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**X012/101**

NATIONAL  
QUALIFICATIONS  
2000

WEDNESDAY, 7 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

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Scottish candidate number

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Number of seat

Necessary data will be found in the Chemistry Data Booklet for Intermediate 1 and Access 3 (2000 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.

## 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.**

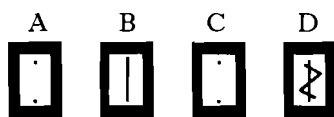
### SAMPLE QUESTION

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

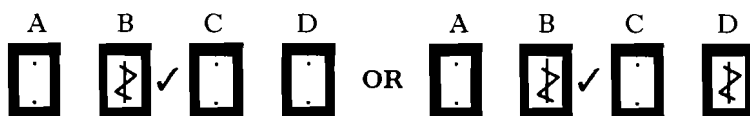
- A fractional distillation
- B chromatography
- C fractional crystallisation
- D filtration.

**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:



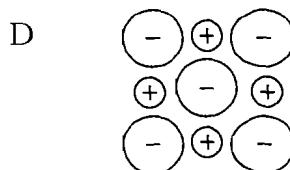
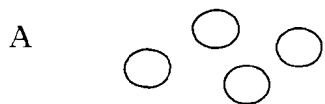
If you want to change back to an answer which has already been scored out, you should **enter a tick (✓)** to the **RIGHT** of the box of your choice, thus:



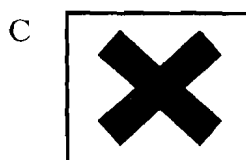
## SECTION A

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

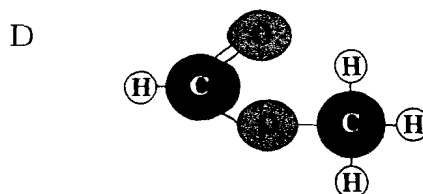
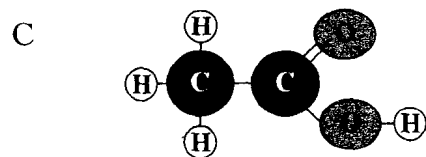
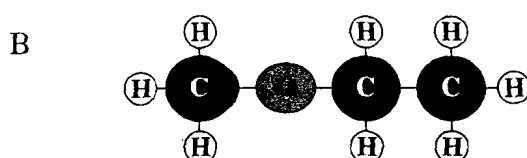
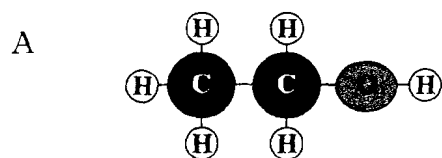
1. The structure of substances can be represented by models.  
Which model shows an element?



2. Which hazard label would be used to indicate that a weedkiller is toxic?



3. Which diagram represents a molecule with the formula  $C_2H_6O$ ?



[Turn over

4. Which of the following is **not** a chemical reaction?

- A Iron rusting
- B Water boiling
- C Food digesting
- D Gas burning

5.  $\text{sodium hydroxide} + \text{nitric acid} \rightarrow \text{sodium nitrate} + \text{water}$

In the above reaction, which compound is the salt?

- A Sodium hydroxide
- B Nitric acid
- C Sodium nitrate
- D Water

6. Which metal would be a solid at  $1000^{\circ}\text{C}$ ?

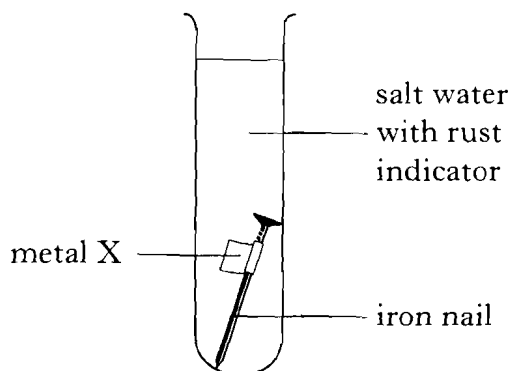
You may wish to use page 3 of the data booklet to answer this question.

- A Aluminium
- B Gold
- C Magnesium
- D Silver

7. Which element is a conductor of electricity?

- A Sulphur
- B Chlorine
- C Hydrogen
- D Aluminium

8. You may wish to use page 5 of the data booklet to answer this question.



In the above experiment, a blue colour appeared in the salt water.  
Metal X could have been

- A aluminium
  - B magnesium
  - C tin
  - D zinc.
9. Which of the following is a synthetic fibre?
- A Cotton
  - B Nylon
  - C Silk
  - D Wool
10. Which substance is **not** a plastic?
- A PVC
  - B Perspex
  - C Kevlar
  - D Styrene
11. 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

12. Which metal is found uncombined in the Earth's crust?

- A Gold
- B Iron
- C Magnesium
- D Sodium

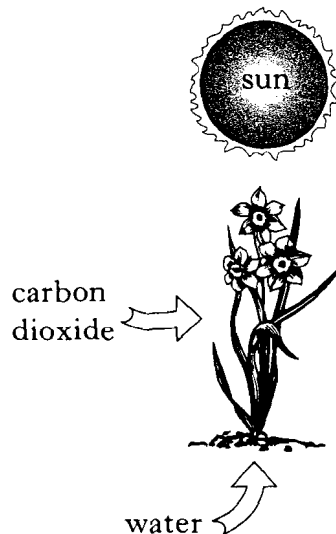
13. An example of an alloy is

- A brass
- B carbon
- C tin
- D rust.

**Questions 14 and 15** refer to the following information.

In sunlight, a reaction takes place in green plants.

In this reaction, carbon dioxide and water change into glucose and a gas.



14. What is the name for this reaction in a green plant?

- A Combustion
- B Respiration
- C Fermentation
- D Photosynthesis

15. Which gas is formed in the reaction?

- A Nitrogen
- B Hydrogen
- C Oxygen
- D Sulphur dioxide

16. The table shows the results of testing four foods.  
Which food contained glucose and fat?

Food	Food test		
	Rubbing food on filter paper	Benedict's test	Iodine test
A	no mark	stayed blue	stayed brown
B	no mark	turned orange	turned blue/black
C	oily mark	stayed blue	turned blue/black
D	oily mark	turned orange	stayed brown

17. Which amount 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

18. Anodising increases the thickness of the oxide layer of

- A aluminium
- B iron
- C magnesium
- D zinc.

19. Alcohol can be made from carbohydrates.

Which substance catalyses the reaction?

- A Carbon dioxide
- B Ethanol
- C Water
- D Yeast

20. Animals obtain energy by respiration.

During respiration

- A carbon dioxide is used up
- B glucose is used up
- C oxygen is produced
- D starch is produced.

**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) Name an element which is liquid at room temperature.

\_\_\_\_\_

1

- (b) Why have lithium, sodium and potassium been placed in the same column of the periodic table?

\_\_\_\_\_

\_\_\_\_\_

1

- (c) In which year was chlorine discovered?

You may wish to use page 1 of the data booklet to answer this question.

\_\_\_\_\_

1

(3)

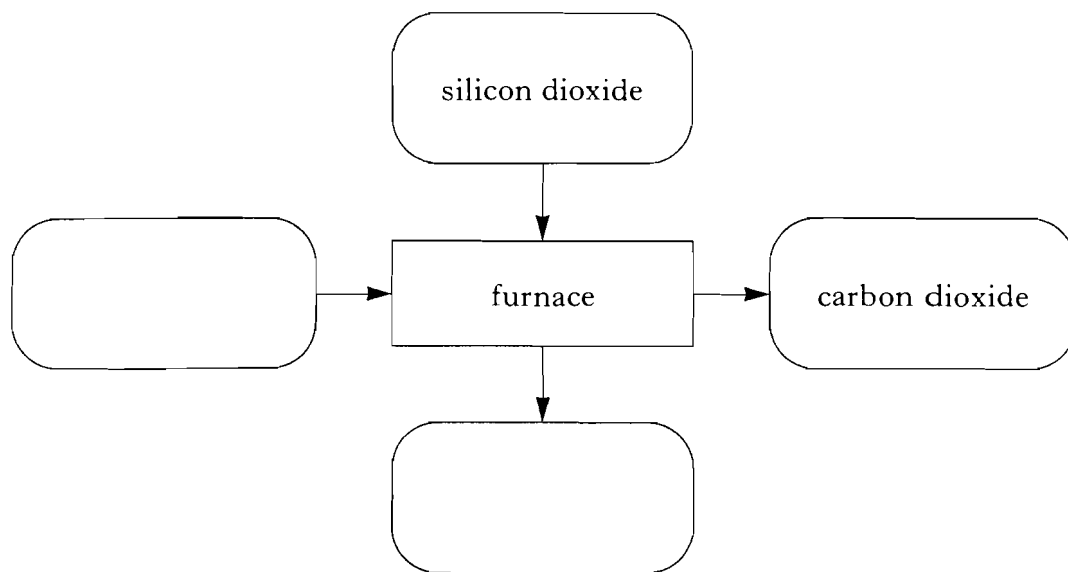


Marks

2. Glass is sodium silicate. It is made by heating silicon dioxide and sodium carbonate in a furnace. Carbon dioxide is also formed during the reaction.

(a) A flow chart for glass-making is shown below.

Write the names of the missing chemicals in the boxes.



1

(b) Which elements are in sodium silicate?

\_\_\_\_\_

1

(c) Write the formula for silicon dioxide.

\_\_\_\_\_

1

(3)

[Turn over

Marks

3. Farmers use natural and artificial fertilisers to help replace essential elements taken out of the soil by crops.

(a) Name a natural fertiliser.

\_\_\_\_\_

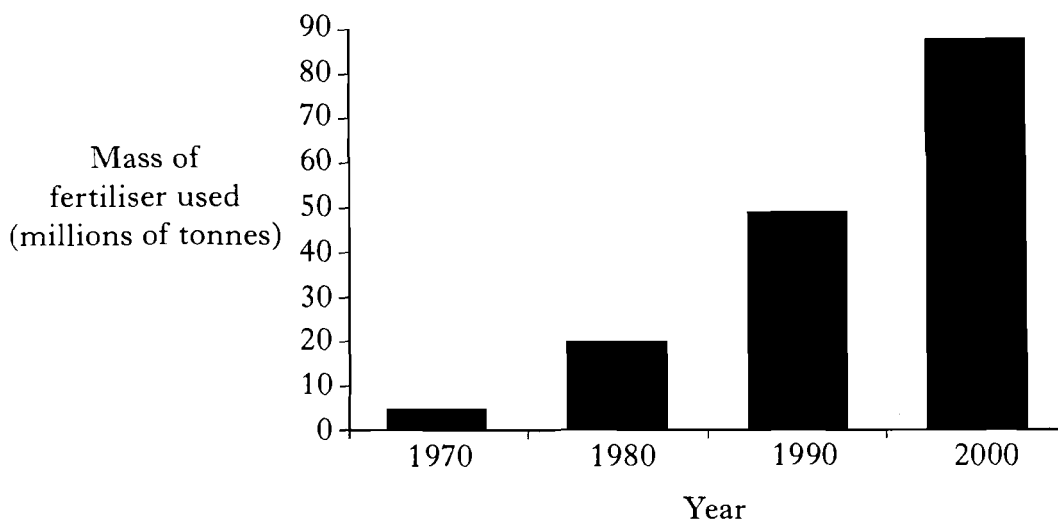
1

(b) Name an element provided by fertilisers which is essential for healthy plant growth.

\_\_\_\_\_

1

(c) The graph shows how fertiliser use is changing.



Why is the amount of fertiliser used changing in this way?

\_\_\_\_\_  
\_\_\_\_\_

1  
(3)

Marks

4. Problems can be caused if poisonous liquids seep from rubbish tips into water supplies. A rubbish tip in the North of Scotland is being lined with poly(ethene) strips to prevent this. Heat is used to join the edges of the poly(ethene) strips together.

(a) Name the monomer that is used to make poly(ethene).

\_\_\_\_\_

1

(b) Name the type of reaction which is used to make poly(ethene).

\_\_\_\_\_

1

(c) Suggest a reason why a biodegradable plastic **should not** be used to line the rubbish tip.

\_\_\_\_\_

\_\_\_\_\_

1

(d) What name is given to plastics that can be heated and reshaped?

\_\_\_\_\_

1

(4)

[Turn over

Marks

5.

**A Balanced Diet**

Type of food	Why it is needed
Carbohydrates	_____
Proteins	Growth and repair
Vitamins and minerals	Healthy skin, teeth and bones
_____	Keeps gut working

(a) Complete the table by filling in the missing information.

2

(b) A piece of cheese was put into a test tube. Some soda lime was added. The mixture was heated. The gas coming out of the test tube was tested using moist pH paper.

**Draw and label** a diagram of this experiment.

2

*Marks***5. (continued)**

- (c) Our diet also needs to contain compounds which supply important elements.

Calcium is needed for making bones, while sulphur is required in forming proteins. For many enzymes to work properly, zinc is needed. Iron is needed for blood formation.

Present this information in the form of a table with two headings.

2  
(6)

**[Turn over**

Marks

6. (a) Calcium hydroxide can be added to soil which is too acidic.

(i) Describe how you would test calcium hydroxide solution to show that it is an alkali.

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2

(ii) Name the type of chemical reaction that takes place when an acid and an alkali react.

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1

(b) Calcium hydroxide can also act as a fungicide.

Why are fungicides used?

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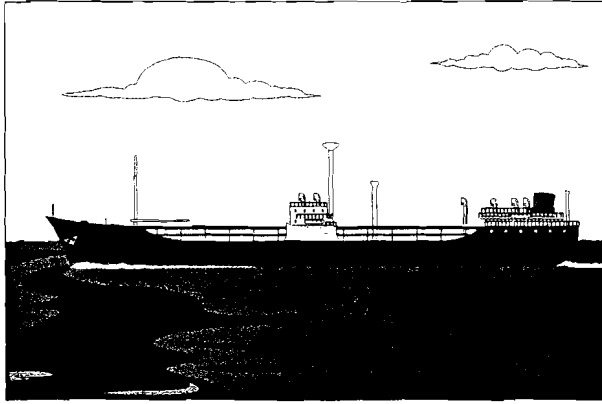
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1

(4)

Marks

7.



Oil spilt from tankers pollutes the environment.

(a) In what way can an oil slick pollute the environment?

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1

(b) Detergents are able to break up oil slicks into tiny droplets. Why are detergents able to do this?

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1

(c) Describe how you would test two detergents in the laboratory to find out which produced the most lather.

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2  
(4)

[Turn over

Marks

8. There are two methods of producing aluminium. One is by smelting its ore and the other is by recycling old aluminium. The table shows the mass of various pollutants produced by each method per tonne of aluminium.

Pollutant	Mass of pollutant produced per tonne of aluminium	
	From its ore (in kilograms)	By recycling (in kilograms)
sulphur dioxide	89.0	1.0
dust	7.0	1.5
carbon monoxide	35.0	2.5
nitrogen oxides	139.0	7.0
hydrocarbons	87.0	5.0

- (a) From the table suggest an advantage of recycling.

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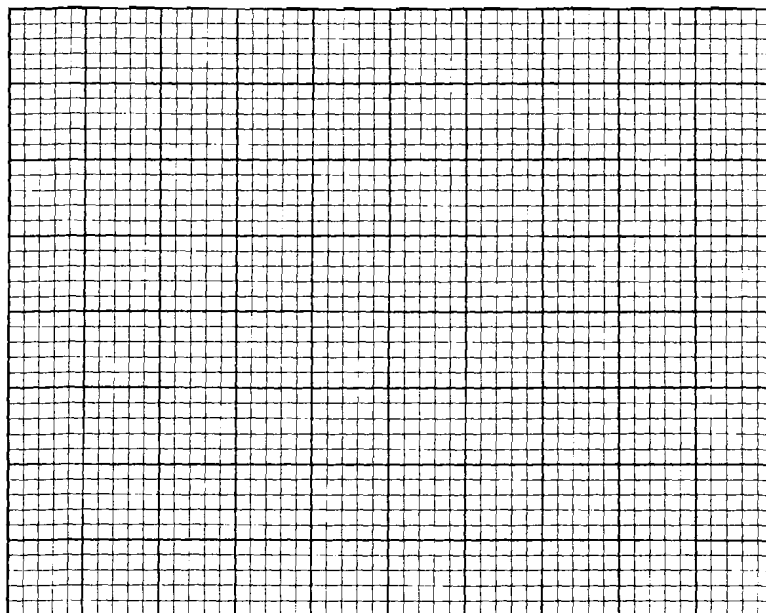


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1

- (b) Draw a bar chart to show the different pollutants produced by recycling.

(Additional graph paper, if required, will be found on page 21.)



2

- (c) What pollution problem is caused if sulphur dioxide is released into the air?

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1



Marks

9. Methane is the first member of a family of compounds called the alkanes. The table gives the formulae for some of the members of the family.

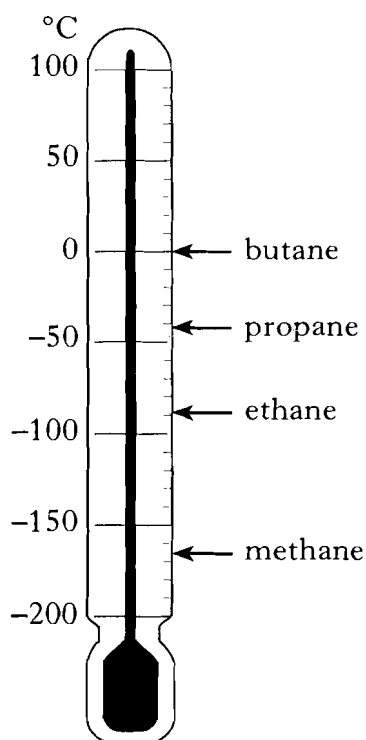
Name	Formula
methane	$\text{CH}_4$
ethane	$\text{C}_2\text{H}_6$
propane	$\text{C}_3\text{H}_8$
butane	$\text{C}_4\text{H}_{10}$
pentane	$\text{C}_5\text{H}_{12}$

- (a) What name is given to compounds which contain carbon and hydrogen only?

\_\_\_\_\_

1

- (b)



Draw an arrow on the temperature scale to show where you think the boiling point of pentane should be.

1  
(2)

[Turn over

Marks

10. Part of a student's PPA write up is shown below.

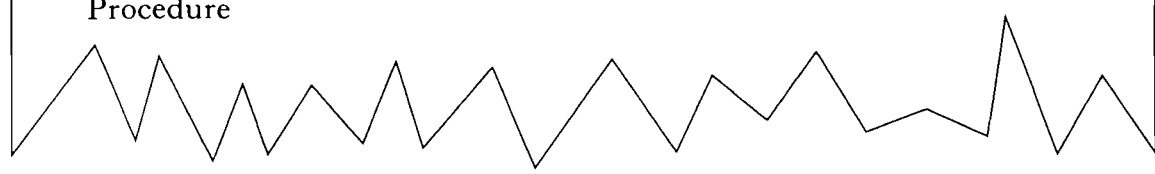
Intermediate 1 Chemistry	The Effect of Temperature Changes on Dissolving Speed				Unit 1 PPA 1
Name: <i>Jane Brown</i>	PC(a)	PC(b)	PC(c)	PC(d)	Teacher's Initials: <i>JBM</i>
Date: <i>23/8/99</i>	✓	✓	✓	✓	

- ASSESSMENT SHEET -

- What was the aim of the experiment?

*To find out how the temperature of water affects the dissolving speed of sugar in water.*

Procedure



- (a) What factor would the student have changed in her investigation?

\_\_\_\_\_

1

- (b) When you did this experiment, what did you count that told you how quickly the sugar crystals dissolved in the water?

\_\_\_\_\_

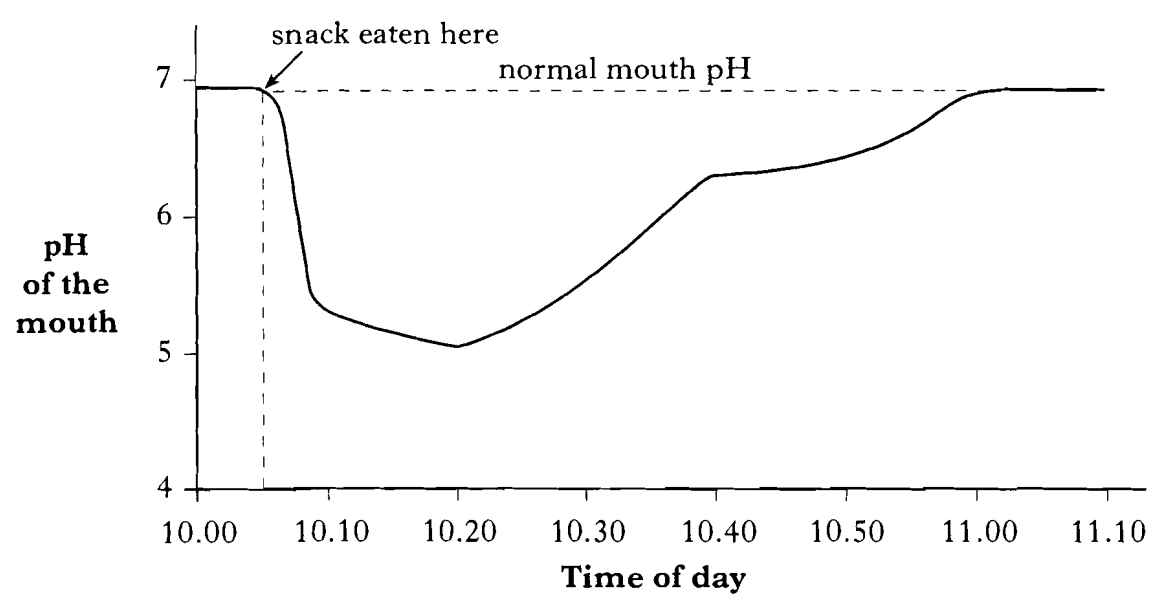
\_\_\_\_\_

1  
(2)

Marks

11. A student ate a snack at morning interval.

The graph shows how the pH inside his mouth changed after eating the snack.



(a) What happened to the **acidity** inside his mouth immediately after eating the snack?

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1

(b) Chewing gum helps to produce saliva. Saliva helps the pH of the mouth to return to normal more quickly.

**On the graph**, sketch the curve you would expect if the student had started to chew gum at 10.20 a.m.

1  
(2)

[Turn over for Question 12 on *Page twenty*

Marks

12. The following information is given on the label of a bottle of cough medicine.



- (a) What is an **active ingredient**?

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1

- (b) Each dose of medicine weighs 10 g and contains 0.5 g of lemon juice. Calculate the percentage of lemon juice in the medicine.

1

- (c) Throat infections are caused by micro-organisms. What type of drug might a doctor prescribe for a throat infection?

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1

(3)

[END OF QUESTION PAPER]

Scottish Qualifications Authority

SCEHG Chemistry - 2000 Examination

Paper 1

Statistical Data from Sample of Candidates

Item	Syllabus		Ability	Facility	r	Percentage Choosing Option				
	Section					A	B	C	D	Omit
1	SG	KU		0.68	0.44	68*	7	2	23	0
2	SG	KU		0.60	0.25	6	60*	10	24	0
3	SG	KU		0.64	0.50	17	12	7	64*	0
4	SG	KU		0.61	0.32	61*	7	9	22	0
5	U1	KU		0.83	0.31	9	5	83*	3	0
6	U1	KU		0.71	0.34	71*	1	17	11	0
7	U1	KU		0.86	0.24	6	2	86*	6	0
8	U1	PS		0.82	0.22	82*	6	6	6	0
9	U2	KU		0.56	0.39	12	56*	25	7	0
10	U2	KU		0.52	0.21	12	52*	18	18	0
11	U2	KU		0.50	0.34	17	22	11	50*	0
12	U2	KU		0.78	0.24	78*	6	7	9	0
13	U2	PS		0.62	0.40	13	62*	20	5	0
14	U2	KU		0.80	0.24	2	80*	2	15	0
15	U2	PS		0.54	0.31	54*	41	1	4	0
16	U3	PS		0.77	0.36	12	77*	9	2	0
17	U3	PS		0.61	0.31	61*	5	9	25	0
18	U3	KU		0.41	0.21	7	45	7	41*	0
19	U3	PS		0.29	0.34	48	15	29*	8	0
20	U4	KU		0.74	0.30	74*	4	12	10	0
21	U4	KU		0.70	0.32	16	70*	5	8	0
22	U4	KU		0.82	0.46	82*	8	5	5	0
23	U5	KU		0.44	0.48	39	4	44*	14	0
24	U5	KU		0.55	0.42	11	13	21	55*	0
25	U5	PS		0.68	0.42	11	16	68*	5	0
26	U5	KU		0.77	0.47	77*	13	4	6	0
27	U5	KU		0.87	0.33	2	87*	9	2	0
28	U5	KU		0.60	0.42	14	8	18	60*	0
29	U5	PS		0.59	0.45	59*	17	9	15	0
30	U5	PS		0.46	0.39	17	14	23	46*	0
31	U6	KU		0.47	0.33	47*	28	7	18	0
32	U6	KU		0.69	0.21	10	69*	5	16	0
33	U6	KU		0.61	0.36	15	61*	18	5	1
34	U6	KU		0.54	0.42	24	54*	15	6	0
35	U7	KU		0.81	0.35	14	3	81*	2	0
36	U7	PS		0.56	0.53	8	27	10	56*	0
37	U7	PS		0.76	0.12	2	15	7	76*	0
38	U8	KU		0.88	0.27	4	3	88*	4	0
39	U8	KU		0.68	0.45	10	68*	5	17	1
40	U8	KU		0.65	0.50	11	65*	16	7	0