FOR OFFICIAL USE

Section B
Total

X007/101

NATIONAL QUALIFICATIONS 2008

TUESDAY, 27 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

Scottish candidate number

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?

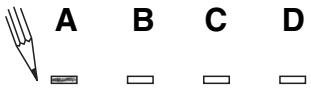
A Butter

B Bread

C Sugar

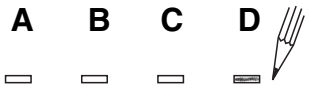
D Apple

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**.

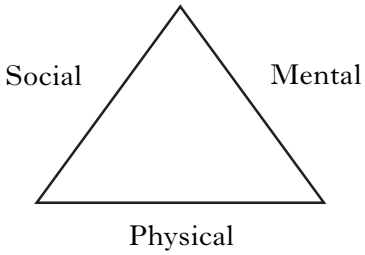


SECTION A

All questions in this section should be attempted.

Answers should be given on the separate answer sheet provided.

1. There are three aspects to health shown below in the health triangle.



Which of the following is a physical aspect of health?

A No stress at work

B Eating a balanced diet

C Looking forward to the weekend

D Enjoying the company of friends

2. Which line in the table below shows correctly the change in concentrations of oxygen and carbon dioxide in the blood as it passes through the lungs?

	Concentration in blood	
	Oxygen	*Carbon dioxide*
A	increases	decreases
B	increases	increases
C	decreases	decreases
D	decreases	increases

3. Oxygen moves into the tissues as the blood is flowing through the

A capillaries

B arteries

C veins

D arteries and veins.

[Turn over

4. Males have on average between 15% and 17% body fat.
Females have on average between 18% and 22% body fat.

The table below gives average percentage body fat for athletes in four sports.

	Sport	*Average body fat of athletes* (%)	
		Male	*Female*
A	Swimming	10	16
B	Running	9	12
C	Volleyball	11	16
D	Shotput	18	24

In which sport do the athletes have a higher than average percentage of body fat?

5. Which line in the table indicates correctly the increased health risks for being overweight or underweight?

	Overweight	*Underweight*
A	Anorexia	Cancer
B	Diabetes	Heart disease
C	Arthritis	Anorexia
D	Cancer	Arthritis

6. The blood groups of 200 students are shown in the table below.

Blood Group	*Number of Students*
O	94
A	84
B	16
AB	6

What percentage of the students have Blood Group A?

A 42%

B 45%

C 84%

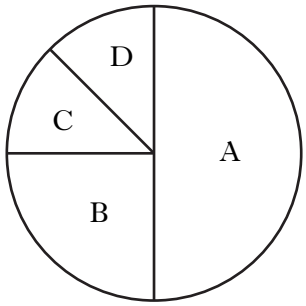
D 90%

7. Which row in the table below describes correctly a health problem linked to blood pressure?

	Health Problem	*Blood Pressure*
A	angina	low
B	heart attack	low
C	fainting	high
D	stroke	high

8. The table and pie chart contain the same information about the diet of British people.

Type of Food	*Percentage of Diet*
Cereals	50
Animal protein	25
Fruit and vegetables	12·5
Others	12·5



Animal protein is represented by which slice of the pie chart?

9. When sowing fine seeds they should be

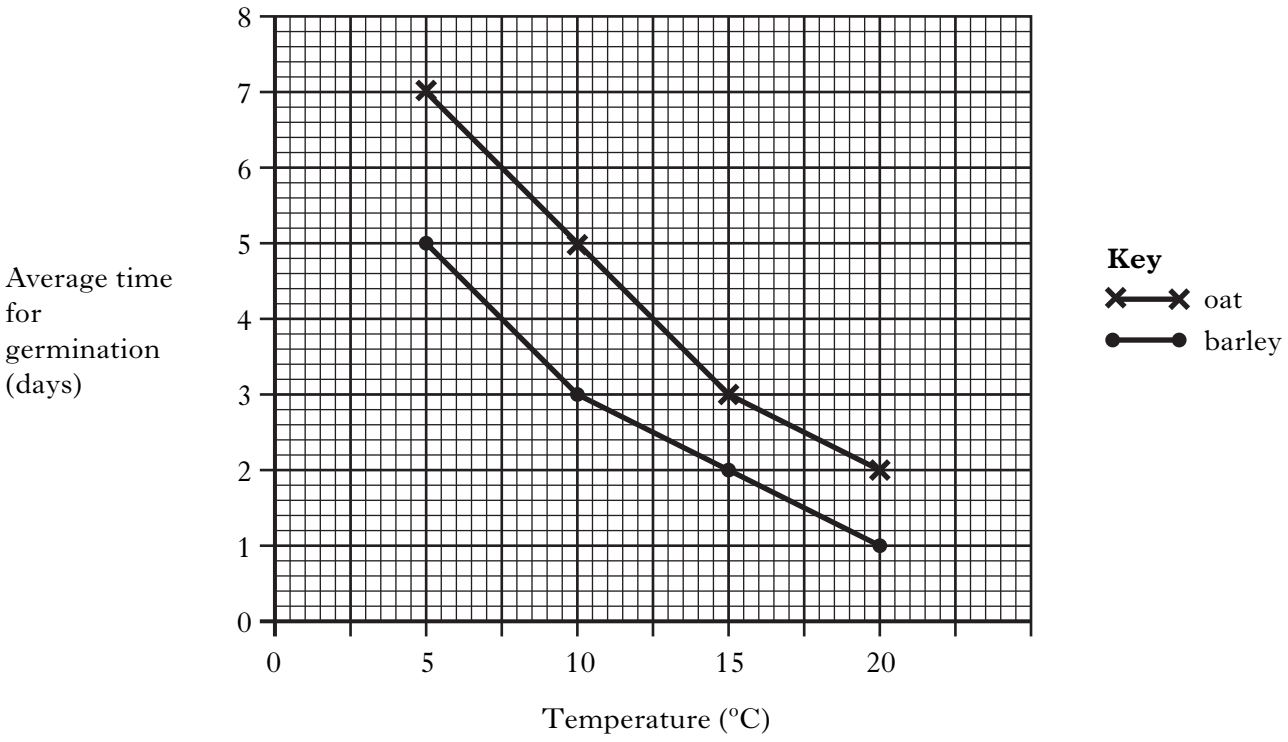
A pre-germinated

B spaced out individually

C mixed with silver sand

D mixed with larger seeds.

10. The following graph shows the effect of temperature on the germination of oat seeds and barley seeds.



What is the average time for oat seeds to germinate at 5 °C?

A 5 days

B 6 days

C 7 days

D 10 days

11. A student tested four types of seeds 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 – albustix turns from yellow to green

The results are shown in the table below.

Seed type	*Colour produced*		
	Starch test	*Sugar test*	*Protein test*
Barley	black	pink	yellow
Pea	black	pink	green
Cabbage	brown	purple	yellow
Mustard	brown	purple	green

Which type of seed contains only starch?

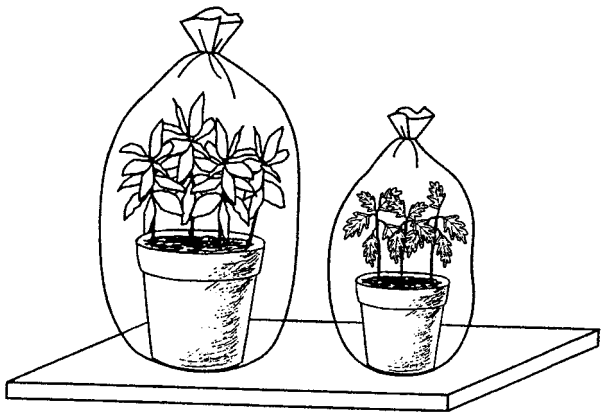
A Barley

B Pea

C Cabbage

D Mustard

12. The diagram below shows cuttings enclosed in plastic bags.



This results in

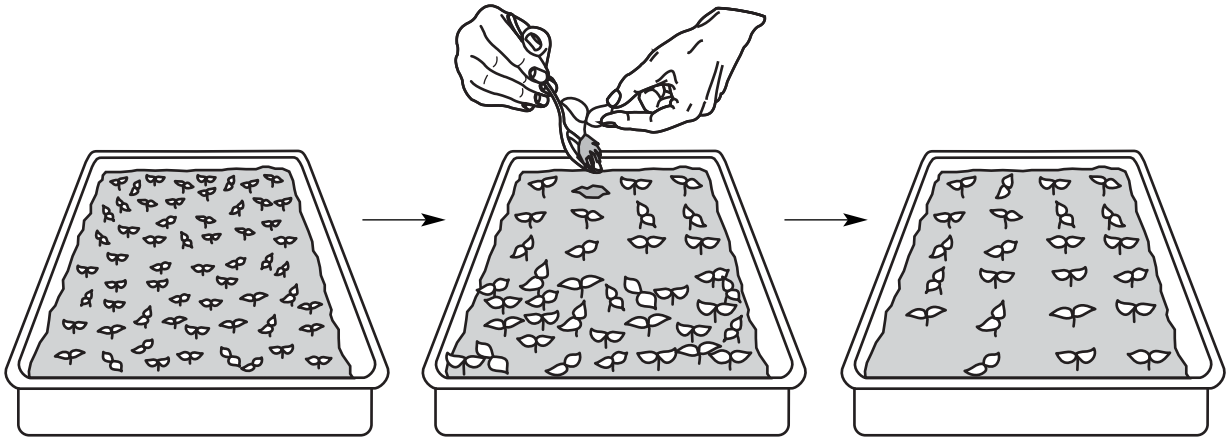
A an increase in light intensity

B an increase in humidity

C a decrease in temperature

D a decrease in leaf area.

13. Which method of maintaining plants is shown in the diagram below?



A Layering

B Dead heading

C Pricking out

D Taking cuttings

14. Which of the following is important for good leaf growth?

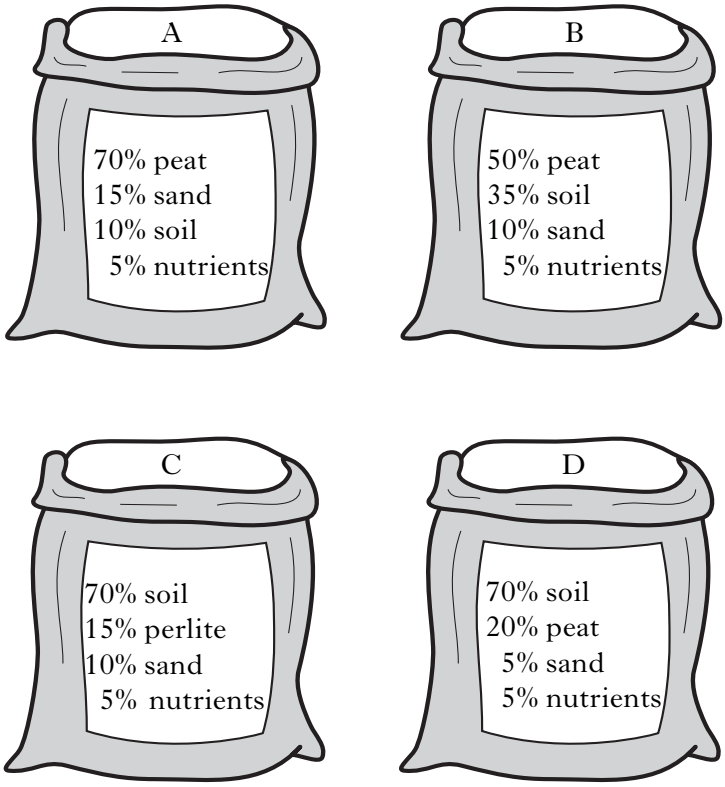
A Phosphorus

B Nitrogen

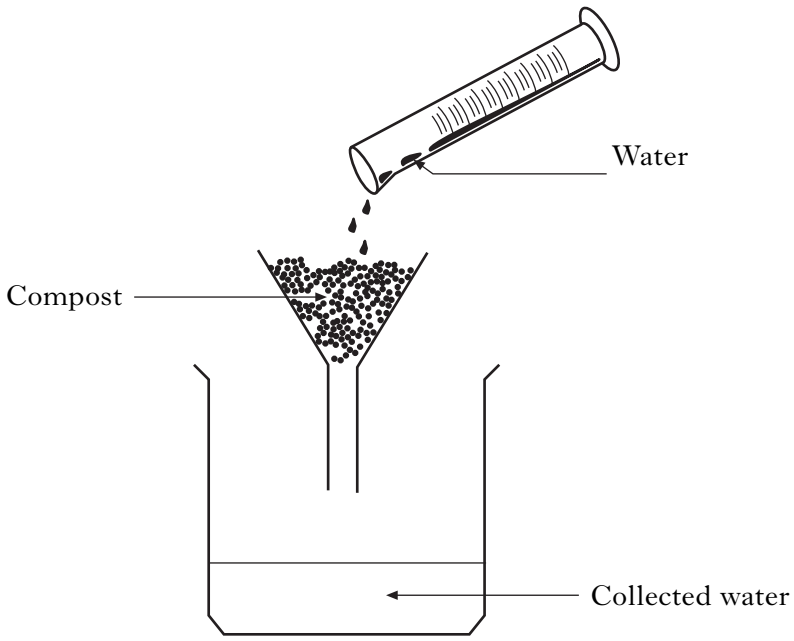
C Perlite

D Sand

15. Which of the following composts would have the best drainage?



16. The following apparatus was used to investigate the ability of different composts to hold water.



Variables	
1	volume of water poured in
2	mass of compost
3	volume of water collected
4	time taken to collect water

Which variables should be kept constant to allow a valid comparison to be made?

A 1, 3 and 4

B 2, 3 and 4

C 1, 2 and 3

D 1, 2 and 4

17. Which of the following is produced by yeast and makes dough rise?

A Oxygen

B Rennet

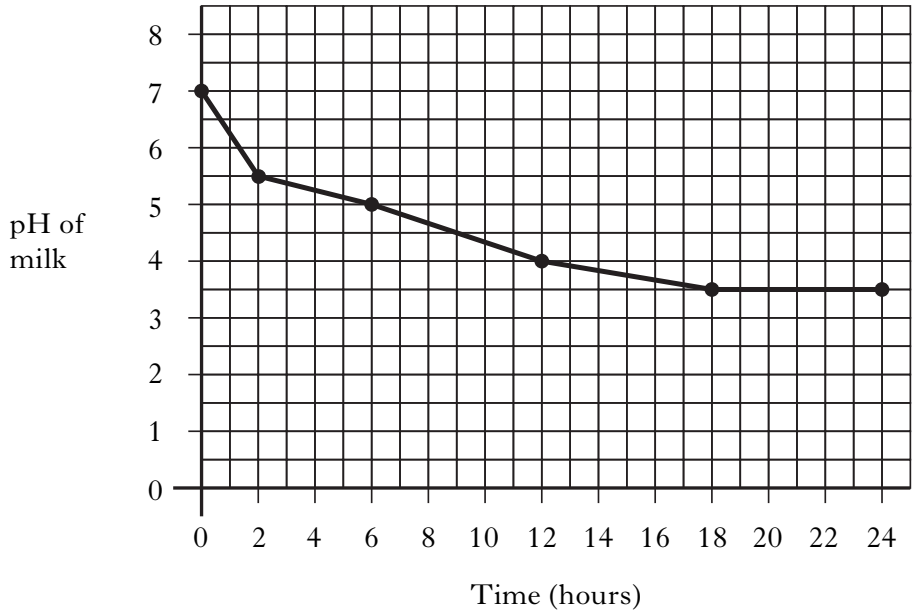
C Carbon dioxide

D Alcohol

[Turn over

Questions 18 and **19** refer to the information below.

During yoghurt making, the pH of milk changes as shown in the graph below.



18. The change in pH is caused by the production of acid by

A fungi

B viruses

C bacteria

D yeast.

19. During which period of time was there the greatest change in pH?

A 0–6 hours

B 6–12 hours

C 12–18 hours

D 18–24 hours

20. The table below shows the results of a resazurin test on four milk samples.

Milk sample	*Colour after 30 minutes*
A	pink
B	purple
C	mauve
D	white

Which milk sample contains most bacteria?

21. The solid formed when protein is clotted during cheese making is

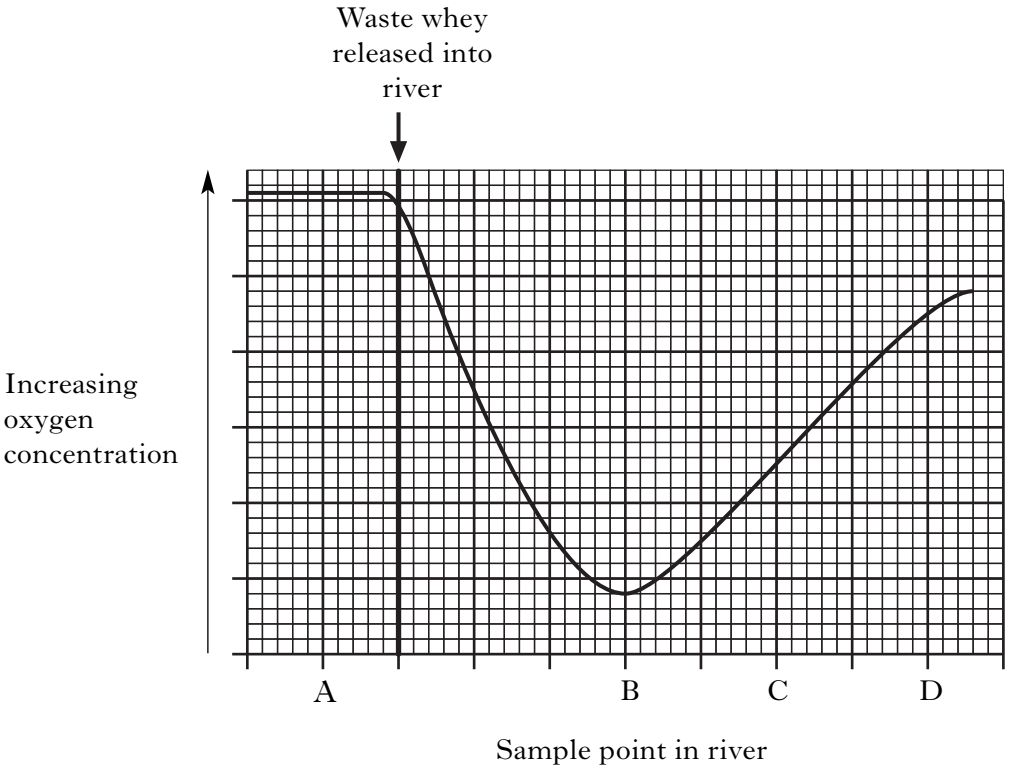
A rennet

B curds

C whey

D yoghurt.

Questions 22 and **23** refer to the following graph. This shows the changes in oxygen concentration before and after waste whey is released into a river.



22. At which sample point in the river was the oxygen concentration highest?

23. After waste whey is released into the river, the oxygen concentration

A increases then stays the same

B increases and then decreases

C decreases then stays the same

D decreases and then increases.

[Turn over

24. Which line in the table below shows correctly the effect of antibiotics on the growth of bacteria and viruses?

	Effect of antibiotics	
	Bacteria	*Viruses*
A	✓	✓
B	✗	✓
C	✗	✗
D	✓	✗

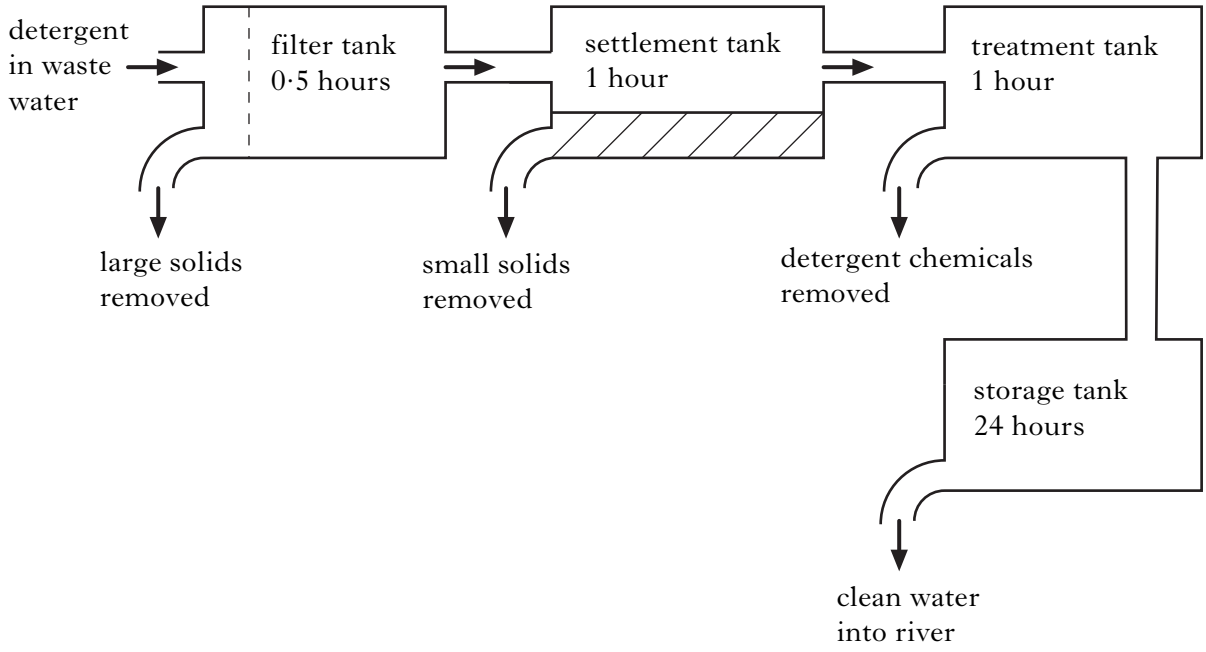
Key

✓ = stops growth

✗ = does not stop growth

25. At a sewage treatment works, waste water containing detergents is processed before being released into rivers.

The diagram below shows the time taken for each stage in the treatment process.



How long does it take to remove all solids and detergent chemicals from the water?

A 26·5 hours

B 21·5 hours

C 2·5 hours

D 1·5 hours

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

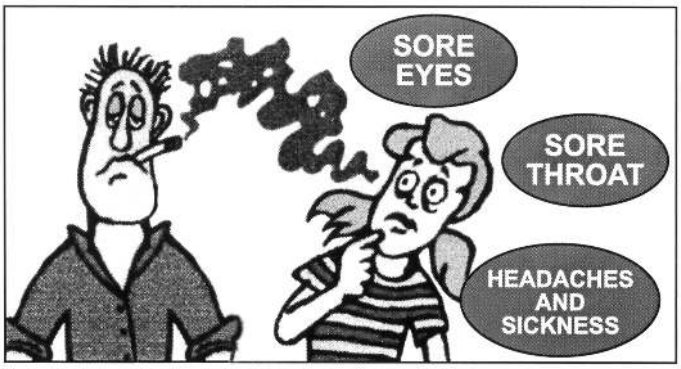
SECTION B

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*) **Read the following passage carefully.**

Second-hand Tobacco Smoke



Second-hand tobacco smoke is the smoke breathed in by non-smokers when other people are smoking. It is sometimes called environmental tobacco smoke and breathing it in is known as passive smoking. Only 1 in 5 of the population smokes but almost everyone breathes in second-hand tobacco smoke at times.

Most non-smokers dislike second-hand tobacco smoke. They complain that it causes headaches, coughs, feelings of dizziness and sickness. It can also cause irritation of the nose, throat and eyes. The smell of tobacco smoke clings to hair, clothes and furnishings.

A burning cigarette is like a mini chemical factory. The smoke contains thousands of chemicals. The smoker breathes in only 15 percent of the smoke from a cigarette. This is called mainstream smoke. The other 85 percent, known as sidestream smoke, goes straight into the air. Sidestream smoke is unfiltered and contains higher concentrations of toxic chemicals than mainstream smoke.

Use information from the passage to answer the questions below.

(i) What name is given to breathing in second-hand smoke?

_____ **1**

(ii) Name **two** effects that second-hand smoke has on non-smokers.

1 _____

2 _____ **1**

(iii) What percentage of smoke from a cigarette is mainstream smoke?

_____ **1**

(iv) Why is sidestream smoke more dangerous than mainstream smoke?

_____ **1**

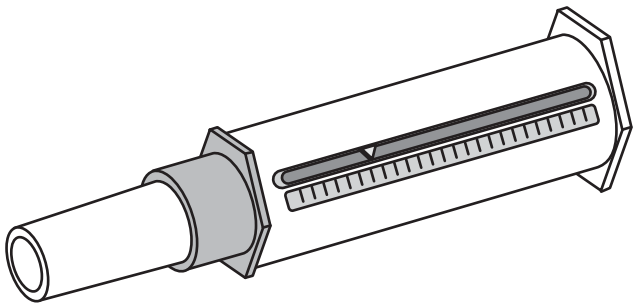
(*b*) Name a harmful chemical found in tobacco smoke.

_____ **1**

DO NOT WRITE IN THIS MARGIN

Marks

2. Peak flow rate is measured using the instrument shown below.



Three peak flow readings of a fourteen-year-old student were taken.

Reading	*Peak Flow* (litres per minute)
1	500
2	510
3	490

(*a*) (i) What is this student's peak flow rate?

_____ litres per minute **1**

(ii) Name **one** factor, other than age, which can affect peak flow rate.

_____ **1**

(*b*) **Underline** one option in each set of brackets to make the statement below correct.

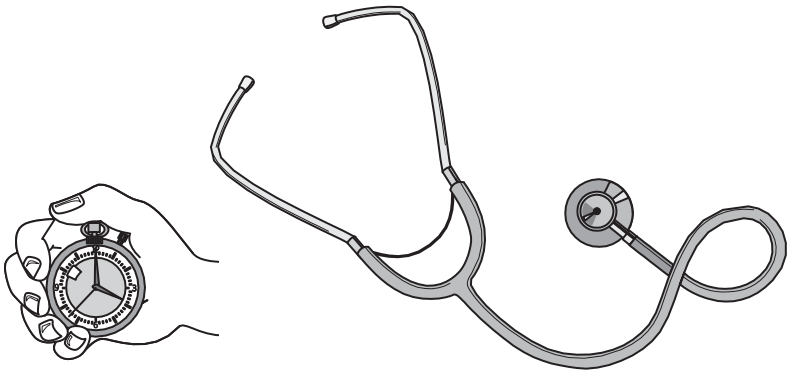
Peak flow is the { minimum / maximum } rate at which air can be forced { into / out of } the lungs. **1**

(*c*) Name a medical condition which can be diagnosed and managed using a peak flow meter.

_____ **1**

Marks

3. A student, when at rest, measured her heart rate three times using a stethoscope and a stopwatch.



The results are shown in the table.

Measurement	*Number of beats in 20 seconds*
1	21
2	21
3	24

(*a*) Calculate the student's:

(i) average heart rate in 20 seconds;
Space for calculation

_____ beats per 20 seconds **1**

(ii) average pulse rate in beats per minute.
Space for calculation

_____ beats per minute **1**

(*b*) The student then exercised for 30 minutes.

What effect would this have on her pulse rate?

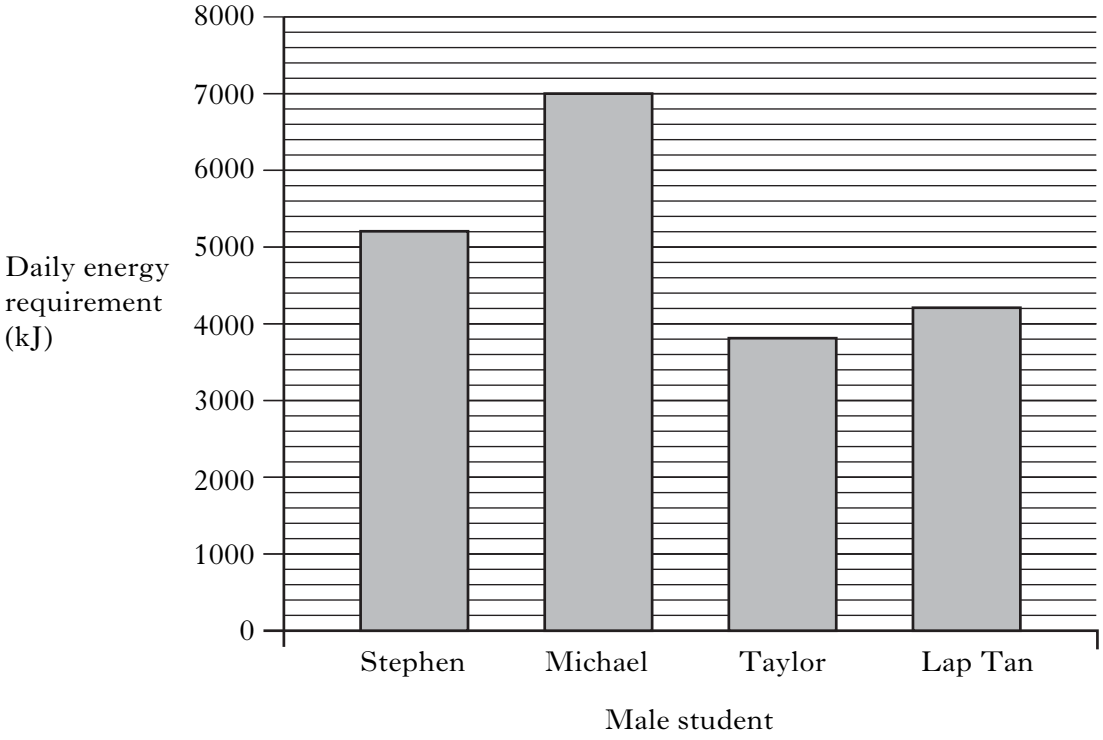
_____ **1**

(*c*) What term is used to describe the time taken for the pulse rate to return to normal after exercise?

_____ **1**

Marks

4. (*a*) The bar graph below shows the daily energy requirements of four male students.



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

Male student	*Daily energy requirement* (kJ)
Stephen	
	7000
Taylor	
Lap Tan	

2

(ii) Stephen and Michael are the same age and weight.

What evidence from the bar graph shows that Michael is most likely to be an athlete?

_____

_____ **1**

Marks

4. (continued)

(*b*) Tick (✓) **one** box for each food group in the table to show its **main** use.
One food group has been completed for you.

Food group	*Main use*		
	Energy	*Growth and repair of cells/tissues*	*Protection against disease*
Carbohydrates	✓		
Proteins			
Fats			
Vitamins and minerals			

2

[Turn over

5. A student carried out an investigation into the effect of watering on spider plants.

Five plants were placed under identical conditions and regularly watered over a period of four months.

Each plant received a different volume of water.

The number of new plants growing from each parent plant is shown below.

Plant	*Volume applied at each watering* (cm^3)	*Number of new plants produced*
A	20	0
B	40	2
C	60	6
D	80	4
E	100	3

DO NOT WRITE IN THIS MARGIN

Marks

5. (continued)

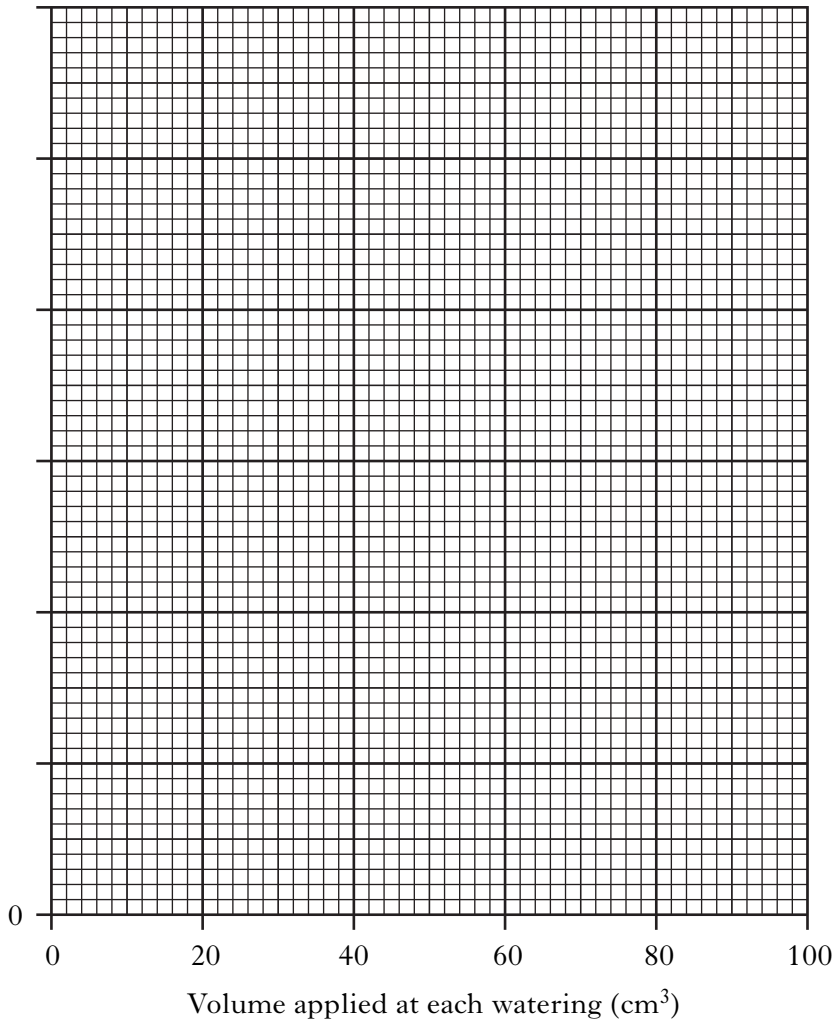
(*a*) On the grid below, complete the **line graph** to show the number of new plants produced by

(1) providing a label for the vertical axis **1**

(2) putting a scale on the vertical axis **1**

(3) plotting the results. **1**

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



(*b*) Identify the volume of water applied at each watering that resulted in most new plants.

_____ cm^3 **1**

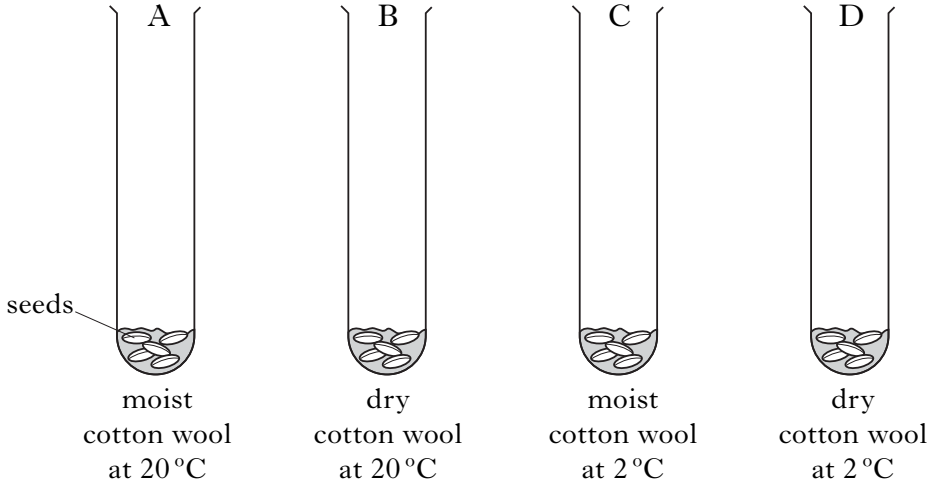
(*c*) Suggest an improvement to the investigation which would make the results more **reliable**.

_____ **1**

DO NOT WRITE IN THIS MARGIN

Marks

6. (*a*) The diagram below shows test tubes set up to investigate the conditions required for seed germination.



(i) In which test tube would most seeds germinate?

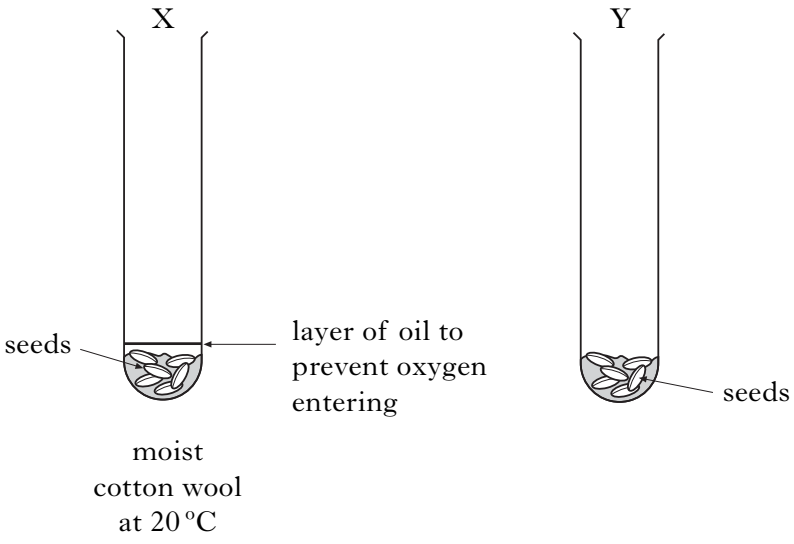
Tube _____ **1**

(ii) Identify the variable being investigated when comparing test tubes A and C.

_____ **1**

(*b*) Test tube X was set up to find out if **oxygen** is necessary for germination.

Label test tube Y to show a suitable control for this experiment.



1

Marks

6. (continued)

(*c*) Name the part of a seed which is used to provide energy for germination.

_____ **1**

(*d*) Some seeds will not germinate until spring when the soil temperature rises. What name is given to this delay in germination?

_____ **1**

[Turn over

DO NOT WRITE IN THIS MARGIN

Marks

7. The table shows the rooting success of cuttings of four varieties of *Fuchsia*.

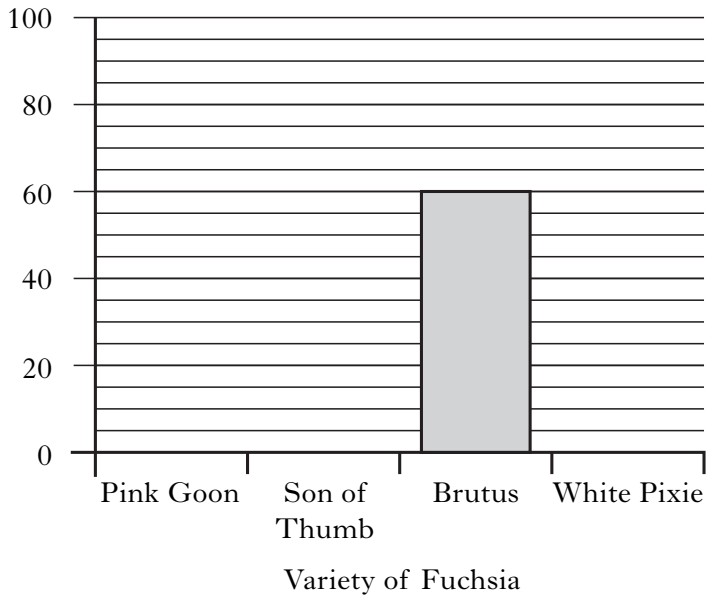
Variety of Fuchsia	*Successful rooting* (%)
Pink Goon	85
Son of Thumb	65
Brutus	60
White Pixie	70

(*a*) On the grid below, complete the bar graph by

(1) putting a label on the vertical axis **1**

(2) plotting the results for the other varieties. **1**

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



(*b*) Which variety of *Fuchsia* was least successful at rooting?

_____ **1**

(*c*) What could improve the successful rooting of the cuttings?

_____

_____ **1**

DO NOT WRITE IN THIS MARGIN

Marks

8. Commercially grown plants, such as lettuce, are often grown in a polythene tunnel.

(*a*) State **one** reason why plants are cultivated in this way.

_____ **1**

(*b*) Disease and pests must be controlled when growing plants.
State **one** way in which aphids and grey mould can be controlled.

Aphids _____ **1**

Grey mould _____ **1**

(*c*) Name the process by which plants produce food for growth.

_____ **1**

[Turn over

DO NOT WRITE IN THIS MARGIN

Marks

9. (*a*) The table below shows the components of two soft cheeses.

	Component (g per 100 g)			
Type of cheese	*Protein*	*Carbohydrate* (including sugars)	*Fat*	*Water*
Cottage cheese	15	2	4	79
Cream cheese	3	0	48	49

(i) Calculate the ratio of fat in cottage cheese to that in cream cheese.

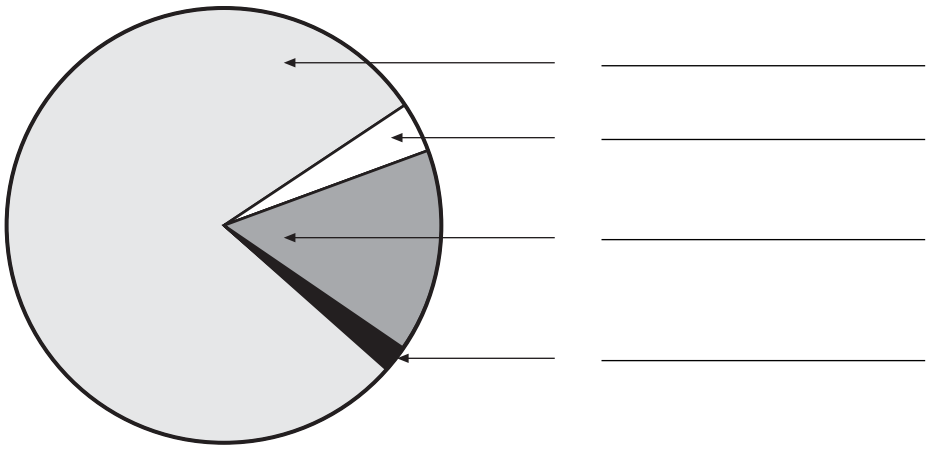
Express your answer as a **simple whole number ratio**.

Space for calculation

_____ : _____ **1**

Cottage cheese Cream cheese

(ii) Use the information for cottage cheese in the table to label the pie chart.



1

DO NOT WRITE IN THIS MARGIN

Marks

9. (continued)

(*b*) A substance is added to milk during cheese making which makes the protein clot.

(i) Name this substance.

_____ **1**

(ii) One source of this substance is genetically engineered yeast.

State **one** other source of the substance.

_____ **1**

(*c*) Whey is a waste product of cheese making.

(i) Name the organism involved in the upgrading of waste whey.

_____ **1**

(ii) Give **one** example of a product made from whey.

_____ **1**

[Turn over

DO NOT WRITE IN THIS MARGIN

Marks

10. (*a*) A student carried out an investigation to compare biological and non-biological detergents.

Four pieces of cloth were stained and then each washed using a different detergent.

The time taken for each stain to disappear is shown in the table below.

Detergent	*Type of detergent*	*Time taken for stain to disappear* (minutes)
Alpha	Biological	100
Beta	Non-biological	140
Gamma	Biological	120
Delta	Non-biological	160

(i) What conclusion can be drawn from these results?

_____

_____ **1**

(ii) Which variable was altered in this investigation?

_____ **1**

(iii) Identify **two** variables which should have been kept the same when setting up the investigation.

1 _____

2 _____ **2**

(*b*) Explain why using biological detergents is claimed to save energy.

_____

_____ **1**

Marks

10. (continued)

(*c*) Biological detergents contain enzymes.

(i) Which type of living organism is used to produce these enzymes?

_____ **1**

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

Name **one** medical condition which can be caused by this allergic reaction.

_____ **1**

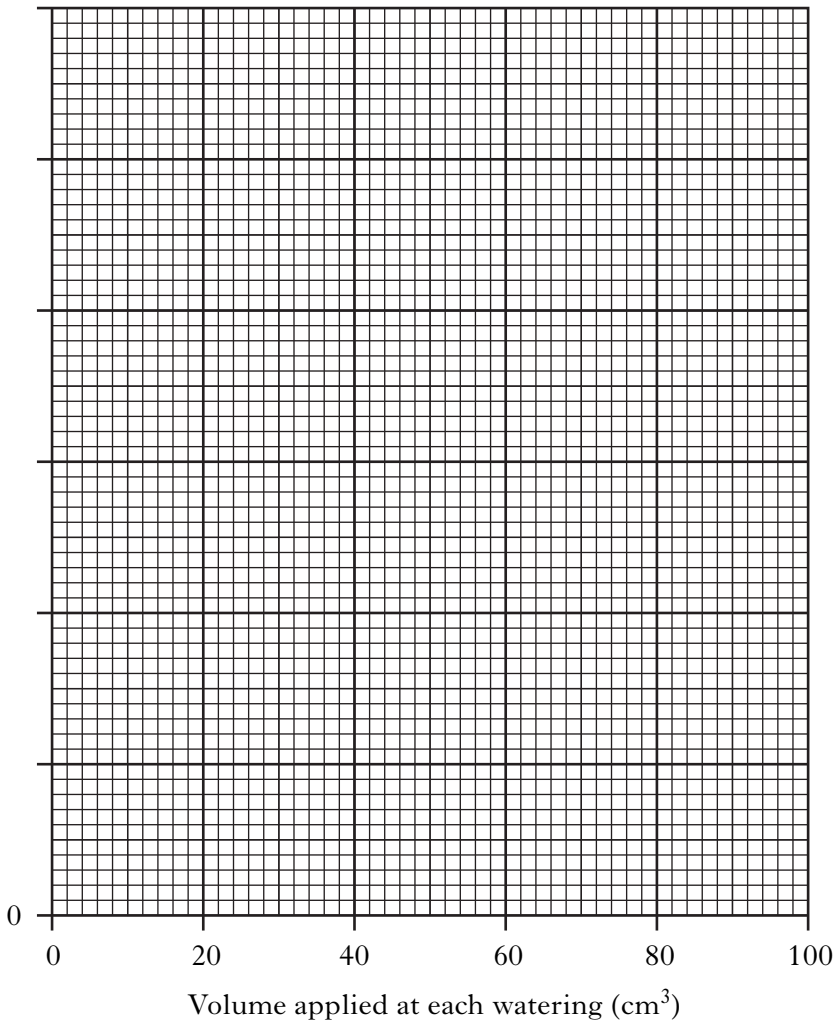
(iii) How does the manufacturer reduce the chance of the enzymes in detergents causing an allergic reaction?

_____ **1**

[*END OF QUESTION PAPER*]

SPACE FOR ANSWERS

ADDITIONAL GRAPH PAPER FOR QUESTION 5(*a*)



ADDITIONAL GRAPH PAPER FOR QUESTION 7(*a*)