

FOR OFFICIAL USE

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Section B
Total

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X007/101

NATIONAL
QUALIFICATIONS
2004

WEDNESDAY, 19 MAY
9.00 AM – 10.30 AM

BIOLOGY
INTERMEDIATE 1

Fill in these boxes and read what is printed below.

Full name of centre

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Town

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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

Instructions for completion of Section A are given on page two.

SECTION B

- 1 All questions should be attempted.
- 2 The questions may be answered in any order but all answers are to be written in the spaces provided in this answer book, and must be written clearly and legibly in ink.
- 3 Additional space for answers and rough work 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.
- 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 Fill in the details required on the answer sheet.
- 3 In this section a question is answered by indicating the choice A, B, C or D by a stroke made in **ink** in the appropriate place in the answer sheet—see the sample question below.
- 4 For each question there is only **one** correct answer.
- 5 Rough working, if required, should be done only on this question paper—or on the rough working sheet provided—**not** on the answer sheet.
- 6 At the end of the examination the answer sheet for Section A **must** be placed **inside** this answer book.

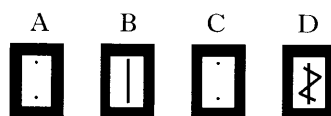
Sample Question

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

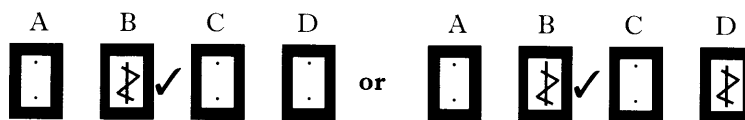
- A Bread
- B Butter
- C Sugar
- D Apple

The correct answer is **B**—butter. A **heavy** vertical line should be drawn joining the two dots in the appropriate box in the column headed **B** as shown in the example on the answer sheet.

If, after you have recorded your answer, you decide that you have made an error and wish to make a change, you should cancel the original answer and put a vertical stroke in the box you now consider to be correct. Thus, if you want to change an answer D to an answer B, your answer sheet would look like this:



If you want to change back to an answer which has already been scored out, you should enter a tick (✓) to the **right** of the box of your choice, thus:

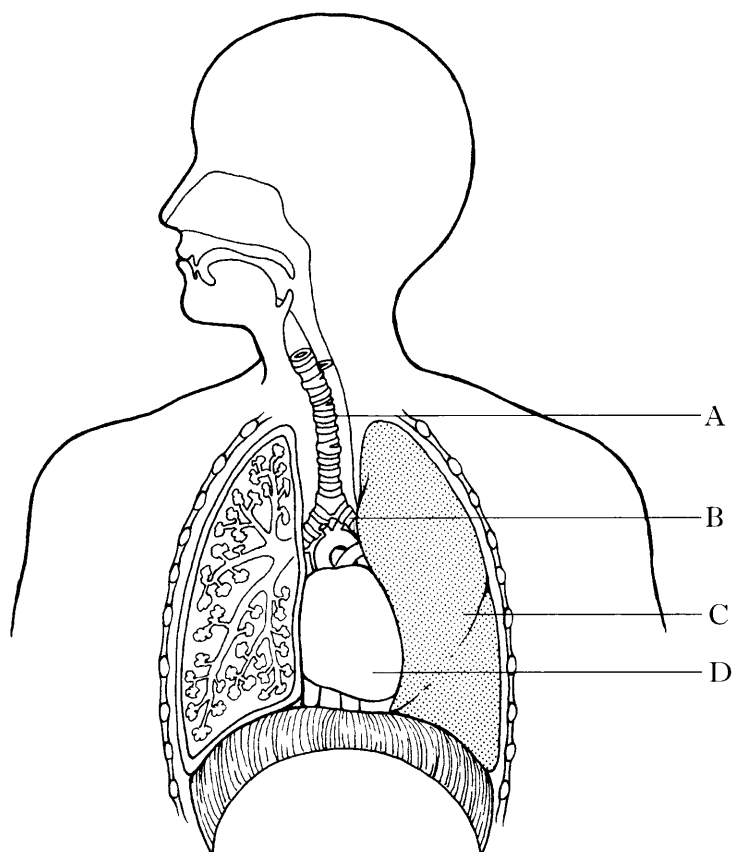


SECTION A

All questions in this Section should be attempted.

Answers should be given on the separate answer sheet provided.

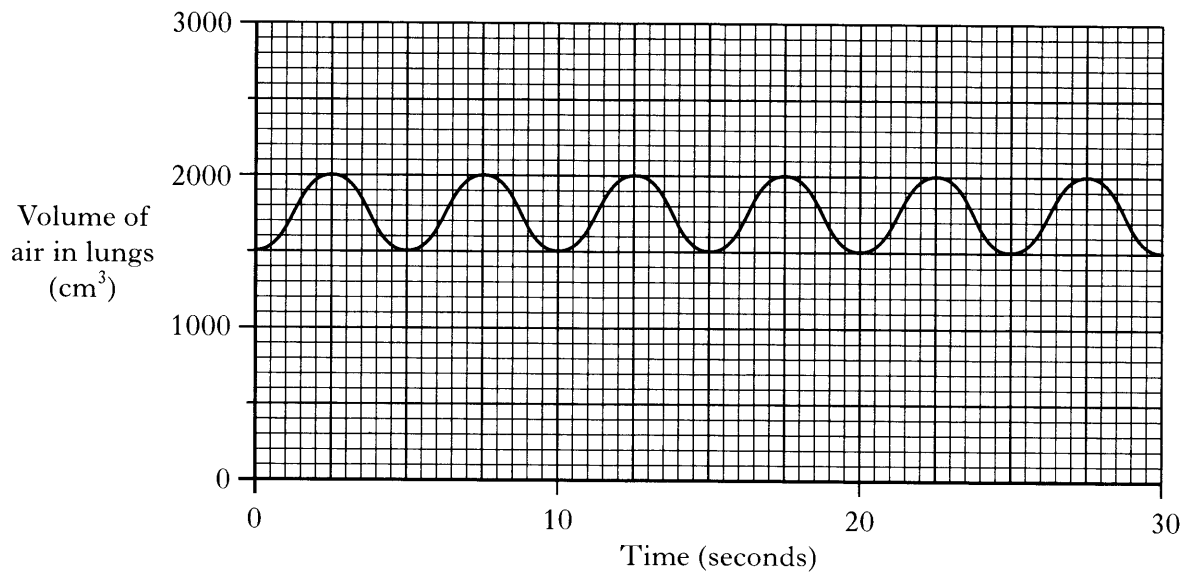
Questions 1 and 2 refer to the following diagram.



1. Which structure is the windpipe?
2. The function of part D is to
 - A remove carbon dioxide from the blood
 - B carry oxygen around the body
 - C pump blood around the body
 - D remove oxygen from the air.

[Turn over

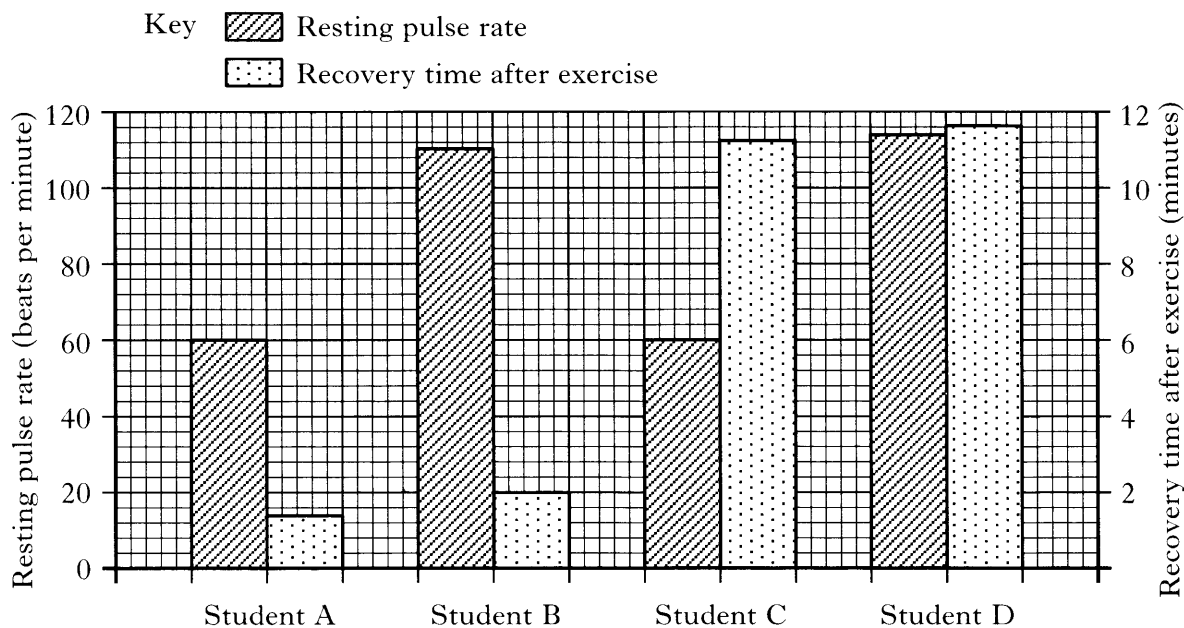
3. The graph below shows the volume of air in the lungs of a student during a 30 second period of time.



The student's breathing rate, in breaths per minute is

- A 6
 - B 12
 - C 13
 - D 24.
4. What name is given to the maximum rate at which air can be forced from the lungs?
- A Breathing rate
 - B Vital capacity
 - C Tidal volume
 - D Peak flow

5. The resting pulse rates and recovery times after exercise for four students are shown below.



Which student is most likely to be the fittest?

6. What can happen to the size and strength of muscles if they are **not** exercised regularly?

- A Size increases and strength decreases.
- B Size decreases and strength increases.
- C Size and strength both increase.
- D Size and strength both decrease.

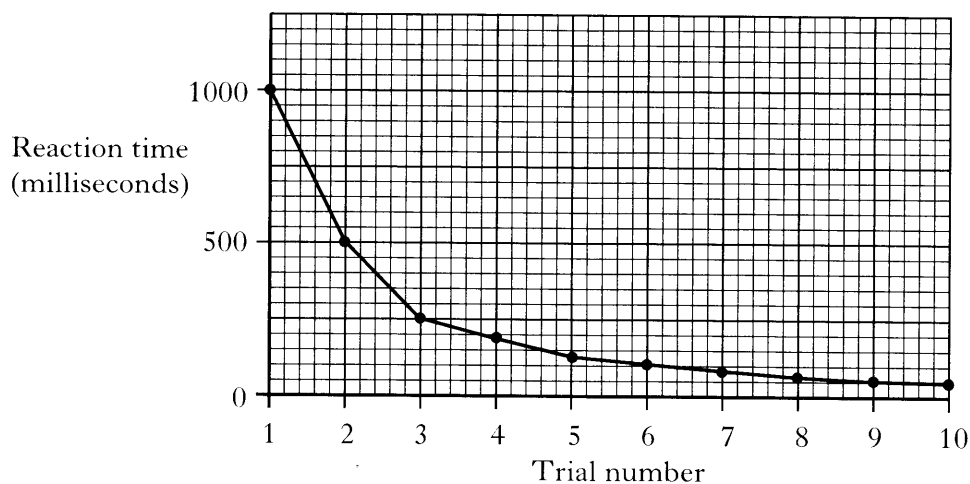
7. The percentages of different blood groups present in the British population are shown in the table below.

<i>Blood Group</i>	<i>Percentage of Population</i>
O	47
A	42
B	8
AB	3

In a British town of 100 000 people, how many would be expected to have blood group A?

- A 42
- B 2381
- C 42 000
- D 45 000

8. The graph below shows a student's reaction time over ten trials.



The change in reaction time shown in the graph is most likely to have been due to

- A a nerve disorder
 - B practice
 - C fatigue
 - D drinking alcohol.
9. The energy content of different foods is shown in the table below.

<i>Food</i>	<i>Energy content</i> (kJ per 100 g)
cornflakes	1500
milk	280
bread	1000
butter	3100

What is the energy content in a snack of 200 g bread, 10 g of butter and 100 g of milk?

- A 1590 kJ
- B 2590 kJ
- C 4380 kJ
- D 5380 kJ

10. Which of the following produces the carbon dioxide gas that makes dough rise?

- A Bacteria
- B Alcohol
- C Yeast
- D Lactic acid

11. Immobilisation techniques can be used in the production of

- A bread
- B beer
- C cheese
- D fermented milk drinks.

12. Which line in the table is true for **brewery** conditioned beer?

	<i>Yeast</i>	<i>Carbon dioxide</i>
A	not removed	added
B	removed	not added
C	removed	added
D	not removed	not added

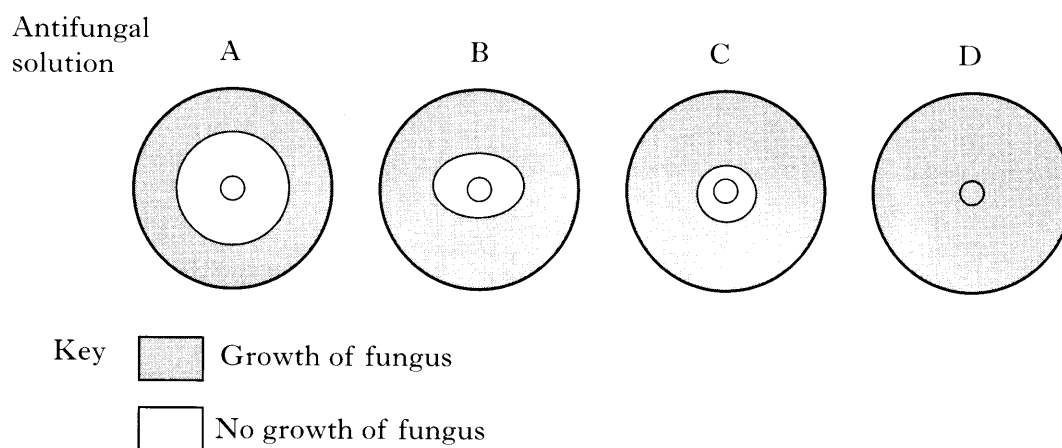
[Turn over

Questions 13 and 14 refer to the following information.

The steps in an investigation into the effects of four antifungal solutions are outlined below.

1. Four agar plates were spread with the same type of fungus.
2. A well was made in the centre of the agar in each plate.
3. A different antifungal solution was placed in each well.
4. The plates were incubated.
5. The size of any clear zone around each well was observed.

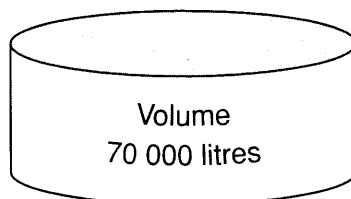
The results are shown below.



13. Which antifungal solution was **most** effective against the fungus?
14. Which of the following describes how a **control** for this investigation would differ from the plates above?
- A Different fungus
 - B Different antifungal solutions
 - C Water instead of antifungal solution
 - D Water instead of fungus
15. Which line in the table describes correctly the effects of disposal of waste whey into rivers?

	<i>Number of bacteria in river</i>	<i>Oxygen content of river</i>	<i>Number and types of other organisms</i>
A	decreases	increases	increase
B	increases	decreases	increase
C	increases	decreases	decrease
D	decreases	increases	decrease

16. The fermenter below is used in the manufacture of antibiotics.

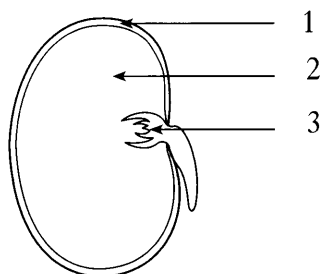


The fermenter produces 5 g of antibiotic **per litre** every day.

The total number of grams of antibiotic produced in **one week** in the fermenter is

- A 70 000
- B 350 000
- C 490 000
- D 2 450 000.

Questions 17 and 18 refer to the diagram of a broad bean seed below.



17. Which of the following correctly labels the parts of the seed?

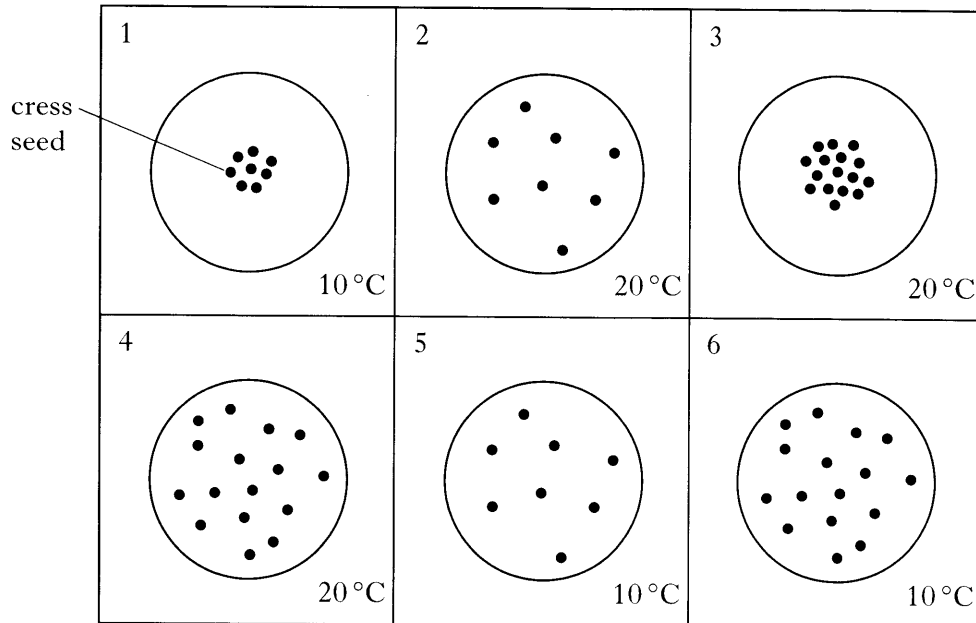
	<i>Part labelled</i>		
	<i>1</i>	<i>2</i>	<i>3</i>
A	embryo plant	seed coat	food store
B	seed coat	food store	embryo plant
C	food store	embryo plant	seed coat
D	seed coat	embryo plant	food store

18. The function of the seed coat is to provide

- A energy
- B protection
- C food
- D a suitable temperature.

Questions 19 and 20 refer to the investigation below.

The following dishes were set up to investigate different conditions affecting the germination of cress seeds.



19. Which **two** dishes should be compared to find the effect of temperature on germination?

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

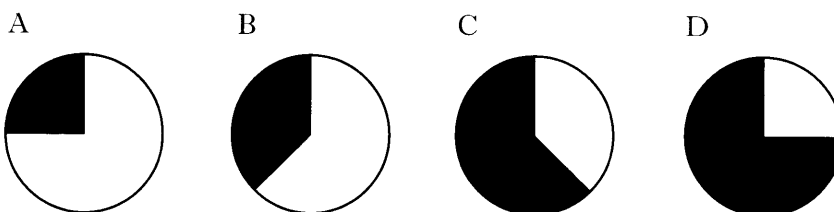
20. To investigate the effect of spacing on germination, dish 3 is best compared with

- A dish 2
- B dish 4
- C dish 5
- D dish 6.

21. The ratio of peat to sand in a compost is **3 : 1**.

Which of the following pie charts presents this information correctly?

Key Peat
 Sand



22. Which of the following **both** improve drainage when added to soil?

- A Loam and peat
- B Peat and sand
- C Sand and perlite
- D Loam and perlite

23. Which line in the table correctly matches the mineral to the part of the plant it encourages to grow?

<i>Mineral</i>		
	<i>Nitrogen (N)</i>	<i>Phosphorus (P)</i>
A	leaf	root
B	root	leaf
C	leaf	leaf
D	root	root

24. The plant in the diagram needs to be

- A dead headed
- B watered
- C potted on
- D given fertiliser.



25. Grey mould in plants can be controlled by

- A crushing
- B insecticide
- C fungicide
- D pesticide.

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

[Turn over for Section B on Page thirteen

SECTION B

All questions in this Section should be attempted.

Marks

1. Read the following passage carefully.

Inhalers can be used in the management of asthma as shown in the photograph.



Asthma is a very common condition. Britain has one of the highest rates for asthma in the world, along with New Zealand, Australia and Ireland. In 2001 the number of people suffering from asthma in Britain was higher than ever before.

It was estimated that 4.5 million people – 1 in 13 adults and 1 in 8 children – were being treated for asthma in Britain in that year. In 1999 the estimated figure was 3.4 million.

Nobody knows for sure why asthma is becoming more common, but it is thought to be due to a complex combination of genetic and environmental factors.

The number of new cases of asthma each year is now three to four times higher in adults and six times higher in children than it was twenty five years ago.

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

- (a) Which four countries have the highest rates for asthma in the world?

1

- (b) How many people were treated for asthma in Britain in 2001?

_____ million

1

- (c) Was the rate of asthma higher in adults or in children in 2001?

1

- (d) Which combination of factors is thought to have caused asthma to become more common?

1

Marks

2. (a) Forty adults were asked to name their favourite drink.
The results are shown below.

<i>Favourite drink</i>	<i>Number of adults</i>
Beer	20
Lemonade	10
Wine	5
Water	5

- (i) What was the most popular type of drink?

1

- (ii) Calculate the percentage of adults whose favourite drink was lemonade.

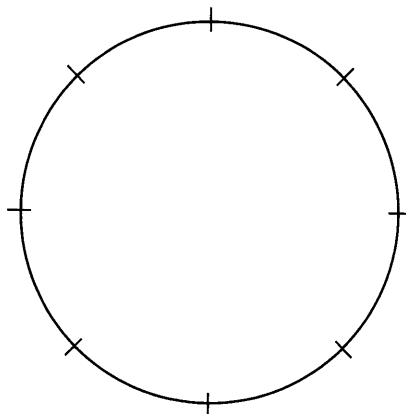
Space for calculation

_____ %

1

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

(An additional pie chart, if required, will be found on page 27.)



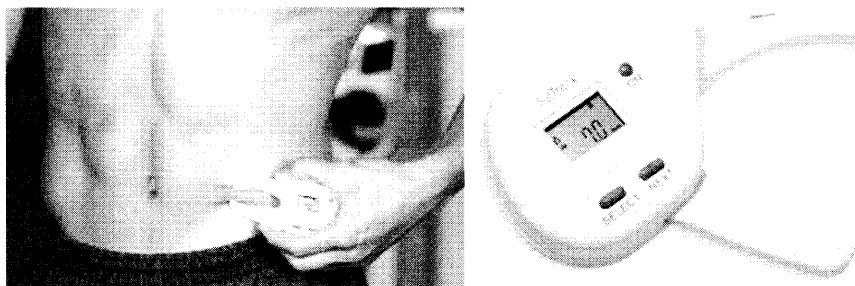
2

- (b) State **one long-term** effect of drinking alcohol to excess.

1

Marks

3. (a) Body fat can be measured using a body fat sensor as shown in the photograph. The sensor is an example of a high tech instrument.



- (i) Complete the table below by stating the measurement taken by each instrument and whether it is a high or low tech instrument.

<i>Instrument</i>	<i>Measurement</i>	<i>High or low tech</i>
Body fat sensor	Body fat	High
Clinical thermometer		
Digital sphygmomanometer		
Pulsometer		

2

- (ii) State **one disadvantage** of using high tech instruments.

1

- (b) Name **one** health condition which might occur as a result of being very overweight.

1

[Turn over

Marks

4. (a) The table below shows the percentage of men in different age groups who are light, medium and heavy smokers.

	<i>Percentage of men</i>					
	<i>16–24 years</i>	<i>25–34 years</i>	<i>35–44 years</i>	<i>45–54 years</i>	<i>55–64 years</i>	<i>65–74 years</i>
Light smokers	13	7	6	3	2	4
Medium smokers	19	17	11	13	13	8
Heavy smokers	6	15	18	17	17	8

- (i) What percentage of men aged 45–54 years are heavy smokers?

_____ %

1

- (ii) Calculate the percentage of men aged 16–24 years who **do not** smoke.

Space for calculation

_____ %

1

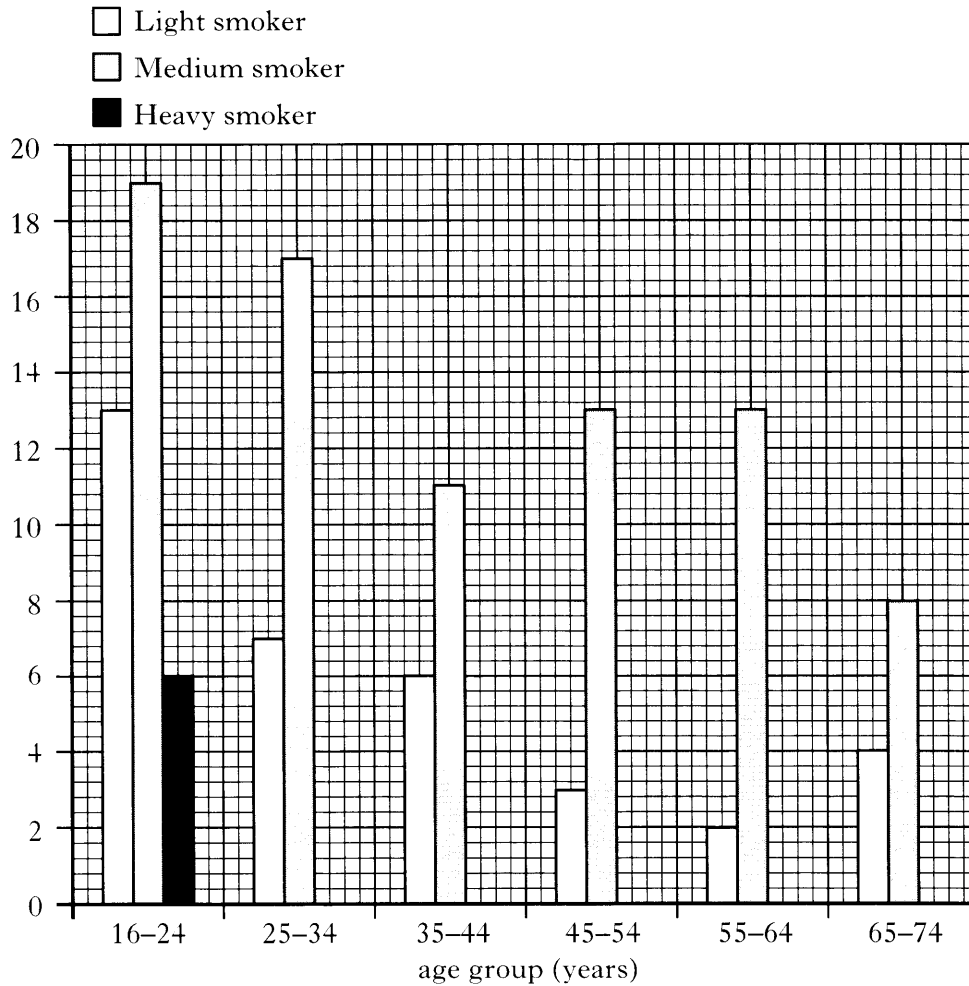
Marks

4. (a) (continued)

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

- (1) putting a label on the vertical axis
- (2) plotting the remaining results for heavy smokers.

(Additional graph paper, if required, will be found on page 27.)



(iv) Draw **one** conclusion from the table.

1

(b) Name **one** substance present in cigarette smoke which reduces the ability of the blood to carry oxygen.

1

[Turn over

Marks

5. The table below shows the percentage of 11–15 year olds who ate fresh fruit daily.

Year	11–15 year olds who ate fresh fruit daily (%)	
	Boys	Girls
1990	49.4	60.4
1994	60.9	69.0
1998	62.4	68.4

(a) What change occurred between 1990 and 1998 in the percentage of girls eating fresh fruit daily?

1

(b) Fresh fruit is a source of vitamins in a healthy diet.

(i) Why are vitamins important in a healthy diet?

1

(ii) A healthy diet contains a balance of three food types.

Name the three food types.

1 _____

2 _____

3 _____

1

Marks

6. The growth of sunflowers from seeds of different varieties was investigated by five students.

Each student grew a single seed from one of the varieties in the **same conditions**. After eight weeks, the height of each plant was measured.

The results are shown in the table below.

<i>Variety of sunflower</i>	<i>Height after eight weeks (cm)</i>
Teddy Bear	40
Pacino	0
Ring of Fire	100
Sunspot	45
Vanilla Ice	150

- (a) (i) Which variety of sunflower grew fastest?

1

- (ii) Suggest **one** improvement to make the results more **reliable**.

1

- (b) A suitable temperature is required to allow the sunflower seeds to germinate. Name **one** other condition required for seed germination.

1

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

1

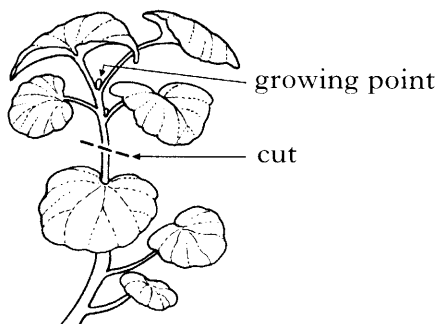
- (d) After a seed has germinated the plant makes its own food using sunlight. Name this process of food production.

1

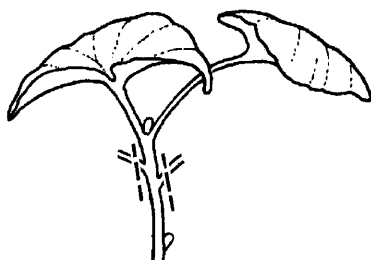
[Turn over

7. (a) A student carried out the following steps to take a cutting from a *Geranium* plant.

Step 1 A diagonal cut was made in the stem.

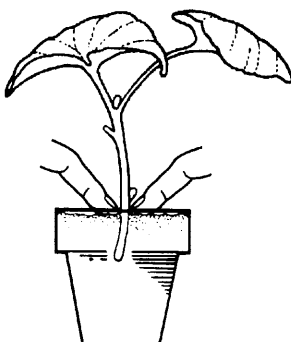


Step 2 The lower leaves of the cutting were removed.



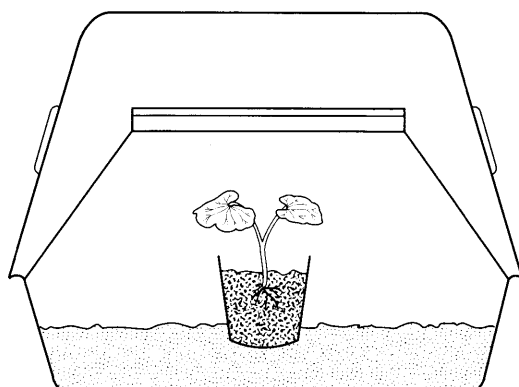
Step 3 A hole was made in the centre of the compost in a plant pot.

Step 4 The cutting was placed in the hole and secured by pressing down gently on the compost.



Step 5 The compost was dampened by adding water.

Step 6 The potted cutting was then placed in a mist propagator.



Marks

7. (a) (continued)

- (i) What name is given to the growing point shown in **Step 1**?

1

- (ii) Describe an additional step that could be taken to encourage root growth.

1

- (iii) Suggest a different method of increasing humidity if a mist propagator was not available for **Step 6**.

1

- (b) Another method of propagating plants involves the pegging down of stems into soil. This is shown in the diagram below.



- (i) What name is given to this method of pegging down?

1

- (ii) State **one** advantage of this method.

1

[Turn over

Marks

8. (a) The temperature in a greenhouse was recorded once each day for a week. The results are shown in the table below.

<i>Day of week</i>	<i>Temperature (°C)</i>
Monday	24
Tuesday	22
Wednesday	23
Thursday	24
Friday	20
Saturday	13
Sunday	21

- (i) Calculate the **average** temperature for the week.

Space for calculation

_____ °C

1

- (ii) Describe a possible source of error that could have given the result obtained on Saturday.

1

- (b) During warm, sunny weather the temperature in a greenhouse can rise so high that the plants can be damaged.

State **one** way of reducing the temperature in a greenhouse.

1

Marks

9. Seeds can be sown on capillary matting or in pots. These methods of sowing seeds were compared using three types of Cyclamen: *C. balearicum*, *C. coum* and *C. libanoticum*.

Ten seeds of each type were sown in pots and fifteen seeds of each type were sown on capillary matting.

C. balearicum took 89 days to germinate in pots and 120 days on capillary matting.

C. coum took 51 days to germinate in pots and 55 days on capillary matting.

C. libanoticum took 57 days to germinate in pots and 62 days on capillary matting.

- (a) Use this information to complete the table by

(i) providing headings

1

(ii) putting in the results for each type.

1

<i>Type of Cyclamen</i>	<i>Time to germinate (days)</i>	
<i>C. balearicum</i>		
<i>C. coum</i>		
<i>C. libanoticum</i>		

- (b) Which type of Cyclamen was the slowest to germinate?

1

- (c) Suggest **one** way in which the experimental procedure could be improved to make the comparison **valid**.

1

[Turn over

Marks

10. A student carried out an investigation to compare how well a washing powder worked at different temperatures.

The results are shown in the table below.

<i>Temperature (°C)</i>	<i>Percentage of stain removed</i>
10	80
20	88
30	94
40	92
50	82
60	63

(a) On the grid below complete the **line graph** by

(i) providing a label for the horizontal axis

1

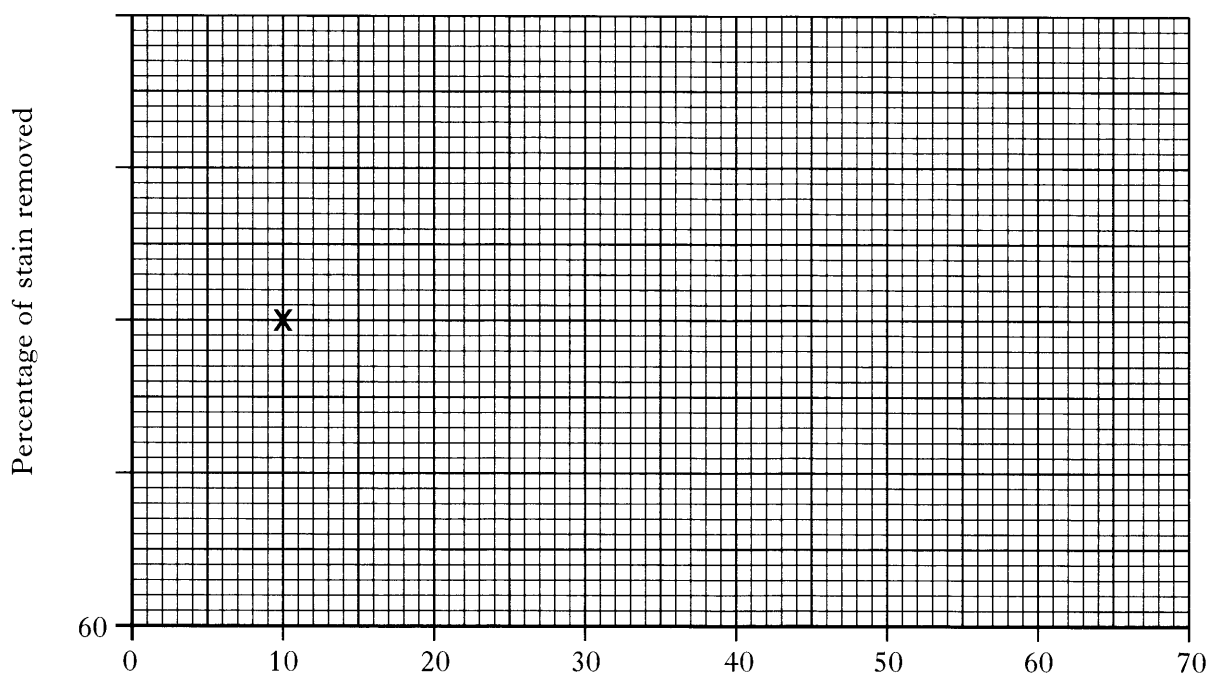
(ii) completing the scale on the vertical axis

1

(iii) plotting the remaining results.

1

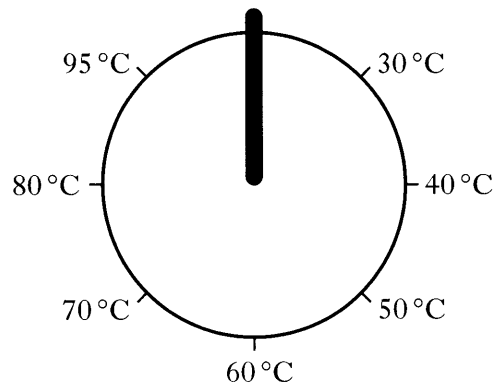
(Additional graph paper, if required, will be found on page 28.)



Marks

10. (continued)

(b) The diagram below represents the temperature dial on a washing machine.



Using the information in the table, **circle** the temperature that should be recommended to get the best results from this washing powder.

1

(c) **Biological** washing powders contain enzymes.

(i) Name the organisms used to produce these enzymes.

1

(ii) The enzymes are enclosed in a harmless coating.
Suggest a reason for this.

1

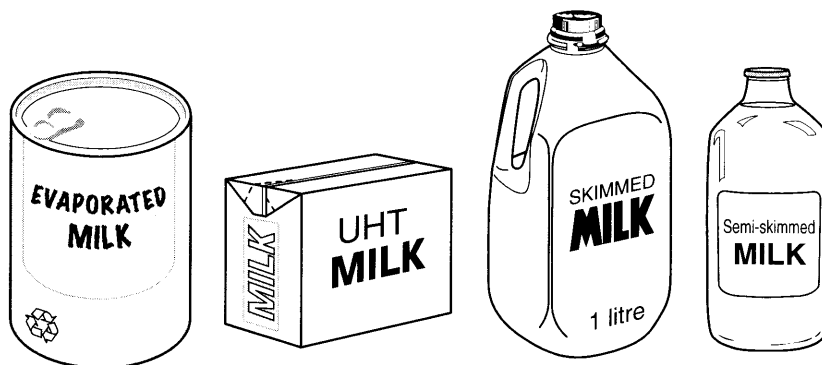
(iii) Biological washing powders are used at lower temperatures and this reduces fuel consumption.
Explain why this can reduce pollution in the environment.

1

[Turn over

Marks

11. (a) Four types of milk are shown in the diagram below.



Complete the table below to match the type of milk to its treatment.

<i>Treatment</i>	<i>Type of milk</i>
Heat treated to kill all bacteria giving it a longer shelf life	
Nearly all the fat is removed	
Half the water is removed	
About half of the fat is removed	

2

(b) Before the milk reaches the supermarket, samples are tested with resazurin. What does the resazurin test detect in the milk samples?

1

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

Rennet is added to milk during cheese-making to clot {protein.} {fat.}

The liquid left over after clotting is called {curds.} {whey.}

1

[END OF QUESTION PAPER]