

FOR OFFICIAL USE

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Section B  
Total

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**X007/101**

NATIONAL  
QUALIFICATIONS  
2003

MONDAY, 26 MAY  
9.00 AM – 10.30 AM

**BIOLOGY**  
**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

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**SECTION A**

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

**SECTION B**

- 1 All questions should be attempted.
- 2 The questions may be answered in any order but all answers are to be written in the spaces provided in this answer book, and must be written clearly and legibly in ink.
- 3 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 book.
- 4 The numbers of questions must be clearly inserted with any answers written in the additional space.
- 5 Rough work, if any should be necessary, should be written in this book and then scored through when the fair copy has been written.
- 6 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

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### Read carefully

- 1 Check that the answer sheet provided is for Biology Intermediate 1 (Section A).
- 2 Fill in the details required on the answer sheet.
- 3 In this section a question is answered by indicating the choice A, B, C or D by a stroke made in **ink** in the appropriate place in the answer sheet—see the sample question below.
- 4 For each question there is only **one** correct answer.
- 5 Rough working, if required, should be done only on this question paper—or on the rough working sheet provided—**not** on the answer sheet.
- 6 At the end of the examination the answer sheet for Section A **must** be placed **inside** this answer book.



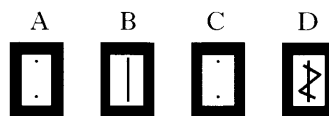
### Sample Question

Which of the following foods contains a high proportion of fat?

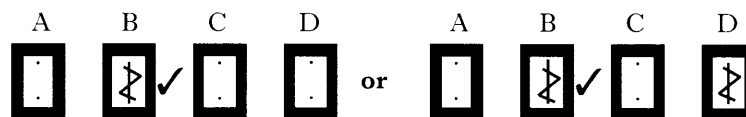
- A Bread
- B Butter
- C Sugar
- D Apple

The correct answer is **B**—butter. 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

All questions in this Section should be attempted.

Answers should be given on the separate answer sheet provided.

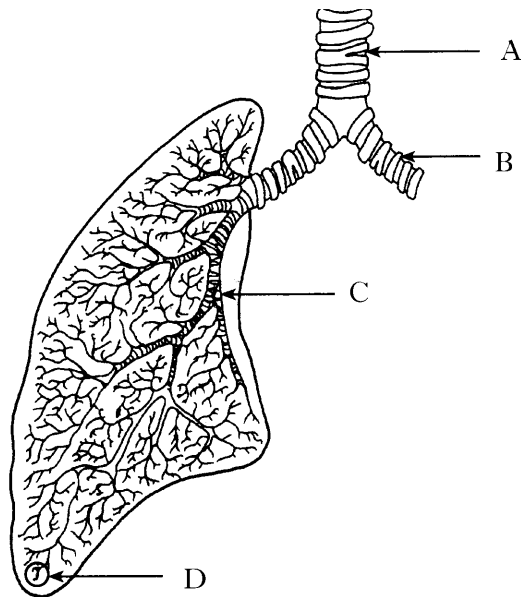
1. Which blood test can be carried out to detect leukaemia?

- A Sugar content
- B Iron content
- C White cell count
- D Presence of antibodies

2. Blood is carried **towards** the heart in

- A veins
- B arteries
- C capillaries
- D arteries and veins.

Questions 3 and 4 refer to the diagram of part of the breathing system.



3. Which structure is a bronchus?

4. Where does oxygen pass into the blood?

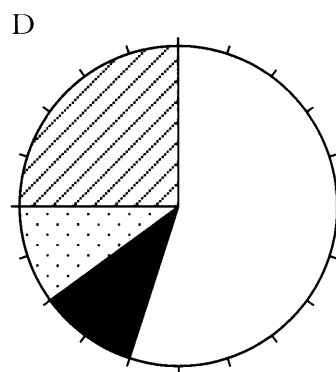
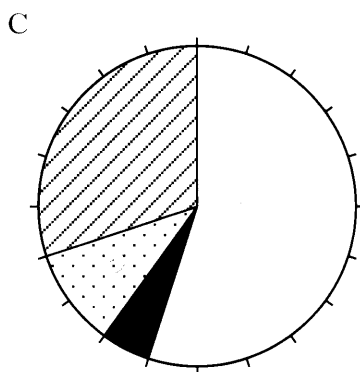
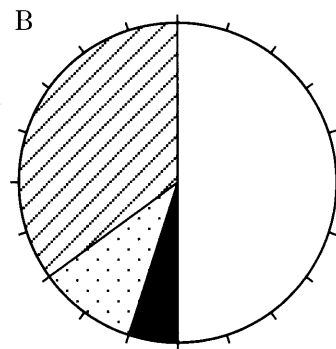
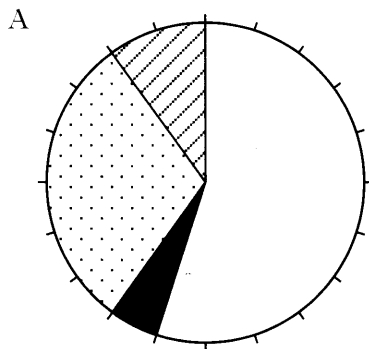
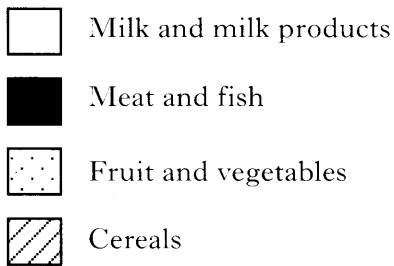
[Turn over

5. The table below shows four sources of calcium and the percentage of calcium in the diet from each source.

<i>Source of calcium</i>	<i>Calcium in the diet (%)</i>
Milk and milk products	55
Meat and fish	5
Fruit and vegetables	10
Cereals	30

Which of the following pie charts represents this information correctly?

Key



6. The table below shows the breathing rate of a male student, before and during exercise.

	<i>Breathing rate</i> (breaths per minute)
At rest	14
During exercise	21

The percentage increase in breathing rate due to exercise was

- A 33  
B 50  
C 70  
D 15.
7. The table below shows data obtained from a student during an investigation.

<i>Activity</i>	<i>Average volume of each breath</i> (litres)	<i>Breathing rate</i> (breaths per minute)
At rest	0.5	14
Running	2.0	36

The total volume of air breathed in one minute by the student at rest is

- A 0.5 litres  
B 2.5 litres  
C 7.0 litres  
D 14.5 litres.

**[Turn over**

8. A student tested four foods A, B, C and D for the presence of glucose and starch.

The tests used were:

Glucose – blue Benedict’s solution turns orange if glucose is present.

Starch – brown iodine solution turns black if starch is present.

The results are shown in the table below.

<i>Food</i>	<i>Final colour observed in test</i>	
	<i>Glucose</i>	<i>Starch</i>
A	orange	brown
B	blue	black
C	blue	brown
D	orange	black

Which food contains starch and glucose?

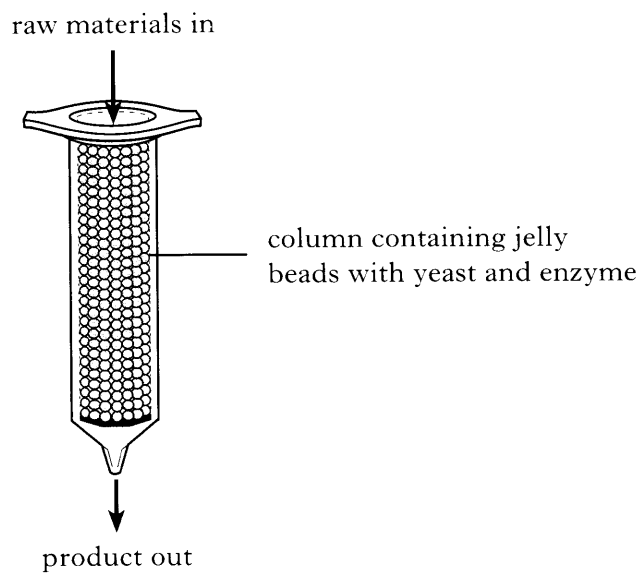
9. Low blood pressure can lead to

- A fainting
- B a stroke
- C diabetes
- D anaemia.

10. Which of the following could be the result of regular exercise?

	<i>Recovery time</i>	<i>Resting pulse rate</i>
A	long	low
B	short	high
C	long	high
D	short	low

11. The liquid which is formed when protein is clotted during cheese making is
- A milk
  - B whey
  - C water
  - D yoghurt.
12. Which living organisms are used to make yoghurt?
- A Viruses
  - B Fungi
  - C Yeast
  - D Bacteria
13. The diagram below shows a method for the production of a fermented milk drink.



What name is given to the technique in which the yeast and enzyme are trapped in the jelly beads?

- A Immobilisation
- B Pasteurisation
- C Separation
- D Purification

**[Turn over**

14. Which of the following are two uses of yeast products?

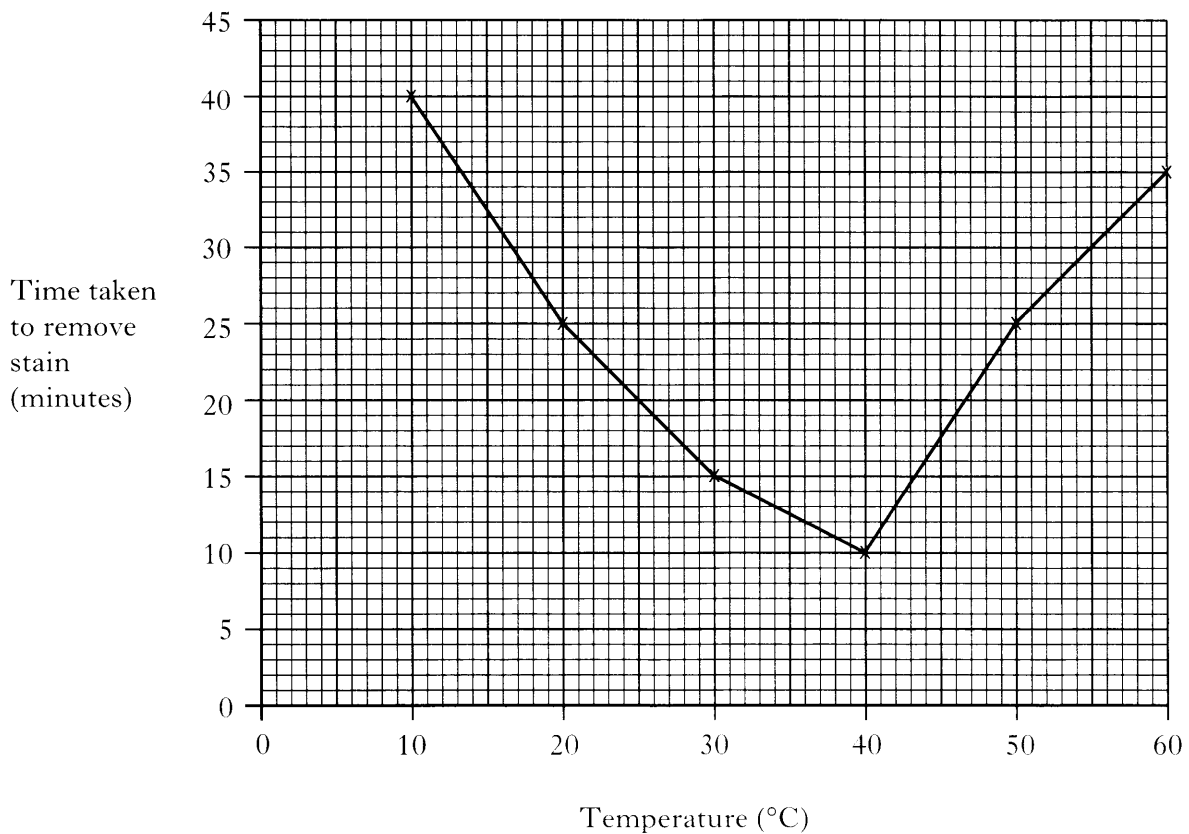
- A Colouring crisps and flavouring salmon flesh
- B Flavouring crisps and flavouring salmon flesh
- C Flavouring crisps and colouring salmon flesh
- D Colouring crisps and colouring salmon flesh

15. Biological washing powders remove stains at moderate temperatures.

As a result

- A energy is saved and there is less damage to delicate fabrics
- B less washing powder is used and there is more damage to delicate fabrics
- C more washing powder is used and energy is saved
- D energy is saved and there is more damage to delicate fabrics.

16. The graph below shows the time taken for a washing powder to remove a stain at different temperatures.

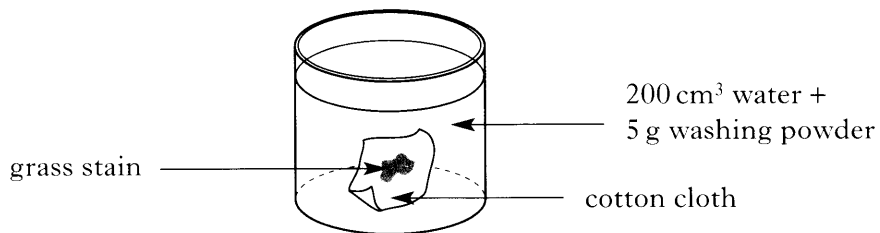


At what temperature does the washing powder work best?

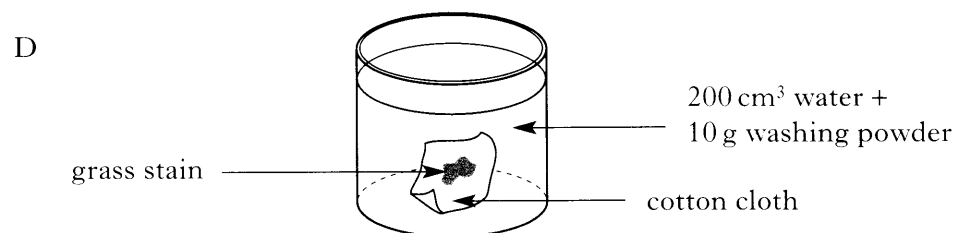
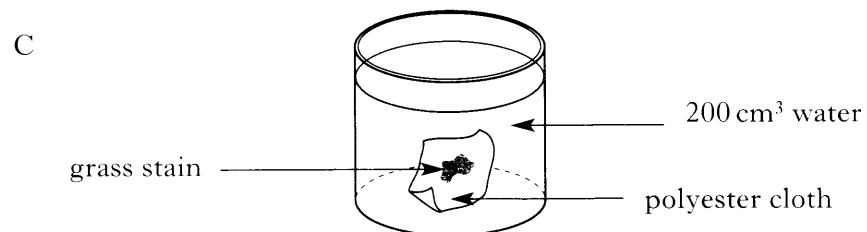
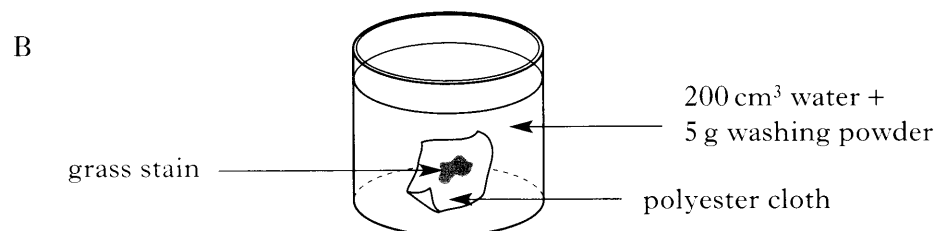
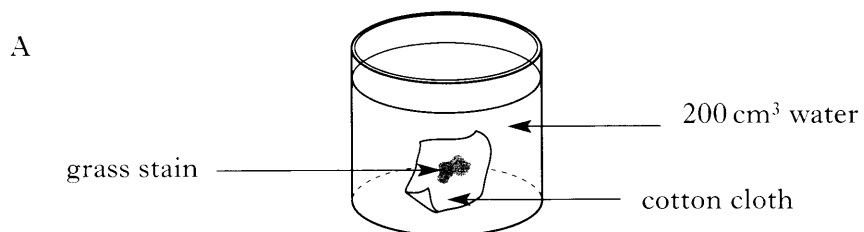
- A 10 °C
- B 35 °C
- C 40 °C
- D 60 °C



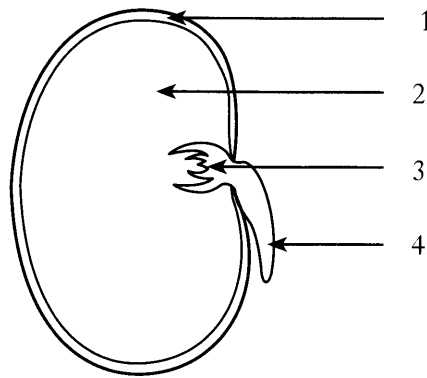
17. The diagram below shows an investigation into the removal of grass stains by a washing powder.



Which control should be set up in order to make a valid comparison?



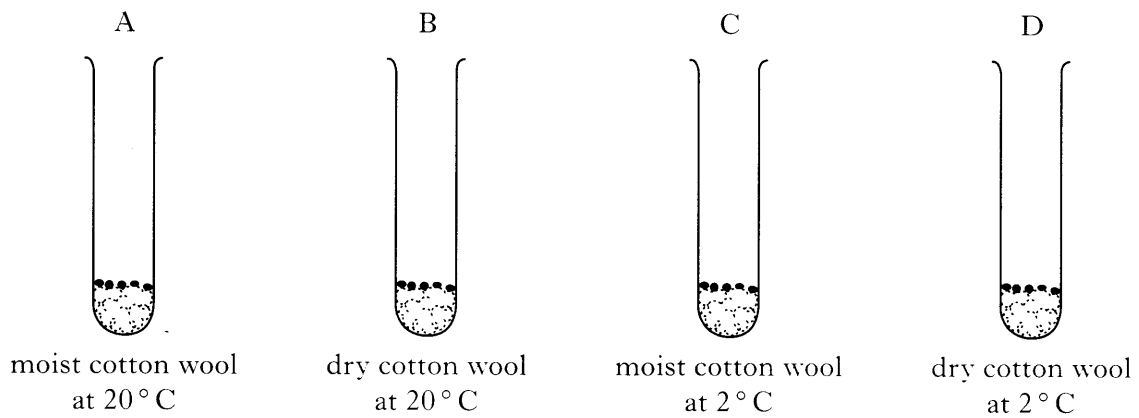
18. The diagram below shows the main parts of a seed.



The part of the seed labelled 2

- A grows into a new plant
- B provides food for the embryo to grow
- C protects the root as it pushes down into the soil
- D produces food in photosynthesis.

19. The diagrams below show the tubes set up to investigate the conditions required for seed germination.

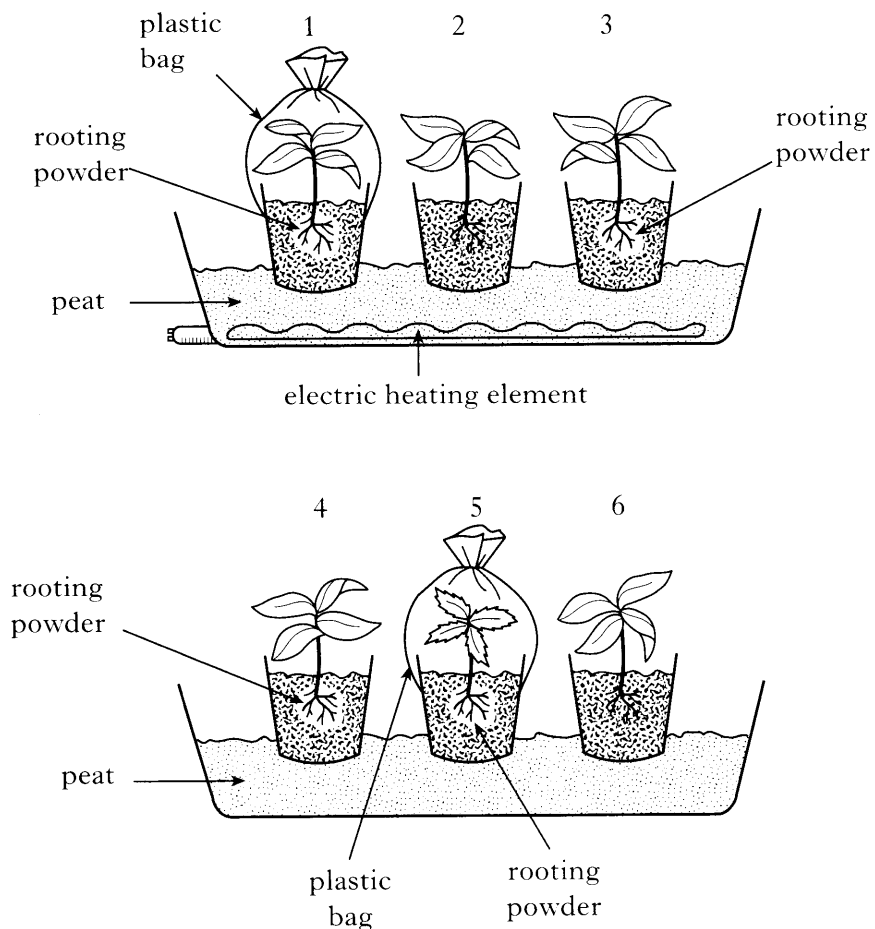


In which tube would the seeds germinate?

Questions 20 and 21 refer to the information below.

An investigation to find out which factors speed up root development in cuttings was carried out.

The diagram below shows how the investigation was set up.



20. Which factor is being investigated in pots 1 and 3?

- A The effect of rooting powder
- B The effect of heat
- C The effect of enclosing the cutting in a plastic bag
- D The type of cutting

21. Which pots should be compared to investigate the effect of heat on the rooting of cuttings?

- A 2 and 4
- B 1 and 4
- C 2 and 6
- D 3 and 6

22. Antibiotics act on
- A bacteria but not viruses
  - B viruses but not bacteria
  - C both viruses and bacteria
  - D fungi and bacteria.
23. Aphids can be controlled by spraying plants with
- A fungicide
  - B insecticide
  - C herbicide
  - D liquid fertiliser.
24. Sharp sand is added to compost to
- A increase nutrients
  - B decrease drainage
  - C increase drainage
  - D increase water retention.
25. The steps for sowing sweet pea seeds are shown below.
- 1 Gently press down the compost.
  - 2 Water and cover with polythene.
  - 3 Fill a seed tray with compost and level the compost.
  - 4 Space out seeds on the surface.
  - 5 Sieve compost over the seeds.

Which of the following shows the correct sequence of steps?

- A 3 → 1 → 4 → 5 → 2
- B 3 → 4 → 5 → 1 → 2
- C 3 → 2 → 4 → 5 → 1
- D 3 → 1 → 4 → 2 → 5

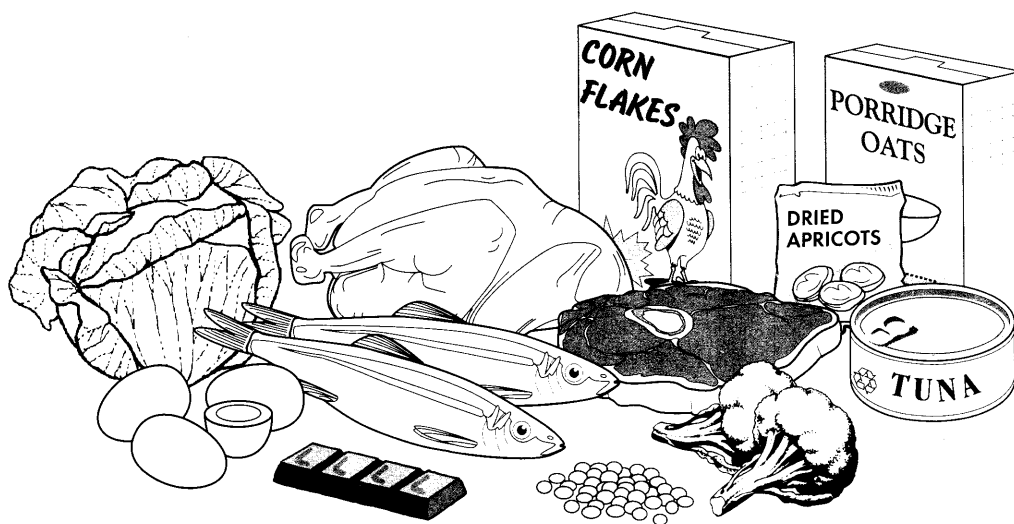
**Candidates are reminded that the answer sheet for Section A MUST be returned inside this answer book.**

## SECTION B

All questions in this Section should be attempted.

1. Read the following passage carefully.

Iron has many functions in the body. In the UK the main sources of iron in the diet include meat, cereals and vegetables.



Iron is essential for the body to make haemoglobin. Haemoglobin is found in red blood cells and its function is to carry oxygen in the blood.

It is very important that people have enough iron in their diets. Too little iron will cause symptoms of iron deficiency anaemia to develop. Iron deficiency anaemia can make people feel tired, irritable and less able to concentrate.

It is estimated that at least 500 million people in the world are affected by iron deficiency anaemia. The condition is much more common in developing countries where people may be unable to obtain enough foods that contain iron.

**Answer the questions below**, using information from the passage.

(a) Name **two** sources of iron in the diet.

1 \_\_\_\_\_

2 \_\_\_\_\_

1

(b) What is the function of haemoglobin?

\_\_\_\_\_

1

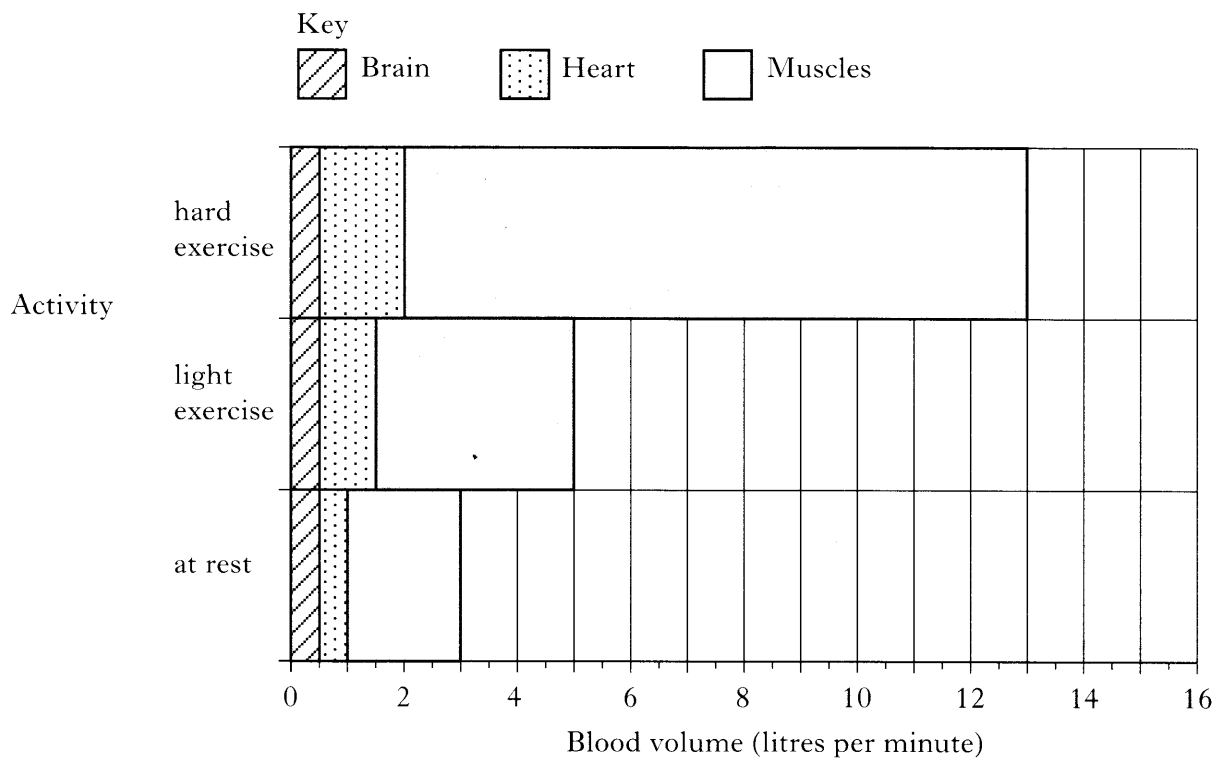
(c) Give **one** symptom of iron deficiency anaemia.

\_\_\_\_\_

1

Marks

2. (a) The bar chart shows how much blood is supplied to some parts of the body at rest and during exercise.



- (i) What volume of blood is supplied to the muscles at rest?

\_\_\_\_\_ litres per minute

1

- (ii) Describe what happens to the blood supply to the heart as the activity level increases.

\_\_\_\_\_

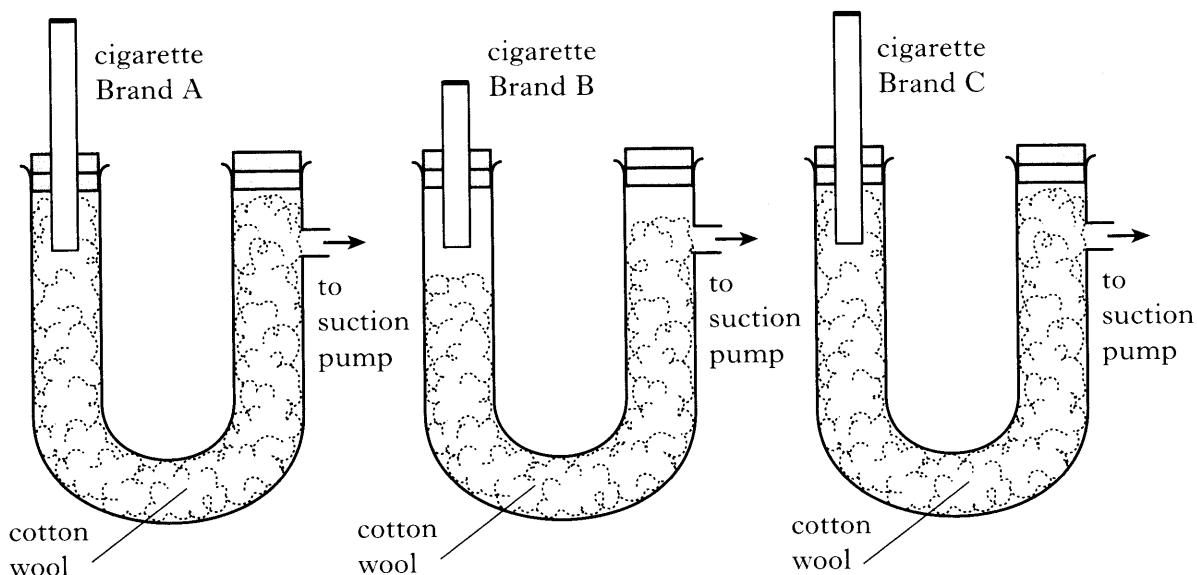
1

- (b) What is the function of the heart?

\_\_\_\_\_

1

3. The tar contents of three different brands of cigarette were compared using simple smoking machines. Marks



The diagrams above show the machines **before** the cigarettes were lit.  
 Each cigarette was “smoked” slowly by lighting it and then drawing air through using the suction pump.  
 The tar collected made a brown stain on the cotton wool.

(a) (i) Suggest **one** improvement to make the comparison **valid**. 1

\_\_\_\_\_

(ii) Brand A produced a darker brown stain on the cotton wool than Brand C.  
 What does this indicate about the tar content of Brand A compared with Brand C? 1

\_\_\_\_\_

(b) Name **one** health risk which may be increased by regularly smoking cigarettes. 1

\_\_\_\_\_

(c) (i) What term describes the volume of air breathed in or out of the lungs in one normal breath? 1

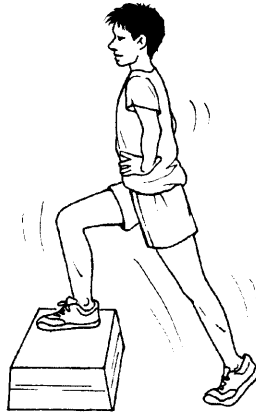
\_\_\_\_\_

(ii) State **one** factor that can affect this volume. 1

\_\_\_\_\_

Marks

4. (a) A student used a step test to measure the effect of exercise on pulse rate.



The pulse rate was measured before the student began the exercise. The student stepped up and down at a fixed pace for three minutes. His pulse rate was then measured every minute for nine minutes after the exercise.

The results are shown in the table below.

<i>Time after exercise</i> (minutes)	<i>Pulse rate</i> (beats per minute)
1	140
2	128
3	110
4	90
5	84
6	70
7	68
8	68
9	68

- (i) On the grid plot a line graph by

- (1) completing the scale on the vertical axis
- (2) completing the horizontal axis
- (3) plotting the graph.

1

1

1

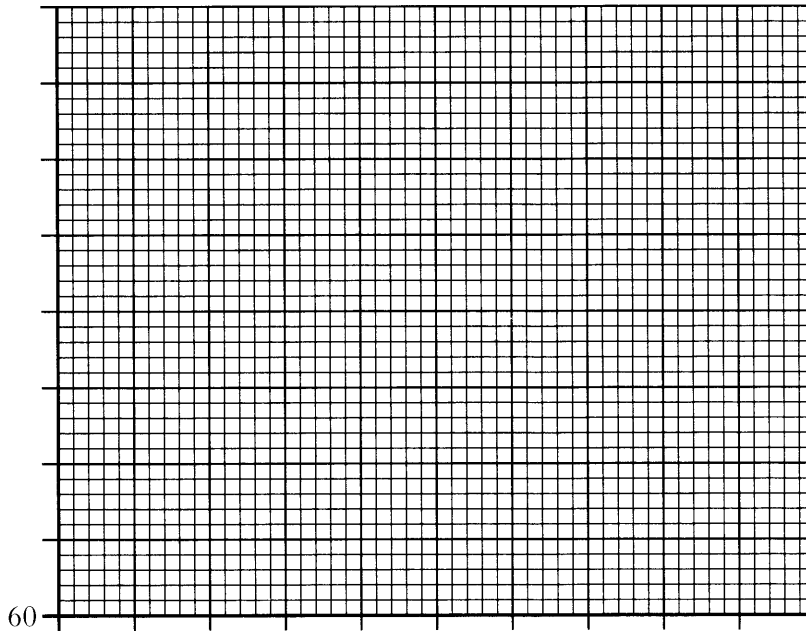
(Additional graph paper, if required, will be found on *Page 28*)



Marks

4. (a) (i) (continued)

Pulse rate  
(beats per  
minute)



(ii) Use the information **in the table** to suggest a value for the resting pulse rate.

\_\_\_\_\_ beats per minute

1

(b) What name is given to the time taken for the pulse rate to return to normal after exercise?

\_\_\_\_\_

1

(c) Describe the effect of the lack of regular exercise on the strength of the muscles.

\_\_\_\_\_

1

(d) What is a sphygmomanometer used to measure?

\_\_\_\_\_

1

[Turn over

Marks

5. (a) A student used a skinfold calliper to measure the skin thickness in two body areas.  
The results are shown in the table below.

<i>Body area</i>	<i>Skin thickness (mm)</i>			
	<i>First measurement</i>	<i>Second measurement</i>	<i>Third measurement</i>	<i>Average</i>
Back below shoulder blade	8	9	7	
Front of upper arm	10	14	9	

1

- (i) Complete the table by inserting the average measurements.  
*Space for calculations*

- (ii) Why were three measurements taken in each body area and an average calculated?

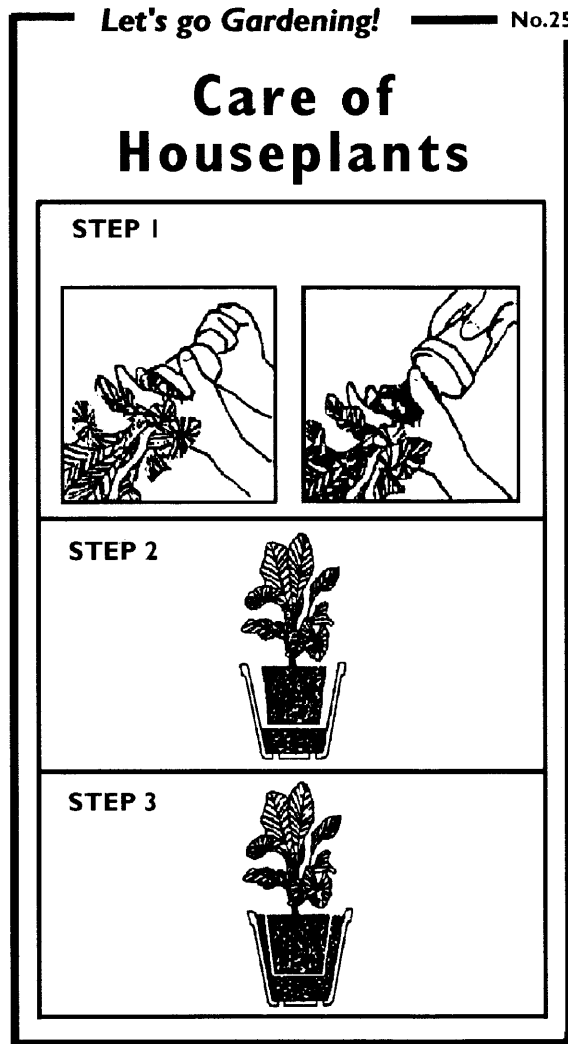
1

- (b) Describe **one** effect of anorexia on the body.

1

Marks

6. (a) Part of a leaflet produced to help people look after their houseplants is shown in the diagram below.



- (i) Name the procedure shown.

\_\_\_\_\_

1

- (ii) What would indicate that this procedure should be carried out on a houseplant?

\_\_\_\_\_

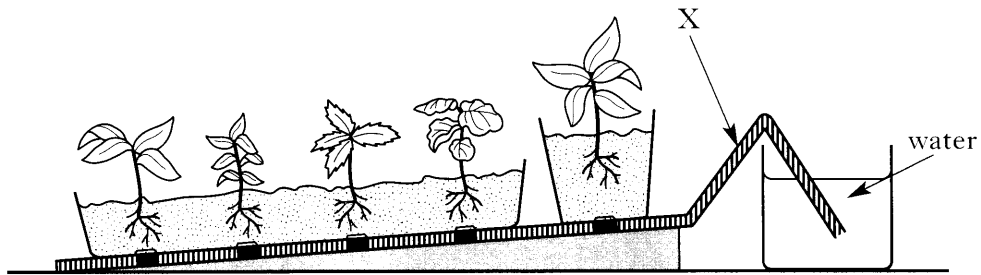
1

[Turn over

Marks

6. (continued)

- (b) The diagram below shows a system for watering houseplants while their owner is away from home on holiday.

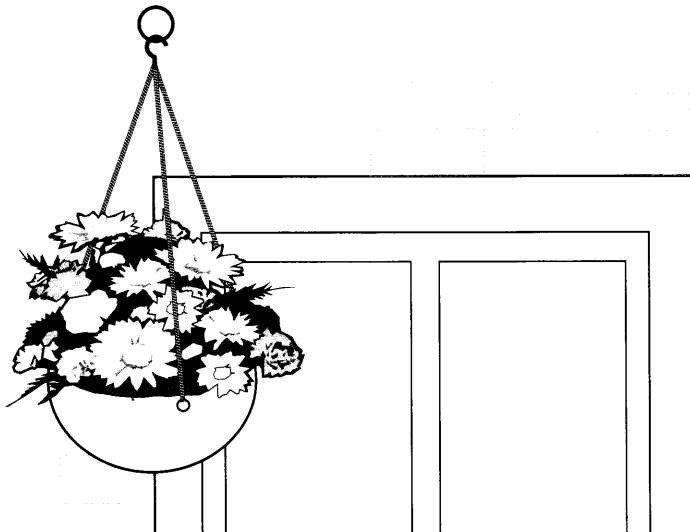


Name the material labelled X in the diagram.

\_\_\_\_\_

1

- (c) The diagram below shows a hanging basket of flowering plants.



What can be mixed with the compost to stop it drying out quickly in hot weather?

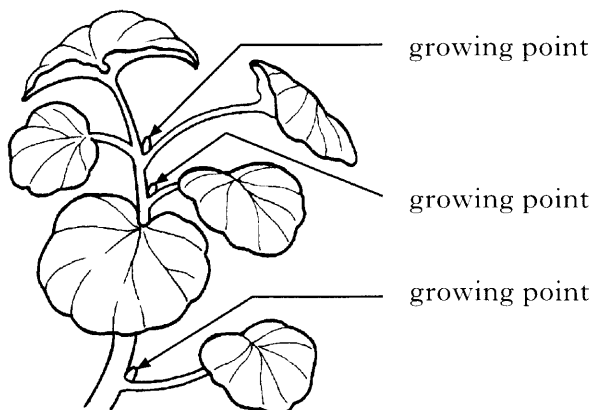
\_\_\_\_\_

1

Marks

6. (continued)

(d) The diagram of a plant below has a number of growing points labelled.



What name is given to these points on a plant?

\_\_\_\_\_

1

(e) The diagram below shows a plant with flowers that have begun to fade or shed their petals.



Name the procedure by which such flowers are removed.

\_\_\_\_\_

1

[Turn over

Marks

7. Read the following passage carefully.

Garden centres sell many different types of fertiliser.

Bloodmeal and bonemeal both contain nitrogen. Bloodmeal contains 12% nitrogen compared with 4% in bonemeal. However bonemeal contains more phosphorus, as it contains 20% compared with the 1% found in bloodmeal. They each contain 0.5% potassium.

Dried cattle manure contains 2% nitrogen, 2% phosphorus and contains five times more potassium than bloodmeal or bonemeal.

The best source of potassium comes from a ground up rock called rock phosphate. It contains 10% potassium but no nitrogen or phosphorus.

(a) (i) Use the information in the passage above to complete the table below.

<i>Material</i>	<i>Plant nutrient (%)</i>		
	<i>Nitrogen</i>	<i>Phosphorus</i>	<i>Potassium</i>
Bloodmeal			
Bonemeal			
Dried cattle manure	2	2	2.5
Rock phosphate	0	0	10

2

(ii) A gardener decides to make his own NPK general fertiliser.

Which materials have the highest nitrogen, phosphorus and potassium contents?

Nitrogen \_\_\_\_\_

Phosphorus \_\_\_\_\_

Potassium \_\_\_\_\_

1

(b) Which mineral promotes the development of fruit?

\_\_\_\_\_

1

Marks

8. (a) A student carried out an investigation to compare the germination of pelleted and unpelleted *Begonia* seeds.

The student carried out the following steps.

Step 1 The seeds were sown on the same day in separate seed trays of compost.

Step 2 The seed trays were then watered.

Step 3 The seed trays were placed in a greenhouse.

The trays were examined regularly.

- (i) Identify **two** variables that should have been kept the same when setting up the investigation.

1 \_\_\_\_\_

2 \_\_\_\_\_

2

- (ii) Describe **one** observation or measurement that could be made to compare the germination of seeds.

\_\_\_\_\_

1

- (b) Very fine seeds are often sold as pelleted seeds.

Describe **one** other way in which very small seeds can be sown.

\_\_\_\_\_

1

[Turn over

Marks

9. (a) (i) Why is rennet added to milk during cheese making?

\_\_\_\_\_ 1

(ii) Rennet can be obtained from genetically engineered yeast.  
State **one** other source of rennet.

\_\_\_\_\_ 1

(b) (i) Name the test carried out to show if milk is safe to drink.

\_\_\_\_\_ 1

(ii) Describe the result of the test if the milk is **unsafe** to drink.

\_\_\_\_\_ 1

(c) (i) Whey is a source of food for bacteria.

Describe **one** possible effect of releasing waste whey on the other organisms living in a river.

\_\_\_\_\_ 1

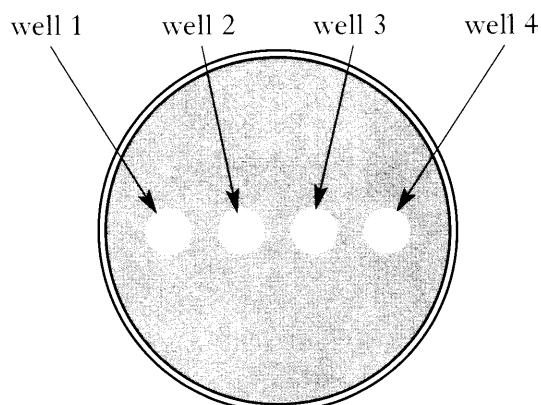
(ii) Give **one** example of how yeast-based industries prevent disposal of waste having an environmental impact.

\_\_\_\_\_ 1



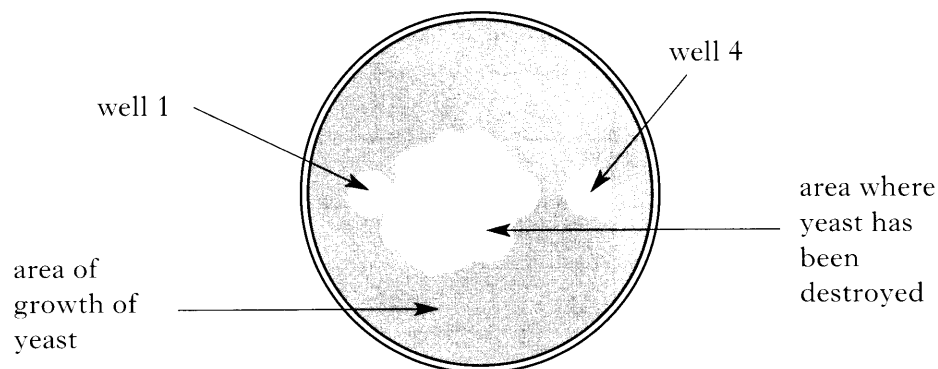
Marks

10. A student cut four wells in an agar plate on which yeast was growing. He placed drops of a different chemical in each well.



The plate was then placed in an oven at 20 °C for 48 hours.

After this time, he examined the plates to see where the yeast was still growing.



- (a) Which wells contained chemicals which had **no effect** on the yeast?

\_\_\_\_\_ and \_\_\_\_\_

1

- (b) Which well contained the chemical which was most effective in destroying the yeast?

\_\_\_\_\_

1

- (c) (i) Describe **one** way in which this investigation could be improved.

\_\_\_\_\_

1

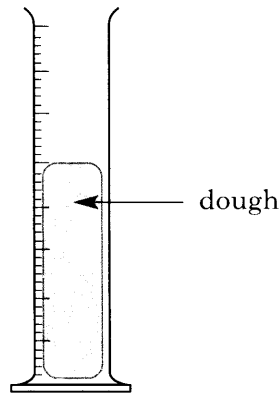
- (ii) Explain the reason for the improvement suggested.

\_\_\_\_\_

1

Marks

11. A student carried out an investigation to compare the activity of four yeast types.



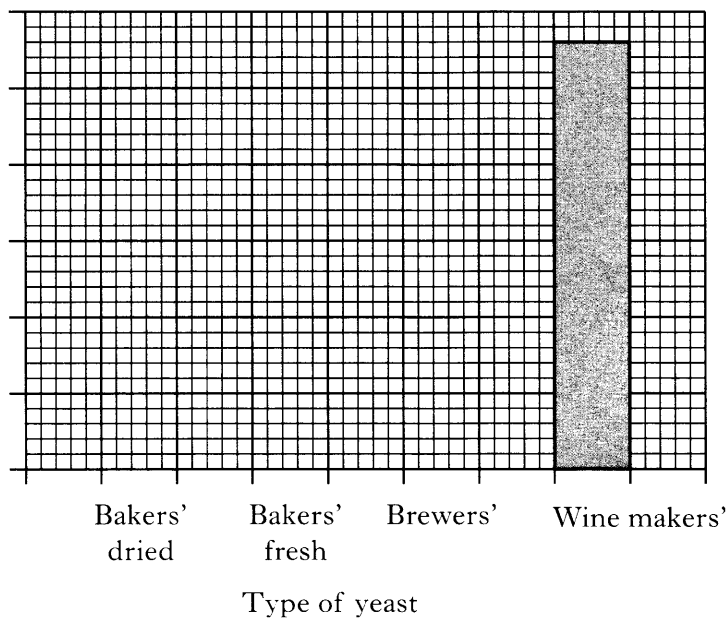
The height of the dough was measured after 1 hour.

The results are shown in the table below.

<i>Type of yeast in dough</i>	<i>Height of dough after 1 hour (cm)</i>
Bakers' dried	2.8
Bakers' fresh	5.2
Brewers'	4.2
Wine makers'	5.6

- (a) (i) On the grid below, complete the bar graph by
- (1) putting a label and a scale on the vertical axis
  - (2) plotting the bars for the other types of yeast.
- (Additional graph paper, if required, will be found on page 28.)

1  
1



Marks

11. (a) (continued)

(ii) What conclusion could be drawn from these results?

\_\_\_\_\_

1

(b) Real ales are cask-conditioned beers.

Why does fermentation continue in cask-conditioned beers?

\_\_\_\_\_

1

(c) Describe one **short-term** effect of drinking alcohol.

\_\_\_\_\_

1

[END OF QUESTION PAPER]

[Turn over