Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

For Examiner's Use

General Certificate of Secondary Education
June 2007

SCIENCE B **CHY1F**
Unit Chemistry C1

F

CHEMISTRY
Unit Chemistry C1

Foundation Tier

Thursday 21 June 2007 1.30 pm to 2.15 pm

For this paper you must have:
- a ruler.

You may use a calculator.

Time allowed: 45 minutes

Instructions
- Use blue or black ink or ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The maximum mark for this paper is 45.
- The marks for questions are shown in brackets.
- 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.

For Examiner's Use			
Question	Mark	Question	Mark
1		6	
2		7	
3			
4			
5			
Total (Column 1) →			
Total (Column 2) →			
TOTAL			
Examiner's Initials			

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

1 Helium is used to fill party balloons.

(a) Tick **two** properties that make helium suitable for filling party balloons.

Property	Suitable (✓)
Colourless	
Low density	
Small atoms	
Unreactive	

(2 marks)

(b) Complete the sentence by drawing a ring around the correct line in the box.

The material used to make balloons is

a metal
a polymer
an element

.

(1 mark)

(c) One environmental problem is that balloons are non-biodegradable.

What does *non-biodegradable* mean?

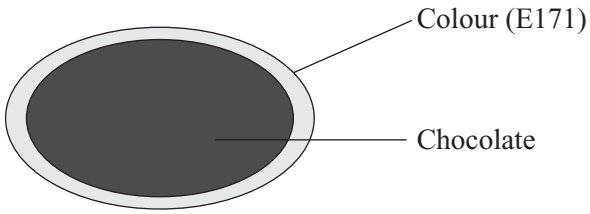
.....

.....

(1 mark)

4

2 A packet contains colour-coated, chocolate sweets. The label on the packet lists the ingredients. Some of these are given E-numbers.



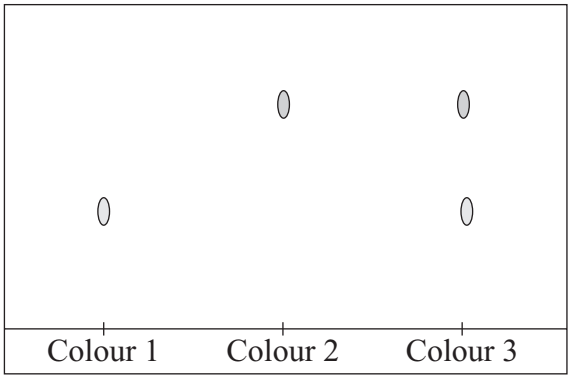
(a) Use the correct word from the box to complete the sentence.

additive	**element**	**fuel**

An E-number is used to identify a permitted food ..... .

(1 mark)

(b) Chromatography was used to compare three of the colours used to coat the chocolate sweets.



What do these results tell you about these three colours?

.....

.....

.....

.....

.....

.....

(3 marks)

4

Turn over ▶

3 Crude oil is a natural resource from which useful fuels can be separated.

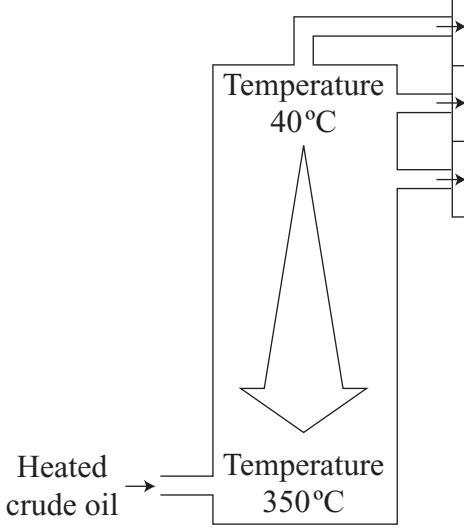
(a) Crude oil is a mixture of hydrocarbons.

Complete the sentence about a hydrocarbon molecule.

A hydrocarbon molecule is made up of ..... and carbon atoms only.

(1 mark)

(b) Many fuels come from crude oil. Some of these fuels are shown in the diagram.



Fraction	Number of carbon atoms in each molecule
gases	1–4
petrol	5–12
diesel	15–25

Suggest **two** properties of these fuels that allow them to be separated from crude oil.

.....

.....

.....

.....

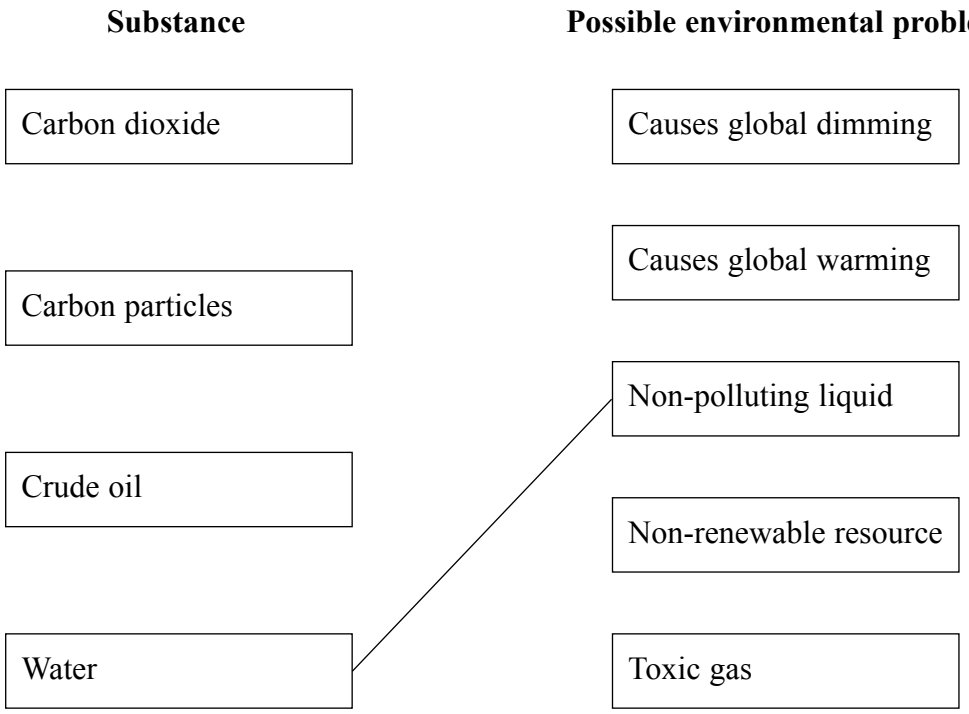
(2 marks)

(c) Fuels from crude oil burn to provide heat energy.

When a fuel burns, it combines with oxygen in the air and produces carbon dioxide and water. When there is not enough oxygen, the fuel burns and also produces carbon monoxide and carbon particles.

Draw a straight line from each substance that links it to a possible environmental problem.

One has been done for you.



(3 marks)

6

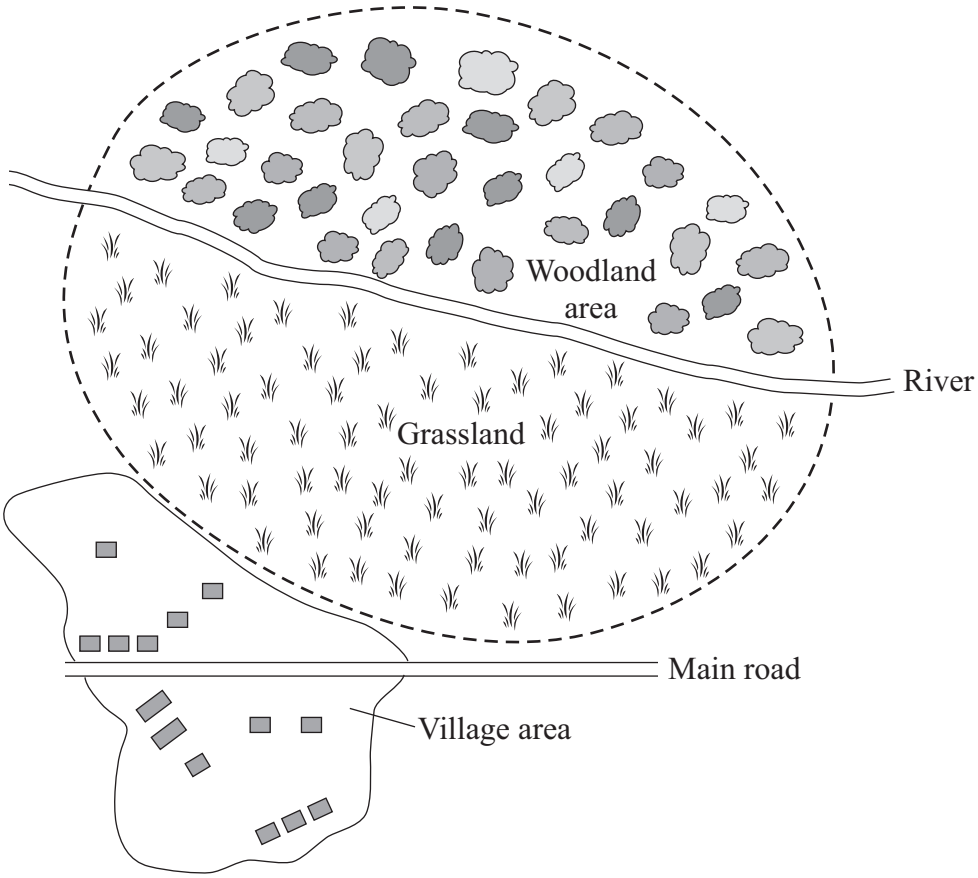
Turn over for the next question

4 Iron ore is the main source of iron.

(a) This was the headline in a newspaper.

‘Village protests against quarry’

The dotted line (– – – –) on the map is drawn around the area from which a company wants to quarry iron ore.



(i) Give **one** reason that the company could give for the need to quarry the iron ore.

.....

.....

(1 mark)

(ii) The people who live in the village do not want the quarry because it would decrease the value of their homes.

Suggest **two** other reasons why the villagers do not want the quarry.

1 .....

.....

2 .....

.....

(2 marks)

(b) Iron ore contains the compound iron oxide, Fe_2O_3.

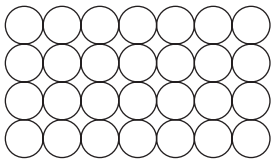
(i) Iron is extracted from its oxide in the blast furnace.

Complete the word equation for the extraction of iron.

iron oxide + ... → iron + carbon dioxide

(1 mark)

(ii) This diagram represents pure iron.



Use the diagram to explain why pure iron is described as an element.

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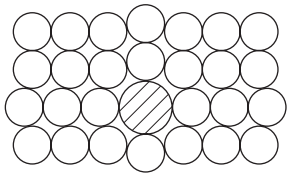
(2 marks)

Question 4 continues on the next page

(iii) Pure iron is relatively soft. The iron from the blast furnace is hard and brittle. The diagram below represents iron from the blast furnace.



Use the diagram to explain why iron from the blast furnace is hard and brittle.

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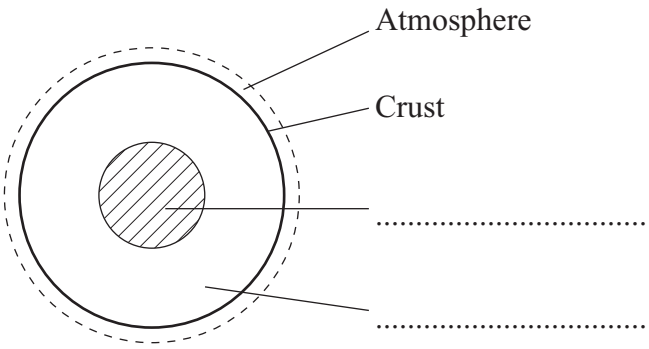
(2 marks)

8

Turn over for the next question

5 The Earth is shaped like a ball and is surrounded by an atmosphere.

(a) The diagram shows the layered structure of the Earth.



Choose words from the box to complete the labels on the diagram.

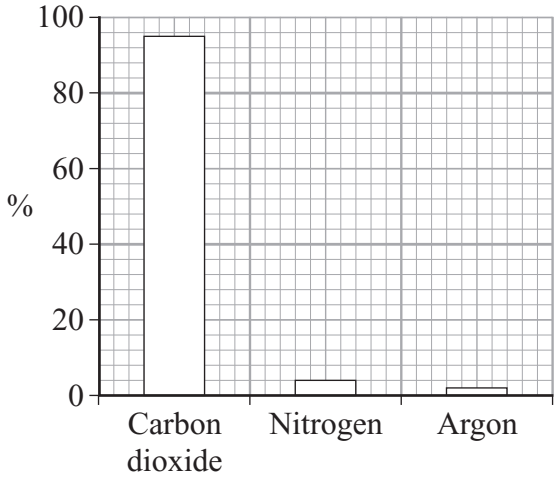
core	**mantle**	**plate**

(2 marks)

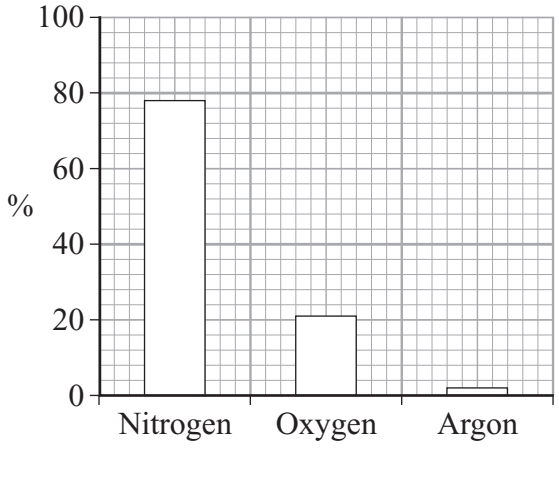
(b) Some theories suggest that the Earth's early atmosphere was like the atmosphere of Mars today.

The bar charts show the three most common gases in each atmosphere today.

The atmosphere of Mars today



The atmosphere of Earth today



(i) Use the bar charts to complete the sentence by writing in the correct gases.

In the atmosphere of Mars today there is mainly ..... and no ..... . *(2 marks)*

(ii) Use the bar charts to complete the sentence by writing in the correct number.

These theories suggest that there was about ..... % nitrogen in the Earth's early atmosphere. *(1 mark)*

(iii) The atmosphere of the Earth today has much more nitrogen than in the early atmosphere. Denitrifying bacteria released most of this nitrogen into the atmosphere.

There are other differences between the Earth's early atmosphere and the atmosphere of the Earth today.

Use the bar charts to describe and explain **two** of these other differences.

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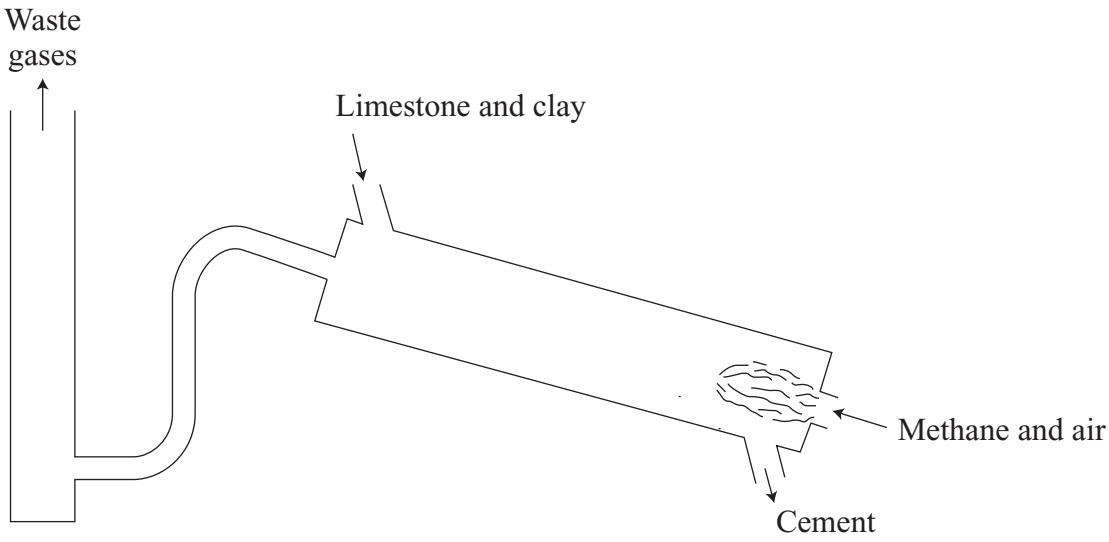
(3 marks)

8

Turn over for the next question

6 Limestone contains the compound calcium carbonate, $CaCO_3$.

(a) Limestone is used to make cement in a rotary kiln.



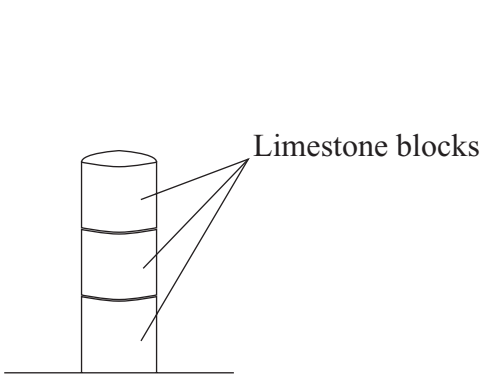
Use the information in the diagram to name the **two** main waste gases from this rotary kiln.

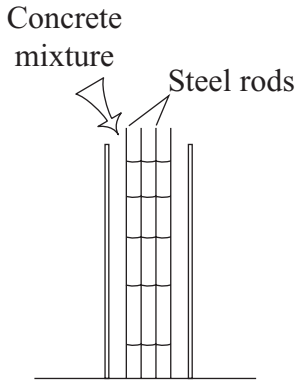
1 .....

2 .....

(2 marks)

(b) Columns used as supports for buildings can be made from materials such as limestone blocks or concrete.





Concrete is a mixture of cement, sand, small stones and water

From the diagrams, name which you think is the better material for making a column.

.....

Give **three** advantages for your choice of material.

1 .....

.....

2 .....

.....

3 .....

.....

(3 marks)

5

Turn over for the next question

7 Copper is a widely used metal. The main ore of copper contains copper sulfide. Copper can be extracted from copper sulfide in a three stage process.

(a) In the first stage of extraction the copper sulfide is heated in air.

(i) Balance the symbol equation for the reaction.

$$Cu_2S + ...O_2 \rightarrow .....CuO + SO_2$$

(1 mark)

(ii) Explain why there would be an environmental problem if the gas from this reaction were allowed to escape into the atmosphere.

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(2 marks)

(b) In the second stage copper oxide, CuO, is reduced using carbon.

Describe and explain what happens during this reaction.

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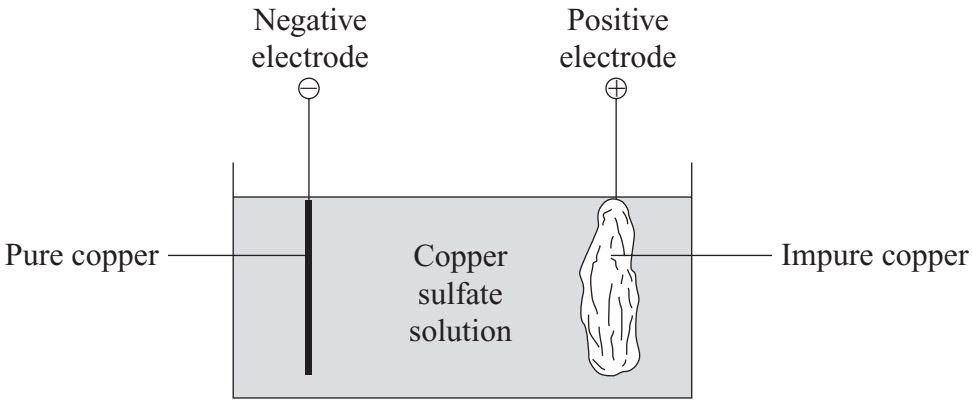
(2 marks)

(c) During the third stage the copper can be purified as shown in the diagram.



(i) What is the name of the type of process used for this purification?

.....

(1 mark)

(ii) Give **one** use of purified copper.

.....

(1 mark)

(d) Copper-rich ores are running out.

New ways of extracting copper from low grade ores are being researched.

Recycling of copper may be better than extracting copper from its ores.

Explain why.

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(3 marks)

10

END OF QUESTIONS

There are no questions printed on this page