



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)
Higher Tier

[GSS22]

THURSDAY 25 FEBRUARY 2016, MORNING



TIME

1 hour 15 minutes.

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 75.
Quality of written communication will be assessed in Questions **3** and **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	
11	

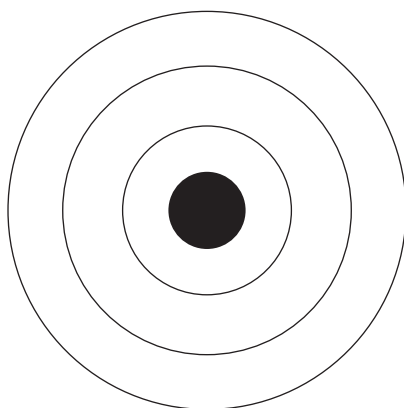
Total
Marks

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

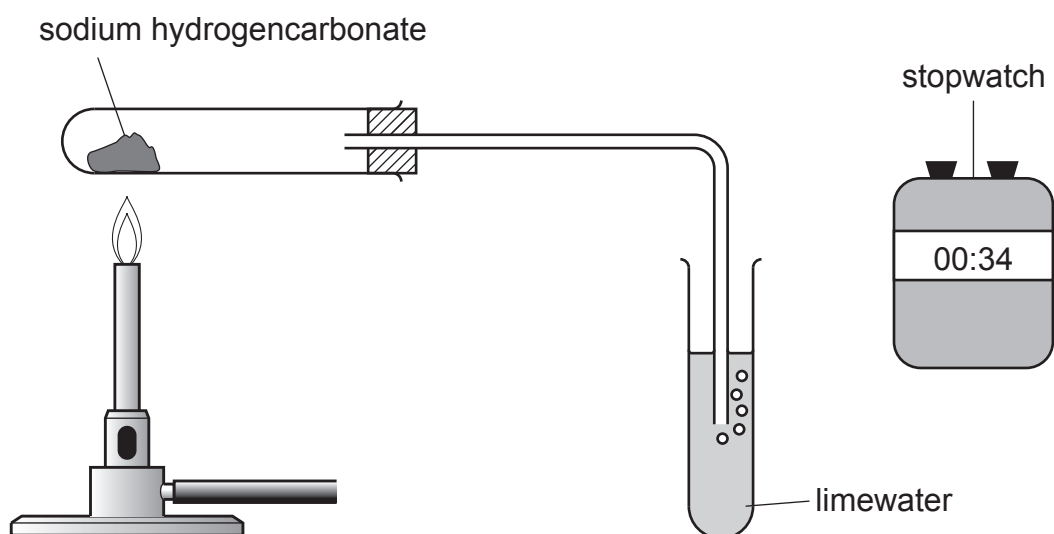
_____ % [1]

(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]

- 2** 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

3 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]

- 4 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.

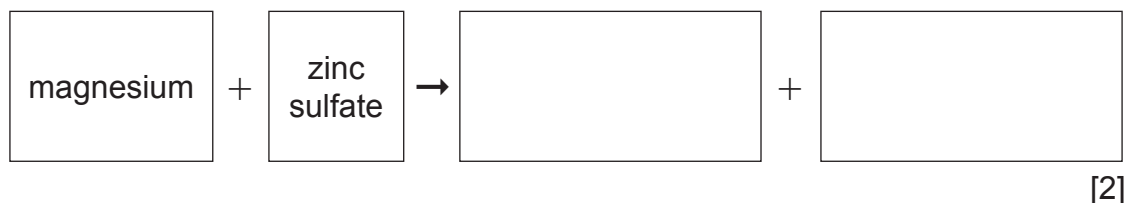
Some results are shown below.

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

Solution Metal	Copper sulfate	Zinc sulfate	Magnesium sulfate
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

- 5** 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]

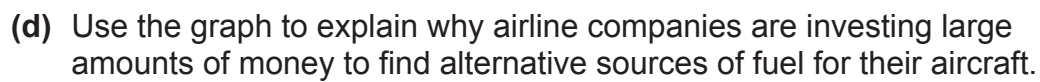
- (c) A plane needs 4800 gallons of **jet fuel** for one journey. Calculate how many barrels of crude oil are needed for this journey.

(Show your working out.)

[2]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark



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

- [Turn over**

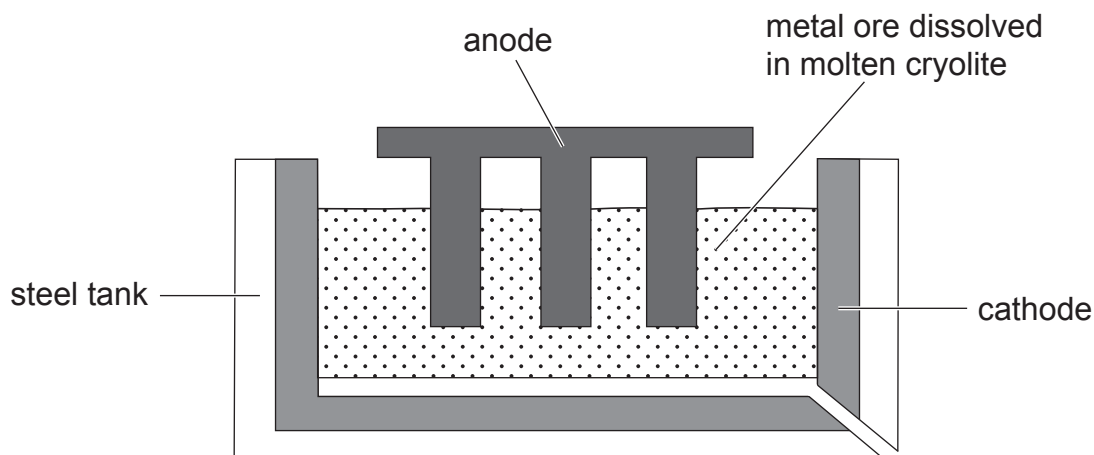
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(Questions continue overleaf)

(c) Electrolysis plays an important part in extracting some metals from their ores.

(i) Name **one** metal that is obtained from its ore by electrolysis.

_____ [1]

The apparatus shown below is used for electrolysis.



Source: CCEA

(ii) Name **one** material often used to make the anode and the cathode. Explain your choice.

 _____ [2]

(iii) Complete the following sentence.

In this extraction process the cathode is

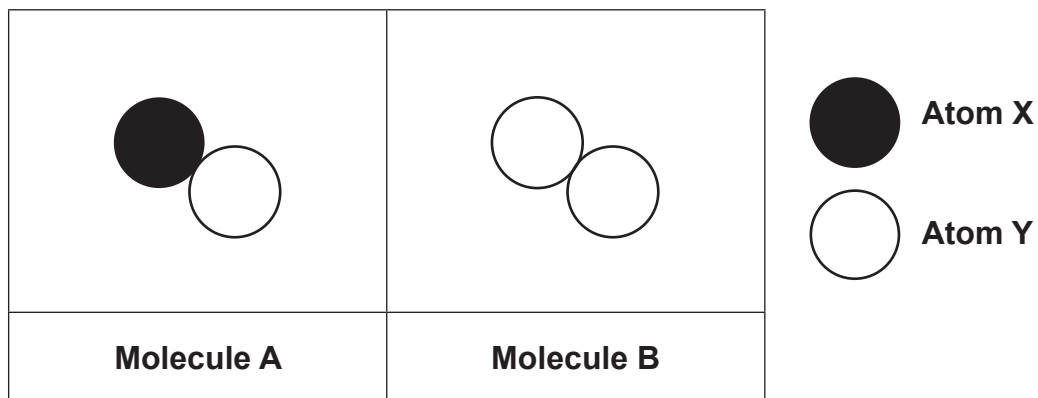
the _____ charged electrode. [1]

Examiner Only	
Marks	Remark

During a lesson on elements and compounds a student made the following statement.

“Since all compounds are molecules, then all molecules must be compounds.”

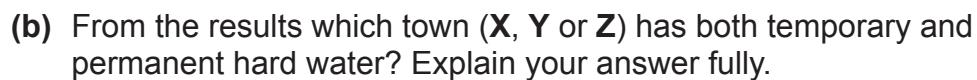
- (c) Explain with reference to **both** molecules **A** and **B** shown below why this statement is incorrect.



[3]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark



(c) Name a compound which causes permanent hardness in water.

 [1]

11 (a) The following chemical compounds are all hydrocarbons.

ethane

propane

ethene

butane

(i) Which of the above compounds is **not** an alkane?

_____ [1]

(ii) Complete the table below about two hydrocarbons.

Name of hydrocarbon	Molecular formula	Structural formula
methane	CH ₄	
butane		<pre> H H H H H — C — C — C — C — H H H H H</pre>

[2]

Polypropene is made by a process involving propene molecules.

(b) Name the process used to make polypropene.

_____ [1]

The word equation for the combustion of propane is given below.

propane + oxygen → carbon dioxide + water

(c) Write the **balanced symbol** equation for the combustion of propane.

_____ [3]

THIS IS THE END OF THE QUESTION PAPER

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