

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	
TOTAL	



General Certificate of Secondary Education
Foundation Tier
January 2010

Science B
Unit Chemistry C1

CHY1F

F

Chemistry
Unit Chemistry C1

Written Paper

Monday 18 January 2010 9.00 am to 9.45 am

For this paper you must have:

- a ruler
- You may use a calculator.

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 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.



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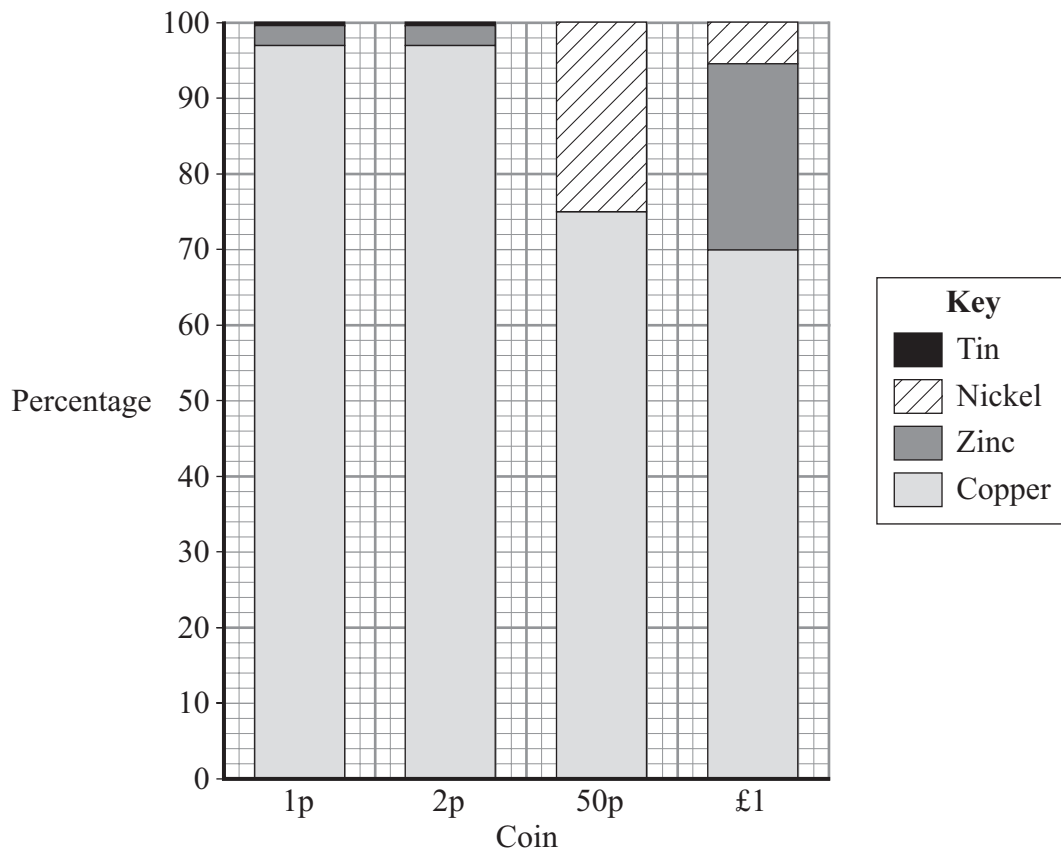
CHY1F

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

1 This is the headline from a newspaper:

‘Why is a 2p coin worth 3.3p?’

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



Use the bar chart to answer these questions.

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

.....
(1 mark)

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

.....
(1 mark)



1 (a) (iii) What is the percentage of nickel in a 50p coin?

Percentage = %
(1 mark)

1 (a) (iv) Draw a ring around the correct metal to complete the sentence.

Pure copper is too soft to be used for 1p and 2p coins.

Copper is mixed with zinc and

nickel
tin
iron

 for 1p and 2p coins.

(1 mark)

1 (b) The value of the metal in 2p coins which were made in 1991 is now 3.3p.

1 (b) (i) Suggest why a 2p coin made in 1991 is worth 3.3p.

.....
.....
.....

(1 mark)

1 (b) (ii) Suggest why copper-plated steel is now used for 1p and 2p coins.

.....
.....
.....

(1 mark)

6

Turn over for the next question

Turn over ►



2 Read the article about strawberry milkshakes.

‘Strawberry milkshakes without strawberries!’



To make strawberry milkshakes at home, all you need is ice-cream, strawberries and milk.

Fast-food strawberry milkshakes could contain 60 additives but no strawberries. The fast-food strawberry milkshakes:

- are cheap
- keep for a long time
- have an enhanced flavour. For example they may taste sweet.

2 (a) (i) Suggest **one** reason why the strawberry milkshakes made at home may also contain additives.

.....

.....

(1 mark)

2 (a) (ii) State **one** reason why some fast-food strawberry milkshakes do **not** contain strawberries.

.....

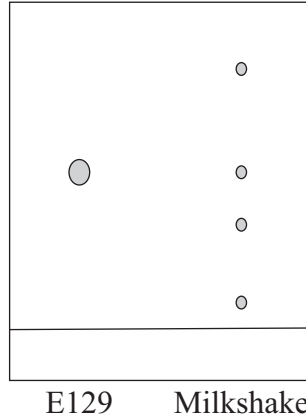
.....

(1 mark)



- 2 (b) The additive E129, allura red, is often added to enhance the colour of strawberry milkshakes.

A student used chromatography to test if a strawberry milkshake contained E129. The result is shown.



- 2 (b) (i) How many colours are in this milkshake?

.....
(1 mark)

- 2 (b) (ii) The student concluded that the strawberry milkshake contained E129.

What evidence did the student use to make this conclusion?

.....
.....
(1 mark)

- 2 (b) (iii) Suggest why this conclusion may **not** be correct.

.....
.....
.....
(1 mark)

5

Turn over for the next question

Turn over ►



- 3 In 1980 Mount St Helens suddenly exploded. This volcanic eruption was so violent that it blew off the top of the mountain. Ash particles and volcanic gases spread throughout the Earth's atmosphere.



- 3 (a) Mount St Helens is on a boundary between two of the Earth's tectonic plates.

Draw a ring around the correct word to complete the sentences.

- 3 (a) (i) The Earth's tectonic plates are made up of the upper part of the mantle

and the

atmosphere.
core.
crust.

(1 mark)

- 3 (a) (ii) The movement of the Earth's tectonic plates is caused by convection currents within the mantle. These convection currents are driven by heat released by

natural

combustion
radioactive
shrinking

 processes.

(1 mark)



- 3 (b) The volcano released large amounts of ash particles, carbon dioxide, sulfur dioxide and water vapour.

Draw **one** straight line from each substance to an environmental effect that it causes.

One has been done for you.

Substance	Environmental effect
Ash particles	Acid rain
Carbon dioxide	Global dimming
Sulfur dioxide	Global warming
Water vapour	Non-polluting liquid
	Radioactive processes

(3 marks)

- 3 (c) Why do volcanic eruptions and earthquakes happen?

.....

(1 mark)

6

Turn over for the next question

Turn over ►



4 Natural gas is mainly a hydrocarbon called methane.

4 (a) Use **one** word from the box to complete the sentence.

compounds

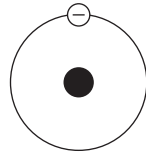
elements

molecules

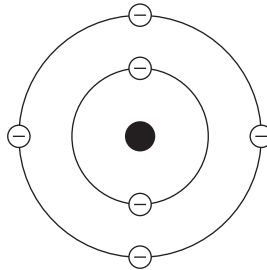
Hydrocarbons contain hydrogen and carbon only.

Hydrogen and carbon are
(1 mark)

4 (b) The diagrams represent atoms of hydrogen and carbon.



Hydrogen



Carbon

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

4 (b) (i) The centre of each atom is called the

bond.

nucleus.

symbol.

(1 mark)

4 (b) (ii) The hydrogen atom has one electron and the carbon atom has

three

four

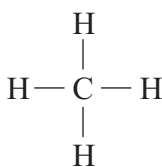
six

electrons.

(1 mark)



4 (c) A molecule of methane can be represented as



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

4 (c) (i) The formula of methane is

CH
CH ₄
C ₄ H ₄

(1 mark)

4 (c) (ii) The line between C—H is called a

bond.
molecule.
nucleus.

(1 mark)

4 (d) Methane burns to produce carbon dioxide (CO₂) and water (H₂O).

4 (d) (i) Draw a ring around the correct answer to complete the sentence.

When methane burns it reacts with

carbon.
nitrogen.
oxygen.

(1 mark)

4 (d) (ii) Hydrogen (H₂) can be used as a fuel.

Suggest why burning hydrogen would be less harmful to the environment than burning methane.

.....

.....

(1 mark)

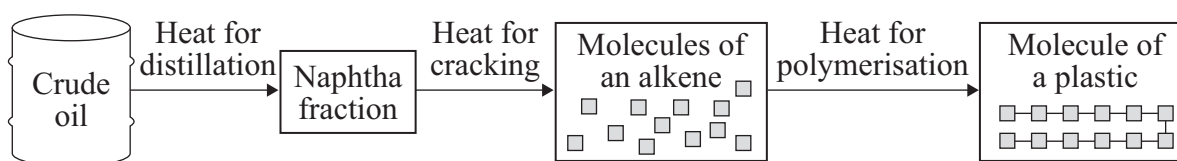
7

Turn over ►



5 Crude oil is used to make plastics.

5 (a) To make a plastic from crude oil involves many processes.



5 (a) (i) How do alkene molecules form a molecule of a plastic?

.....

(1 mark)

5 (a) (ii) Suggest **one** of the main costs of making a plastic from crude oil.

.....

(1 mark)

5 (a) (iii) Suggest **two** problems caused by the disposal of plastics in landfill sites.

1

.....

2

.....

(2 marks)



- 5 (b) Some companies are using bio-plastics made from plants such as corn. Less fossil fuel is used to make bio-plastics than is used to make plastics from crude oil.

Plastics made from plants would be more environmentally friendly than plastics made from crude oil.

Explain why.

.....

.....

.....

.....

(2 marks)

6

Turn over for the next question

Turn over ▶



6 Rapeseed oil can be used for cooking.

A label on a bottle of rapeseed oil stated:

Rapeseed oil is healthy because it is

- low in saturated fat
- high in poly-unsaturated fat.

Two students investigated if the statement was true. They found the following information about four oils.

	Rapeseed oil	Sunflower oil	Olive oil	Corn oil
Saturated fat (%)	6.6	12.0	14.3	14.4
Mono-unsaturated fat (%)	59.3	20.5	73.0	29.9
Poly-unsaturated fat (%)	29.3	63.3	8.2	51.3
Melting point (°C)	5	-18	-12	-15

6 (a) Does this information support the two claims made on the label?
Explain your answers.

6 (a) (i) 'Rapeseed oil is low in saturated fat.'

.....

(1 mark)

6 (a) (ii) 'Rapeseed oil is high in poly-unsaturated fat.'

.....

(1 mark)



6 (b) Rapeseed oil contains unsaturated fats.

How could the students test the oil to show that it contained unsaturated fats?

Test.....

.....

Result of test

.....

(2 marks)

6 (c) Rapeseed oil can be hardened by reacting it with hydrogen.

6 (c) (i) What would happen to the melting point of rapeseed oil if it was hardened?

.....

.....

(1 mark)

6 (c) (ii) One student claimed that hardening would make the rapeseed oil healthier.

Explain why the student is wrong.

.....

.....

.....

.....

.....

(2 marks)

7

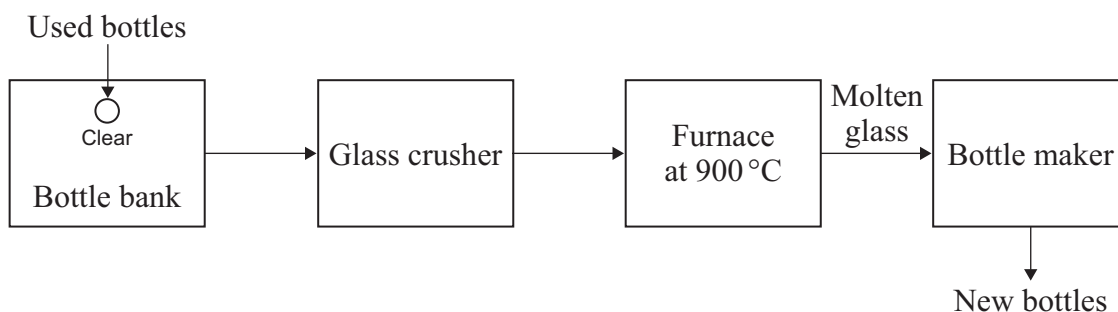
Turn over for the next question

Turn over ►



7 In recent years we have become more aware of the need to recycle glass.

7 (a) Used glass bottles can be recycled if they are put into bottle banks.



7 (a) (i) Suggest **one** reason why light bulbs should **not** be put into bottle banks.

.....

(1 mark)

7 (a) (ii) Very few glass bottles are reused (used more than once).

Suggest **one** reason why.

.....

(1 mark)

7 (a) (iii) New glass bottles can also be produced by heating, at 1700 °C, a mixture of the following raw materials:

- sand (silicon dioxide), SiO₂
- soda ash (sodium carbonate), Na₂CO₃
- limestone (calcium carbonate), CaCO₃

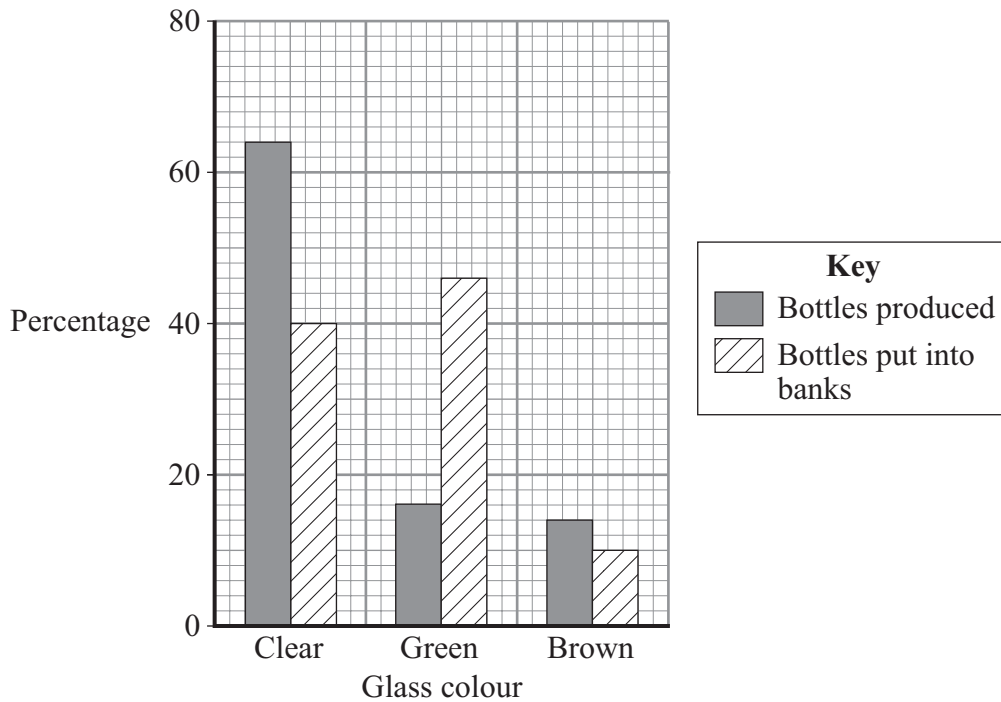
Explain why the use of recycled glass to make glass bottles produces less carbon dioxide than making glass bottles from these raw materials.

.....

(2 marks)



7 (b) The bar chart shows the percentages of glass bottles produced and the percentages of glass bottles put into bottle banks in the UK.



7 (b) (i) The percentage of green glass bottles produced is 16%.
What is the percentage of green glass bottles put into bottle banks?

Percentage = %
(1 mark)

7 (b) (ii) More green glass bottles are put into bottle banks than are made in the UK.
Suggest **one** reason why.

.....
.....
(1 mark)

7 (b) (iii) Suggest and explain **one** problem resulting from the percentage of clear glass bottles produced in the UK.

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

END OF QUESTIONS



There are no questions printed on this page

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