



Centre Number

71	
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Candidate Number

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General Certificate of Secondary Education
2014–2015

Science: Single Award

Unit 2 (Chemistry)

Foundation Tier

[GSS21]

MV18

THURSDAY 13 NOVEMBER 2014, MORNING

TIME

1 hour, plus your additional time allowance.

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 at the end of each question indicate the marks awarded to each question or part question.

A Data Leaflet, which includes a Periodic Table of the Elements, is included in this question paper.

- 1 (a) Given below is information about some household substances.

Complete the table. [2 marks]

Choose from:

vinegar : **baking soda** : **lemon juice**

Substance	Chemical present
Milk of Magnesia	Magnesium hydroxide
	Sodium hydrogencarbonate
	Citric acid

- (b) Hazard symbols are used to warn of danger. The hazard symbol below is found on a bottle of hydrochloric acid.



- (i) Name this hazard symbol. [1 mark]

(ii) Circle the correct pH for hydrochloric acid. [1 mark]

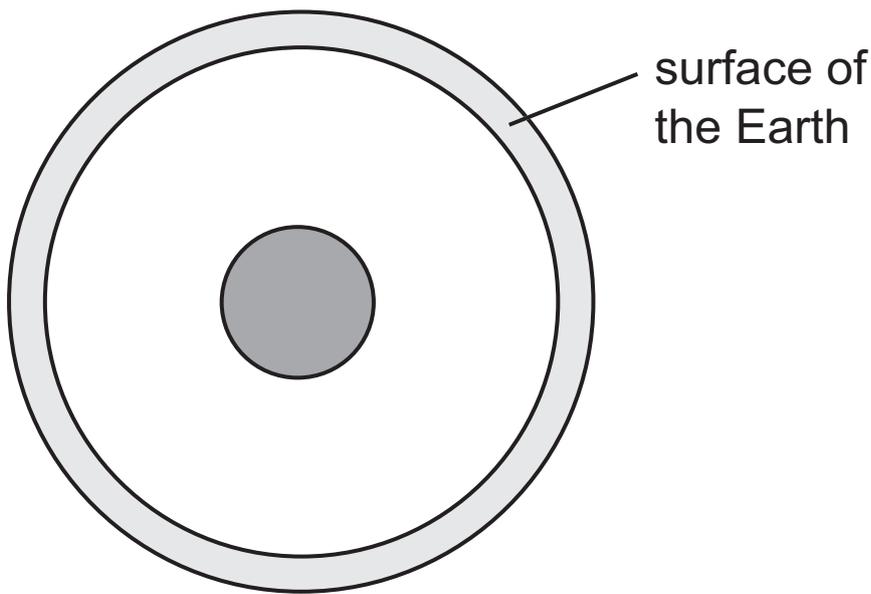
2

7

12

(c) Name a plant that can be used to make a chemical indicator. [1 mark]

2 The diagram below shows the structure of the Earth.



(a) Complete the following sentences. [3 marks]

Choose from:

core layer mantle crust nucleus

The surface of the Earth is called the

_____ .

It is made up of tectonic plates that float on the

_____ .

At the centre of the Earth is the

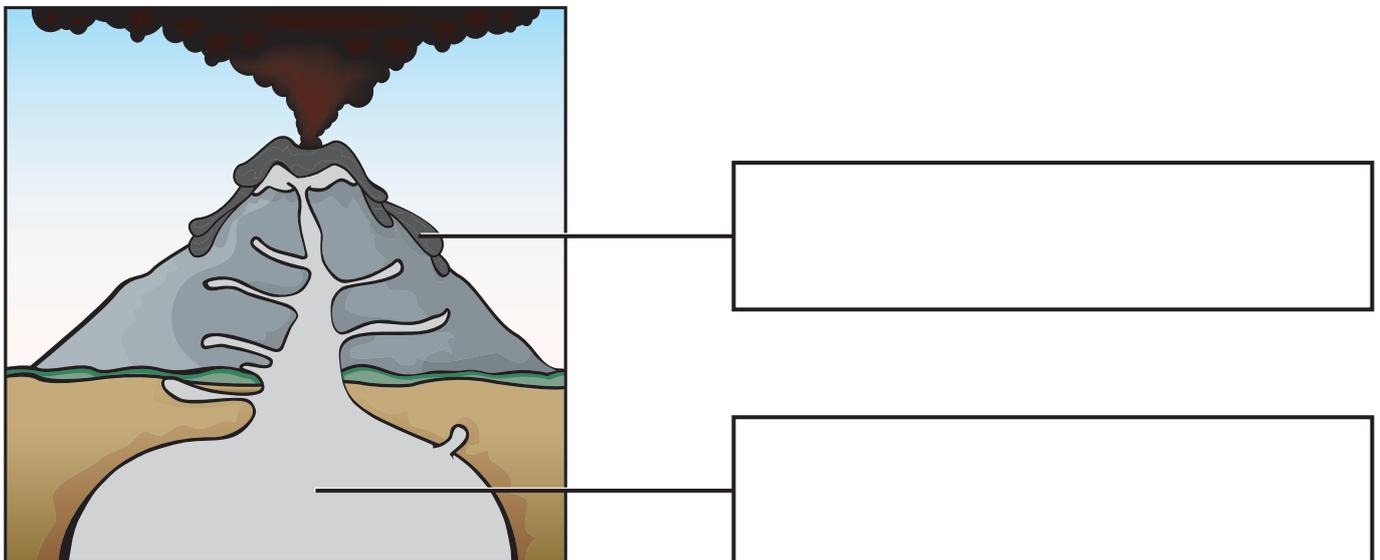
_____ .

- (b) Complete the table below about different rock types.
[2 marks]

Rock type	Example
metamorphic	marble
sedimentary	
	granite

- (c) The diagram below shows a cross-section through an active volcano.

Label the parts of the volcano shown below. [2 marks]



- 3 (a) The table below shows the pH that some plants grow best in.

Plant	pH
apple	5.0–6.5
potato	4.5–6.0
blackcurrant	5.5–8.0
mint	7.0–8.0
onion	6.0–7.0
strawberry	5.0–7.0
lettuce	6.0–7.0

Use the information in the table and your knowledge to answer the following questions.

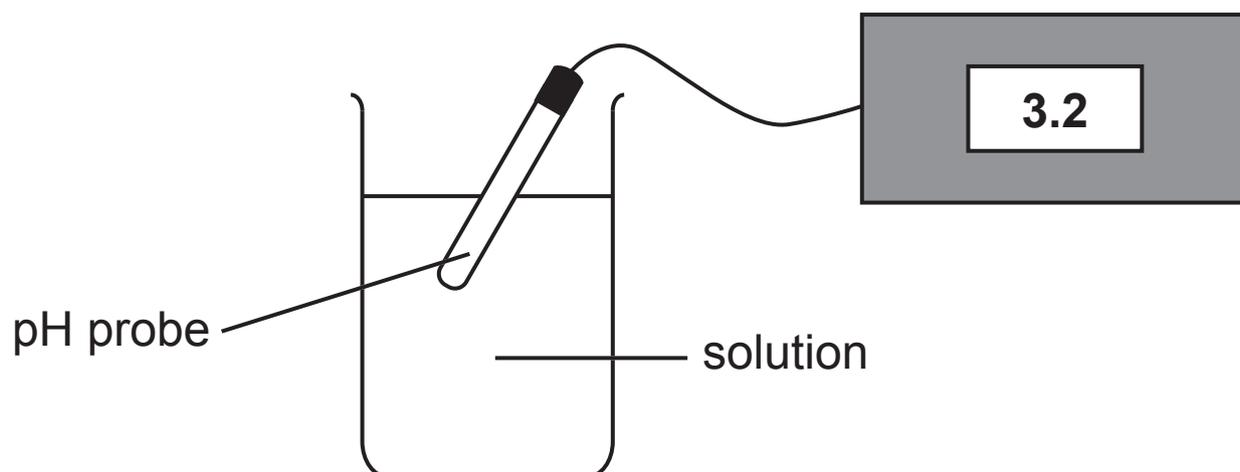
- (i) Name the plant that will grow best in the most acidic soil. [1 mark]

- (ii) Name the plant which grows best over the largest **range** of pH values. [1 mark]

- (iii) The pH of a farmer's field is 6.5. How many plants named in the table would grow well at this pH? [1 mark]

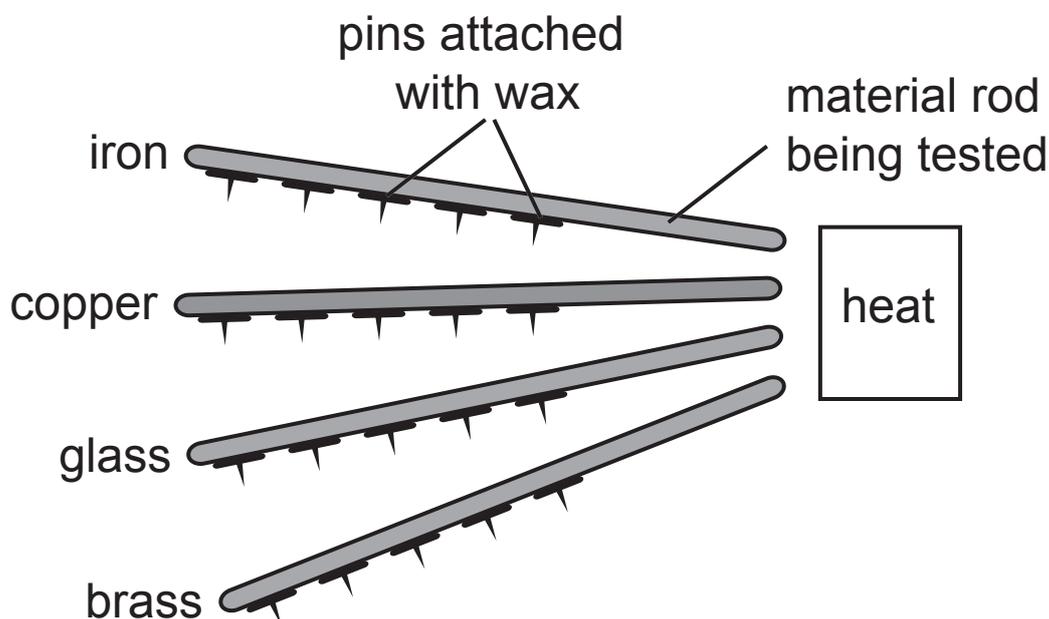
(b) Name a substance farmers can use to neutralise acidic soil. [1 mark]

The diagram below shows a way of measuring pH.



(c) Give **one** advantage of using a pH probe instead of an indicator solution to measure pH. [1 mark]

- 4 (a) A student investigated how four materials (iron, copper, glass and brass) allow heat to pass through them. He used the apparatus shown in the diagram below.



The number of pins still attached to each rod was recorded after 1, 3 and 5 minutes. The results are shown below.

Material	Number of pins attached after;		
	1 minute	3 minutes	5 minutes
Iron	5	5	4
Copper	4	3	2
Glass	5	5	5
Brass	5	4	3

- (i) On the diagram above, put a circle around the pin that will fall off first. [1 mark]

(ii) List the four materials in order of conductivity.
[2 marks]

_____ Best conductor

_____ Worst conductor



(b) State **two** ways in which the student made this investigation a fair test. [2 marks]

1. _____

2. _____

- 5 Criminals can be identified by matching their fingerprint patterns with those taken from a crime scene.



- (a) Arch, loop and whorl are three of the main fingerprint patterns.

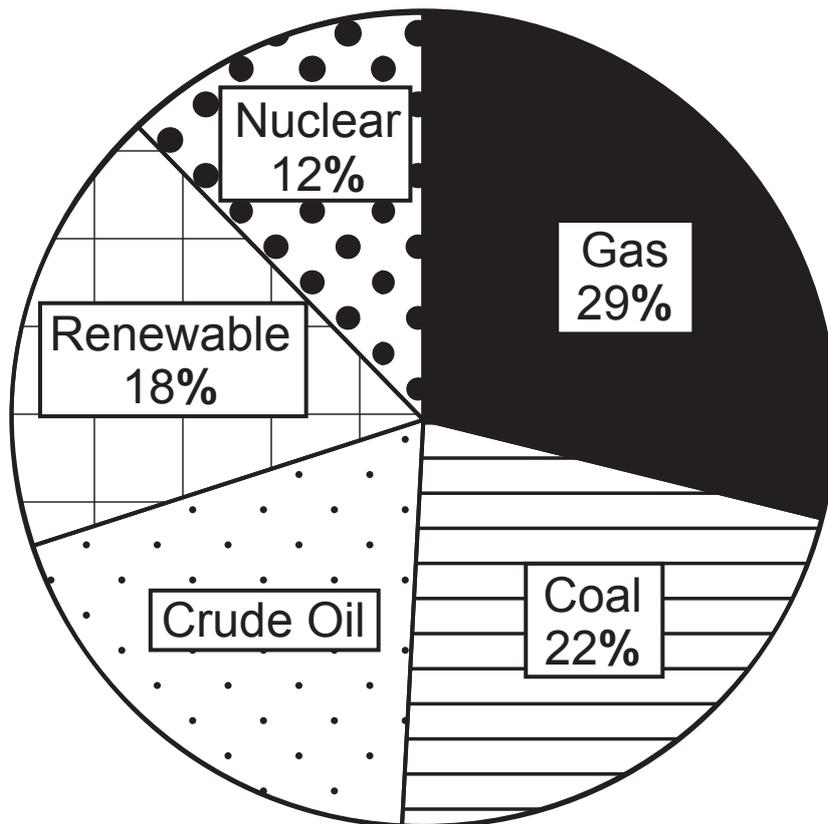
Name **one** other main fingerprint pattern. [1 mark]

- (b) Police dust powder over prints to make them visible.
Name a powder used to show prints on a white surface.
[1 mark]

(c) A national database could hold everyone's fingerprint records.

Suggest why a national database of fingerprints is useful and why some people may object to it. [2 marks]

- 6 Below is a pie chart showing sources of energy used in the UK during 2013.



- (a) Calculate the percentage of the UK's energy that came from crude oil in 2013. [2 marks]

(Show your working out.)

_____ %

(b) Complete the paragraph below. [1 mark]

Crude oil is a mixture that can be separated by fractional distillation.

This involves heating the mixture to evaporate the different fractions.

This works because each fraction has a different

- 7 The Government has set local councils targets for recycling. The aim is to reduce the amount of waste that ends up in landfill sites.



- (a) Some waste is non-biodegradable. Explain fully what is meant by the term 'non-biodegradable'. [2 marks]

(b) Waste plastic can be disposed of in several ways.

- **Burning** – waste plastic is burned to provide energy, but this can produce toxic gases such as carbon monoxide.
- **Landfill** – waste plastic can be put into landfill sites and left underground for many years. This can cause pollution of groundwater.
- **Recycling** – waste plastics can be recycled by melting and remoulding them into new items.

Using only the information above, name the method which is the most environmentally friendly way to dispose of waste plastic. Explain fully your answer.

Method [1 mark] _____

Explanation [2 marks] _____

(a) Using only the elements shown on page 16 and your knowledge, answer the following questions.

(i) Give the symbol of an element that is in **Group 2**.
[1 mark]

(ii) Name **two** elements that are in the same **period**.
[1 mark]

_____ and _____

(iii) Name the element that has **only one** electron in its outer shell. [1 mark]

(iv) Give the name of a gas shown on the Periodic Table on page 16. [1 mark]

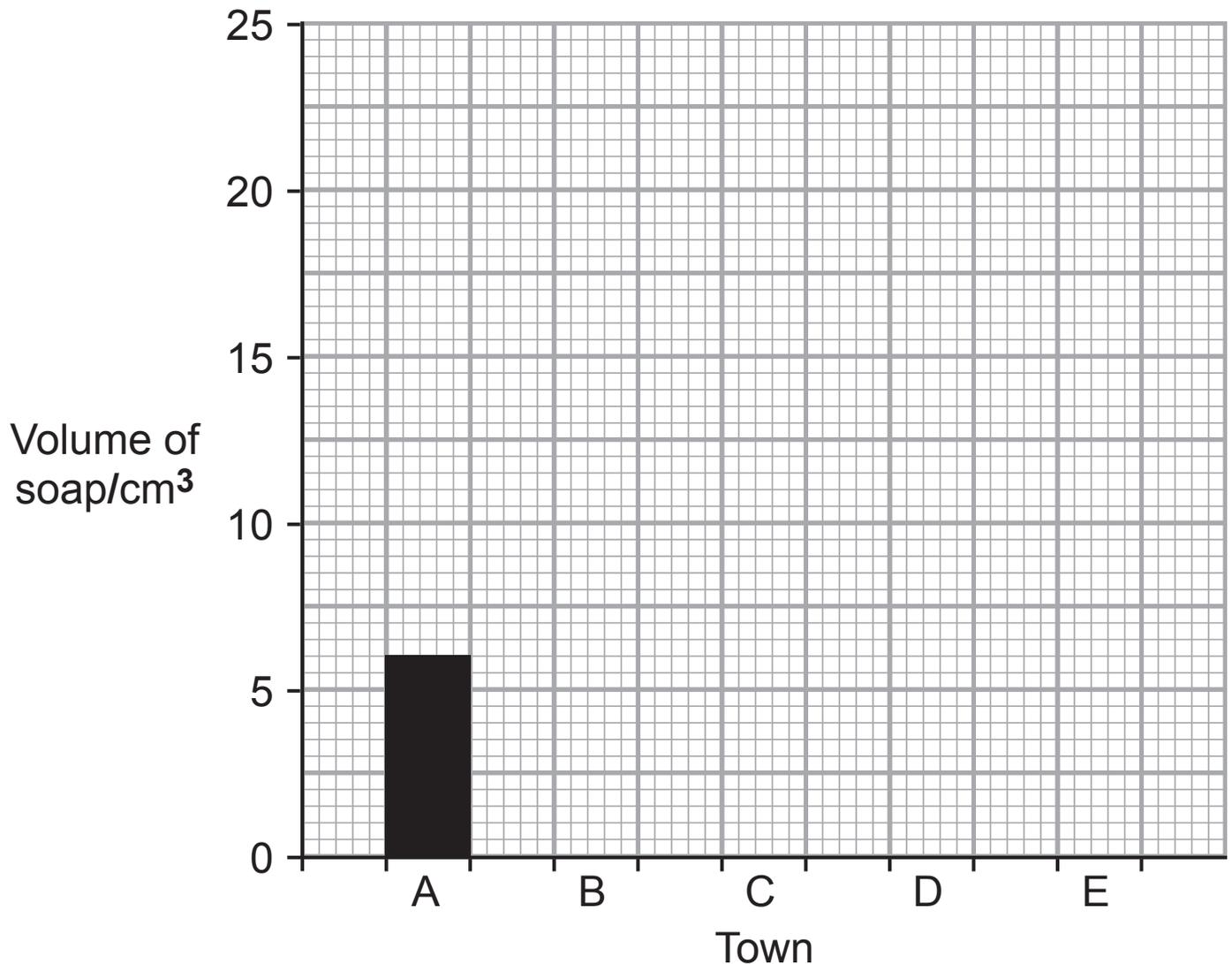
(b) What name is given to elements in Group 7? [1 mark]

(c) On the outline Periodic Table on page 16, write the symbol for hydrogen in its correct position. [1 mark]

- 9 (a) A scientist collected water samples from five towns (A, B, C, D and E). The table below gives the volume of soap solution needed to produce a lather with each of the samples.

Town	Volume of water/ cm^3	Volume of soap/ cm^3
A	50	6
B	50	17
C	50	24
D	50	20
E	50	11

- (i) Use the information in the table on page 18 to complete the bar chart below. [2 marks]



- (ii) Which town (**A**, **B**, **C**, **D** or **E**) has the hardest water? Explain your answer. [2 marks]

Town _____

Explanation _____

(iii) Scientists found that they needed 11 cm^3 of soap to produce a lather after shaking the water sample from **town E**.

Describe how they could continue their investigation to prove that the water is temporary hard water, including how the results should show this. [3 marks]

(b) (i) Name **two** metal ions that cause hard water. [2 marks]

_____ and _____

(ii) Apart from taste, give **one** advantage of drinking hard water. [1 mark]

(c) Hard water can cause undesirable deposits (fur) in kettles.

(i) Complete the word equation opposite to show how these undesirable deposits form in kettles. [3 marks]

(ii) Give **one** reason why these deposits cause problems in kettles. [1 mark]

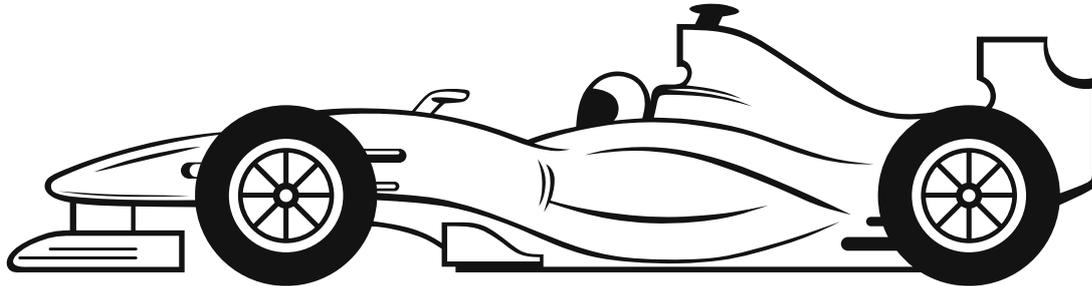
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calcium
hydrogencarbonate

10 The first racing cars were built using aluminium. Around 1990 this was replaced with glass fibre, a composite material.



Explain why the makers of modern Formula One cars choose glass fibre instead of aluminium to make the car bodies. [6 marks]

Your answer should include:

- a full explanation of what a composite material is
- the advantages of using glass fibre in Formula One car bodies
- a disadvantage of glass fibre.

SOURCES

Ú* Q1(a) Image of corrosive hazard symbol - © Danylo Fomin/iStock/Thinkstock

Pg 5, Q2(c) Diagram showing a cross-section through an active volcano - © Abomb Industries Design/iStock/Thinkstock

Pg10, Q5 Image of a robber- © Jorgenmac/iStock/Thinkstock

Pg 14, Q7 Image of a landfill site - © Digital Vision/Thinkstock

Pg 22, Q10 Diagram of a racing car - © Kreatiw/iStock/Thinkstock

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Question Number	Marks
1	
2	
3	
4	
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Total Marks	

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