

FOR OFFICIAL USE

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Section B  
Total

**X007/101**

NATIONAL  
QUALIFICATIONS  
2007

MONDAY, 21 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

## **SECTION A**

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**

- 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

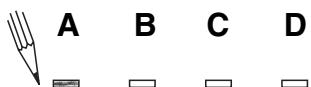
- 1 Check that the answer sheet provided is for **Biology Intermediate 1 (Section A)**.
- 2 For this section of the examination you must use an **HB pencil** and, where necessary, an eraser.
- 3 Check that the answer sheet you have been given has **your name, date of birth, SCN** (Scottish Candidate 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 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?

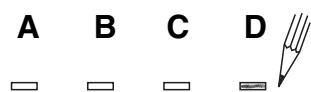
- A Butter
- B Bread
- C Sugar
- D Apple

The correct answer is **A—Butter**. 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

**All questions in this section should be attempted.**

**Answers should be given on the separate answer sheet provided.**

1. The process of food production in a leaf is called
  - photosynthesis
  - propagation
  - germination
  - fermentation.
2. The diagram shows plants growing in a hanging basket.



- One way of preventing compost in a hanging basket from drying out in hot weather is to use
- A capillary matting
  - grit
  - water retentive gel
  - sand.
3. An advantage of dormancy is that
    - seeds are able to germinate in winter
    - seeds require less water for germination
    - seed germination is delayed until spring
    - seeds germinate more quickly.

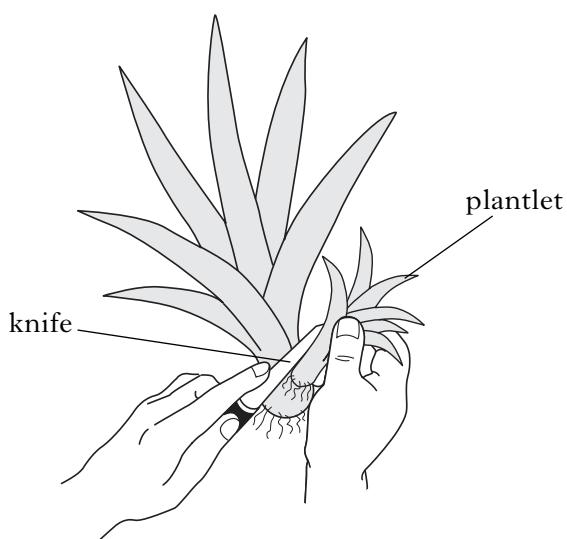
**[Turn over**

4. The steps for taking stem cuttings are shown below.

- 1 Remove the lower leaves.
- 2 Place the cuttings into compost.
- 3 Cut the stem below a node.
- 4 Cover the pot with a polythene bag.
- 5 Dip the cut end into rooting powder.

Which of the following shows the correct sequence of steps?

- A  $3 \rightarrow 5 \rightarrow 4 \rightarrow 2 \rightarrow 1$
  - B  $3 \rightarrow 1 \rightarrow 5 \rightarrow 2 \rightarrow 4$
  - C  $3 \rightarrow 4 \rightarrow 5 \rightarrow 1 \rightarrow 2$
  - D  $3 \rightarrow 5 \rightarrow 2 \rightarrow 4 \rightarrow 1$
5. Grey mould on strawberry plants can be controlled using
- A soapy water
  - B fertiliser
  - C fungicide
  - D insecticide.
6. The diagram shows a Mother-in-law's tongue plant being propagated.



The type of plantlet being removed from the base of the parent plant is

- A a bulb
- B a tuber
- C an offset
- D a runner.

7. A student carried out an investigation into the water content of pea seeds. A pot of fresh seeds was weighed and then placed in an oven at 100 °C until there was no more loss in mass.

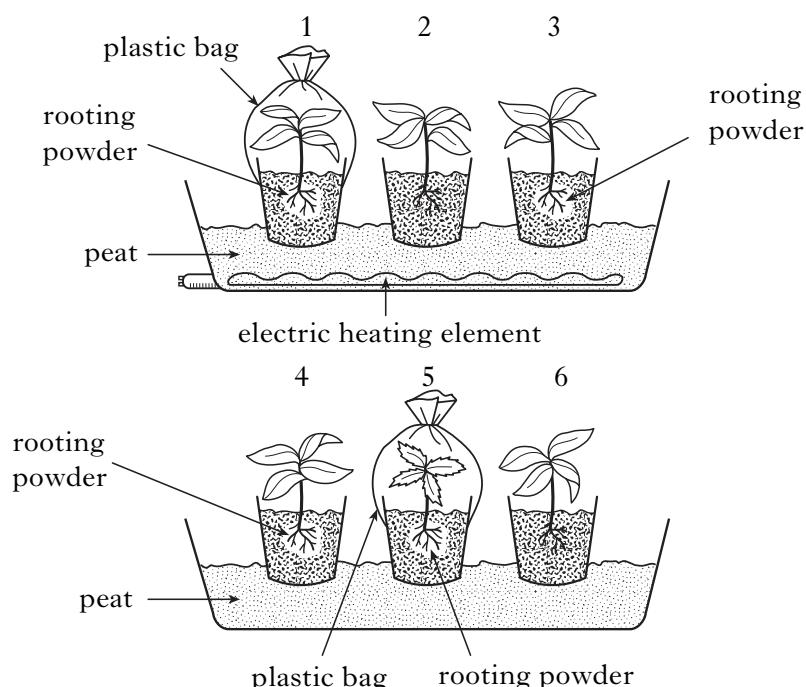
The results are shown in the table below.

Condition of peas	Mass (g)
Fresh	200
Dry	20

To improve the **reliability** of the results, the student should

- A repeat the experiment
  - B set the oven at 150 °C
  - C leave the peas in the oven for longer
  - D use a smaller number of peas.
8. A student carried out an investigation into root development in cuttings.

Six pots were set up as shown in the diagram.



Which pots should be compared to investigate the effect of increasing humidity on the root development in cuttings?

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

9. The table below shows how often a sample of Scottish students take exercise.

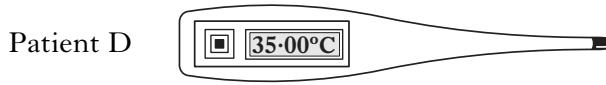
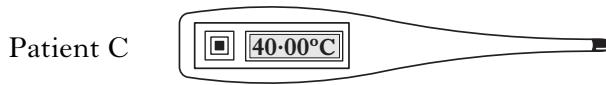
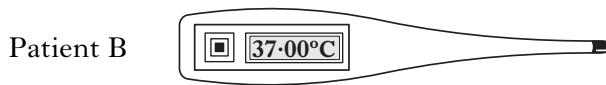
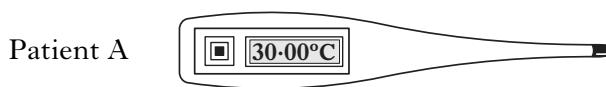
<i>Frequency of exercise</i>	<i>Number of students</i>	
	<i>Male</i>	<i>Female</i>
Daily	35	20
2–3 times a week	25	30
Once a week	7	18
Once a month	3	9

From the table, which of the following statements is correct?

- A Fewer females exercise once a month than males.  
 B More males exercise once a week than females.  
 C Fewer females exercise daily than males.  
 D More males exercise 2–3 times a week than females.
10. Which line in the table below correctly shows a physiological measurement and a **high-tech** instrument used to measure it?

	<i>Physiological Measurement</i>	<i>Instrument</i>
A	body fat	skin fold callipers
B	temperature	clinical thermometer
C	blood pressure	stethoscope and mercury manometer
D	heart rate	pulsometer

11. The diagrams of digital thermometers below show the temperatures of four patients in a hospital.

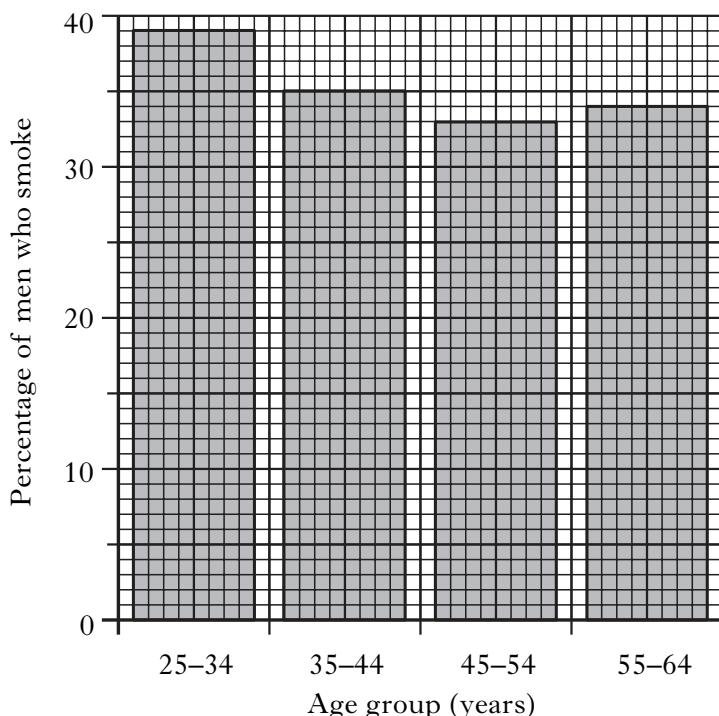


Which patient is most likely to be suffering from a fever?

12. Diabetes can be detected by measuring the blood level of

- A antibodies
- B sugar
- C iron
- D white blood cells.

13. The bar graph below shows the percentage of men in different age groups who are smokers.



What percentage of 25–34 year old men smoke?

- A 33
- B 34
- C 35
- D 39

**[Turn over]**

14. Which line in the table below correctly matches the food group to its use?

	<i>Food group</i>	<i>Use</i>
A	fats	growth and repair of cells
B	carbohydrates	energy
C	proteins	protection against deficiency disease
D	vitamins	energy

15. Some of the factors which affect blood pressure are listed below.

Factors:

- 1 lack of exercise
- 2 balanced diet
- 3 being overweight
- 4 stress

Which of these can lead to high blood pressure?

- A Factors 1 and 2 only
- B Factors 1 and 4 only
- C Factors 1, 2 and 3 only
- D Factors 1, 3 and 4 only

16. The table below shows the components which make up the body mass of an adult female.

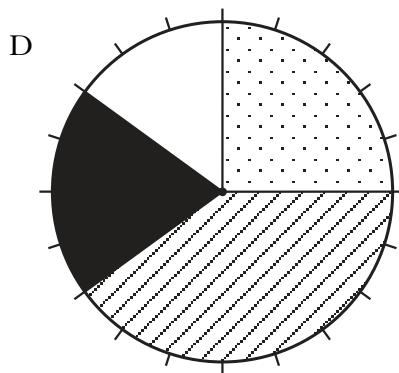
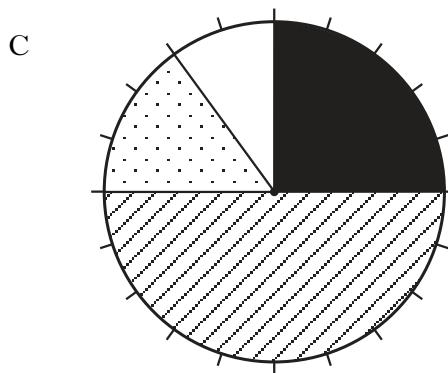
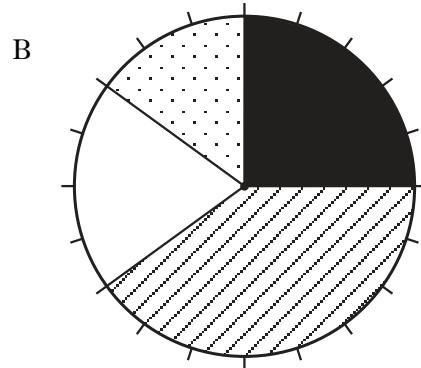
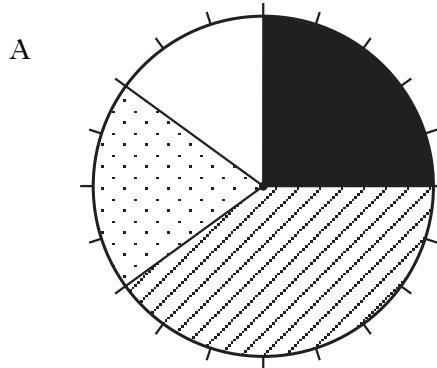
<i>Component</i>	<i>Percentage of adult female's body mass</i>
Fat	40
Muscle	25
Bone	20
Other tissues	15

Which of the following pie charts presents this information correctly?

Key



	Fat
	Muscle
	Bone
	Other tissues



**[Turn over**

17. The steps in an investigation into the fitness of two students are outlined below.

1. Both students measured their resting pulse rate using a pulsometer.
2. One student used an exercise bike for ten minutes while the other ran for the same length of time.
3. Both students measured their pulse rate after the exercise for twenty minutes.
4. The investigation was repeated.

Which of the following is a possible source of error in this investigation?

- A A pulsometer was used.
- B The period of exercise was only ten minutes.
- C The investigation was repeated.
- D The students performed different exercises.

18. Heating milk to remove some liquid makes it more concentrated.

The type of milk produced by this treatment is

- A evaporated
- B skimmed
- C semi-skimmed
- D UHT.

19. The table below shows the results of an investigation into the removal of stains.

Type of stain	Washing temperature (°C)	Biological detergent	Non-biological detergent
Grass	40	✓	✗
Mud	40	✓	✗
Grass	100	✗	✗
Mud	100	✓	✓

✓ = stain removed

✗ = stain not removed

Grass stains were removed by a

- A biological detergent at 40 °C
- B biological detergent at 100 °C
- C non-biological detergent at 40 °C
- D non-biological detergent at 100 °C.

20. Waste whey can be upgraded to produce
- A cheese and animal feed
  - B animal feed and a creamy alcoholic drink
  - C yoghurt and a creamy alcoholic drink
  - D cheese and yoghurt.
21. Which of the following is added to the food of farmed salmon to give their flesh the same appearance as wild salmon?
- A Flavouring
  - B Minerals
  - C Dried whey
  - D Yeast products
22. The table below shows the temperature ranges in which different types of yeast can grow.

<i>Type of yeast</i>	<i>Temperature range (°C)</i>
1	14–16
2	12–30
3	18–35
4	8–15

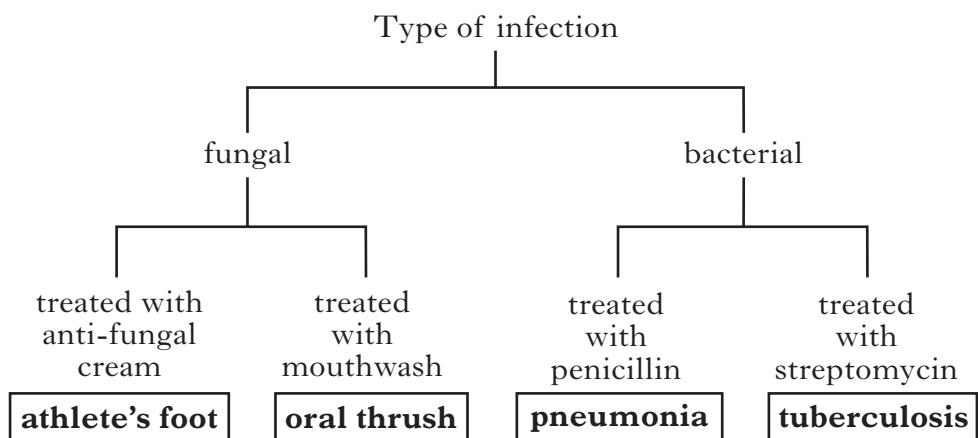
- Which types of yeast will **not** grow at 16 °C?
- A Types 1 and 3
  - B Types 1 and 4
  - C Types 2 and 3
  - D Types 3 and 4
23. Which of the following is added to milk to make yoghurt?
- A Antibiotics
  - B Bacteria
  - C Enzymes
  - D Yeast

**[Turn over**

24. Which line in the table below correctly identifies the effects of discharging whey into a river?

	<i>Number of bacteria</i>	<i>Oxygen availability</i>
A	increase	increase
B	increase	decrease
C	decrease	increase
D	decrease	decrease

25. The key below shows different types of infection and their treatment.



Which of the following correctly identifies tuberculosis from this information?

	<i>Type of infection</i>	<i>Treatment</i>
A	bacterial	streptomycin
B	fungal	anti-fungal cream
C	bacterial	penicillin
D	fungal	mouthwash

**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.  
All answers must be written clearly and legibly in ink.**

1. Read the following passage carefully.

**What's in a Washing Powder?**

Modern washing powders contain a number of chemicals which reflect the complex demands of modern living. These detergents must remove stains without damaging fabrics and washing machines. They should also be environmentally friendly.

Most detergents contain surfactants which allow the water to spread across the fabric and builders to soften the water. In addition, lather control agents are put in to stop too much froth forming. The pleasant smell of detergents is produced by fragrances. Corrosion inhibitors protect the washing machine from rusting.

Biological washing powders also contain several types of enzyme such as proteases, amylases and lipases. These enzymes are so powerful that the powders have only 1% enzymes.

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

- (a) Name the chemical in washing powders which prevents too much froth forming.

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- (b) Why are “builders” added to washing powders?

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1

- (c) Why do biological washing powders contain a very low percentage of enzymes?

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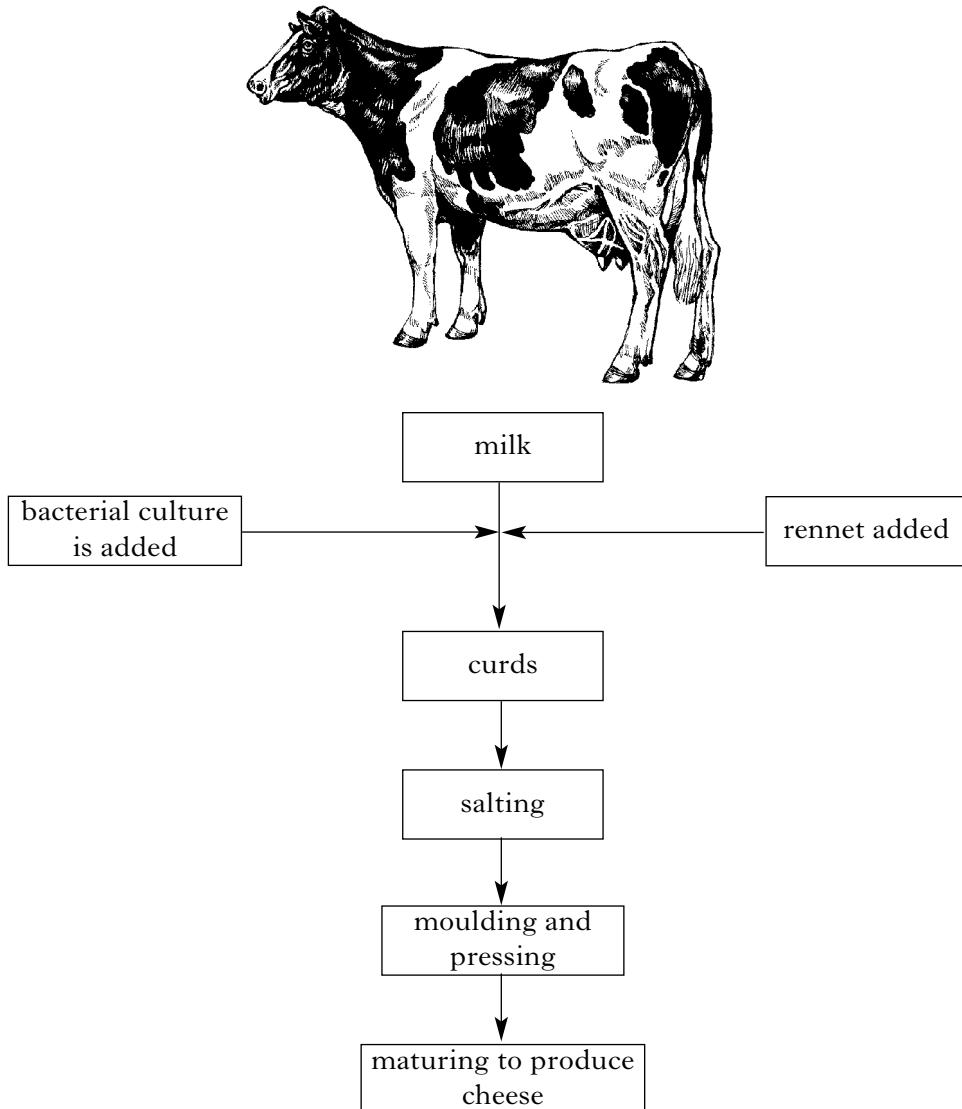
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- (d) Name an enzyme found in biological washing powders.

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1

2. The following flow chart shows some of the processes involved in cheese making.



- (a) State **one** source of the rennet which is used in cheese making.

\_\_\_\_\_ 1

- (b) Name the liquid which is left behind when the curds are formed.

\_\_\_\_\_ 1

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

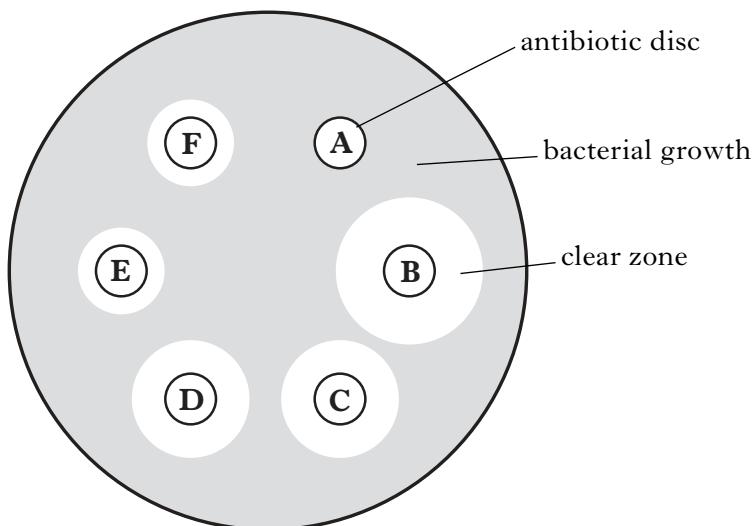
Bacterial cultures are added to milk to help convert  $\begin{Bmatrix} \text{sugar} \\ \text{acid} \end{Bmatrix}$  into  $\begin{Bmatrix} \text{acid} \\ \text{sugar} \end{Bmatrix}$ .

This helps to clot the  $\begin{Bmatrix} \text{protein} \\ \text{fat} \end{Bmatrix}$  and also affects the  $\begin{Bmatrix} \text{colour} \\ \text{flavour} \end{Bmatrix}$  of the cheese. 2

3. (a) The steps in an investigation into the effect of six antibiotics on bacterial growth are shown below.

- Step 1 An agar plate was evenly spread with a type of bacteria.  
Step 2 Six different antibiotic discs (A–F) were placed on the agar.  
Step 3 The plate was left at 25 °C for 48 hours.  
Step 4 The size of any clear zone around each disc was measured.

The results are shown below.



- (i) The conclusion below was written by the student who carried out the investigation.

**Conclusion:**

*Antibiotic A is not effective against any type of bacteria*

Explain why this is **not** a valid conclusion.

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1

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

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1

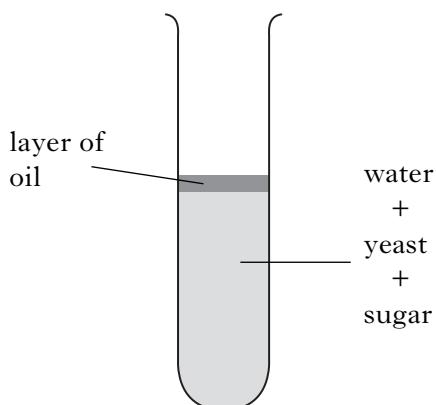
- (b) Why have some bacteria developed resistance to antibiotics?

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1

**[Turn over**

4. A student carried out an investigation into the production of alcohol by yeast. Four test tubes each containing water, yeast and sugar were set up as shown.



Each test tube contained a different type of yeast.

The test tubes were left in identical conditions for three days and the percentage alcohol was measured.

The results are shown below.

<i>Type of yeast</i>	<i>Percentage alcohol after 3 days</i>
1	2.4
2	3.4
3	4.0
4	3.0

(a) (i) On the grid opposite, complete the **bar chart** by

- (1) providing a label on the vertical axis
- (2) putting a scale on the vertical axis
- (3) plotting the remaining results.

(Additional graph paper, if required, will be found on page 28.)

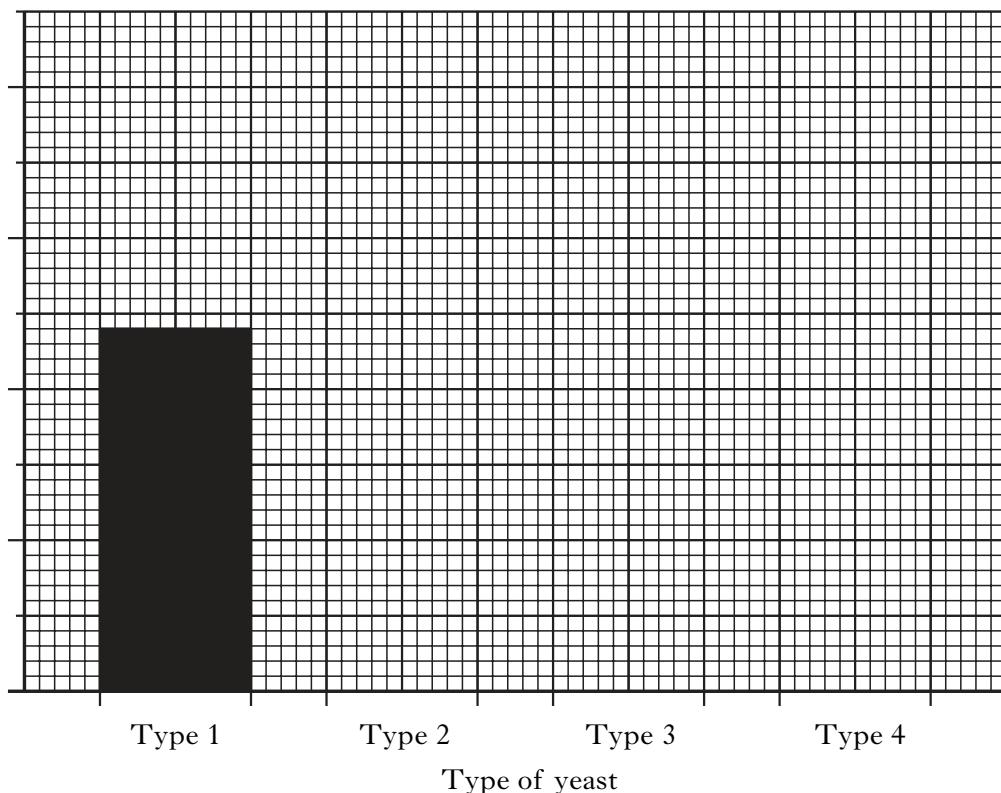
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1

Marks

4. (a) (i) (continued)



- (ii) Draw **one** conclusion from the results.

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1

- (b) (i) Name the process by which alcohol is produced by yeast in beer making.

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1

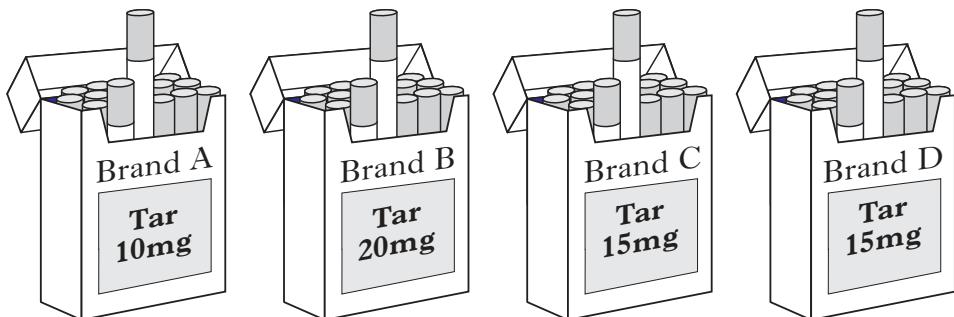
- (ii) Name another substance produced in this process.

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1

**[Turn over**

5. The mass of tar in four different brands of cigarette is shown below.



- (a) Calculate the average mass of tar in the four brands of cigarette.

*Space for calculation*

\_\_\_\_\_ mg

1

- (b) State **one** health risk that is increased by regularly smoking cigarettes.

\_\_\_\_\_

1

- (c) Cigarette smoke also contains carbon monoxide.

Describe the effect carbon monoxide has on the ability of the blood to carry oxygen.

\_\_\_\_\_

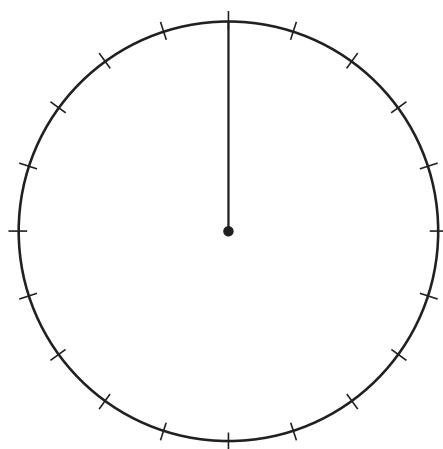
1

6. The table below shows the percentage composition of a veggie burger.

Component	Composition (%)
Protein	50
Fat	15
Fibre	25
Water	10

- (a) Present the information in the table in the form of a pie chart.

(An additional pie chart, if required, will be found on page 28.)



2

- (b) The veggie burger weighs 50 grams.

Calculate the mass of protein present in the veggie burger.

*Space for calculation*

\_\_\_\_\_ grams

1

- (c) A beef burger contains 35% fat.

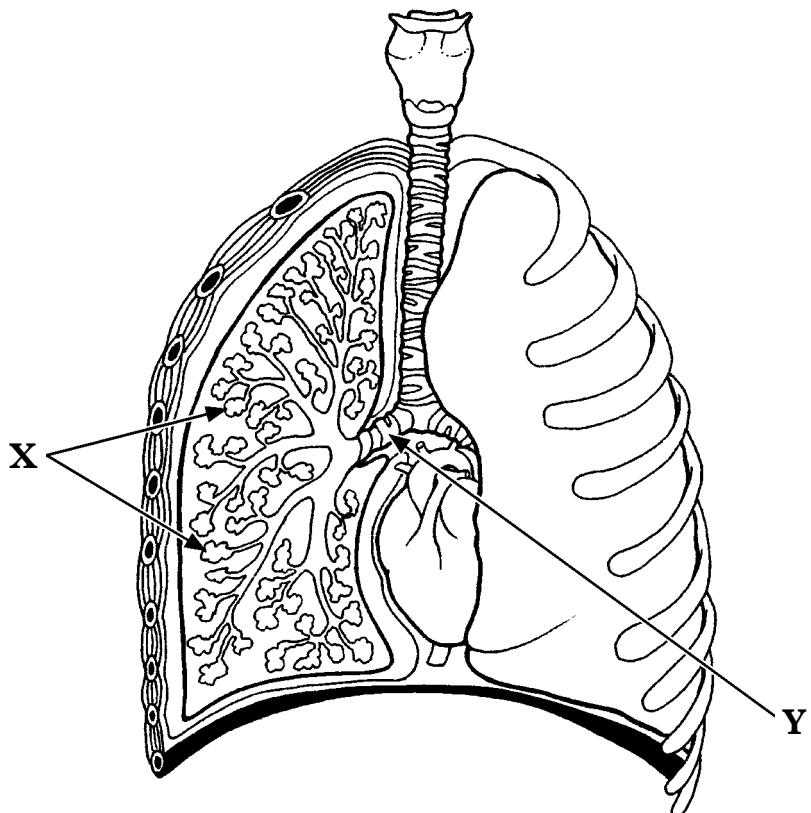
Calculate the simple whole number ratio of fat in a beef burger to fat in a veggie burger.

*Space for calculation*

\_\_\_\_\_ : \_\_\_\_\_  
beef burger                    veggie burger

1

7. A diagram of part of the breathing system is shown below.



- (a) (i) Name structure Y.

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1

- (ii) Name the gas that is **removed from** the blood at structure X.

---

1

- (b) Draw arrows to link each physiological measurement with its correct definition.

*Physiological measurement*

*Definition*

Tidal volume

Maximum volume of air breathed out in one breath after breathing in as deeply as possible

Vital capacity

Maximum rate at which air can be forced out of the lungs

Peak flow

Volume of air breathed in or out in one normal breath

2

8. (a) The table below shows the blood group of a number of students.

<i>Blood group</i>	<i>Number of students</i>
A	4
B	4
O	11
AB	1

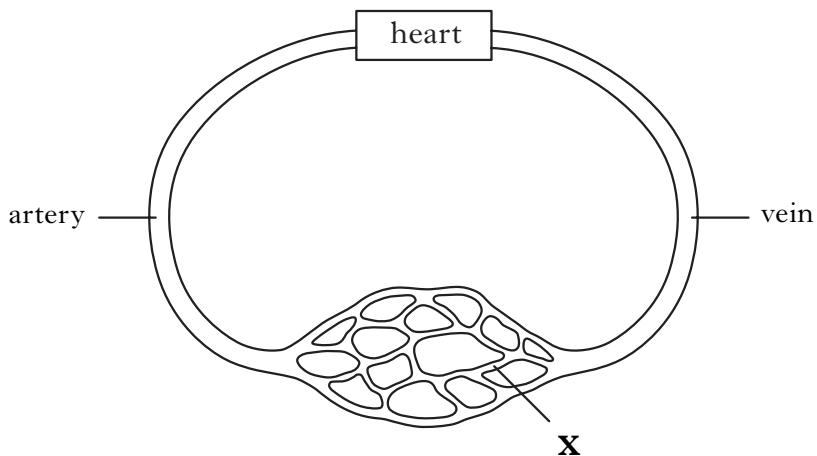
Calculate the percentage of students with blood group O.

*Space for calculation*

\_\_\_\_\_ %

1

- (b) The diagram represents part of the circulatory system.



- (i) Name the type of blood vessel labelled X.

\_\_\_\_\_

1

- (ii) Draw arrows on the diagram to show the direction of blood flow in the artery and the vein.

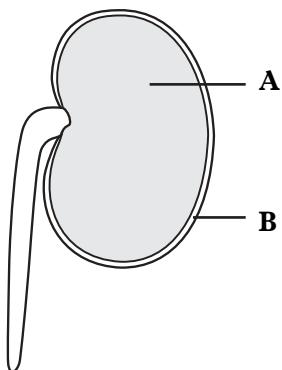
1

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

\_\_\_\_\_

1

9. (a) The diagram shows a germinating kidney bean seed.



Use the diagram to complete the following table.

<i>Label</i>	<i>Name</i>	<i>Function</i>
A		Provides energy for growth
B	Seed coat	

2

## 9. (continued)

- (b) The root length of the germinating kidney bean seedling was measured every two days.

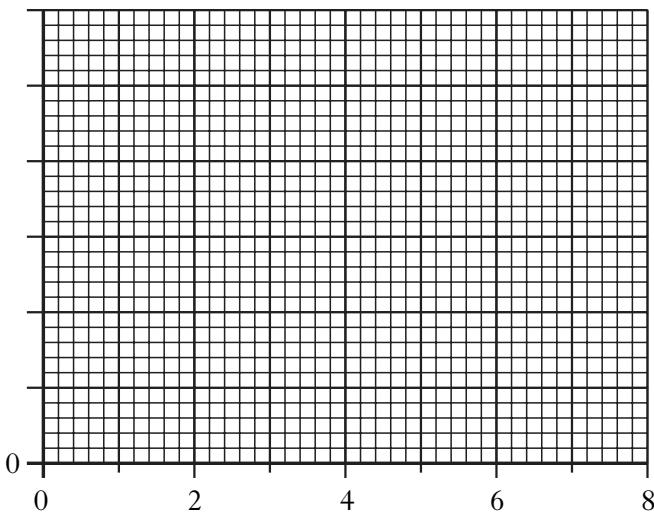
The results are shown in the table below.

Time (days)	Root length (mm)
0	0
2	4
4	8
6	18
8	27

- (i) On the grid below, complete the **line graph** by
- (1) providing a label for the horizontal axis
  - (2) completing the scale on the vertical axis
  - (3) plotting the results.

(Additional graph paper, if required, will be found on page 29.)

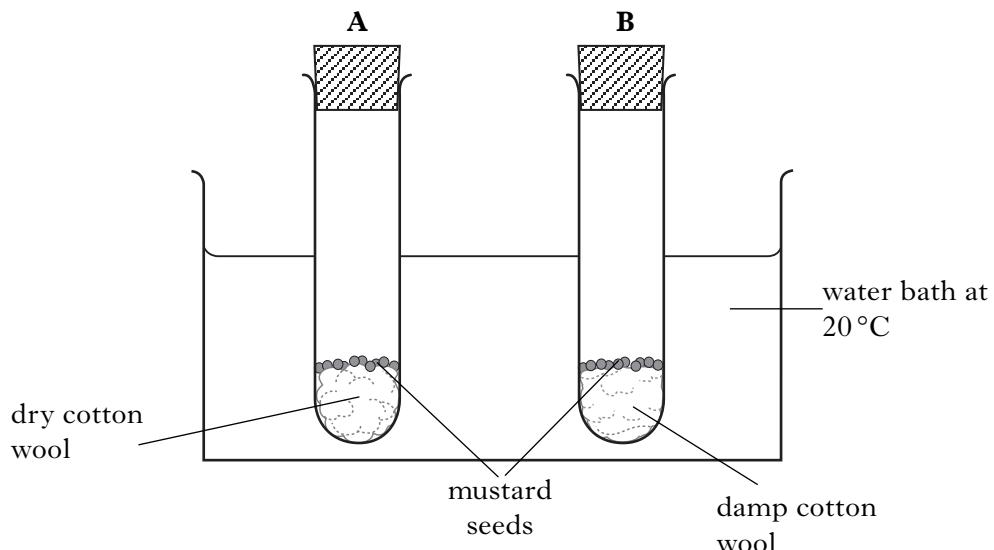
Root  
length  
(mm)



- (ii) Between which **two** days was there the greatest increase in root length?

Between day \_\_\_\_\_ and day \_\_\_\_\_.

10. (a) An investigation into the conditions required for germination was carried out as shown below.



- (i) Which variable is being investigated?

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1

- (ii) Twelve of the fifteen seeds sown in tube B germinated.

Calculate the percentage germination in this tube.

*Space for calculation*

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1

- (iii) Predict the effect on the number of seeds germinating if the investigation was repeated at 0°C.

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1

- (b) Some seeds have thick seed coats which are split open before sowing.

What name is given to this process?

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1

## 10. (continued)

- (c) Various methods are used in maintaining plants.

Decide if each description is true or false and tick (✓) the appropriate box.

If the description is **false**, write the correct word or phrase in the correction box to replace the phrase underlined in the definition.

Definition	True	False	Correction
Dead-heading is the removal of dead flowers to <u>prevent</u> further flowering.			
<u>Pricking out</u> is the removal of seedlings to give more room to grow.			
Potting on is the placing of a growing plant into a <u>larger</u> container.			

3

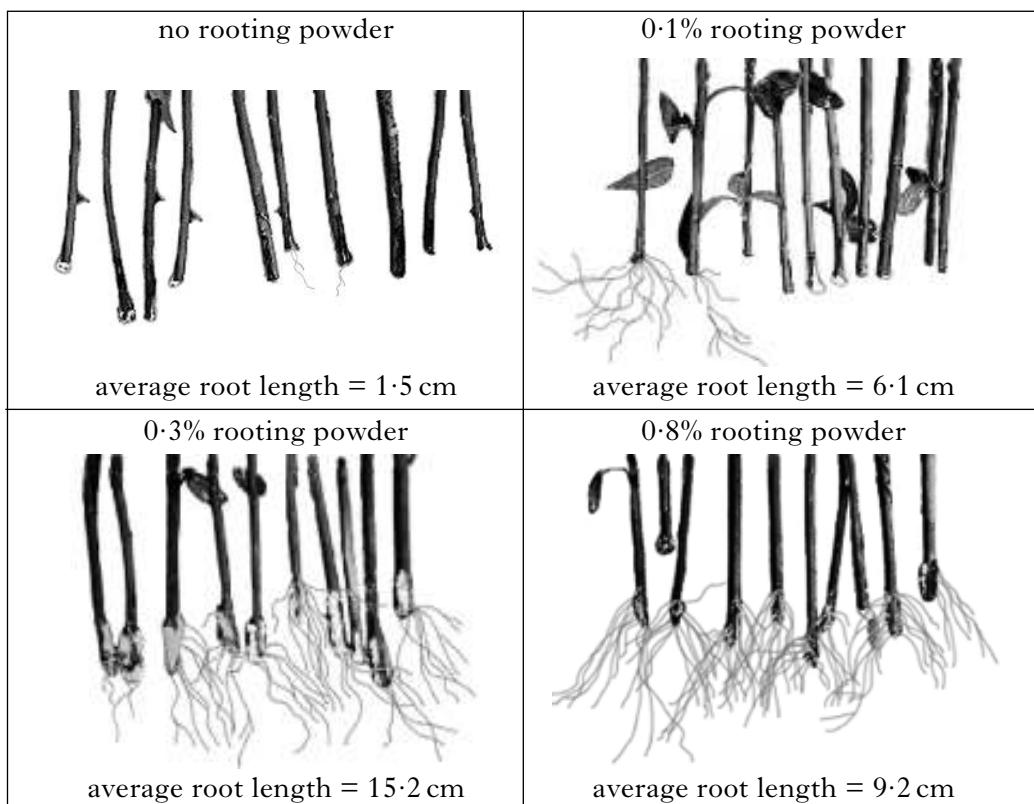
[Turn over

11. A group of students carried out an investigation into the effect of different concentrations of rooting powder on the root growth of rose cuttings.

Ten cuttings were dipped in different concentrations of rooting powder.

The cuttings were grown in coarse sand for five weeks and the lengths of the roots were measured.

The results are shown below.



- (a) Use this information to complete the following table.

Concentration of rooting powder (%)	

**11. (continued)**

- (b) Explain why cuttings with no rooting powder were grown.

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**1**

- (c) Which concentration of rooting powder had the greatest effect on root length?

\_\_\_\_\_ %

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**1**

- (d) Explain why ten cuttings were used at each concentration of rooting powder.

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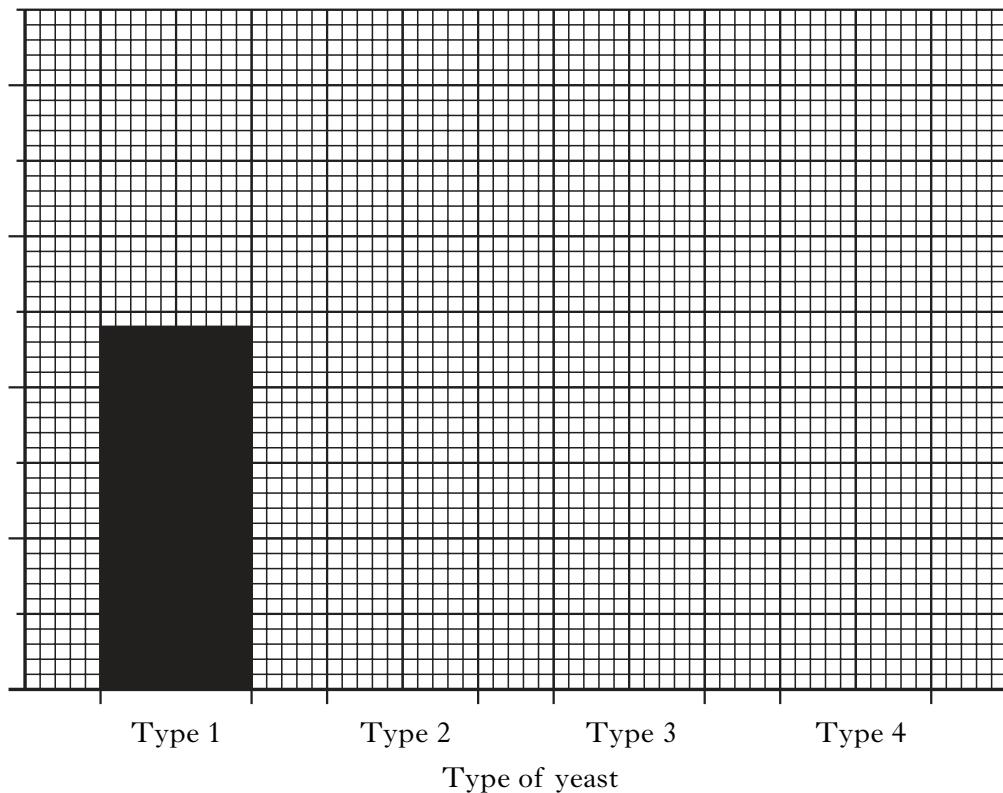
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*[END OF QUESTION PAPER]*

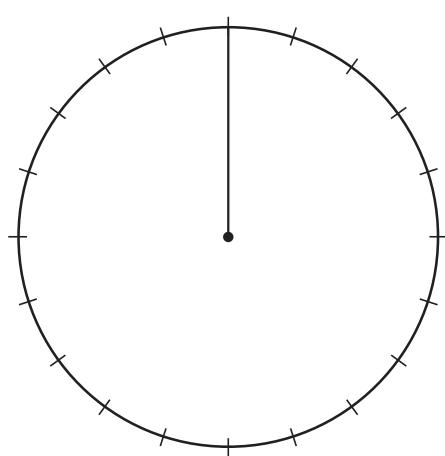
SPACE FOR ANSWERS

DO NOT  
WRITE IN  
THIS  
MARGIN

ADDITIONAL GRAPH PAPER FOR QUESTION 4(a)(i)



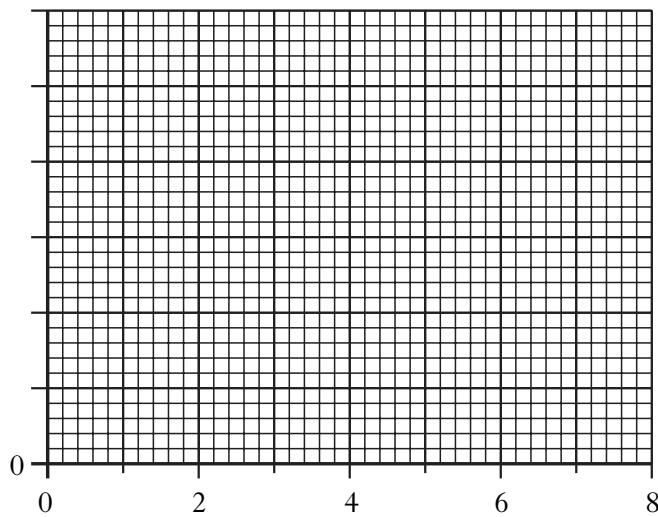
ADDITIONAL PIE CHART FOR QUESTION 6(a)



SPACE FOR ANSWERS

ADDITIONAL GRAPH PAPER FOR QUESTION 9(b)(i)

Root  
length  
(mm)



SPACE FOR ANSWERS

DO NOT  
WRITE IN  
THIS  
MARGIN

SPACE FOR ANSWERS

DO NOT  
WRITE IN  
THIS  
MARGIN

SPACE FOR ANSWERS

DO NOT  
WRITE IN  
THIS  
MARGIN