

Candidate forename						Candidate surname					
Centre number						Candidate number					

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GCSE

A322/01

TWENTY FIRST CENTURY SCIENCE
CHEMISTRY A

Unit 2: Modules C4 C5 C6 (Foundation Tier)

MONDAY 25 JUNE 2012: Afternoon

DURATION: 40 minutes
plus your additional time allowance

MODIFIED ENLARGED

Candidates answer on the Question Paper.

OCR SUPPLIED MATERIALS:

None

OTHER MATERIALS REQUIRED:

Pencil

Ruler (cm/mm)

READ INSTRUCTIONS OVERLEAF

INSTRUCTIONS TO CANDIDATES

- **Write your name, centre number and candidate number in the boxes on the first page. Please write clearly and in capital letters.**
- **Use black ink. HB pencil may be used for graphs and diagrams only.**
- **Answer ALL the questions.**
- **Read each question carefully. Make sure you know what you have to do before starting your answer.**
- **Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).**

INFORMATION FOR CANDIDATES

- **The number of marks is given in brackets [] at the end of each question or part question.**
- **The total number of marks for this paper is 42.**
- **An enlarged copy of the Periodic Table will be provided.**

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Answer ALL the questions.

- 1 The table shows data about the properties of some Group 1 elements.**

ELEMENT	PROPERTIES			
	MELTING POINT IN °C	BOILING POINT IN °C	DENSITY IN g/cm³	FORMULA OF HYDROXIDE
LITHIUM	180.0	1330	0.53	LiOH
SODIUM	97.8	890	0.97	NaOH
POTASSIUM	63.7	774	0.86	KOH
RUBIDIUM	38.9	688	1.53	RbOH

- (a) Elements in the same group show similarities and trends in their properties.**

- (i) What similarities and trends are shown in the table?**

[3]

(ii) Which property in the table does NOT show a clear trend? Explain your reasoning.

[2]

(b) Sea salt contains both sodium chloride and potassium chloride.

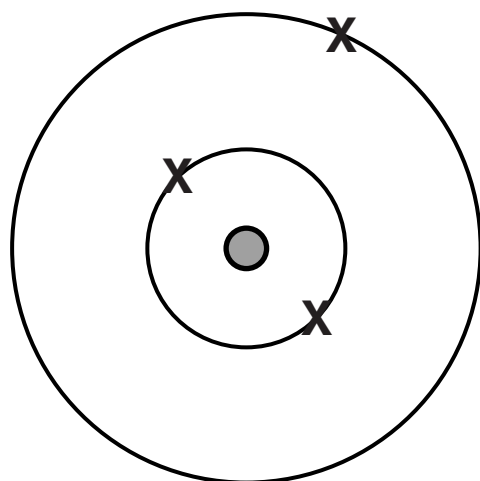
The formula for sodium chloride is NaCl.

What is the formula for potassium chloride?

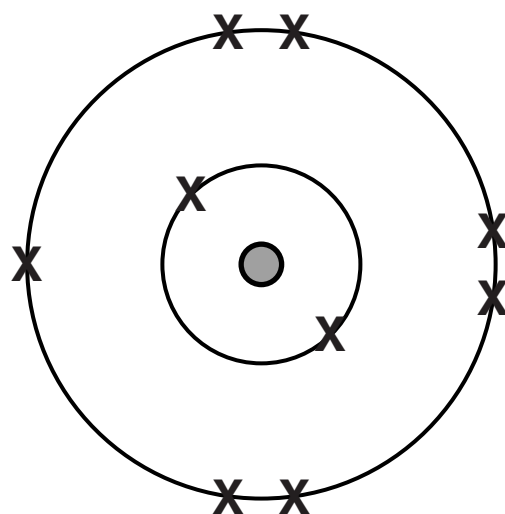
formula _____ **[1]**

[Total: 6]

- 2 The diagram shows the arrangement of electrons in an atom of lithium and an atom of fluorine.**



LITHIUM



FLUORINE

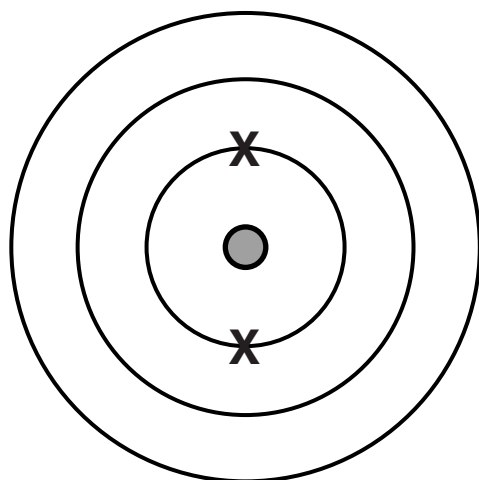
- (a) The electron arrangement of the lithium atom is 2.1.**

What is the electron arrangement of the fluorine atom?

answer _____ **[1]**

(b) Sodium has eleven electrons.

Complete the diagram to show the arrangement of all of the electrons in a sodium atom.



SODIUM

[1]

(c) Give the names of the two particles found in the nucleus of an atom.

_____ and _____ **[1]**

[Total: 3]

3 Chlorine, bromine and iodine are in Group 7 of the Periodic Table.

- (a) Draw three straight lines to connect each ELEMENT to its correct APPEARANCE at room temperature and pressure.**

ELEMENT	APPEARANCE
	grey solid
	red-brown solid
chlorine	green gas
bromine	grey gas
iodine	red-brown liquid
	green liquid

[2]

- (b) (i) Joe does an experiment. He reacts sodium with chlorine to make sodium chloride.**

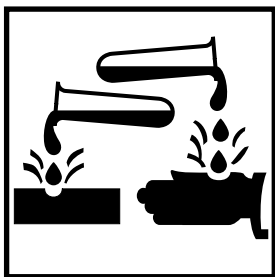
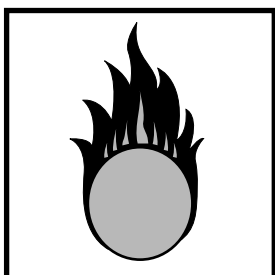
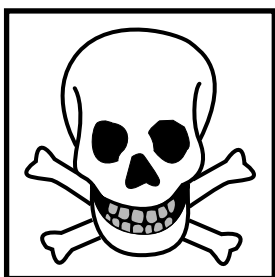
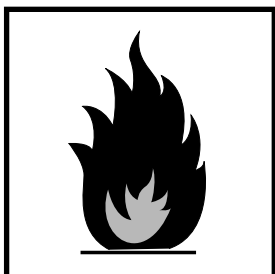
Write a word equation for this reaction.

_____ **[1]**

(ii) Joe knows that chlorine is hazardous.

What is the correct hazard symbol for chlorine?

Put a ring around the correct answer.







[1]

[Total: 4]

4 Four gases that are in the air are nitrogen, oxygen, argon and carbon dioxide.

(a) Draw four lines to connect the NAME of each gas to the correct ARRANGEMENT OF ATOMS AND ITS RELATIVE MASS.

NAME	ARRANGEMENT OF ATOMS AND RELATIVE MASS
nitrogen	 relative mass = 32
oxygen	 relative mass = 40
argon	 relative mass = 44
carbon dioxide	 relative mass = 28

[2]

(b) Which of the following statements about gases in the air are TRUE?

Put ticks (✓) in the boxes next to the TWO correct answers.

All of the gases in the air are elements.

☐

Air contains only non-metal elements.

☐

There are weak attractions between molecules in the air.

☐

All the gases have high melting points and boiling points.

☐

The gases are good conductors of electricity.

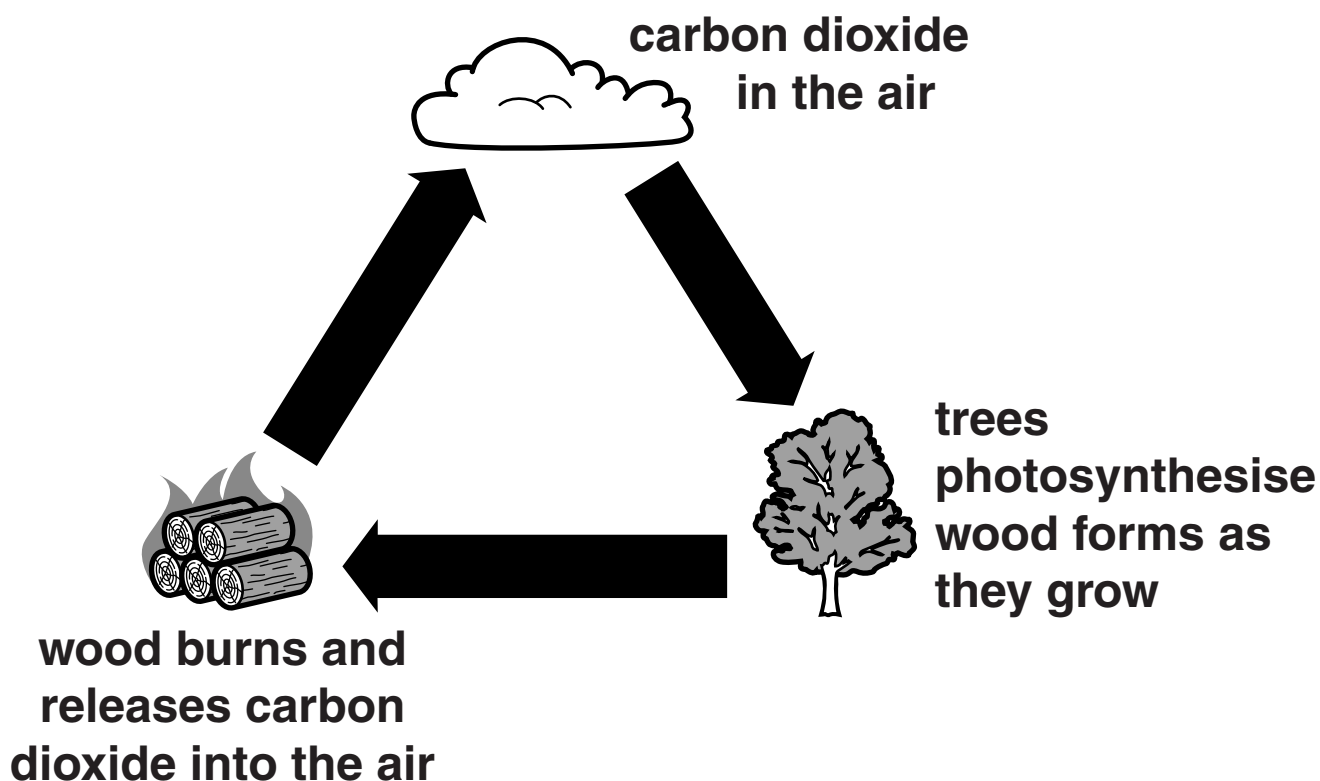
☐

[2]

[Total: 4]

- 5 Some people burn wood to heat their houses because they say it is a **CARBON NEUTRAL FUEL**.

A carbon neutral fuel does not add to the amount of carbon dioxide in the air.



- (a) Use the diagram to explain why wood is a **CARBON NEUTRAL FUEL**.

[3]

(b) There are four main elements in ALL living things.

One of the elements is carbon.

What are the other three?

Put a tick (✓) in the box next to the correct answer.

hydrogen, oxygen and nitrogen

☐

oxygen, nitrogen and chlorine

☐

silicon, oxygen and nitrogen

☐

iron, hydrogen and oxygen

☐

[1]

[Total: 4]

6 Aluminium is extracted from its ore by electrolysis.

Aluminium ore contains aluminium oxide.

(a) This is the word equation for the reaction.

aluminium oxide \rightarrow aluminium + oxygen

The aluminium oxide is reduced.

What does this mean?

Put a tick (✓) in the box next to the correct answer.

The aluminium oxide loses oxygen.

☐

The density of the aluminium oxide decreases.

☐

The aluminium oxide loses energy.

☐

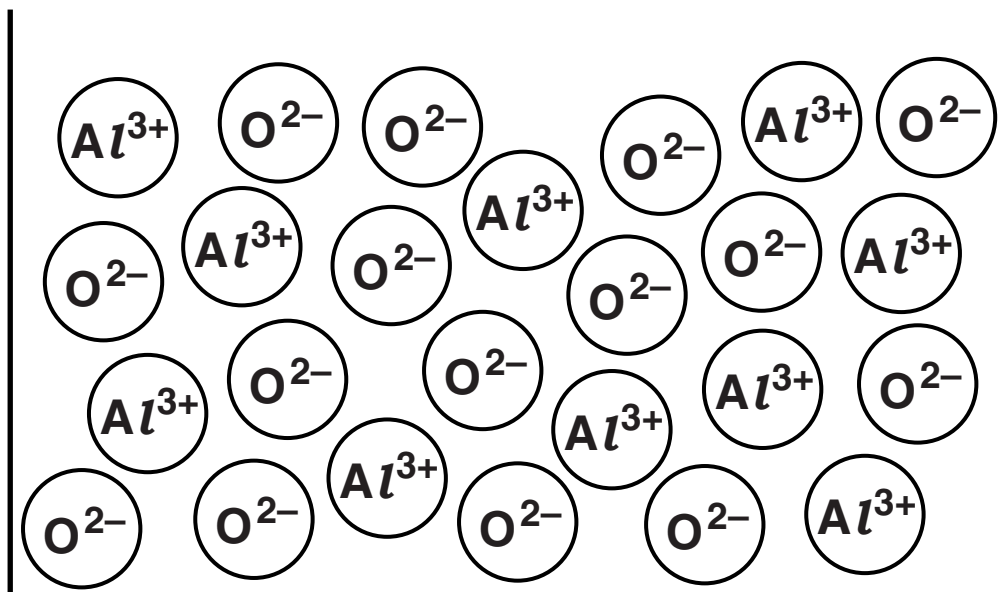
The volume of the aluminium oxide decreases.

☐

[1]

- (b) The electrolysis process uses molten aluminium oxide.

The diagram shows the arrangement of particles in molten aluminium oxide.



- (i) Which two words can be used to describe molten aluminium oxide?

Put rings around the TWO correct answers.

COVALENT

GAS

IONIC

LIQUID

MOLECULAR

SOLID

[2]

- (ii) During the electrolysis, negative ions move to the positive electrode and positive ions move to the negative electrode. A product is made at each electrode.

Draw two straight lines to connect each **ELECTRODE** with the correct **PRODUCT MADE**.

ELECTRODE	PRODUCT MADE
positive electrode	aluminium
	aluminium oxide
negative electrode	water
	hydrogen
	oxygen

[2]

(c) Aluminium has many different uses.

The uses of aluminium depend on making the best use of its properties.

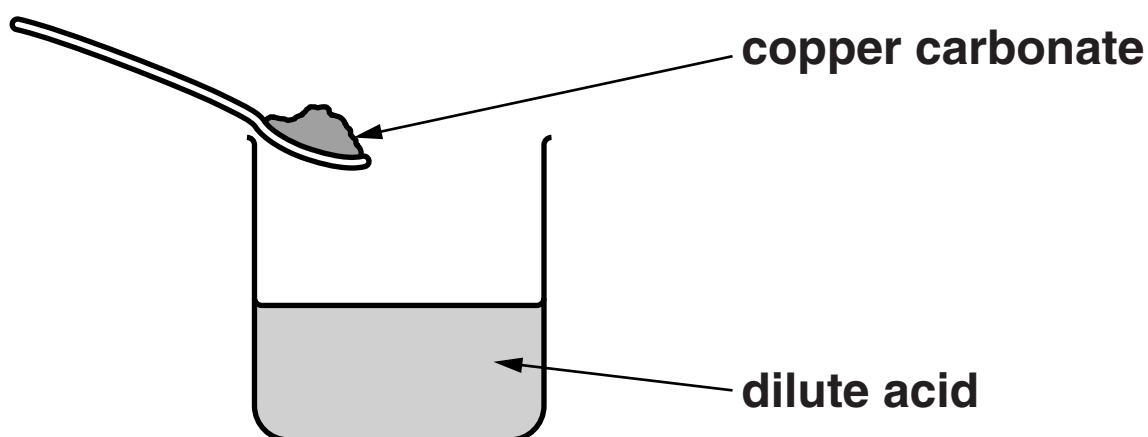
Draw four straight lines to connect each USE with the MOST IMPORTANT REASON for that use.

USE	MOST IMPORTANT REASON
aircraft parts	low density and can be mixed with other metals to make it strong
power cables	shiny appearance and surface can be coloured using dyes
drinks and food cans	surface is non-toxic and does not react with dilute acids
jewellery	very good electrical conductivity and can be shaped into wires

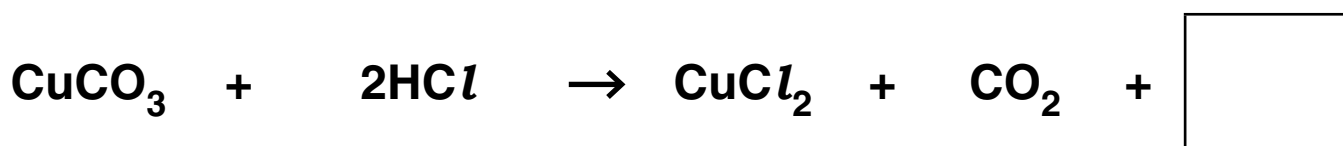
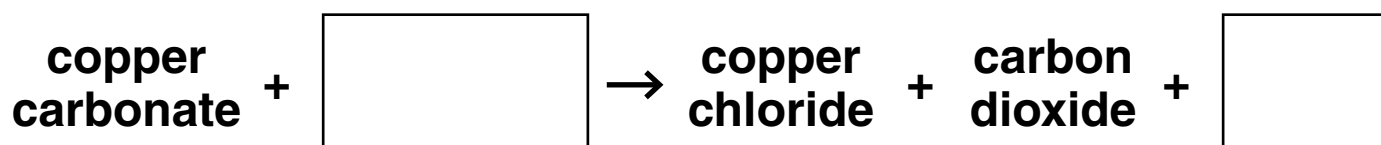
[2]

[Total: 7]

- 7 Sue makes some copper chloride crystals. She adds copper carbonate to a dilute acid.



- (a) Complete the word and symbol equations for the reaction by filling in the empty boxes.



[2]

- (b) Which other chemicals react with the same dilute acid to form copper chloride?

Put rings around the TWO correct answers.

COPPER HYDROXIDE

COPPER NITRATE

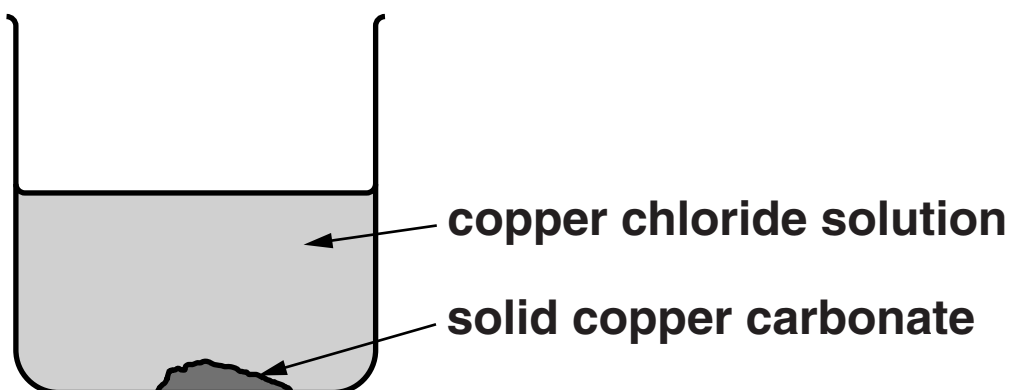
COPPER OXIDE

COPPER SULFATE

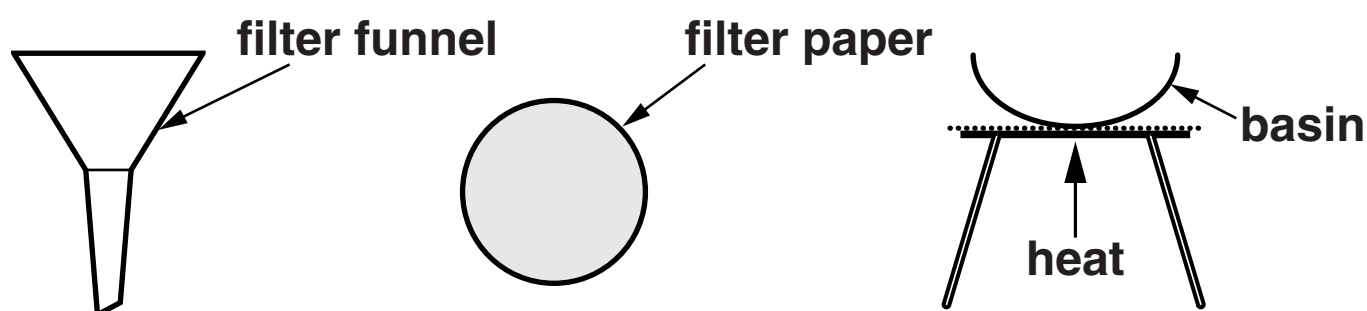
[1]

- (c) Sue adds solid copper carbonate to the dilute acid until no more reacts.

At the end of the experiment, the beaker contains copper chloride solution and some left-over solid copper carbonate.



She has this equipment.



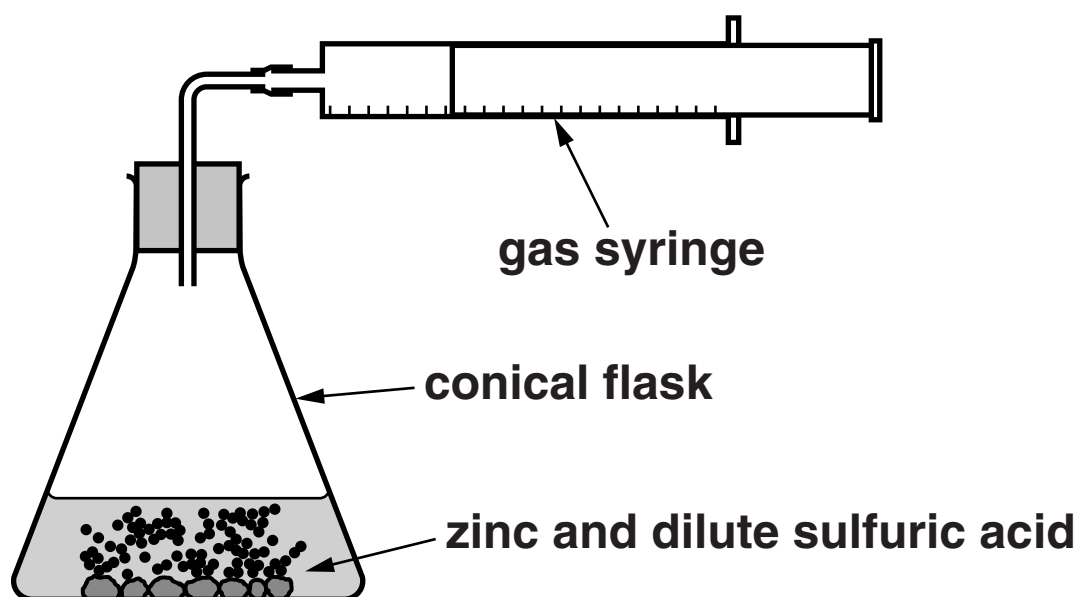
Describe how Sue makes some copper chloride crystals using this equipment.

[4]

[Total: 7]

8 Alex adds some zinc to some dilute sulfuric acid.

He measures the volume of hydrogen given off every 30 seconds.



(a) Draw three straight lines to connect each CHEMICAL to its correct STATE SYMBOL.

CHEMICAL	STATE SYMBOL
hydrogen	(s)
zinc	(g)
dilute sulfuric acid	(aq)

[2]

(b) Zinc reacts with sulfuric acid.

Which salt is made?

Put a ring around the correct answer.

ZINC CHLORIDE

ZINC HYDROXIDE

ZINC NITRATE

ZINC SULFATE

[1]

(c) Alex thinks that the reaction is too slow.

What could Alex do to make the reaction faster?

Put ticks (✓) in the boxes next to the TWO correct answers.

Use the same mass of zinc but in larger pieces.

☐

Use a higher concentration of acid.

☐

Do the experiment at a lower temperature.

☐

Use a lower mass of zinc.

☐

Increase the surface area of the zinc.

☐

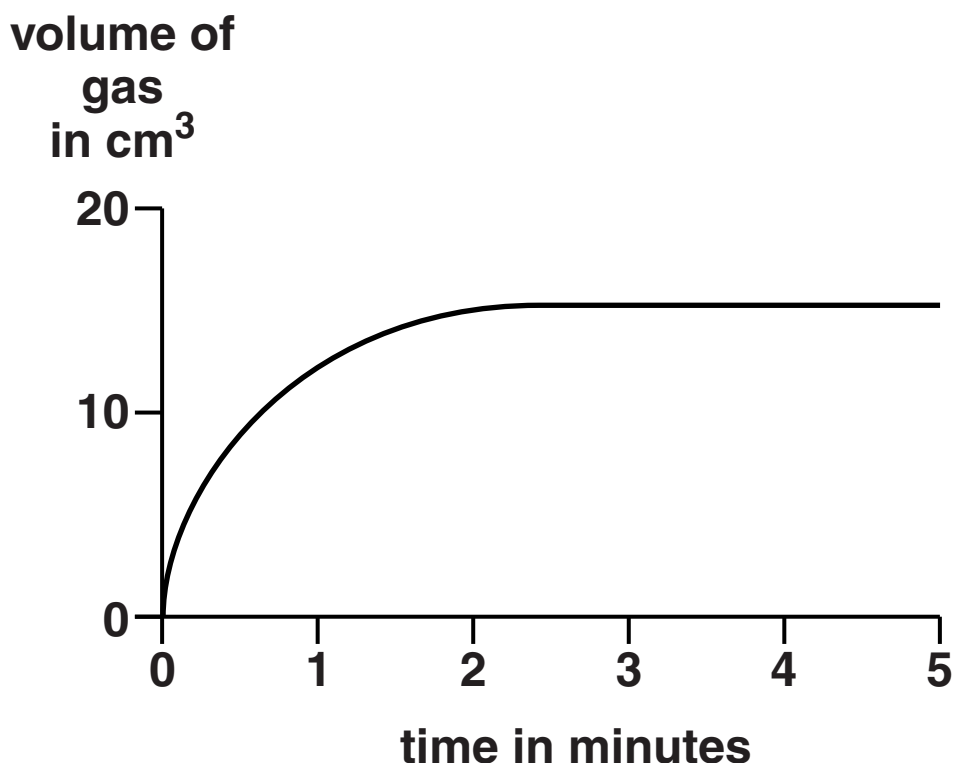
Use a larger gas syringe.

☐

[2]

- (d) Alex measures the volume of hydrogen in the gas syringe for 5 minutes.

He plots his results on a graph.



- (i) Which statement is the best description of what is happening at the **START** of the reaction?

Put a tick (✓) in the box next to the correct answer.

No reaction is happening.

☐

The reaction rate is at its fastest.

☐

The reaction is slow but getting faster.

☐

The reaction is happening at a constant rate.

☐

[1]

(ii) Which statement is the best description of what is happening after 5 minutes?

Put a tick (✓) in the box next to the correct answer.

The reaction has stopped.

☐

The reaction rate is at its fastest.

☐

The reaction is increasing in rate.

☐

Gas is being given off at a constant rate.

☐

[1]

[Total: 7]

END OF QUESTION PAPER

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