



General Certificate of Secondary Education
2012–2013

Science: Single Award

Unit 2 (Chemistry)

Foundation Tier

[GSS21]

TUESDAY 26 FEBRUARY 2013, MORNING

Centre Number

71

Candidate Number



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 nine** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 60.

Quality of written communication will be assessed in question 8.
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	

Total Marks	
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1 Some chemicals in the school laboratory have symbols on their labels to warn of danger.

(a) What name is given to these symbols?

Circle the correct answer.

harmful hazard safety universal [1]

(b) Below are three symbols and some descriptions of the dangers. Using lines match each symbol to **one** description of a danger it may cause.

Symbol	Danger
	<input type="text" value="Could blow up"/>
	<input type="text" value="Could poison you"/>
	<input type="text" value="Can cause cancer"/>
	<input type="text" value="Can damage your skin"/>

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[3]

(c) Tick (✓) **two** boxes below which explain why symbols are better than words.

They can be understood in many countries

They are more eye catching

They take up less space

They tell you more information

[2]

Examiner Only	
Marks	Remark

- 2 (a) The list below shows materials used in some types of sports equipment.

Using lines, match each material to **one** property that makes it suitable for that use. One has been done for you.

Material	Property
Aluminium in bicycles	High strength
Plastic in fishing rods	High melting point
Fibres in climbing ropes	Low density
Ceramic brakes in racing cars which get very hot	Flexible
	Good conductor of electricity

[3]

- (b) Some golf clubs are made from carbon fibre reinforced plastic. This material combines the properties of carbon fibre and plastic.

What name is given to this type of material?

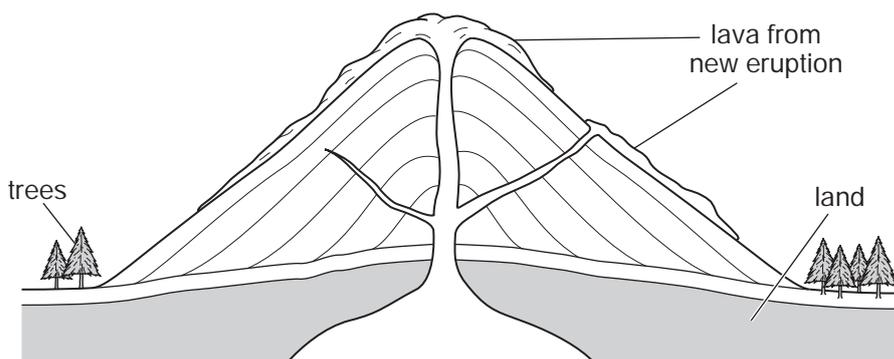
Choose from:

composite synthetic modern

_____ [1]

Examiner Only	
Marks	Remark

3 The diagram below shows a cross-section through a volcano.

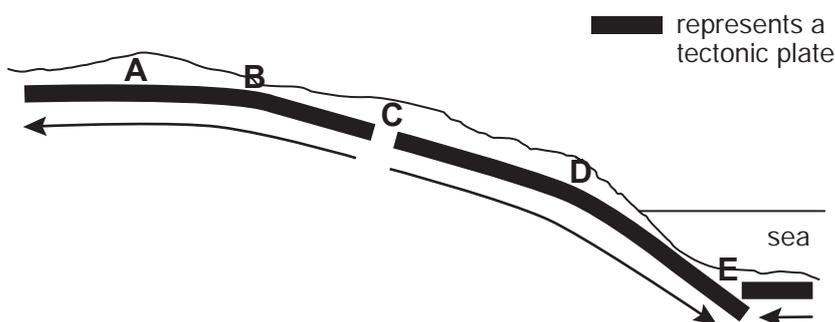


Source: Principal Examiner Phyllis VandeVyver, CCEA

(a) What evidence is there in this diagram to show that the volcano has erupted many times?

_____ [1]

(b) The diagram below represents a section close to the surface of the Earth. The arrows show the direction in which the tectonic plates are moving.



Source: Principal Examiner Phyllis VandeVyver, CCEA

(i) At which point on the diagram A, B, C, D or E is there most likely to be an earthquake?

_____ [1]

(ii) At which two points on the diagram are there likely to be volcanoes?

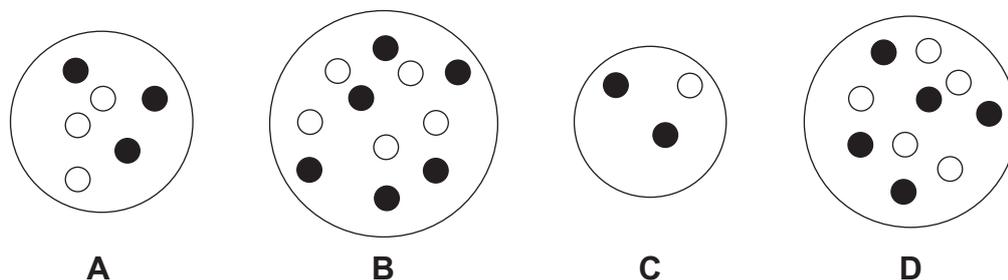
Circle the correct answer.

A and D **C and E** **B and D** [1]

Examiner Only	
Marks	Remark

- 4 The diagrams below show the nucleus from four different atoms **A**, **B**, **C** and **D**.

(You may find your Data Leaflet useful in answering this question.)



Key:	● Neutron
	○ Proton

- (a) Which atom **A**, **B**, **C** or **D** has an atomic number of three?

_____ [1]

- (b) What is the name of element **D**?

_____ [1]

- (c) Which two atoms **A**, **B**, **C** or **D** are of the same element?

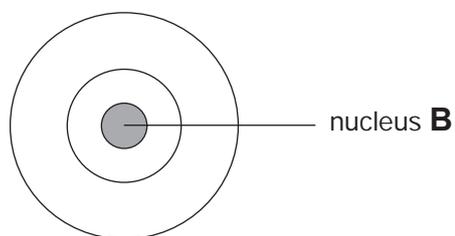
_____ and _____ [1]

Examiner Only	
Marks	Remark

(d) (i) How many electrons does atom **B** have?

_____ [1]

(ii) Complete the diagram below to show the arrangement of these electrons in atom **B**.



[1]

(e) In what Group and Period of the Periodic Table would you find atom **A**?

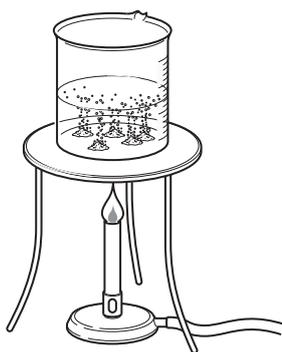
Group _____

Period _____

[2]

Examiner Only	
Marks	Remark

- 5 Red cabbage leaves can be used to make a coloured liquid which changes colour in acids and alkalis.

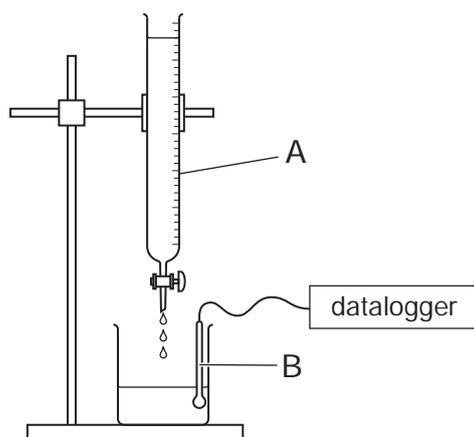


Source: Principal Examiner Phyllis VandeVyver, CCEA

- (a) What name is given to a substance which changes colour in acids and alkalis?

_____ [1]

- (b) The diagram below shows apparatus used to follow a neutralisation reaction in the laboratory.



Source: Principal Examiner Phyllis VandeVyver, CCEA

Name the pieces of apparatus labelled A and B.

Choose from:

thermometer : measuring cylinder : burette : pipette : pH sensor

A _____

B _____

[2]

Examiner Only

Marks Remark

Red cabbage dye and red litmus paper change colour as shown in the table below.

Chemical	Colour of red cabbage dye	Colour of red litmus paper	pH range
Hydrochloric acid	red	red	1–2
Sodium hydroxide	yellow	blue	12–14
Water	purple	red	7
Ethanoic acid	red	red	3–6
Sodium hydrogencarbonate	green	blue	8–10

(c) Explain why red litmus paper is not as good as red cabbage dye when testing the pH of chemicals.

[2]

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Marks Remark

6 (a) Below are some natural and synthetic materials.

linen	polyester	wool	nylon
Lycra	cotton	silk	

(i) What is meant by the term natural material?

_____ [1]

(ii) List any **three** of the natural materials given above.

_____ [1]

The picture below shows a cyclist wearing a modern cycling suit.



© iStockphoto / Thinkstock

The following table gives some information about materials that could be used to make the cycling suit.

Material	Effect of washing	Can stretch	Effect of sunlight	Effect of sweat
cotton	can shrink	no	colour fades	stains
Lycra	does not shrink	yes	colour does not fade	does not stain
linen	shrinks	no	colour fades	stains
polyester	does not shrink	no	colour does not fade	does not stain

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Marks Remark

- 7 The photograph below shows the Marble Arch Caves in County Fermanagh. The water in this area is described as being hard.



© Northern Ireland Tourist Board

- (a) What is meant by the term **hard water**?

[2]

The table below gives the results of an experiment to test the hardness of different water samples.

Water sample	Volume of soap solution needed to form a lather before boiling/cm ³	Volume of soap solution needed to form a lather after boiling/cm ³
A	20	15
B	4	3
C	14	2
D	24	11

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Marks Remark

(b) Use this information to answer the following questions.

(i) Which sample **A**, **B**, **C** or **D** of water is the least hard?

_____ [1]

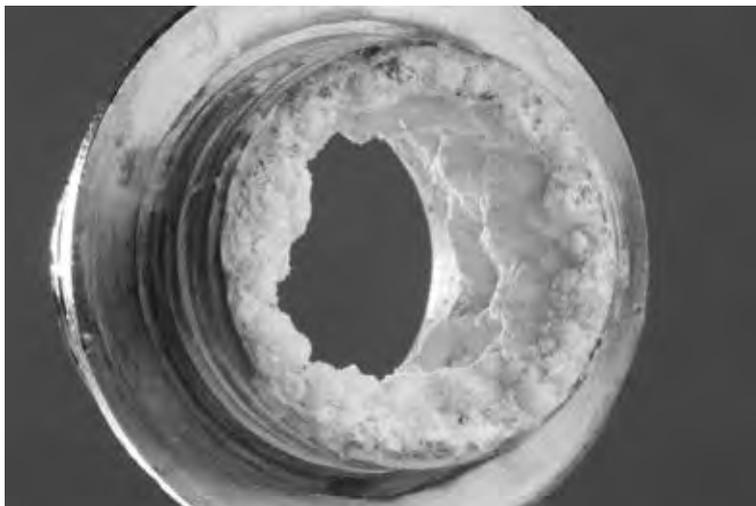
(ii) Which sample **A**, **B**, **C** or **D** contains only temporary hardness?

_____ [1]

(iii) Which **two** samples **A**, **B**, **C** or **D** contain both temporary and permanent hardness?

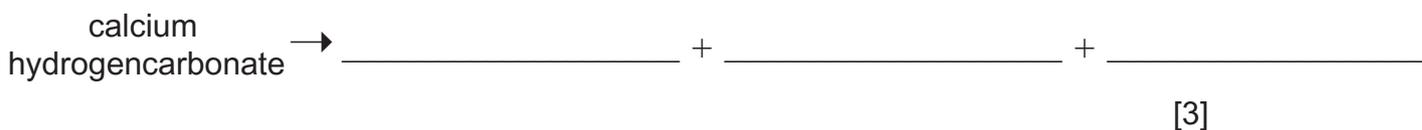
_____ and _____ [1]

(c) Hard water can cause unwanted deposits in hot water pipes.



© Martyn F Chillmaid / Science Photo Library

Complete the word equation for the reaction that forms the unwanted deposits.



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Marks	Remark

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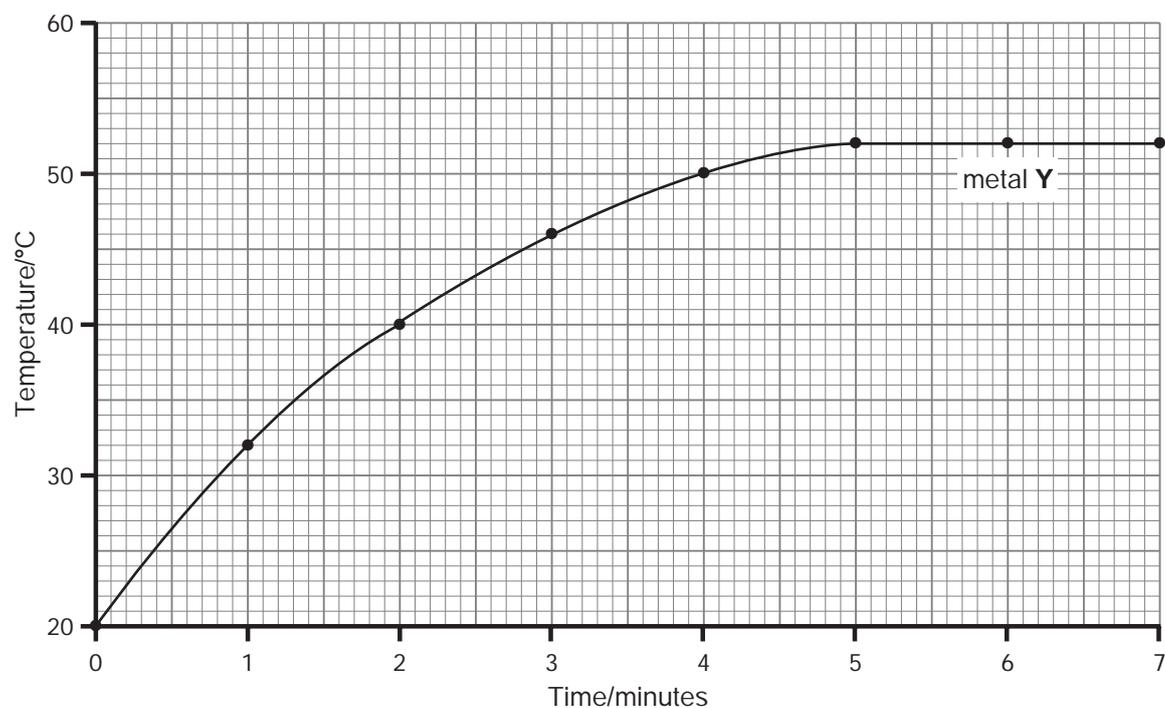
- 9 Karen carried out an experiment to investigate the reactivity of two metals X and Y. She added 2 grams of metal X to 20 cm³ of copper sulfate solution (in excess) in a boiling tube. She recorded the temperature of the mixture every minute for seven minutes. She repeated the procedure for metal Y.

The table of results is shown below.

Time/minutes	0	1	2	3	4	5	6	7
Temperature/°C metal X	20	35	44	51	56	58	59	59
Temperature/°C metal Y	20	32	40	46	50	52	52	52

The graph below shows the results for metal Y.

- (a) On the same grid plot the results for metal X and draw a line of best fit.



[3]

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Marks Remark

(b) (i) Describe the trend shown in the graph for metal Y.

_____ [2]

(ii) Describe **one** difference between the results for metals X and Y.

_____ [1]

(c) (i) Calculate the total increase in temperature for metal X.

_____ °C [1]

(ii) What type of chemical reaction caused this increase in temperature?

Choose from:

combustion

displacement

neutralisation

_____ [1]

(iii) Using the information from the graph and your knowledge suggest an order of reactivity of the metals, **copper**, X and Y.

_____ [2]
 most reactive _____ least reactive

THIS IS THE END OF THE QUESTION PAPER

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Marks	Remark

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