

Surname _____

Other Names _____

Centre Number _____

For Examiner's Use

Candidate Number _____

Candidate Signature _____

ASSESSMENT AND QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Foundation Tier

June 2010

Science B

Unit Chemistry C1

Chemistry

Unit Chemistry C1

Written Paper

CHY1F

Wednesday 16 June 2010 9.00 am

For this paper you must have:

- a ruler.

You may use a calculator.

TIME ALLOWED

- 45 minutes plus your additional time allowance.

At the top of the page, write your surname and other names, your centre number, your candidate number and add your signature.

[Turn over]

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INSTRUCTIONS

- **Use black ink or black ball-point pen.**
- **Answer ALL questions.**
- **You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.**
- **Do all rough work in this book. Cross through any work you do not want to be marked.**

INFORMATION

- **The marks for questions are shown in brackets.**
- **The maximum mark for this paper is 45.**
- **You are expected to use a calculator where appropriate.**
- **You are reminded of the need for good English and clear presentation in your answers.**

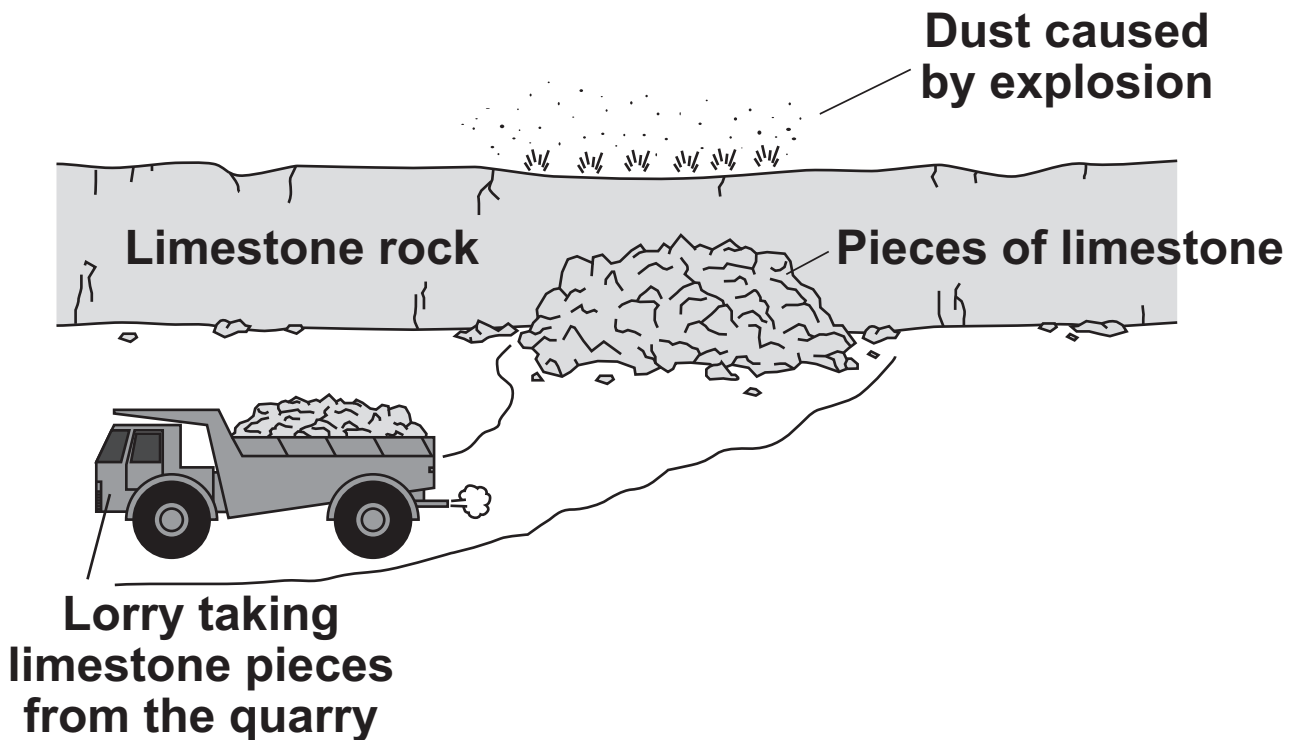
ADVICE

- **In all calculations, show clearly how you work out your answer.**

DO NOT TURN OVER UNTIL TOLD TO DO SO

Answer ALL questions in the spaces provided.

- 1 In a quarry, limestone is blasted into pieces by explosives.
The pieces of limestone are taken from the quarry by lorries.



- 1 (a) Draw a ring around the correct word in the box to complete the sentence. [1 mark]

Limestone can be used as a material.

building

plastic

smart

- 1 (b) Tick (✓) ONE possible advantage for people who live near to the limestone quarry. [1 mark]

TICK (✓)	ADVANTAGE
	causes more traffic
	provides jobs
	attracts tourists to the area

- 1 (c) Give TWO types of pollution that would be caused by the limestone quarry. [2 marks]

1 _____

2 _____

- 1 (d) Limestone contains calcium carbonate (CaCO_3).

Complete the TWO empty boxes in the table about the formula of calcium carbonate. [2 marks]

NAME OF ELEMENT	SYMBOL FOR THE ELEMENT	NUMBER OF ATOMS IN THE FORMULA
calcium	Ca	1
carbon	C	1
oxygen	_____	_____

[Question 1 continues on the next page]

- 1 (e) Lorries take some of the limestone to be heated in a lime-kiln.
Calcium carbonate, in the limestone, decomposes when heated.

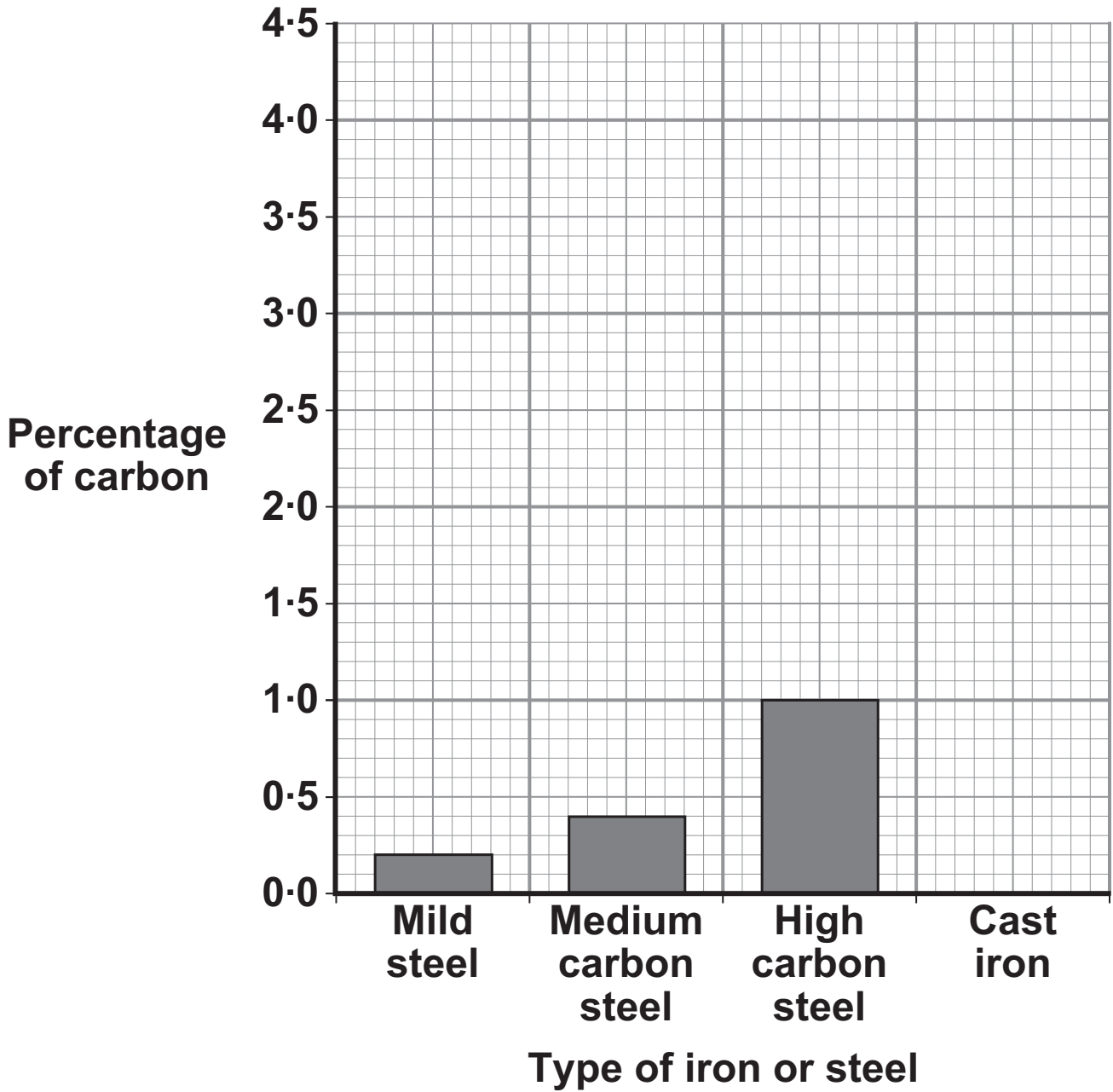
Use the balanced chemical equation to help you complete the word equation for the decomposition of calcium carbonate. [1 mark]



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TURN OVER FOR THE NEXT QUESTION

- 2 The bar chart shows the percentage of carbon in three types of steel.



- 2 (a) Draw a ring around the correct word in the box to complete the sentence. [1 mark]

Steel is the name used for

alloys
atoms
ores

 of iron.

- 2 (b) Cast iron contains 4% carbon.
Draw the bar for cast iron on the chart. [1 mark]

- 2 (c) Cast iron is more brittle than these three types of steel.

Use the bar chart to suggest why. [1 mark]

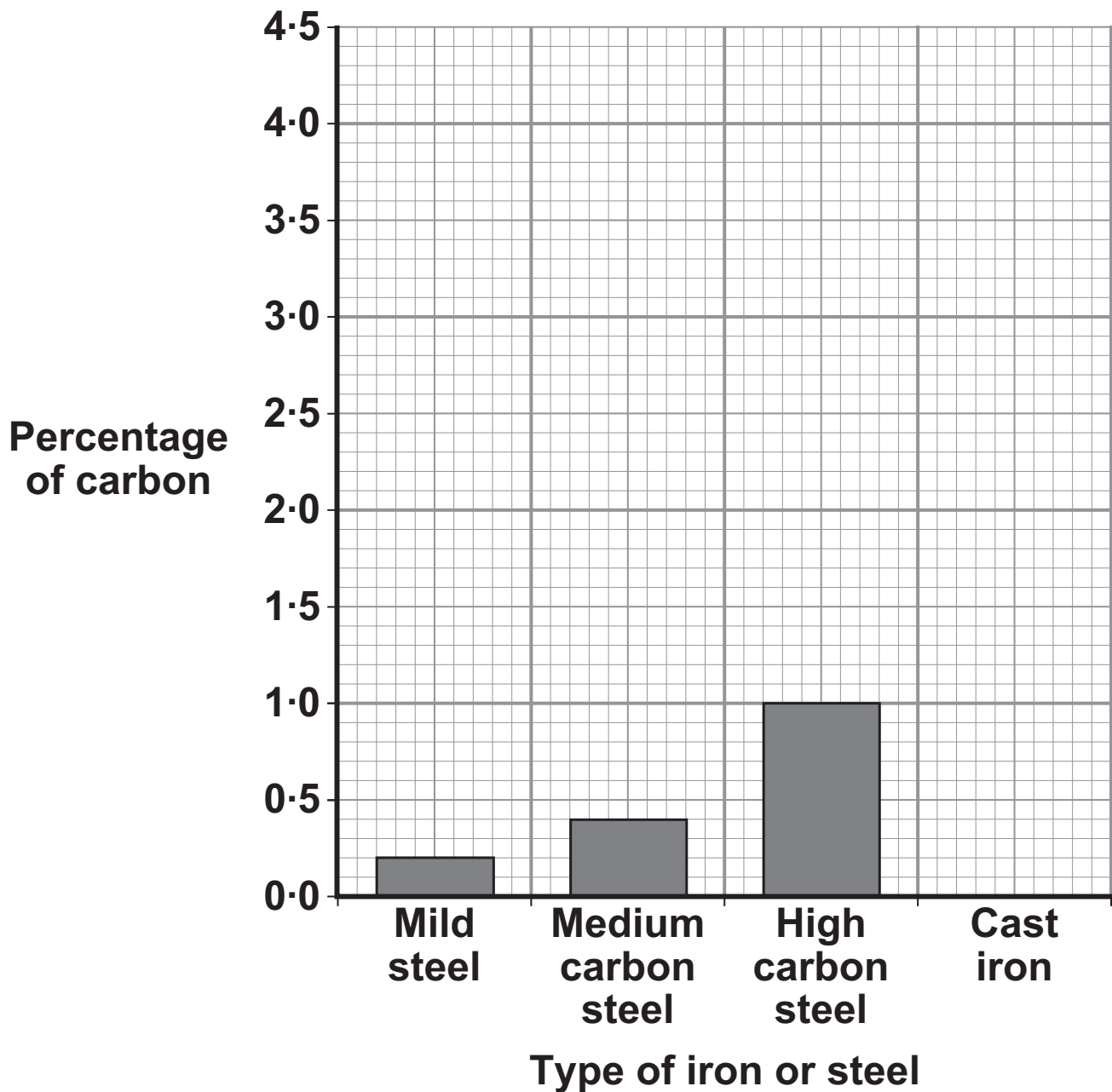
- 2 (d) One type of stainless steel contains iron with 0.2% carbon to which 8% nickel and 18% chromium were added.

- 2 (d) (i) Tick (✓) the percentage of iron in this type of stainless steel. [1 mark]

Tick (✓)	Percentage (%) of iron
	92.4
	88.6
	73.8

[Question 2 continues on the next page]

The graph is repeated from page 8.



2 (d) (ii) Use the bar chart to name the type of steel that contains only 0.2% carbon. [1 mark]

2 (d) (iii) Draw a ring around the correct word in the box to complete the sentence. [1 mark]

Stainless steel is used for knives and forks

because it is resistant to

corrosion.

decomposition.

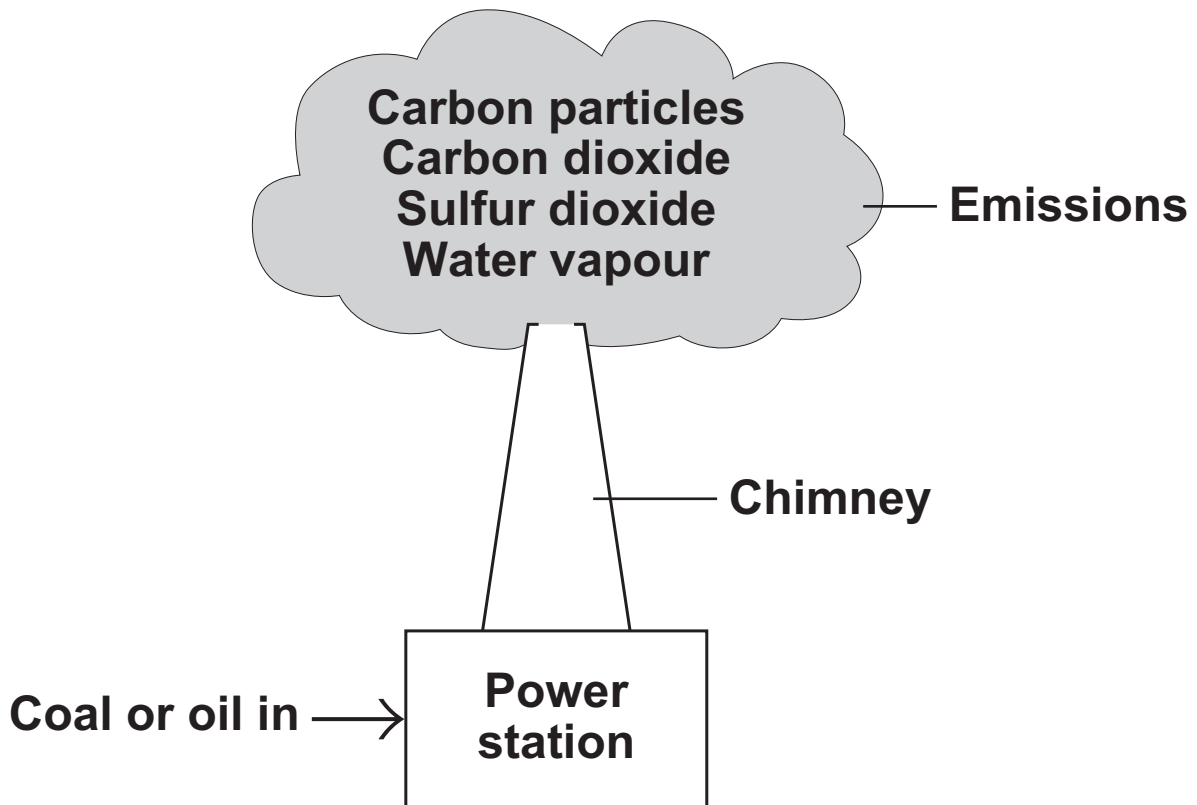
distillation.

[Turn over for the next question]

3

In the future more coal-fired and fewer oil-fired power stations will be used to generate electricity.

When coal and oil are burned they produce the same types of emissions which can cause environmental problems.



- 3 (a)** Emissions from the chimney can cause acid rain, global dimming and global warming. Draw **ONE** straight line from each possible environmental problem to the emission that causes it. [3 marks]

Possible environmental problem	Emission that causes it
acid rain	carbon particles
global warming	carbon dioxide
global dimming	sulfur dioxide
	water vapour

- 3 (b)** Draw a ring around the correct word in the box to complete each sentence. [1 mark + 1 mark]

- 3 (b) (i)** Incomplete combustion of coal or oil is caused

by too little

carbon dioxide.
nitrogen.
oxygen.

- 3 (b) (ii)** A gas formed by the incomplete combustion of

coal or oil is

carbon monoxide.
hydrogen.
oxygen.

[Question 3 continues on the next page]

- 3 (c)** The table shows the world production for both coal and oil in 2000. The world production figures after 2000 are predicted.

Year	World production of coal (billions of tonnes per year)	World production of oil (billions of barrels per year)
2000	3·5	12·5
2050	4·5	5·6
2100	5·0	1·7
2150	5·5	0·5
2200	6·0	0·0

- 3 (c) (i)** How is the world production of oil predicted to change from 2000 to 2200? [1 mark]

3 (c) (ii) Suggest TWO reasons why the world production of coal is predicted to increase. [2 marks]

1 _____

2 _____

8

[Turn over for the next question]

4 An article had the following headline.

NEW FEAR OVER DRINK ADDITIVES

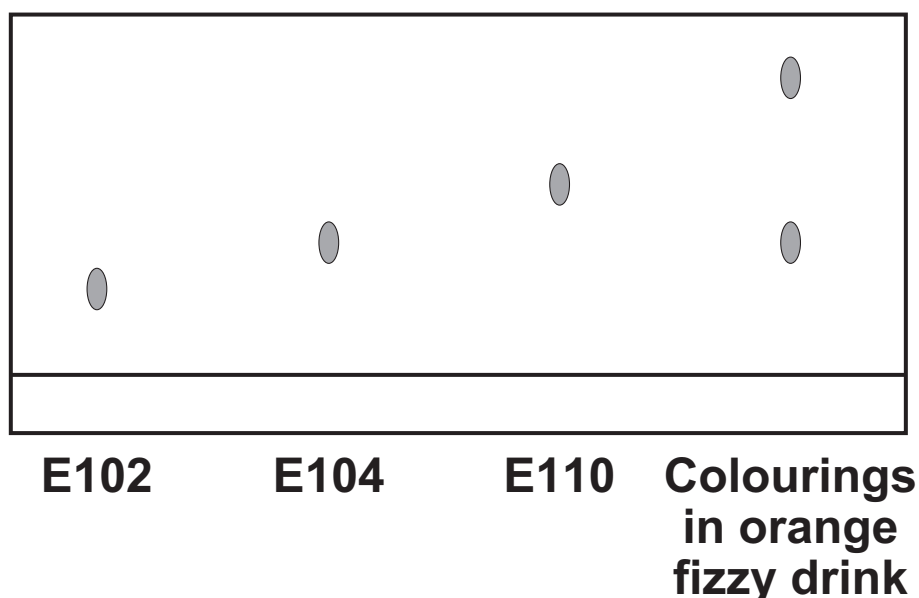
Some children get headaches and skin problems that are possibly caused by some types of fizzy orange drinks.

These fizzy drinks all contain water, carbon dioxide, artificial flavourings and colourings.

Three artificial colourings that have been used in fizzy orange drinks are tartrazine (E102), quinoline yellow (E104) and sunset yellow (E110).

4 (a) Colourings can be detected by chromatography.

The results of chromatography for the colourings in one fizzy orange drink are shown.



4 (a) (i) How many colourings are there in the fizzy orange drink? [1 mark]

4 (a) (ii) Which one of the colourings, E102, E104 or E110, does the fizzy orange drink contain?

Explain your answer. [2 marks]

E _____ because _____

4 (b) (i) Why are artificial colourings added to some fizzy orange drinks? [1 mark]

4 (b) (ii) Some people believe that artificial colourings cause headaches and skin problems.

Suggest ONE other substance in the fizzy orange drink that may cause these problems. [1 mark]

[Question 4 continues on the next page]

4 (c) Plastic bottles are often used as drink containers.

4 (c) (i) Draw a ring around the correct word in each box to complete the sentence. [2 marks]

The plastic is made by joining together many

small molecules called

fractions
metals
monomers

 to form

very large molecules called

alloys.
polymers.
gases.

4 (c) (ii) Used plastic bottles should NOT be dumped in landfill sites.

Give TWO reasons for this. [2 marks]

1 _____

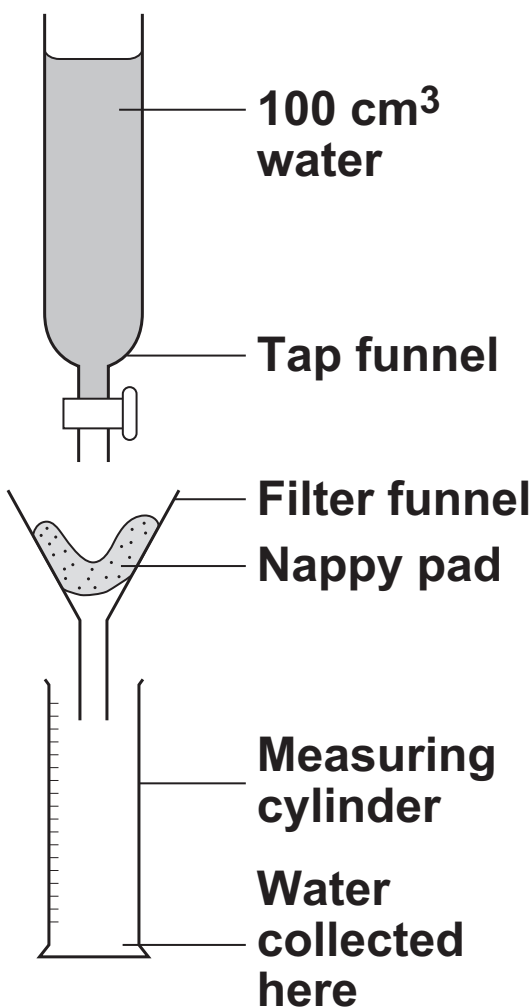
2 _____

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TURN OVER FOR THE NEXT QUESTION

- 5 Disposable nappies for babies need to absorb as much water as possible. Disposable nappies have a pad containing a special polymer called a hydrogel. Hydrogels absorb water.**

A company called Aqanaps compared the water absorption of its nappy pads with nappy pads made by other companies.



- A scientist from Aqanaps poured 100 cm^3 of water onto the pad of one of its nappies.
- He measured the volume of water that passed through.
- He did the test three times using a new nappy pad for each test.
- The scientist then repeated the procedure using the nappy pads from three other companies, A, B and C.

The results are shown in the following table.

COMPANY	VOLUME OF WATER COLLECTED IN cm ³		
	PAD 1	PAD 2	PAD 3
Aqanaps	55	57	55
A	47	46	39
B	65	63	64
C	38	39	38

5 (a) (i) Choose ONE result in the table that should be tested again.

Result: Company _____ Pad _____

Explain why you chose this result. [2 marks]

5 (a) (ii) Suggest ONE variable that should be controlled in this investigation. [1 mark]

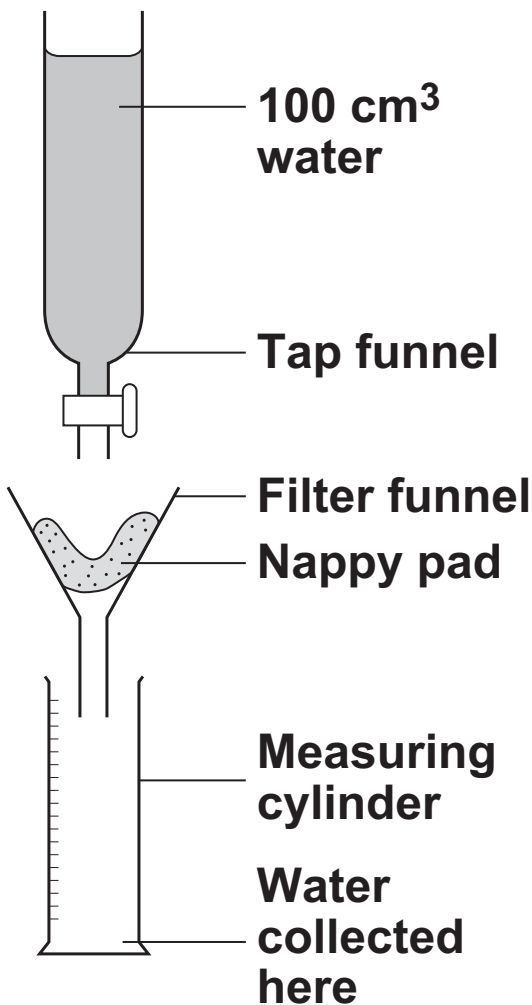
[Question 5 continues on the next page]

The information and the table are repeated from pages 20 and 21.

Disposable nappies for babies need to absorb as much water as possible.

Disposable nappies have a pad containing a special polymer called a hydrogel. Hydrogels absorb water.

A company called Aqanaps compared the water absorption of its nappy pads with nappy pads made by other companies.



- A scientist from Aqanaps poured 100 cm³ of water onto the pad of one of its nappies.
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5 (a) (iii) Suggest ONE possible cause of error in this investigation. [1 mark]

5 (b) (i) The Aqanaps company studied the results. The company concluded that it should increase the amount of hydrogel used in its nappy pads.

Give TWO reasons why the company decided to increase the amount of hydrogel used in its nappy pads. [2 marks]

1

2

[Question 5 continues on the next page]

5 (b) (ii) Suggest ONE disadvantage for the company if it increases the amount of hydrogel used in its nappy pads. [1 mark]

7

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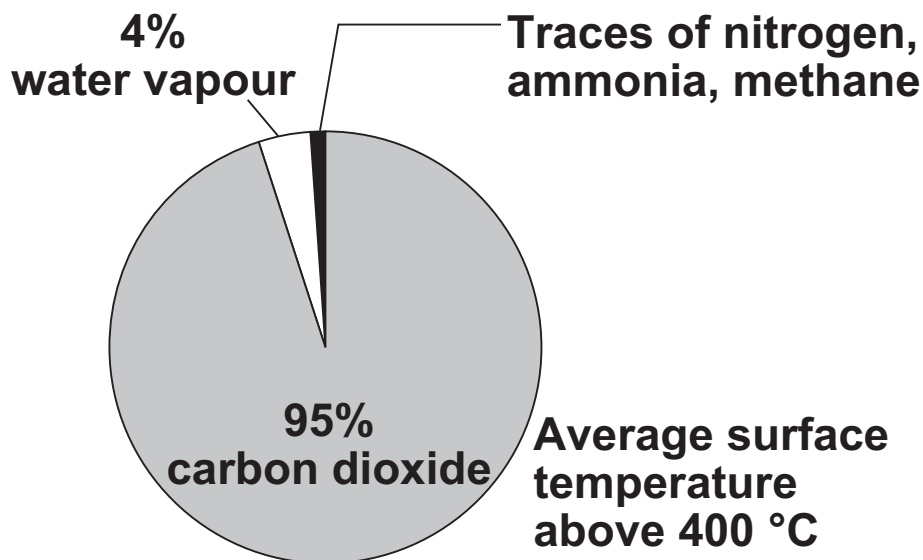
TURN OVER FOR THE NEXT QUESTION

6 (a) Scientists have suggested that:

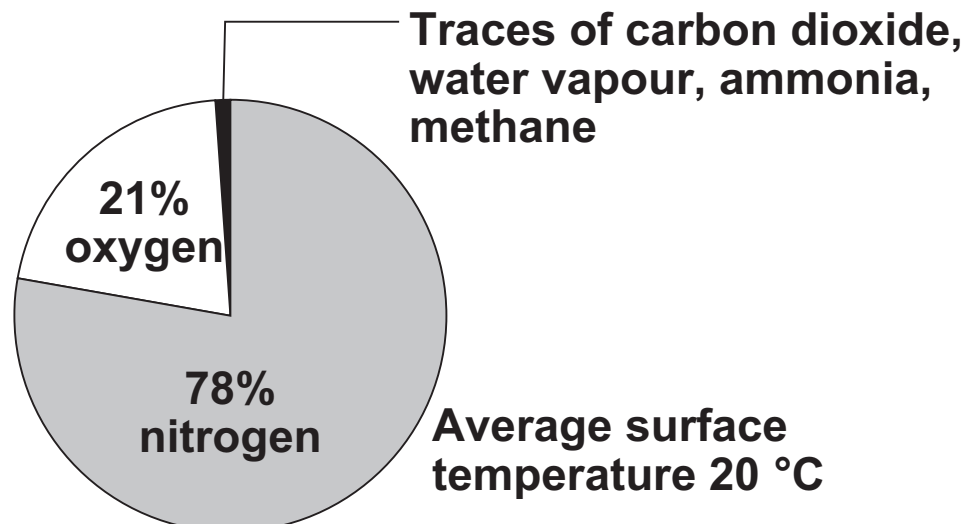
- the Earth formed as a molten ball of rock and minerals
- the rock and minerals cooled slowly
- the surface of the Earth was covered by volcanoes
- the volcanoes released gases that formed the Earth's early atmosphere.

The pie charts show the approximate percentages of gases in the Earth's early atmosphere and in the Earth's atmosphere today.

EARTH'S EARLY ATMOSPHERE



EARTH'S ATMOSPHERE TODAY



6 (a) (i) Explain what has happened to most of the water vapour in the Earth's early atmosphere. [2 marks]

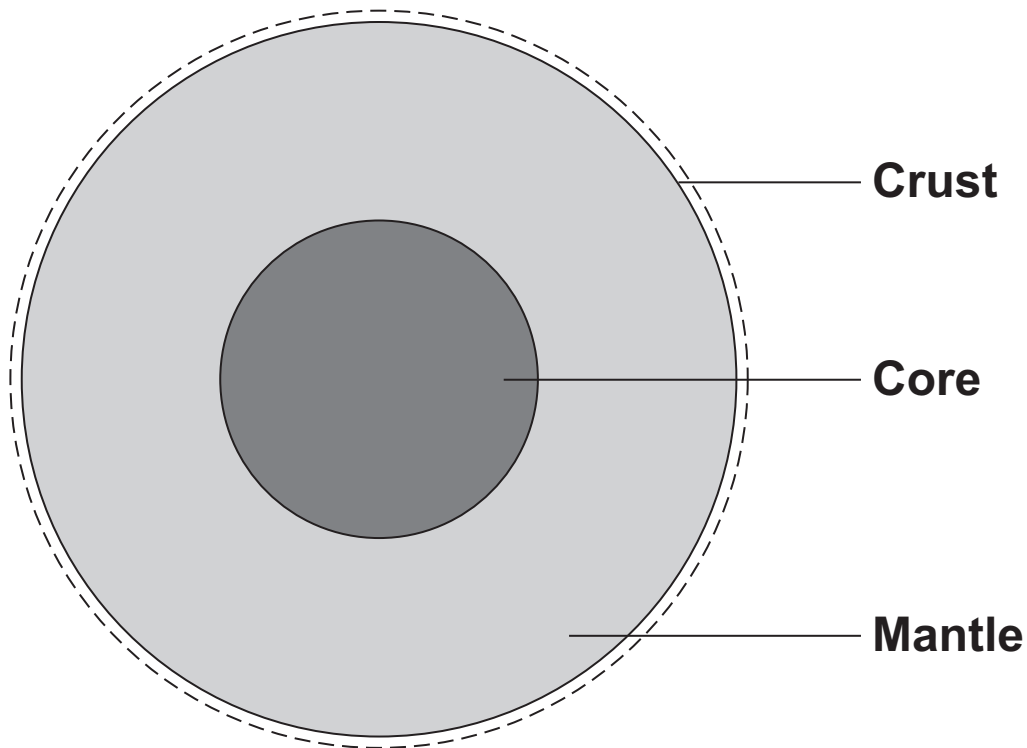
6 (a) (ii) Give TWO reasons why the percentage of carbon dioxide in the Earth's early atmosphere decreased. [2 marks]

1 _____

2 _____

[Question 6 continues on the next page]

6 (b) Scientists have suggested that the Earth consists of a core, mantle and crust.



A 'traditional' theory is that the core is made of iron and nickel.

A 'controversial' theory is that the core is like a nuclear reactor made of the radioactive elements uranium and plutonium.

6 (b) (i) Why can scientists NOT prove which theory about the core is correct? [1 mark]

6 (b) (ii) How can the 'controversial' theory be used to explain why the Earth's tectonic plates move?
[3 marks]

8

END OF QUESTIONS

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For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
TOTAL	

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