Specimen Paper

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
9	
TOTAL	

General Certificate of Secondary Education
Foundation Tier

Science A
Unit Chemistry C1

Chemistry
Unit Chemistry C1

Chemistry 1F

F

For this paper you must have:
- a ruler
- the Data Sheet (enclosed).

You may use a calculator.

Time allowed
- 60 minutes

Instructions
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the space 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 60.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.
- Question 8(c) should be answered in continuous prose. In this question you will be marked on your ability to:
  –use good English
  –organise information clearly
  –use specialist vocabulary where appropriate.

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

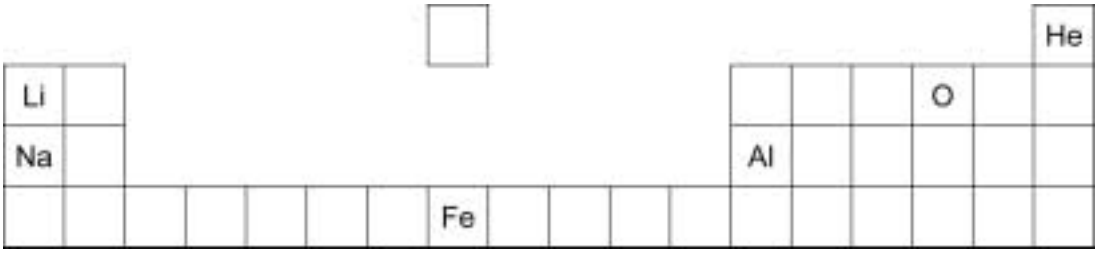
There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED

Answer **all** questions in the spaces provided.

1 A substance made of only one type of atom is called an element.

The chemical symbols and positions of six elements in the periodic table are shown.



Draw a straight line from each description to its correct symbol.

Description	Symbol
A metal with a low density that does not corrode easily	Al
It has properties similar to those of sodium, Na	Fe
It is a transition metal	He
It is a noble gas	Li
	O

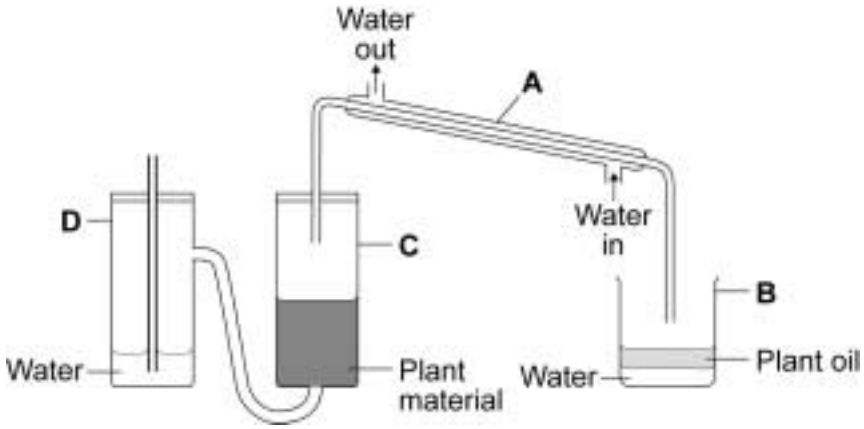
(4 marks)

4

Turn over for the next question

2 Many plants produce useful oils.

2 (a) The diagram shows some apparatus used to obtain oil from plant material.



Four parts of the apparatus are labelled, **A**, **B**, **C** and **D**.

Use the information in the diagram to complete the sentences.

Steam is made in part ☐ .

Oil from the plant material is vaporised in part ☐ .

Steam and oil vapour are condensed in part ☐ .

(3 marks)

2 (b) A student investigated a mixture of a plant oil and water.

2 (b) (i) A mixture of the plant oil and water was shaken and left to stand for 10 minutes.

Draw a ring around the correct answer to complete the sentence.

The plant oil separates from the water because it

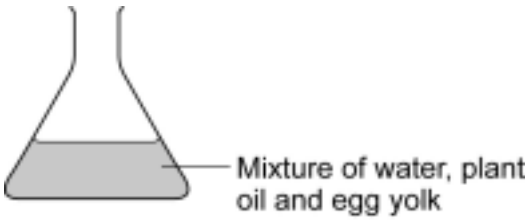
dissolves.

floats.

sinks.

(1 mark)

2 (b) (ii) A mixture of the plant oil, water and egg yolk was shaken and left to stand for 10 minutes. The mixture did not separate.



Draw a ring around the correct answer to complete the sentence.

The plant oil, water and egg yolk make

a compound.

an emulsion.

a fat.

(1 mark)

5

There are no questions printed on this page

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3 Billions of years ago, the Earth's early atmosphere was probably like the atmosphere of Venus today.

The table shows the temperature and the percentage composition of the atmospheres of the Earth and Venus today.

	Percentage (%) composition of atmosphere	
Name of gas	**Earth today**	**Venus today**
Nitrogen	78	3.5
Oxygen	20.6	a trace
Argon	0.97	a trace
Carbon dioxide	0.03	96.5
Water vapour	0.4	a trace
Average surface temperature	20 °C	460 °C

3 (a) Use information from the table to help you to answer each part.

3 (a) (i) In the Earth's atmosphere today, the main gas is ..... .

(1 mark)

3 (a) (ii) In the Earth's atmosphere billions of years ago

the main gas was ..... .

(1 mark)

3 (a) (iii) The Earth's surface is mainly covered with water.

There is no water on the surface of Venus.

Suggest why.

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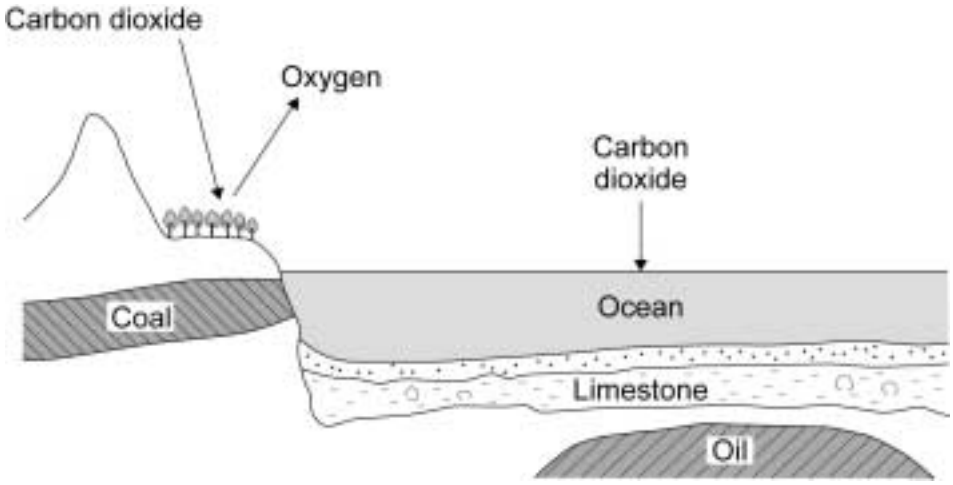
(2 marks)

Question 3 continues on the next page

3 (b) The diagram shows part of the Earth and ways that carbon dioxide can be removed from the Earth's atmosphere.



Give **three** ways that carbon dioxide can be removed from the Earth's atmosphere.

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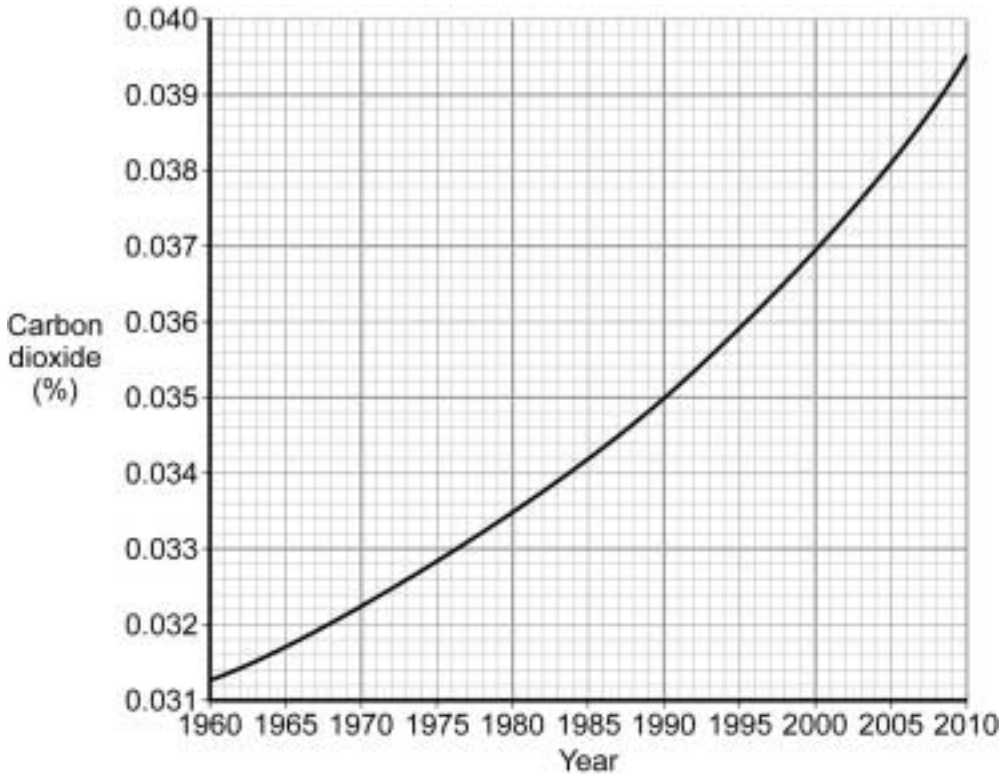
(3 marks)

3 (c) In the Earth's atmosphere the percentage of carbon dioxide has remained at about 0.03% for many thousands of years.

The graph shows the percentage of carbon dioxide in the Earth's atmosphere over the last 50 years.



3 (c) (i) What was the percentage of carbon dioxide in the Earth's atmosphere in 1965?

..... %

..... *(1 mark)*

3 (c) (ii) What change has happened to the percentage of carbon dioxide in the Earth's atmosphere over the last 50 years?

.....

(1 mark)

3 (c) (iii) Suggest **one** reason for this change.

.....

.....

(1 mark)

10

Turn over for the next question

4 Limestone and the products of limestone have many uses.

4 (a) Limestone is quarried.

Quarrying limestone has impacts that cause environmental problems.

Tick (✓) **two** impacts that cause environmental problems.

Impact of quarrying	Tick (✓)
Puts off tourists	
Causes dust pollution	
Increases jobs	
Increases traffic	

(2 marks)

4 (b) Limestone contains calcium carbonate, $CaCO_3$. When it is heated calcium carbonate produces calcium oxide and carbon dioxide.

The word equation for this reaction is:

calcium carbonate ⟶ calcium oxide + carbon dioxide

4 (b) (i) Complete the sentence.

The reaction when calcium carbonate is heated is called thermal .....

(1 mark)

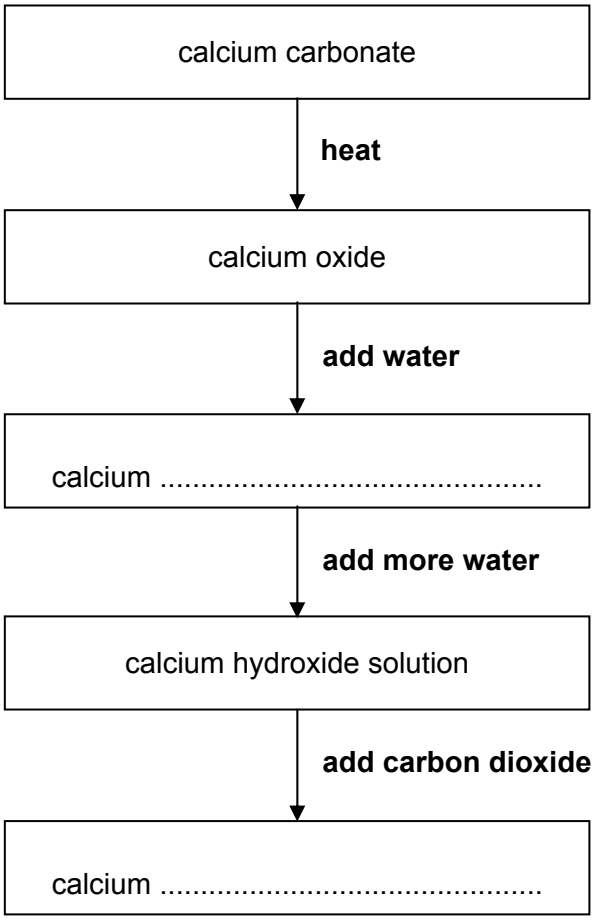
4 (b) (ii) 100 g of calcium carbonate was heated and produced 56 g of calcium oxide.
Calculate the mass of carbon dioxide produced.

.....

.....g
(1 mark)

4 (c) The flow chart shows the stages in the limestone cycle.

Complete the names of the calcium compounds formed in the flow chart.



(2 marks)

6

5 Useful fuels can be produced from crude oil. Crude oil is a mixture of hydrocarbons.

5 (a) The table shows the boiling points of four of these hydrocarbons.

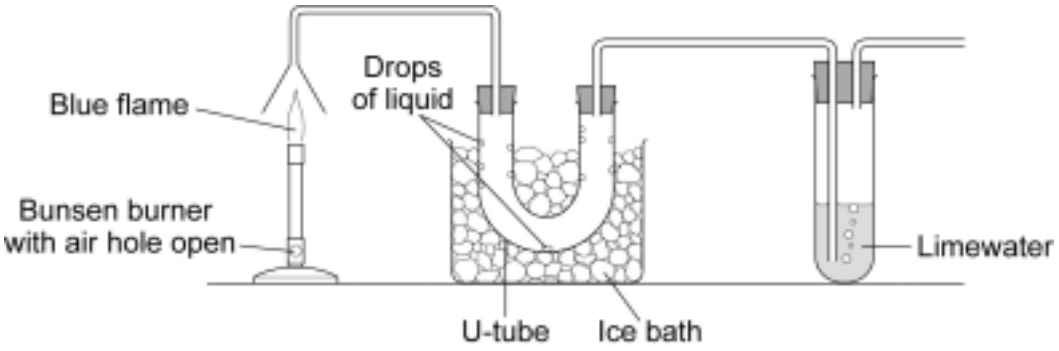
Hydrocarbon	Boiling point in °C
methane, CH_4	-162
butane, C_4H_{10}	0
pentane, C_5H_{12}	+36
decane, $C_{10}H_{22}$	+175

Tick (✓) **two** statements that are correct about these hydrocarbons.

Statement	Tick (✓)
decane has the largest molecules	
pentane is a liquid at 40°C	
methane and butane are gases at 20°C	
methane has the highest boiling point	
butane does **not** boil	

(2 marks)

5 (b) Natural gas supplied to homes and schools is mainly methane.
The diagram shows an apparatus to investigate the two substances produced when natural gas burns completely in air.



5 (b) (i) Name the liquid that collects in the U-tube. ..... .

(1 mark)

5 (b) (ii) Name the gas that turns the limewater cloudy..... .

(1 mark)

5 (c) Some crude oil contains sulfur. Petrol and diesel fuels are produced from crude oil.

The sulfur must be removed from these fuels before they are burned.

Explain why.

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(2 marks)

6

Turn over for the next question

There are no questions printed on this page

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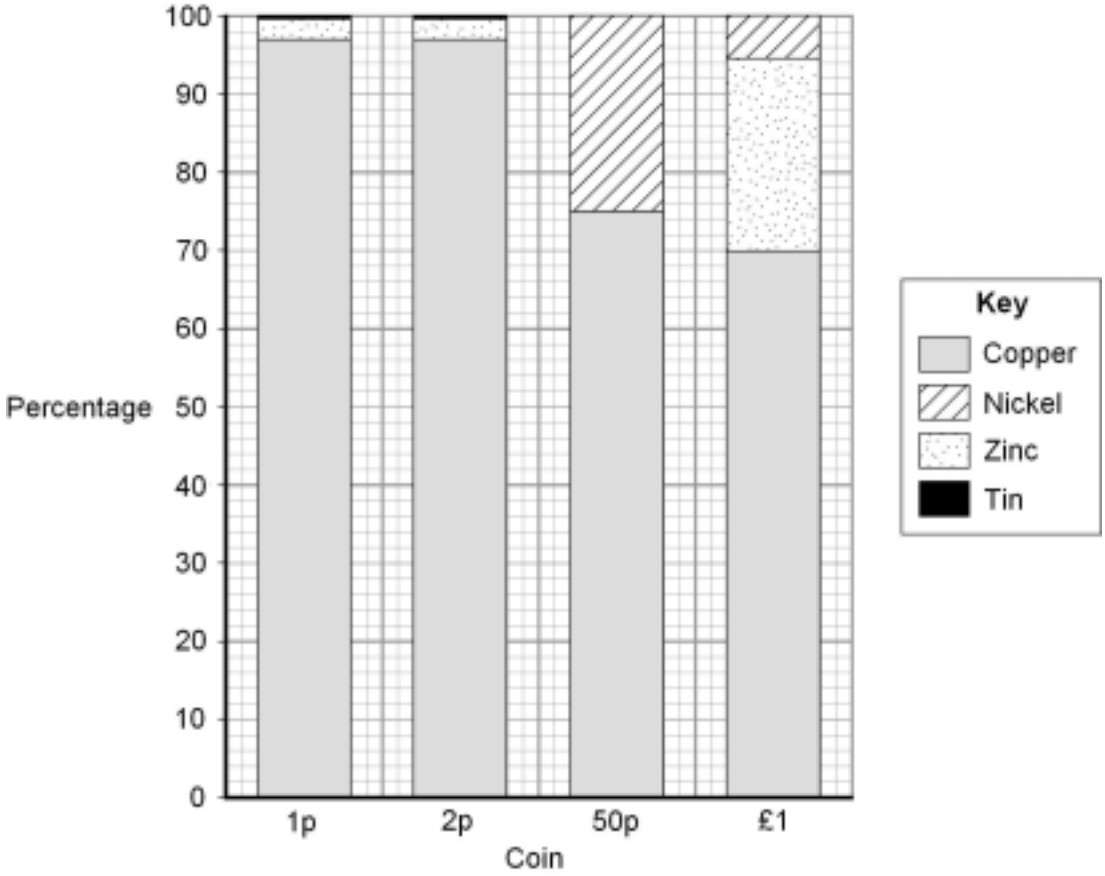
6 This is a headline from a newspaper.

‘Why is a 2p coin made in 1991 now worth 3.3p?’

6 (a) The bar chart shows the percentages of metals in UK coins in 1991.



Use the bar chart to answer these questions.

6 (a) (i) Which metal is in all of these coins? .....

(1 mark)

6 (a) (ii) Which coin does **not** contain zinc? .....

(1 mark)

6 (a) (iii) What is the percentage of nickel in a 50p coin?..... %

(1 mark)

6 (b) Suggest **two** reasons why a 2p coin made in 1991 is now worth 3.3p.

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(2 marks)

5

Turn over ▶

7 Atoms are made up of three main particles called protons, neutrons and electrons.

Use the periodic table on the data sheet to help you to answer these questions.

7 (a) Sodium is in Group 1 of the periodic table.

7 (a) (i) Why are potassium and sodium in the same Group of the periodic table?

.....

.....

(1 mark)

7 (a) (ii) How many protons are in an atom of sodium? .....

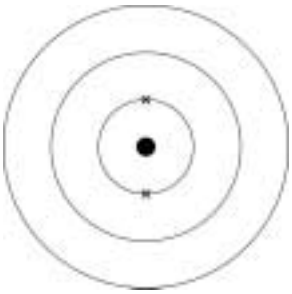
(1 mark)

7 (a) (iii) The atomic number of sodium is 11.

How many neutrons are in an atom of sodium with mass number 23?.....

(1 mark)

7 (a) (iv) Each sodium atom has 11 electrons. Complete the electronic structure of sodium.



(2 marks)

7 (b) The chemical equation for a reaction of sodium is shown below.

$$2Na + Cl_2 \rightarrow 2NaCl$$

Describe this reaction of sodium in terms of the names of the substances and the numbers of the atoms involved.

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(3 marks)

8

Turn over for the next question

8 Most plastic bags are made from poly(ethene).

Poly(ethene) is a polymer made from ethene.

Ethene is made by cracking saturated hydrocarbons from crude oil.

8 (a) Use words from the box to complete the sentences about cracking.

alkanes	**alkenes**	**catalyst**	**fuel**	**gas**

Cracking involves heating the ..... to make a vapour. The vapour is either passed over a hot ..... or mixed with steam and heated to a very high temperature so that thermal decomposition reactions happen.

(2 marks)

8 (b) Poly(ethene) molecules are made from ethene molecules by a polymerisation reaction.

Describe what happens in a polymerisation reaction.

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(2 marks)

8 (c) *In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.*

There are millions of plastic bags in use. After use most of these plastic bags are buried in landfill sites. The amount sent to landfill could be reduced if the plastic bags:

- could be reused
- could be recycled by melting and making them into new plastic products
- could be burned to release energy.

Use the information above and your knowledge and understanding to give the positive and negative environmental impacts of using these methods to reduce the amount of plastic bags sent to landfill.

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(6 marks)

10

Turn over for the next question

9 Evidence shows that the Earth formed from a molten ball of rocks and minerals.

Before 1900 many scientists thought that the Earth's mountains and continents formed in fixed positions when the molten ball of rocks and minerals cooled and wrinkled.

9 (a) In 1912 Alfred Wegener suggested his hypothesis of continental drift.

The areas of rocks shown on **Map 1** contain fossils of the same type of animals.

Today animals in Africa are different from animals in South America.

Map 1
Wegener suggested his hypothesis that all of the continents, including Africa and South America, had been joined together but then drifted slowly apart.

Map 2
In 1920 other scientists stated that all of the continents were in fixed positions, including Africa and South America, and that they had once been joined together by a land bridge.

9 (a) (i) Use the information to suggest **two** pieces of evidence that may have led Wegener to propose his hypothesis that continents move.

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(2 marks)

9 (a) (ii) Suggest why, in 1920, other scientists thought that Wegener's hypothesis was wrong.

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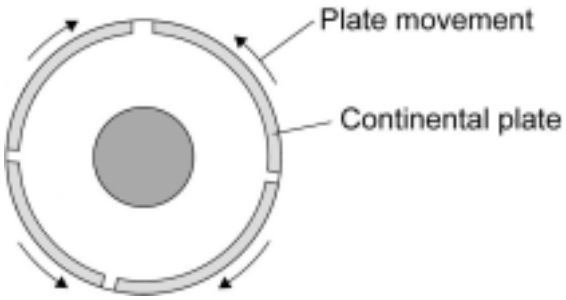
(2 marks)

9 (b) In 1962 scientists produced the theory of plate tectonics.

The theory of plate tectonics supported Wegener's hypothesis that continents move.



Tectonic plates move a few centimetres a year.

Complete the sentences about what causes the movement of the Earth's tectonic plates.

Deep inside the Earth ..... processes release large amounts of energy. These processes heat up the substances in the Earth's..... producing convection currents.

(2 marks)

6

END OF QUESTIONS

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