Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2012–2013

Science: Single Award

Unit 2 (Chemistry)

Foundation Tier

[GSS21]

GSS21

TUESDAY 26 FEBRUARY 2013, 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 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	

Examiner Only	
Marks	Remark

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
	Could blow up
	Could poison you
	Can cause cancer
	Can damage your skin

[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 ☐

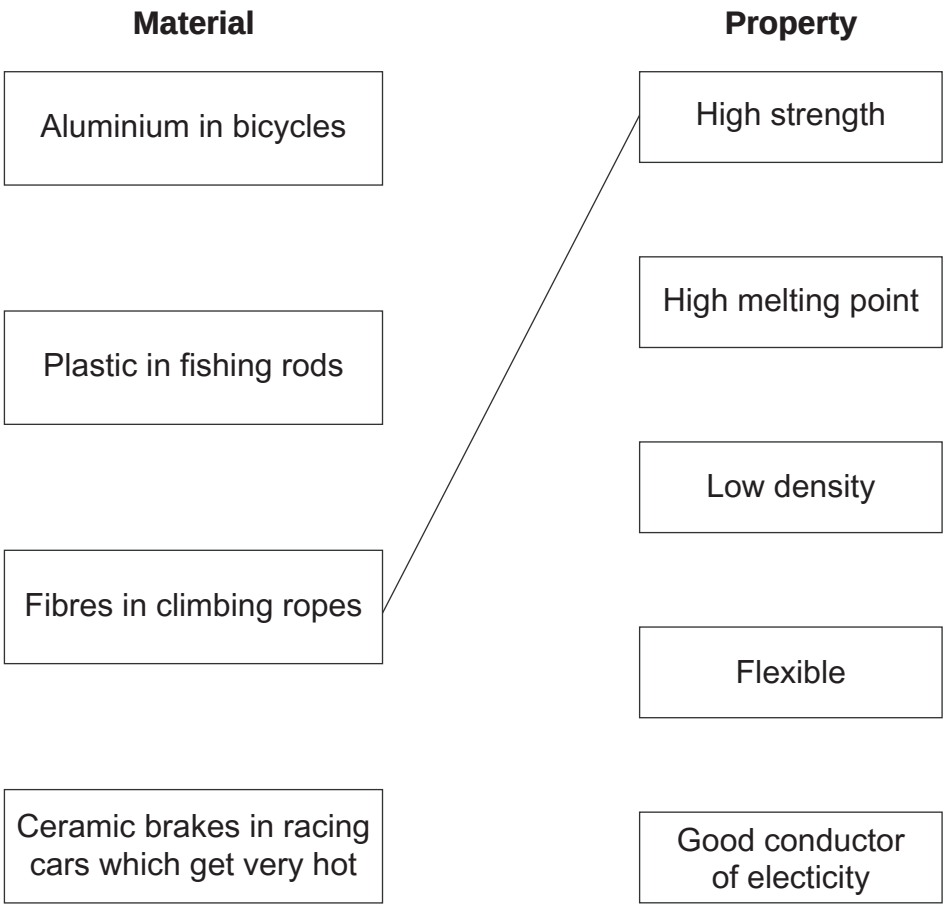
They take up less space ☐

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.



[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?

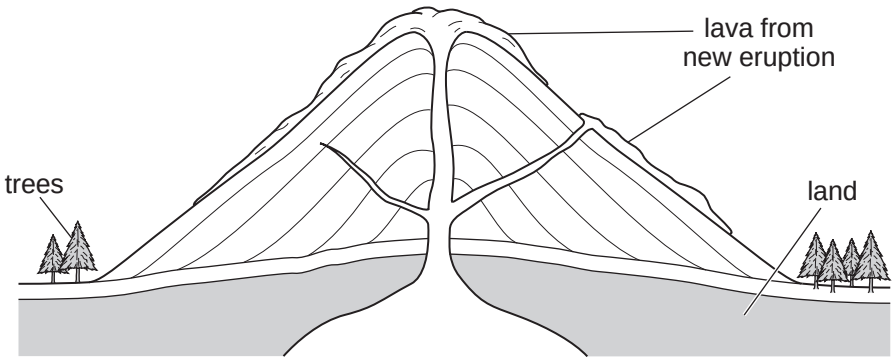
Choose from:

composite **synthetic** **modern**

_____ [1]

Examiner Only	
Marks	Remark

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

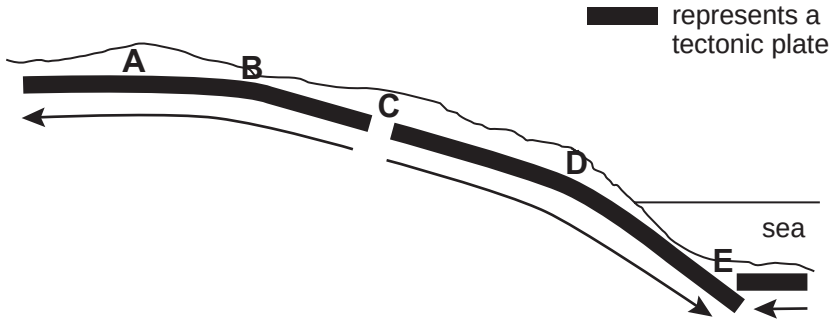


Source: Principal Examiner Phyllis VandeVyver, CCEA

(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]

(c) Describe fully what happens during a volcanic eruption including one effect on the environment.

_____

_____

_____

_____ [3]

(d) Name the **type of rock** produced by volcanic activity and give one example.

Type of rock _____

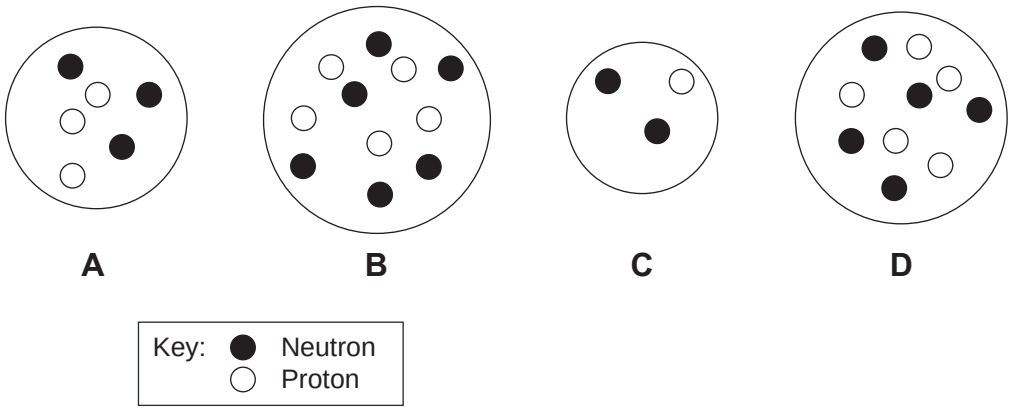
Example _____ [2]

Examiner Only	
Marks	Remark

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.)



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

_____ [1]

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

_____ [1]

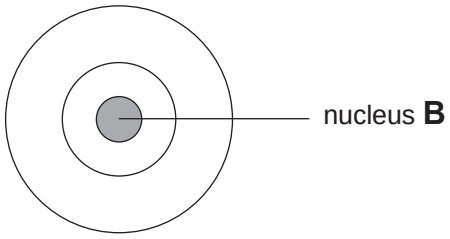
(c) Which two atoms **A**, **B**, **C** or **D** are of the same element?

_____ and _____ [1]

(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 _____

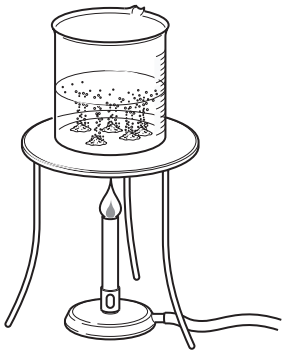
Period _____ [2]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

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

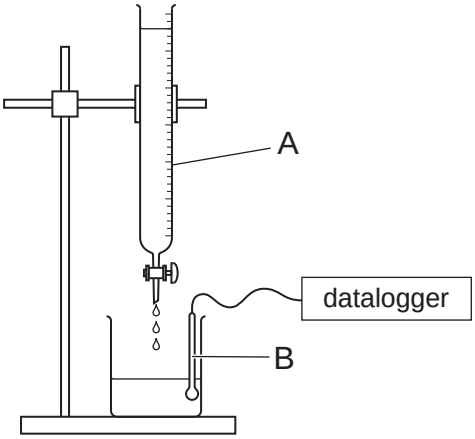


Source: Principal Examiner Phyllis VandeVyver, CCEA

(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]

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]

Examiner Only

Marks	Remark

Examiner Only	
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

(b) Use this information to decide on the best material to make a modern cycling suit. Explain your answer.

_____

_____

_____

_____

_____ [3]

(c) In Northern Ireland many people used to be employed in the linen industry.

Explain why the numbers employed have fallen.

_____ [1]

Examiner Only	
Marks	Remark

Examiner Only	
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

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

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

_____ [1]

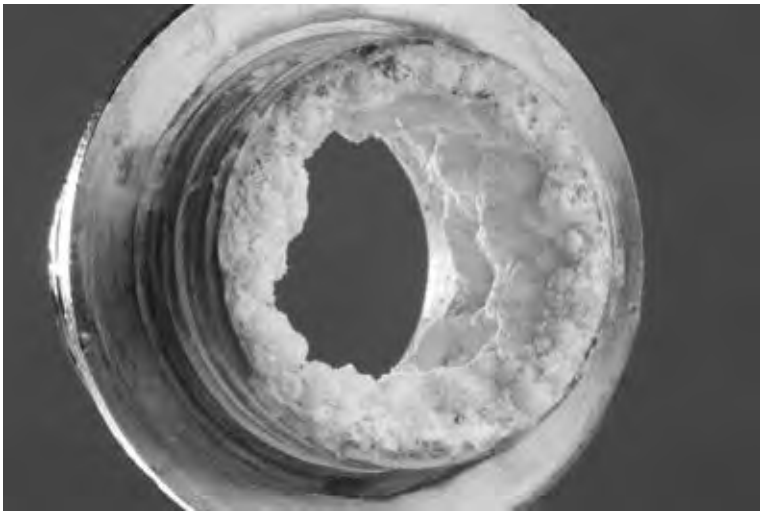
(ii) Which sample **A**, **B**, **C** or **D** contains only temporary hardness?

_____ [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.

calcium hydrogencarbonate → _____ + _____ + _____

[3]

Examiner Only	
Marks	Remark

8 Forensic scientists can help to solve crime by taking and analysing fingerprints found at the scene.

Explain fully why fingerprints are so important.

Your answer should include:

- The different types of fingerprints
- How to obtain a fingerprint from different surfaces
- How they are used in the court system

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

[6]

Examiner Only	
Marks	Remark

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(Questions continue overleaf)

Examiner Only	
Marks	Remark

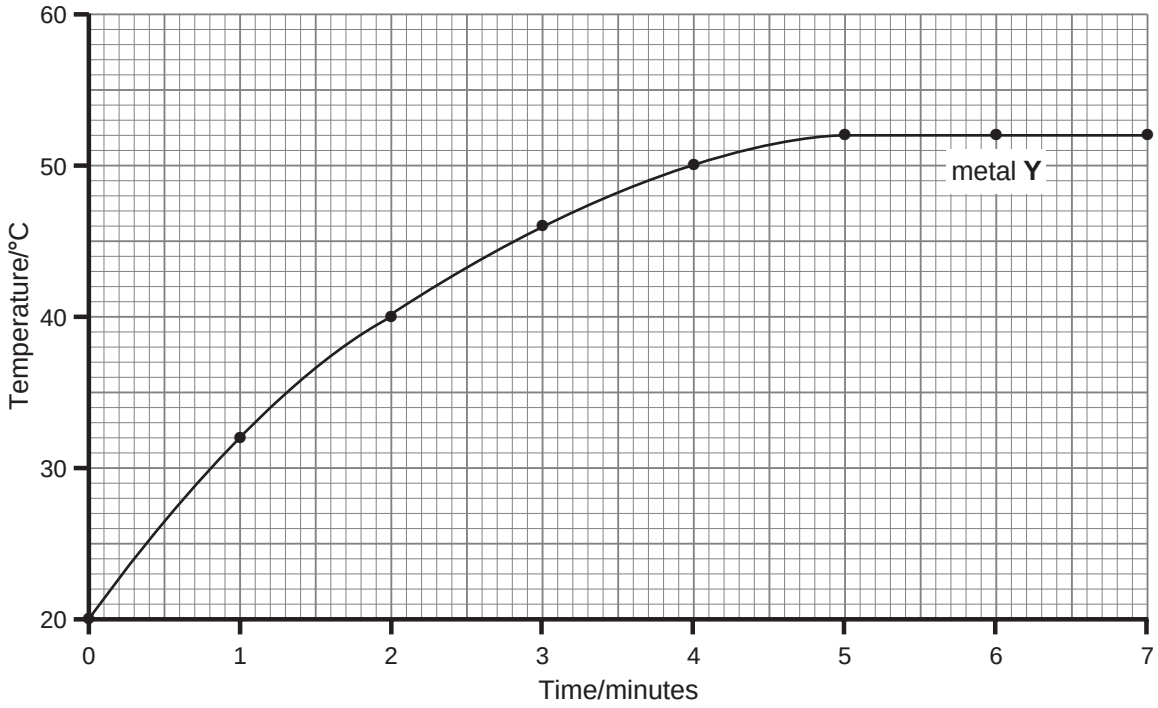
9 Karen carried out an experiment to investigate the reactivity of two metals X and Y. She added 2 grams of metal X to 20 cm^3 of copper sulfate solution (in excess) in a boiling tube. She recorded the temperature of the mixture every minute for seven minutes. She repeated the procedure for metal Y.

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]

(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

Examiner Only

Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

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