



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

MV18

[GSS21]

THURSDAY 12 NOVEMBER 2015, 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 eight** questions.

Information for Candidates

The total mark for this paper is 60.

Quality of written communication will be assessed in Question 6.
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 for your use.

- 1 (a) Given below are three materials and some possible uses.
Using lines, match each material to **one** of its main uses. [3 marks]

Material

Use



aeroplane wings

plastic



bottom of saucepans

copper



clothing

wool



shopping bags

(b) Some materials come from living things and are described as natural; others are man-made. Place the following materials in the correct column of the table below. [2 marks]

wool

silk

cotton

nylon

Natural	Man-made

(c) Most modern glasses' frames are made from plastic.



Give **two** reasons why plastic is better than metal for glasses' frames. [2 marks]

Choose from:

lighter : **better conductor** : **heavier** : **cheaper**

1. _____

2. _____

2 (a) Many household substances contain an acid or an alkali.

(i) Complete the following sentences. [2 marks]

Indigestion is caused by too much _____
in the stomach. Milk of Magnesia contains an alkali
and can be used to cure indigestion in the stomach in
a reaction called _____ .

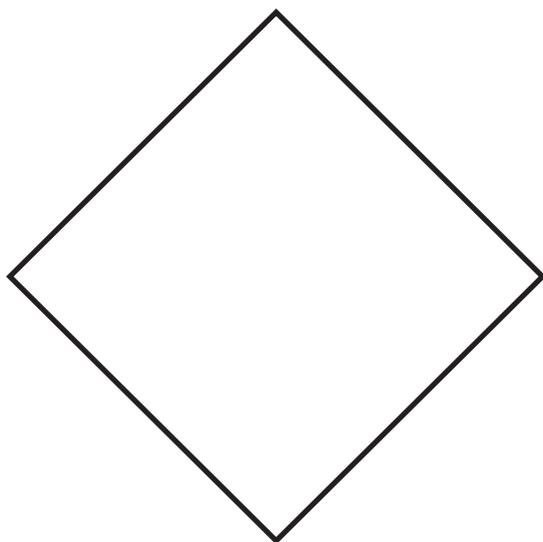
(ii) What is the chemical name for Milk of Magnesia?

Circle the correct answer. [1 mark]

sodium hydrogencarbonate : **magnesium chloride**
magnesium hydroxide

(b) Sodium hydroxide is a corrosive substance found in oven cleaner.

(i) In the space below draw the hazard symbol you would expect to see on a bottle of oven cleaner.
[1 mark]



(ii) What colour will Universal Indicator turn when added to oven cleaner? [1 mark]

- (c) The photograph below shows a way of finding the pH of a solution.



- (i) What name is given to this piece of equipment?
[1 mark]

- (ii) State **one** reason why this method of measuring pH is better than using Universal Indicator. [1 mark]

(iii) The equipment on page 6 shows a pH reading of 8.77.

What does this tell you about the solution that has been tested? [1 mark]

Tick (✓) the correct answer.

It is a weak acid

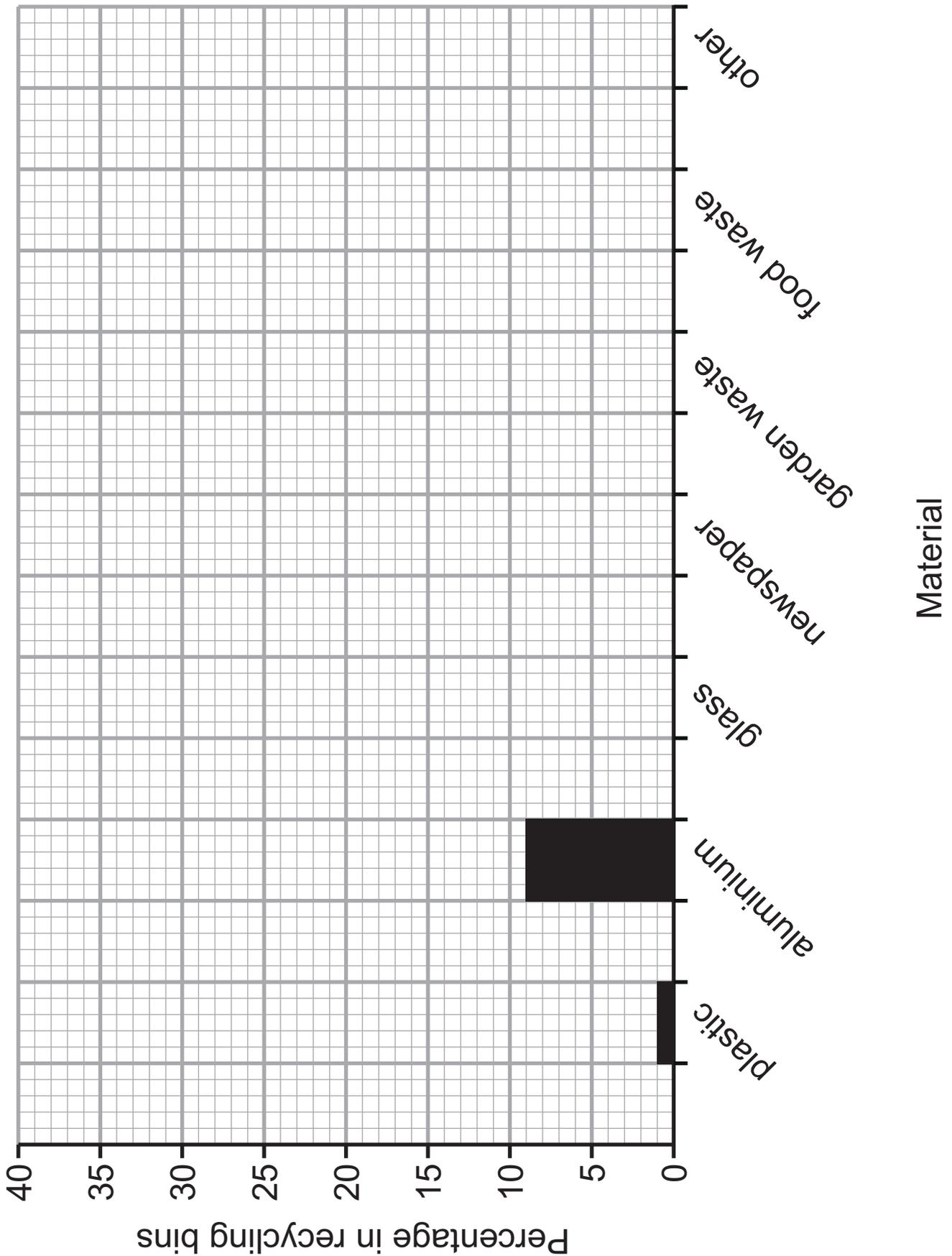
It is a weak alkali

It is a strong acid

- 3 The table below shows the percentage of different materials that are in household recycling bins.

Material	Percentage in recycling bins
plastic	1
aluminium	9
glass	11
newspaper	22
garden waste	36
food waste	12
other	9

(a) Use the information in the table on page 8 to complete the bar chart below. [2 marks]



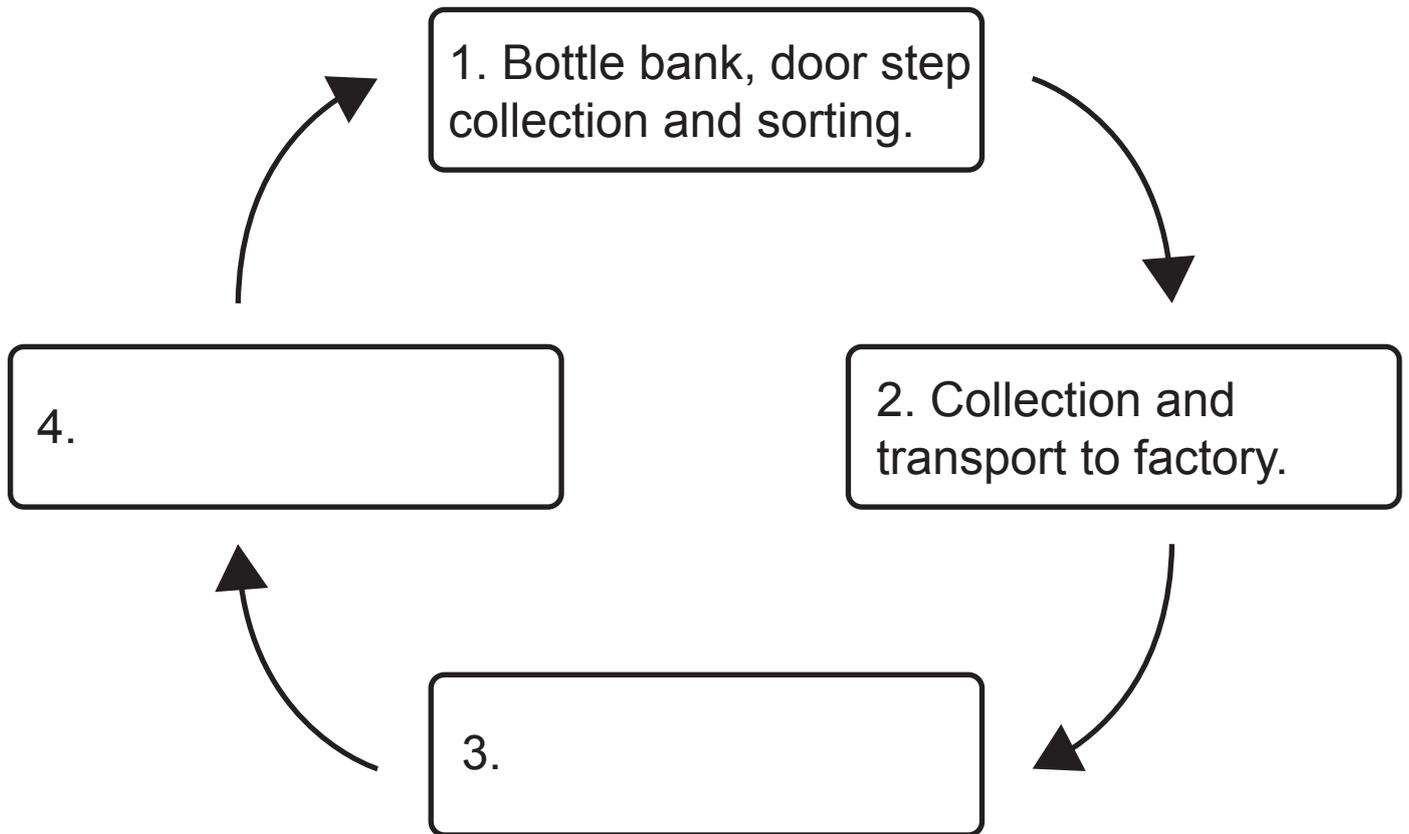
(b) (i) What is meant by the term **non-biodegradable**?
[2 marks]

(ii) Name **two** non-biodegradable materials shown in the table on page 8. [2 marks]

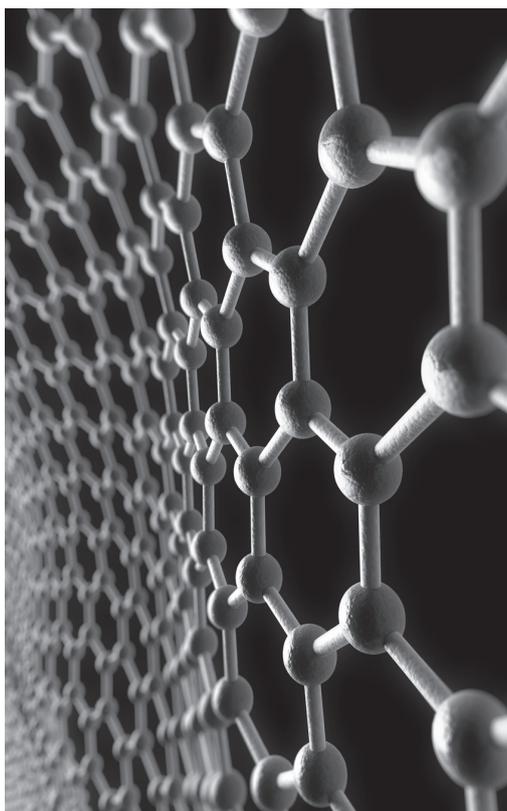
and

(c) State **one** reason why local authorities are encouraging people to recycle. [1 mark]

(d) Complete the flow diagram below about glass recycling.
[2 marks]



4 Below is part of an article from a science magazine.



Graphene – A new wonder material?

Graphene is a nano material. It is a sheet of carbon, only one atom thick, arranged in a honeycomb structure.

Graphene has amazing properties: it is one hundred times stronger than steel, a better conductor than copper and more flexible than rubber. These properties would be useful if graphene was used in the making of a composite material.

A new light bulb made with graphene is due to go on sale soon. Using graphene allows it to conduct electricity and heat better. The light bulb will use less energy and last longer.

(a) What size is a nanoparticle?

Circle the correct answer. [1 mark]

10^{-9} m

10^9 m

10^{19} m

(b) Give the names of **two** elements written about in the article above. [2 marks]

_____ and _____

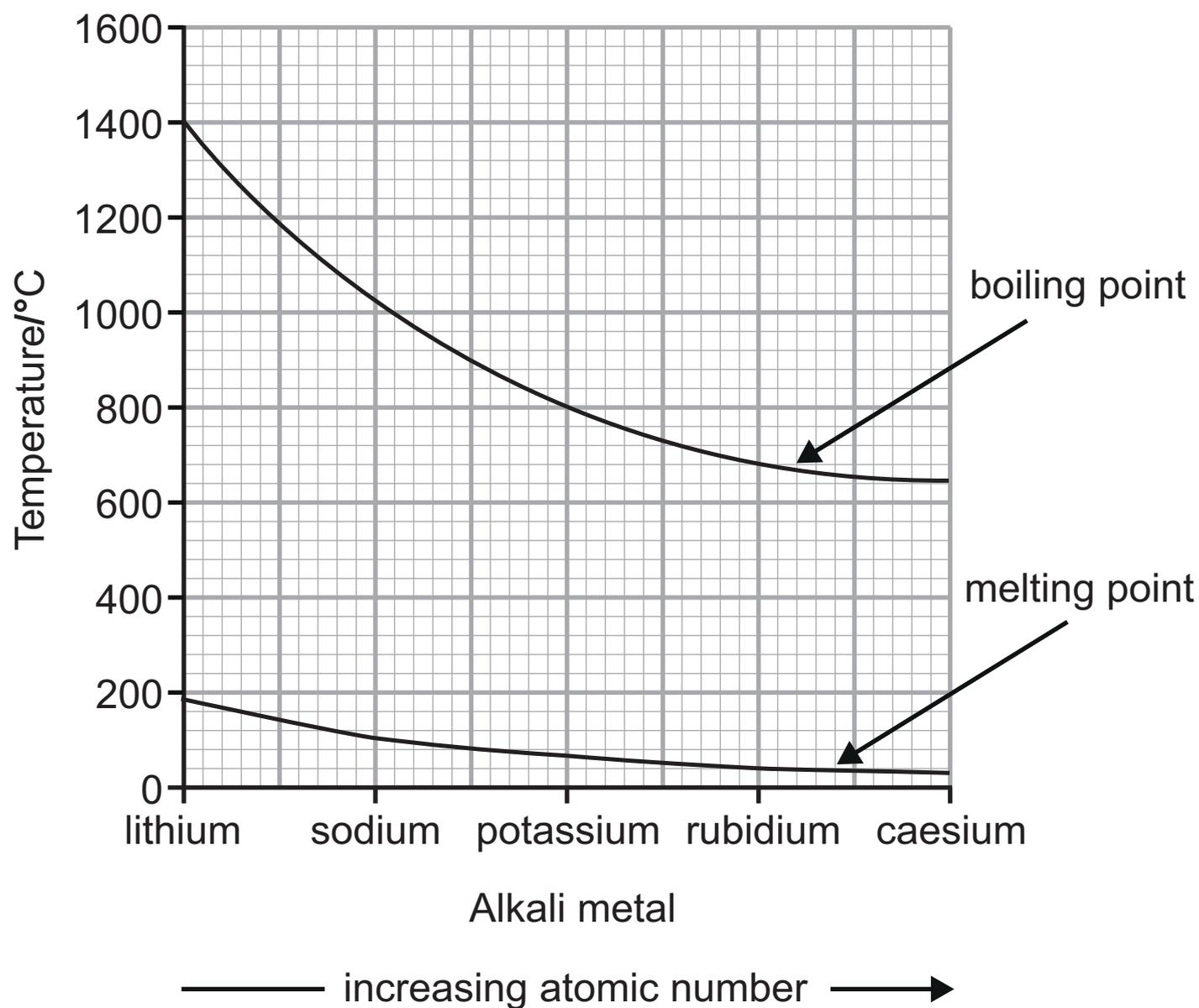
(c) Give **one** property of graphene that would be useful in making mobile phone covers. [1 mark]

(d) Give **one** advantage of using graphene in a household light bulb.

Explain your answer. [2 marks]

(e) Another nano material is silver. Give **one** medical use of silver nanoparticles. [1 mark]

- 5 Information about the melting and boiling points of some Group 1 (alkali) metals is shown below.



Use this information and your knowledge to answer the following questions.

- (a) Complete the following sentence to describe the trend in boiling points of the alkali metals. [1 mark]

As the atomic number of the alkali metals

- (b) Francium is below caesium in Group 1 of the Periodic Table.
Predict the boiling point of francium. [1 mark]

_____ °C

- (c) Choose the metal with the biggest difference between its melting point and its boiling point. Calculate the temperature difference between its melting point and its boiling point. [2 marks]

(Show your working out.)

_____ °C

(d) Name the gas formed when the alkali metals react with water. [1 mark]

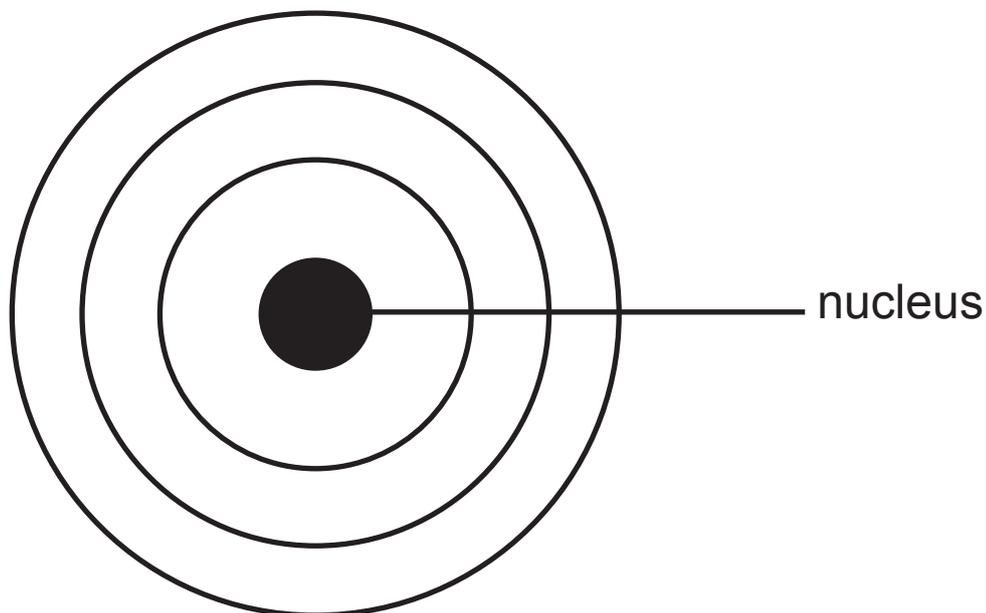
(e) Potassium reacts vigorously with water. Describe how you would expect lithium to react with water compared to potassium. [1 mark]

(f) Apart from wearing safety goggles, state **two** safety precautions needed when adding potassium to water. [2 marks]

1. _____

2. _____

- (g) (i) A sodium atom has 11 electrons. Complete the diagram below to show how the electrons are arranged in a sodium atom. [1 mark]



- (ii) In terms of the arrangement of electrons, state why sodium and other alkali metals are placed in Group 1 of the Periodic Table. [1 mark]

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7 The table below gives information about some plastics.

Plastic	Properties	Colours available	Cost
PVC	hard, keeps its shape, weather resistant	wide range of colours	medium
nylon	hard, long lasting	white or cream	high
polythene	soft, flexible, good electrical insulator	wide range of colours but they fade easily	medium
plasticised PVC	soft, flexible, good electrical insulator	wide range of colours	medium
polystyrene	does not keep its shape, good heat insulator	white	low
acrylic	stiff, weather resistant, good electrical insulator	wide range of colours	high

Use the information in the table to answer the questions below.

(a) Which **two** plastics could be best used for covering electrical cables? [1 mark]

_____ and _____

(b) A manufacturer is going to produce cheap, green buckets to sell at large DIY stores.



Which plastic should the manufacturer choose?
Give **two** reasons for your choice. [3 marks]

(c) Give **one** reason why polystyrene is **not** used to make garden chairs. [2 marks]
Explain your answer.

- 8 Given below is information about the reactions of some metals with their metal salt solutions.

	Tin sulfate	Zinc sulfate	Copper sulfate	Magnesium sulfate
Tin		no reaction	reaction	no reaction
Zinc	reaction		reaction	no reaction
Copper	no reaction	no reaction		no reaction
Magnesium	reaction	reaction	reaction	

- (a) Use the information to put the metals in order of decreasing reactivity. [2 marks]

_____ most reactive

_____ least reactive

- (b) (i) Complete the word equation for the reaction between tin and copper sulfate. [2 marks]



(ii) What name is given to this type of reaction?
[1 mark]

(c) Using lines, match each metal reaction with **one** expected observation. [2 marks]

Metal reaction

Expected observation

zinc + copper sulfate

bubbles of gas

blue solution fades

magnesium + acid

silver coloured solid forms

solution turns milky

THIS IS THE END OF THE QUESTION PAPER

SOURCES

- Q1(a) - - -Image of aeroplane wings © Okea/ iStock/ Thinkstock
 Image of saucepan © rgbdigital/ iStock/ Thinkstock
 Image of a hat © digitalgenetics/ iStock/ Thinkstock
 Image of shopping bags © WestLight/ iStock/ Thinkstock
- Q1(c) - - - Image of glasses © Creative_Outlet/ iStock/ Thinkstock
- Q2(c) - - - Photo of pH meter © Martyn F. Chillmaid / Science Photo Library
- Q4 - - - -Photo of graphene structure © Science Picture Co / Science Photo Library
- Q7(b) - - -Image of a bucket © AlexandrGryzlov / iStock / Thinkstock

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Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
Total Marks	

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