

Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

For Examiner's Use

General Certificate of Secondary Education
January 2009



SCIENCE B
Unit Chemistry C1

CHY1F
F

CHEMISTRY
Unit Chemistry C1

Foundation Tier

Thursday 15 January 2009 1.30 pm to 2.15 pm

<p>For this paper you must have:</p> <ul style="list-style-type: none"> a ruler. <p>You may use a calculator.</p>

Time allowed: 45 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 spaces provided. Answers written in margins or on blank pages will not be marked.
- 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		5	
2		6	
3			
4			
Total (Column 1)		→	
Total (Column 2)		→	
TOTAL			
Examiner's Initials			

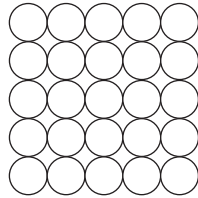


J A N O 9 C H Y 1 F O 1

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

1 Iron is the main structural metal used in the world.

1 (a) The diagram represents the particles in iron, Fe.



Draw a ring around the correct word in the box to complete the sentence.

Iron is described as an element because all the

atoms

compounds

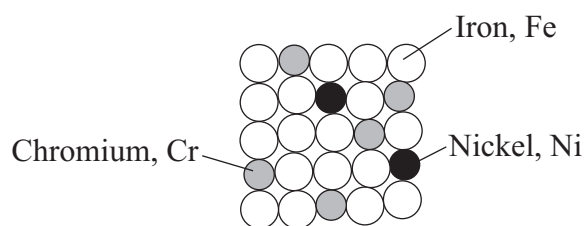
metals

are the same.

(1 mark)

1 (b) Stainless steel is mostly iron.

The diagram represents the particles in stainless steel.



1 (b) Use the correct words from the box to complete the sentences about alloys.

metal mixture molecule polymer smart structure

Stainless steel is an alloy because it is a
of iron, chromium and nickel.

An alloy is made up of more than one type of

Stainless steel alloys are harder than iron because the different sized atoms added
change the

An alloy that can return to its original shape after being deformed is called a
..... alloy. (4 marks)

1 (c) In the UK, we use about 1.8 billion steel cans every year but only 25% are recycled.
Used steel cans are worth about £100 per tonne.

Recycling saves raw materials and reduces waste that would end up in landfill.
Producing steel by recycling used cans saves 75% of the energy that would be needed
to produce steel from iron ore. This also reduces carbon dioxide emissions.

1 (c) (i) Give **two** reasons, from the information above, to explain why recycling
used steel cans is a good idea.

1
.....

2
.....

(2 marks)

1 (c) (ii) Suggest how the local council could increase the percentage of used steel cans
that are recycled.

.....
.....

(1 mark)

8

Turn over ▶



2 Limestone has been called the Earth's most useful rock.

2 (a) Limestone contains calcium carbonate, CaCO_3 .

2 (a) (i) Complete the table to show the number of atoms of each element in the formula of calcium carbonate.

Calcium has been done for you.

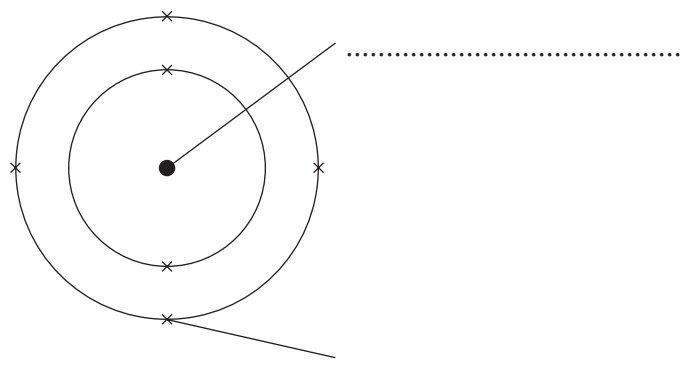
Element	Number of atoms in the formula CaCO_3
Calcium, Ca	1
Carbon, C	
Oxygen, O	

(2 marks)

2 (a) (ii) The diagram below represents a carbon atom.

Use words from the box to label the parts of this atom.

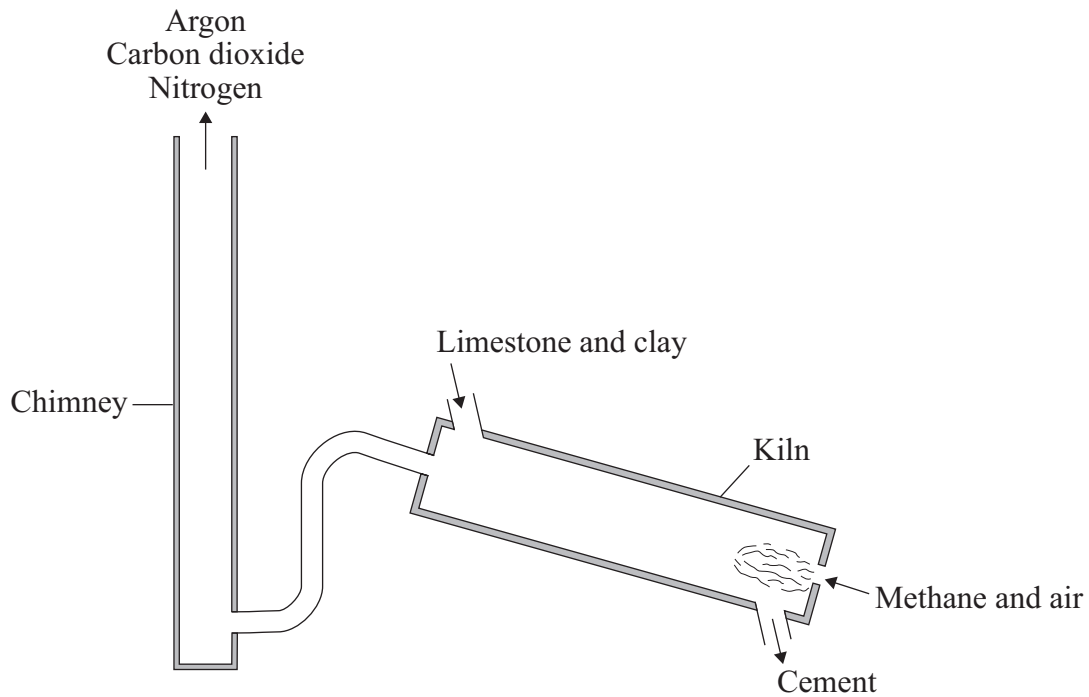
bond	electron	molecule	nucleus
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(2 marks)



- 2 (b) At a cement works, limestone is mixed with clay and heated in a kiln.



Use the information in the diagram to answer these questions.

- 2 (b) (i) Name the fuel that is used to heat the limestone and clay.

.....
(1 mark)

- 2 (b) (ii) Limestone contains calcium carbonate, CaCO_3 .
Draw a ring around the correct gas in the box to complete the sentence.

The gas formed when calcium carbonate decomposes is

argon.
carbon dioxide.
nitrogen.

(1 mark)

Question 2 continues on the next page

Turn over ►



2 (c) The cement works starts to burn a different fuel.

Local residents are concerned because more children are suffering asthma attacks. Residents have also noticed that parked cars are becoming dirty because of smoke particles from the chimney.

The table shows the possible medical risk from smoke particles.

Particle size in mm	Medical effect
Larger than 0.4	No medical risks known
0.3 and smaller	Causes asthma attacks
0.2 and smaller	May cause cancer

2 (c) (i) Give **two** reasons why local residents are concerned about the cement works burning a different fuel.

1

.....

2

.....

(2 marks)

2 (c) (ii) The company operating the cement works stated that smoke particles from the chimney had not changed since it started burning the different fuel.

If you were a local resident, what evidence would you like to see to help you decide if the company's statement is true or not?

.....

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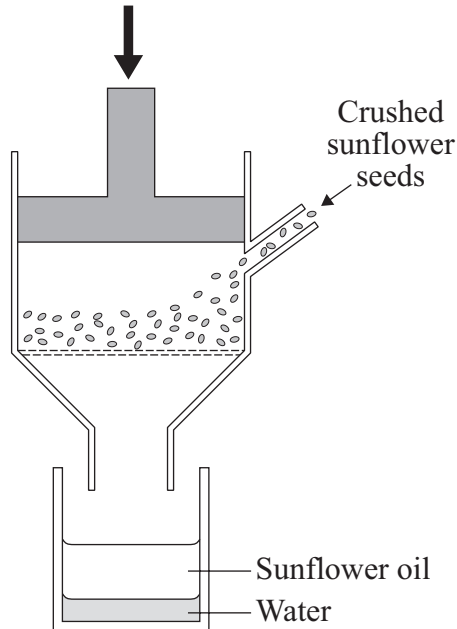
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(2 marks)



3 An advert for crisps claims that they now contain only 30% saturated fat because they are cooked in sunflower oil.

3 (a) The oil is extracted from sunflower seeds. The diagram shows how this can be done.



Draw a ring around the correct word in each box to complete the sentences.

3 (a) (i) The oil is obtained from crushed sunflower seeds by

evaporating.

filtering.

pressing.

(1 mark)

3 (a) (ii) The oil does not

burn

dissolve

in water.

melt

(1 mark)

Question 3 continues on the next page

Turn over ►



- 3 (b) Draw a ring around the correct word in the box to complete the sentence.

Carbon carbon double bonds in sunflower oil can be detected

by reacting with

bromine.
iron.
oxygen.

(1 mark)

- 3 (c) Water has a boiling point of 100 °C. Sunflower oil has a boiling point above 232 °C.

Suggest why sunflower oil and not water is used to make crisps from thin slices of potato.

.....

.....

.....

.....

(2 marks)

- 3 (d) Additives in some crisps include red chilli powder.

Sudan 1 is a bright red dye and is thought to cause cancer. In 2005, it was used to add more colour to a large batch of chilli powder. This batch of chilli powder was used by many food companies. The contaminated foods were removed from sale and destroyed.

- 3 (d) (i) Suggest why more colour was added to this batch of chilli powder.

.....

.....

(1 mark)

- 3 (d) (ii) Why is it **not** a good idea to add Sudan 1 to chilli powder?

.....

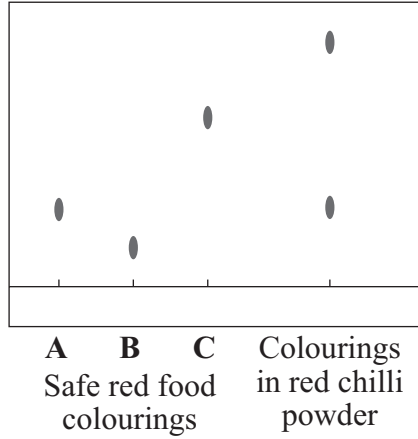
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(1 mark)



- 3 (e) A crisp manufacturer tested its chilli powder to check that it contained only safe food colourings.

The results of the test are shown below.



- 3 (e) (i) Draw a ring around the correct word in the box to complete the sentence.

This method of detecting and identifying colours is called

chromatography.
distillation.
electrolysis.

(1 mark)

- 3 (e) (ii) What do the results of this test tell you about the colours in the red chilli powder?

.....

.....

.....

.....

(2 marks)

10

Turn over ►

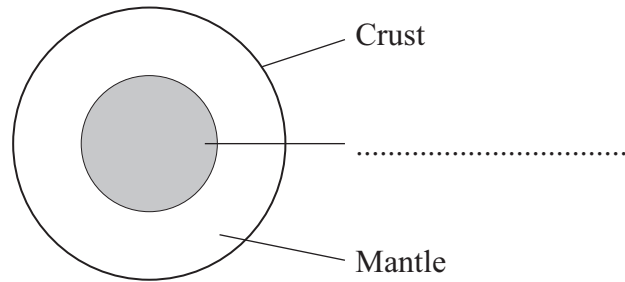


4 Earthquakes are common in certain places on Earth.

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

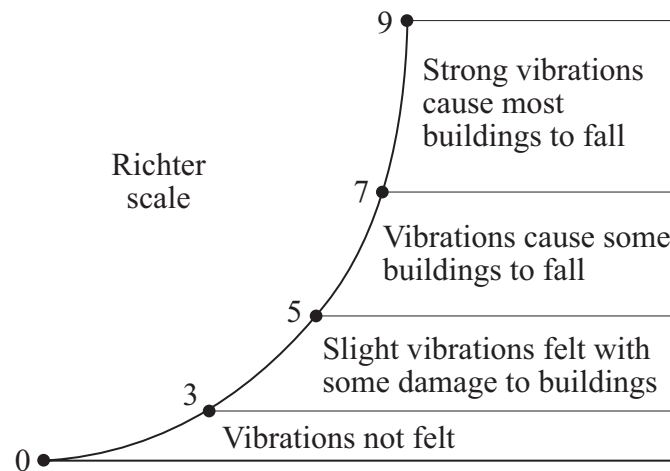
Choose one word from the box to complete the label on the diagram.

atmosphere core plate

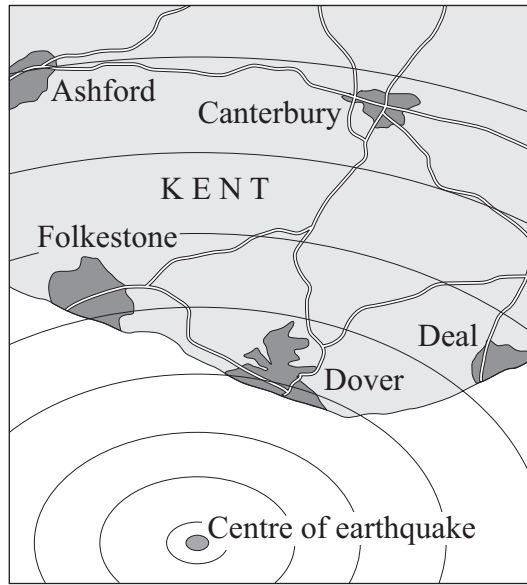


(1 mark)

4 (b) In 1935 C.F. Richter designed a scale for comparing the size of earthquakes.



4 (b) A newspaper reported that an earthquake off the coast of Kent had caused plaster to come down from ceilings, house tiles to loosen and church bells to ring.



4 (b) (i) Earthquakes happen often in the UK.

Suggest why most of these earthquakes are **not** reported in the newspapers.

.....

.....

(1 mark)

4 (b) (ii) Draw a ring around the number which best shows the size of the earthquake in Kent.

1 4 6 8

(1 mark)

4 (b) (iii) State what causes earthquakes.

.....

.....

(1 mark)

4 (b) (iv) Why were people living in Kent **not** warned about this earthquake?

.....

.....

(1 mark)

5

Turn over ▶



5 Water sold in plastic bottles has a high 'carbon cost'.

The 'carbon cost' depends on the amount of carbon dioxide emitted in making and transporting the product.

The more carbon dioxide emitted, the higher the 'carbon cost'.

5 (a) Plastic water bottles are made from a polymer.
The polymer is made from ethene.
Ethene is made by cracking hydrocarbons.

5 (a) (i) Name the polymer made from ethene.

.....
(1 mark)

5 (a) (ii) Ethene can be made by cracking the hydrocarbon pentane, C₅H₁₂.

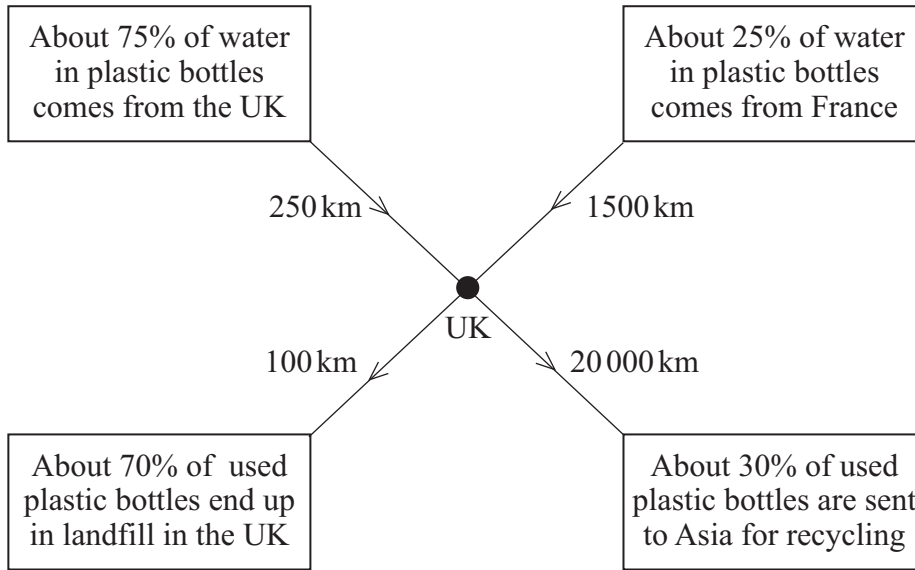


Explain why there is a 'carbon cost' for the process of cracking a hydrocarbon.

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.....
.....
.....
(2 marks)



- 5 (b) The diagram shows information about water sold in plastic bottles in the UK. The diagram also shows the average distances that water and plastic bottles are transported.



Suggest how the high 'carbon cost' of water sold in plastic bottles could be reduced.

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(3 marks)

6

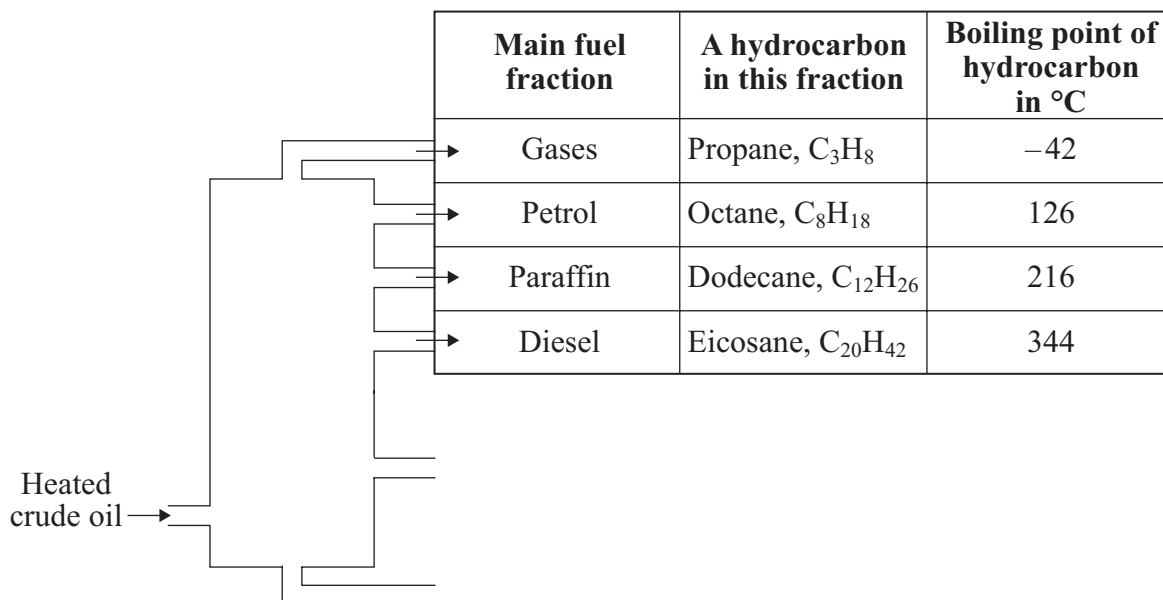
Turn over for the next question

Turn over ▶



6 Crude oil is a resource from which fuels can be separated.

6 (a) The name of the main fuel fractions and one of the hydrocarbons in each fraction are shown in the table.



6 (a) (i) How does the number of carbon atoms in a hydrocarbon affect its boiling point?

.....

(1 mark)

6 (a) (ii) Suggest the lowest temperature to which crude oil needs to be heated to vaporise all the hydrocarbons in the table.

Temperature = °C

(1 mark)

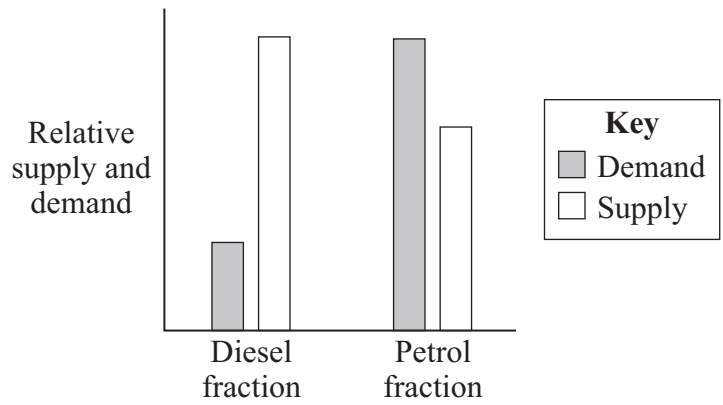
6 (a) (iii) Dodecane boils at 216 °C. At what temperature will dodecane gas condense to liquid?

Temperature = °C

(1 mark)



6 (b) The bar chart shows the relative supply and demand for the petrol and diesel fractions.



6 (b) (i) How does the relative supply and demand for petrol and diesel fractions cause problems for an oil company?

.....

.....

.....

.....

(2 marks)

6 (b) (ii) Suggest **one** way an oil company could solve these problems.

.....

.....

(1 mark)

6

END OF QUESTIONS



There are no questions printed on this page

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ANSWER IN THE SPACES PROVIDED**

