

Please write clearly in block capitals.

Centre number

--	--	--	--	--

Candidate number

--	--	--	--

Surname

\_\_\_\_\_

Forename(s)

\_\_\_\_\_

Candidate signature

\_\_\_\_\_

# GCSE SCIENCE A CHEMISTRY

# F

Foundation Tier Unit Chemistry C1

Thursday 18 May 2017

Morning

Time allowed: 1 hour

### Materials

For this paper you must have:

- a ruler
- the Chemistry Data Sheet (enclosed).

You may use a calculator.

### 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 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 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 7 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.

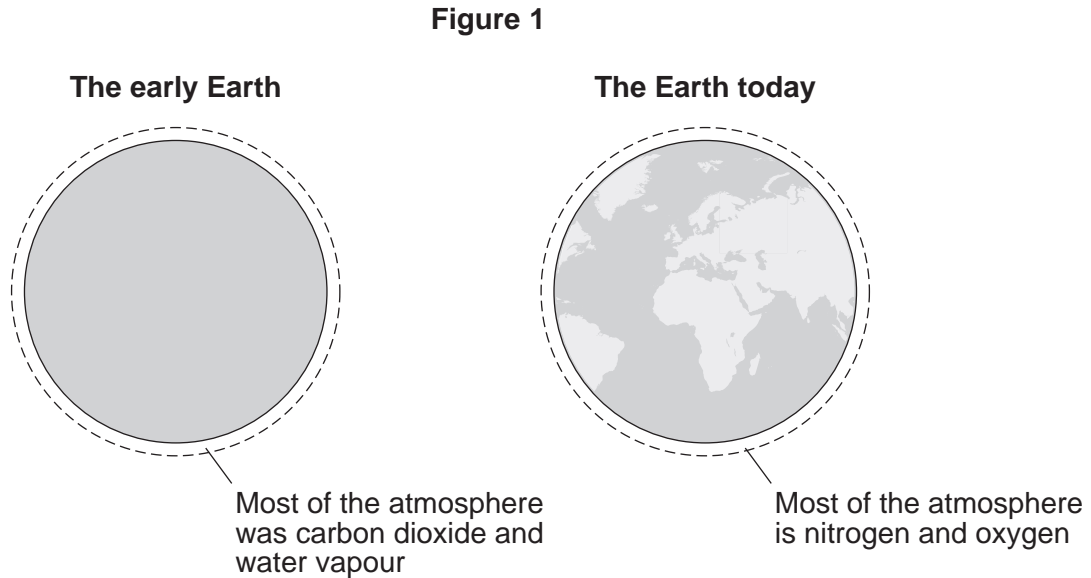
For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
<b>TOTAL</b>	



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

- 1 This question is about gases in the Earth's atmosphere.

**Figure 1** shows the atmospheres of the early Earth and of the Earth today.



- 1 (a) (i) Use the correct answers from the box to complete the sentence.

[2 marks]

<b>dissolved</b>	<b>evaporated</b>
<b>locked up</b>	<b>released</b>

The amount of carbon dioxide in the early Earth's atmosphere decreased because carbon dioxide was \_\_\_\_\_ in the oceans and gradually became \_\_\_\_\_ in sedimentary rocks as carbonates.

- 1 (a) (ii) Plants and algae used carbon dioxide and water vapour in the early Earth's atmosphere to produce oxygen.

Give the name of this process.

[1 mark]

\_\_\_\_\_



1 (b) The Earth's atmosphere today contains about 0.04% carbon dioxide.

1 (b) (i) Draw **one** line from each gas to the approximate percentage of gas in the Earth's atmosphere today.

[3 marks]

Gas	Approximate percentage of gas in the Earth's atmosphere today
	1
Argon	10
	20
Nitrogen	50
	80
Oxygen	90

1 (b) (ii) Give **one** reason why the amount of carbon dioxide in the Earth's atmosphere has increased in the last 50 years.

[1 mark]

---

---

7

Turn over ►



2 Use the Chemistry Data Sheet to help you answer this question.

Figure 2 shows part of the periodic table.

Figure 2

1	2										3	4	5	6	7	0
																He
Li	Be														F	Ne
Na	Mg														Cl	Ar
K	Ca														Br	Kr

2 (a) Give the name of the element that should be in the shaded box.

[1 mark]

\_\_\_\_\_

2 (b) How many different elements are there in the complete periodic table?

[1 mark]

Tick (✓) **one** box.

About 36

About 100

About 500



**2 (c)** What are **two** reasons why lithium, sodium and potassium are in the same group of the periodic table?

[2 marks]

Tick (✓) **two** boxes.

Low melting points

Same number of electrons in the outer shell

Similar atomic (proton) numbers

Similar chemical reactions

Two electrons in the innermost shell

**2 (d)** Complete each sentence.

[2 marks]

The elements in Group 0 are called \_\_\_\_\_ gases.

The elements in the central block are known as \_\_\_\_\_ metals.

**2 (e)** Use the correct word from the box to complete each sentence.

[2 marks]

**alloys      ions      molecules      polymers      protons**

Atoms of fluorine gain electrons to form fluoride \_\_\_\_\_ .

Atoms of fluorine share electrons to form fluorine \_\_\_\_\_ .

8

Turn over ►



**3** This question is about metals.

**3 (a)** Complete the word equation for the reaction of magnesium with oxygen.

[1 mark]

magnesium + oxygen  $\longrightarrow$  \_\_\_\_\_

**3 (b)** Iron oxide is reduced to iron in a blast furnace.

The chemical equation for the reaction is:



**3 (b) (i)** Give the name of the element used for the reduction of iron oxide.

[1 mark]

\_\_\_\_\_

**3 (b) (ii)** How can you tell that iron oxide is reduced?

[1 mark]

\_\_\_\_\_

\_\_\_\_\_

**3 (b) (iii)** Complete the sentences.

[3 marks]

For many uses, iron from the blast furnace is too \_\_\_\_\_ .

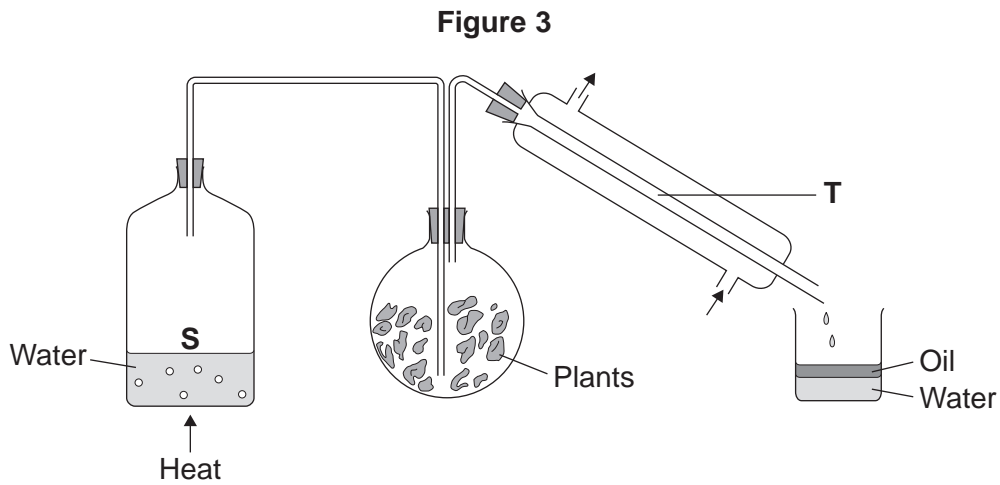
For many uses, pure iron is too \_\_\_\_\_ .

Mixtures of iron with carbon are called \_\_\_\_\_ .



4 Some plants contain oils that can be extracted.

Figure 3 shows a process used to separate oils from plants.



4 (a) What is the name of this process?

[1 mark]

Tick (✓) **one** box.

Displacement

Distillation

Pressing

4 (b) (i) Describe the change of state at **S**.

[1 mark]

---



---

4 (b) (ii) Describe the change of state at **T**.

[1 mark]

---



---

Question 4 continues on the next page

Turn over ►



4 (c) **Table 1** gives the melting points and boiling points of some plant oils.

**Table 1**

Plant oil	Melting point in °C	Boiling point in °C
Olive	-41	+216
Sunflower	-17	+227
Corn	-11	+232
Peanut	-2	+232
Coconut	+25	+177

4 (c) (i) An article stated that:

'plant oils with lower melting points are healthier because they are high in unsaturated oils'.

Which plant oil in **Table 1** is the healthiest according to the article?

[1 mark]

\_\_\_\_\_

4 (c) (ii) Which plant oil in **Table 1** is solid at room temperature (20 °C)?

[1 mark]

\_\_\_\_\_

4 (c) (iii) Which plant oil in **Table 1** is liquid over the greatest temperature range?

[1 mark]

\_\_\_\_\_

4 (d) Give **two** ways that food cooked in plant oils would be different from the same food cooked in water.

[2 marks]

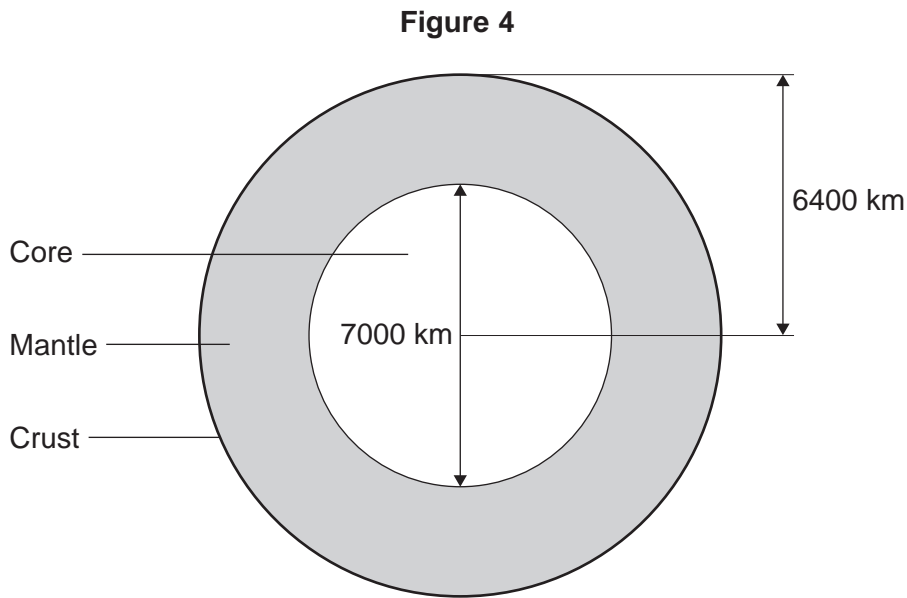
1 \_\_\_\_\_

2 \_\_\_\_\_





5 (a) Figure 4 shows the layered structure of the Earth.



5 (a) (i) The radius of the Earth is 6400 km.

Calculate the distance from the surface of the crust to the surface of the core.

[2 marks]

---



---

Distance = \_\_\_\_\_ km

5 (a) (ii) Use the correct answers from the box to complete the sentences.

Each word can be used only once.

[4 marks]

currents	concentrations	distances
plates	processes	speeds

Tectonic \_\_\_\_\_ move at \_\_\_\_\_ of a few centimetres per year.

This movement is caused by convection \_\_\_\_\_ within the Earth's mantle

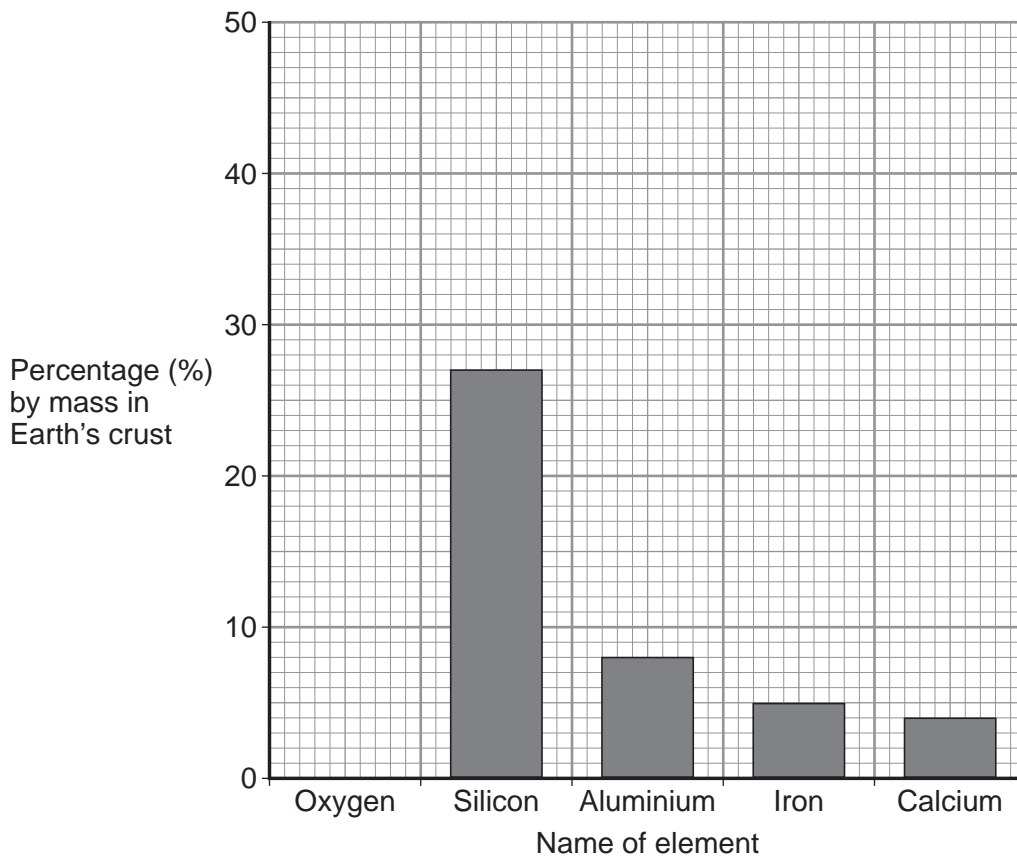
driven by heat released by natural radioactive \_\_\_\_\_ .

Turn over ►



5 (b) Figure 5 shows the percentage by mass of some elements in the Earth's crust.

Figure 5



5 (b) (i) The percentage by mass of oxygen is 47%.

Draw the bar for oxygen on **Figure 5**.

[1 mark]

5 (b) (ii) Look at your completed bar chart.

What is the percentage by mass of all the other elements not shown on the chart in the Earth's crust?

[1 mark]

Tick (✓) **one** box.

1%

9%

20%



**5 (b) (iii)** There is about 0.007% by mass of copper in the Earth's crust.

Suggest why copper should be recycled.

**[1 mark]**

---

---

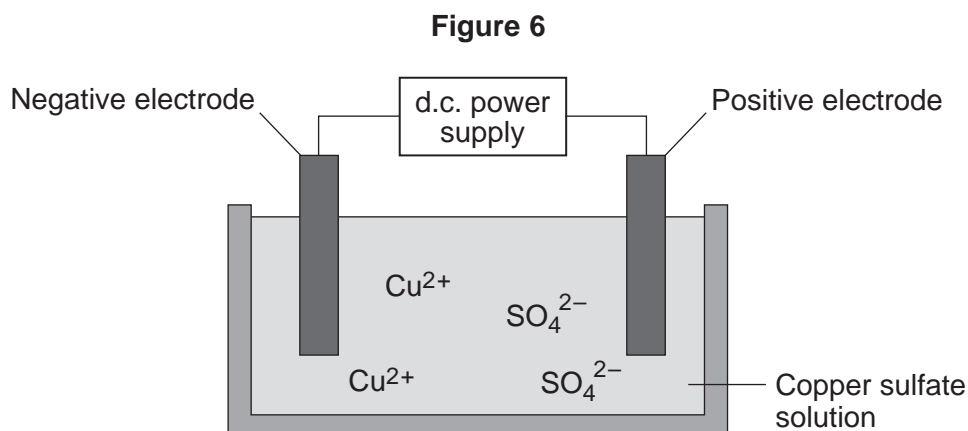
**Question 5 continues on the next page**

**Turn over ►**



5 (b) (iv) Bioleaching of low-grade copper ores produces a solution of copper sulfate.

Figure 6 shows apparatus used to obtain copper from copper sulfate solution.



What is the name of the process shown in **Figure 6**?

[1 mark]

Tick (✓) **one** box.

Combustion

Cracking

Electrolysis

Hydration

5 (b) (v) Explain why copper ions move towards the negative electrode in **Figure 6**.

[2 marks]

---



---



---



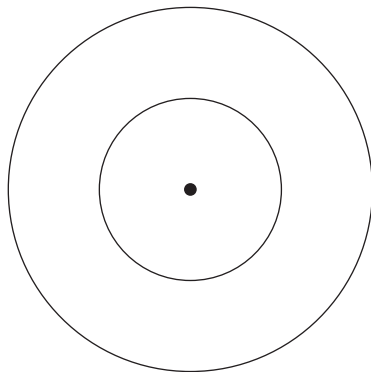
---



6 This question is about compounds of carbon.

6 (a) **Figure 7** shows an atom with two energy levels (shells).

**Figure 7**



6 (a) (i) A carbon atom has six electrons.

Complete **Figure 7** to show the electronic structure of a carbon atom.

Use **x** to represent an electron.

[1 mark]

6 (a) (ii) Complete the following description about the central part of this carbon atom.

[3 marks]

The central part is made up of six neutrons that have no electrical charge and \_\_\_\_\_

---

---

---

---

6 (b) Crude oil is a mixture of compounds. These compounds are mainly hydrocarbons.

What does the term hydrocarbon mean?

[1 mark]

---

---

Turn over ►



6 (c) Alkanes and alkenes are hydrocarbons.

Table 2 shows the boiling points of some alkanes and alkenes.

Table 2

Alkanes

Name	Formula	Boiling point in °C
Ethane	C <sub>2</sub> H <sub>6</sub>	-88
Propane	C <sub>3</sub> H <sub>8</sub>	-42
Butane	C <sub>4</sub> H <sub>10</sub>	0
Pentane	C <sub>5</sub> H <sub>12</sub>	+36
Hexane	C <sub>6</sub> H <sub>14</sub>	+69

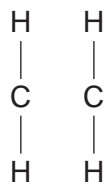
Alkenes

Name	Formula	Boiling point in °C
Ethene	C <sub>2</sub> H <sub>4</sub>	-104
Propene	C <sub>3</sub> H <sub>6</sub>	-48
Butene	C <sub>4</sub> H <sub>8</sub>	-6
Pentene	C <sub>5</sub> H <sub>10</sub>	+30
Hexene	C <sub>6</sub> H <sub>12</sub>	+64

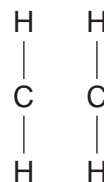
6 (c) (i) Complete the displayed structure of ethane and the displayed structure of ethene.

[2 marks]

Ethane



Ethene



6 (c) (ii) Describe the relationship between the number of carbon atoms in an alkane molecule and the boiling point of the alkane molecule.

[1 mark]

---



---



6 (c) (iii) Use the information in **Table 2** to compare the boiling points of alkanes with the boiling points of alkenes.

[2 marks]

---

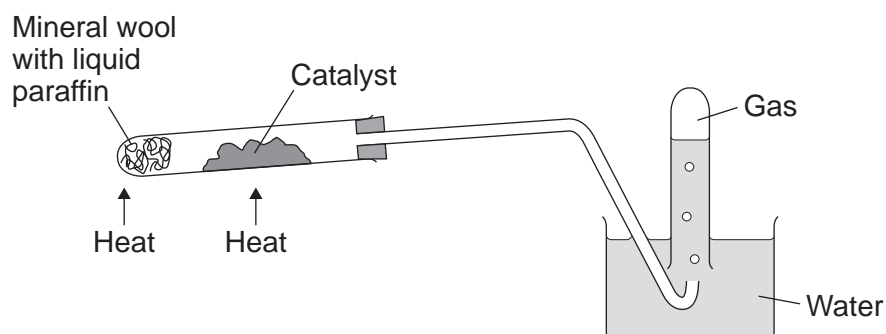
---

---

---

6 (d) A student used the apparatus in **Figure 8** to investigate what happens when liquid paraffin is heated to a high temperature.

**Figure 8**



Liquid paraffin contains alkanes.

Describe what happens to the alkane molecules in this investigation.

[3 marks]

---

---

---

---

---

---

---

---

---

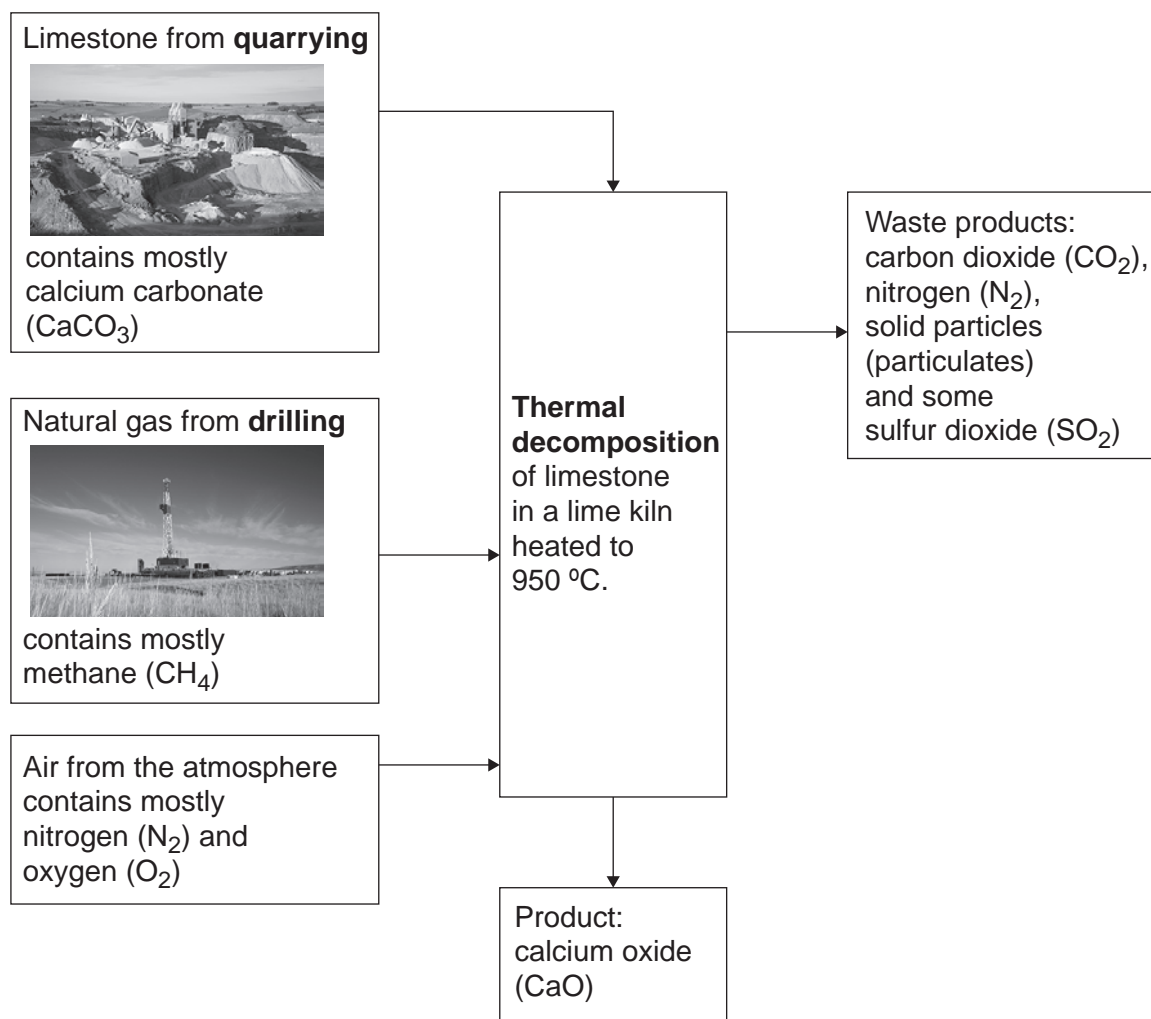


- 7 In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.

Limestone is heated in a lime kiln to produce calcium oxide.

Figure 9 shows the reactants used and the products made in a lime kiln.

Figure 9



Use information from **Figure 9** to explain the potential environmental impacts of quarrying, drilling and the thermal decomposition of limestone used in the production of calcium oxide.

[6 marks]

---



---



---



---





---

---

---

---

---

---

---

---

---

---

---

Extra space

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

END OF QUESTIONS

<b>6</b>



**There are no questions printed on this page**

**DO NOT WRITE ON THIS PAGE  
ANSWER IN THE SPACES PROVIDED**



**There are no questions printed on this page**

**DO NOT WRITE ON THIS PAGE  
ANSWER IN THE SPACES PROVIDED**



**There are no questions printed on this page**

**DO NOT WRITE ON THIS PAGE  
ANSWER IN THE SPACES PROVIDED**

**Copyright information**

For confidentiality purposes, from the November 2015 examination series, acknowledgements of third party copyright material will be published in a separate booklet rather than including them on the examination paper or support materials. This booklet is published after each examination series and is available for free download from [www.aqa.org.uk](http://www.aqa.org.uk) after the live examination series.

Permission to reproduce all copyright material has been applied for. In some cases, efforts to contact copyright-holders may have been unsuccessful and AQA will be happy to rectify any omissions of acknowledgements. If you have any queries please contact the Copyright Team, AQA, Stag Hill House, Guildford, GU2 7XJ.

Copyright © 2017 AQA and its licensors. All rights reserved.

