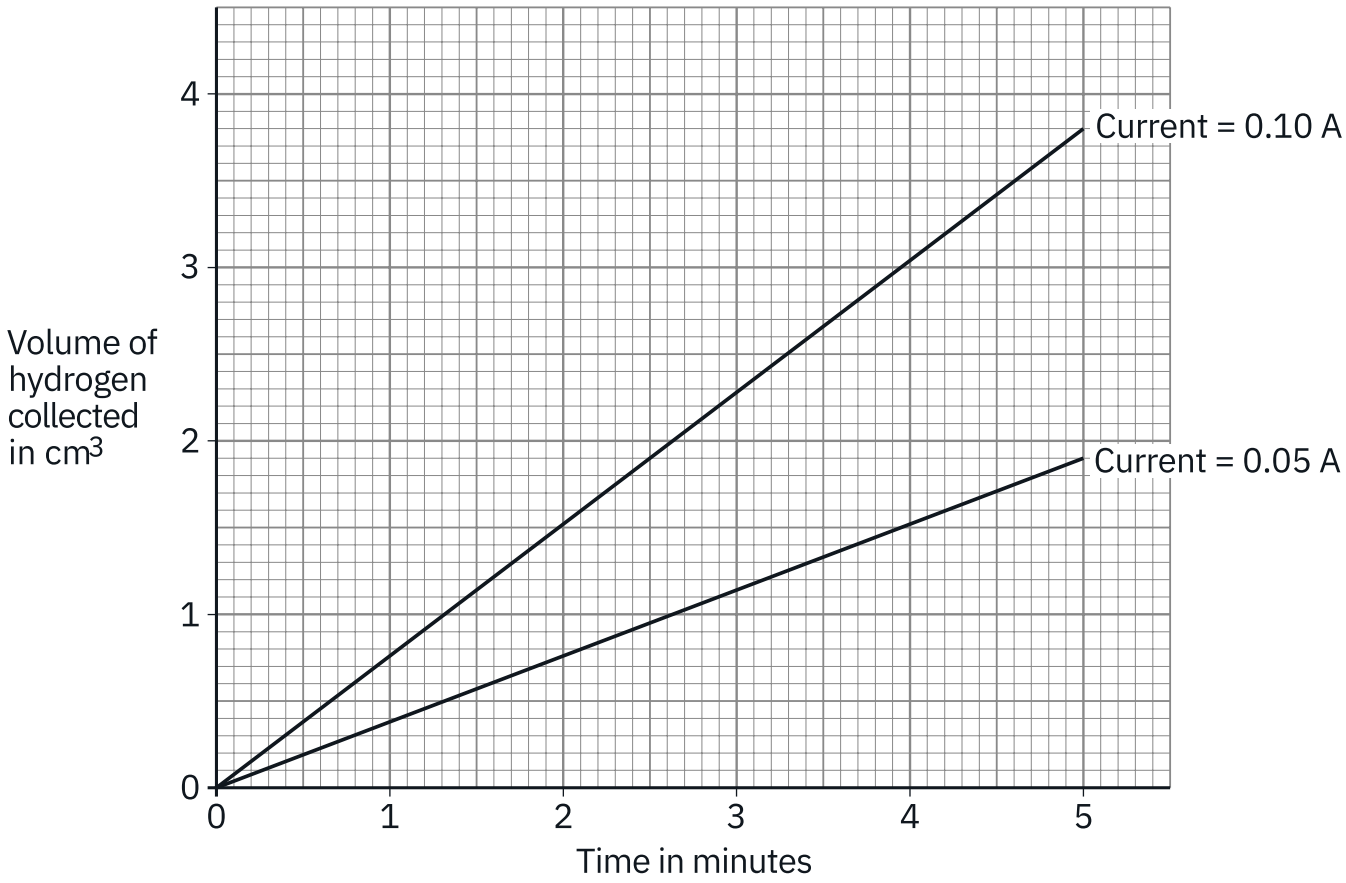
Tick (✓) **one** box.

Hydrogen is less reactive than magnesium.	☐
Hydrogen has the same reactivity as magnesium.	☐
Hydrogen is more reactive than magnesium.	☐

[1 mark]

05.8 Figure 7 shows the results for the volume of hydrogen collected.

Figure 7



Which hypothesis explains the results in Figure 7?

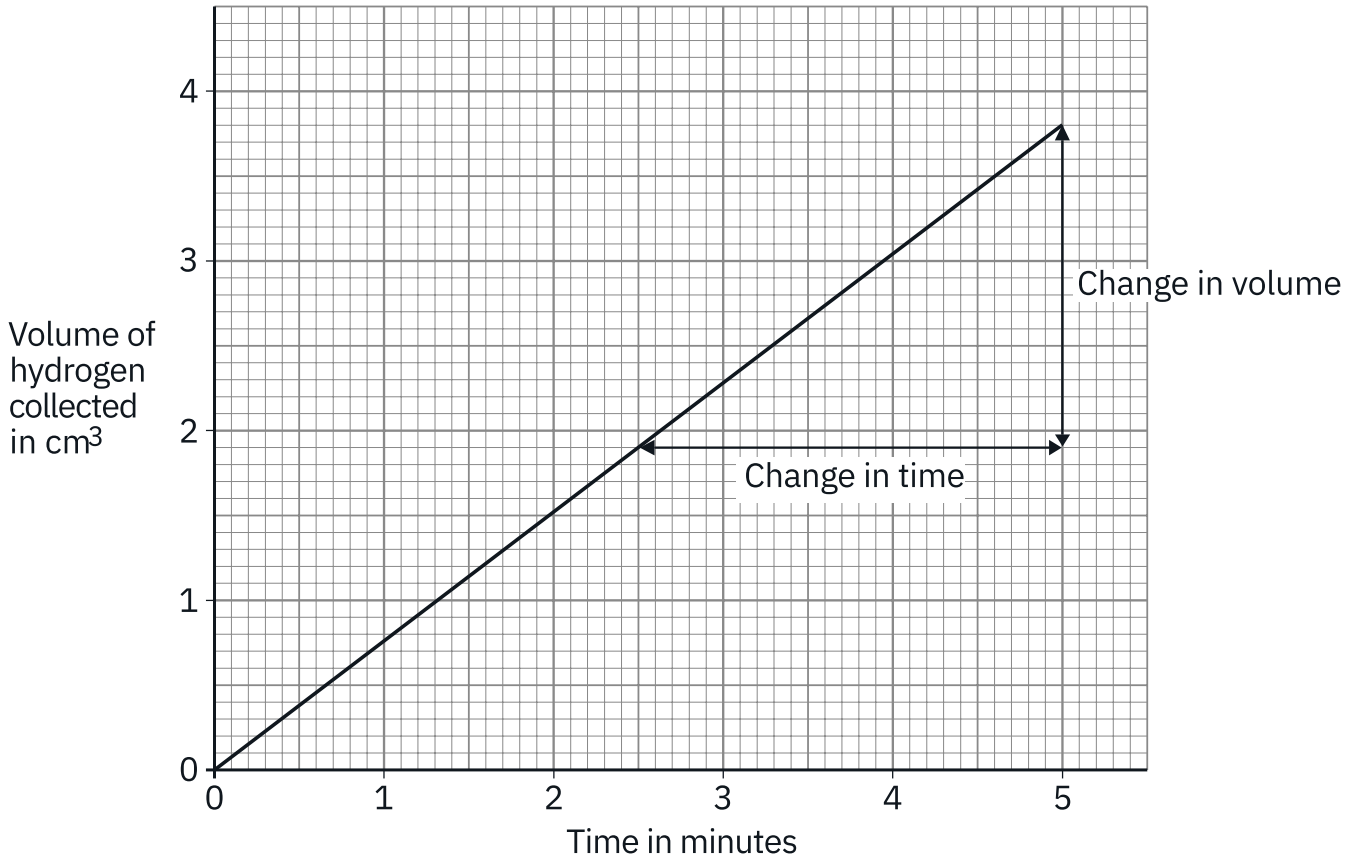
Tick (✓) **one** box.

The volume of hydrogen collected depends on **both** the current and the time.	☐
The volume of hydrogen collected depends on the current but **not** the time.	☐
The volume of hydrogen collected depends on the time but **not** the current.	☐

[1 mark]

05.9 Figure 8 is a repeat of part of the graph for current = 0.10 A in Figure 7.

Figure 8



Determine the gradient of the graph in Figure 8.

Use the equation

gradient = (change in volume)/(change in time)

Change in volume = _____ cm^3

Change in time = _____ min

Gradient = _____ cm^3/min

[4 marks]

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