FOR OFFICIAL USE

Section B Total Marks

X012/101

NATIONAL QUALIFICATIONS 2005

TUESDAY, 31 MAY
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 (2002 Edition).

Section A – Questions 1–20 (20 marks)

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

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.

SCOTTISH QUALIFICATIONS AUTHORITY

Read carefully

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

2 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.

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

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

5 Use **black** or **blue ink** for your answers. **Do not use red ink.**

6 The answer to each question is **either** A, B, C or D. Decide what your answer is, then 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 exam, 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

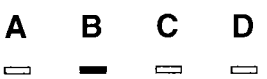
A fractional distillation

B chromatography

C fractional crystallisation

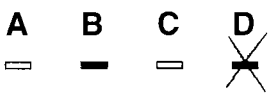
D filtration.

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

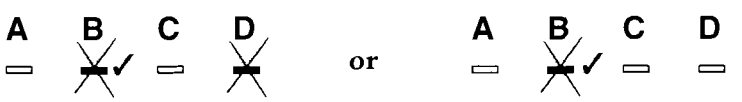


Changing an answer

If you decide to change your answer, cancel your first answer by putting a cross through it (see below) and fill in the answer you want. The answer below has been changed to **B**.



If you then decide to change back to an answer you have already scored out, put a tick (✓) to the **right** of the answer you want, as shown below:



SECTION A

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

1. Which of the following magnesium compounds does **not** contain oxygen?

A Magnesium oxide

B Magnesium sulphate

C Magnesium sulphide

D Magnesium sulphite

2. Which of the following would produce the most dilute solution?

A 5 g of copper sulphate dissolved in 50 cm^3 of water

B 5 g of copper sulphate dissolved in 100 cm^3 of water

C 10 g of copper sulphate dissolved in 50 cm^3 of water

D 10 g of copper sulphate dissolved in 100 cm^3 of water

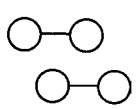
3. Which line in the table correctly describes what happens if 1 gram of a catalyst is involved in a chemical reaction?

	Speed of reaction	**Mass of catalyst left at end in grams**
A	faster	1
B	unchanged	1
C	faster	0
D	unchanged	0

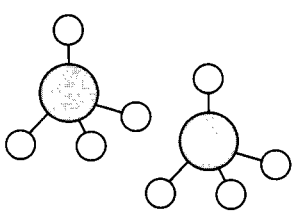
4. The structures of substances can be represented by models.

Which model shows a compound made of molecules?

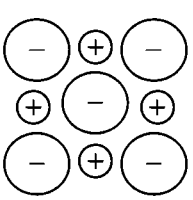
A



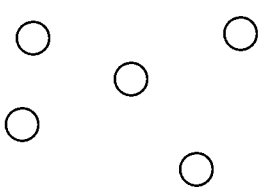
B



C



D



5. What is the name of the compound with the formula N_2O_4?

A Nitrogen dioxide

B Nitrogen tetroxide

C Dinitrogen trioxide

D Dinitrogen tetroxide

6. The pH of four solutions is shown.

Which solution is most acidic?

Solution	pH
A	2
B	6
C	8
D	11

7. Iron metal is extracted from its ore by

A heating with sulphur

B crushing the ore

C using electricity

D heating with carbon.

8. Which of the following metals has a melting point that is higher than the melting point of magnesium but lower than that of calcium?

(You may wish to use page 3 of the data booklet to help you.)

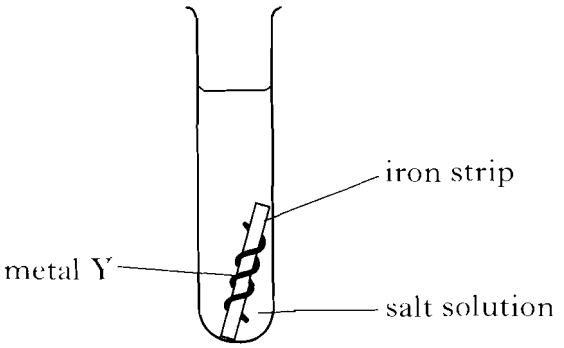
A Aluminium

B Gold

C Silver

D Tin

9. Metal Y protects the iron strip from rusting.



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

Metal Y could be

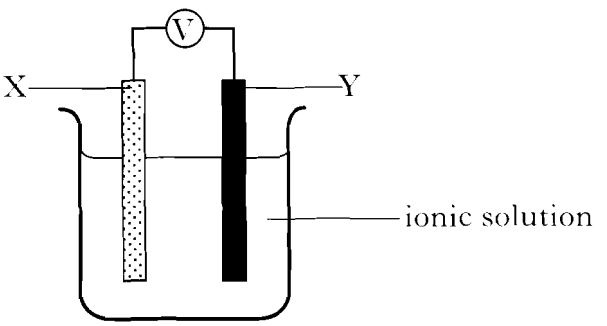
A copper

B lead

C magnesium

D tin.

10. A voltage is produced when different metals are joined together in a cell.



Which of the following metal pairs would give the highest voltage in the cell?

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

	X	Y
A	silver	copper
B	copper	zinc
C	magnesium	copper
D	magnesium	silver

[Turn over

11. Which of the following is a synthetic fibre?

A Silk

B Wool

C Cotton

D Terylene

12. Which of the following substances should **not** be used to put out a petrol fire?

A Sand

B Foam

C Water

D Carbon dioxide

13. Biogas is a fuel produced from plant material.

Biogas is mainly

A oil

B alcohol

C methane

D hydrogen.

14. Crude oil can be separated into fractions by

A cracking

B distillation

C fermentation

D filtration.

15. Which line in the table shows suitable properties of a plastic which could be used in greenhouses instead of glass?

	Lets light through?	**Effect of heat**	**Effect of light**
A	yes	none	very little
B	no	none	none
C	yes	none	becomes brittle
D	yes	cracks	very little

16. Chlorophyll in the leaves of plants absorbs

A water

B oxygen

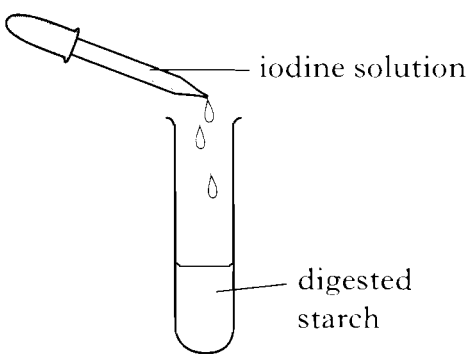
C light energy

D carbon dioxide.

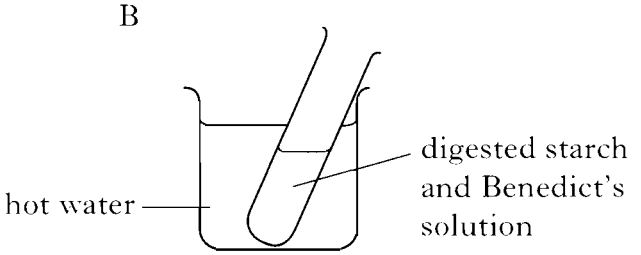
17. Starch is broken down by digestion.

Which test would give a positive result for the digested starch?

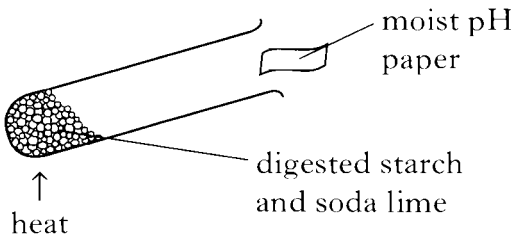
A



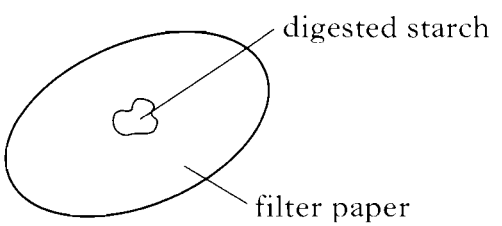
B



C



D



[Turn over

18. Which of the following additives are used to improve the taste of food?

A Colourings

B Flavourings

C Preservatives

D Vitamins

19. The body uses amino acids to produce

A fats

B starch

C sugars

D proteins.

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

$$\text{Glucose} \xrightarrow{\text{yeast}} \text{ethanol} + \text{carbon dioxide}$$

A Fermentation

B Photosynthesis

C Polymerisation

D Respiration

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

Marks

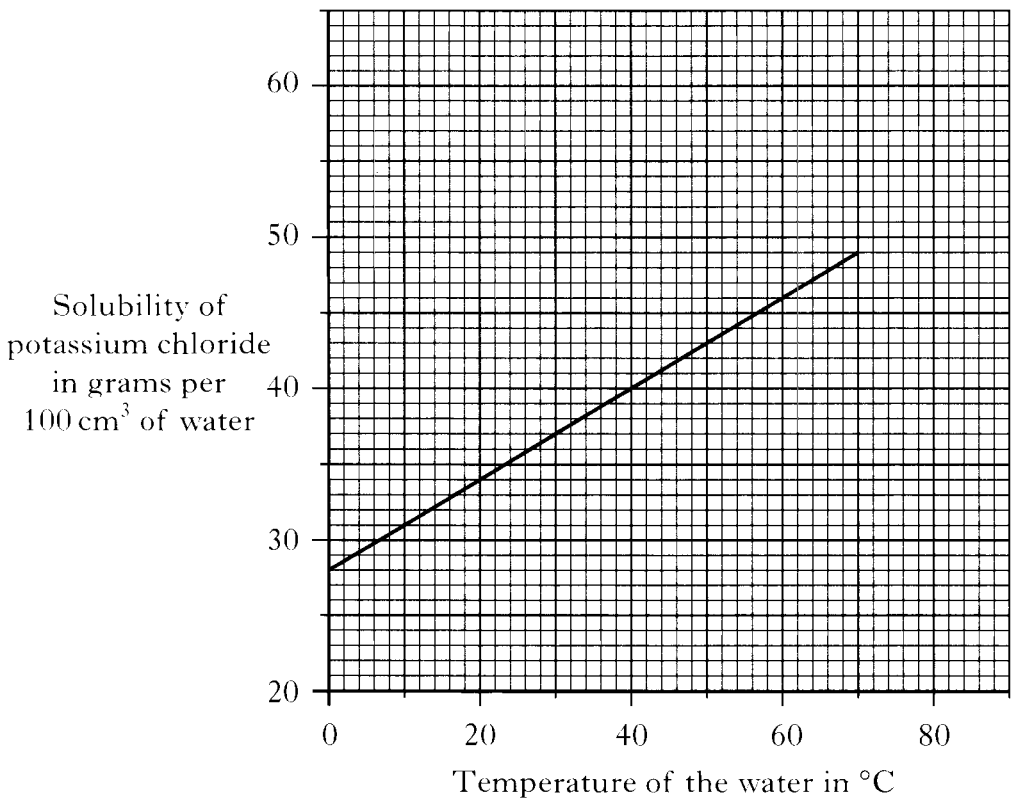
SECTION B

40 marks are available in this section of the paper.

1. (*a*) Complete the sentence.

A solution in which no more substance will dissolve is called a _____ solution. **1**

(*b*) The graph shows how the solubility of potassium chloride changes with temperature.



(i) How does increasing the temperature of the water affect the mass of potassium chloride which will dissolve?

_____ **1**

(ii) Predict the solubility of potassium chloride at 80 °C.

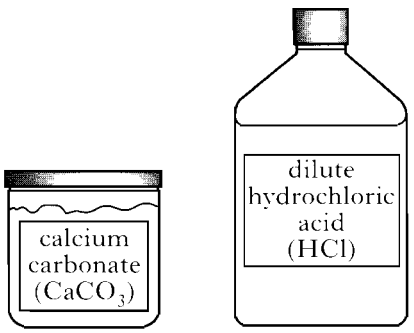
_____ grams per 100 cm^3 of water. **1**

(3)

[Turn over

Marks

2. Calcium carbonate reacts with dilute hydrochloric acid. This reaction is an example of a neutralisation reaction.



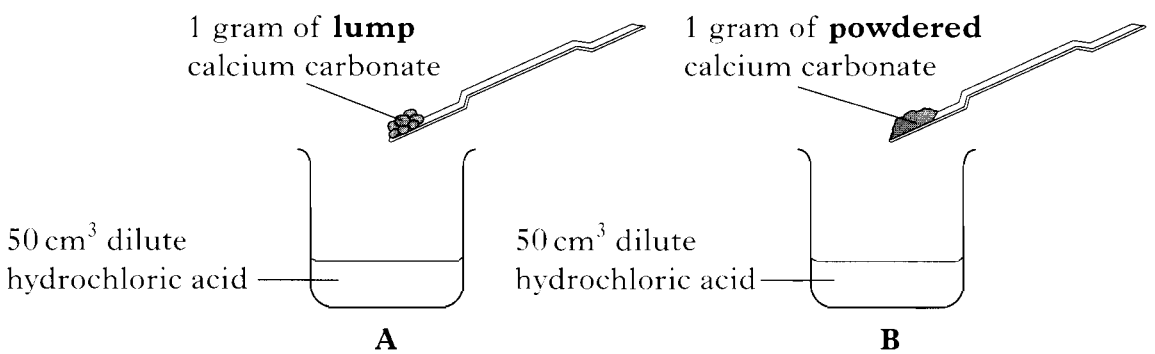
(*a*) The three products of this reaction are:

_____

_____

_____ **2**

(*b*) A student carried out two experiments.



(i) What will be **seen** in each beaker to show that a reaction is taking place?

_____ **1**

(ii) Why will the speed of reaction be faster in experiment **B**?

_____

_____ **1**

(4)

Marks

3. Some results from part of the **PPA "Testing the pH of solutions"** are shown below.

Solution	Colour of pH paper
ammonia	blue-purple
bicarbonate of soda	blue
lemon juice	red-orange
salt water	green

A pH colour chart is used to identify the pH of each substance.

colour	red	red-orange	orange	green	blue	blue-purple	purple
	↓	↓	↓	↓	↓	↓	↓
pH	1	3	5	7	9	11	13

(*a*) Complete both columns of the table of results.

Solution	pH	Acid/alkali/neutral
ammonia		
bicarbonate of soda		
lemon juice		
salt water		

2

(*b*) Why is it **not** possible to measure the pH of some substances, for example, sand, glass and marble?

_____

1

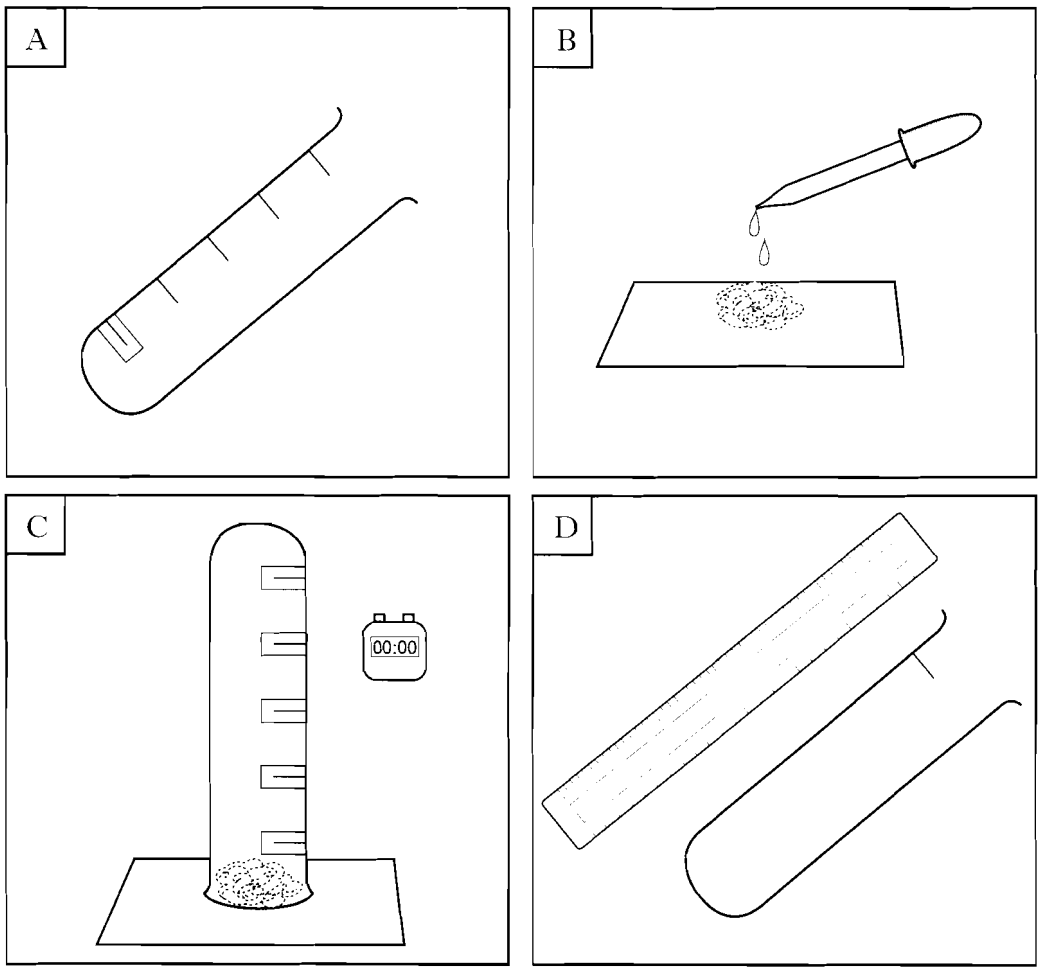
(3)

[Turn over

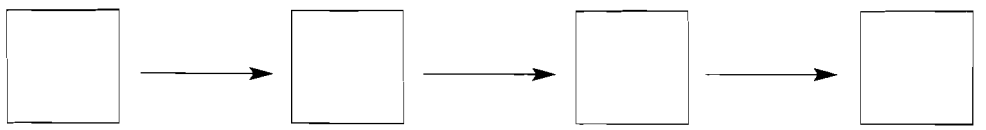
Marks

4. A teacher set up an experiment to show how quickly ammonia gas moves through air.

A test tube was marked every two centimetres. A piece of wet pH paper was placed at each mark. Ammonia solution was dropped on to a small piece of cotton wool on a tile. The test tube was placed over the cotton wool and a stopwatch was started.



(*a*) Place a letter in each box to show the order in which the experiment was carried out.



1

Marks

4. (continued)

(*b*) The results from this experiment are shown in the table.

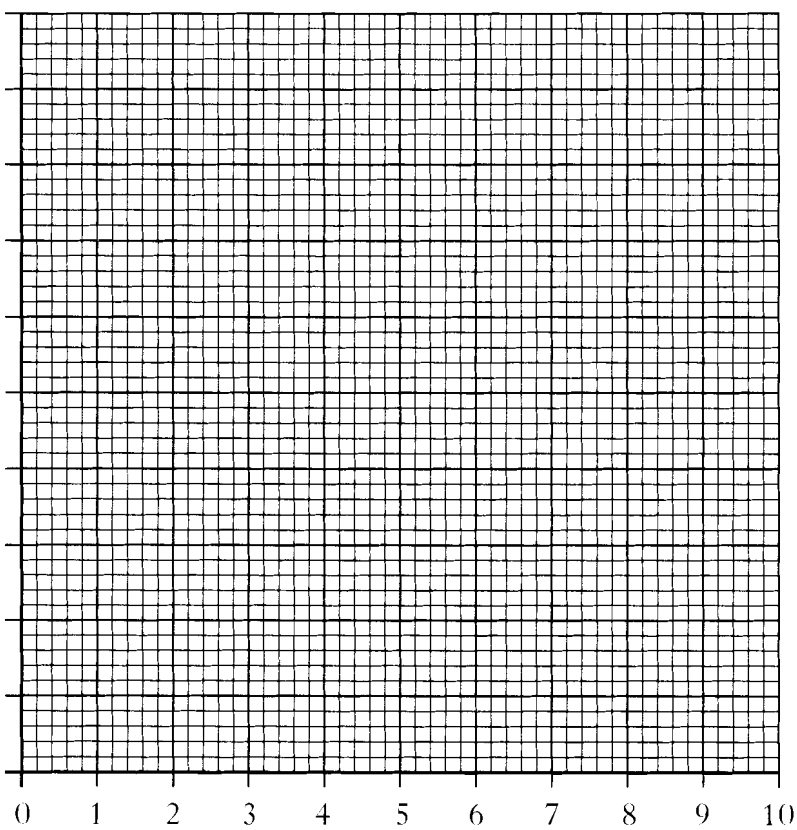
Distance from mouth of test tube in centimetres	Time taken for pH paper to change colour in seconds
2	20
4	40
6	60
8	100
10	180

Use the above information to

(i) label and complete the scale on the vertical axis;

(ii) draw a line graph of the results.

(Additional graph paper, if required, will be found on page 22.)

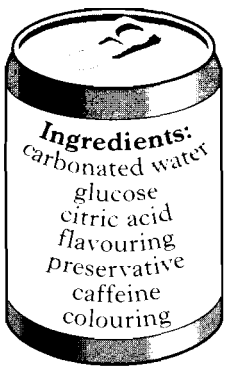


2

(3)

Marks

5. The label shows the ingredients in a sparkling soft drink.



(*a*) Carbonated water is water with carbon dioxide dissolved in it.

Why is carbon dioxide added?

_____

_____ **1**

(*b*) Which substance is added to the drink to make it sweeter?

_____

_____ **1**

(*c*) Why is a preservative added to the drink?

_____

_____ **1**

(3)

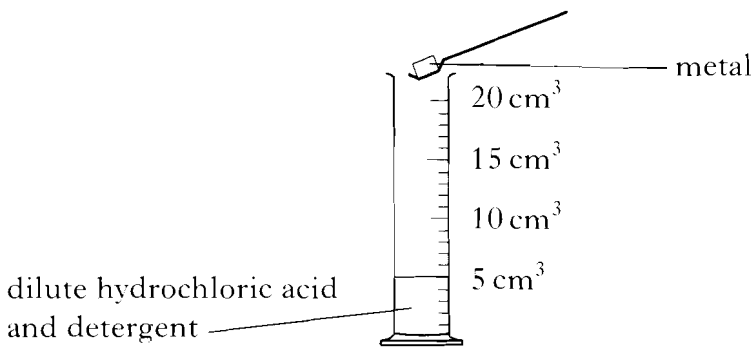
Marks

6. Some metals react with dilute hydrochloric acid.

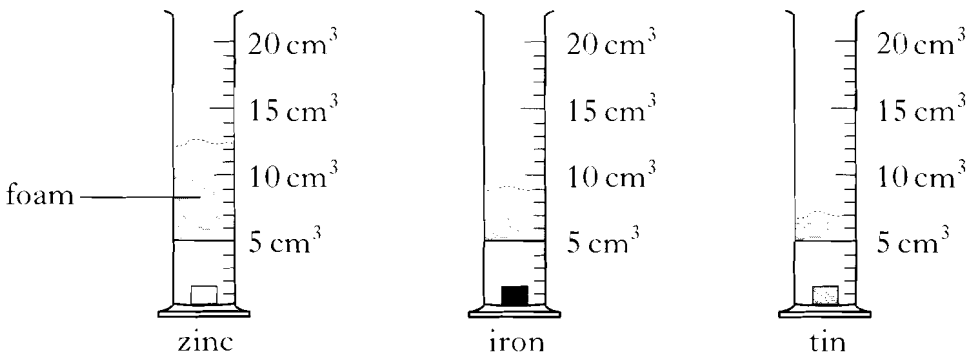
(*a*) Name the gas produced when metals react with dilute hydrochloric acid.

_____ **1**

(*b*) The speed of reaction of four metals, zinc, iron, tin and magnesium, with dilute hydrochloric acid was investigated.

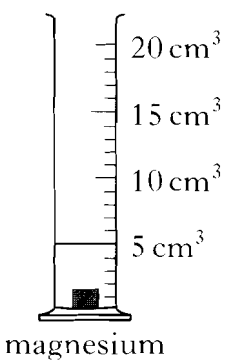


The gas caused the detergent to foam.



(i) Draw on the diagram below, the level the foam would have reached when magnesium was used in the experiment.

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



1

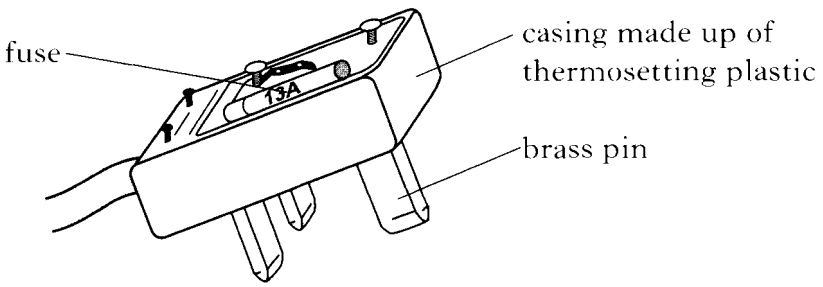
(ii) The experiment was repeated using another metal but no foam was produced. Suggest a name for this metal.

_____ **1**

(3)

Marks

7. Many different materials are used to make an electrical plug.



(*a*) What is meant by a thermosetting plastic?

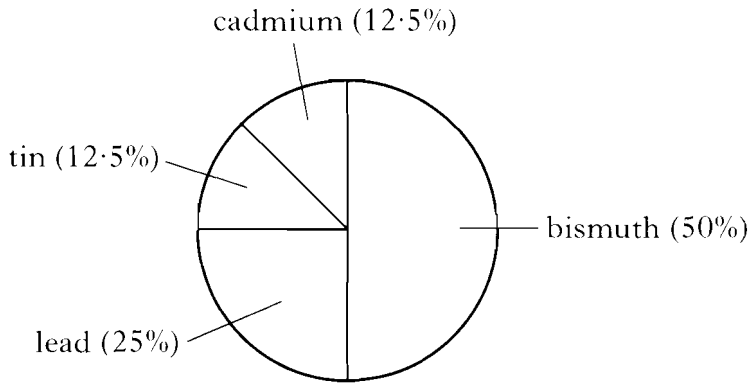
_____ **1**

(*b*) What property of brass makes it suitable for use as the pins in an electrical plug?

_____ **1**

(*c*) Wood's metal is a material which can be used in fuses.

The pie chart shows the mixture of metals used to make Wood's metal.



(i) What name is given to a mixture of metals?

_____ **1**

(ii) Calculate the mass of lead in 160 grams of Wood's metal.

_____ grams **1**

(4)

DO NOT WRITE IN THIS MARGIN

Marks

8. Three methods of disposing of plastics are:

burying

incineration (burning)

recycling.

(*a*) Why is burying a good method of disposing of biodegradable plastics?

_____

_____ **1**

(*b*) Suggest a disadvantage of incineration as a method of disposal.

_____

_____ **1**

(*c*) Most plastics are made from oil.
Recycling plastics is important because it conserves stocks of oil.

Why is it important to conserve stocks of oil?

_____

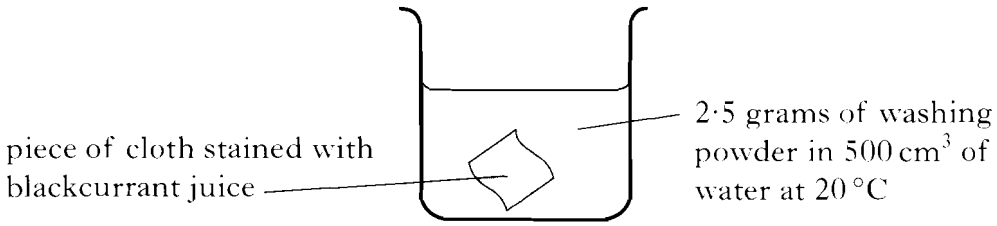
_____ **1**

(3)

[Turn over

Marks

9. A student investigated the removal of blackcurrant stains using a biological washing powder. The investigation was carried out at different temperatures.

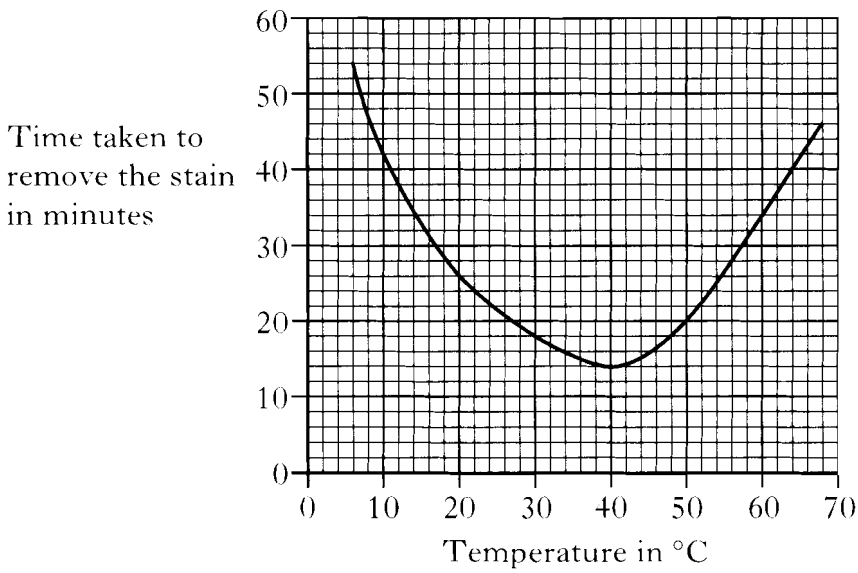


(*a*) What volume of water and mass of washing powder should be used to test the washing powder at 30 °C?

Volume of water _____ cm^3

Mass of washing powder _____ grams **1**

(*b*) The graph shows the time taken for a biological washing powder to remove blackcurrant stains at different temperatures.



(i) From the graph, what temperature was best for removing the stain?

_____ °C **1**

(ii) Enzymes in the biological washing powder help to remove the blackcurrant stains.

Why does biological washing powder not work as well at high temperatures?

_____

_____ **1**

(3)

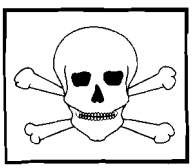
Marks

10. Farmers use chemicals to **control pests**, **kill weeds** and **prevent diseases**.

(*a*) Complete the following sentence.

Farmers use chemicals called herbicides to _____. **1**

(*b*) Many chemicals used by farmers are labelled with the following hazard-warning symbol.



What does this symbol mean?

_____ **1**

(*c*) Farmers add fertilisers to provide elements essential for healthy plant growth.

(i) Name a natural fertiliser.

_____ **1**

(ii) Name an element essential for healthy plant growth.

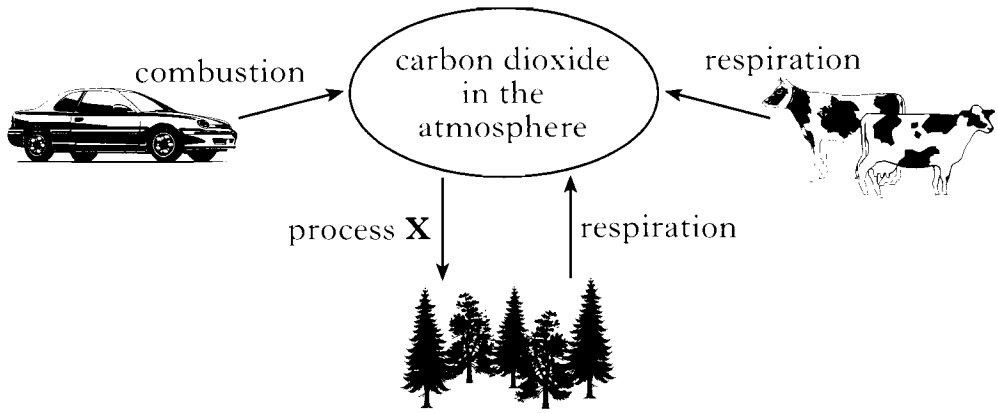
_____ **1**

(4)

[Turn over

Marks

11. Carbon dioxide is present in the atmosphere.



(*a*) What is the test for carbon dioxide?

_____ **1**

(*b*) Name process **X**.

_____ **1**

(*c*) The level of carbon dioxide in the atmosphere is increasing.

What effect is this thought to cause?

_____ **1**

(*d*) When petrol burns in a car engine some of it undergoes incomplete combustion.

Name the poisonous gas that is produced in incomplete combustion.

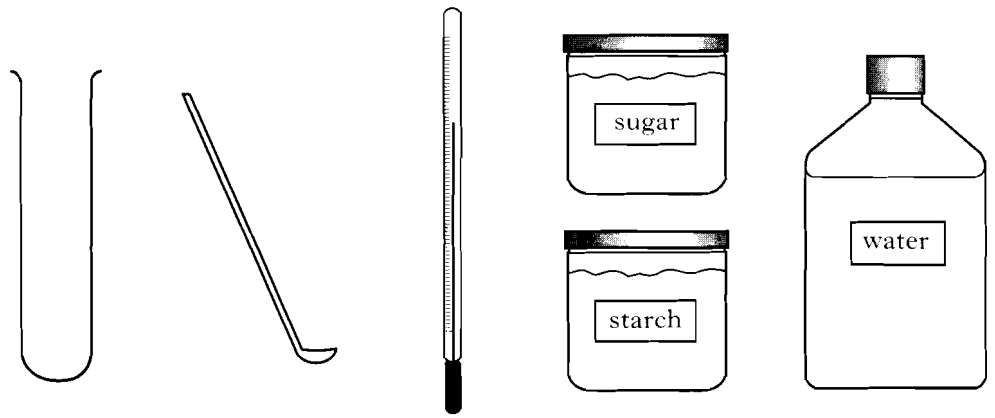
_____ **1**

(4)

Marks

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

PPA "Burning Carbohydrates"
Equipment and chemicals



boiling tube | burning spoon | thermometer | jars of sugar and starch | bottle of water

(*a*) **Draw** and **label** a diagram to show how the heat given out by burning sugar can be measured. **2**

(*b*) Which gas in the air is used up when a carbohydrate burns?

_____ **1**

(3)

[END OF QUESTION PAPER]