

FOR OFFICIAL USE

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X007/101

Section B
Total

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NATIONAL
QUALIFICATIONS
2005

WEDNESDAY, 18 MAY
9.00 AM – 10.30 AM

BIOLOGY
INTERMEDIATE 1

Fill in these boxes and read what is printed below.

Full name of centre

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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 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. If further space is required, a supplementary sheet for rough work may be obtained from the invigilator.
- 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.



Read carefully

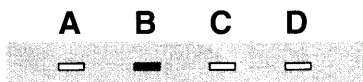
- 1 Check that the answer sheet provided is for **Biology Intermediate 1 (Section A)**.
- 2 Check that the answer sheet you have been given has **your name, date of birth, SCN** (Scottish Candidate Number) and **Centre Name** printed on it.
Do not change any of these details.
- 3 If any of this information is wrong, tell the Invigilator immediately.
- 4 If this information is correct, **print** your name and seat number in the boxes provided.
- 5 Use **black or blue ink** for your answers. **Do not use red ink.**
- 6 The answer to each question is **either** A, B, C or D. Decide what your answer is, then 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 exam, put the **answer sheet for Section A inside the front cover of this answer book.**

Sample Question

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

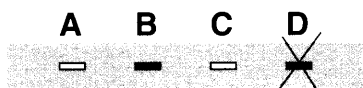
- A Bread
- B Butter
- C Sugar
- D Apple

The correct answer is **B**—Butter. The answer **B** has been clearly marked with a horizontal line (see below).

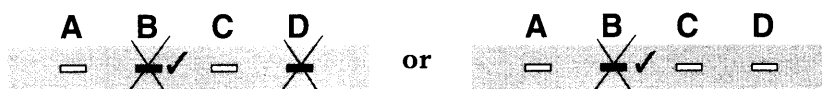


Changing an answer

If you decide to change your answer, cancel your first answer by putting a cross through it (see below) and fill in the answer you want. The answer below has been changed to **B**.



If you then decide to change back to an answer you have already scored out, put a tick (✓) to the **right** of the answer you want, as shown below:

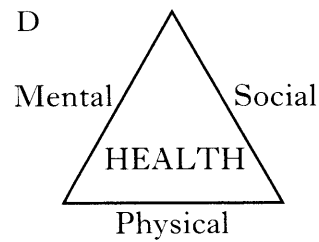
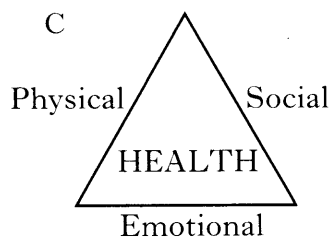
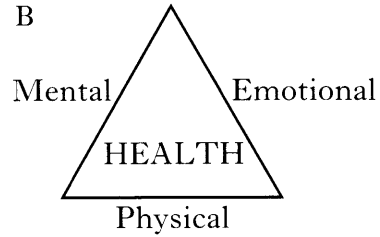
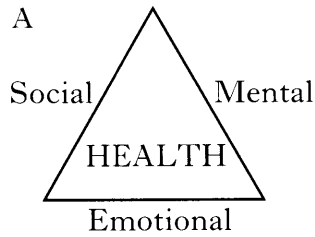


SECTION A

All questions in this Section should be attempted.

Answers should be given on the separate answer sheet provided.

1. Which of the following shows the health triangle correctly?



2. Which of the following is **most** likely to lead to high blood pressure?

	<i>Diet</i>	<i>Exercise</i>
A	high fat	regular
B	low fat	none
C	high fat	none
D	low fat	regular




[Turn over

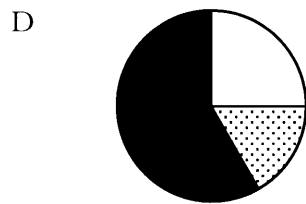
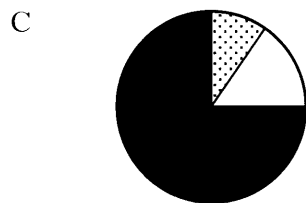
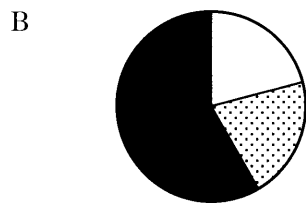
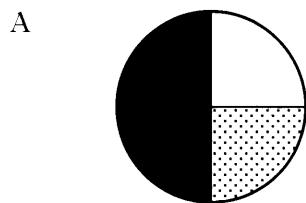
3. A number of people were asked how often they exercised.
The results are shown in the table below.

<i>How often exercise is taken</i>	<i>Number of people</i>
regularly	70
occasionally	20
never	30

Which pie-chart represents this information correctly?

Key

-  regularly
-  occasionally
-  never



4. A student measured his pulse rate and found it to be 12 beats in a **10 second period**.

His heart rate, in **beats per minute**, was

- A 12
- B 60
- C 72
- D 120.

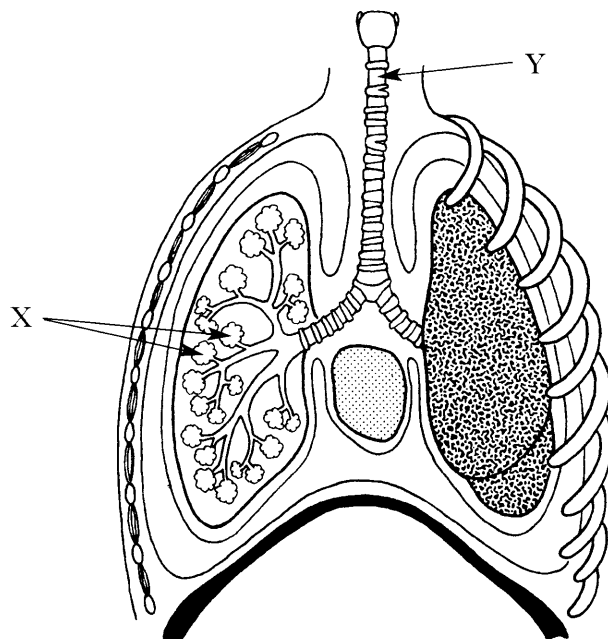
5. The table below shows the resting pulse rates and recovery times for four students.

<i>Student</i>	<i>Resting Pulse Rate</i> (beats per minute)	<i>Recovery Time</i> (minutes)
A	60	5
B	60	10
C	80	10
D	80	5

Which student is likely to be the fittest?

[Turn over

Questions 6 and 7 refer to the diagram of the human breathing system shown below.



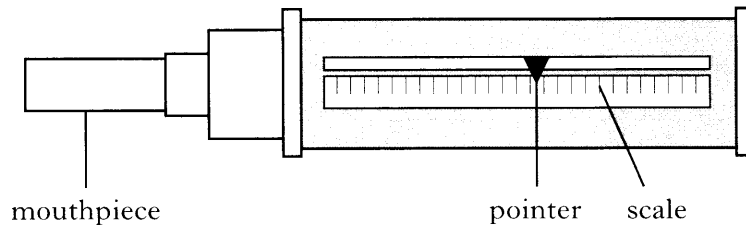
6. Which line in the table identifies correctly structures X and Y?

	X	Y
A	air sacs	bronchus
B	air sacs	windpipe
C	bronchioles	windpipe
D	bronchioles	bronchus

7. The function of the structures labelled X is to allow

- A oxygen to enter and leave the blood
- B carbon dioxide to enter and leave the blood
- C carbon dioxide to enter and oxygen to leave the blood
- D oxygen to enter and carbon dioxide to leave the blood.

8. The diagram below shows an instrument used by people with asthma.



People with asthma use this instrument to measure

- A peak flow
 - B tidal volume
 - C vital capacity
 - D breathing rate.
9. The table below shows the blood groups of fifty students.

<i>Blood group</i>	<i>Number of students</i>
A	8
B	10
AB	5
O	27

What percentage of the students have blood group AB?

- A 5%
 - B 10%
 - C 23%
 - D 46%
10. What is the name of the test used to show if milk is safe to drink?
- A Pasteurisation
 - B Preservation
 - C Resazurin
 - D Immobilisation

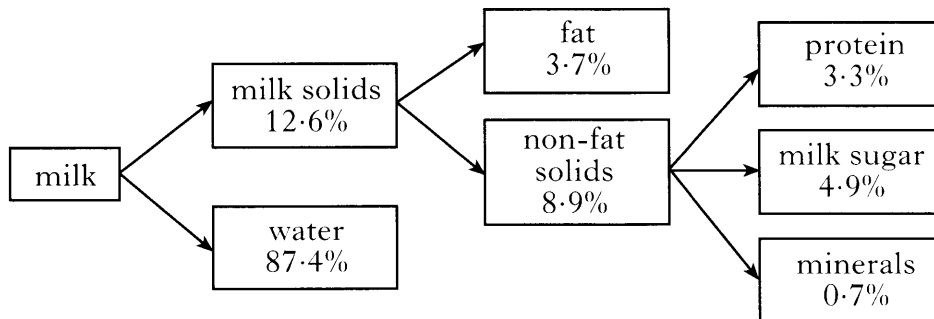
[Turn over

11. Fresh milk is treated to produce different types of milk.

Which line in the table identifies correctly the type of milk produced by each treatment?

	<i>Treatment</i>		
	<i>Some liquid removed by heating</i>	<i>Nearly all fat removed</i>	<i>Some fat removed</i>
A	semi-skimmed	skimmed	evaporated
B	evaporated	skimmed	semi-skimmed
C	skimmed	evaporated	semi-skimmed
D	skimmed	semi-skimmed	evaporated

12. The diagram below shows some information about the composition of milk.



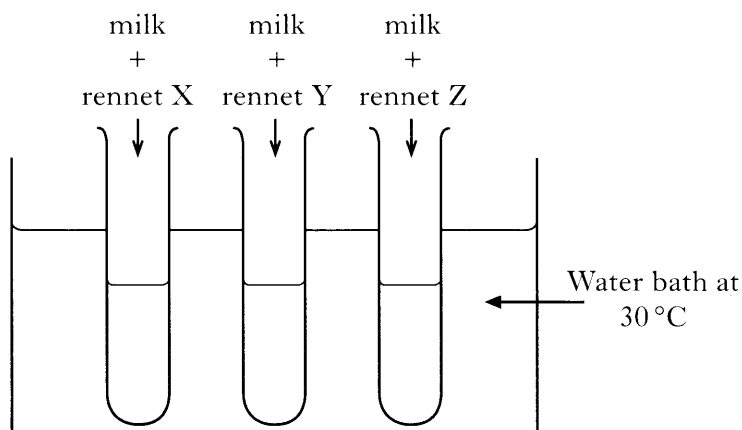
Which of the following conclusions can be drawn from this information?

- A There are more milk solids than water in milk.
- B Milk consists mainly of non-fat solids.
- C Milk has a higher percentage of fat than sugar.
- D There is seven times as much sugar as minerals in milk.

13. During yoghurt making, which of the following is converted into an acid?

- A Sugar
- B Protein
- C Fat
- D Rennet

14. The diagram shows an investigation on the production of cheese from milk.



The table below shows the time taken for cheese to form.

<i>Rennet</i>	<i>Time taken for cheese to form (minutes)</i>
X	80
Y	50
Z	60

Which variable was altered in this investigation?

- A Temperature
- B Time
- C Type of rennet
- D Type of milk

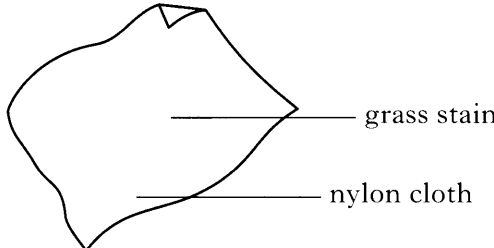
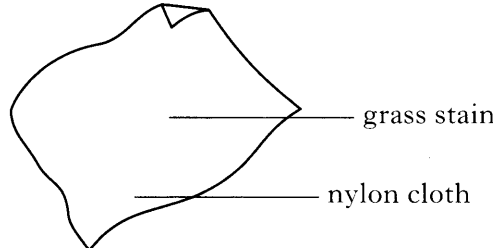
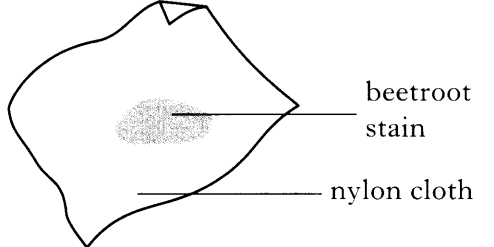
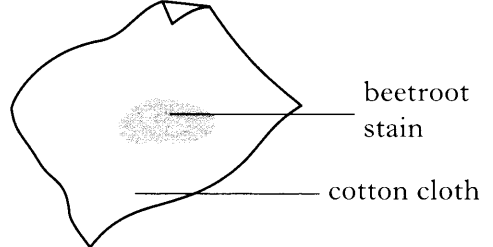
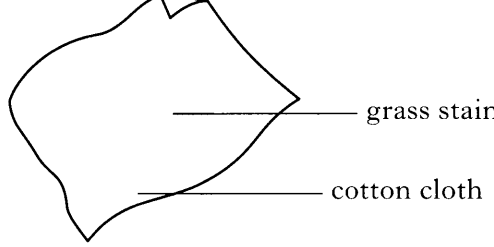
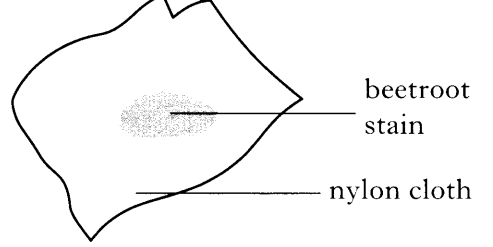
15. Which of the following are **both** sources of rennet?

- A Bacteria and genetically engineered fungi
- B Calves and genetically engineered fungi
- C Bacteria and calves
- D Yeast and bacteria

[Turn over

Questions 16 and 17 refer to the following investigation into the effectiveness of washing powders on removing stains.

Six cloths were stained and washed under the conditions shown.

<p>1</p>  <p>grass stain</p> <p>nylon cloth</p> <p>Non-biological powder at 30 °C</p>	<p>2</p>  <p>grass stain</p> <p>nylon cloth</p> <p>Non-biological powder at 40 °C</p>
<p>3</p>  <p>beetroot stain</p> <p>nylon cloth</p> <p>Non-biological powder at 30 °C</p>	<p>4</p>  <p>beetroot stain</p> <p>cotton cloth</p> <p>Biological powder at 30 °C</p>
<p>5</p>  <p>grass stain</p> <p>cotton cloth</p> <p>Biological powder at 30 °C</p>	<p>6</p>  <p>beetroot stain</p> <p>nylon cloth</p> <p>Biological powder at 40 °C</p>

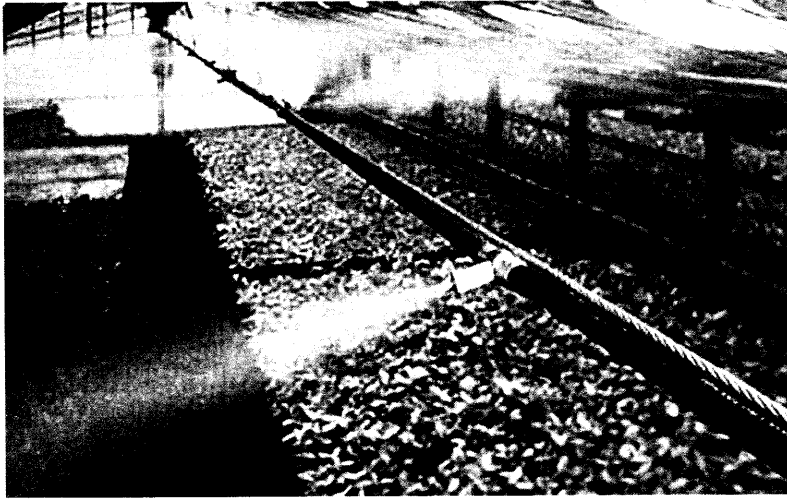
16. Which two cloths should be compared to investigate the effect of temperature on stain removal?

- A 1 and 2
- B 1 and 6
- C 2 and 3
- D 5 and 6

17. Which factor is being investigated by comparing cloths 4 and 5?

- A Type of detergent
- B Type of stain
- C Temperature
- D Type of cloth

18. The picture shows mist propagation of cuttings growing in a greenhouse.

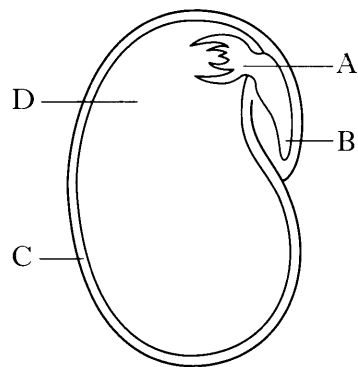


The main reasons for growing cuttings in this way are to

- A decrease humidity and increase temperature
 - B decrease humidity and decrease temperature
 - C increase humidity and increase temperature
 - D increase humidity and decrease temperature.
19. Which of the following would **increase** water retention when added to soil?
- A Peat
 - B Grit
 - C Sand
 - D Perlite
20. Which of the following are both methods of controlling aphids?
- A Soapy water and insecticides
 - B Insecticides and dead heading
 - C Dead heading and fungicide
 - D Fungicide and soapy water

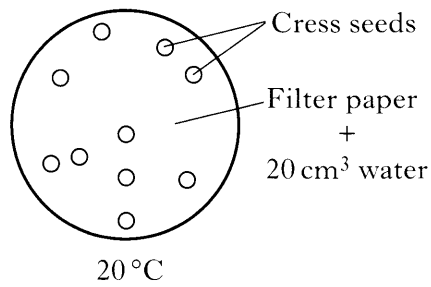
[Turn over

Questions 21 and 22 refer to the following diagram of a seed.

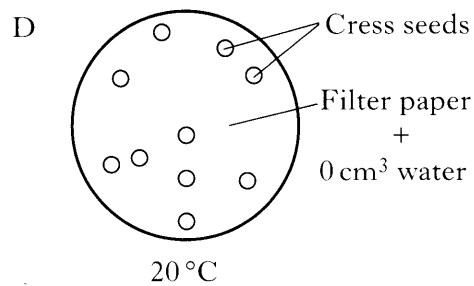
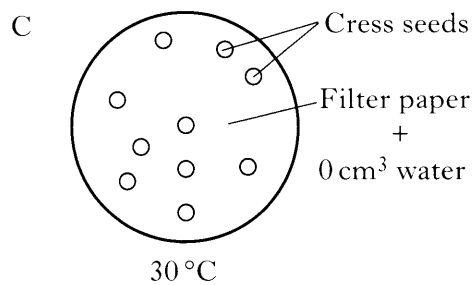
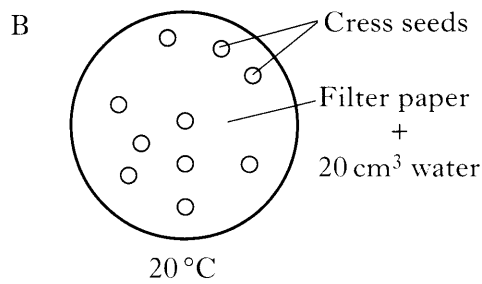
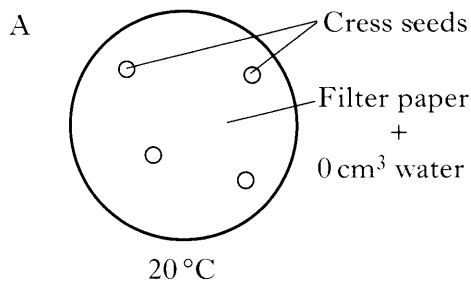


21. Which part is the food store?
22. The function of part C is to
- A grow into new root
 - B grow into new shoot
 - C protect the seed
 - D provide energy for growth.
23. What name is given to fine seeds that are enclosed in a ball of clay?
- A Chitted
 - B Pre-germinated
 - C Pelleted
 - D Non-pelleted

24. A student investigated if water was needed for cress seeds to germinate.
The diagram below shows a dish she set up.

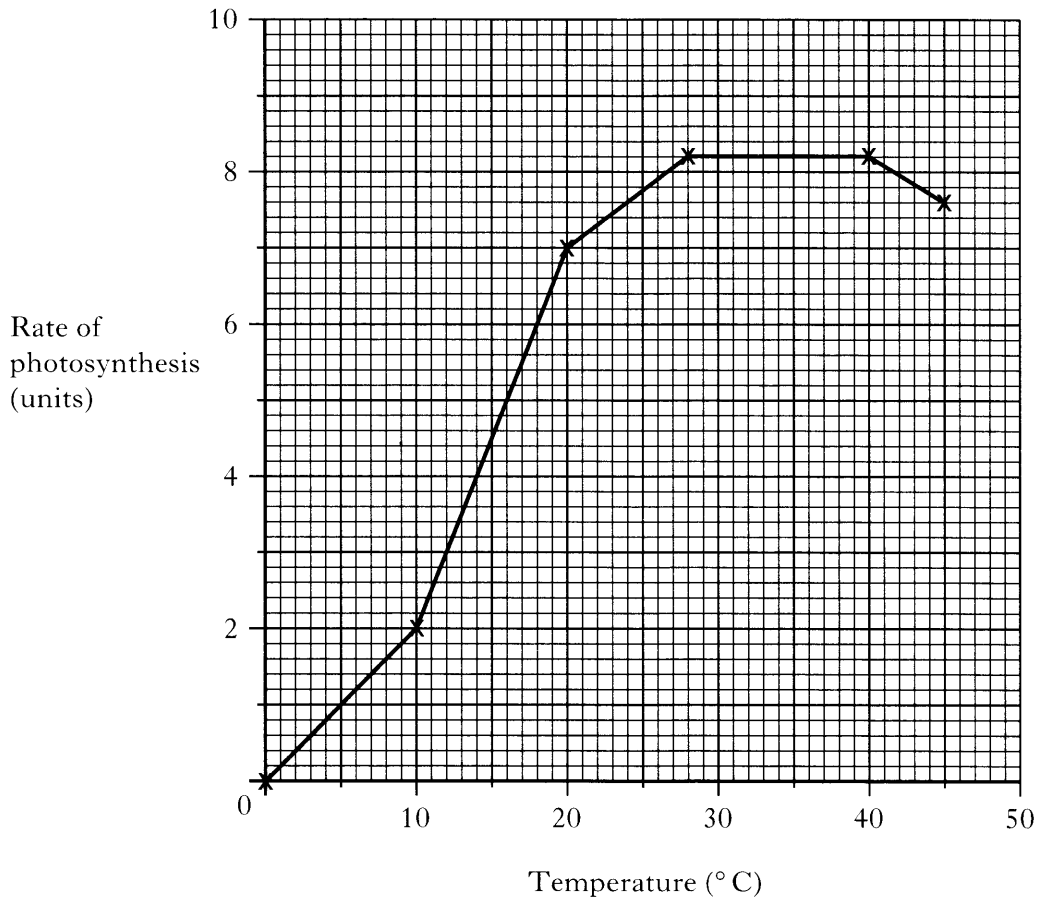


Which of the following dishes would be a suitable **control** for this experiment?



[Turn over

25. The graph below shows the results of an investigation into the effect of temperature on the rate of photosynthesis.



Between which two temperatures is the **increase** in the rate of photosynthesis greatest?

- A 0 – 2°C
- B 0 – 10°C
- C 2 – 7°C
- D 10 – 20°C

Candidates are reminded that the answer sheet for Section A MUST be returned INSIDE the front cover of this answer book.

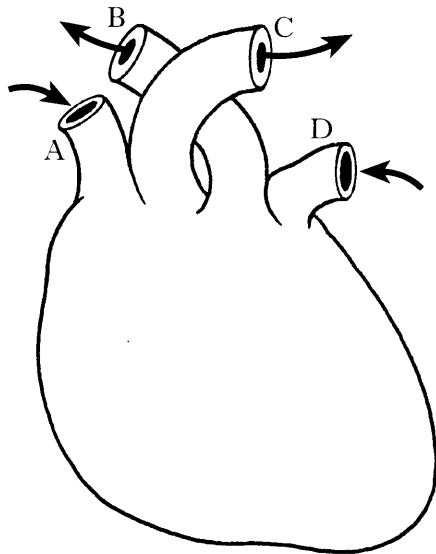
SECTION B

All questions in this Section should be attempted.

DO NOT
WRITE IN
THIS
MARGIN

Marks

1. The diagram below represents the human heart. The arrows indicate the direction of blood flow through the blood vessels.



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

_____ 1

- (b) Which **two** letters in the diagram identify arteries?

Letters _____ and _____ 1

- (c) Name the type of blood vessels which link arteries to veins.

_____ 1

[Turn over

Marks

2. (a) The reaction time of five students was measured using an electronic timer. The results are shown in the table below.

Student	Reaction time (s)		
	First attempt	Second attempt	Third attempt
1	0.35	0.24	0.19
2	0.27	0.20	0.14
3	0.15	0.10	0.08
4	0.27	0.19	0.15
5	0.24	0.17	0.12

- (i) What conclusion can be drawn about the effect of practice on reaction time?

1

- (ii) Which student had the fastest reaction time?

Student _____

1

- (b) State **one** factor, other than practice, which can affect reaction time.

1

Marks

3. A healthy, varied diet should provide all the vitamins a person needs.

The table shows information about some vitamins.

<i>Vitamin</i>	<i>Good food sources</i>	<i>Importance</i>
A	liver, eggs, butter, margarine, oily fish	healthy eyes and skin
B ₁	pork, breakfast cereal, wholemeal bread	releasing energy from food
B ₁₂	red meat, liver, chicken, eggs	healthy nervous system
C	oranges, strawberries, kiwi fruit, potatoes	healthy immune system
D	eggs, cheese, oily fish	healthy bones and teeth
E	butter, margarine, avocado, muesli, olive oil	healthy skin
K	broccoli, cabbage, yoghurt	blood clotting and healthy bones and teeth

Use the information in the table to answer the following questions.

- (a) Which **two** vitamins are important for healthy bones and teeth?

_____ and _____

1

- (b) Name **one** food which is a good source of vitamins A, B₁₂ and D.

1

- (c) Which vitamins are found in margarine and butter?

1

- (d) Suggest why an athlete might need a lot of vitamin B₁.

1

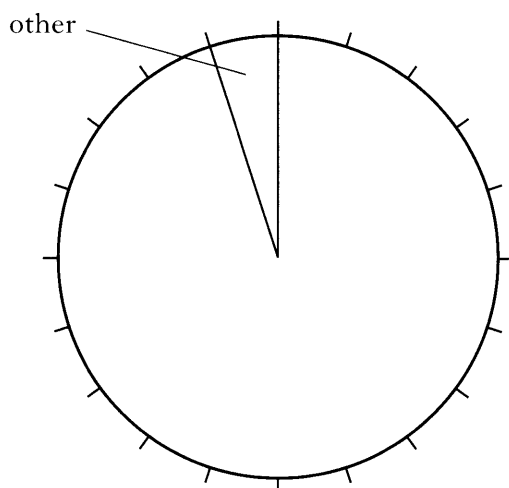
[Turn over

Marks

4. The table shows the percentage of the food groups found in rice.

<i>Food Group</i>	<i>Percentage (%)</i>
carbohydrate	80
fat	5
protein	10
other	5

- (a) Use the information in the table to complete and label the pie chart below.
(An additional pie chart, if required, will be found on page 33.)



2

- (b) Calculate the ratio of protein to fat in rice.
Show your answer as a simple whole number ratio.
Space for calculation

_____ : _____
Protein Fat

1

Marks

5. (a) Draw lines to join each of the physiological measurements to the correct instrument.

Physiological measurement

Instrument

temperature

finger and stopwatch

body fat

clinical thermometer

blood pressure

skin fold callipers

heart rate

digital sphygmomanometer

2

- (b) Physiological measurements can be made using high or low tech instruments.

- (i) Name the high tech instrument in the list above.

1

- (ii) State **one advantage** of using a high tech instrument.

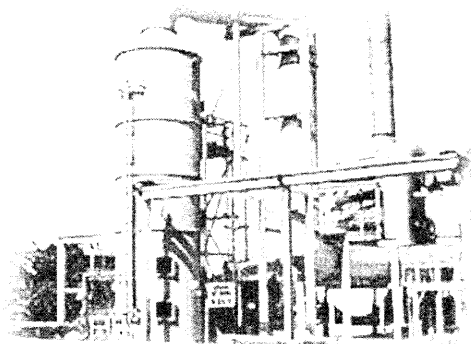
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[Turn over

6. Read the following passage carefully.

Warning on drugs in river water

Adapted from *The Guardian* newspaper



Waste Water Treatment Plant

Antibiotics and other medicines given to humans and livestock are contaminating European rivers.

High concentrations of antibiotics have been found in hospital and household sewage. Antibiotics can also reach the environment directly from the urine and faeces of farm animals.

Twenty-five pharmaceutical compounds, including five antibiotics, have been found in German rivers. Similar high levels of contamination have been found in other European rivers.

Scientists worry that the increasing levels of antibiotics may damage the environment and lead to an increase in antibiotic resistance.

New ways of reducing the contamination of waste water are needed. One suggested method is to collect the urine of hospital patients and use separation techniques to remove the antibiotics.

Use information from the passage to answer the questions below.

(a) Name **one** type of sewage in which antibiotics have been found.

1

(b) State why the increasing levels of antibiotics worry scientists.

1

Marks

6. (continued)

- (c) State
- one**
- way in which contamination of waste water could be reduced.

1

- (d) What percentage of the pharmaceutical compounds found in German rivers was antibiotics?

Space for calculation

_____ %

1

7. (a)
- Tick the correct box**
- for each statement in the table to show whether it refers to antibiotics or antifungals.

<i>Statement</i>	<i>Antibiotics</i>	<i>Antifungals</i>
Used to treat athlete's foot and thrush		
Act on bacteria but not viruses		
Limit growth of fungi		
Produced naturally by soil fungi		

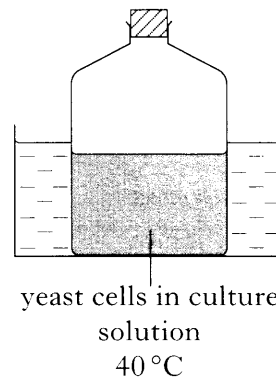
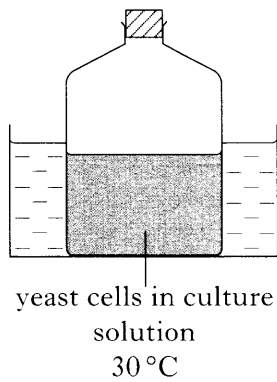
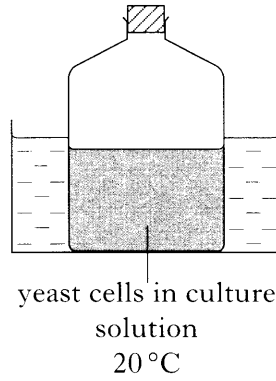
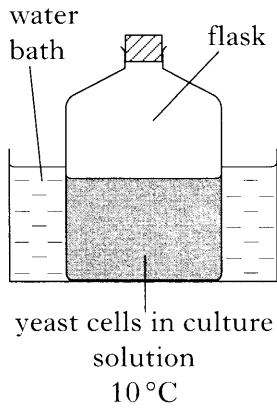
2

- (b) Name the type of vessel in which antibiotics can be commercially produced.

1

[Turn over

8. A student carried out an investigation into the effect of temperature on the reproduction of yeast cells.
Four identical flasks were set up and placed in water baths at different temperatures as shown below.



The results are shown in the table.

<i>Temperature</i> (°C)	<i>Number of yeast cells at start</i> (per mm ³)	<i>Number of yeast cells after 2 hours</i> (per mm ³)
10	50	60
20	55	100
30	50	560
40	45	140

Marks

8. (continued)

(a) On the grid complete the **line graph** for the number of yeast cells after 2 hours by

(i) putting a scale on the vertical axis

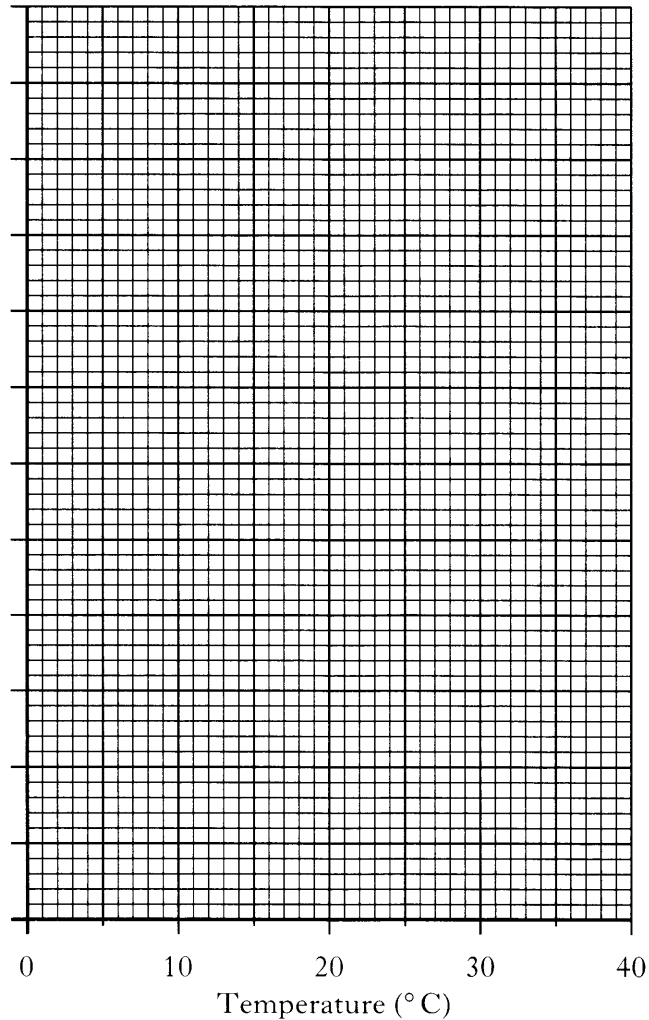
1

(ii) plotting the graph.

1

(Additional graph paper, if required, will be found on page 33.)

Number of
yeast cells after
2 hours
(per mm³)



(b) (i) From the table, at which temperature was the number of yeast cells the highest after 2 hours?

_____ °C

1

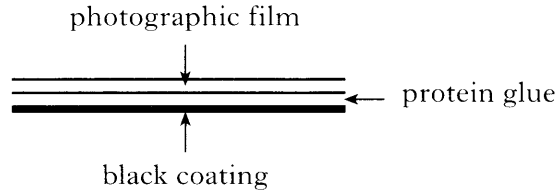
(ii) Suggest **one** improvement that would make this investigation **valid**.

1

[Turn over

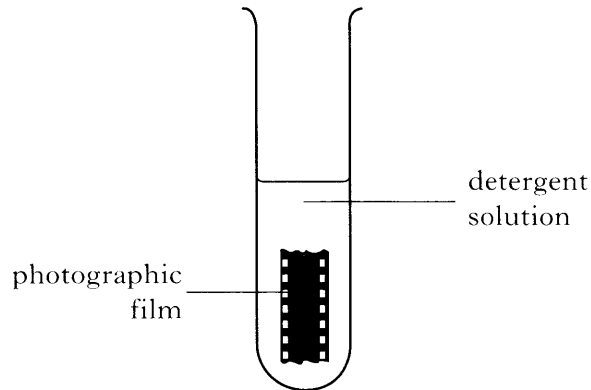
Marks

9. (a) The black chemical on photographic film is stuck onto the film with a protein glue.



The following steps were carried out to investigate the effect of **different detergents** on the protein glue.

- 1 A piece of photographic film was placed in each of five identical test tubes.
- 2 A different detergent solution was poured into each test tube.
- 3 The test tubes were placed in a water bath at 40 °C.
- 4 The appearance of each piece of photographic film was noted after two hours.



The table below shows the result of the investigation after 2 hours.

<i>Detergent</i>	Momo	Novo	Ohno	Promo	Quango
<i>Appearance of photographic film</i>	clear	black	black	clear	clear

- (i) Identify the **biological** detergents used in the investigation.

1

- (ii) Suggest an improvement which could be made to make the results of the investigation more **reliable**.

1

Marks

9. (continued)

(b) Some people are allergic to the enzymes in biological detergents.

How does the manufacturer reduce the chance of a detergent causing an allergic reaction?

1

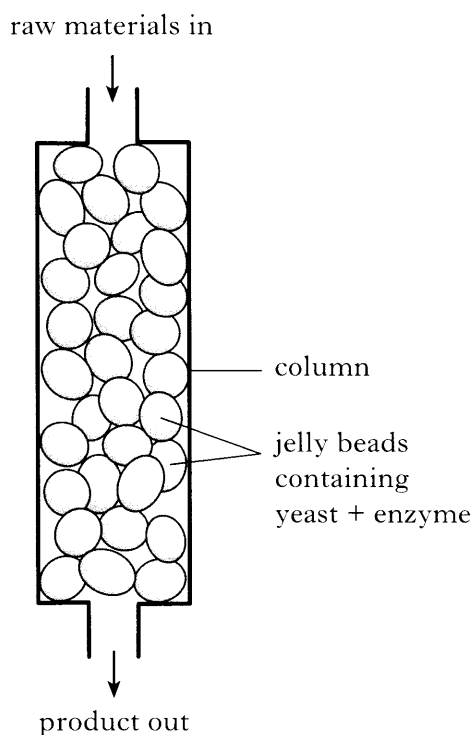
(c) State **one** possible advantage of using a **biological** detergent.

1

[Turn over

Marks

10. (a) The diagram shows a method for the production of a fermented milk drink.



(i) Name the technique by which the yeast and enzyme are trapped in the jelly beads.

_____ 1

(ii) State **one** advantage of using this method of production.

_____ 1

(b) Fermentation also occurs during the brewing of beer.
Complete the summary of this process below.

Sugar \longrightarrow Alcohol + _____ 1

Marks

10. (continued)

- (c) **Underline** one option in each of the brackets to make the following sentences correct.

Cask conditioned beer differs from other beers because the yeast $\left\{ \begin{array}{l} \text{is} \\ \text{is not} \end{array} \right\}$

removed from the cask.

Brewery conditioned beer has $\left\{ \begin{array}{l} \text{oxygen} \\ \text{carbon dioxide} \end{array} \right\}$ added.

1

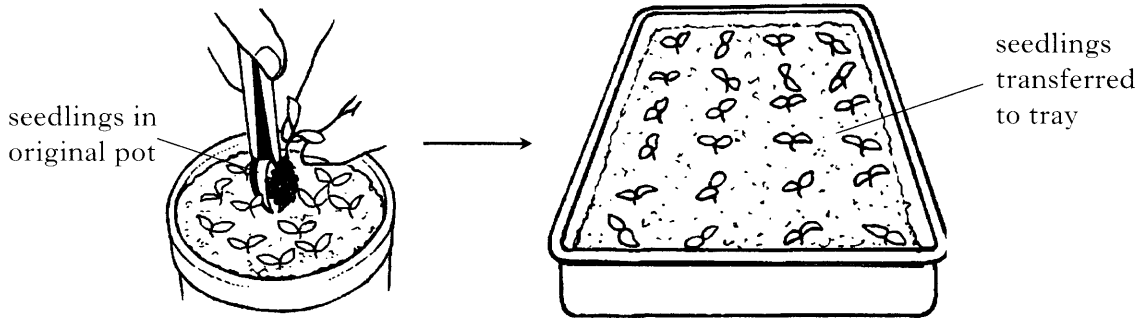
- (d) The disposal of waste produced in brewing can cause environmental problems. State **one** way of avoiding such problems.

1

[Turn over

Marks

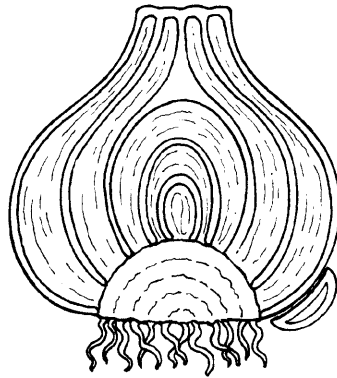
11. (a) The diagram below shows seedlings being pricked out and transferred to a tray.



Give **one** reason why this procedure is carried out.

1

(b) New plants can be grown from plant propagation structures such as the food storage organ shown below.



(i) Name this type of food storage organ.

1

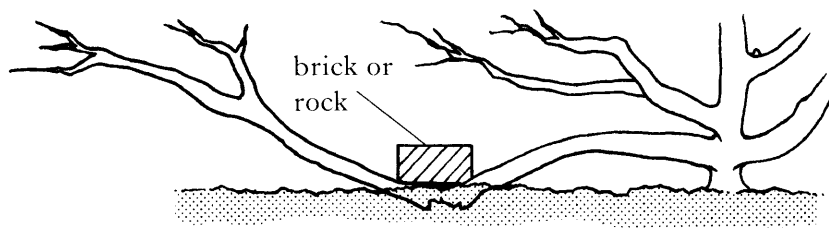
(ii) Name **one other** plant propagation structure.

1

Marks

11. (continued)

(c) The following diagram shows a method of artificial propagation.



(i) Name this method of artificial propagation.

_____ 1

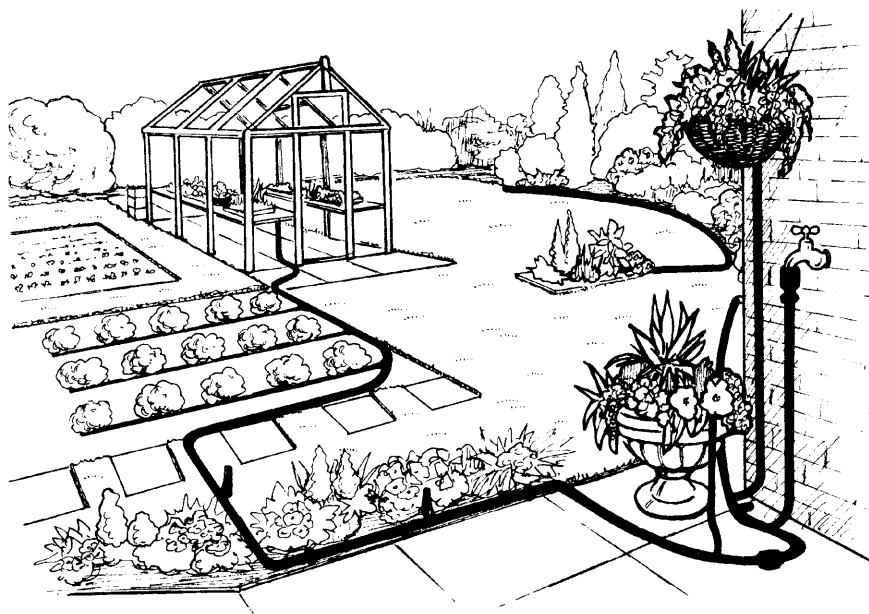
(ii) State **one** advantage of this method of artificial propagation.

_____ 1

[Turn over

Marks

12. The diagram shows a garden with a greenhouse and an automatic irrigation system.



- (a) (i) What is supplied to the plants in this garden by the irrigation system?

1

- (ii) Suggest **one** reason for growing plants in the greenhouse.

1

- (b) Plants can be protected by floating fleece.

The following table shows the yields of various crops when grown with and without floating fleece.

<i>Crop</i>	<i>Average yield (units per hectare)</i>	
	<i>Without floating fleece</i>	<i>With floating fleece</i>
cantaloupe	1500	6000
cucumber	240	720
pepper	300	900
tomato	800	2400
watermelon	750	2500

- (i) Which crop shows the greatest increase in yield (units per hectare) when grown with floating fleece?

Space for calculation

1

Marks

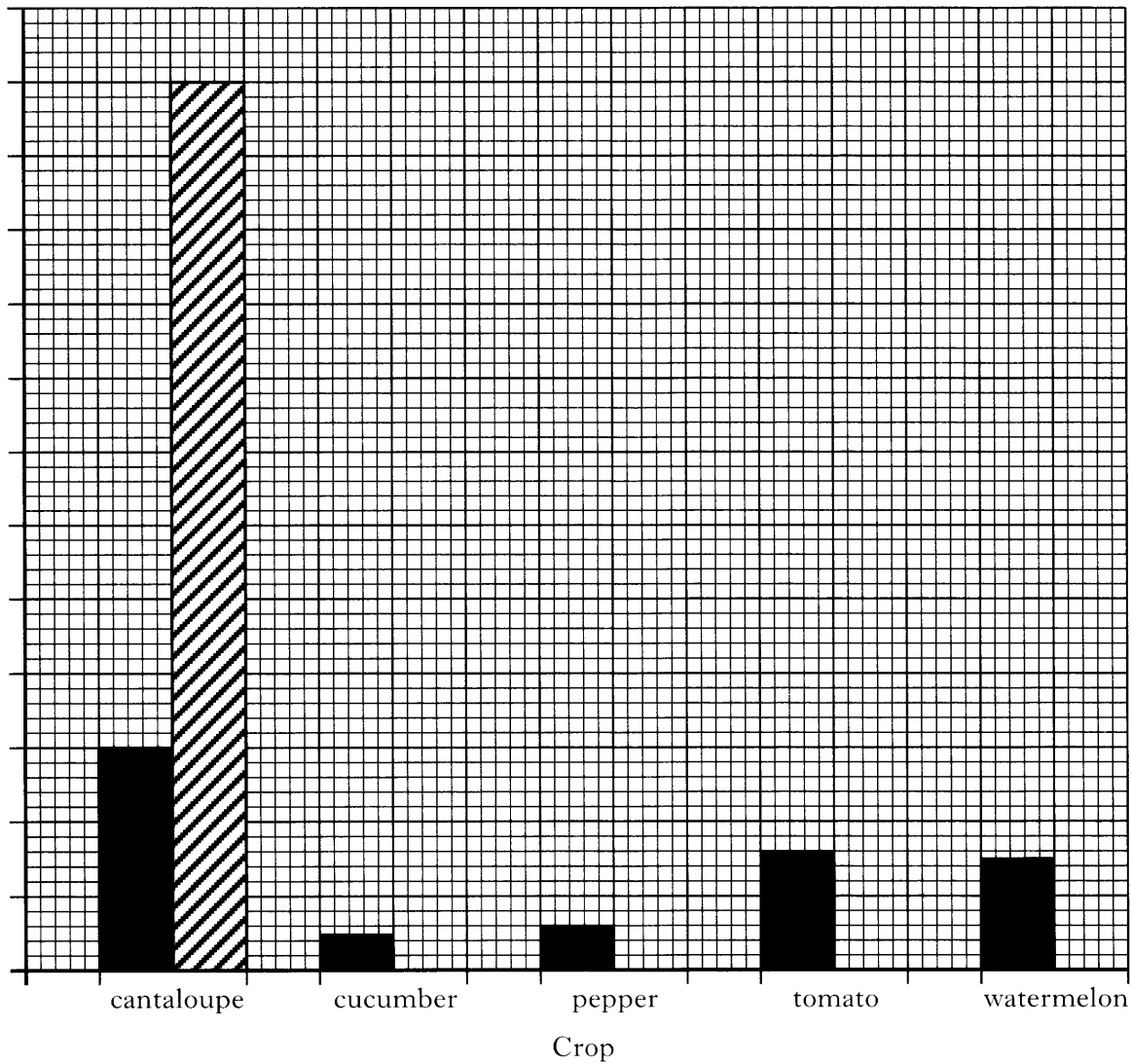
12. (b) (continued)

(ii) On the grid below complete the bar graph by

- (1) putting a scale on the vertical axis 1
- (2) plotting the remaining results for the average yield with floating fleece. 1

(Additional graph paper, if required, will be found on page 34.)

- without floating fleece
- with floating fleece



[Turn over

Marks

13. A student carried out an investigation to compare the germination of four different types of seeds.
The results are shown in the table below.

<i>Type of seed</i>	<i>Number of seeds sown</i>	<i>Number of seeds germinated</i>
sunflower	28	15
grass	20	18
lettuce	24	12
tomato	20	12

- (a) Half the seeds of one type failed to germinate. Name this type of seed.

1

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

1 _____

2 _____

2

[END OF QUESTION PAPER]