FOR OFFICIAL USE

Section B | Total Marks |

X012/10/02

NATIONAL QUALIFICATIONS 2013

FRIDAY, 31 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.

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.

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

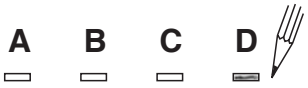
C fractional crystallisation

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 gases is dissolved in some drinks to make them fizzy?

A Oxygen
B Nitrogen
C Hydrogen
D Carbon dioxide

2. Which instruction tells you how to prepare a saturated solution of salt in water?

A Add salt to water with stirring until no more salt can dissolve.
B Add a little salt to water with stirring until it has all dissolved.
C Add as much water as you can to salt, stirring all the time.
D Stir salt into water, then add more water and stir to dissolve the salt.

3. Which of the following is **not** evidence of a chemical reaction taking place?

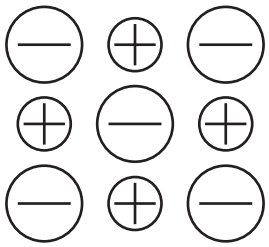
A A substance boiling.
B Gas being given off.
C Energy being given out.
D A precipitate being formed.

4. Which pair of statements is true, when a catalyst is used in a reaction?

	Speed of reaction	**Amount of catalyst present**
A	increases	decreases
B	stays same	stays same
C	increases	stays same
D	stays same	decreases

[Turn over

5. The diagram shows particles in a salt crystal.



Which line in the table is correct for the salt crystal?

	Type of particles in salt crystal	**Strength of bonds in salt crystal**
A	atoms	strong
B	ions	weak
C	atoms	weak
D	ions	strong

6. Which of the following molecules contains only **four** atoms?

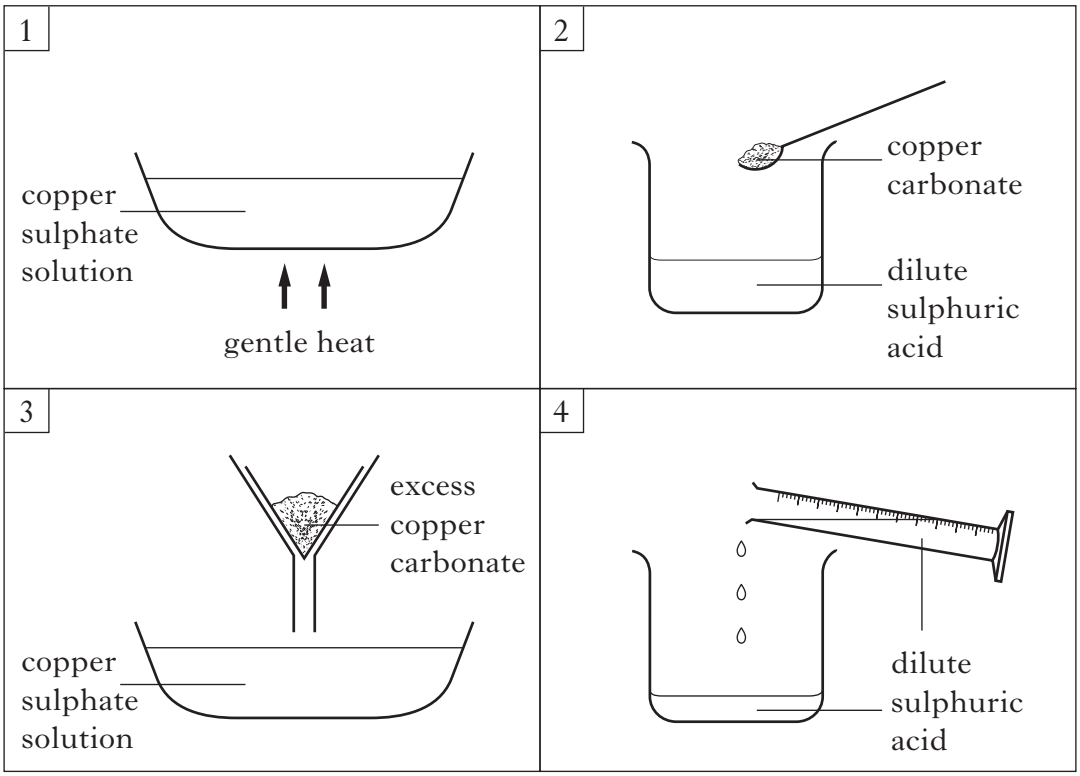
A Sulphur dioxide

B Sulphur trioxide

C Dinitrogen tetroxide

D Carbon monoxide

7. Copper sulphate crystals can be made from copper carbonate and dilute sulphuric acid. The four diagrams show separate stages of the experiment.



Which of the following shows the correct sequence for carrying out the experiment?

A 2, 1, 3, 4

B 2, 3, 4, 1

C 4, 3, 1, 2

D 4, 2, 3, 1

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

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

A Potassium hydroxide

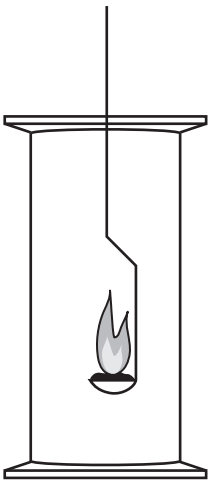
B Sulphuric acid

C Potassium sulphate

D Water

[Turn over

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



Metal	Result
X	dull glow
Y	burst into flame
Z	glowed brightly

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

A X, Z, Y

B X, Y, Z

C Y, Z, X

D Y, X, Z.

10. The process in which iron is dipped into molten zinc to give it a protective layer against corrosion is known as

A electroplating

B galvanising

C greasing

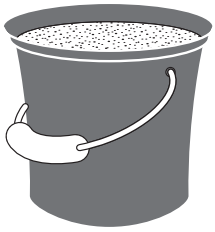
D tin-plating.

11. A fibre used in a T-shirt needs to be hard wearing, be able to absorb water and be flame resistant.

Which line in the table shows the properties of a suitable fibre?

	Strength	Absorbency	Flame resistant
A	strong	very good	no
B	strong	good	yes
C	weak	good	no
D	weak	poor	yes

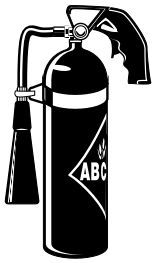
12. Which of the following should **not** be used to put out an oil fire?

A 

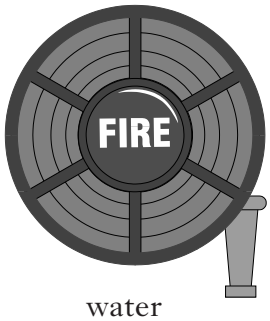
sand

B 

fire blanket

C 

carbon dioxide

D 

water

13. Which of the following are **both** fossil fuels?

A Oil and peat

B Oil and petrol

C Coal and hydrogen

D Natural gas and ethanol

14. Some of the long-chain hydrocarbons produced from crude oil are made into smaller, more useful molecules.

What is this process called?

A Cracking

B Decomposition

C Polymerisation

D Fractional distillation

[Turn over

15. Which line in the table shows the properties of a plastic which is moulded into water pipes for use underground?

	Thermoplastic	**Soluble in water**	**Biodegradable**
A	yes	yes	no
B	no	no	yes
C	yes	no	no
D	no	yes	yes

16. Plants use light energy to produce

A fat
B glucose
C oil
D protein.

17. Which gas is produced during photosynthesis?

A Carbon dioxide
B Nitrogen
C Oxygen
D Sulphur dioxide

18. Which of the following processes provides your body with energy?

A Fermentation
B Photosynthesis
C Polymerisation
D Respiration

19. Which statement about carbon dioxide in air is thought to be **false**?
The increase in the level of carbon dioxide in the air may

A cause global warming
B cause the atmosphere to cool down
C be due to increased burning of fossil fuels
D be due to the extensive clearing of forests.

20. Which of the following compounds could be used as a fertiliser?
(You may wish to use page 4 of the data booklet to help you.)

A Sodium phosphate
B Magnesium phosphate
C Iron phosphate
D Calcium phosphate

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

[Turn over for Section B on *Page ten*

SECTION B

Marks

40 marks are available in this section of the paper.

All answers must be written clearly and legibly in ink.

1. Seaweed is a source of many important chemicals.

(*a*) Iodine is an element which can be obtained from seaweed.

(i) Write the symbol for iodine.
(You may wish to use page 1 of the data booklet to help you.)

_____ **1**

(ii) Name another element which has similar chemical properties to iodine.
(You may wish to use page 1 of the data booklet to help you.)

_____ **1**

(*b*) A type of compound called alginate can also be obtained from seaweed. Adding alginates to foods can change their appearance.
Give another reason for using food additives.

_____ **1**

(*c*) Seaweed is an example of a natural fertiliser that was used in the past.
Why is it now necessary to use artificial fertilisers?

_____ **1**

(4)

DO NOT WRITE IN THIS MARGIN

Marks

2. Some clothes should be dry-cleaned.

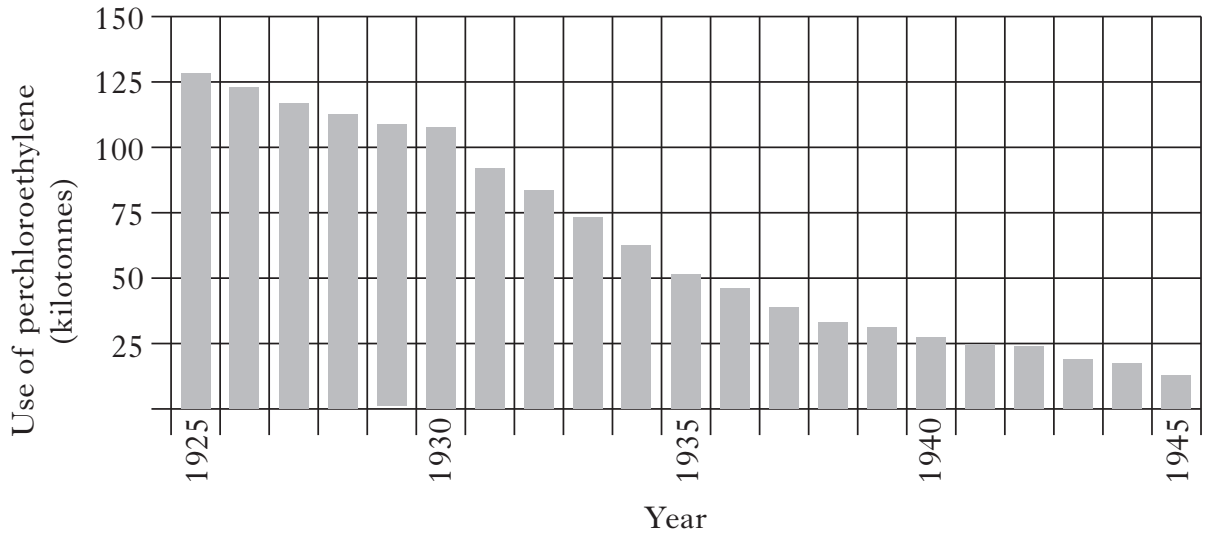
Many different compounds, such as carbon chloride, perchloroethylene and trichloroethane, have been used as solvents in the dry-cleaning process over the years.

(*a*) Name the elements in carbon chloride.

_____ **1**

(*b*) Perchloroethylene was first used in the dry-cleaning process in 1925.

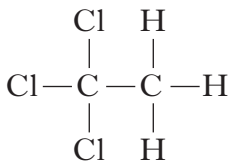
The chart shows the use of perchloroethylene over a 20 year period.



In which year did the use of perchloroethylene first fall below 75 kilotonnes?

_____ **1**

(*c*) The diagram shows the structure of trichloroethane.



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

C __ H __ Cl __ **1**

(3)

DO NOT WRITE IN THIS MARGIN

3. Part of a PPA write-up is shown below. *Marks*

INTERMEDIATE 1 CHEMISTRY	- The Effect of Temperature Changes on Dissolving Speed -	UNIT 1 PPA 1 (revised 2000)

Name: Date:		PC(a)	PC(b)	PC(c)	PC(d)	Teacher's/Lecturer's Initials	

- ASSESSMENT SHEET -

* ***What was the aim of the experiment?***
PC(b)

To find out how the temperature of the water affects the speed at which sugar dissolves.

(*a*) What factor was changed in this PPA?

_____ **1**

(*b*) What was counted to find out how quickly the sugar crystals dissolved in water?

_____ **1**

(*c*) What effect will increasing the temperature have on the speed at which sugar dissolves in water?

_____ **1**

(3)

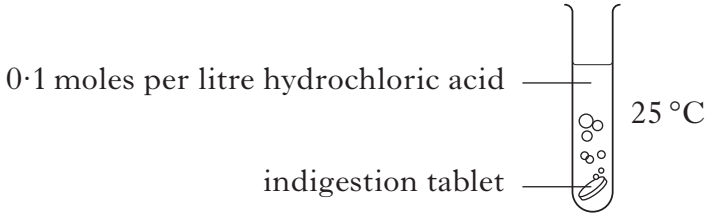
Marks

4. Indigestion can be caused by the stomach producing too much acid. Indigestion tablets can help by neutralising the acid.

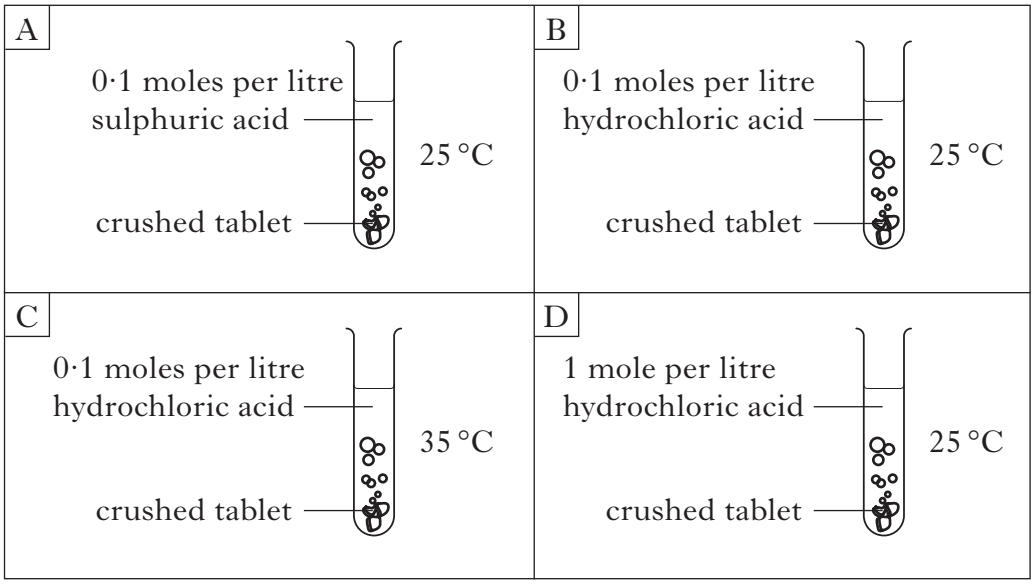
(*a*) (Circle) the correct words to complete the sentence.

As acid is neutralised, the pH { goes up towards 7 / goes down towards 7 / stays at 7 }. **1**

(*b*) (i) Neutralisation reactions can be carried out in a test tube.



Which test tube could be used to compare the effect of crushing the indigestion tablets on the speed of the reaction?



Test tube _____ **1**

(ii) What could be used to show that an acid has been neutralised?

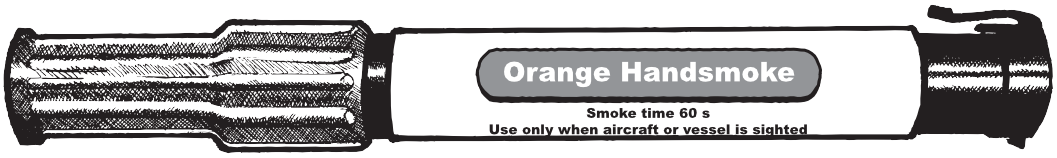
_____ **1**

(3)

DO NOT WRITE IN THIS MARGIN

Marks

5. Diphosphane is used in self-igniting flares.



It is made in a chemical reaction in which water is added to calcium phosphide. This produces calcium hydroxide, hydrogen and diphosphane.

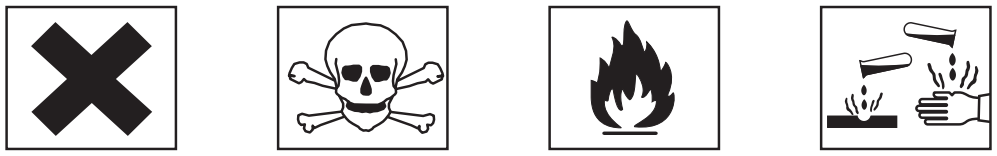
(*a*) Write a word equation for the reaction

_____ + _____

↓

_____ + _____ + _____ **1**

(*b*) (Circle) the hazard symbol which would be used on self-igniting flares.



1

(2)

DO NOT WRITE IN THIS MARGIN

6. Copper coins are not made from pure copper as it is too soft. *Marks*

They are made of a mixture of metals.

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

_____ **1**

(*b*) The exact composition of the mixture has changed over the years as shown in the table and charts.

Year	% copper	% tin	% zinc
1900	95	4	1
1950	95·5	3	1·5
1975	97	0·5	2·5

Chart A

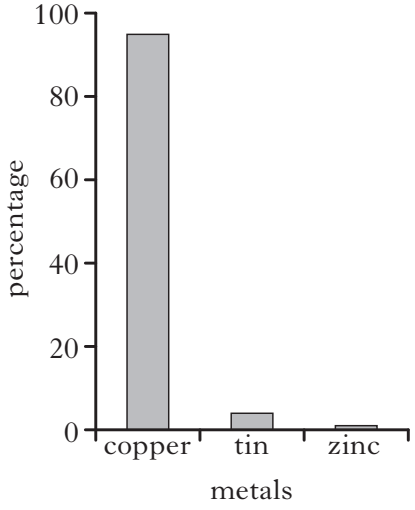


Chart B

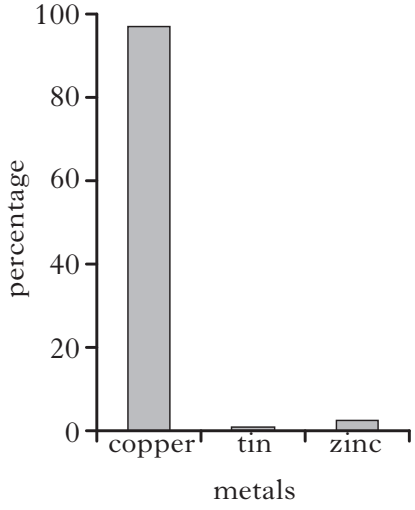
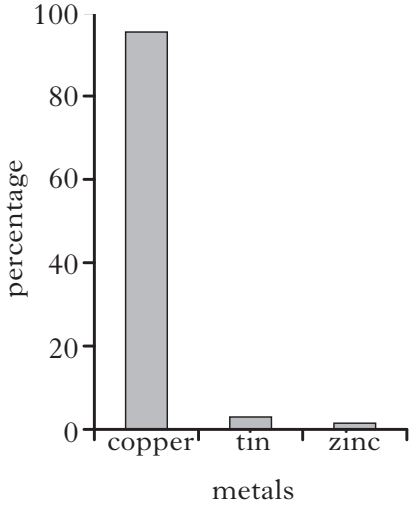


Chart C



Which chart represents a coin from 1975?

Chart _____ **1**

(*c*) Copper can be found uncombined in the Earth's Crust.

Name another metal which can be found uncombined in the Earth's Crust.

_____ **1**

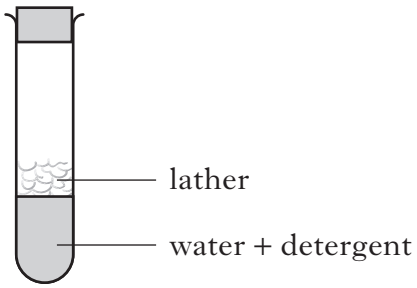
(3)

[Turn over

DO NOT WRITE IN THIS MARGIN

Marks

7. In the **PPA, "Factors which affect lathering"**, a student chose to investigate how the volume of detergent affects the amount of lather produced when detergents are shaken with water.



(*a*) What would the student have used to measure the amount of lather formed?

_____ **1**

(*b*) The experiment was carried out using different volumes of detergent. The same volume of water was used each time.

State another factor which must be kept the same to make it a fair test.

_____ **1**

(*c*) Soapless detergents are used to form lather with hard water.

Why can soap not be used in hard water areas?

_____ **1**

(3)

DO NOT WRITE IN THIS MARGIN

Marks

8. Candles are made from wax which contains hydrocarbon compounds.

(*a*) Name the elements present in hydrocarbons.

_____ and _____ **1**

(*b*) When a candle burns it reacts with oxygen in the air.

Name the type of chemical reaction that happens when burning takes place.

_____ **1**

(*c*) Candles burn with a sooty flame.

What does this suggest about the amount of oxygen involved in the burning?

_____ **1**

(3)

[Turn over

DO NOT WRITE IN THIS MARGIN

Marks

9. Plastics are synthetic polymers made from oil.

(*a*) What does the term synthetic mean?

_____ **1**

(*b*) The plastic used to make some food and drink containers is called poly(propene).

Name the monomer used to make poly(propene).

_____ **1**

(*c*) Plastics can be disposed of by burning.

State a problem caused by burning plastics.

_____

_____ **1**

(3)

[Turn over for Question 10 on *Page twenty*

DO NOT WRITE IN THIS MARGIN

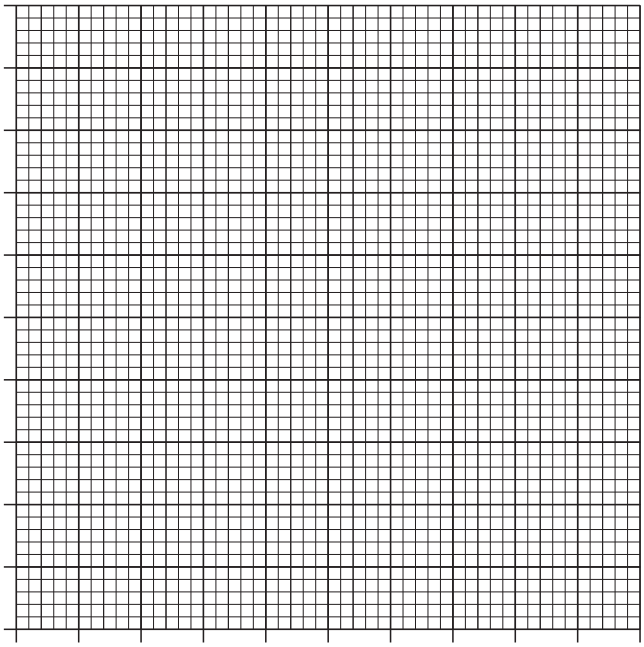
10. The table shows the nutritional content in 100 grams of cereal.

Marks

Class of food	%
protein	6
carbohydrate	84
fat	2
fibre	4
vitamins + minerals	4

(*a*) Draw a bar graph to show this information.

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



2

Marks

10. (continued)

(*b*) (i) The mass of fibre in the cereal can be calculated using the formula

$$\text{mass of fibre in grams} = \frac{\%\ \text{fibre}}{100} \times \text{mass of cereal in grams}$$

Calculate the mass of fibre in a 50 gram serving of the cereal.

_____ grams **1**

(ii) Why is fibre an important part of a balanced diet?

_____ **1**

(4)

DO NOT WRITE IN THIS MARGIN

Marks

11. Fats and oils in our diet provide our bodies with energy.

(*a*) Animals are a source of fats and oils.

Name another source of fats and oils.

_____ **1**

(*b*) Too much fat in our diet can lead to weight gain.

Body Mass Index (BMI) is used to describe people's weight.

Body Mass Index (BMI)	**Description**
less than 18·5	underweight
18·5–24·9	healthy
25·0–29·9	overweight
30·0–39·9	obese
40 or above	very obese

(i) Which description from the table would be applied to someone with a BMI of 31·5?

_____ **1**

(ii) Body mass index can be calculated using the equation

$$\text{BMI} = \frac{\text{body weight in kilogrammes}}{\text{height in metres} \times \text{height in metres}}$$

Calculate the BMI of a person weighing 100 kilogrammes and measuring 2·00 metres in height.

_____ **1**

(3)

DO NOT WRITE IN THIS MARGIN

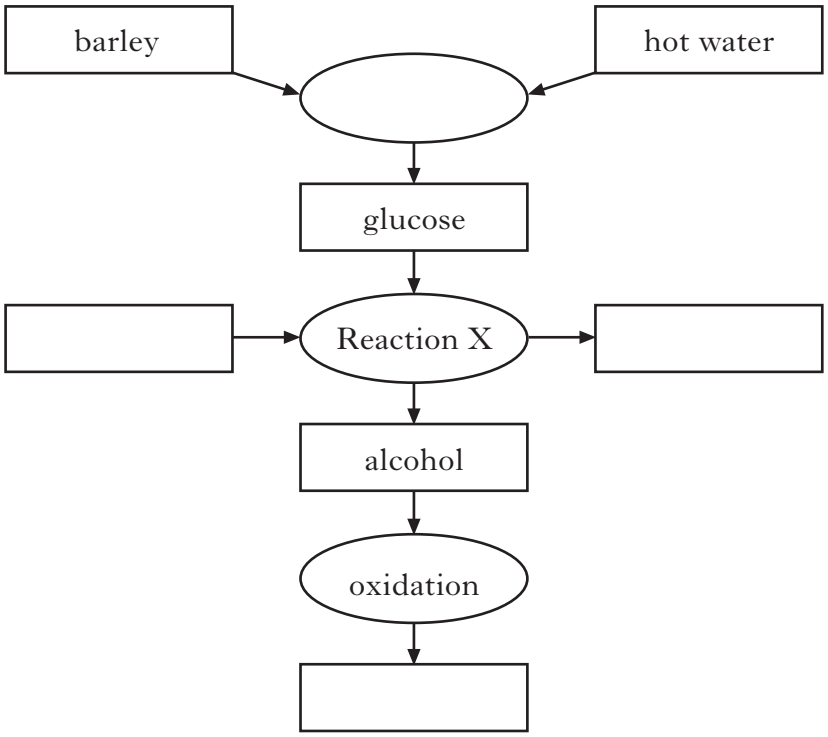
Marks

12. Vinegar can be produced from alcohol.

The process starts by adding hot water to barley. This is called **mashing** and produces glucose.

Yeast is added to the glucose to turn it into alcohol and **carbon dioxide**. Oxidation changes alcohol to **vinegar**.

(*a*) Use the above information to complete the flow chart.



2

(*b*) Name Reaction X.

_____

1

(*c*) The alcohol produced in this process can also be used in alcoholic drinks.

What is the chemical name of this alcohol?

_____

1

(4)

[Turn over

13. *Marks*

Amazing spiders!

Spiders can produce different types of silk for various uses including capturing prey and egg protection.

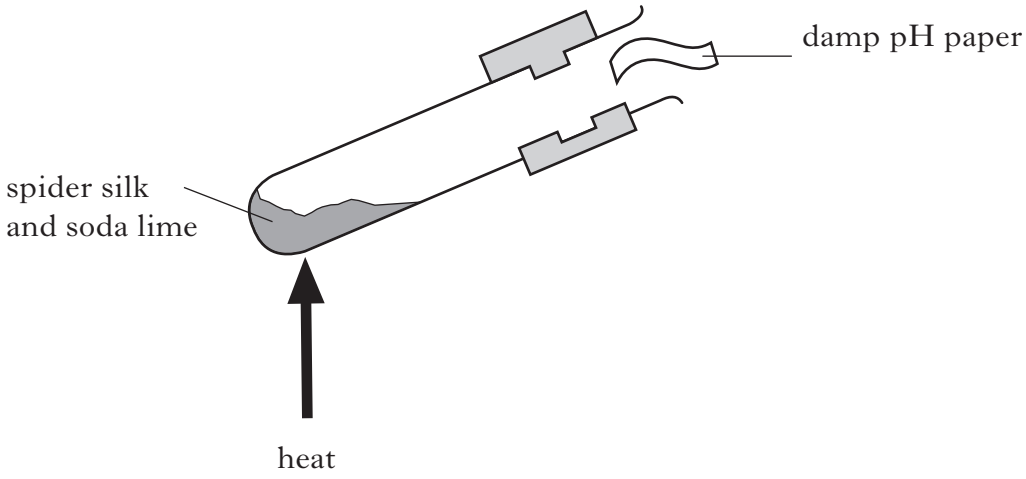
It has been found that spider silk is made mainly of protein.

(*a*) Complete the sentence.

All proteins contain the elements carbon, hydrogen, oxygen and

_____ . **1**

(*b*) We can show that spider silk contains proteins by heating with soda lime. This produces a gas.



What colour would the damp pH paper turn?

_____ **1**

(2)

[*END OF QUESTION PAPER*]

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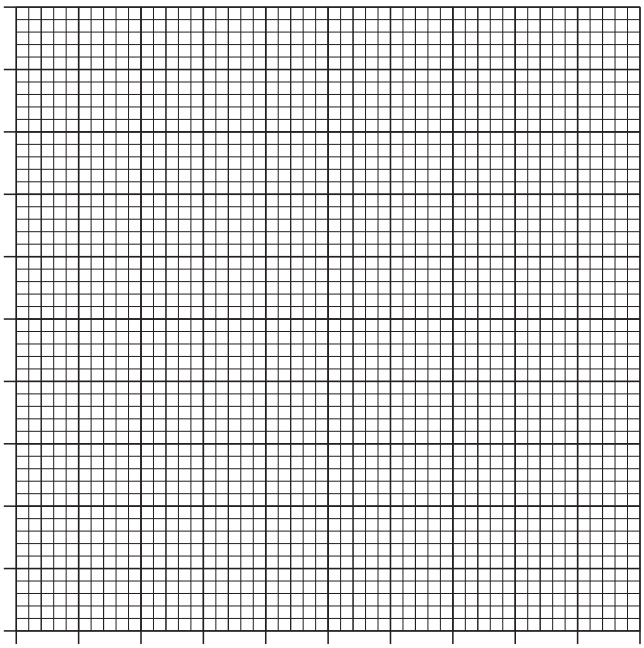
ADDITIONAL SPACE FOR ANSWERS

ADDITIONAL GRAPH PAPER FOR QUESTION 10(*a*).



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