FOR OFFICIAL USE

Section B

Total Marks

X012/101

NATIONAL QUALIFICATIONS 2010

WEDNESDAY, 2 JUNE
9.00 AM – 10.30 AM

CHEMISTRY
INTERMEDIATE 1

Fill in these boxes and read what is printed below.

Full name of centre

Town

Forename(s)

Surname

Date of birth
Day Month Year

Scottish candidate number

Number of seat

Necessary data will be found in the Chemistry Data Booklet for Intermediate 1 and Access 3.

Section A – Questions 1–20 (20 marks)

Instructions for completion of **Section A** are given on page two.

For this section of the examination you must use an **HB pencil**.

Section B (40 marks)

All questions should be attempted.

The questions may be answered in any order but all answers are to be written in this answer book, **and must be written clearly and legibly in ink**.

Rough work, if any should be necessary, should be written in this book, and then scored through when the fair copy has been written. If further space is required, a supplementary sheet for rough work may be obtained from the Invigilator.

Additional space for answers will be found at the end of the book. If further space is required, supplementary sheets may be obtained from the Invigilator and should be inserted inside the **front** cover of this booklet.

Before leaving the examination room you must give this book to the Invigilator. If you do not, you may lose all the marks for this paper.

SQA ©

Read carefully

1 Check that the answer sheet provided is for **Chemistry Intermediate 1 (Section A)**.

2 For this section of the examination you must use an **HB pencil** and, where necessary, an eraser.

3 Check that the answer sheet you have been given has **your name**, **date of birth**, **SCN** (Scottish Candidate Number) and **Centre Name** printed on it.

Do not change any of these details.

4 If any of this information is wrong, tell the Invigilator immediately.

5 If this information is correct, **print** your name and seat number in the boxes provided.

6 The answer to each question is **either** A, B, C or D. Decide what your answer is, then, using your pencil, put a horizontal line in the space provided (see sample question below).

7 There is **only one correct** answer to each question.

8 Any rough working should be done on the question paper or the rough working sheet, **not** on your answer sheet.

9 At the end of the examination, put the **answer sheet for Section A inside the front cover of this answer book**.

Sample Question

To show that the ink in a ball-pen consists of a mixture of dyes, the method of separation would be

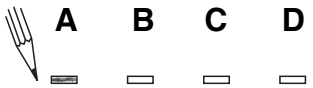
A chromatography

B fractional distillation

C fractional crystallisation

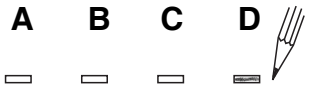
D filtration.

The correct answer is **A**—chromatography. The answer **A** has been clearly marked in **pencil** with a horizontal line (see below).



Changing an answer

If you decide to change your answer, carefully erase your first answer and using your pencil, fill in the answer you want. The answer below has been changed to **D**.



SECTION A

This section of the question paper consists of 20 multiple-choice questions.

1. Which of the following elements shows similar chemical properties to chlorine?
(You may wish to use page 1 of the data booklet to help you.)

A Argon

B Iodine

C Oxygen

D Sulphur

2. Which of the following statements is true about a catalyst?

A A catalyst is used up in a reaction.

B A catalyst has no effect on a reaction.

C A catalyst slows down a reaction.

D A catalyst speeds up a reaction.

3. What is the formula for dinitrogen monoxide?

A NO

B NO_2

C N_2O

D N_2O_4

4. Which of the following is a common household alkali?

A Soap

B Vinegar

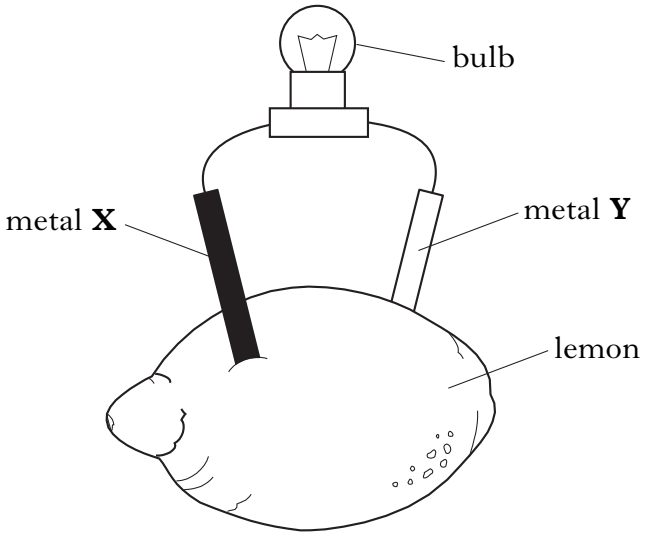
C Lemonade

D Soda water

5. Which of the following solutions is most acidic?

Solution	pH Value
A	8
B	7
C	4
D	2

6. A cell can be made using a lemon.

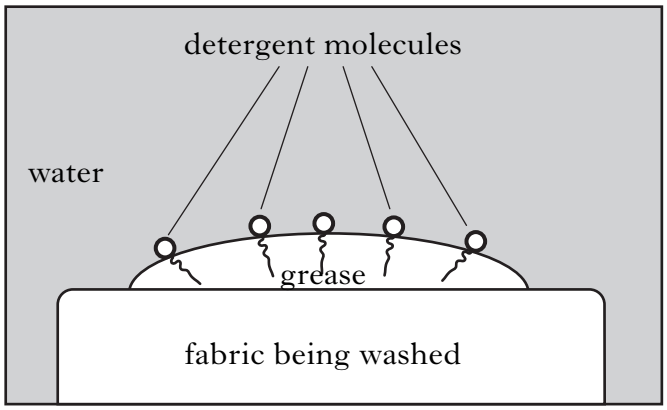


Which of the following pairs of metals would give the brightest bulb?
(You may wish to use page 6 of the data booklet to help you.)

	Metal X	**Metal Y**
A	magnesium	copper
B	copper	copper
C	zinc	copper
D	iron	copper

7. A detergent molecule can be shown as

When used in cleaning, the following happens.

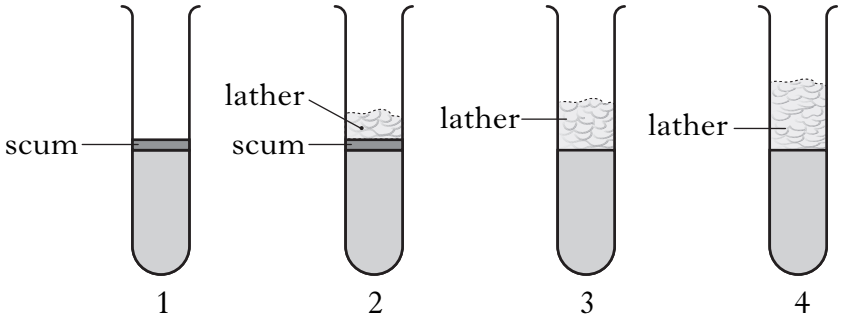


Which line in the table is true for the detergent to work?

	Head	**Tail**
A	soluble in grease	soluble in water
B	soluble in grease	soluble in grease
C	soluble in water	soluble in water
D	soluble in water	soluble in grease

[Turn over

8. A student shook different cleaning chemicals with water and the results are shown below.



In which two test tubes was hard water used?

A 1 and 2

B 2 and 3

C 2 and 4

D 3 and 4

9.

The uniforms of firefighters need to be specially treated.

Which of the following two treatments would be most suitable?

A Dyeing and stain-proofing

B Flame-proofing and dyeing

C Stain-proofing and water-proofing

D Water-proofing and flame-proofing

10. Which fuel is made from sugar cane?

A Biogas

B Ethanol

C Hydrogen

D Petrol

11. When a sample of coal is burned the products include carbon dioxide and sulphur dioxide.

From this information, which elements **must** be present in this sample of coal?

A Carbon and oxygen

B Carbon and sulphur

C Sulphur and oxygen

D Carbon, sulphur and oxygen

12. Uses of plastics are related to their properties.

Which line in the table shows a plastic that could be used for covering electrical wires?

	Plastic	**Property**
A	PVC	flexible
B	Kevlar	very strong
C	Perspex	lets light through
D	Formica	high melting point

13. Which of the following properties is suitable for a plastic that is disposed of by burying?

A Light

B Thermoplastic

C Biodegradable

D Insoluble in water

14. Which process is described by the following word equation?

$$\text{carbon dioxide} + \text{water} \xrightarrow{\text{light}} \text{glucose} + \text{oxygen}$$

A Fermentation

B Photosynthesis

C Polymerisation

D Respiration

15. Which of the following statements is true?

A Carbon dioxide in the air is **not** a cause of the greenhouse effect.

B Clearing forests causes the carbon dioxide levels in the air to increase.

C Burning petrol decreases carbon dioxide levels in the atmosphere.

D Increasing levels of carbon dioxide in the air are causing the atmosphere to cool down.

16. Pesticides are used to

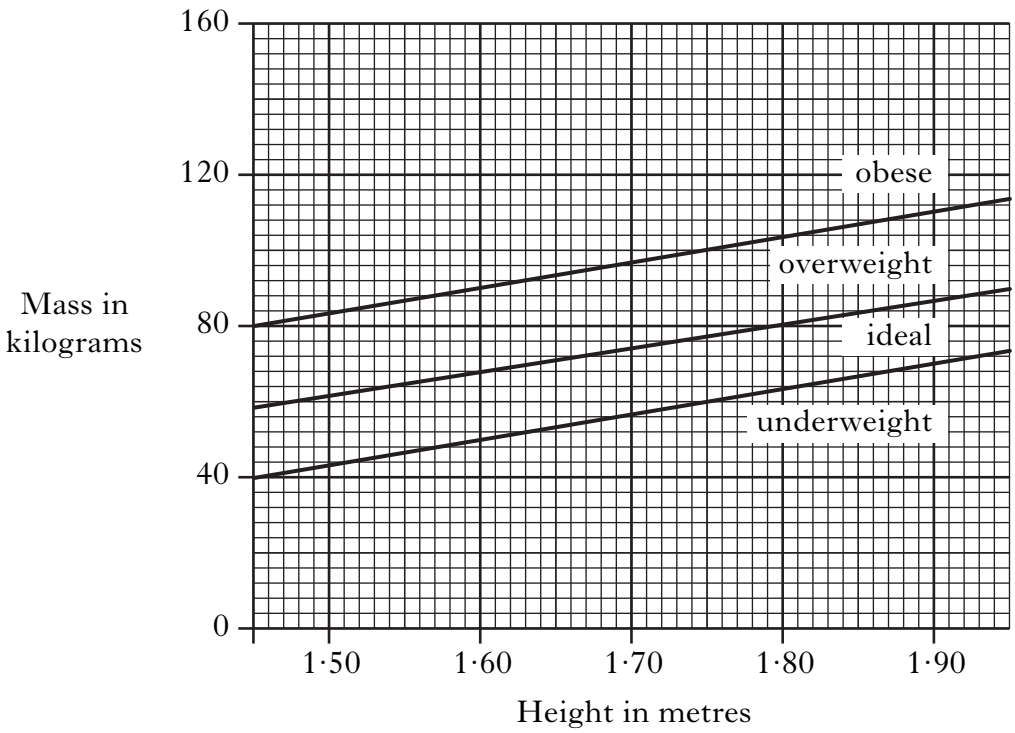
A prevent bacteria and fungi causing disease

B replace essential elements in the soil

C prevent crops being eaten by insects

D reduce the number of weeds.

17. The graph below can be used to determine weight conditions.



A man with a height of 1·70 metres weighs 80 kilograms.

Using the graph, how would he be described?

A ideal

B obese

C overweight

D underweight

18. Which of the following elements is required for healthy blood?

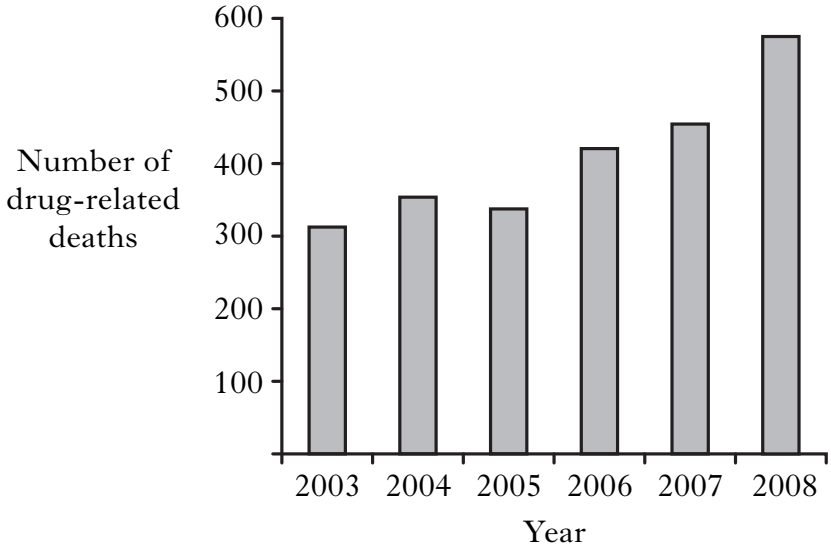
A Iron

B Copper

C Calcium

D Aluminium

19. The bar graph shows the number of drug-related deaths in Scotland over a six-year period.



In general, over the six-year period, the bar graph shows that

A there is no trend in the number of drug-related deaths

B the number of drug-related deaths decreases

C the number of drug-related deaths increases

D the number of drug-related deaths stays constant.

20. Which of the following amounts of drink would the body break down in the shortest time?

A 2 glasses of wine

B 1 whisky

C 1 bottle of alcopop

D 1 pint of beer

Candidates are reminded that the answer sheet MUST be returned INSIDE this answer book.

[Turn over for Section B on *Page ten*

DO NOT WRITE IN THIS MARGIN

Marks

SECTION B

40 marks are available in this section of the paper.

All answers must be written clearly and legibly in ink.

1. Mercury is an element in the Periodic Table. It has an atomic number of 80.

(*a*) Write the symbol for mercury.

(You may wish to use page 8 of the data booklet to help you.)

1

(*b*) Elements can be classified as metals or non-metals.

Is mercury a metal or a non-metal element?

(You may with to use page 8 of the data booklet to help you.)

1

(*c*) Mercury has different uses.

State **one** use for mercury.

(You may wish to use page 5 of the data booklet to help you.)

1

(3)

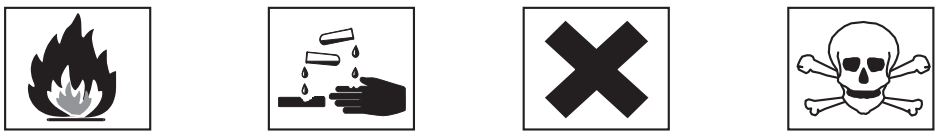
DO NOT WRITE IN THIS MARGIN

Marks

2. Sulphuric acid is an important chemical with many uses.

(*a*) Sulphuric acid is corrosive.

Circle the correct hazard symbol for sulphuric acid.



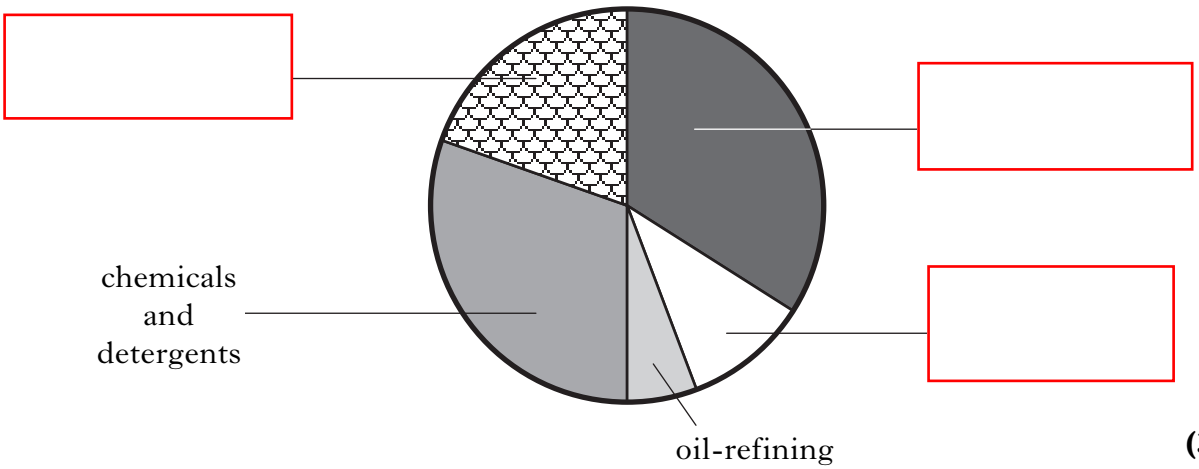
1

(*b*) The table shows the percentages of sulphuric acid used to make different substances.

Use of sulphuric acid	**Percentage (%) of sulphuric acid used**
fertilisers	35
chemicals and detergents	30
paints	20
fibres	10
oil-refining	

(i) Complete the table to show percentage of sulphuric acid used in oil-refining. **1**

(ii) Use the information in the table to label the pie chart.



1

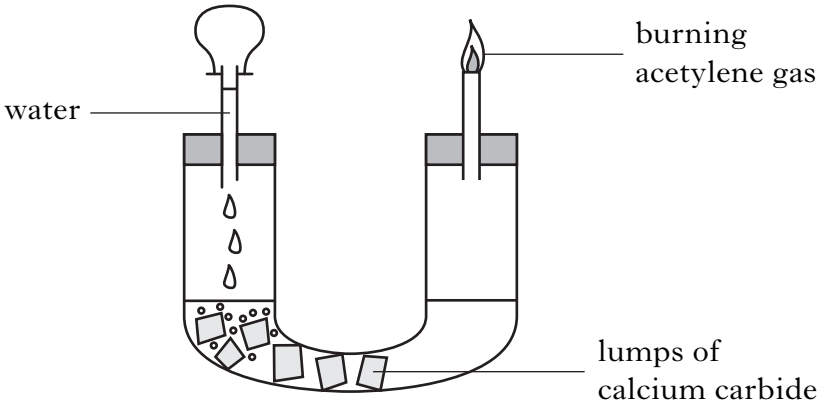
(3)

DO NOT WRITE IN THIS MARGIN

Marks

3. In the 1920s bicycle lamps were powered by burning acetylene gas.

A student made acetylene and burned it.



(*a*) How would the student know that a chemical reaction had taken place?

1

(*b*) Calcium hydroxide solution is also produced when acetylene gas is made.

Complete the word equation for this reaction.

[ ] + [ ] → [ ] + calcium hydroxide

1

(*c*) The student repeated the experiment using **powdered** calcium carbide.

What would this do to the speed of the reaction?

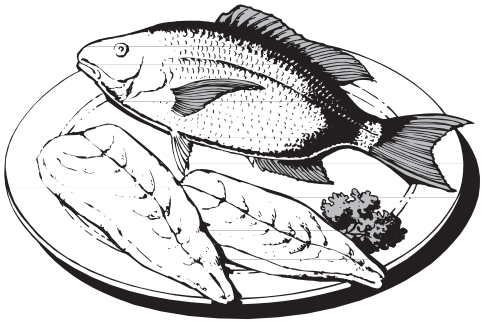
1

(3)

DO NOT WRITE IN THIS MARGIN

Marks

4. Fish is a good source of protein in a healthy diet.

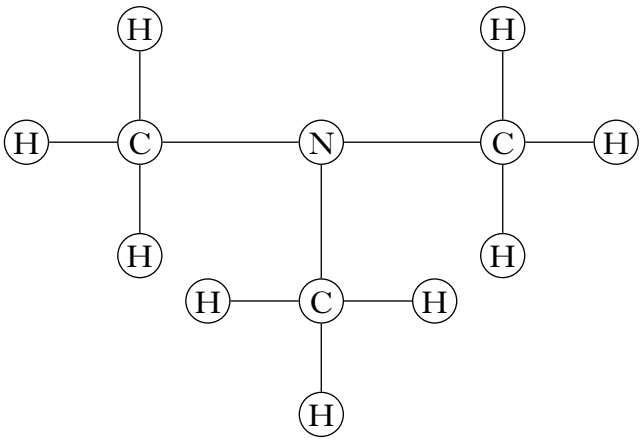


(*a*) What are proteins used for in the body?

1

(*b*) When fish 'goes off' the smell is caused by the chemical trimethylamine.

The diagram below represents trimethylamine.



(i) Complete the formula to show the number of each type of atom in trimethylamine.

C ☐ **H** ☐ **N** ☐

1

(ii) Trimethylamine is made up of atoms held together by bonds.

What name is given to a group of atoms held together by bonds?

1

(3)

[Turn over

DO NOT WRITE IN THIS MARGIN

Marks

5. Lead bromide is a compound.

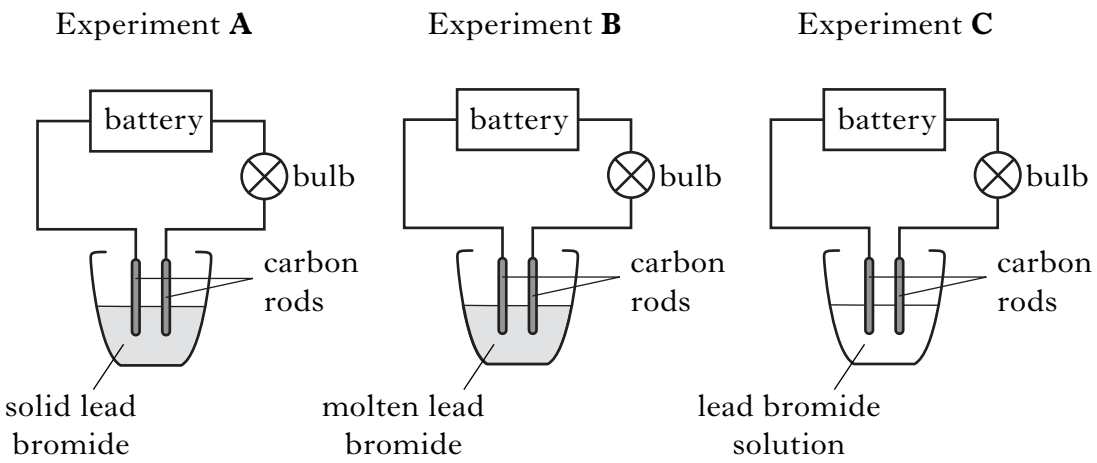
(*a*) Name the elements in lead bromide. **1**

(*b*) Lead bromide is an ionic compound made up of oppositely charged ions.

Circle the correct words to complete the sentence.

Ionic compounds tend to have {high / low} melting and boiling points as the bonds between the ions are {weak / strong}. **1**

(*c*) A student carried out three experiments to investigate the conductivity of lead bromide.



In which experiment will the bulb **not** light?

Experiment _____ **1**

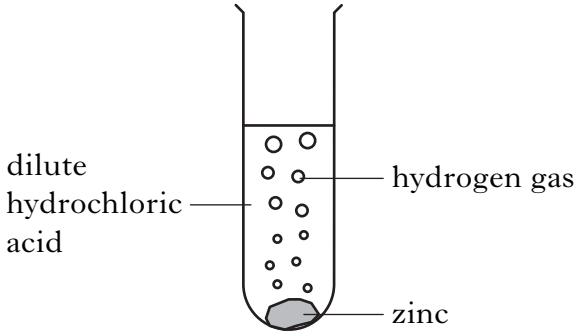
(3)

DO NOT WRITE IN THIS MARGIN

Marks

6. A student added zinc to dilute hydrochloric acid.

In this reaction, a zinc salt and hydrogen gas were formed.



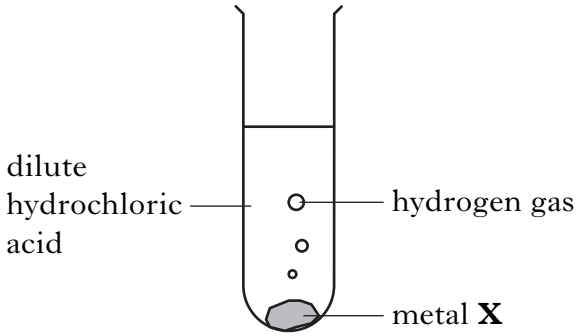
(*a*) Complete the name of the salt formed in this reaction.

zinc _____ **1**

(*b*) State the test for hydrogen gas.

_____ **1**

(*c*) The student repeated the experiment using metal **X**.



She wrote the conclusion:

"Metal **X** is less reactive than zinc."

How did she know this?

_____ **1**

(3)

[Turn over

DO NOT WRITE IN THIS MARGIN

Marks

7. Some Euro coins are made from Nordic Gold, a mixture of copper, aluminium, zinc and tin.

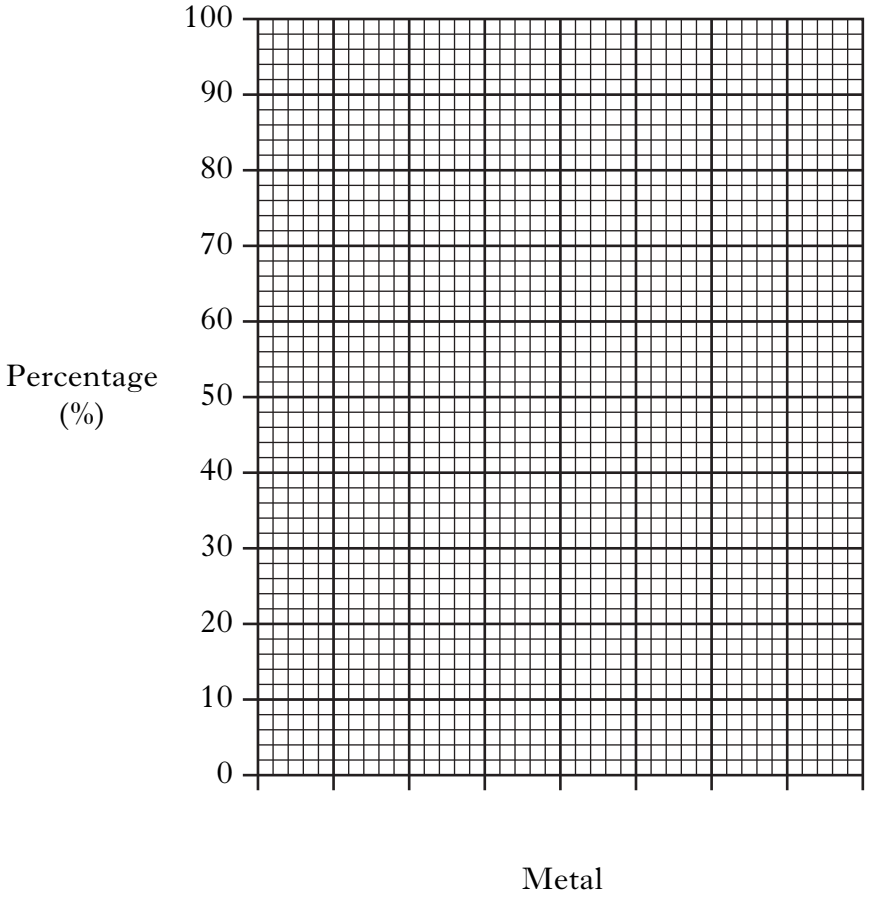
(*a*) What term is used to describe a mixture of metals? **1**

(*b*) The composition of Nordic Gold is shown in the table.

Metal	copper	aluminium	zinc	tin
Percentage (%)	88	6	4	2

Complete the bar graph to show the percentage of each metal in Nordic Gold.

(Additional graph paper, if required, can be found on *Page twenty-four*.)



1

(2)

DO NOT WRITE IN THIS MARGIN

Marks

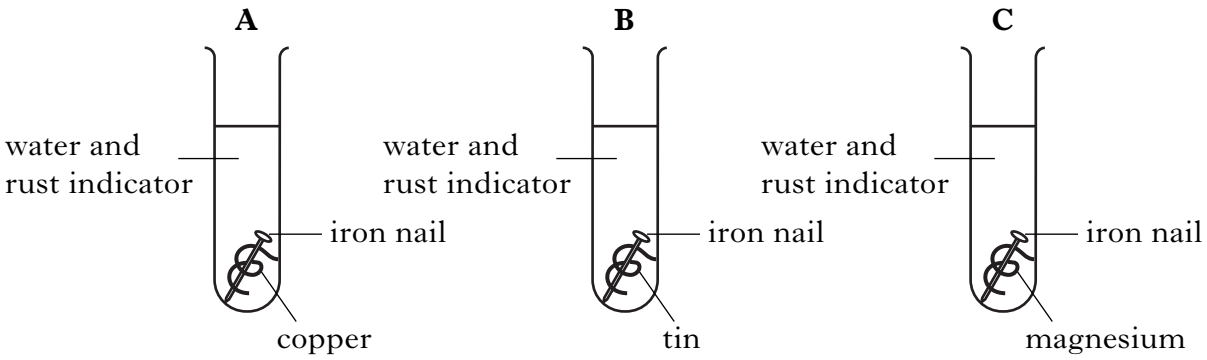
8. Rusting is the corrosion of iron.

(*a*) Water is needed for rusting to take place.

Name the other substance which **must** be present for iron to rust.

1

(*b*) The following experiments were set up to find out if iron rusts when different metals are attached to it.



(i) What colour will the rust indicator turn to if the iron nail rusts?

1

(ii) Circle the correct letter to complete the sentence.

(You may wish to use page 6 of the data booklet to help you.)

The iron nail in test-tube { **A** / **B** / **C** } will **not** rust. **1**

(3)

[Turn over

DO NOT WRITE IN THIS MARGIN

Marks

9. Coal is a fossil fuel.

(*a*) Name another fossil fuel.

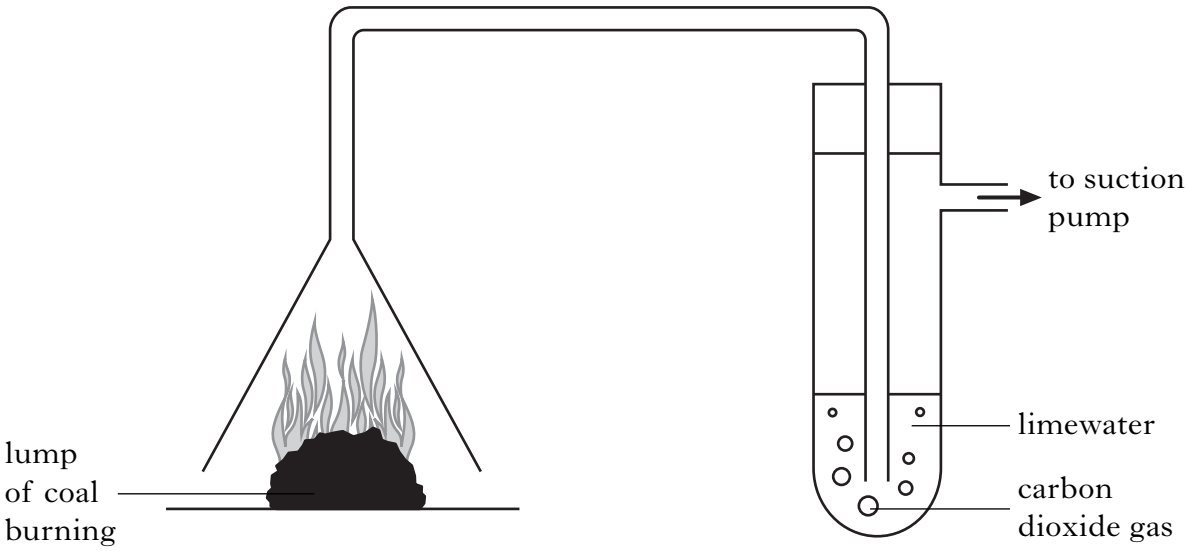
1

(*b*) Coal was formed millions of years ago.

What was coal made from?

1

(*c*) When coal is burned, carbon dioxide gas is produced.



What would you see happening when carbon dioxide is bubbled through limewater?

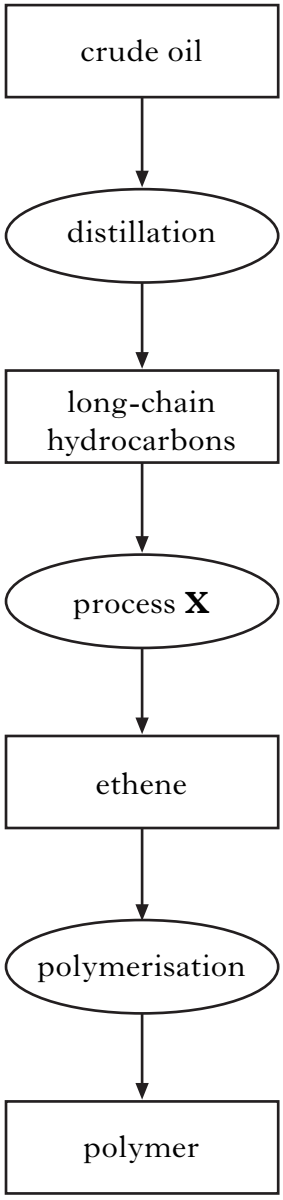
1

(3)

DO NOT WRITE IN THIS MARGIN

Marks

10. This flow chart shows how a polymer is made.



(*a*) Name process **X** which turns long-chain hydrocarbons into smaller, more useful ones like ethene.

1

(*b*) Name the polymer formed from ethene.

1

(*c*) Many polymers are thermoplastic.

What is meant by thermoplastic?

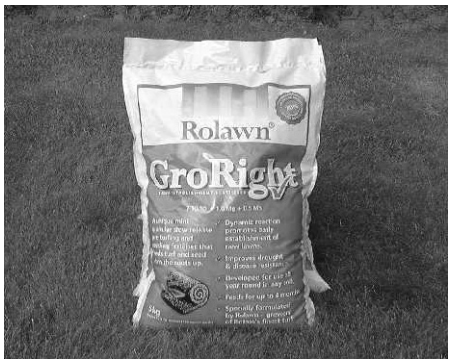
1

(3)

DO NOT WRITE IN THIS MARGIN

Marks

11. Fertilisers are added to soil to supply essential elements for healthy plant growth.



(*a*) Potassium and nitrogen are essential elements supplied by fertilisers.

Name another essential element.

1

(*b*) What **property** of potassium compounds makes them suitable for use as fertilisers?

(You may wish to use page 4 of the data booklet to help you.)

1

(*c*) Peas are plants which have root nodules.

In root nodules, nitrogen from the air is converted to nitrates.

Name another plant which has root nodules.

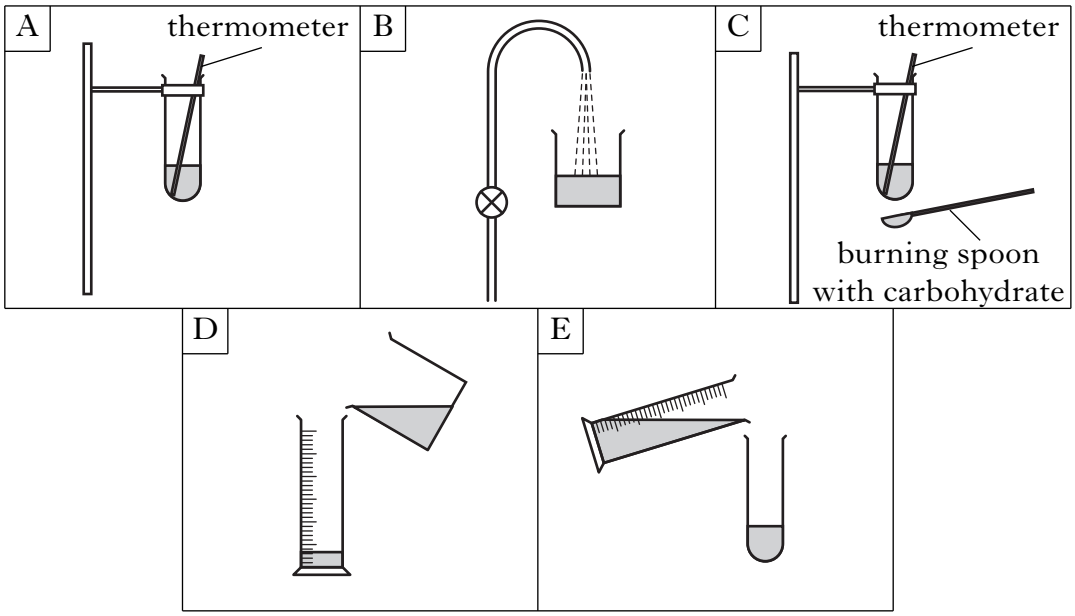
1

(3)

Marks

12. In the **PPA**, **"Burning Carbohydrates"**, the heat energy given out by burning different carbohydrates is compared.

The diagrams show 5 steps in this **PPA**.



(*a*) Place a letter in each box to show the correct order in which the **PPA** is carried out.

☐ → ☐ → ☐ → ☐ → C **1**

(*b*) The experiment was carried out using flour and then icing sugar.

The same volume of water was used each time.

State another factor which must be kept the same to make the experiment fair.

☐ **1**

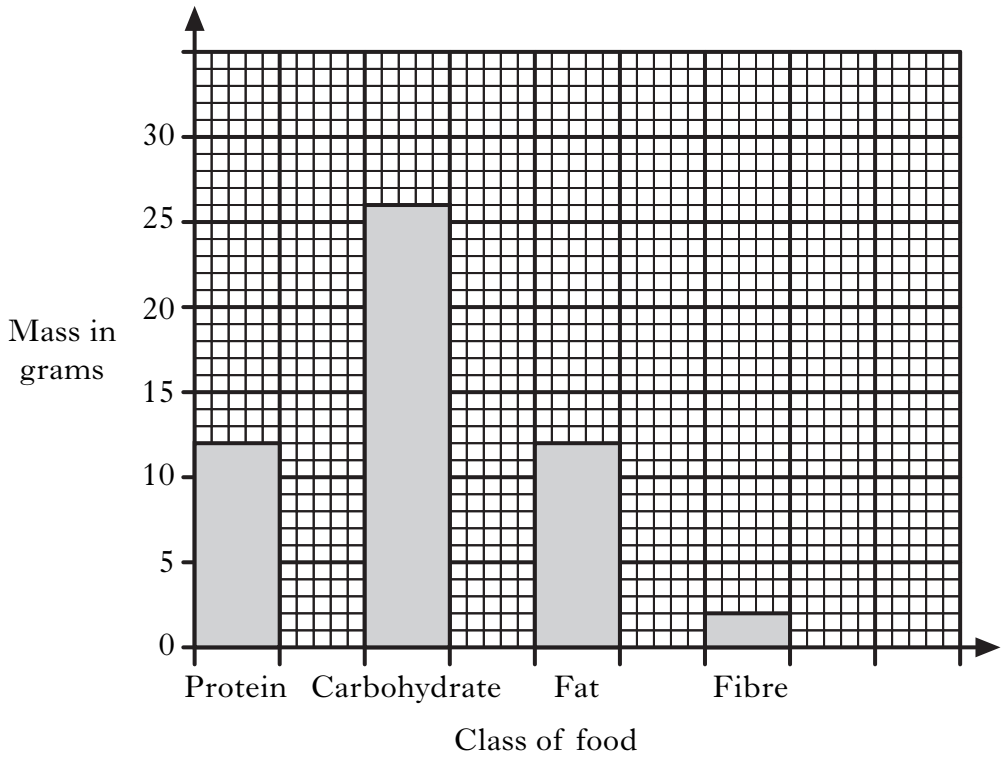
(2)

[Turn over

DO NOT WRITE IN THIS MARGIN

Marks

13. The following bar chart shows the nutritional content of a 100 g pizza.



(*a*) What mass of carbohydrate is in this pizza?

grams **1**

(*b*) The label on the pizza box shows that some of the carbohydrate was sugar.

Suggest a chemical name for the sugar present.

1

(*c*) Eating too much fat can result in high cholesterol in the blood stream.

What health problem can this cause?

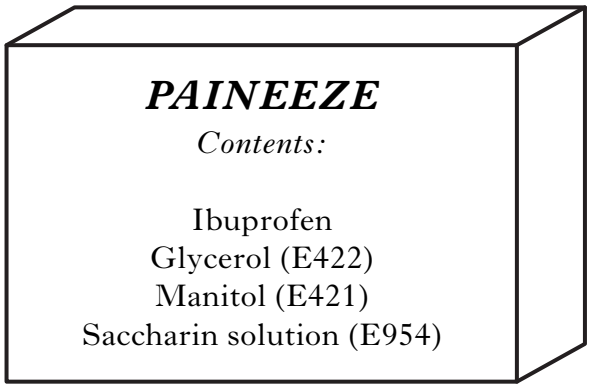
1

(3)

DO NOT WRITE IN THIS MARGIN

Marks

14. Medicines contain drugs which help the body when it is not working properly.



(*a*) (i) The E numbers shown on the contents are codes for food additives.

Why are additives used in medicines?

1

(ii) Ibuprofen is the active ingredient in Paineeze.

10 grams of Paineeze contains 1 gram of Ibuprofen.

Using the equation below, calculate the percentage of Ibuprofen in 10 grams of Paineeze.

$$\textbf{percentage Ibuprofen} = \frac{\textbf{mass of Ibuprofen}}{\textbf{mass of Paineeze}} \times 100$$

% **1**

(*b*) Micro-organisms interfere with chemical reactions which keep the body working properly.

What type of drug can be taken to fight micro-organisms?

1

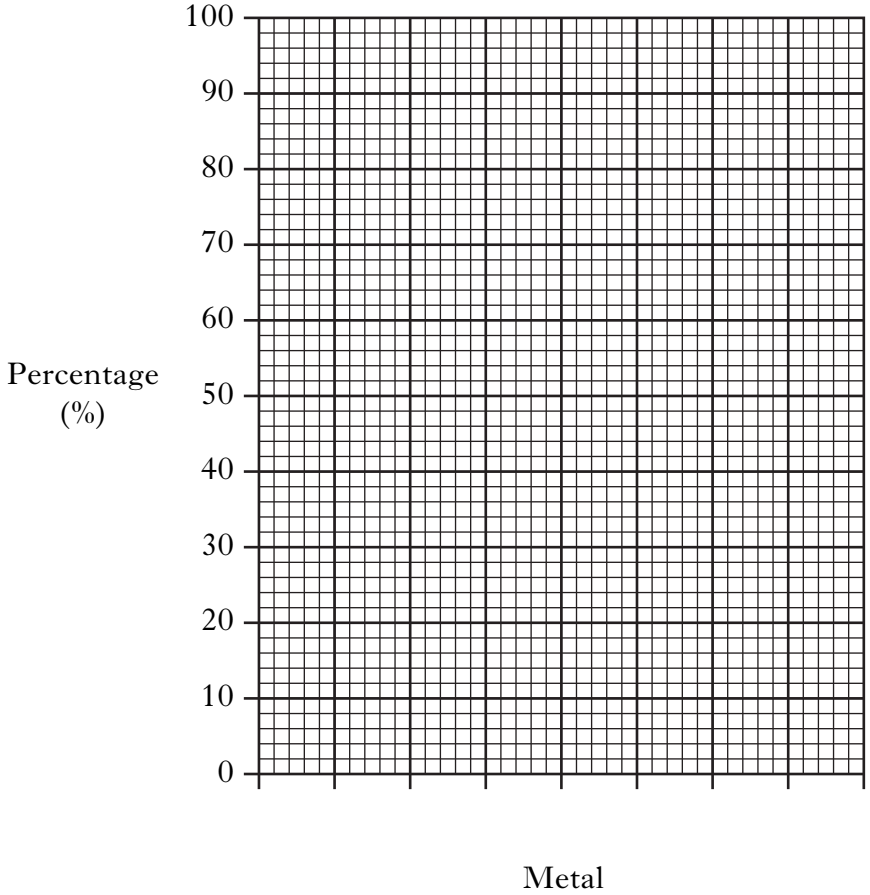
(3)

[*END OF QUESTION PAPER*]

DO NOT WRITE IN THIS MARGIN

ADDITIONAL SPACE FOR ANSWERS

ADDITIONAL GRAPH PAPER FOR QUESTION 7(*b*).



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ADDITIONAL SPACE FOR ANSWERS

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ADDITIONAL SPACE FOR ANSWERS

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ADDITIONAL SPACE FOR ANSWERS

ACKNOWLEDGEMENTS

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