FOR OFFICIAL USE

Section B Total Marks

X012/101

NATIONAL QUALIFICATIONS 2003

FRIDAY, 23 MAY
1.00 PM – 2.30 PM

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 (Questions 1 to 12)

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

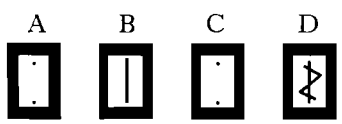
B chromatography

C fractional crystallisation

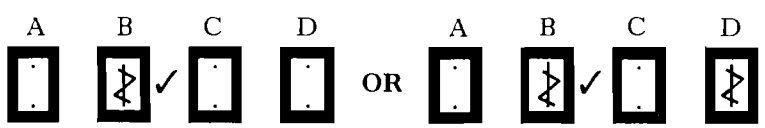
D filtration.

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. Helium, neon and argon are in the same column of the Periodic Table because they are
   A non-metals
   B found in air
   C gases at room temperature
   D elements with similar chemical properties.

2. Sodium fluoride is dissolved in drinking water to
   A kill bacteria
   B make it fizzy
   C prevent lead poisoning
   D protect against tooth decay.

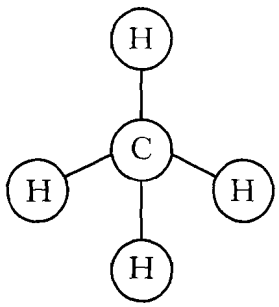
3. Which of the following **always** occurs in a chemical reaction?
   A A gas is given off.
   B A solid is produced.
   C A new substance is formed.
   D A colour change takes place.

4. 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	unchanged	0
B	faster	0
C	unchanged	1
D	faster	1

[Turn over

5. The diagram below shows a methane molecule.



Which of the following statements correctly describes this molecule?

A The atoms are held together by weak bonds.

B The atoms are held together by strong bonds.

C The ions are held together by weak bonds.

D The ions are held together by strong bonds.

6. Which of the following metals is extracted from its ore using electricity?

A Aluminium

B Gold

C Iron

D Silver

7. Which of the following metals has a density greater than nickel?
(You may wish to use page 3 of the data booklet to answer this question.)

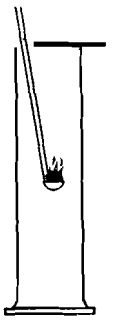
A Tin

B Silver

C Aluminium

D Magnesium

8. Samples of three metals were each heated and placed in jars of oxygen.



Metal	Result
1	Dull glow
2	Burst into flames
3	Glowed brightly

The correct order of reactivity of the metals, putting the most reactive first, is

A 1, 3, 2

B 1, 2, 3

C 2, 3, 1

D 2, 1, 3.

9. Which of the following is a natural fibre?

A Silk

B Nylon

C Kevlar

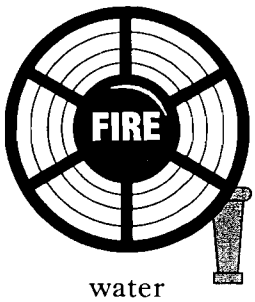
D Polyester

[Turn over

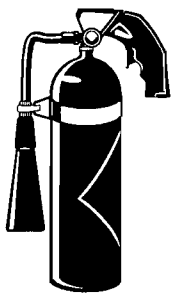
10. Which of the following should **not** be used to put out an oil fire?

A 

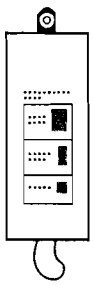
sand

B 

water

C 

carbon dioxide

D 

fire blanket

11. The boiling point of a hydrocarbon depends on the size of the hydrocarbon molecule. Which of the following hydrocarbons has the lowest boiling point?

A C_6H_{14}

B C_8H_{18}

C $C_{10}H_{22}$

D $C_{12}H_{26}$

12. Which of the following is a harmful substance produced by the incomplete combustion of diesel?

A Soot

B Water

C Hydrogen

D Carbon dioxide

13. Polythene is a useful plastic because after it is made it can be heated and re-shaped. However it causes pollution problems because bacteria are unable to break it down.

Polythene can be described as

A thermoplastic and biodegradable

B thermoplastic and not biodegradable

C thermosetting and biodegradable

D thermosetting and not biodegradable.

14. What percentage of body weight is water?

A Less than 30%

B Approximately 40%

C Approximately 50%

D More than 60%

15. Which sugar is used as table sugar?

A Fructose

B Glucose

C Maltose

D Sucrose

16. The results of tests carried out on a piece of food are shown in the table.

Food test	Result
Rubbing food on filter paper	Oily mark
Iodine test	Stays brown
Benedict's test	Turns brick-red
Heating with soda lime	No gas produced

The food contained

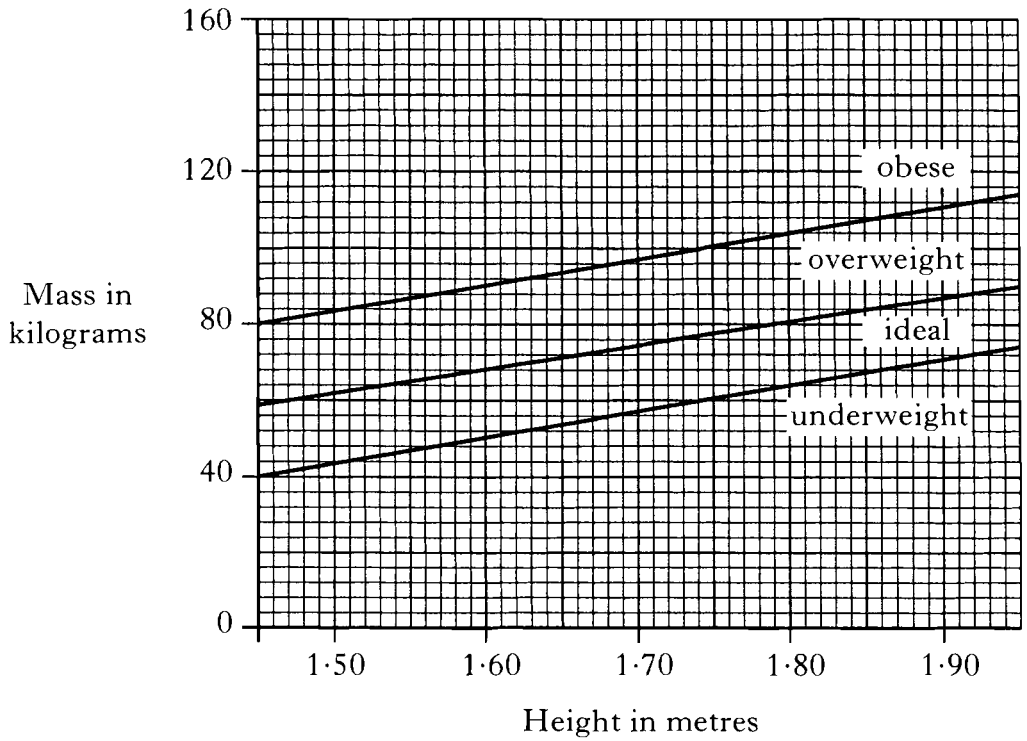
A fat and protein

B fat and glucose

C starch and glucose

D protein and starch.

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 Underweight

B Ideal

C Overweight

D Obese

18. Which element is found in proteins but not in carbohydrates?

A Carbon

B Hydrogen

C Nitrogen

D Oxygen

19. Which type of food produces amino acids during digestion?

A Carbohydrates

B Fats

C Oils

D Proteins

20. Alcohol is made by the fermentation of glucose.

Distillation can then be used to

A increase the alcohol concentration

B decrease the alcohol concentration

C increase the glucose concentration

D decrease the glucose concentration.

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

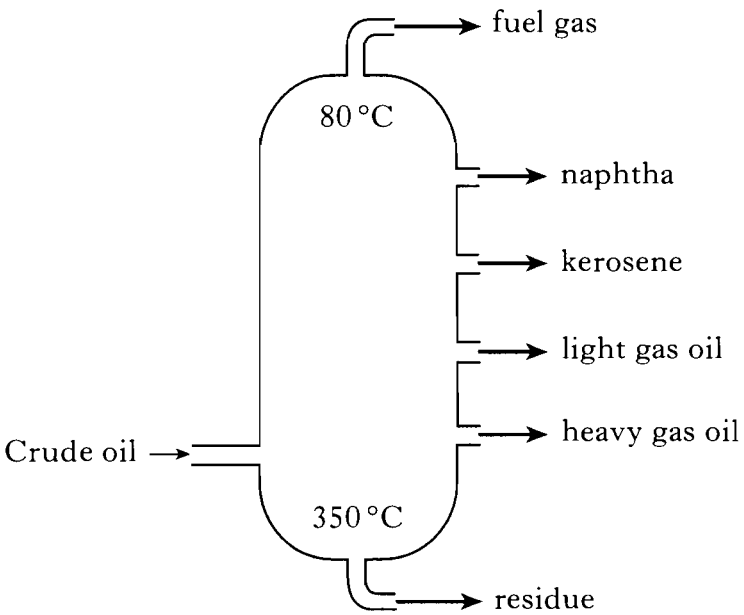
40 marks are available in this section of the paper.

1. Crude oil is a fossil fuel.

(*a*) Name another fossil fuel.

_____ **1**

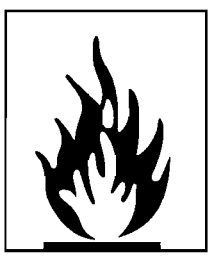
(*b*) Crude oil is separated into different fractions in a refinery.



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

_____ **1**

(ii) Naphtha can be used to make petrol.
A petrol tanker has the following hazard-warning symbol on it.



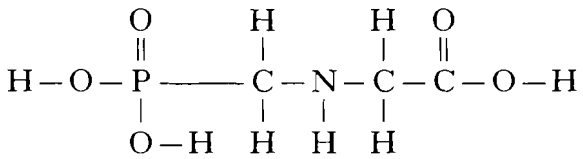
What does this hazard-warning symbol tell you about petrol?

_____ **1**

(3)

Marks

2. (*a*) Farmers use herbicides to control weeds. The diagram shows a molecule of a herbicide.



Complete the formula to show the number of each type of atom in this molecule.

C H O N P **1**

(*b*) Why do crops not grow as well when weeds are present?

_____

_____

_____ **1**

(*c*) What type of compound can farmers use to prevent diseases in plants?

_____ **1**

(3)

[Turn over

Marks

3. The results from a student's PPA write-up are shown below.

Intermediate 1 Chemistry	Testing the pH of Solutions	Unit 1 PPA 3
Name: Tom Fleming Date:		Teacher's Initials:

ASSESSMENT SHEET

What was the aim of the experiment?

To find the pH of some household substances and classify them as acidic/alkaline/neutral.

Results

Substance	pH	Acidic/alkaline /neutral
vinegar	4	acidic
bicarbonate of soda	12	alkaline
dilute household ammonia	11	alkaline
lemon juice	5	acidic
sugar		neutral

(*a*) How would the student use the colour chart to get the pH value?

_____

_____ **1**

(*b*) Complete the table above to show the pH value for sugar. **1**

(*c*) Describe what the student would have to do with a **solid** substance before going on to test its pH value.

_____

_____ **1**

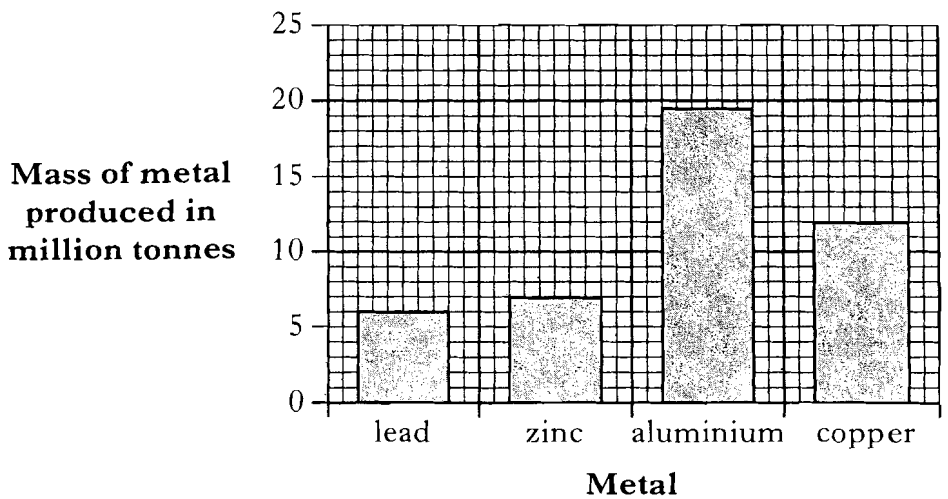
(3)

Marks

4. The table shows the chemical names of four ores.

Ore	Chemical name
bauxite	aluminium oxide
galena	lead sulphide
malachite	copper carbonate
sphalerite	zinc sulphide

The graph shows how much metal is produced each year from these ores.



(*a*) Which ore is a compound made up of **three** elements?

_____ **1**

(*b*) How much metal is produced each year from the ore galena?

_____ million tonnes **1**

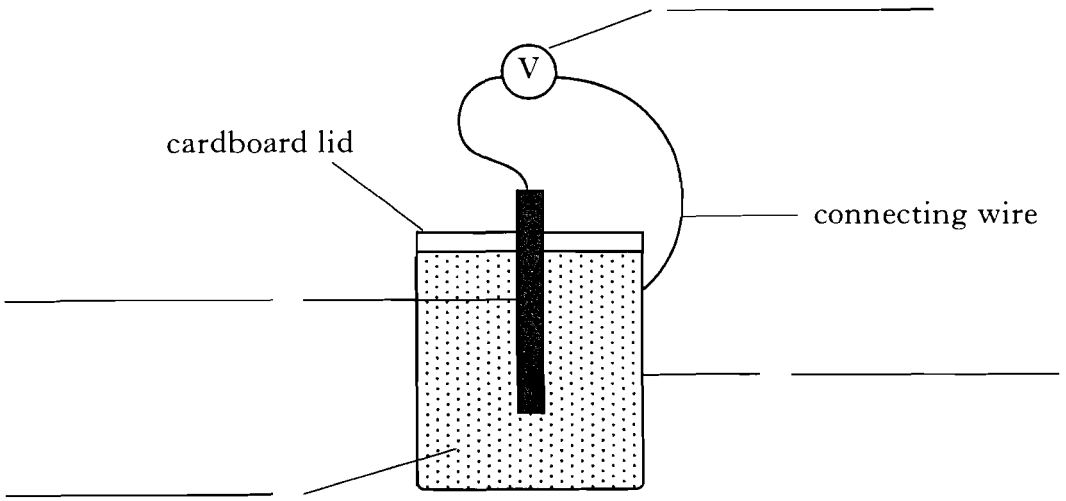
(2)

[Turn over

5. The diagram shows a simple battery made from everyday materials. *Marks*

This battery has a **tin case**. The case is in contact with a **paste**. The other metal in the battery is **copper**. The voltage produced by the battery can be measured using a **voltmeter**.

(*a*) Use the information above to label the diagram of the battery.



2

(*b*) The paste is made from porridge and salt solution.

(i) The salt solution provides ions.
Why are ions needed?

1

(ii) Porridge is mainly made of starch.
Describe how you would test the porridge to prove that it contains starch.

1

(4)

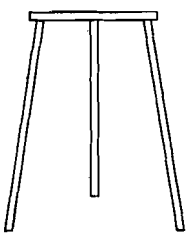
Marks

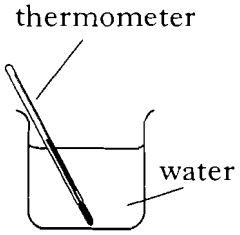
6. Manufacturers are now producing liquid detergents in capsule form.
The capsules have a plastic coating which dissolves in water.

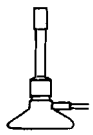
(*a*) Name the process used to make plastics?

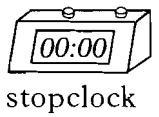
_____ **1**

(*b*) Describe how you would show whether the plastic coating dissolves faster at higher or lower temperatures.
You may wish to use some or all of the apparatus shown below.
You may use other apparatus if required.









stopclock

liquid detergent capsules

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____ **2**

(3)

[Turn over

Marks

7. Coating iron with other metals can be used to prevent iron from rusting.

(*a*) How does the metal coating prevent the iron from rusting?

_____

_____

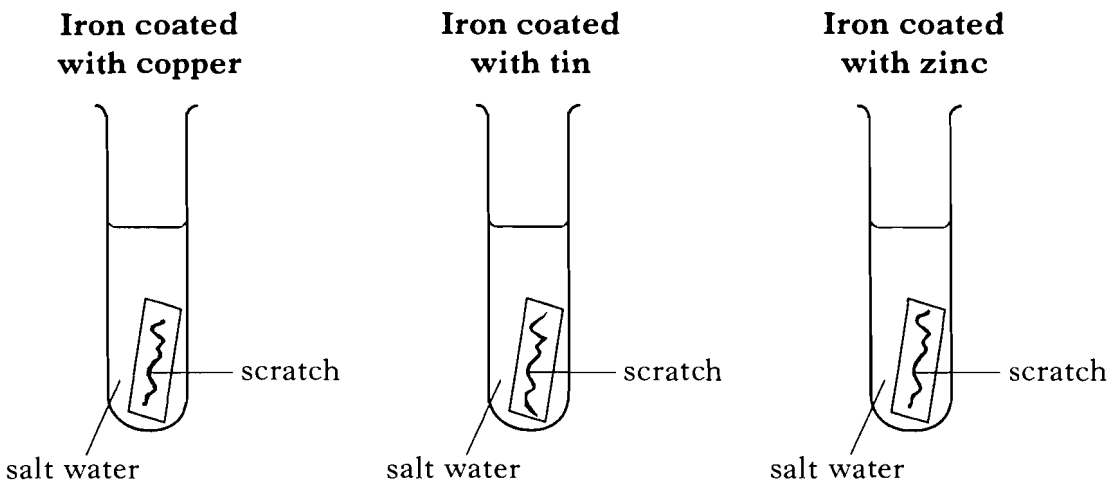
_____ **1**

(*b*) What name is given to the process of coating iron with zinc?

_____ **1**

(*c*) Some metals will protect iron from rusting even when the coating is scratched.

A student set up the test tubes shown below.



(i) What other substance needs to be added to the test tubes to show if the iron is protected from rusting?

_____ **1**

(ii) Complete the table to show the results you would expect.

(You may wish to use page 6 of the data booklet to answer this question.)

Metal used to coat iron	Does iron rust?
copper	
tin	
zinc	

1

(4)

WRITE IN THIS MARGIN

Marks

8. Caffeine is found in many foods and can alter the way our body works.

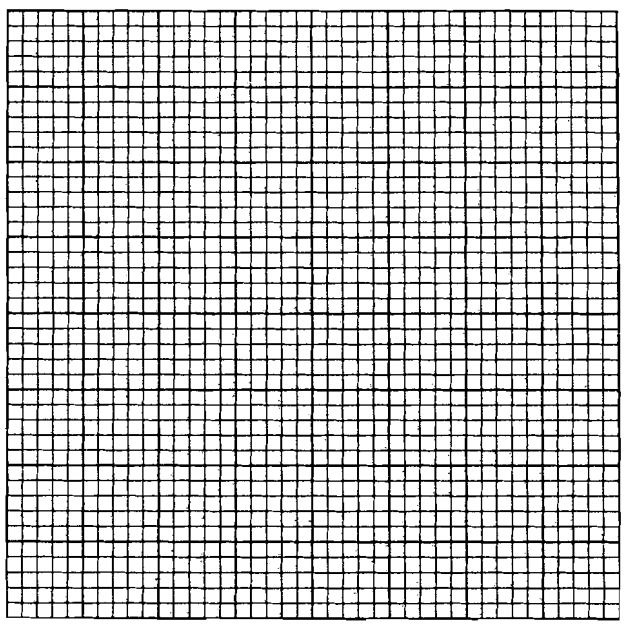
(*a*) What name is given to a substance which alters the way our body works?

_____ 1

(*b*) The table shows the mass of caffeine in different foods.

Food	**Mass of caffeine in milligrams**
cup of coffee	65
cup of tea	40
can of cola	40
50 g bar of chocolate	80

(i) Draw a **bar graph** to show the mass of caffeine in different foods. (Additional graph paper, if required, will be found on page 23.)



2

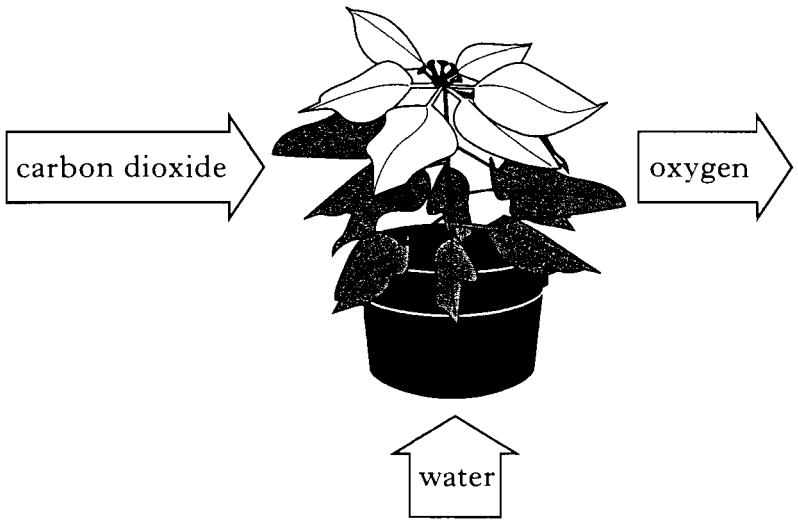
(ii) A student ate a 100 g bar of chocolate and drank a can of cola. Calculate the mass of caffeine in the student's food.

_____ milligrams 1

(4)

Marks

9. (*a*) During photosynthesis green plants make **glucose**.



(i) Write a word equation for photosynthesis.

_____ **1**

(ii) Name the substance in green plants which absorbs light during photosynthesis.

_____ **1**

(*b*) The level of carbon dioxide in the atmosphere has increased in recent years.

(i) Give **one** reason why the level of carbon dioxide in the atmosphere has increased.

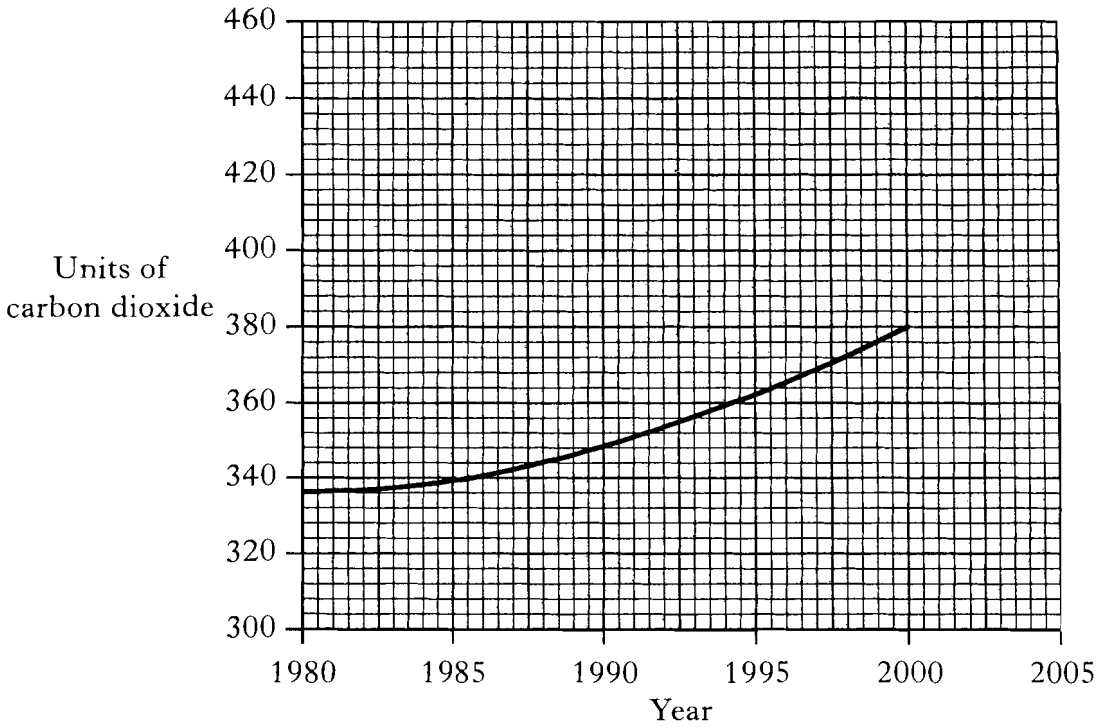
_____

_____ **1**

Marks

9. (*b*) (continued)

(ii) The graph shows how the level of carbon dioxide in the atmosphere has changed since 1980.



Predict the level of carbon dioxide in the atmosphere in 2005 if the trend continues.

_____ units of carbon dioxide **1**

(4)

[Turn over

Marks

10.

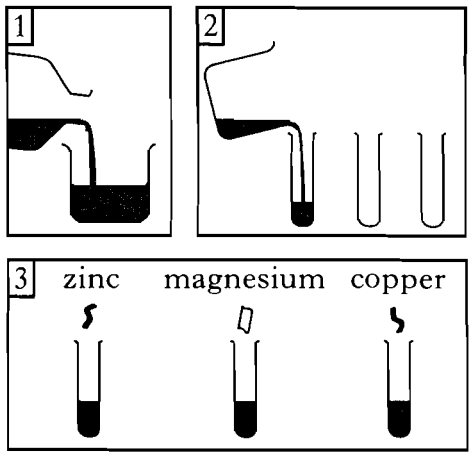
Intermediate 1 Chemistry — **Reaction of Metals with Acid** — **Unit 2 PPA 2**

• **Procedure (what you do)**

1. Add dilute hydrochloric acid to the beaker until it is half full.

2. Put three test tubes in the test tube rack. Pour some of the hydrochloric acid into the first test tube to a depth of about 4 cm. Pour the same volume of acid into the other two test tubes.

3. Add a piece of zinc to the first test tube.
Add a piece of magnesium to the second test tube.
Add a piece of copper to the third test tube.



(*a*) What is the aim of the experiment?

_____

_____

_____ 1

(*b*) During the experiment, the volume of the acid must be kept the same.
State another factor which the student would need to keep the same in each of the three experiments.

_____ 1

(*c*) Name the salt formed during the reaction between magnesium and hydrochloric acid.

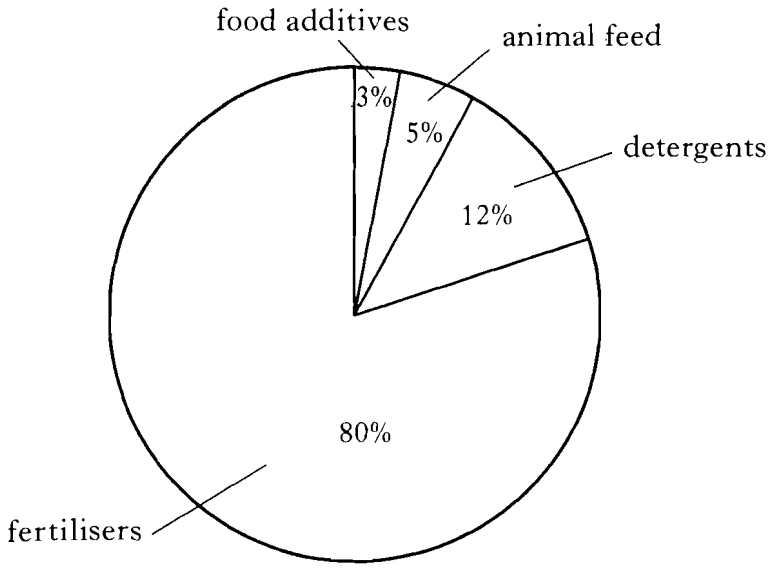
_____ 1

(3)

WRITE IN THIS MARGIN

Marks

11. The pie chart shows the percentage of phosphoric acid used to make other substances.



(*a*) Give **one** reason why a food might contain a food additive.

_____

_____ **1**

(*b*) 50 million tonnes of phosphoric acid are produced in the world each year.
Calculate the mass of phosphoric acid used to make animal feed each year.

_____ million tonnes **1**

(*c*) How does using detergent help to remove grease when washing dishes?

_____

_____

_____ **1**

(*d*) Name the element in calcium phosphate fertiliser which is essential for healthy plant growth.

_____ **1**

(4)

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

THIS MARGIN

Marks

12. Some coal contains sulphur. This forms sulphur dioxide when the coal burns in air.

(*a*) Write the formula for sulphur dioxide.

_____ **1**

(*b*) Air is a mixture of nitrogen and oxygen.
What percentage of the air is oxygen?

_____ **1**

(*c*) What is produced when sulphur dioxide dissolves in water in the atmosphere?

_____ **1**

(3)

[END OF QUESTION PAPER]

SCOTTISH QUALIFICATIONS AUTHORITY

Scottish Qualifications Authority

Intermediate 1 Chemistry - 2003 Examination

Paper 1A

Statistical Data from Sample of Candidates

Item	Syllabus Section	Ability	Facility	r	Percentage Choosing Option A	B	C	D	Omit
1	1ai	KU	0.38	0.35	37	6	19	38*	1
2	1aiii	KU	0.56	0.30	28	8	7	56*	0
3	1bi	KU	0.69	0.28	23	1	69*	7	1
4	1bii	KU	0.64	0.17	3	24	8	64*	1
5	1ci	KU	0.61	0.09	18	61*	10	11	1
6	2ai	KU	0.52	0.23	52*	8	36	3	1
7	2ai	PS	0.89	0.17	2	89*	4	4	1
8	2aii	PS	0.68	0.21	22	6	68*	4	0
9	1bii	KU	0.66	0.38	66*	17	8	8	1
10	2ci	KU	0.70	0.26	4	70*	19	7	0
11	2civ	PS	0.70	0.19	70*	5	5	19	1
12	2cv	KU	0.32	0.09	32*	3	13	51	1
13	2diii	PS	0.61	0.24	12	61*	11	15	0
14	3ci	KU	0.81	0.18	5	7	6	81*	1
15	3cii	KU	0.42	0.37	12	35	11	42*	0
16	3civ/v	PS	0.50	0.40	22	50*	18	9	0
17	3c	PS	0.74	0.16	2	10	74*	14	0
18	3cv	PS	0.64	0.36	14	11	64*	10	0
19	3cv	KU	0.31	0.42	29	31	9	31*	0
20	3di	KU	0.50	0.22	50*	29	7	13	0