

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

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



General Certificate of Secondary Education
Foundation Tier
June 2015

Science A

Unit Chemistry C1

CH1FP

F

Chemistry

Unit Chemistry C1

Tuesday 9 June 2015 1.30 pm to 2.30 pm

For this paper you must have:

- a ruler
 - the Chemistry Data Sheet (enclosed).
- You may use a calculator.

Time allowed

- 1 hour

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 6(b) 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.



J U N 1 5 C H 1 F P O 1

G/KL/110341/Jun15/E3

CH1FP

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

1 This question is about metals.

1 (a) Which unreactive metal is found in the Earth as the metal itself?

[1 mark]

Tick (✓) **one** box.

aluminium

gold

magnesium

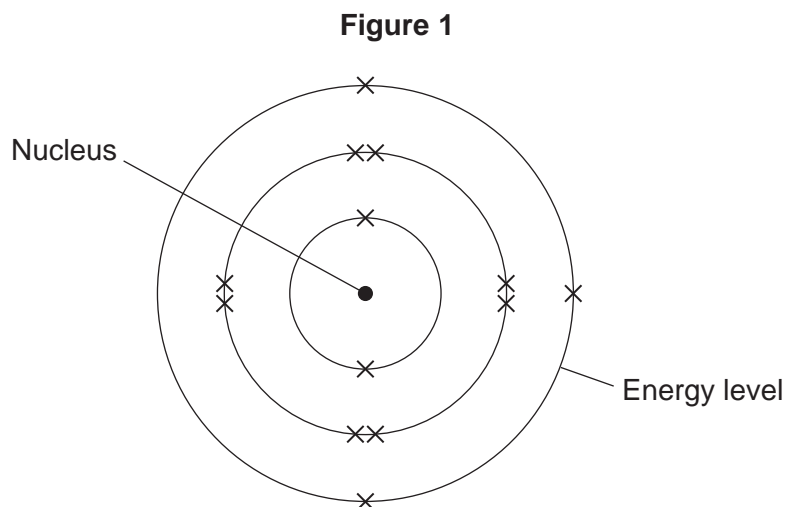
1 (b) Complete the sentence.

[1 mark]

Aluminium is an element because aluminium is made of
only one type of



1 (c) Figure 1 shows the electronic structure of an aluminium atom.



1 (c) (i) Use the correct words from the box to complete the sentence.

[2 marks]

electrons

ions

protons

neutrons

shells

The nucleus of an aluminium atom contains and

1 (c) (ii) Complete the sentence.

[1 mark]

In the periodic table, aluminium is in Group

Question 1 continues on the next page

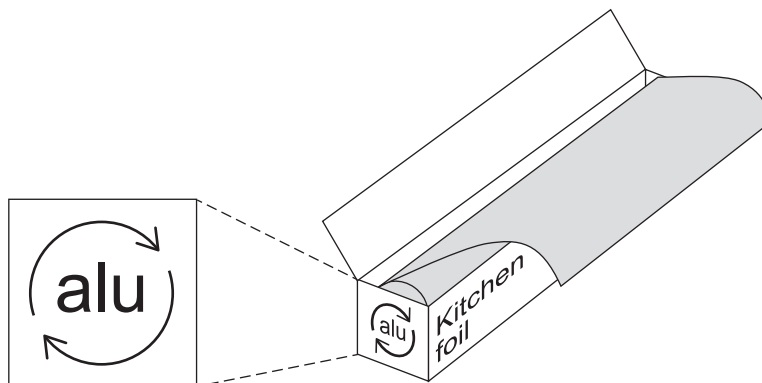
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- 1 (d) Aluminium is used for kitchen foil.

Figure 2 shows a symbol on a box of kitchen foil.

Figure 2



The symbol means that aluminium can be recycled. It does not show the correct chemical symbol for aluminium.

- 1 (d) (i) What is the correct chemical symbol for aluminium? [1 mark]

- 1 (d) (ii) Give **two** reasons why aluminium should be recycled. [2 marks]

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- 1 (e) Aluminium has a low density, conducts electricity and is resistant to corrosion.

Which **one** of these properties makes aluminium suitable to use as kitchen foil?
Give a reason for your answer.

[2 marks]

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0 5

2 Copper is a transition metal.

2 (a) (i) Where is copper in the periodic table?

[1 mark]

Tick (✓) **one** box.

in the central block

in Group 1

in the noble gas group

2 (a) (ii) What is a property of copper?

[1 mark]

Tick (✓) **one** box.

breaks easily

conducts electricity

does not conduct heat



2 (b) Copper ores are quarried by digging large holes in the ground, as shown in **Figure 3**.

Figure 3



Give **two** reasons why quarrying is bad for the environment.

[2 marks]

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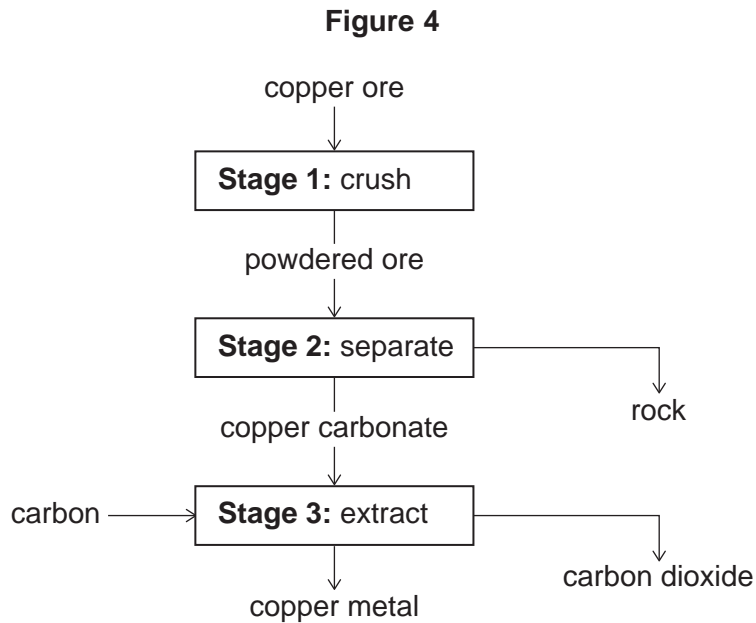


2 (c) Some copper ores contain only 2% copper.

Most of the ore is rock that is not needed.

In one ore, the main compound is copper carbonate (CuCO_3).

Figure 4 shows the stages used in the extraction of copper from this ore.



2 (c) (i) Why is **Stage 2** important?

[1 mark]

.....

.....



2 (c) (ii) The equation for the reaction in **Stage 3** is:



From the symbol equation a company calculated that 247 tonnes of copper carbonate are needed to produce 127 tonnes of copper and 132 tonnes of carbon dioxide are released.

Calculate the mass of carbon needed to make 127 tonnes of copper.

[2 marks]

copper carbonate	+	carbon	→	copper	+	carbon dioxide
247 tonnes	 tonnes		127 tonnes		132 tonnes

.....

.....

2 (c) (iii) Suggest **one** reason why it is important for the company to calculate the mass of reactants in **Stage 3**.

[1 mark]

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8

Turn over for the next question

Turn over ►



3 Crude oil is a fossil fuel.

3 (a) To make crude oil more useful it is separated into fractions.

Use the correct word from the box to complete each sentence.

boiling	compound	decomposition	distillation
	filtration	mixture	molecule

3 (a) (i) Crude oil is a of different substances.

[1 mark]

3 (a) (ii) The substances in crude oil have different points.

[1 mark]

3 (a) (iii) Crude oil is separated by fractional

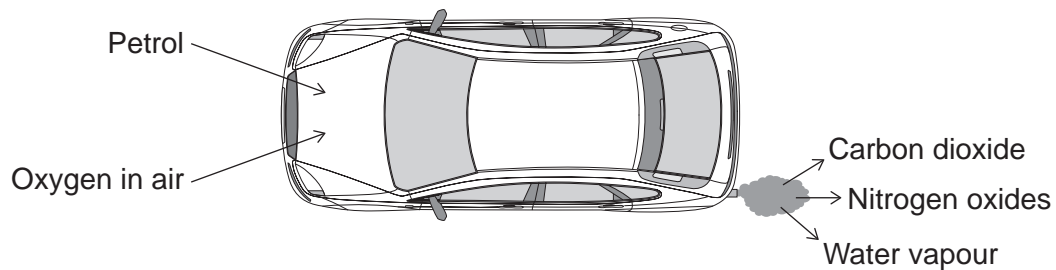
[1 mark]

3 (b) Petrol is one of the fractions produced from crude oil.

Car engines use a mixture of petrol and air.

Figure 5 shows some of the gases produced.

Figure 5



3 (b) (i) What type of reaction happens to petrol in a car engine?

[1 mark]

Tick (✓) **one** box.

combustion

decomposition

neutralisation

3 (b) (ii) Petrol contains octane (C_8H_{18}).

Complete the word equation for the reaction of octane with oxygen.

[2 marks]

octane + → +

3 (b) (iii) Cars use sulfur-free petrol as a fuel.

Describe why sulfur should be removed from petrol.

[2 marks]

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Question 3 continues on the next page

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3 (c) Some fractions from crude oil contain large hydrocarbon molecules.

These molecules can be cracked to produce smaller, more useful molecules.

An equation for cracking decane is:



3 (c) (i) Why is propane useful?

[1 mark]

Tick (✓) **one** box.

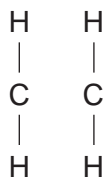
Propane is a polymer.

Propane is an alloy.

Propane is a fuel.

3 (c) (ii) Draw bonds to complete the displayed structure of ethene.

[1 mark]



3 (c) (iii) What is the colour change when bromine water reacts with ethene?

[1 mark]

Tick (✓) **one** box.

Orange to colourless

Orange to green

Orange to red

3 (c) (iv) Complete the sentence.

[1 mark]

Pentene is useful because many pentene molecules can join together
to form

12

Turn over for the next question

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4 Polymers and fuels can be produced from crude oil and from plants.

4 (a) There are many types of polymer. Each polymer has different properties.

4 (a) (i) Poly(chloroethene) is a polymer produced from crude oil.

Why is poly(chloroethene) used for water pipes?

[2 marks]

Tick (✓) **two** boxes.

The polymer is not biodegradable.

The polymer is made from crude oil.

The polymer decomposes when heated.

The polymer is waterproof.

The polymer does not conduct electricity.

4 (a) (ii) Some shopping bags are made from a biopolymer.

Biopolymers are produced from plants.

Suggest **one** advantage of using a biopolymer.

[1 mark]

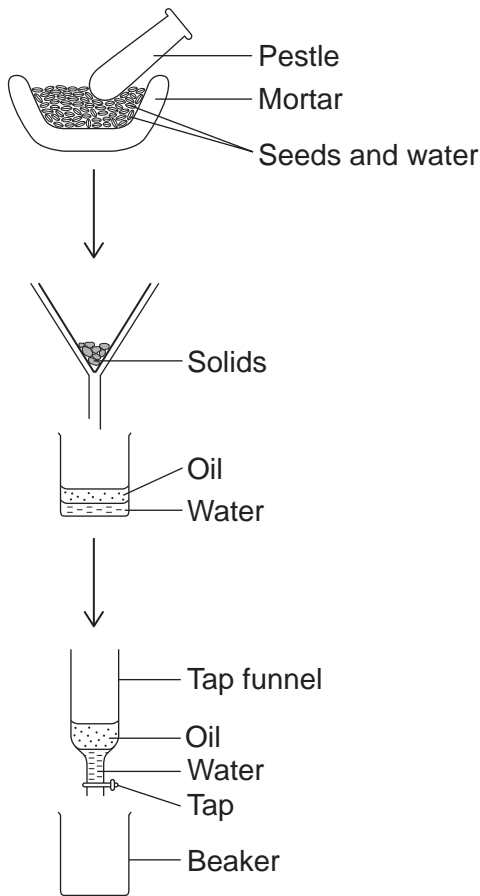
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4 (b) Some plants have seeds that contain vegetable oils. The flow diagram in **Figure 6** shows how the oil can be extracted.

Figure 6



4 (b) (i) Use the correct word from the box to complete each sentence.

[2 marks]

burning	crushing	distilling	filtering
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Oil is released from the seeds by..... .

Solids are removed from the oil and water by

4 (b) (ii) Describe how the tap funnel can be used to separate the oil from the water.

[2 marks]

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4 (c) Vegetable oils are used as foods and fuels.

4 (c) (i) Why are vegetable oils important foods and fuels?

[1 mark]

Tick (✓) **one** box.

They are used as emulsifiers.

They have high boiling points.

They provide a lot of energy.

4 (c) (ii) Burning fossil fuels made from crude oil increases the overall percentage of carbon dioxide in the atmosphere.

Burning biofuels made from vegetable oil does **not** increase the overall percentage of carbon dioxide in the atmosphere.

Explain why.

[2 marks]

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10



5 Limestone is used to make many different materials.

5 (a) Heating limestone produces calcium oxide and carbon dioxide.

Complete the sentences.

5 (a) (i) The main compound in limestone is calcium
[1 mark]

5 (a) (ii) The reaction to produce calcium oxide from limestone is thermal
[1 mark]

5 (a) (iii) Calcium hydroxide is produced when calcium oxide reacts with
[1 mark]

5 (a) (iv) Calcium hydroxide is used to neutralise acids because it is an
[1 mark]

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5 (b) Cement is made from limestone and clay.

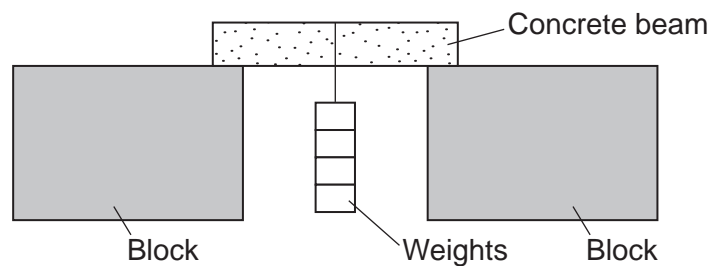
Concrete is made by mixing cement with water, sand and aggregate (small pieces of rock).

A group of students did an investigation on the amount of aggregate needed to make the strongest concrete beam.

The students used this method:

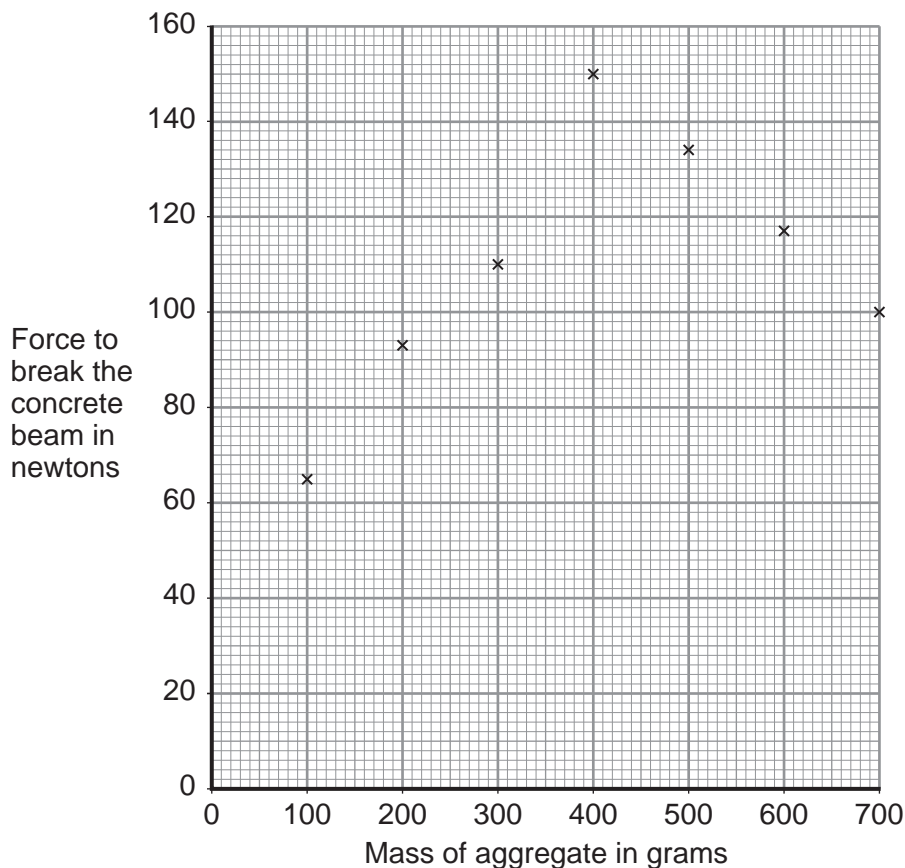
- use the same mass of cement and the same mass of sand but change the mass of aggregate to make seven different concrete mixtures
- use the different concrete mixtures to make beams of the same size
- add weights, as shown in **Figure 7**, until the concrete beam breaks.

Figure 7



The students' results are plotted on the graph in **Figure 8**.

Figure 8



5 (b) (i) One of the points is anomalous.

Complete the graph in **Figure 8** by drawing **two** straight lines of best fit.

[2 marks]

5 (b) (ii) Describe **one** way the students could improve the method so that their results are more accurate for each graph point.

[2 marks]

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5 (b) (iii) What force is needed to break a concrete beam containing no aggregate?

Show your working on the graph.

[2 marks]

Force = newtons

5 (b) (iv) One of the students concluded that:

'The force needed to break a concrete beam increases as the mass of aggregate increases.'

The student's conclusion is **not completely** correct. Use values from the graph to explain why.

[3 marks]

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6 This question is about life, the Earth and its atmosphere.

6 (a) There are many theories about how life was formed on Earth.

Suggest **one** reason why there are many theories.

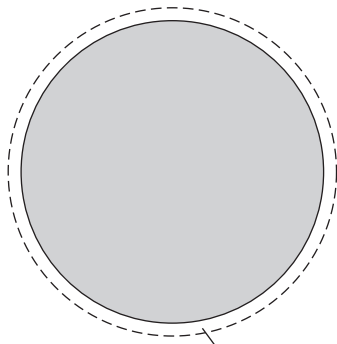
[1 mark]

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

This Earth and its atmosphere today are not like the early Earth and its atmosphere.

The early Earth
Most of the surface
was covered by volcanoes



Most of the atmosphere
was carbon dioxide and
water vapour

The Earth today
Most of the surface
is covered by oceans



Most of the atmosphere
is nitrogen and oxygen

Describe and explain how the surface of the early Earth and its atmosphere have changed to form the surface of the Earth and its atmosphere today.

[6 marks]

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END OF QUESTIONS



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Question 2: Figure 3 Photograph © Thinkstock

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