FOR OFFICIAL USE

Section B Total Marks

X012/101

NATIONAL QUALIFICATIONS 2004

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 (2002 Edition).

Section A (Questions 1 to 20)

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

Section B

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, as well as the fair copy, is to be written in this book.

Rough work should be scored through when the fair copy has been written.

Additional space for answers and rough work 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

SECTION A

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

Fill in the details required on the answer sheet.

In questions 1 to 20 of this part of the paper, an answer is given by indicating the choice A, B, C or D by a stroke made in INK in the appropriate place of the answer sheet—see the sample question below.

For each question there is only ONE correct answer.

Rough working, if required, should be done only on this question paper, or on the rough working sheet provided—**not** on the answer sheet.

At the end of the examination the answer sheet for Section A **must** be placed **inside** this answer book.

This part of the paper is worth 20 marks.

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

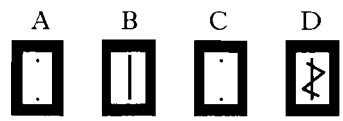
B chromatography

C fractional crystallisation

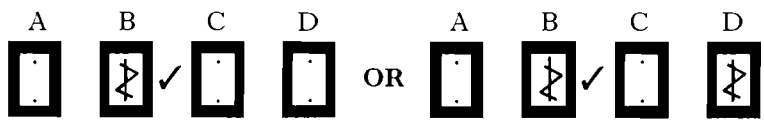
D filtration.

The correct answer is B—chromatography. A **heavy** vertical line should be drawn joining the two dots in the appropriate box in the column headed **B** as shown **in the example on the answer sheet.**

If, after you have recorded your answer, you decide that you have made an error and wish to make a change, you should cancel the original answer and put a vertical stroke in the box you now consider to be correct. Thus, if you want to change an answer **D** to an answer **B**, your answer sheet would look like this:



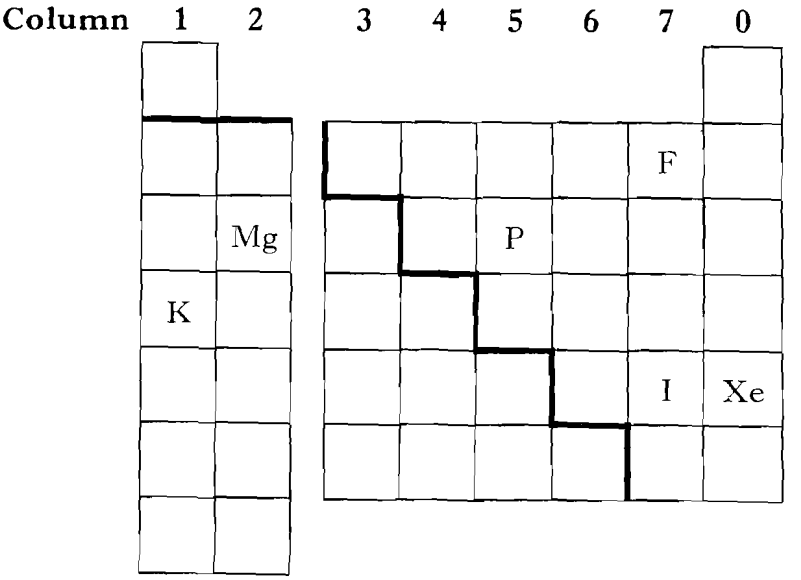
If you want to change back to an answer which has already been scored out, you should **enter a tick (✓)** to the RIGHT of the box of your choice, thus:



SECTION A

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

1. The diagram shows part of the Periodic Table.



Which **two** elements show similar chemical properties?

A F and I

B Mg and P

C Mg and K

D I and Xe

2. Which of the following metals would be a solid at 1000 °C?

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

A Aluminium

B Calcium

C Iron

D Magnesium

[Turn over

3. Which of the following gases is dissolved in some drinks to make them fizzy?

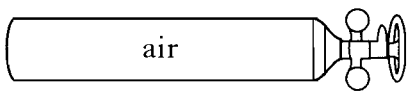
A Oxygen

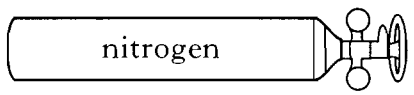
B Nitrogen

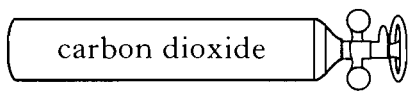
C Hydrogen

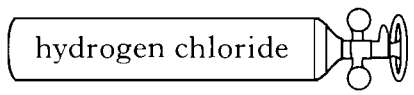
D Carbon dioxide

4. Which of the following cylinders contains a mixture of gases?

A 

B 

C 

D 

5. As water is added to an acid, the acid becomes

A less acidic and its pH goes down

B less acidic and its pH goes up

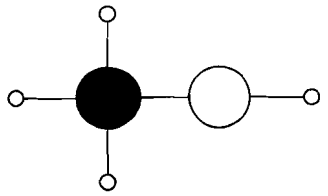
C more acidic and its pH goes down

D more acidic and its pH goes up.

6. An alcohol has the formula C_2H_5OH.

Which diagram could represent a molecule of this alcohol?

A



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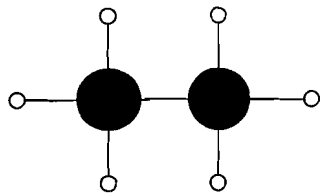

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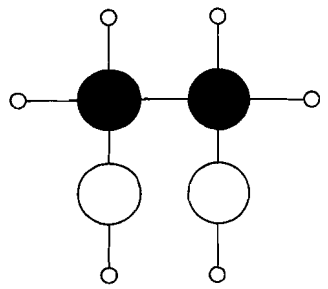
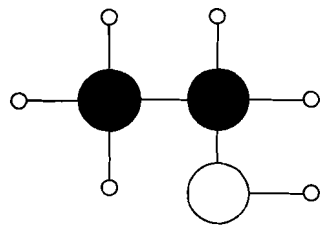
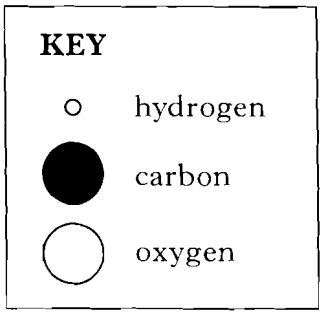


D





7. When sulphur dioxide gas is dissolved in water, the solution formed would have a pH of

A 3

B 7

C 9

D 12.

8. potassium hydroxide + sulphuric acid → potassium sulphate + water

Which compound is the salt in the reaction shown by the above equation?

A Potassium hydroxide

B Sulphuric acid

C Potassium sulphate

D Water

[Turn over

9. Which substance is **not** an alloy?

(You may wish to use page 1 of the data booklet to help you.)

A Brass

B Lead

C Solder

D Steel

10. Fabrics are dyed to make them

A good at soaking up perspiration

B easy to drip-dry

C flameproof

D coloured.

11. Which type of cleaning chemical can give a scum with hard water?

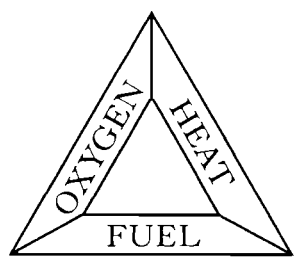
A Soap

B Shampoo

C Washing-up liquid

D Soapless detergent

12. The triangle shows that a fuel, oxygen and a high temperature are needed for a fire.



Spraying water on a bonfire puts out the fire by

A soaking up the fuel

B preventing oxygen getting to the fuel

C lowering the temperature of the fuel

D providing carbon dioxide to put out the fire.

13. Burning a hydrocarbon in a plentiful supply of air produces

A carbon monoxide only

B carbon dioxide only

C carbon monoxide and water

D carbon dioxide and water.

14. Plastics are said to be biodegradable if they are broken down by

A acid in the soil

B bacteria in the soil

C plants in the soil

D water in the soil.

15. Plants make their own food by taking in

A oxygen only

B carbon dioxide only

C oxygen and water

D carbon dioxide and water.

16. The table shows the number of drug-related deaths in Scotland over a five-year period.

Year	Number of drug-related deaths
1	153
2	209
3	247
4	251
5	267

Over the five-year period, the table shows that

A there is no general 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.

[Turn over

17. Which gas in the atmosphere is responsible for the greenhouse effect?

A Argon

B Carbon dioxide

C Nitrogen

D Oxygen

18. At which temperature do enzymes in the human body function best?

A 0 °C

B 11 °C

C 37 °C

D 100 °C

19. Which food contains more fat than carbohydrate?

(You may wish to use page 7 of the data booklet to help you.)

A Bread

B Peanuts

C Rice

D Spaghetti

20. Which of the following sodium chloride solutions would be the most dilute?

A 1 gram of sodium chloride dissolved in 200 cm^3 of water

B 2 grams of sodium chloride dissolved in 100 cm^3 of water

C 10 grams of sodium chloride dissolved in 1000 cm^3 of water

D 20 grams of sodium chloride dissolved in 2000 cm^3 of water

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

[Turn over for SECTION B on *Page ten*

Marks

SECTION B

40 marks are available in this section of the paper.

1. Chemists use symbols and formulae to represent atoms, ions and molecules. Some of these are shown below.

CH_4 Na^+ Br_2 Ne Cl^- Mg

Complete the table by putting the symbols and formulae in the correct column.

Atoms	Ions	Molecules

(2)

Marks

2. In **Unit 2 PPA 1 "Electrical Conductivity"**, a circuit is used to show if an element is a conductor or non-conductor of electricity.

(*a*) Complete the list of equipment needed to make the electrical circuit.

element to be tested _____

connecting wires _____

_____

_____ **1**

(*b*) The table shows the results obtained when some elements were tested. Complete the table for strontium.
(You may wish to use page 1 of the data booklet to help you.)

Element	Metal/Non-metal	Conductor/Non-conductor
aluminium	metal	conductor
carbon (graphite)	non-metal	conductor
copper	metal	conductor
sulphur	non-metal	non-conductor
strontium		

1

(2)

[Turn over

WRITE IN THIS MARGIN

Marks

3. (*a*) Crude oil is a finite resource.
What is meant by a finite resource?

_____

_____ **1**

(*b*) Give an example of damage to the environment caused by oil spilt from tankers at sea.

_____

_____ **1**

(*c*) Crude oil is a mixture of hydrocarbons.

(i) Which elements are present in hydrocarbons?

_____ **1**

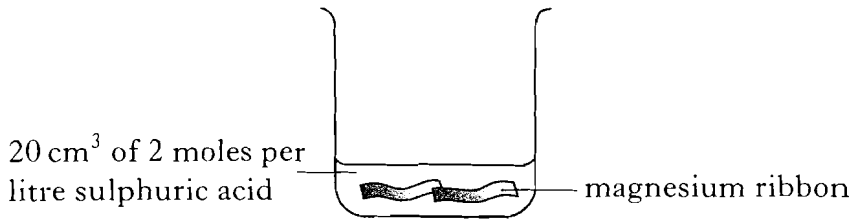
(ii) Name the process used to separate crude oil into fractions.

_____ **1**

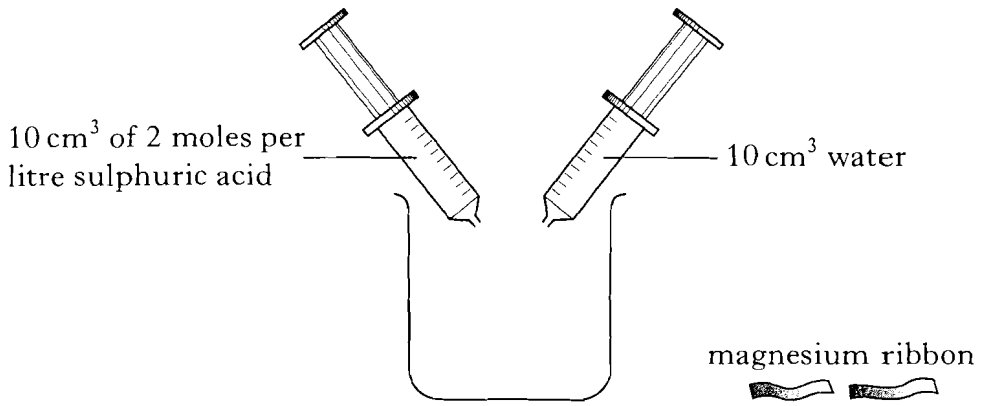
(4)

Marks

4. The experiment below is carried out in a **PPA in Unit 1**.



The experiment is repeated using 10 cm^3 of 2 moles per litre sulphuric acid and 10 cm^3 water as shown below.



(*a*) Complete the statement.

The factor affecting reaction speed which is being changed in the PPA is _____. 1

(*b*) If magnesium powder was used instead of magnesium ribbon, what effect would this have on the reaction speed?

_____

_____ 1

(*c*) Magnesium sulphate is a product of the reaction.

Magnesium sulphate contains magnesium, sulphur and one other element.

Name the other element.

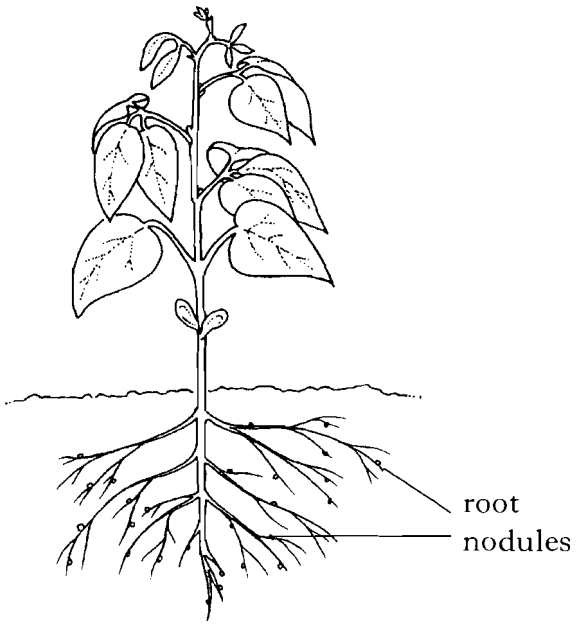
_____ 1

(3)

[Turn over

Marks

5. Some plants have root nodules which allow them to absorb nitrogen from the air.



(*a*) Name a plant with root nodules.

_____ **1**

(*b*) Nitrate fertilisers are also a source of nitrogen.
What property of nitrate compounds makes them suitable as fertilisers?
(You may wish to use page 4 of the data booklet to help you.)

_____ **1**

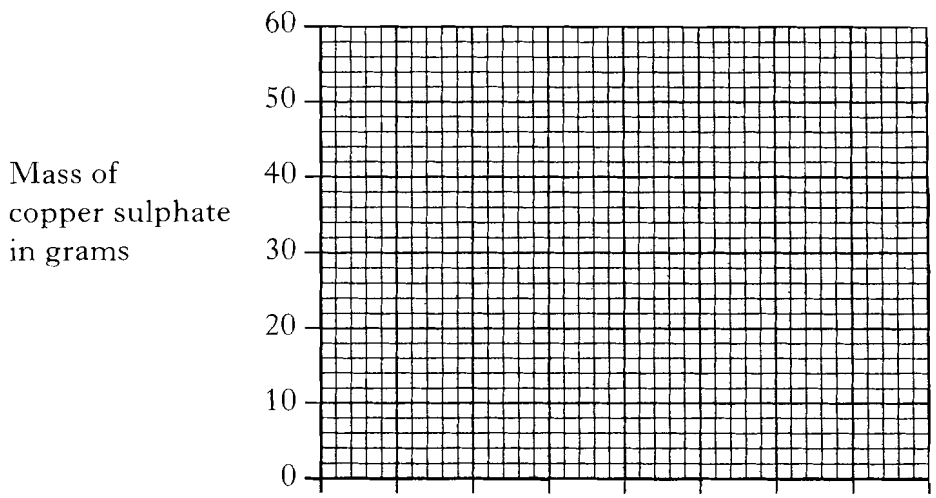
(2)

Marks

6. The table shows the mass of copper sulphate which can be dissolved in 100 grams of water at different temperatures.

Temperature in °C	10	30	50	70
Mass of copper sulphate in grams	17	24	34	47

(*a*) Use the information in the table to plot a line graph.
Use an appropriate scale to fill most of the graph paper.
(Additional graph paper, if required, will be found on page 23.)



2

(*b*) Predict the mass of copper sulphate which could be dissolved in 100 grams of water at 80 °C.

_____ grams **1**

(3)

[Turn over

Marks

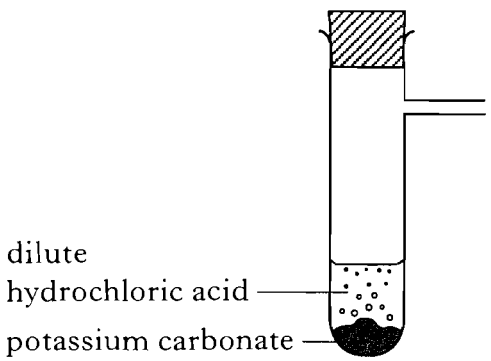
7. Potassium carbonate reacts with dilute hydrochloric acid to produce a salt.

(*a*) Name the type of chemical reaction taking place.

_____ 1

(*b*) Carbon dioxide is also produced. It can be identified by bubbling the gas through limewater.

(i) Complete the diagram to show the gas being **bubbled** through limewater.



1

(ii) What would you see happening as carbon dioxide is bubbled through limewater?

_____ 1

(3)

Marks

8. (*a*) Why must our diet contain proteins?

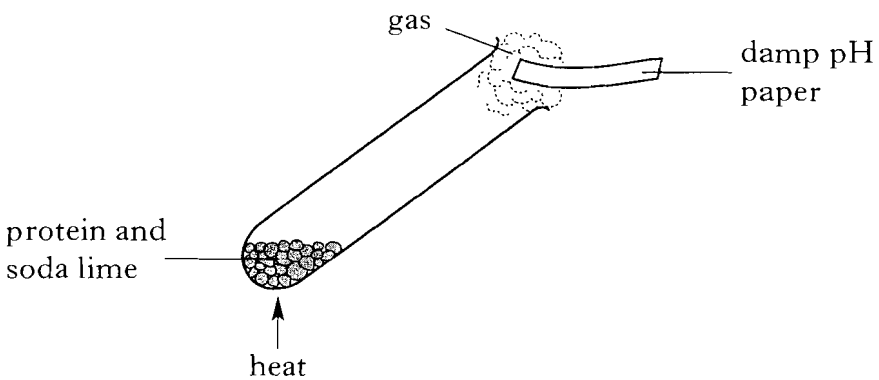
_____

_____ 1

(*b*) Carbon, hydrogen and oxygen atoms are found in proteins.
What other atom is always found in proteins?

_____ 1

(*c*) When a protein is heated with soda lime a gas is given off.
This gas can be detected using damp pH paper.



What colour would the pH paper turn?

_____ 1

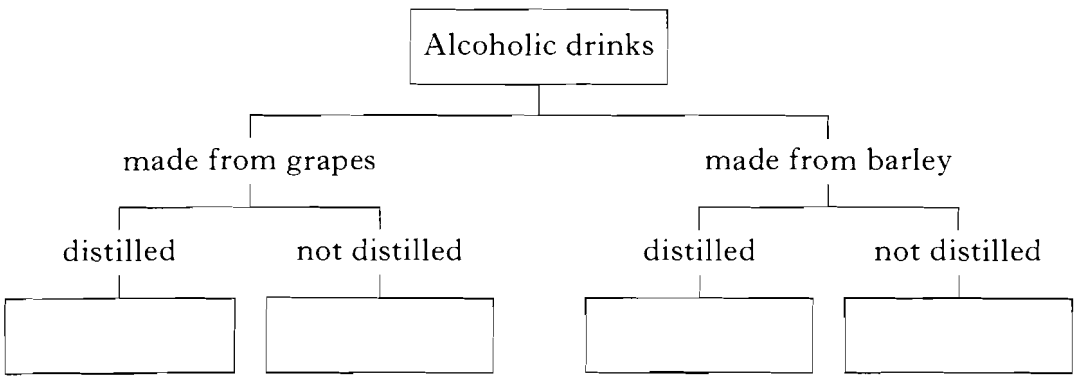
(3)

[Turn over

Marks

9. Alcoholic drinks can be made from different carbohydrate sources. For example, **wine** comes from grapes while barley is the raw material for **beer**. Wine and beer have a low percentage of alcohol. Barley is also used to produce **whisky** which has its percentage of alcohol increased by distillation. Distillation of wine produces **brandy**.

(*a*) Use the information above to complete the following key by entering the names of the alcoholic drinks in the correct boxes.



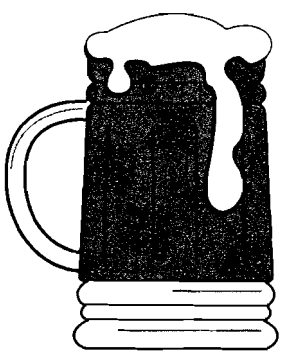
2

(*b*) Name the process used to change carbohydrates into alcohol.

_____

1

(*c*) Different alcoholic drinks contain different units of alcohol.



pint of beer
(2 units)

measure of whisky
(1 unit)

On average, it takes 1 hour to break down 1 unit of alcohol.

A man drinks **two** pints of beer and **one** measure of whisky.

How long will it take for all of the alcohol that he drank to break down in his body?

_____ hours

1

WRITE IN THIS MARGIN

Marks

9. (continued)

(*d*) Methylated spirits (meths) contains alcohol. Methylated spirits is toxic.

What is added to methylated spirits to discourage people from drinking it?

_____

_____ **1**

(5)

[Turn over

WRITE IN THIS MARGIN

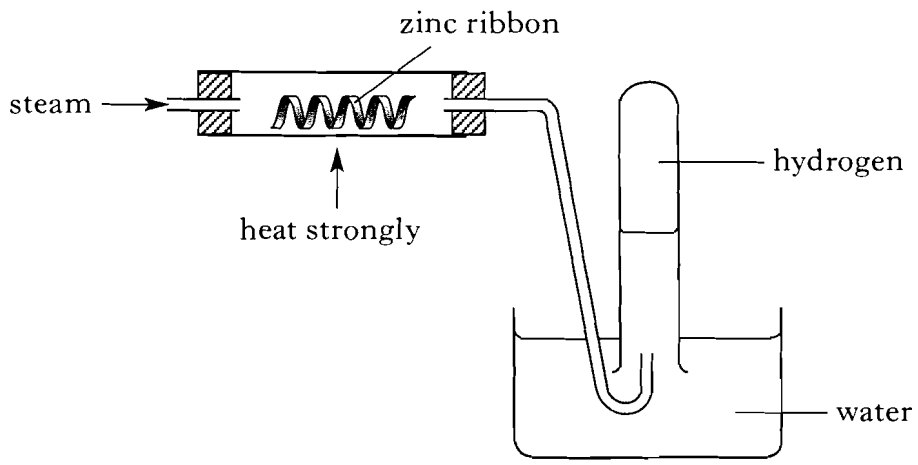
Marks

10. Hydrogen is produced when steam reacts with hot zinc metal. Zinc oxide is also produced in the reaction.

(*a*) (i) Write a word equation for this reaction.

_____ **1**

(ii) The diagram shows how the reaction can be carried out.



Why can the hydrogen gas be collected in this way?

_____

_____ **1**

(iii) State the test for hydrogen gas.

_____

_____ **1**

(*b*) Predict how the speed of the reaction will change if steam reacts with magnesium instead of zinc.
(You may wish to use page 6 of the data booklet to help you.)

_____

_____ **1**

(4)

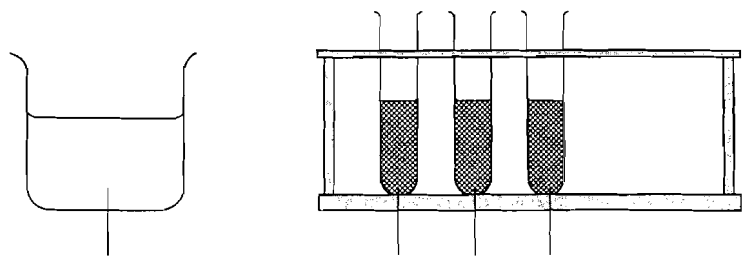
Marks

11. Starch and sugars are carbohydrates.

(*a*) State **one** difference between starch and sugars.

_____ **1**

(*b*) Benedict's solution is used to test for sugars in the **PPA "Testing for Starch and Sugars in Food"**.



(i) What must be done to the test tubes containing the food samples and Benedict's solution, to bring about the colour change?

_____

_____ **1**

(ii) What colour change shows that a food sample contains sugar?

_____ **1**

(*c*) One of the sugars in foods is glucose.
During respiration, glucose reacts with oxygen. Water and a gas are produced.

(i) Name the gas produced.

_____ **1**

(ii) Why is respiration important?

_____

_____ **1**

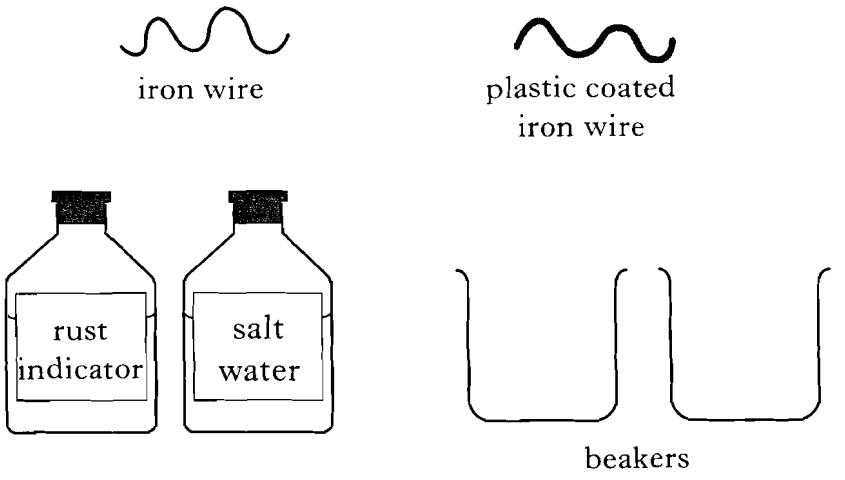
(5)

[Turn over for Question 12 on *Page twenty-two*

Marks

12. Plastic coating can be used to protect iron from rusting.

(*a*)



Using the above equipment, describe an experiment you could use to show that plastic coating prevents iron from rusting.

_____

_____

_____

_____

_____ **2**

(*b*) One plastic used to coat iron is poly(ethene).

(i) Name the monomer used to make poly(ethene).

_____ **1**

(ii) Poly(ethene) can be re-shaped on heating.
What do we call this type of plastic?

_____ **1**

(4)

[END OF QUESTION PAPER]