



Rewarding Learning

General Certificate of Secondary Education
2015–2016

Centre Number

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Candidate Number

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Science: Single Award

Unit 2 (Chemistry)
Foundation Tier



[GSS21]

THURSDAY 25 FEBRUARY 2016, 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 eleven** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 60.
Quality of written communication will be assessed in Question 9.
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	
11	

Total Marks	
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1 The hazard symbol below was found on a lorry carrying methylated spirit.



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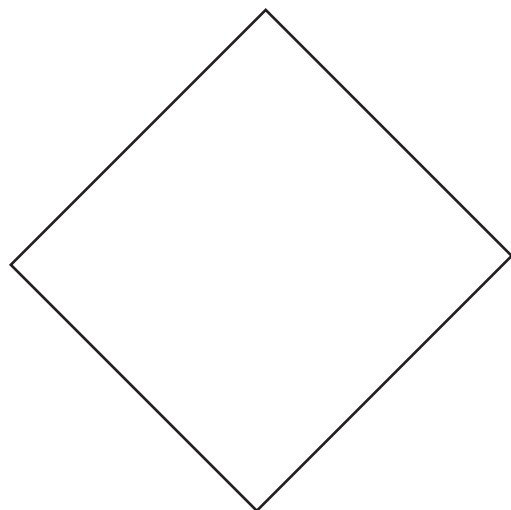
(a) Name the hazard symbol shown above.

_____ [1]

(b) Hazard symbols warn of danger. Give **one** reason why symbols are used and not just words.

[1]

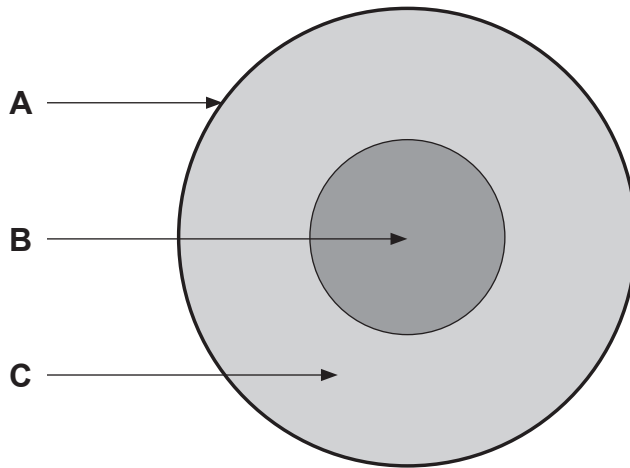
(c) In the space below, draw the hazard symbol for a **toxic** substance.



[1]

Examiner Only	
Marks	Remark

3 Below is a diagram of the structure of the Earth.



(a) Complete the table below to match each layer to its correct name.

Choose from:

core mantle nucleus crust

Layer	Name
A	
B	
C	

[3]

(b) Complete the following sentence.

The surface of the Earth contains three types of rock; these are called igneous, sedimentary and _____ . [1]

Examiner Only	
Marks	Remark

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(Questions continue overleaf)

4 Garden furniture is often made from plastic.



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- (a) Suggest **one** property that makes plastic a suitable material for making garden furniture. Explain why this property makes it suitable.

[2]

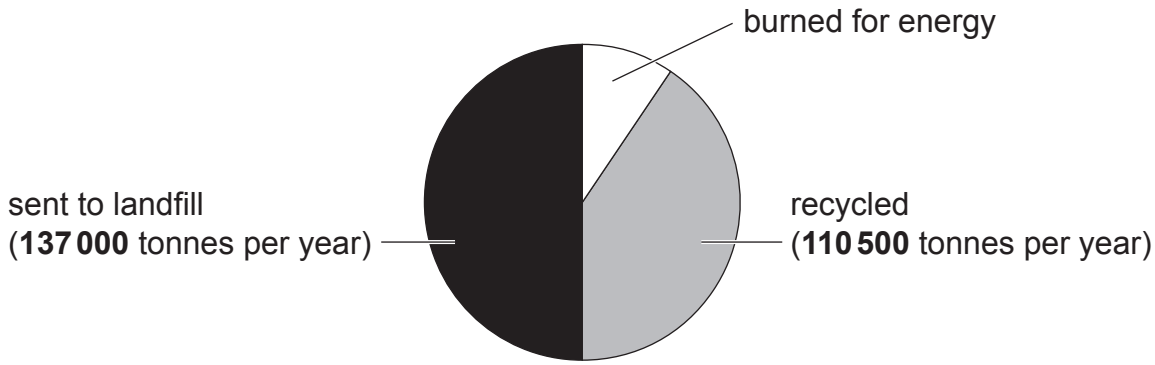
- (b) Wood can also be used to make garden furniture. It absorbs water, is easily available, and can be cut into many shapes.

Using the information above, give **one** disadvantage of using wood to make garden furniture. Explain your answer.

[2]

Examiner Only	
Marks	Remark

The pie chart below shows three methods used in the UK to dispose of waste plastic.



In the UK a total of **275 000** tonnes of waste plastic is disposed of each year.

(c) Calculate the amount of waste plastic that is burned for energy each year.

(Show your working out.)

_____ tonnes [2]

(d) Given below is information about three types of fibres used to make clothing.

Type of fibre	Strength	Keeps its shape	Weight	Ability to absorb water	Biodegradable
Cotton	average	no	heavy	good	yes
Nylon	very strong	yes	light	average	no
Polyester	strong	yes	very light	poor	no

(i) Name the natural fibre shown in the table above.

_____ [1]

(ii) Which fibre would be the best to use in the manufacture of raincoats? Choose **two** properties from the table to support your answer.

Fibre _____

Property 1 _____

Property 2 _____ [2]

Examiner Only	
Marks	Remark

5 (a) Given below are the steps a student used to test for hard water. They are **not** in the correct order.

- A Stop adding soap solution when a permanent lather forms
- B Add 5 cm³ of soap solution and shake well
- C Measure 25 cm³ of water into a conical flask
- D Record the volume of soap used to form a permanent lather
- E Continue adding soap solution 5 cm³ at a time

(i) Using the letters **A, B, C, D** and **E** put the steps in the correct order. The first one has been done for you.

 C _____ _____ _____ _____ _____ [2]

(ii) Suggest why the student shakes the water samples after adding soap solution.

_____ [1]

(iii) Apart from taste, give **one** advantage of drinking hard water.

_____ [1]

Examiner Only	
Marks	Remark

(b) Water can be hard or soft; and hard water can be temporary or permanent.

Using lines, match each statement to the correct type of water.

Statement

Type of water

Easily makes a lather with soap

Permanent hard water

Temporary hard water

Can be softened by boiling

Soft water

[2]

(c) Name **one** chemical compound which causes temporary hardness in water.

_____ [1]

Examiner Only

Marks

Remark

- 6 The positions and chemical symbols of six elements in the Periodic Table are shown below.

Na																				
	Ca																			

- (a) Using **only** the symbols given, identify the element from the descriptions below.

(i) A lightweight metal used in aeroplanes.

_____ [1]

(ii) A metal with properties similar to those of lithium (Li).

_____ [1]

(iii) A noble gas.

_____ [1]

- (b) A student adds a metal to water, it floats and burns with a lilac flame. On the Periodic Table above use the letter **X** to show the position of this metal. [1]

- (c) Beryllium is in Group 2 of the Periodic Table. Which **one** of these statements is correct for beryllium? Tick (✓) the correct box.

Statement	Tick
it is a halogen	
it belongs to the same Period as oxygen	
it is a compound	

[1]

Examiner Only

Marks Remark

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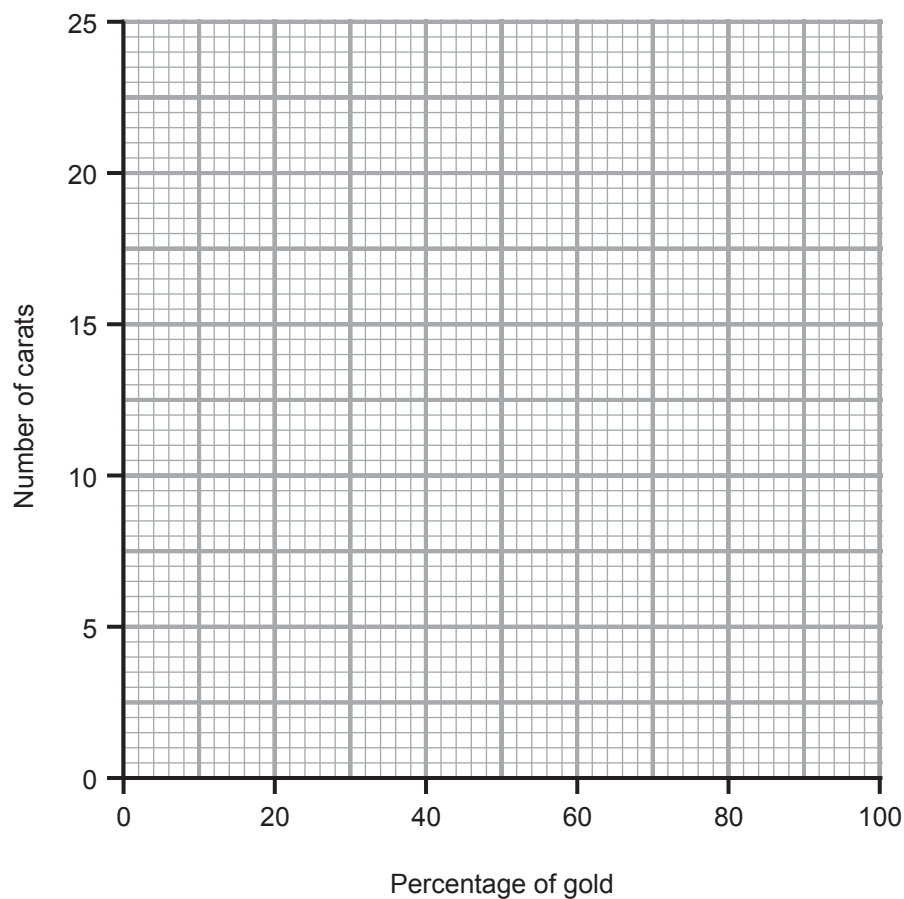
(Questions continue overleaf)

- 7 (a) Gold is a metal element used in jewellery. The purity of gold is often measured in carats.

The table below shows how the number of carats is related to the percentage of gold.

Percentage of gold	Number of carats
100	24
92	22
75	18
38	9

- (i) On the grid below plot and draw a line graph for this information.



[2]

- (ii) State the trend shown by this information.

[1]

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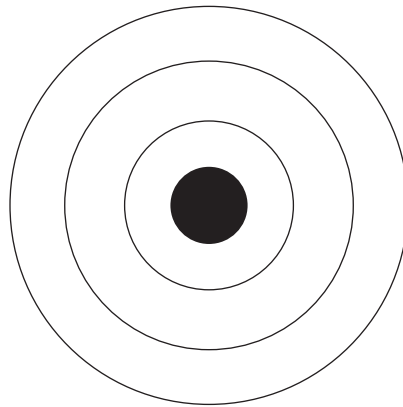
Marks

Remark

(iii) Use the graph to find the percentage of gold in a 14 carat gold ring.

_____ % [1]

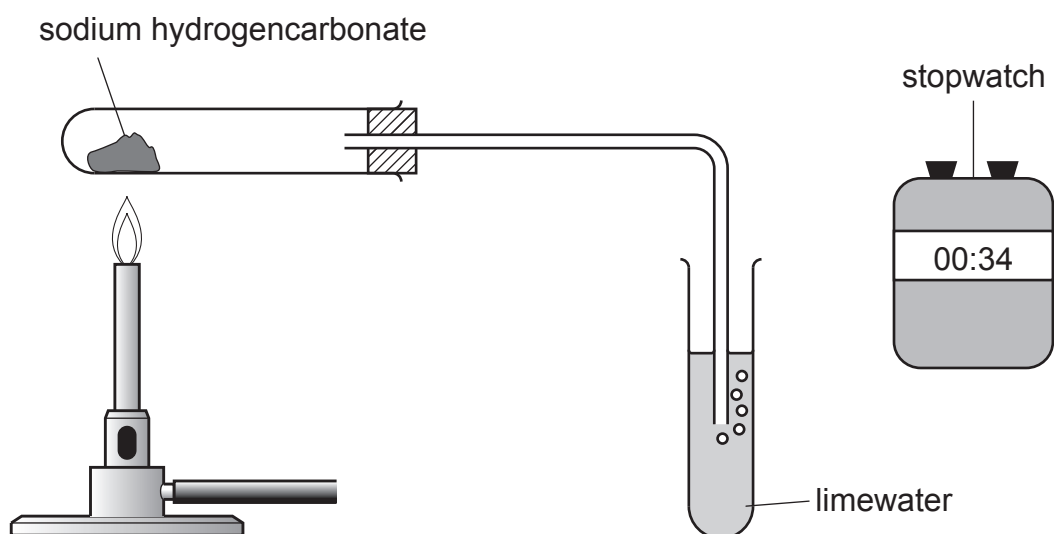
(b) Aluminium is often added to gold in jewellery. An atom of aluminium has 13 electrons. Complete the diagram below to show how all these electrons are arranged.



[1]

Examiner Only	
Marks	Remark

- 8 Sarah investigated the effect of heating a **small** amount of sodium hydrogencarbonate using the apparatus shown below.



Sarah's observations are shown in the table below.

Time interval/ seconds	Observations
0 to 30	Small number of gas bubbles observed in limewater. The limewater remained colourless
31 to 60	A large number of gas bubbles. The limewater turned cloudy
61 to 90	No bubbles

(a) In this investigation:

(i) name the gas produced.

_____ [1]

(ii) name the type of reaction that produced this gas.

_____ [1]

Examiner Only

Marks Remark

(b) Suggest **one** reason for Sarah's observations between 0 and 30 seconds.

[1]

(c) Explain fully Sarah's observation between 61 and 90 seconds.

[2]

Examiner Only	
Marks	Remark

9 The fingerprint shown below was found on the door of a stolen black car.



© Science Source / Science Photo Library

Describe how the fingerprint can be taken from the black car and kept as evidence.

Your answer should include:

- the type of fingerprint shown above,
- why the fingerprint may be useful in helping solve the crime.

In this question you will be assessed on your written communication skills including the use of specialist scientific terms.

[6]

Examiner Only	
Marks	Remark

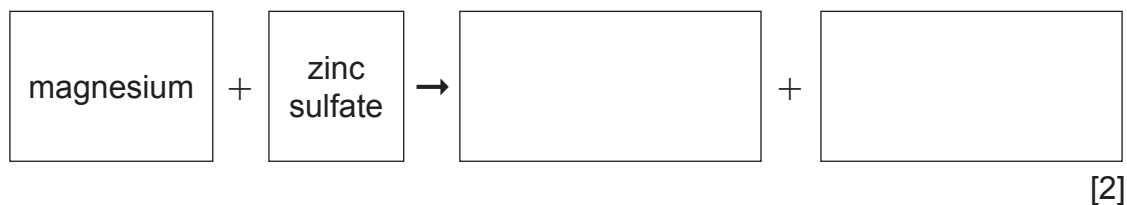
- 10 The reactivity of three metals, copper, zinc and magnesium, was investigated by adding a small amount of each to sulfate solutions of the other metals.

Some results are shown below.

If there was a reaction a tick (✓) was used; for no reaction a cross (X) was used.

Solution	Copper sulfate	Zinc sulfate	Magnesium sulfate
Metal			
Copper		X	
Zinc			
Magnesium		✓	

- (a) Use your knowledge of the reactivity series to complete the table above. [2]
- (b) Complete the word equation for the reaction between magnesium and zinc sulfate.



- (c) Name this type of reaction.
- _____ [1]

Examiner Only	
Marks	Remark

- 11 The table shows some chemicals that can be separated from **one** barrel of crude oil.

Chemicals	Amount in one barrel/gallons
petrol	2.2
jet fuel	4.8
fuel oil	2.8
diesel	8.0
others	7.4

- (a) Name the process used to separate crude oil into these different chemicals.

_____ [1]

- (b) Name **one** other chemical that can be separated from crude oil.

_____ [1]

- (c) A plane needs 4800 gallons of **jet fuel** for one journey. Calculate how many barrels of crude oil are needed for this journey.

(Show your working out.)

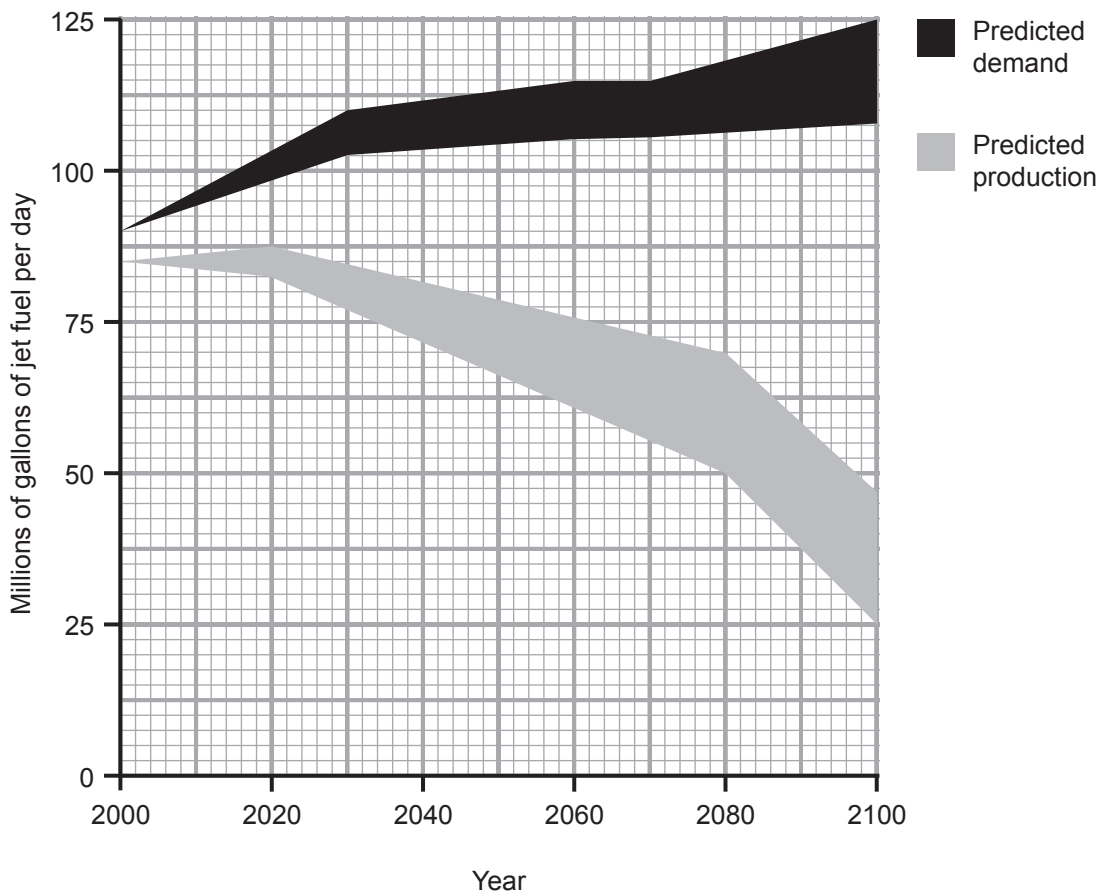
_____ [2]

Examiner Only

Marks

Remark

The graph below shows the predicted demand for jet fuel. It also shows the predicted production of jet fuel from crude oil.



(d) Use the graph to explain why airline companies are investing large amounts of money to find alternative sources of fuel for their aircraft.

_____ [2]

(e) Suggest **two** reasons why these predictions may not be accurate.

1. _____

2. _____ [2]

THIS IS THE END OF THE QUESTION PAPER

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Marks	Remark

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