Write your name here

Surname	Other names

Edexcel GCSE

Centre Number	Candidate Number

Chemistry/Science

Unit C1: Chemistry in our World

Foundation Tier

Sample Assessment Material **Time: 1 hour**	Paper Reference **5CH1F/01**

You do not need any other materials.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*

Information

- The total mark for this paper is 60.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
  – *you should take particular care with your spelling, punctuation and grammar, as well as the clarity of expression, on these questions.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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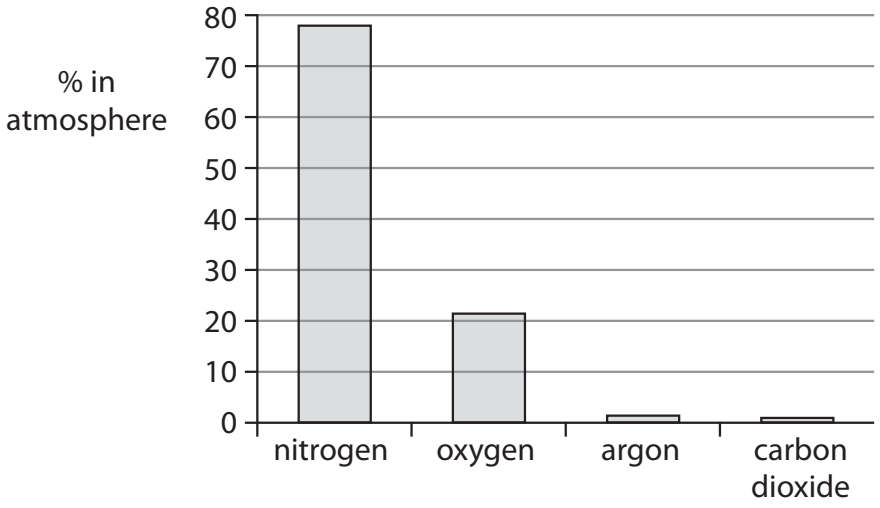
Answer ALL questions

Some questions must be answered with a cross in a box ☒.
If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

The Earth's atmosphere

1 The amount of each gas in today's atmosphere is different from the amount of these gases in the early atmosphere.

The bar chart shows the percentages of the four main gases in today's atmosphere.



(a) Use the bar chart to identify the gas that makes up nearly four fifths of today's atmosphere.

Put a cross (☒) in the box next to your answer.

(1)

☒ **A** argon

☒ **B** carbon dioxide

☒ **C** nitrogen

☒ **D** oxygen

(b) The growth of primitive plants reduced the amount of carbon dioxide in the early atmosphere.
This happened because of the process of photosynthesis.
During photosynthesis another gas is produced.

Use a word from the box to complete the sentence.

(1)

argon	hydrogen	nitrogen	oxygen

The gas produced during photosynthesis is .....

(c) Water vapour from the early atmosphere cooled and formed the oceans.

(i) What name is given to the change when water vapour becomes liquid water?

Put a cross (☒) in the box next to your answer.

(1)

☒ **A** boiling

☒ **B** condensing

☒ **C** freezing

☒ **D** melting

(ii) Explain how the amount of carbon dioxide in the early atmosphere changed once the oceans had formed.

(2)

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(d) (i) Chlorine can be obtained from seawater by using electricity.

What is the name of this process?

(1)

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(ii) Explain why you have to ensure there is good ventilation when you prepare chlorine in the laboratory.

(2)

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(Total for Question 1 = 8 marks)

Metals from the Earth

2 Most metals occur in compounds in the Earth's crust. Gold, however, is found uncombined and can be made into jewellery and coins.

(a) Some gold coins were dug up from the ground.
They were very old but still shiny.

Rob Bartee / Alamy

(i) State why the gold coins were still shiny.

(1)

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.....

(ii) Suggest another property of gold which makes it suitable for use in coins.

(1)

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.....

(b) Iron is found as iron oxide in the Earth's crust.

Iron oxide is heated with carbon to form iron.
In this reaction, oxygen is removed from the iron oxide.

Complete the sentence by putting a cross (☒) in the box next to your answer.

The iron oxide is

(1)

☒ **A** distilled

☒ **B** neutralised

☒ **C** oxidised

☒ **D** reduced

(c) Aluminium, rather than steel, is used to make cans for drinks.

Explain how the properties of aluminium help to reduce transport costs when delivering the cans to shops.

(2)

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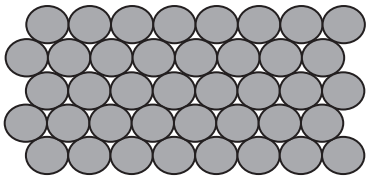
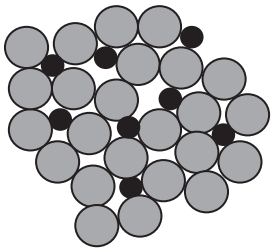
(d) The diagrams show models of the structures of pure aluminium and an alloy of aluminium.



aluminium



alloy of aluminium

Use the diagrams to help you explain why alloys of aluminium are stronger than pure aluminium.

(2)

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(e) Aluminium is extracted from aluminium oxide using electricity.

Discuss the environmental impact of recycling aluminium from drinks cans rather than using aluminium extracted from its ore.

(3)

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(Total for Question 2 = 10 marks)

Useful rocks

3 Calcium carbonate is found in the Earth's crust.
It is found in several natural forms.

Shutterstock

(a) The photograph shows one natural form of calcium carbonate.
Use evidence from the photograph to explain what type of rock is shown.

(2)

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(b) Limestone, one natural form of calcium carbonate, is used as a building material.
It is also used to make other building materials.

Give the name of a building material made from limestone.

(1)

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(c) Another natural form of calcium carbonate is marble.
Marble is formed from limestone in the Earth.

Describe how limestone is changed into marble in the Earth.

(3)

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(d) Which of these is also a natural form of calcium carbonate?

Put a cross (☒) in the box next to your answer.

(1)

☒ **A** chalk

☒ **B** granite

☒ **C** sandstone

☒ **D** slate

(e) When calcium carbonate is heated very strongly, calcium oxide and a gas are the only products.

(i) Write the word equation for this reaction.

(1)

.....

(ii) What type of reaction occurs when a compound is broken up by heat?

(1)

.....

.....

(f) When 10.0 g of calcium carbonate were heated until the reaction was complete, 5.6 g of calcium oxide were formed.

Calculate the mass of the gas produced when this reaction took place.

(1)

Answer = ... g

(Total for Question 3 = 10 marks)

Fuels

4 There are many different types of fuel.

(a) Many cars use petrol as their fuel.

(i) Petrol is obtained from crude oil.

What is the name of the process used to obtain petrol from crude oil?

Put a cross (☒) in the box next to your answer.

(1)

☒ **A** combustion

☒ **B** cracking

☒ **C** fractional distillation

☒ **D** oxidation

(ii) Petrol is a mixture of liquids with low boiling points.
The word equation for the complete combustion of petrol is

petrol + oxygen → carbon dioxide + water

Use this information to help you explain why petrol is a good fuel.

(2)

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(b) Burning fuels produces substances that pollute the atmosphere. The photograph shows some trees that have been affected by polluted air.

Simon Fraser/Science Photo Library

(i) What has caused these trees to be damaged?

(1)

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.....

(ii) Explain how burning fuels, such as petrol, leads to this atmospheric pollution.

(2)

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(c) Biofuels can be used instead of petrol as a fuel in cars.

(i) Ethanol produced from plants is a biofuel.
Name a plant that is used to produce ethanol.

(1)

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(ii) Explain the advantages of using biofuels instead of petrol.

(2)

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(Total for Question 4 = 9 marks)

Methane

5 Bunsen burners in chemistry laboratories use natural gas as their fuel.
Natural gas contains methane.

(a) Natural gas is a non-renewable, fossil fuel.

Complete the sentence by putting a cross (☒) in the box next to your answer.

One other non-renewable fossil fuel is

(1)

☒ **A** wood

☒ **B** vegetable oil

☒ **C** kerosene

☒ **D** biodiesel

(b) The formula of methane is CH_4.

Name the **two** elements which are present in a molecule of methane.

(2)

1 .....

2 .....

(c) When methane is burnt, one of the products is carbon dioxide.

Describe the test to show that this gas is carbon dioxide.

(2)

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*(d) Fuels used in gas fires contain methane.

The complete combustion of methane produces carbon dioxide and water.
In faulty gas fires, incomplete combustion of methane can take place.

Discuss the problems that can be caused by both the complete and incomplete combustion of methane in a gas fire.

(6)

(Total for Question 5 = 11 marks)

Uses of calcium compounds

6 Some farmers add calcium hydroxide to their soil.

Across Europe, this symbol is used on packets of calcium hydroxide.

(a) Explain why a farmer wears protective clothing, gloves and goggles when using calcium hydroxide.

(2)

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(b) Explain why farmers add calcium hydroxide to their soil.

(2)

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(c) Calcium hydroxide reacts with hydrochloric acid.

Complete the word equation for this reaction.

(2)

calcium hydroxide + hydrochloric acid → ..... + ...

*(d) There are several different brands of indigestion tablets which contain calcium carbonate.
The calcium carbonate neutralises excess acid in the stomach.

In an investigation, dilute hydrochloric acid was added to an indigestion tablet until the tablet had completely reacted.

The volume of hydrochloric acid required was measured.
The experiment was repeated with four different brands of tablet, A, B, C and D.

The cost of one tablet and the results of the experiment are shown in the table.

tablet	cost of one tablet (p)	volume of hydrochloric acid neutralised by the tablet (cm^3)
A	5	9
B	10	12
C	5	4
D	10	15

Evaluate the results of the experiment to find the effectiveness and value for money of each indigestion tablet.

(6)

(Total for Question 6 = 12 marks)

TOTAL FOR PAPER = 60 MARKS

Sample Mark Scheme

Unit C1: Chemistry in our World (Foundation Tier)

Question Number	Answer	Mark
1(a)	**C**	**(1)**

Question Number	Answer	Mark
1(b)	oxygen	**(1)**

Question Number	Answer	Mark
1(c)(i)	**B**	**(1)**

Question Number	Answer	Acceptable answers	Mark
1(c)(ii)	an explanation linking the following: (amount of carbon dioxide) is reduced (1) (because) carbon dioxide dissolves (into the seawater)(1)		**(2)**

Question Number	Answer	Mark
1(d)(i)	electrolysis	**(1)**

Question Number	Answer	Acceptable answers	Mark
1(d)(ii)	an explanation linking the following: chlorine gas is toxic (1) (so) you (ventilate to) avoid breathing it in (1)		**(2)**

TOTAL: 8 MARKS

Question Number	Answer	Acceptable answers	Mark
2(a)(i)	gold is unreactive/gold is unlikely to form compounds	gold has not been oxidised	**(1)**

Question Number	Answer	Acceptable answers	Mark
2(a)(ii)	malleable	high melting point	**(1)**

Question Number	Answer	Mark
2(b)	**D**	**(1)**

Question Number	Answer	Acceptable answers	Mark
2(c)	an explanation linking the following: it saves fuel/can transport more (1) (since) aluminium has low density (1)	accept lightweight	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(d)	an explanation linking the following: different size atom/ions/particles (1) (helps to) stop layers sliding (1)		**(2)**

Question Number	Answer	Acceptable answers	Mark
2(e)	a discussion to include **three** of the following, including at least one disadvantage and one advantage: **Advantages:** saves resources; saves energy; less environmental impact due to less mining **Disadvantages:** aluminium cans are often alloys (impure)	if only discussing advantages or disadvantages a maximum of 2 marks can be given	**(3)**

TOTAL: 10 MARKS

Question Number	Answer	Mark
3(a)	an explanation linking the following: contains fossils (1) (therefore) the rock is sedimentary (1)	**(2)**

Question Number	Answer	Mark
3(b)	glass/cement/concrete	**(1)**

Question Number	Answer	Mark
3(c)	a description including the following in a logical order: heat (1) and pressure (1) (acts on rock) over a very long time (1)	**(3)**

Question Number	Answer	Mark
3(d)	**A**	**(1)**

Question Number	Answer	Acceptable answers	Mark
3(e)(i)	calcium carbonate → calcium oxide + carbon dioxide	accept correct formulae	**(1)**

Question Number	Answer	Mark
3(e)(ii)	thermal decomposition	**(1)**

Question Number	Answer	Mark
3(f)	10 – 5.6 = 4.4 g	**(1)**

TOTAL: 10 MARKS

Question Number	Answer	Mark
4(a)(i)	**C**	**(1)**

Question Number	Answer	Mark
4(a)(ii)	an explanation linking a pair of the following: volatile/vaporises easily (1) (so) is easy to ignite (1) no solid waste/ash/smoke (1) (so) is convenient to use (1) releases lots of energy when burnt/ high energy content (1) (so) is easy to transport in useful amounts (1) note, other pairs of these points and explanations may be acceptable.	**(2)**

Question Number	Answer	Mark
4(b)(i)	acid rain	**(1)**

Question Number	Answer	Acceptable answers	Mark
4(b)(ii)	an explanation linking: sulfur in petrol combusts to form sulfur dioxide (1) (which) dissolves in rain/forms sulfuric acid in rain (1)	produces carbon dioxide, leading to greenhouse effect is worth 1 mark	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(c)(i)	sugar cane/beet	accept grapes, barley, potatoes or any suitable alternative	**(1)**

Question Number	Answer	Mark
4(c)(ii)	an explanation linking a pair of the following: advantages: • crops are renewable (1) (so) preserves oil supplies (1) • plants use CO_2 (when growing) (1) (so)no/little net CO_2 released into the atmosphere (1) • no sulfur dioxide formed (1) (so) no acid rain (1)	**(2)**

TOTAL: 9 MARKS

Question Number	Answer	Mark
5(a)	**C**	**(1)**

Question Number	Answer	Acceptable answers	Mark
5(b)	carbon hydrogen	in either order	 **(2)**

Question Number	Answer	Mark
5(c)	a description including the following: gas is bubbled through limewater (1) limewater goes milky/cloudy (1)	 **(2)**

Question Number		Indicative content	Mark
***5(d)** **QWC**		a discussion including references to the following: complete combustion: • gives carbon dioxide • leads to global warming incomplete combustion: • carbon monoxide is formed • carbon monoxide is toxic/toxic gas formed • carbon monoxide combines with haemoglobin • oxygen cannot combine with haemoglobin • carbon monoxide is odourless/colourless • people are not aware of breathing it in • carbon (soot) blocks chimneys/aggravates asthma • may give out less energy.	**(6)**
Level	**0**	no rewardable material	
1	**1–2**	• limited ideas about what happens when either completely or incompletely burnt • little development of the ideas (e.g. CO toxic but doesn't explain why) • use of everyday language and the response lacks clarity and organisation • spelling, punctuation and the rules of grammar are used with limited accuracy	
2	**3–4**	• ideas about both complete and incomplete combustion but is not comprehensive • some understanding of the ideas • use of some scientific terms e.g. haemoglobin, global warming, and some focus and organisation • spelling, punctuation and the rules of grammar are used with some accuracy	
3	**5–6**	• a comprehensive overview of problems with both complete and incomplete combustion • good understanding of the ideas e.g. explains why CO is toxic • use of range of scientific terms and good focus and organisation • spelling, punctuation and the rules of grammar are used with considerable accuracy	

TOTAL: 11 MARKS

Question Number	Answer	Acceptable answers	Mark
6(a)	an explanation linking the following: to stop the farmer coming into contact with the calcium hydroxide (1) (because) the calcium hydroxide is harmful (1)	 irritant	 **(2)**

Question Number	Answer	Mark
6(b)	an explanation linking the following: it's an alkali/a base (1) (so) it neutralises acid soils (1)	 **(2)**

Question Number	Answer	Acceptable answers	Mark
6(c)	calcium chloride water	answers may be in either order	 **(2)**

Question Number		Indicative content	Mark
***6(d)** **QWC**		an evaluation including references to the following: • the more acid neutralised the more effective the tablet • order is D, B, A, C • cost must also be taken into account • order per penny is A, D, B, C • most effective per tablet is D • best value tablet is A.	**(6)**
Level	**0**	no rewardable material	
1	**1–2**	• a limited idea that D is the 'best' tablet because is reacts with the most acid • the order may not be given nor cost considered • little understanding of the ideas • use of everyday language and the response lacks clarity and organisation • spelling, punctuation and grammar are used with limited accuracy	
2	**3–4**	• a complete explanation of order D, B, A, C (or A, D, B, C) but without full justification • use of some scientific terms, e.g. neutralisation, and some focus and organisation • spelling, punctuation and grammar are used with some accuracy	
3	**5–6**	• a comprehensive evaluation using the data to produce the order A, D, B, C • the most effective and best-value tablets are clearly identified and justified • good understanding of the ideas • use of a range of scientific terms and good focus and organisation • spelling, punctuation and grammar are used with few errors	

TOTAL: 12 MARKS

