

FOR OFFICIAL USE

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X007/101

Section B
Total

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NATIONAL
QUALIFICATIONS
2006

TUESDAY, 23 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.

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

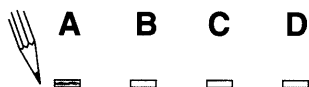
- 1 Check that the answer sheet provided is for **Biology Intermediate 1 (Section A)**.
- 2 For this section of the examination you must use an **HB pencil** and, where necessary, an eraser.
- 3 Check that the answer sheet you have been given has **your name, date of birth, SCN** (Scottish Candidate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

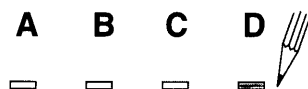
- A Butter
- B Bread
- C Sugar
- D Apple

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**.

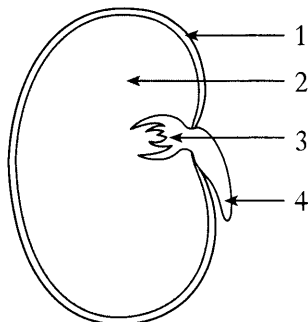


SECTION A

All questions in this Section should be attempted.

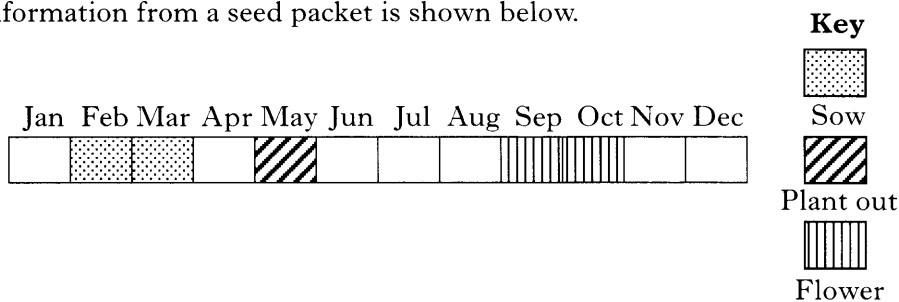
Answers should be given on the separate answer sheet provided.

1. The following diagram shows the structure of a broad bean seed.



The embryo plant is shown by label(s)

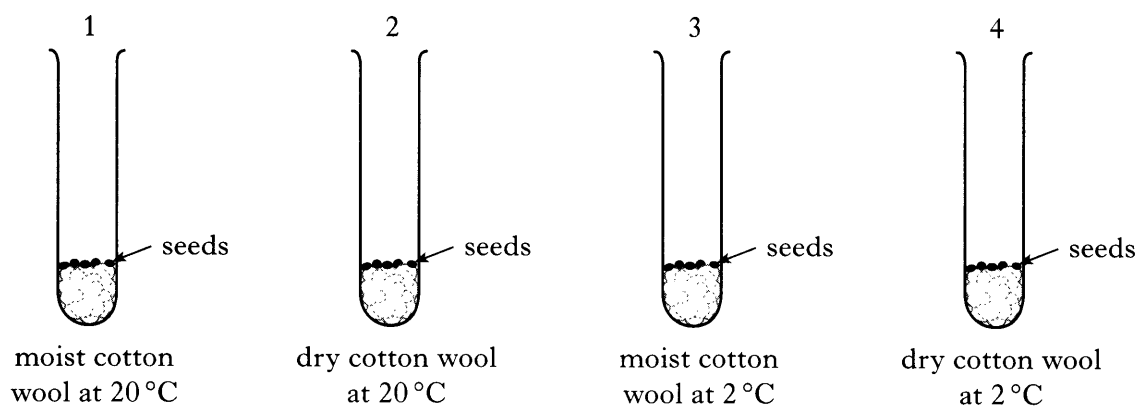
- A 1 only
 B 1 and 2
 C 3 and 4
 D 4 only.
2. Which of the following is **not** required for the germination of seeds?
 A Water
 B A suitable temperature
 C Oxygen
 D Fertiliser
3. The information from a seed packet is shown below.



Which of the following is correct for this type of seed?

	<i>Sow</i>	<i>Plant out</i>	<i>Flower</i>
A	February/March	April	September/October
B	February/March	May	September/October
C	May	February/March	September/October
D	September/October	May	February/March

4. A group of students set up the following investigation.

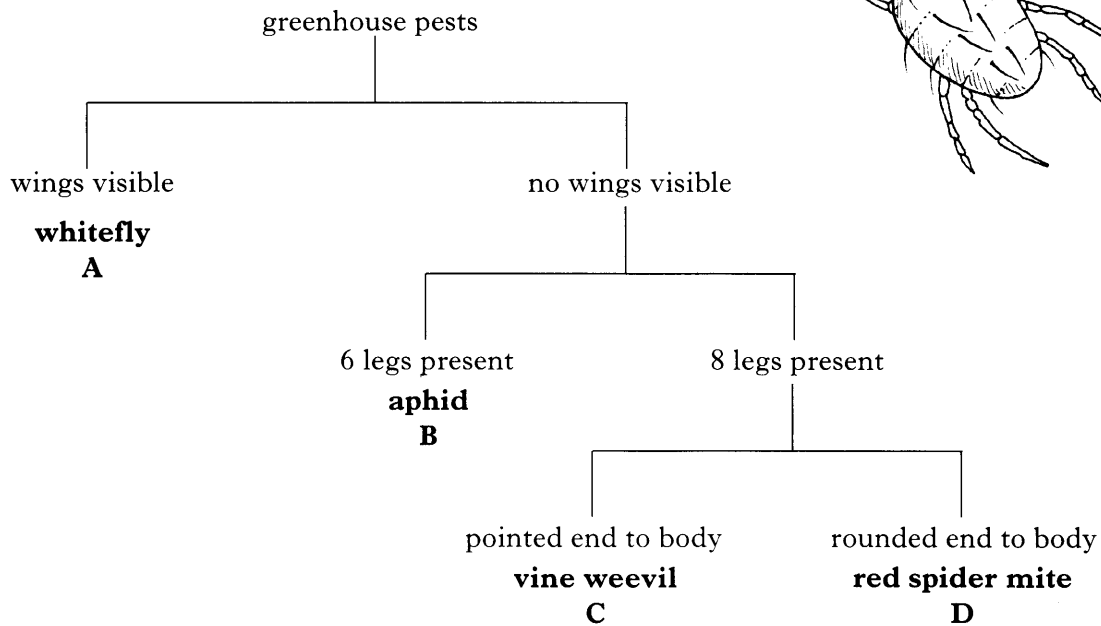
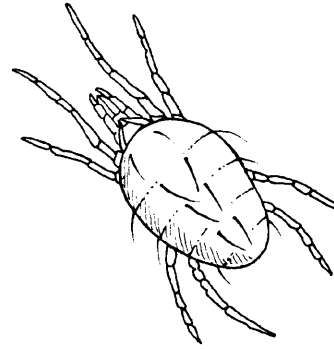


Which two tubes would be used to investigate the effect of temperature on germination?

- A 1 and 2
 - B 2 and 3
 - C 1 and 3
 - D 3 and 4
5. Which of the following is used to protect plants as they grow?
- A Capillary matting
 - B Water retentive gel
 - C Floating fleece
 - D Automatic irrigation

6. Several animal pests may be found in a greenhouse.

Use the following key to identify the pest shown.



7. A soil test kit can be used to determine soil type.

The colour range of the kit is shown in the table.

<i>Colour</i>	<i>Soil type</i>
orange	strongly acidic
yellow	weakly acidic
bright green	neutral
dark green	weakly alkaline
blue	strongly alkaline

A gardener tested four samples of soil from four different sites.

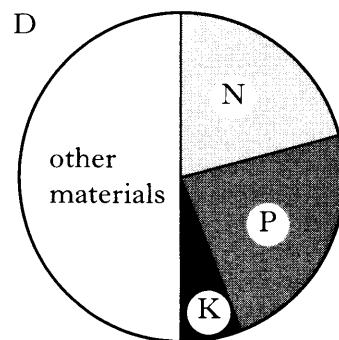
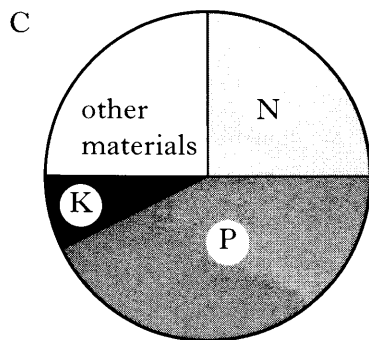
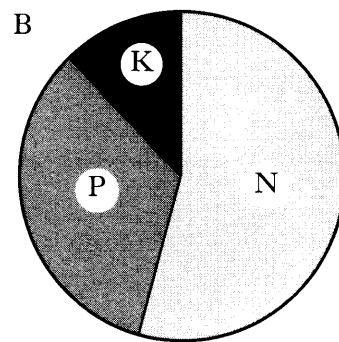
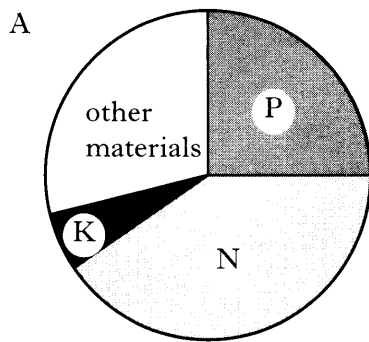
The results of the soil tests are shown below.

<i>Soil site</i>	<i>Colour</i>
A	yellow
B	blue
C	orange
D	dark green

Heather plants grow best in weakly acidic soils.

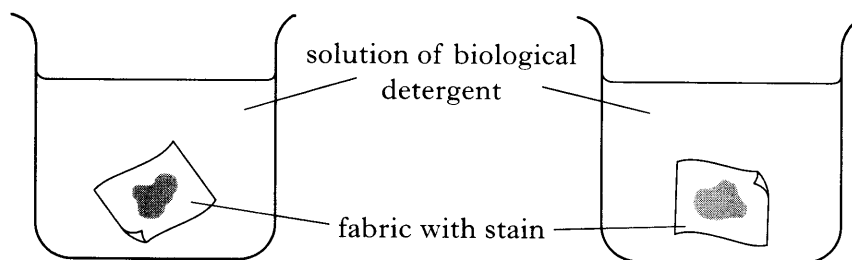
Which soil is the best for growing heathers?

8. A fertiliser contained 40% nitrogen (N), 25% phosphorus (P) and 5% potassium (K). Which of the following pie charts shows this information correctly?



9. Washing powders described as “biological” contain
- A bacteria
 - B fungi
 - C enzymes
 - D antibiotics.

10. An experiment was set up to compare stain removal by two biological detergents.



Which of the following factors should be kept constant?

- R – type of biological detergent
S – type of fabric
T – type of stain

- A S and T only
B R and T only
C R and S only
D R, S and T
11. Why have some bacteria become resistant to antibiotics?
- A The range of antibiotics has increased.
B Antibiotics have been overused.
C The antibiotics are produced by fungi.
D Too few antibiotics have been prescribed by doctors.

[Turn over

12. The alcohol content of four types of beer are shown in the following table.

<i>Type of beer</i>	<i>Alcohol content of beer (%)</i>
W – cask conditioned	4.4
X – brewery conditioned	4.3
Y – brewery conditioned	5.5
Z – cask conditioned	3.8

Which line in the table below correctly shows the average alcohol content of the brewery conditioned and cask conditioned beers?

	<i>Average alcohol content (%)</i>	
	<i>Brewery conditioned beers</i>	<i>Cask conditioned beers</i>
A	4.9	4.1
B	4.1	4.9
C	9.8	8.2
D	8.2	9.8

13. Which of the following is removed from brewery conditioned beer?

- A Carbon dioxide
- B Yeast
- C Alcohol
- D Oxygen

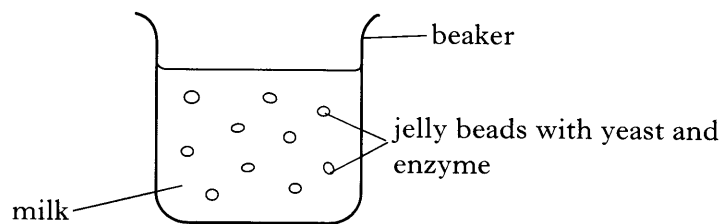
14. The resazurin test is carried out on milk to detect

- A bacteria
- B viruses
- C sugar
- D protein.

15. Salmon in fish farms are fed with yeast products to produce flesh with

- A less fat
- B more protein
- C better flavour
- D pink colour.

16. The diagram below shows an investigation into the production of a fermented drink.



A student predicts that yeast and an enzyme are needed for the milk to be fermented.

Which of the following would be a suitable control for this investigation?

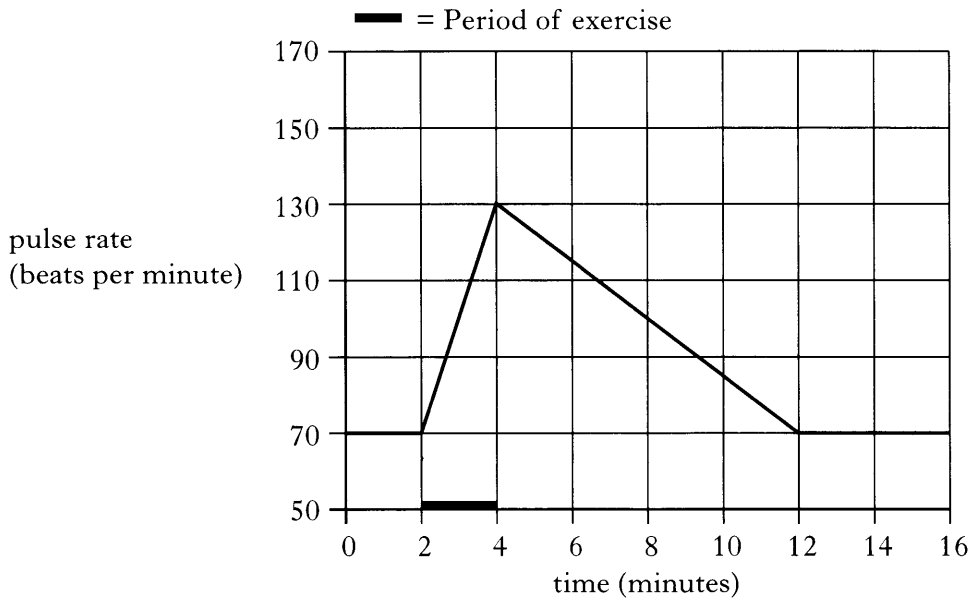
A	B	C	D
<p>20 jelly beads with no yeast or enzyme in milk</p>	<p>10 jelly beads with yeast and enzyme in water</p>	<p>20 jelly beads with yeast and enzyme in water</p>	<p>10 jelly beads with no yeast or enzyme in milk</p>

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

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

[Turn over

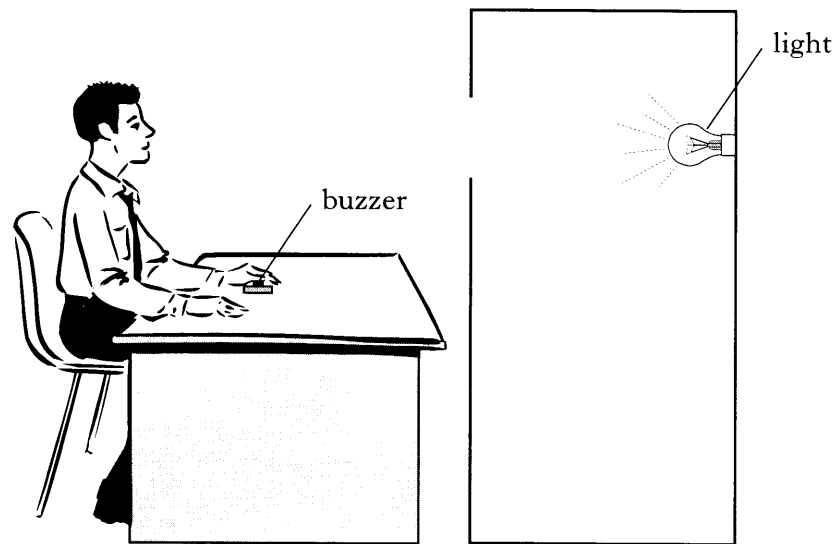
18. The pulse rate of a fifteen-year-old girl was recorded before, during and after a two minute period of exercise. The results are presented in the graph below.



What was the time taken for her pulse rate to return to normal after exercise had stopped?

- A 2 minutes
 - B 8 minutes
 - C 10 minutes
 - D 12 minutes
19. Normal body temperature is
- A 30°C
 - B 35°C
 - C 37°C
 - D 40°C.
20. Smoking tobacco increases the risk of
- A hypothermia
 - B heart disease
 - C arthritis
 - D anaemia.

21. In an investigation to measure reaction time, a student was asked to press a buzzer as soon as he saw the light going on as shown in the diagram below.



The results are shown in the table.

<i>Reaction time (milliseconds)</i>	
<i>After 1 trial</i>	<i>After 10 trials</i>
500	300

After 10 trials, the percentage decrease in the student's reaction time was

- A 30%
 - B 40%
 - C 50%
 - D 60%.
22. Which physiological measurement could be used to detect leukaemia?
- A Body fat
 - B Blood pressure
 - C Blood cell count
 - D Pulse rate

[Turn over

23. Which of the following sequences correctly represents the pathway taken by air when breathing in?

- A Bronchus → windpipe → air sac → bronchiole
- B Windpipe → bronchus → air sac → bronchiole
- C Bronchus → windpipe → bronchiole → air sac
- D Windpipe → bronchus → bronchiole → air sac

24. Which two food groups provide energy?

- A Vitamins and minerals
- B Minerals and fats
- C Proteins and vitamins
- D Carbohydrates and fats

25. A student tested four foods, A, B, C and D, for the presence of starch, sugar and protein.

The tests used were:

Starch present – iodine solution turns from brown to black.

Sugar present – clinistix turns from pink to purple.

Protein present – albusix turns from yellow to green.

The results are shown in the table below.

<i>Food</i>	<i>Colour produced</i>		
	<i>Starch test</i>	<i>Sugar test</i>	<i>Protein test</i>
A	black	purple	green
B	black	pink	yellow
C	brown	purple	yellow
D	brown	purple	green

Which food contained starch, sugar and protein?

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

Marks

SECTION B

All questions in this Section should be attempted.

All answers must be written clearly and legibly in ink.

1. (a) **Read the following passage carefully.**

HOW TO AVOID DAMPING OFF

Adapted from *The Greenock Telegraph*

Damping off is one of the most common plant diseases. It not only causes problems on flower seedlings such as *Lobelia*, *Petunia* and *Salvia* but also affects vegetable plants including cabbage, cauliflower and lettuce.

The symptoms of damping off disease can be varied. In some cases the seedlings become weak looking and shrivel up or simply collapse and die as shown in the picture below. In others the root system will rot away.



To avoid damping off it is necessary to clean and sterilise all trays and pots as well as greenhouse benches. Old compost should not be used for sowing and potting on. Good clean tap water, to which a fungicide may be added, must be used for watering the seeds after sowing and pricking out.

It is also important that seedlings are pricked out as soon as possible after germination. However, if the disease affects seedlings, they should be disposed of together with the compost in which they were growing.

Answer the questions below, using information from the passage.

- (i) Name **one** flower and **one** vegetable affected by damping off disease.

Flower _____

Vegetable _____

1

- (ii) Give **two** symptoms of the disease.

1 _____

2 _____

2

Marks

1. (a) (continued)

(iii) Describe **one** method of preventing damping off disease.

1

(iv) What should be done to seedlings as soon as possible after they have germinated?

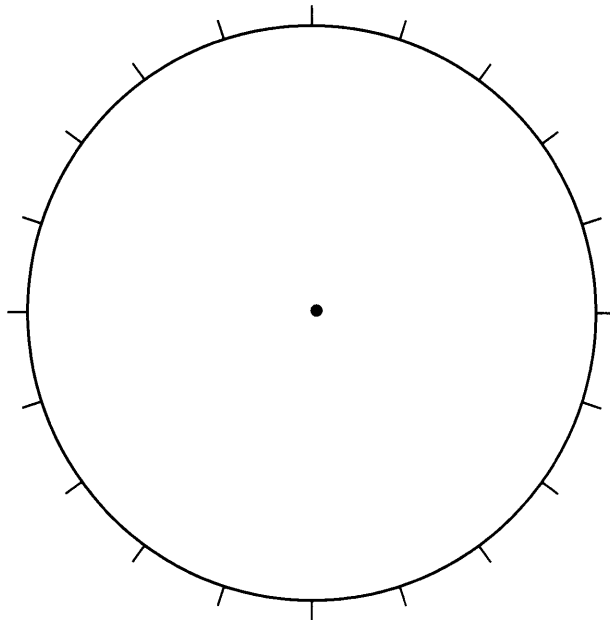
1

(b) The composition of a compost is shown below.

	Percentage
Loam	75
Peat	20
Sand	5

(i) Present this information as a pie chart.

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



2

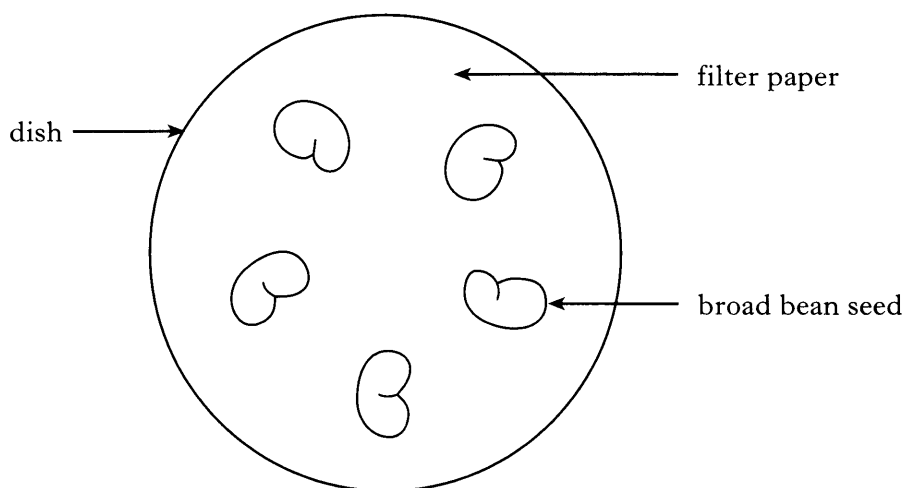
(ii) What can be added to compost to improve drainage?

1

Marks

2. (a) A student carried out an investigation into the effect of water on seed germination.

Five dishes were set up as shown below.



A different volume of water was added to each dish.

The dishes were covered and placed in a cupboard at room temperature.

After ten days, the length of the seedling roots were measured and the average length calculated.

The results are shown below.

<i>Volume of water added (cm³)</i>	<i>Average length of seedling root (cm)</i>
0	0
5	1.6
10	3.4
15	6.6
20	2.0

- (i) Using the information in the table, state the volume of water which resulted in the greatest root growth.

_____ cm³

1

Marks

2. (a) (continued)

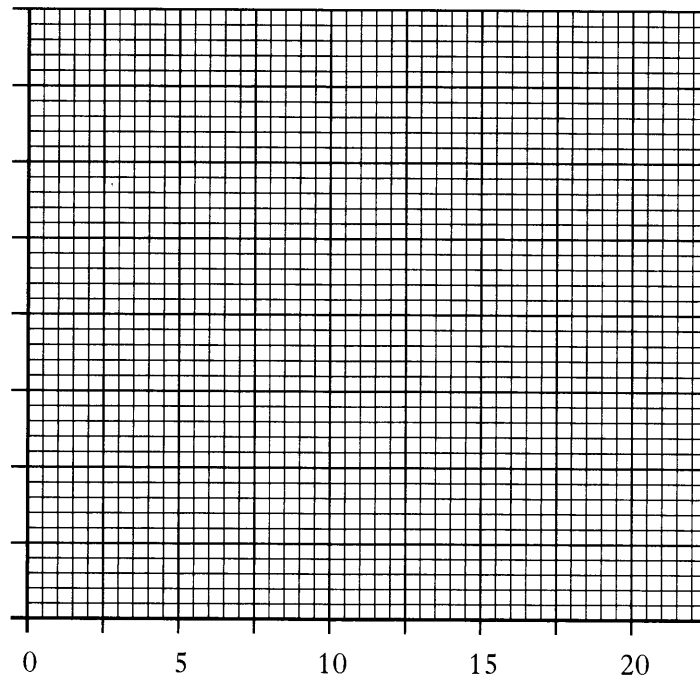
(ii) On the grid below, complete the **line graph** by

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

1
1
1

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

Average length of
seedling root (cm)



(iii) Five seeds were used in each dish.

Explain why this was good experimental technique.

1

(b) Broad bean seeds are large and easy to sow individually.

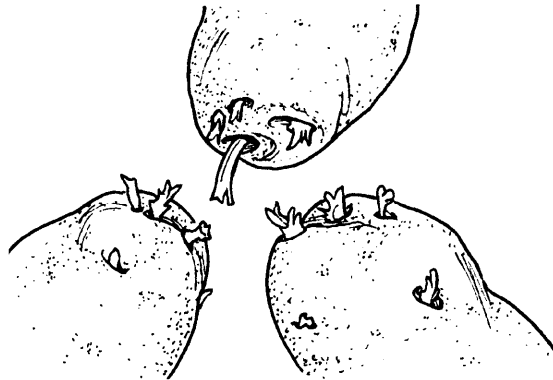
Describe **one** way in which very small seeds can be sown.

1

[Turn over

Marks

3. (a) New potato plants can be grown from the storage organs shown below.



Name this type of storage organ.

1

- (b) Once the potato plant has developed leaves, it can make its own food.

- (i) Name the process by which the plant makes its own food.

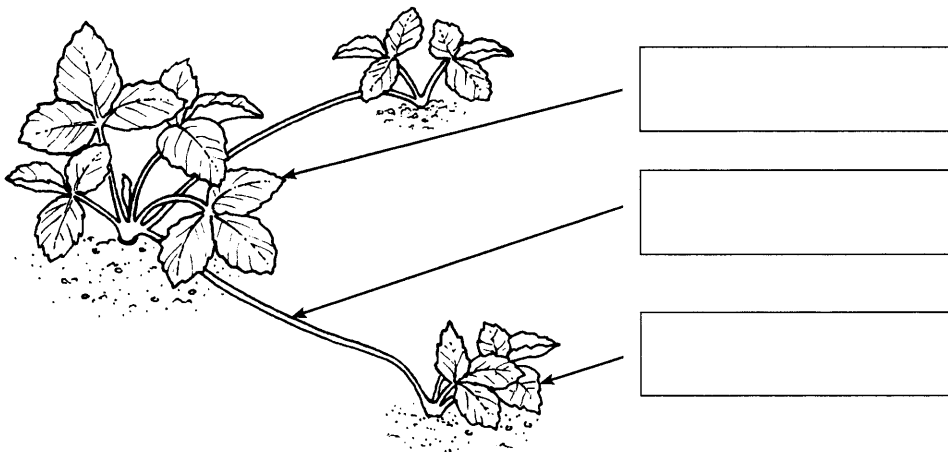
1

- (ii) State **one** use the plant makes of the food produced in this way.

1

- (c) The diagram below shows another method of plant propagation. Use the words from the list to label the diagram.

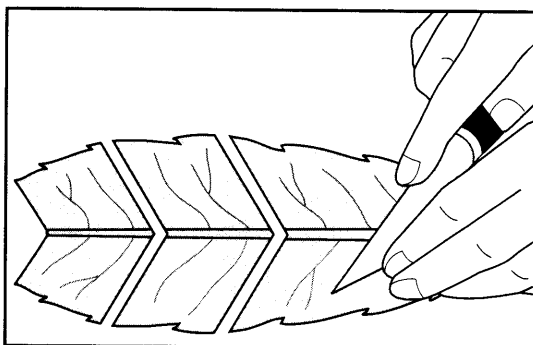
List: runner plantlet parent plant



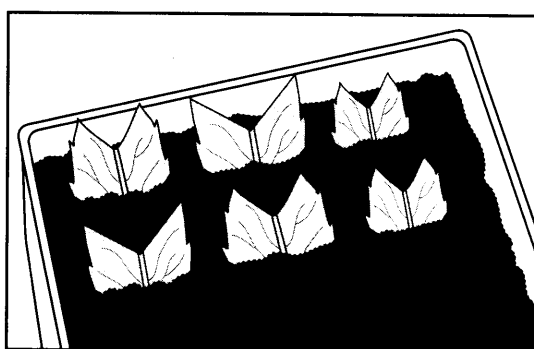
1

Marks

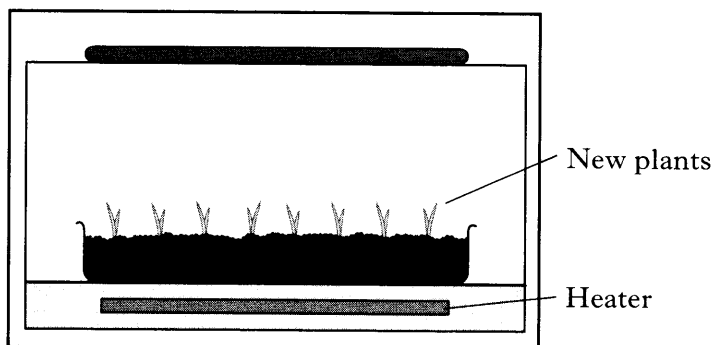
4. The diagrams below show a method of growing new plants without using seeds.



1. Cut V-shaped parts out of leaf



2. Place leaf parts into soil in tray



3. Place tray in heated propagator

- (a) What name is given to this method of growing new plants?

_____ 1

- (b) State **one** advantage of using the heated propagator.

_____ 1

- (c) Describe **one** additional step that could be taken to encourage root growth.

_____ 1

Marks

5. The label below is from a carton of milk.

Content	Mass per 100g (g)
Water	87
Protein	4
Fat	4
Sugar	5

(a) Use the information from the label to complete the bar graph by

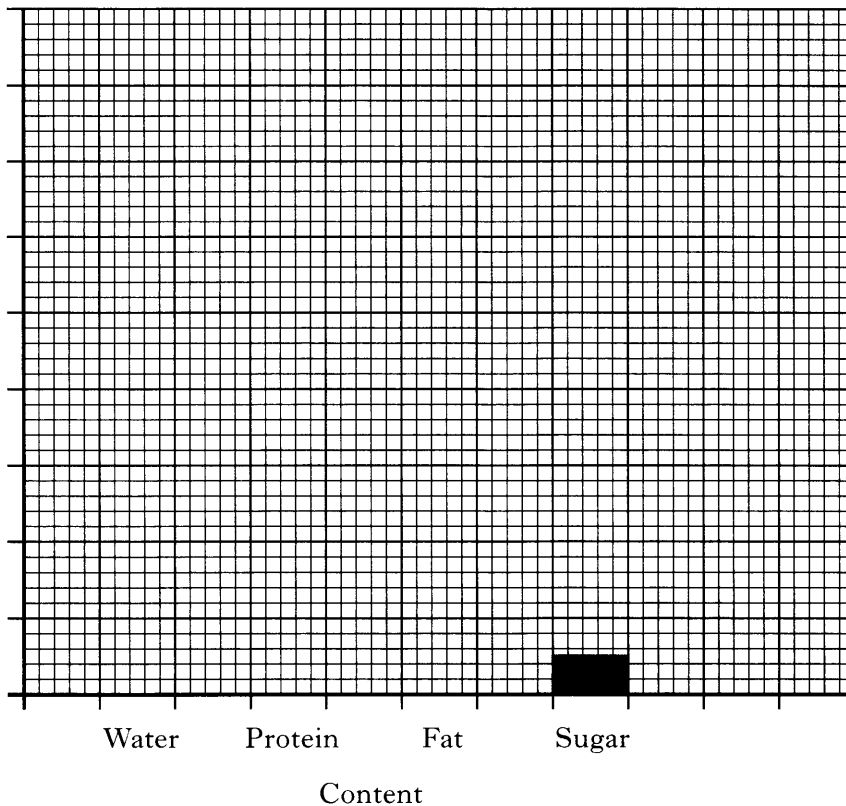
(i) putting a label and scale on the vertical axis

1

(ii) plotting the other bars.

1

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



(b) Why is milk pasteurised?

1

(c) Name **one** method of preserving fresh milk.

1

Marks

5. (continued)

- (d) The Recommended Daily Allowances (RDA) of fat, sugar and fibre for 15–17 year olds are shown in the table.

	<i>Fat</i>	<i>Sugar</i>	<i>Fibre</i>
<i>RDA</i> (g)	25	5	30

- (i) A 100 g carton of yoghurt contains 2.5 g of fat.
What percentage of the RDA of fat would be provided by a 100 g carton of yoghurt?
Space for calculation

_____ %

1

- (ii) Calculate the ratio of the RDA of sugar to the RDA of fibre.
Express your answer as a simple whole number.
Space for calculation

_____ : _____
sugar fibre

1

[Turn over

Marks

6. (a) A student carried out an investigation on cheese-making.

The time taken for rennet to clot milk protein at different temperatures is shown in the table.

<i>Temperature (° C)</i>	<i>Time taken for milk protein to clot (min)</i>
10	No clotting
20	35
30	8
40	3
50	50
60	No clotting

(i) At what temperature was clotting fastest?

_____ °C

1

(ii) State a temperature that would **not** be suitable for this process.

_____ °C

1

(b) Name the solid formed when milk protein clots.

1

(c) (i) Tick (✓) the correct box in **each column** to show the effect of the disposal of waste whey into rivers.

<i>Number of bacteria</i>		<i>Oxygen level</i>		<i>Number of other organisms</i>	
Increases	<input type="checkbox"/>	Increases	<input type="checkbox"/>	Increases	<input type="checkbox"/>
Decreases	<input type="checkbox"/>	Decreases	<input type="checkbox"/>	Decreases	<input type="checkbox"/>

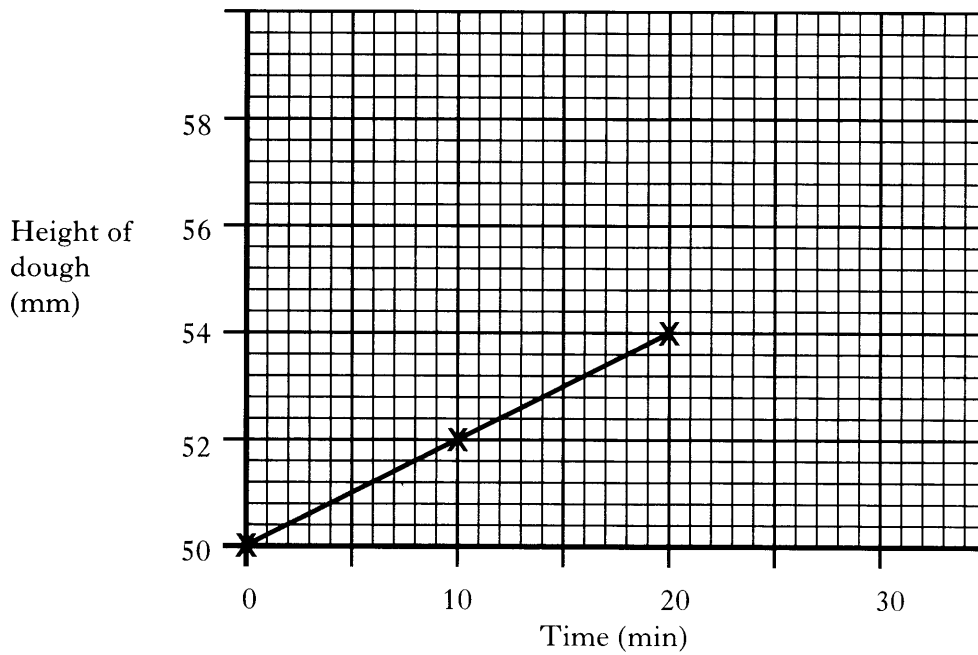
2

(ii) Describe **one** way in which whey can be upgraded.

1

Marks

7. The graph shows the results of an investigation on the raising of bread dough.



(a) Use the information in the graph to complete the table below.

<i>Time</i> (min)	0	10	
<i>Height of dough</i> (mm)			54

1

(b) Predict the height of the dough after **30 minutes**.

_____ mm

1

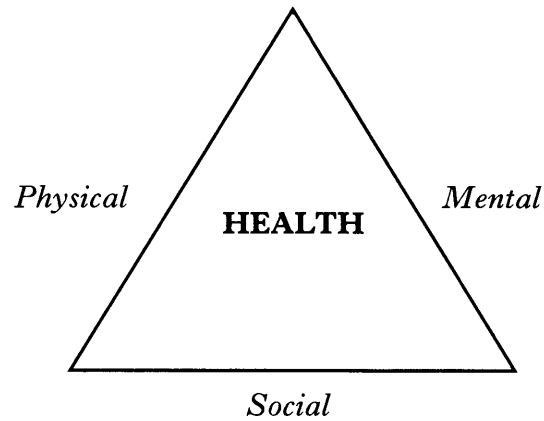
(c) Name the gas produced which makes the dough rise.

1

[Turn over

Marks

8. (a) The three aspects of good health are shown below.



Use this information to complete the headings in the table.

<i>Aspects of Health</i>		
Exercise Diet	Feelings Emotions	Family Friends

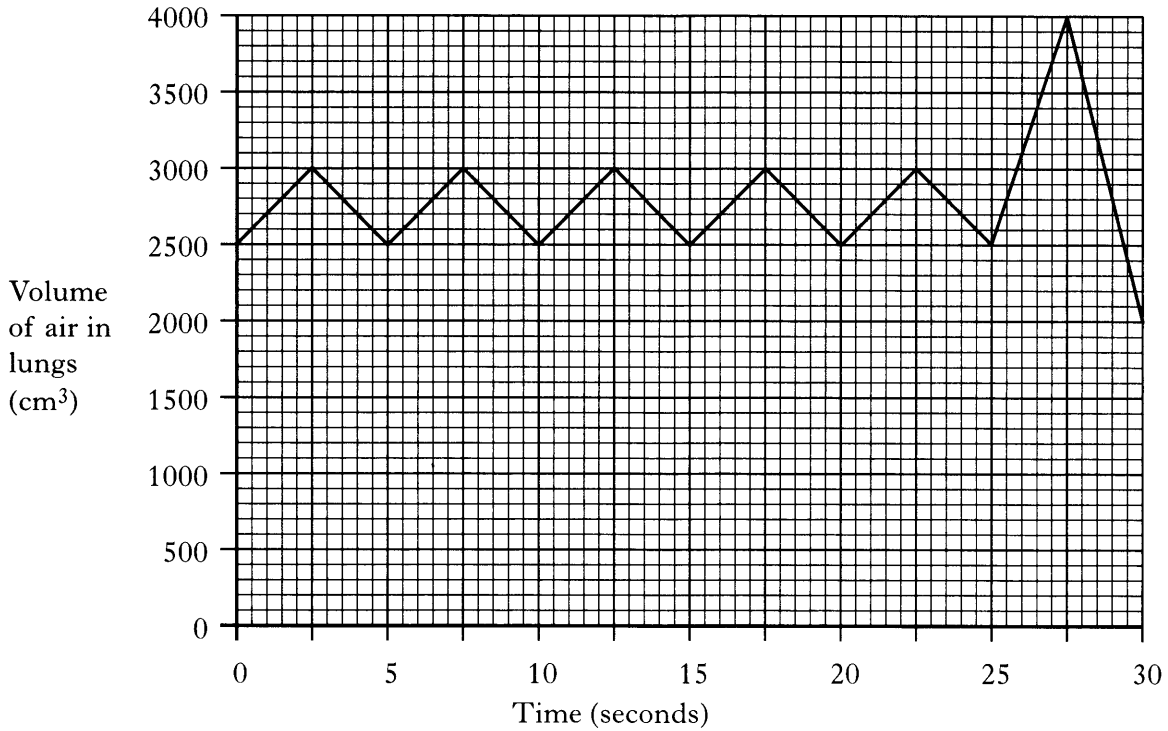
1

- (b) State **one** unnecessary health risk that should be avoided for a healthy lifestyle.

1

Marks

9. The following graph shows the volume of air in the lungs of a female student over a period of thirty seconds.



- (a) Calculate the student's normal breathing rate in breaths **per minute**.

Space for calculation

_____ breaths per minute

1

- (b) Another physiological measurement was taken at 25 seconds.

The student was asked to breathe in as deeply as she could then breathe out as much air as possible in one breath.

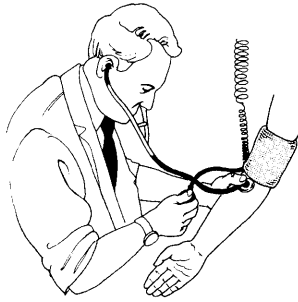
What term is used to describe this measurement?

1

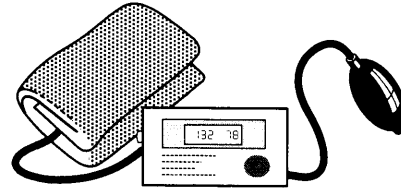
[Turn over

Marks

10. (a) The diagrams below show two methods of measuring blood pressure.



Stethoscope and mercury manometer



Digital sphygmomanometer

The digital sphygmomanometer is a high tech method of measuring blood pressure.

(i) Name **one other** high tech instrument used to take physiological measurements.

_____ 1

(ii) State **one** advantage of using a low tech instrument such as the stethoscope and mercury manometer.

_____ 1

(b) The table below refers to medical conditions that can be caused by high or low blood pressure.

Tick (✓) the correct box for each medical condition to show if it can be caused by high blood pressure or low blood pressure.

<i>Medical condition</i>	<i>Cause</i>	
	<i>High blood pressure</i>	<i>Low blood pressure</i>
Angina		
Stroke		
Fainting		
Heart attack		

2

(c) State **one** factor which can affect pulse rate.

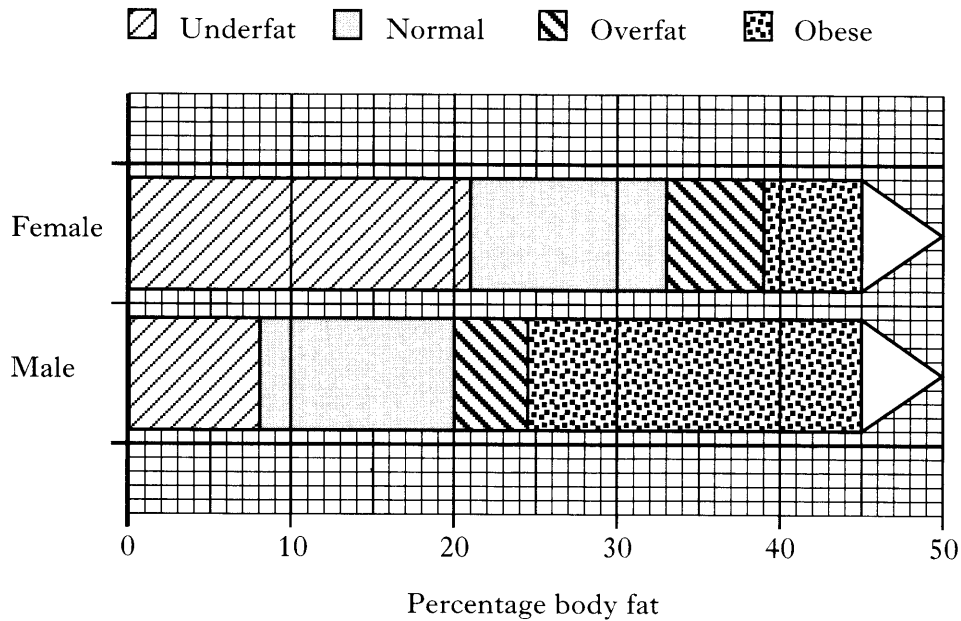
_____ 1

(d) Name **one** substance carried by the blood.

_____ 1

Marks

11. (a) The following chart shows the ranges of percentage body fat for 20–39 year old females and males.



- (i) What term would be used to describe a male in this age group whose body fat is 35%?

_____ 1

- (ii) What is the **normal** range of percentage body fat for a 20–39 year old female?

Between _____% and _____% 1

- (iii) State **one** conclusion which can be drawn from the information in the chart.

_____ 1

- (b) State **one** health problem which could result from being overweight.

_____ 1

[END OF QUESTION PAPER]

[Turn over