



Rewarding Learning

General Certificate of Secondary Education  
2017–2018

Centre Number

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Candidate Number

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# Science: Single Award

Unit 2 (Chemistry)  
Foundation Tier



[GSS21]

THURSDAY 22 FEBRUARY 2018, MORNING

**TIME**

1 hour.

**INSTRUCTIONS TO CANDIDATES**

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.  
Write your answers in the spaces provided in this question paper.  
Answer **all ten** questions.

**INFORMATION FOR CANDIDATES**

The total mark for this paper is 60.  
Quality of written communication will be assessed in Question **10**.  
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.  
A Data Leaflet, which includes a Periodic Table of the Elements, is included for your use.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
<b>Total Marks</b>	

- 1 (a) Shown below are some hazard symbols and their names. Using lines, match each symbol to its name. The first one has been done for you.

**Hazard symbol**

**Name**



toxic



corrosive



explosive

flammable

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[2]

- (b) The symbol below was found on a bottle of acid.



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What effect does acid have on human skin?

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[1]

Examiner Only

Marks Remark

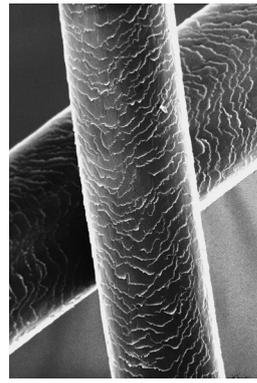
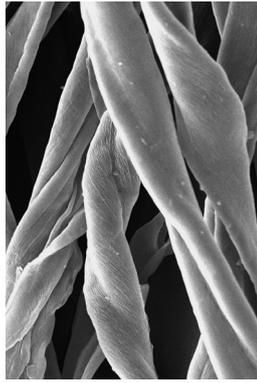
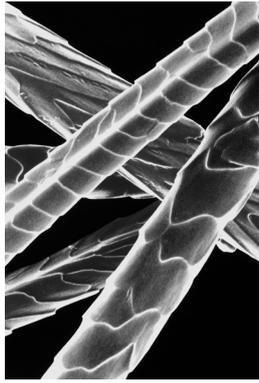
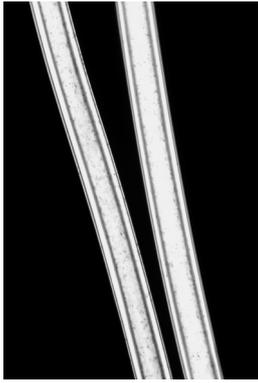
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**(Questions continue overleaf)**



(c) Below are images of four fibres as seen under a microscope.

Examiner Only	
Marks	Remark



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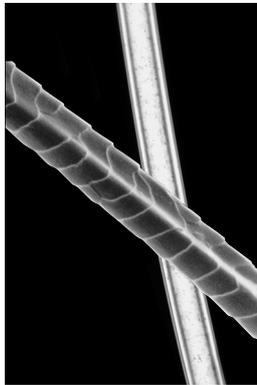
nylon

wool

cotton

hair

A scientist collected the fibres below from a crime scene.



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(i) Using the images above, identify the two different fibres collected from the crime scene.

\_\_\_\_\_ and \_\_\_\_\_ [1]

(ii) Why might hairs collected at a crime scene be useful in helping to solve the crime?

\_\_\_\_\_  
 \_\_\_\_\_ [1]

- 3 Some households in Northern Ireland have boxes that are used to collect man-made materials for recycling.



© TEK IMAGE / Science Photo Library

- (a) Complete the table below to give the **type** of man-made material that the objects shown below are made from. One has been done for you.

Objects	Type of man-made material
bottles	glass
food or fizzy drink cans	
2-litre milk container	

[2]

- (b) Give **one** advantage of recycling man-made materials.

\_\_\_\_\_

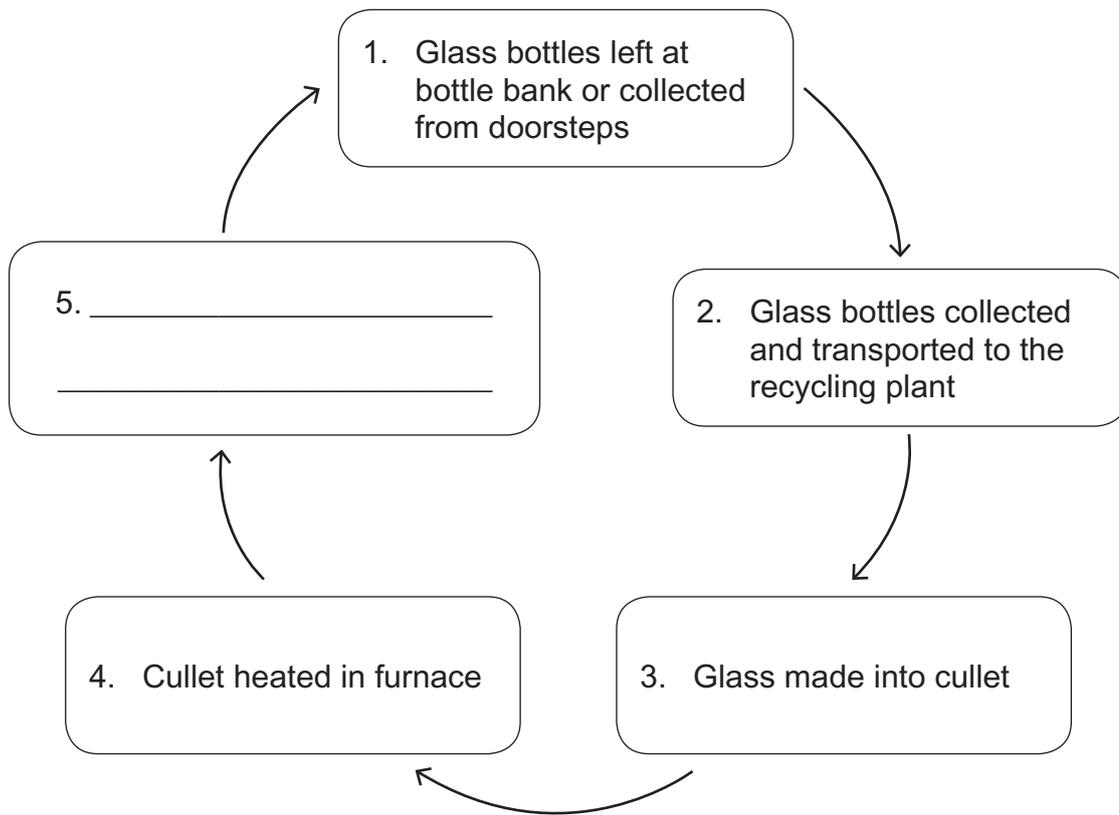
\_\_\_\_\_

[1]

Examiner Only

Marks Remark

(c) Glass makes up around 7% of household waste. Some of the steps in recycling glass are shown in the diagram below.



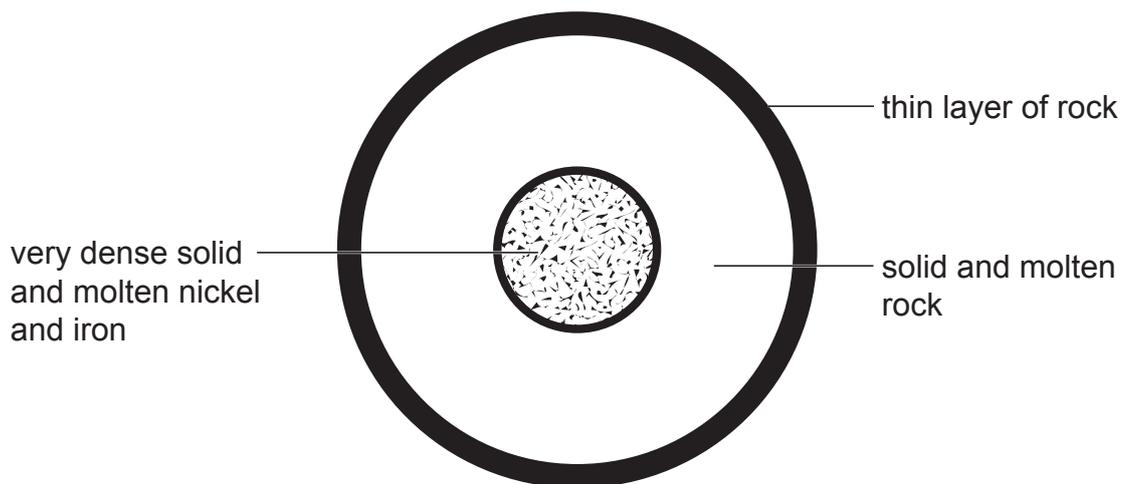
(i) Complete the diagram above by giving the last step in the recycling of glass. [1]

(ii) In step 3, glass is made into cullet. What is cullet?

\_\_\_\_\_  
 \_\_\_\_\_ [1]

Examiner Only	
Marks	Remark

4 The diagram below gives some information about the structure of the Earth.



(a) What name is given to the outer thin layer of rock?

\_\_\_\_\_ [1]

(b) Use the diagram above to describe what the mantle is made from.

\_\_\_\_\_  
\_\_\_\_\_ [1]

(c) Complete the sentences below about different types of rock.

Some types of igneous rocks are formed when a volcano erupts. An example of an igneous rock is \_\_\_\_\_.

Fossils are most likely to be found in \_\_\_\_\_ rock. [2]

Examiner Only	
Marks	Remark

(d) Earthquakes happen because tectonic plates move in the outer thin layer of rock.

(i) Below are statements describing the stages involved in an earthquake, but they are **not** in the correct order.

1. this causes pressure to build up over a long period of time
2. there is a sudden release of pressure
3. the edges of two tectonic plates try to move past each other
4. the plates then move causing the ground to shake

Using the numbers 1, 2, 3 and 4 put the statements in the correct order.

\_\_\_\_\_ [2]

(ii) Name the scale used to measure the intensity of earthquakes.

\_\_\_\_\_ [1]

Examiner Only	
Marks	Remark

- 5 A student made a chemical indicator from blueberries and used it to test some substances. His results are shown below.

Substance	pH	Colour
water	7	green
vinegar	4	purple
hydrochloric acid	2	red
baking soda	9	green
sodium hydroxide	12	green

- (a) Why can blueberry juice be described as an indicator?

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[2]

- (b) Describe how a chemical indicator can be made from blueberries.

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[3]

Examiner Only

Marks Remark

- (c) Use the information from the student's results to complete the table below.

Substance	Colour of blueberry indicator
weak acid	
strong acid	
neutral	green

[2]

- (d) Another student had two beakers of colourless liquids; one was water and one was sodium hydroxide. Explain why the blueberry indicator could not be used to tell which was which.

\_\_\_\_\_ [1]

- (e) Give **one** advantage of using a pH sensor (meter) rather than a chemical indicator.

\_\_\_\_\_ [1]

Examiner Only

Marks Remark

- 6 Soap solution was used to test the hardness of four water samples (**A**, **B**, **C** and **D**). Each sample was tested by shaking 10 cm<sup>3</sup> of the water for 20 seconds with 10 drops of soap solution. The test was then repeated with boiled water samples. The results are shown below.

Sample	Before boiling	After boiling
<b>A</b>	lather	lather
<b>B</b>	no lather	lather
<b>C</b>	no lather	lather
<b>D</b>	no lather	no lather

- (a) Which water sample (**A**, **B**, **C** or **D**) came from a soft water area?

\_\_\_\_\_ [1]

- (b) What can be concluded about the type of hardness in sample **B**?  
Explain your answer.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [2]

- (c) State **two** things that were done in the test to make sure the results were valid (fair test).

1. \_\_\_\_\_  
\_\_\_\_\_  
2. \_\_\_\_\_  
\_\_\_\_\_ [2]

Examiner Only

Marks Remark

(d) Name **one** metal ion present in hard water.

\_\_\_\_\_ [1]

(e) Washing soda can be added to hard water to make it softer. The chemical formula for washing soda is  $\text{Na}_2\text{CO}_3$ . How many elements are present in washing soda?

\_\_\_\_\_ [1]

Examiner Only	
Marks	Remark

- 7 The reactions of three different metals (**X**, **Y** and **Z**) were investigated. The table below gives some information about these reactions.

Metal	Reaction with cold water	Reaction with dilute acid	Reaction when heated in oxygen
<b>X</b>	no reaction	no reaction	black coating formed on metal
<b>Y</b>	reacts vigorously, producing orange sparks	dangerous reaction, not carried out in school	burns vigorously with an orange/yellow flame
<b>Z</b>	no reaction	reacts steadily	burns forming a yellow solid, which changes to white on cooling

- (a) Using the letters **X**, **Y** and **Z**, put the three metals in order of reactivity. Start with the most reactive metal.

\_\_\_\_\_ most reactive  
 \_\_\_\_\_  
 \_\_\_\_\_ least reactive [1]

- (b) Using the information in the table, suggest the name of metal **Y**.

\_\_\_\_\_ [1]

- (c) Name the gas produced when a metal reacts with dilute acid.

\_\_\_\_\_ [1]

- (d) What name is given to the **type** of reaction when oxygen is added to a substance?

\_\_\_\_\_ [1]

Examiner Only

Marks Remark

8 Part of the modern Periodic Table is shown below.

	Be				O	F	He
Na		Al	Si	P		Cl	Ne
K	Ca						

Using **only** the elements shown above, answer the following questions. You may find your Data Leaflet helpful.

(a) Give the symbols of the two elements that are halogens.

\_\_\_\_\_ and \_\_\_\_\_ [1]

(b) Give the symbol of the element that has six electrons in its outer electron shell.

\_\_\_\_\_ [1]

(c) Give the symbol of the element in the same Group as beryllium.

\_\_\_\_\_ [1]

(d) Give the symbol of **one** element that is a gas at room temperature.

\_\_\_\_\_ [1]

(e) How many of the elements shown are in Period 3?

\_\_\_\_\_ [1]

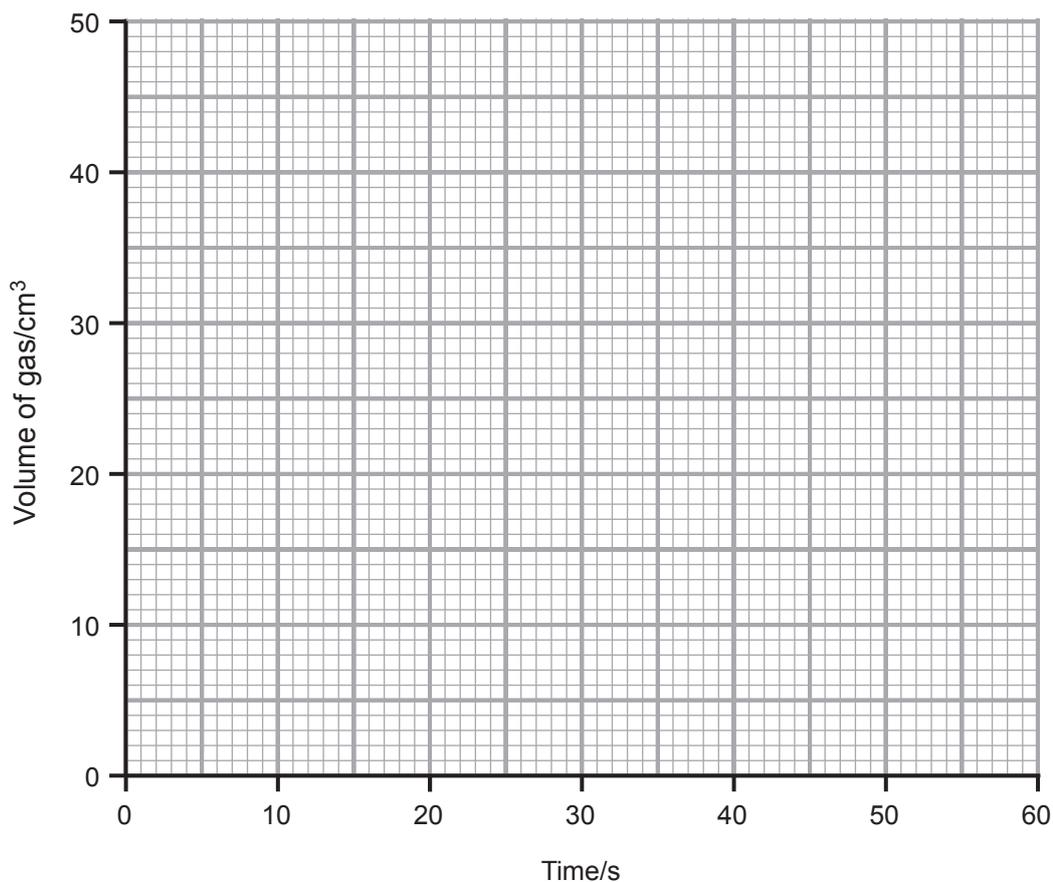
Examiner Only

Marks Remark

- 9 When acid is added to sodium hydrogencarbonate a gas is produced. The table below shows the volume of gas produced by this reaction over 60 seconds.

Time/s	0	10	20	30	40	50	60
Volume of gas/cm <sup>3</sup>	0	18	34	45	48	48	48

- (a) On the grid below plot a **line** graph for these results.



[3]

- (b) Describe fully the trend shown by these results.

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[2]

Examiner Only	
Marks	Remark

(c) The gas produced during this reaction is carbon dioxide.

(i) Name the chemical used to test for carbon dioxide.

\_\_\_\_\_ [1]

(ii) Give the colour change observed during the test for carbon dioxide.

\_\_\_\_\_ to \_\_\_\_\_ [2]

Examiner Only	
Marks	Remark





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