

FOR OFFICIAL USE

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**X007/101**



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Section B  
Total

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NATIONAL  
QUALIFICATIONS  
2009

THURSDAY, 28 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)

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Surname

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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 (25 marks)**

Instructions for completion of Section A are given on page two.  
For this section of the examination you must use an **HB pencil**.

**SECTION B (50 marks)**

- 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.

Use **blue** or **black ink**. Pencil may be used for graphs and diagrams only.



### Read carefully

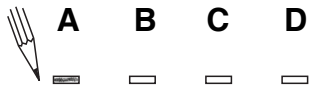
- 1 Check that the answer sheet provided is for **Biology Intermediate 1 (Section A)**.
- 2 For this section of the examination you must use an **HB pencil** and, where necessary, an eraser.
- 3 Check that the answer sheet you have been given has **your name, date of birth, SCN** (Scottish Candidate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

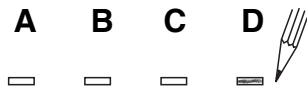
- A Butter
- B Bread
- C Sugar
- D Apple

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.

- The enzymes in biological washing powders are coated with a harmless substance so that they do not cause
  - eczema and skin rashes
  - thrush and athlete's foot
  - skin rashes and thrush
  - eczema and athlete's foot.
- Two groups of students investigated the rising of dough using different quantities of ingredients as shown in the table below.

<i>Ingredients</i>	<i>Quantities used by</i>	
	<i>Group 1</i>	<i>Group 2</i>
Flour	50 g	100 g
Sugar	20 g	20 g
Yeast	0.5 g	0.5 g
Water	20 cm <sup>3</sup>	20 cm <sup>3</sup>

After two hours at room temperature, both groups measured how much their dough had risen. Group 2's dough had risen more than Group 1's dough.

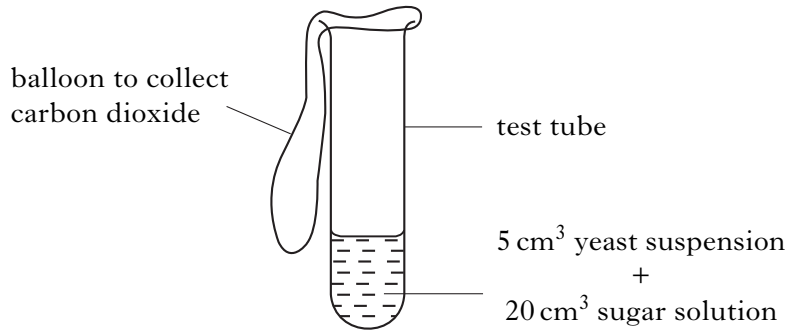
Which variable caused the difference in results between Group 1 and Group 2?

- Mass of flour
- Mass of sugar
- Temperature
- Volume of water

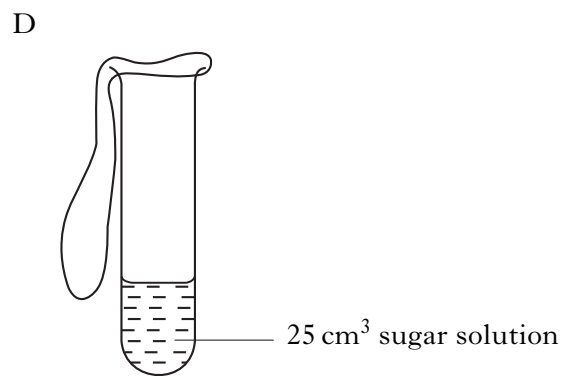
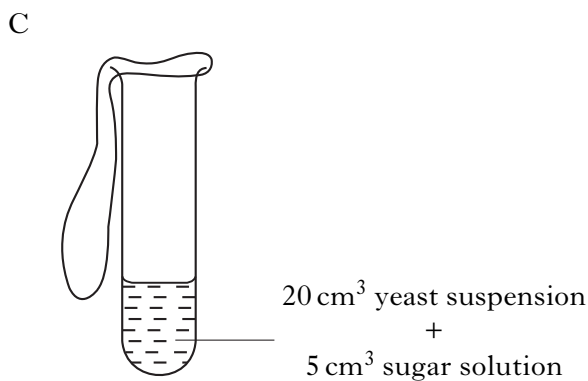
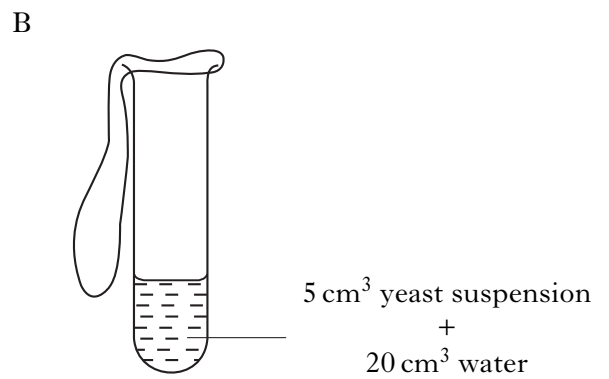
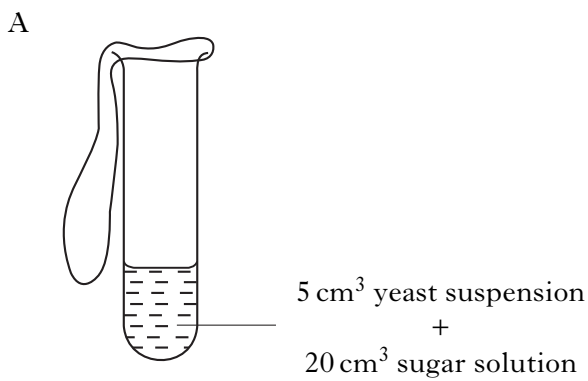
[Turn over

3. An experiment was carried out into the effect of sugar on the production of carbon dioxide during fermentation.

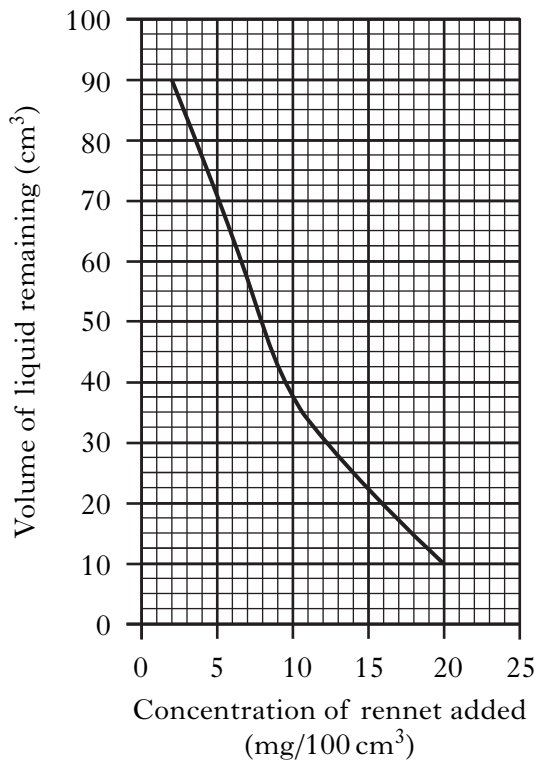
The diagram below shows the apparatus used.



Which of the diagrams below shows the control for this experiment?



4. The graph below shows the volume of liquid remaining after adding different concentrations of rennet to samples of milk.

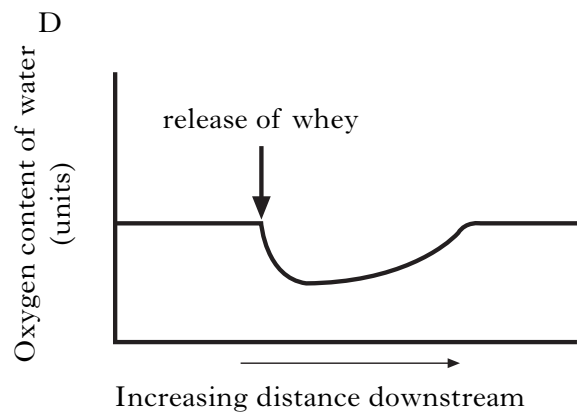
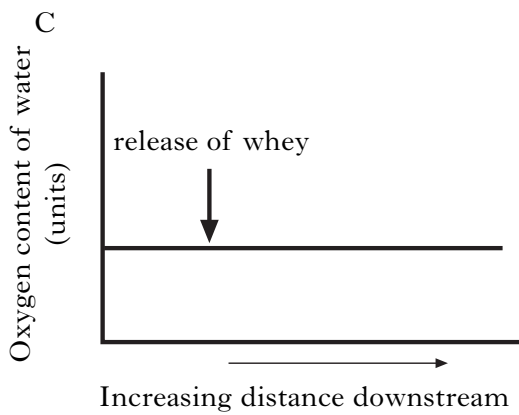
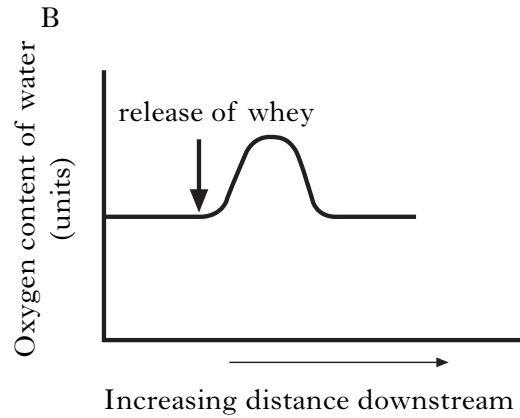
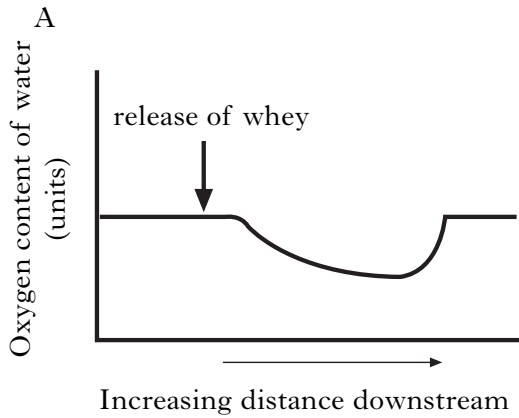


Which concentration of rennet (mg/100 cm<sup>3</sup>) left the smallest volume of liquid?

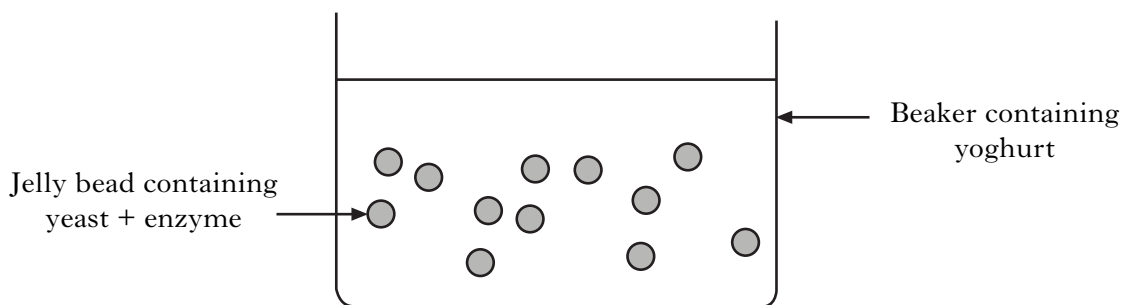
- A 2
  - B 10
  - C 20
  - D 90
5. Which of the following is added to milk during yoghurt-making?
- A Bacteria
  - B Yeast
  - C Curds
  - D Whey

[Turn over

6. Which of the following graphs represents the oxygen content of the water before and after the release of whey into a river?



7. The following apparatus was used in the production of a fermented milk drink.



The technique used to make the jelly beads is called

- A purification
- B immobilisation
- C fermentation
- D genetic engineering.

8. Antibiotics are produced naturally by

- A yeast
- B bacteria
- C viruses
- D soil fungi.

9. A student tested four foods 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 turns black if starch is present.

The results are shown in the table below.

<i>Food</i>	<i>Colour produced</i>	
	<i>Glucose test</i>	<i>Starch test</i>
A	orange	brown
B	blue	black
C	blue	brown
D	orange	black

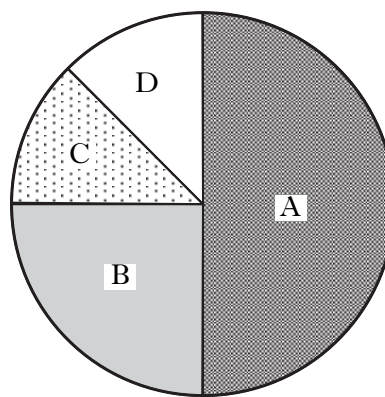
Which food contained starch **and** glucose?

[Turn over

10. The table below shows the responses of a group of Scottish fifteen year olds when asked about their smoking habits.

	<i>Responses</i>			
	<i>Never smoked</i>	<i>Tried smoking</i>	<i>Occasional smoker</i>	<i>Regular smoker</i>
<i>Percentage of fifteen year olds</i>	12.5	50	12.5	25

This information is presented in the pie chart.



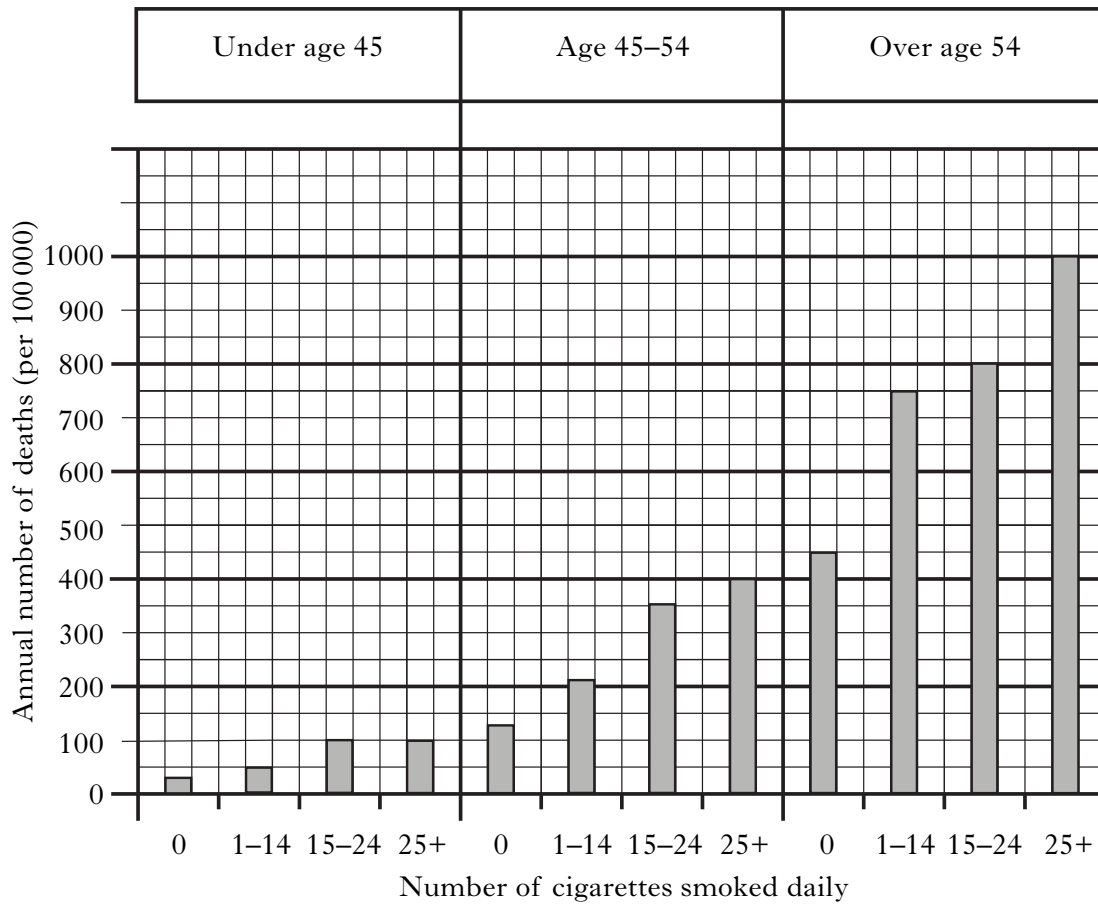
Which slice of the pie chart represents the percentage of fifteen year olds who are regular smokers?

11. Smoking cigarettes can increase the risk of

- A diabetes
- B anorexia
- C cancer
- D arthritis.



12. The bar chart shows the relationship between cigarette smoking and annual deaths from heart disease in males.



What is the annual number of deaths (per 100 000) for males aged between 45 and 54 who smoked between 15 and 24 cigarettes per day?

- A 100
- B 350
- C 400
- D 800

[Turn over

13. Four students made two measurements of their vital capacities.

The results are shown in the table below.

<i>Student</i>	<i>Vital capacity (cm<sup>3</sup>)</i>	
	<i>First measurement</i>	<i>Second measurement</i>
A	3980	4020
B	4000	4200
C	4100	4120
D	4125	4100

Which student had an **average** vital capacity of 4100 cm<sup>3</sup>?

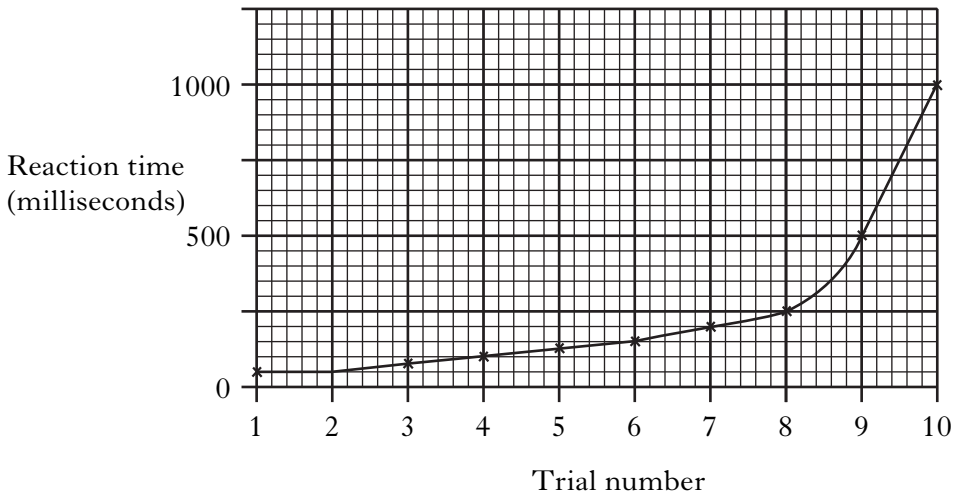
14. Peak flow can be used in the diagnosis and management of

- A asthma
- B diabetes
- C heart disease
- D leukaemia.

15. Which line in the table identifies correctly what can happen to the size and strength of a muscle if it is **not** exercised regularly?

	<i>Size of muscle</i>	<i>Strength of muscle</i>
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

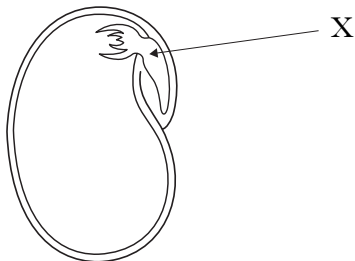
16. The graph below shows a person's reaction time over ten trials carried out in one hour.



The change in reaction time could have been due to

- A practice
  - B drinking alcohol
  - C high blood pressure
  - D smoking one cigarette.
17. A person who has anaemia would have blood which is
- A high in sugar
  - B low in sugar
  - C high in iron
  - D low in iron.

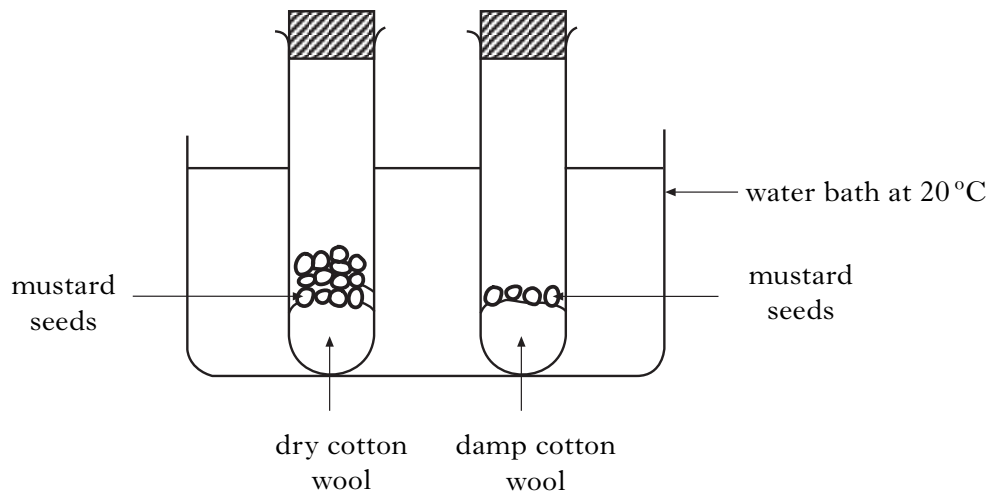
18. The diagram shows parts of a seed.



The part of the seed labelled X is the

- A food store which provides energy for growth
- B embryo which provides energy for growth
- C food store which grows into the new plant
- D embryo which grows into the new plant.

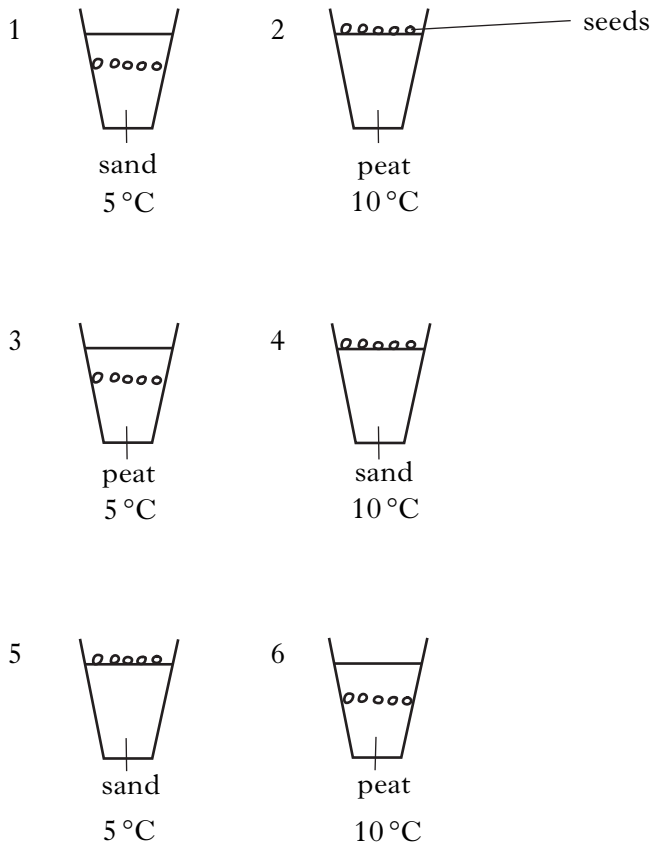
19. A student investigated the effect of spacing on the germination of seeds. The diagram below shows the apparatus the student used.



The investigation could have been improved to make it **valid** by

- A putting the tubes in the dark
  - B repeating at different temperatures
  - C using damp cotton wool in both tubes
  - D using the same number of seeds in both tubes.
20. The process by which green plants produce food is called
- A photosynthesis
  - B propagation
  - C germination
  - D layering.

21. The diagrams below show six pots of seeds set up to investigate germination.

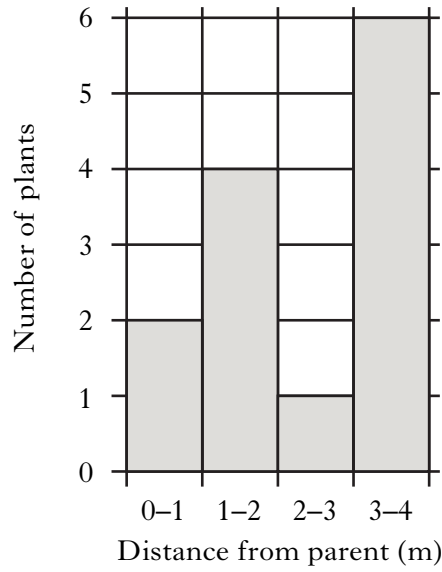


Which two pots should be compared to investigate the effect of **temperature** on germination?

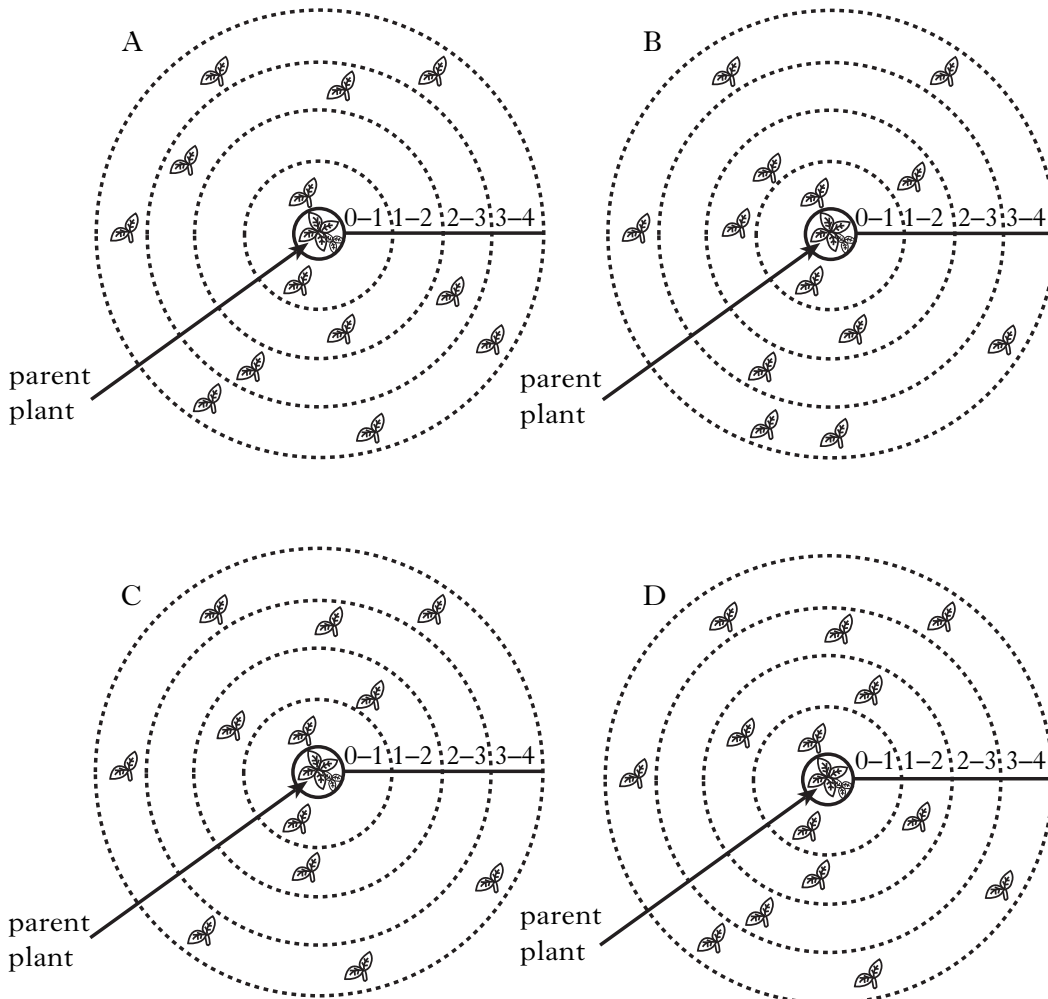
- A 1 and 2
- B 2 and 3
- C 4 and 5
- D 5 and 6

[Turn over





22. The graph below represents information about the number and position of young strawberry plants growing around the parent plant.



Which of the following diagrams shows correctly this information?



23. Which of the following stem cuttings would be expected to produce roots first?

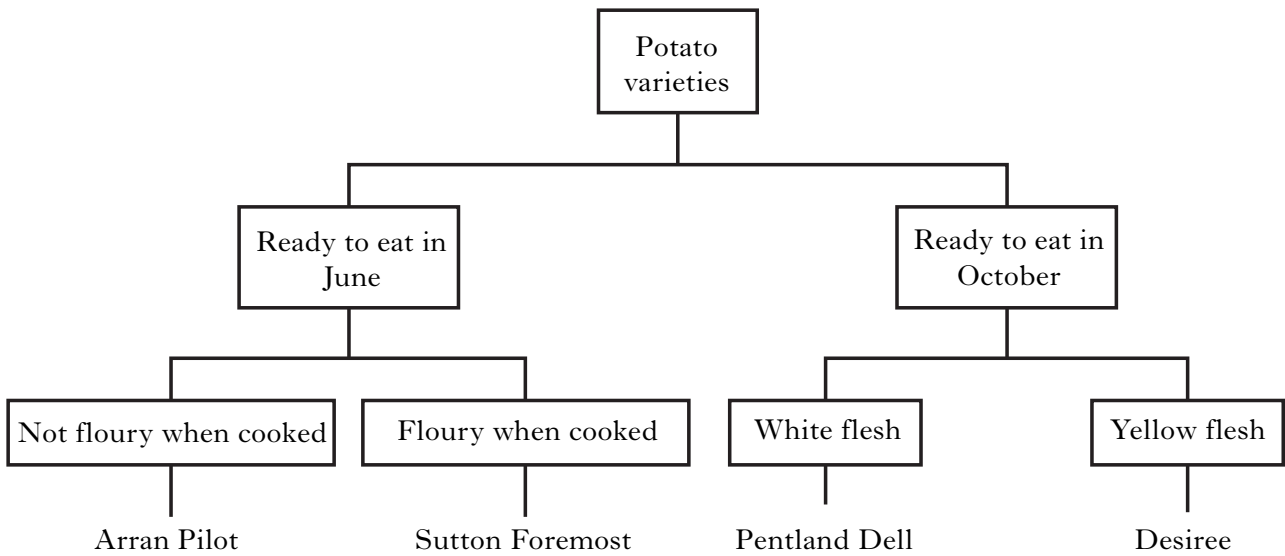
<p>A</p>  <p>All leaves attached Grown at 15 °C</p>	<p>B</p>  <p>All leaves attached Grown at 25 °C</p>
<p>C</p>  <p>Lower leaves removed Grown at 5 °C</p>	<p>D</p>  <p>Lower leaves removed Grown at 25 °C</p>

24. Which of the following methods can **both** be used to control grey mould?

- A Soapy water and crushing
- B Fungicide and crushing
- C Pesticide and soapy water
- D Fungicide and burning

[Turn over

25. The key below shows information about different varieties of potato.



Which potato variety is ready to eat in October and has white flesh?

- A Arran Pilot
- B Sutton Foremost
- C Pentland Dell
- D Desiree

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



[Turn over for SECTION B on *Page eighteen*

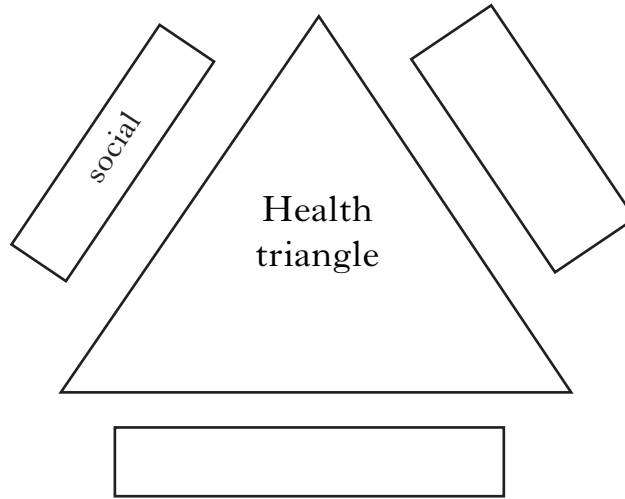
**SECTION B**

**All questions in this Section should be attempted.  
All answers must be written clearly and legibly in ink.**

Marks

DO NOT  
WRITE IN  
THIS  
MARGIN

1. (a) A health triangle should show the three aspects of health.



Complete the health triangle by inserting the other **two** aspects of health.

1

- (b) Draw lines to join each of the instruments to the correct physiological measurement.

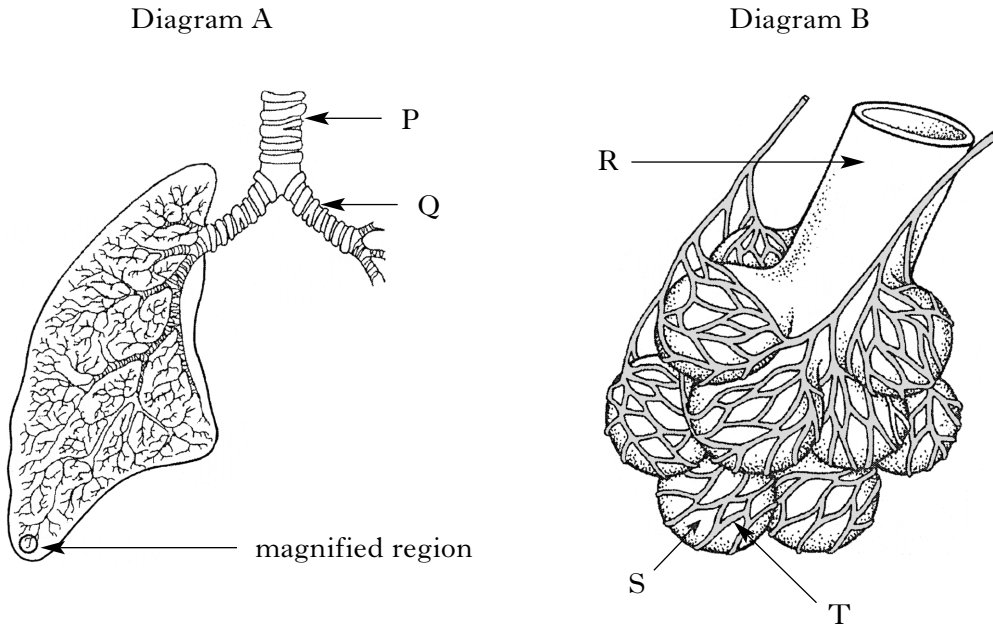
<i>Instrument</i>	<i>Physiological Measurement</i>
Skin fold calliper	Temperature
Thermometer	Body fat
Sphygmomanometer	Blood pressure
Pulsometer	Heart rate

2

Marks

2. (a) Diagram A shows some structures in the human breathing system.

Diagram B shows a magnification of the small region of the lung, circled in diagram A.



(i) Name structure P.

\_\_\_\_\_

1

(ii) Which letter points to a bronchiole?

Letter \_\_\_\_\_

1

(b) Decide if the following statements about gas exchange in the lungs are **True** or **False** and tick (✓) the appropriate box.

If the statement is false, write the correct word in the **Correction** box to replace the word underlined.

Statement	True	False	Correction
In the lungs, <u>oxygen</u> passes into the air from the blood.			
Exercise <u>decreases</u> gas exchange in the lungs.			

2

[Turn over

Marks

3. A person's resting pulse rate can be used as a guide to their level of fitness, as shown in Table 1.

Table 1

<i>Resting Pulse Rate</i> (beats per minute)	<i>Level of Fitness</i>
Below 50	Outstanding
50 – 60	Good
61 – 90	Normal
Above 90	Poor

- (a) State the level of fitness of a person with a resting pulse rate of 48 beats per minute.

1

- (b) Twenty students measured their resting pulse rate to estimate their level of fitness.

The results are shown in Table 2.

Table 2

<i>Level of Fitness</i>	<i>Number of Students</i>
Outstanding	1
Good	7
Normal	10
Poor	2

Marks

3. (b) (continued)

(i) On the grid, plot a bar graph by:

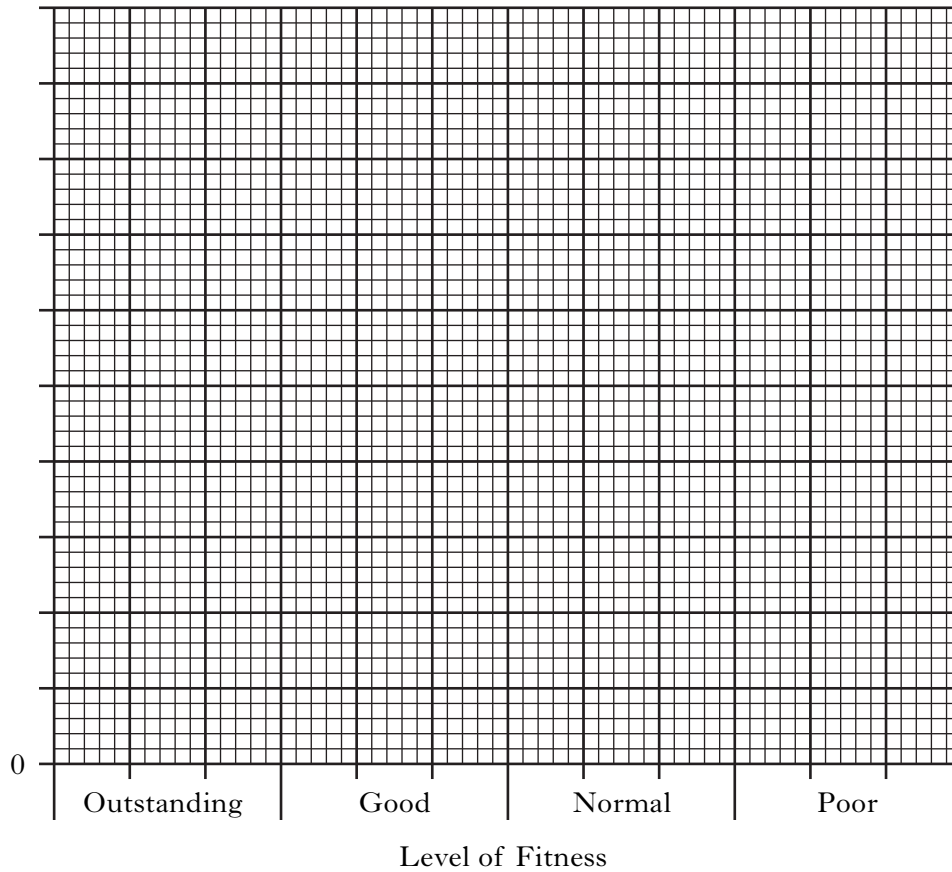
(1) putting a label and scale on the vertical axis;

1

(2) plotting the bars.

1

(Additional graph paper, if required, will be found on *Page thirty-three.*)



(ii) Calculate the percentage of students who had a **normal** level of fitness.

*Space for calculation*

\_\_\_\_\_ % 1

[Turn over

## 4. (a) Read the following passage and table carefully.

**What's in a drink?**

(Adapted from "Alcohol Focus Scotland" leaflets)

Alcohol is so widely used that we sometimes forget the harm it can cause to our physical and mental health. Adults are advised to drink no more than the following sensible limits.

Men should not drink more than three or four units a day and no more than twenty-one units in one week. The sensible limits for women are two to three units a day with a maximum of fourteen units in one week. In addition, it is advised that everyone needs at least two days a week without alcohol.

An adult body can break down one unit of alcohol in one hour.

The table below shows the number of units in some common drinks.

<i>Drink</i>	<i>Alcohol (units)</i>
1 bottle of alcopop	2·0
1 pint of lager	2·3
1 glass of wine	2·1
1 pint of cider	3·0
1 measure of spirits	1·4

Use the information **from the passage and table** to answer the following questions.

- (i) What is the maximum number of units of alcohol recommended for women in one week?

\_\_\_\_\_ units

1

- (ii) Tick (✓) the correct box to show whether **each** person drinks more than or less than the sensible limit.

	<i>More than the sensible limit</i>	<i>Less than the sensible limit</i>
A woman who drinks 3 units of alcohol every day		
A man who drinks 4 units of alcohol 5 times a week		
A woman who drinks 4 units of alcohol 5 times a week		

2

Marks

4. (a) (continued)

- (iii) How many units of alcohol have been taken in by a person who drinks 3 pints of cider?

*Space for calculation*

\_\_\_\_\_ units **1**

- (iv) How long would it take an adult body to break down the alcohol in 2 bottles of alcopop?

*Space for calculation*

\_\_\_\_\_ hours **1**

- (b) Other than drinking alcohol, state **one** other unnecessary health risk which should be avoided for a healthy lifestyle.

\_\_\_\_\_ **1**

**[Turn over**

Marks

5. (a) Real ale is produced by fermentation.



There are many different types of real ale, some of which are described below.

Best Bitter: brown, tawny or amber in colour, 4·6% in strength

Porter: black or dark brown in colour, 6·5% in strength

Stout: 4·5% in strength and black in colour

Golden Ale: 5·3% in strength and pale amber, gold, yellow or straw in colour

Complete the table below using the above information.

<i>Type of ale</i>	<i>Colour(s)</i>	<i>Strength (%)</i>
	Black	
Porter		
	Pale amber, gold, yellow or straw	
		4·6

2

- (b) Kefir is an example of a fermented alcoholic milk drink.

**Circle** one option in each set of brackets to make the sentence about the production of fermented alcoholic milk drinks correct.

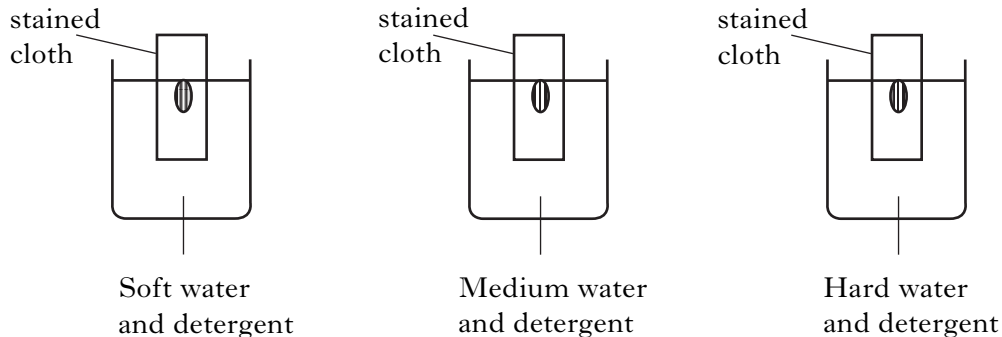
Yeast converts milk sugar into  $\left\{ \begin{array}{l} \text{alcohol} \\ \text{lactic acid} \end{array} \right\}$  and  $\left\{ \begin{array}{l} \text{oxygen} \\ \text{carbon dioxide} \end{array} \right\}$ .

1



Marks

6. (a) Water type varies around the country and can be “soft”, “medium” or “hard”. An experiment was carried out to investigate the effect of water type on stain removal. Three beakers each containing a stained cloth, detergent and water were set up as shown. Each beaker contained a different type of water.



The beakers were left under identical conditions and the percentage of stain removed was measured.

The results are shown below.

<i>Water type</i>	<i>Percentage of stain removed</i>
Soft	90
Medium	79
Hard	62

- (i) What conclusion can be drawn from the results?

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1

- (ii) The beakers were left for the same length of time.

State **one other** variable which should have been kept constant.

---

1

- (iii) Suggest **one** way in which the percentage stain removed could have been increased **in this investigation**.

---



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1

- (b) Explain why it is an advantage to use biological washing powders to wash delicate fabrics.

---



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2

Marks

7. (a) The table below compares the content per  $100\text{ cm}^3$  of full fat milk and evaporated milk.



<i>Content</i>	<i>Full fat milk</i> (g/ $100\text{ cm}^3$ )	<i>Evaporated milk</i> (g/ $100\text{ cm}^3$ )
protein	3	8
sugars	4	12
fat	4	8
minerals	less than 1	less than 1

- (i) What is the protein content of evaporated milk?

\_\_\_\_\_ g/ $100\text{ cm}^3$

1

- (ii) How many times more sugar is there in  $100\text{ cm}^3$  of evaporated milk compared to  $100\text{ cm}^3$  of full fat milk?

*Space for working*

\_\_\_\_\_ times more sugar

1

- (b) (i) Full fat milk is treated to destroy disease-causing microbes.

What name is given to this treatment?

\_\_\_\_\_

1

- (ii) What type of milk is produced when nearly all of the fat is removed?

\_\_\_\_\_

1

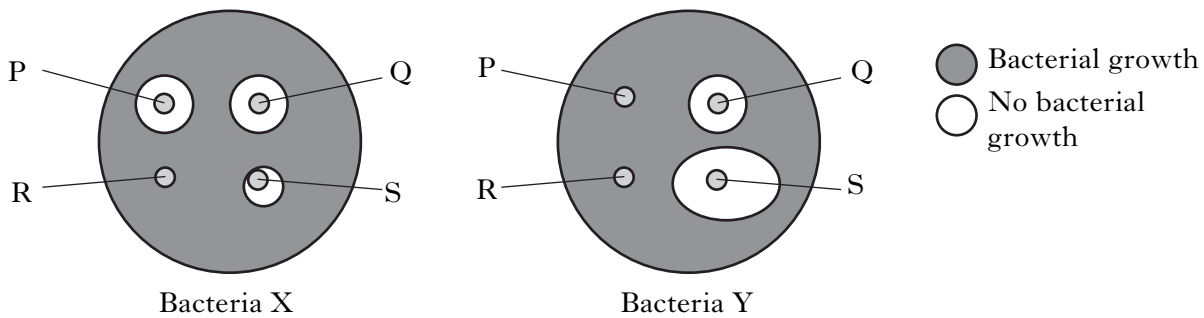
- (c) Why is it important to include minerals as part of a healthy diet?

\_\_\_\_\_

1

Marks

8. (a) A student carried out an investigation into the effectiveness of four antibiotics. Agar plates were set up as follows.
- Step 1 An agar plate was evenly spread with bacteria X.
- Step 2 Four different antibiotic discs (P, Q, R and S) were placed on the agar.
- Step 3 The plates were left at 30 °C for 48 hours.
- Step 4 Steps 1 – 3 were repeated with bacteria Y.
- The results after 48 hours are shown below.



- (i) Which antibiotic was effective against bacteria X only?
- Antibiotic \_\_\_\_\_ 1
- (ii) Which antibiotic(s) would prevent growth of **both** types of bacteria?
- Antibiotic(s) \_\_\_\_\_ 1
- (iii) Which bacteria grows **least** with antibiotic S?
- Bacteria \_\_\_\_\_ 1
- (b) State **one** possible effect on bacteria of the over-use of antibiotics.
- \_\_\_\_\_ 1

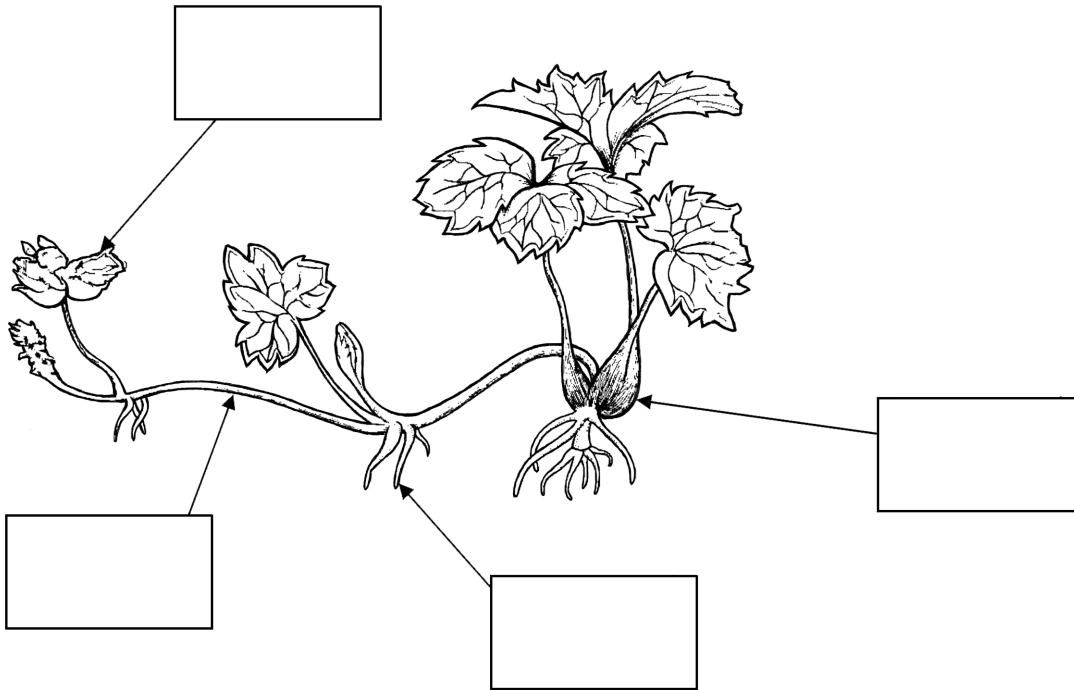
[Turn over

Marks

9. The diagram below shows the vegetative propagation structure of the creeping buttercup plant.

(a) Use words from the list to correctly label the diagram.

**List:** *parent plant*    *plantlet*    *runner*    *root*



2

(b) Name **one** other vegetative propagation structure.

\_\_\_\_\_

1

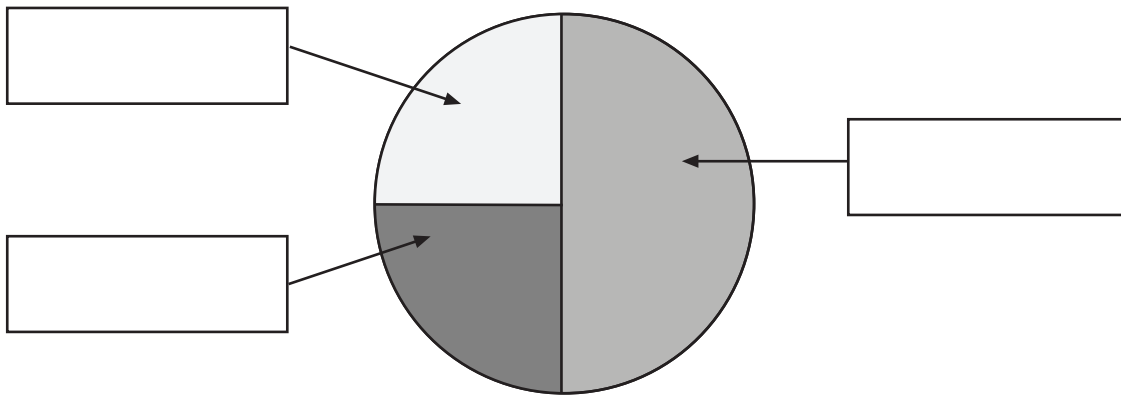
Marks

10. (a) The table below shows the mineral composition of three fertilisers.

Name of fertiliser	Minerals (units)		
	Nitrogen (N)	Phosphorus (P)	Potassium (K)
“Brighten Up”	8	0	0
“Spring Up”	10	5	5
“Root Boost”	5	10	5

Use the information in the table to label the pie chart for “Spring Up” fertiliser.

(An additional pie chart, if required, will be found on *Page thirty-three.*)



1

(b) Another fertiliser called “Standard Pre-seeder” contains 120 g nitrogen, 180 g phosphorus and 120 g potassium.

Calculate the simplest whole number ratio of nitrogen, phosphorus and potassium in “Standard Pre-seeder”.

*Space for calculation*

\_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_  
nitrogen phosphorus potassium

1

(c) Which major plant mineral is essential for the growth of flowers and fruit?

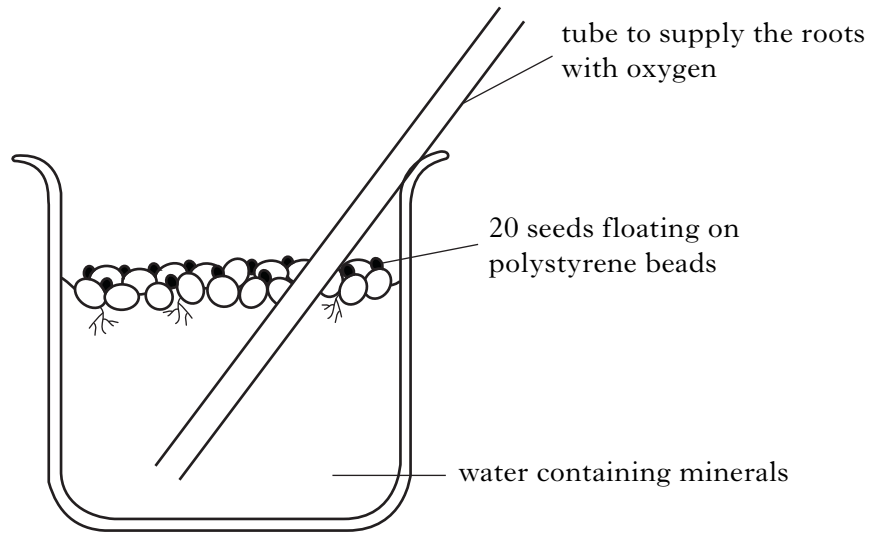
\_\_\_\_\_

1

[Turn over

Marks

11. A student set up the experiment below to investigate the effect of minerals on the root growth of seeds.



- (a) Twenty seeds were used in the beaker.

Explain why this was good experimental technique.

---

---

1

- (b) The root length of each seed was measured every five days and the average length of the roots in the beaker was calculated.

The results are shown below.

<i>Time (days)</i>	<i>Average length of roots (mm)</i>
0	0
5	9
10	15
15	22
20	27
25	30

Marks

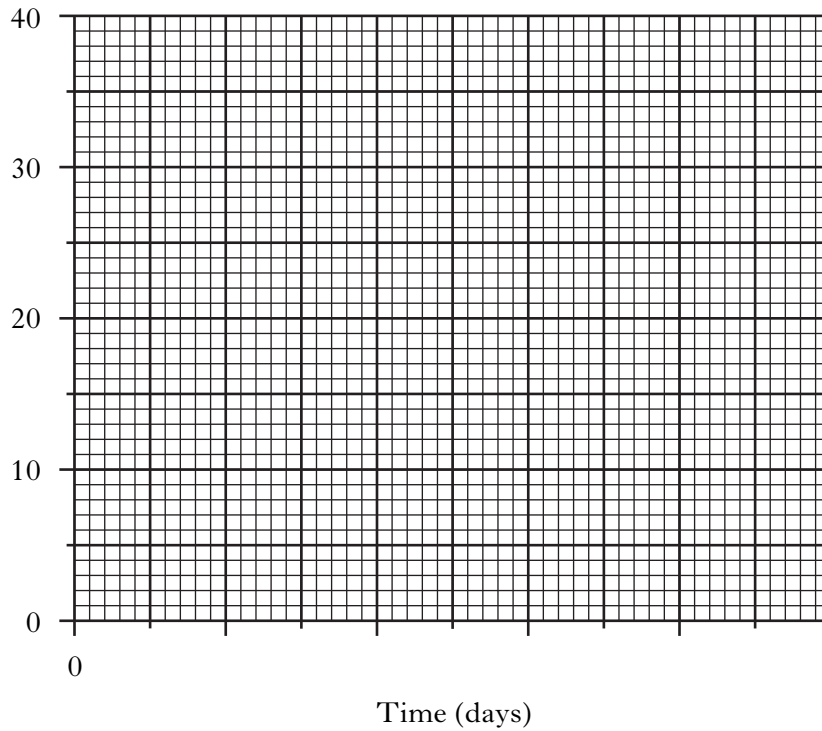
11. (b) (continued)

On the grid, complete the line graph by:

- (i) putting a scale on the horizontal axis;
- (ii) labelling the vertical axis;
- (iii) plotting the graph.

1  
1  
1

(Additional graph paper, if required, will be found on *Page thirty-four*.)



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

Tick (✓) the correct box.

0–5 days	<input type="checkbox"/>	5–10 days	<input type="checkbox"/>
10–15 days	<input type="checkbox"/>	15–20 days	<input type="checkbox"/>
20–25 days	<input type="checkbox"/>		

1

- (d) This student set up a second beaker exactly the same as the beaker shown except the water did not contain minerals.

Why did the student set up this second beaker?

\_\_\_\_\_

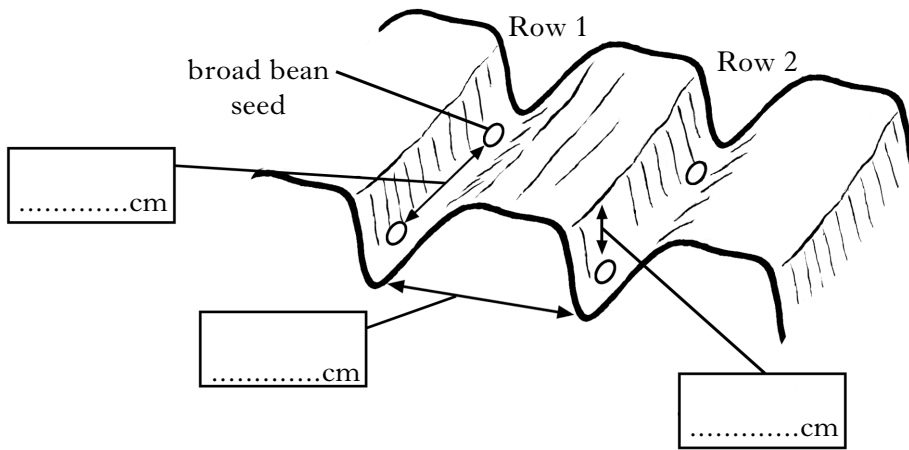
1

[Turn over

Marks

12. (a) Broad bean seeds were sown at a depth of 6 cm in two rows. There were 20 cm between the rows and 18 cm between the seeds.

(i) Using the information above, complete the diagram by inserting the distances in the boxes.



1

(ii) The broad bean seeds had undergone “chitting”.

Describe the process of chitting seeds.

\_\_\_\_\_

1

(b) It is easy to space out large seeds like broad beans during sowing.

Fine seeds are more difficult to space out.

Describe **one** method used to sow fine seeds.

\_\_\_\_\_

1

(c) After sowing in autumn, some seeds do not germinate until spring when soil temperature rises.

What name is given to this delay in germination?

\_\_\_\_\_

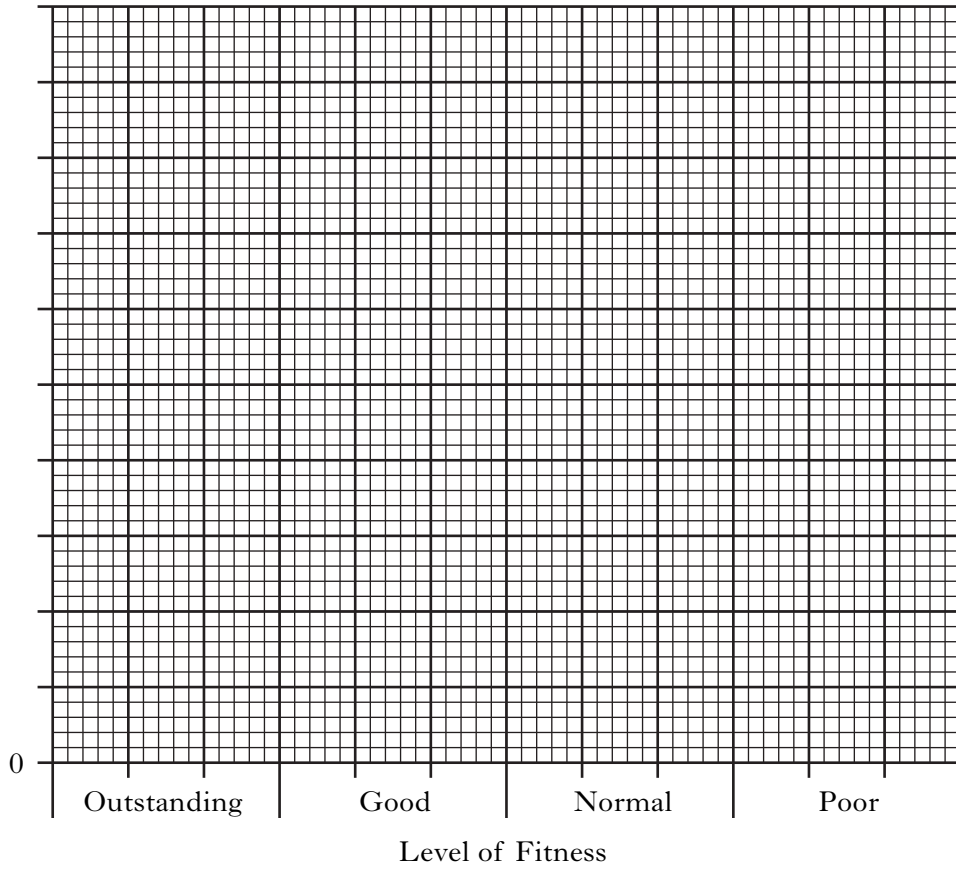
1

[END OF QUESTION PAPER]

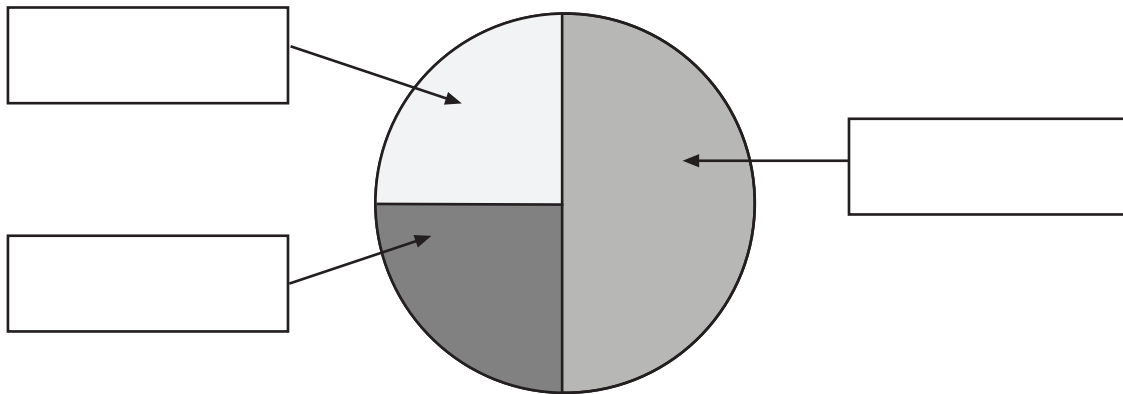


SPACE FOR ANSWERS

ADDITIONAL GRAPH PAPER FOR QUESTION 3(b)(i)



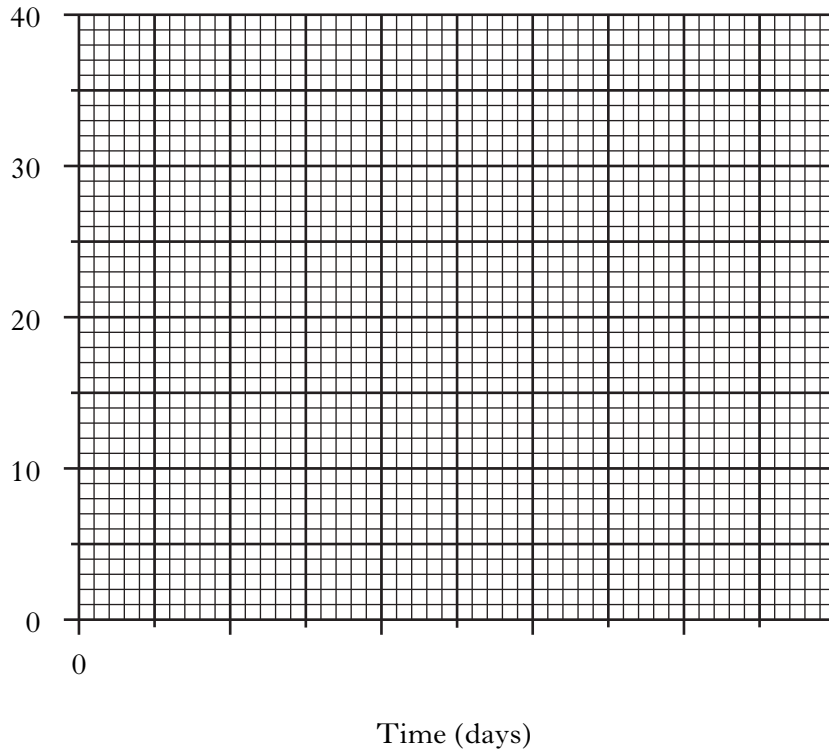
ADDITIONAL PIE CHART FOR QUESTION 10(a)



SPACE FOR ANSWERS

DO NOT  
WRITE IN  
THIS  
MARGIN

ADDITIONAL GRAPH PAPER FOR QUESTION 11(b)



SPACE FOR ANSWERS

DO NOT  
WRITE IN  
THIS  
MARGIN

SPACE FOR ANSWERS

DO NOT  
WRITE IN  
THIS  
MARGIN

## ACKNOWLEDGEMENTS

Section B Question 4(a)—Text is adapted from Alcohol Focus Scotland leaflets. © Crown Copyright.