FOR OFFICIAL USE

X007/101

X0071002 1

Section B Total

NATIONAL QUALIFICATIONS 2010

THURSDAY, 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 (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** 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 examination, 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?

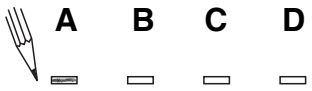
A Butter

B Bread

C Sugar

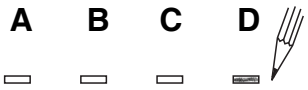
D Apple

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. Which box below shows two products that are **both** made using yeast?

A UHT milk and cheese 	B Bread and Beer 
C Bread and UHT milk 	D Yoghurt and beer 

2. Antibiotics act on

A bacteria but not viruses

B viruses but not bacteria

C viruses and bacteria

D fungi and viruses.

3. The enzyme rennet is produced by both

A calves and bacteria

B calves and genetically engineered fungi

C viruses and genetically engineered fungi

D bacteria and fungi.

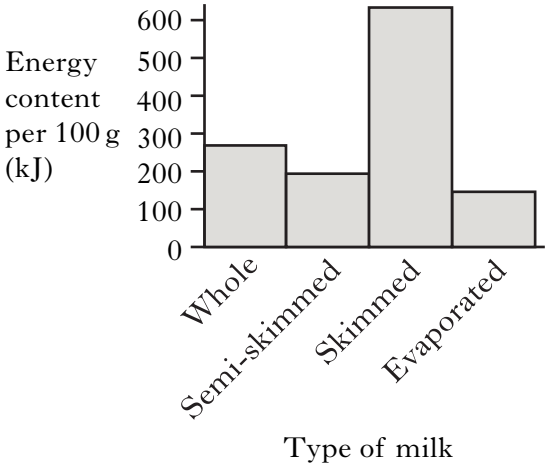
[Turn over

4. The table below shows the energy content of four types of milk.

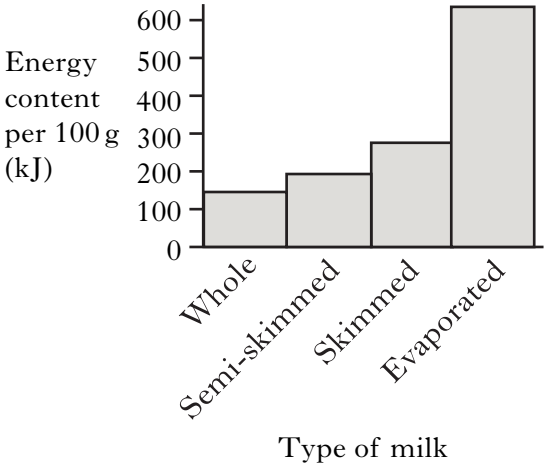
Type of milk	*Energy content per 100 g* (kJ)
Whole	275
Semi-skimmed	195
Skimmed	145
Evaporated	630

Which of the following graphs correctly represents this information?

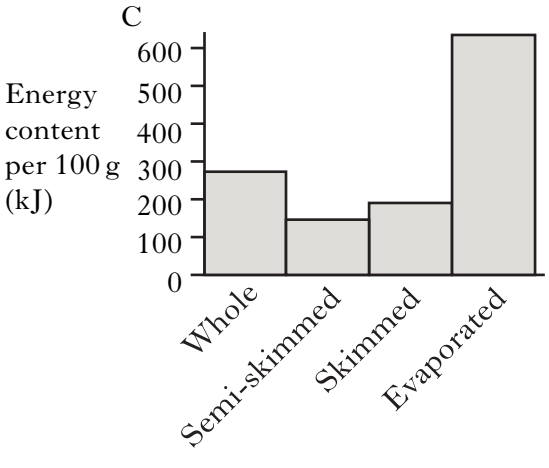
A



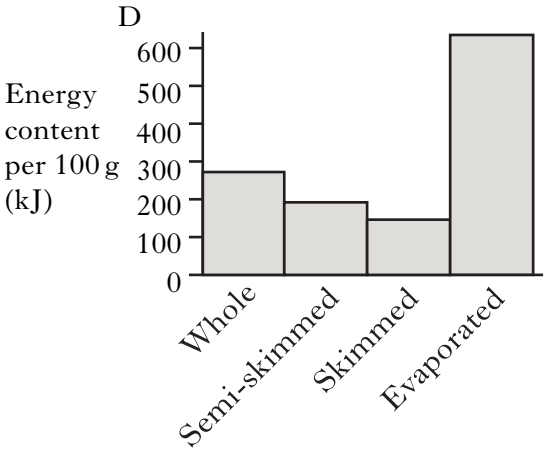
B



C

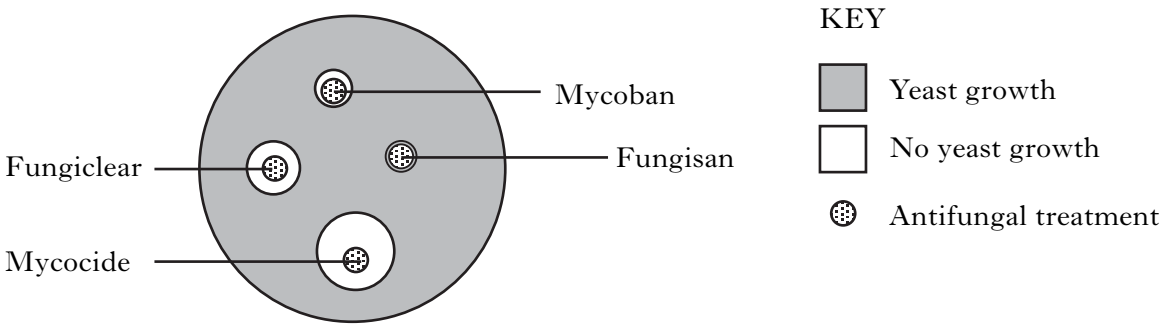


D



5. An investigation was carried out into the effectiveness of four antifungal treatments on preventing the growth of yeast.

The results are shown in the diagram below.



Use the results to select the correct conclusion.

A All antifungal treatments are equally effective.

B All antifungal treatments prevent growth of all yeasts.

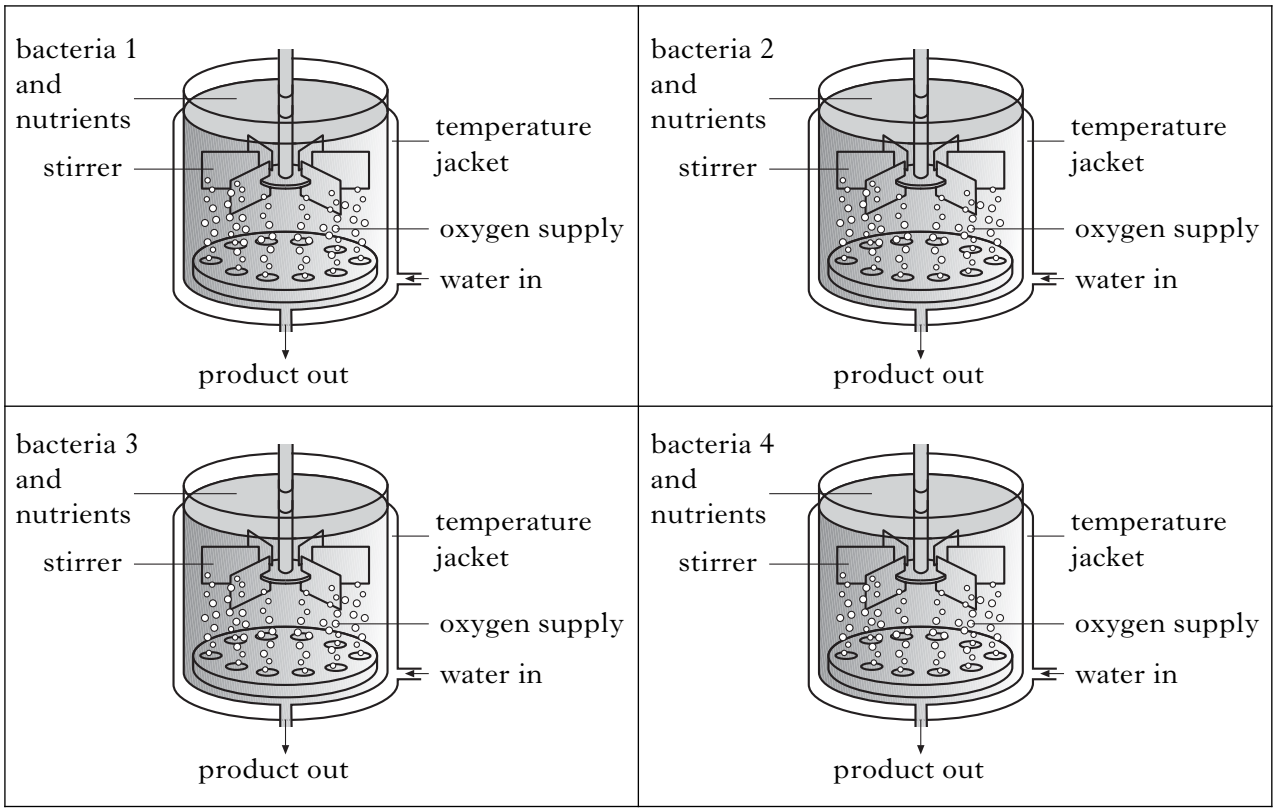
C Mycocide is most effective and Fungisan is least effective.

D Fungisan is most effective and Mycocide is least effective.

[Turn over

6. The diagrams below show an investigation into the production of bacteria in four fermenters set up under identical conditions.

The time taken for 100 mg of each type of bacteria to be produced was measured.



The results are shown in the table below.

Type of bacteria	*Time taken to produce 100 mg* (minutes)
1	35
2	12
3	50
4	42

Which variable was altered in this investigation?

A Temperature

B Type of bacteria

C Mass of bacteria produced

D Time

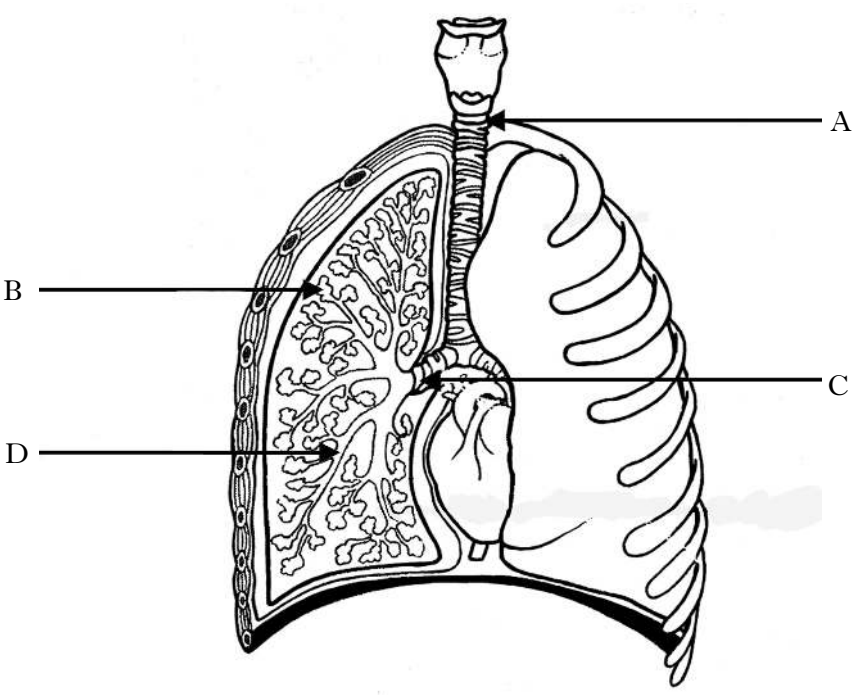
7. Fresh milk can be heat treated to destroy disease-causing microbes.
The milk produced is

A pasteurised
B skimmed
C evaporated
D UHT.

8. Detergent enzymes are enclosed in a coating. This is to prevent them

A dissolving in hot water
B causing allergic reactions
C digesting stains
D causing pollution.

9. The diagram below shows part of the breathing system.
Which structure is a bronchiole?



[Turn over

10. Pulse rate can be used as an indicator of health.

Which line in the following table shows **three** correct methods of measuring pulse rate?

	Methods		
A	heart rate monitor	peak flow meter	pulsometer
B	heart rate monitor	peak flow meter	finger and stop watch
C	heart rate monitor	pulsometer	finger and stop watch
D	peak flow meter	pulsometer	finger and stop watch

11. Which of the following statements about body temperature is correct?

A Normal human body temperature is 35 °C.

B A body temperature below 37 °C indicates fever.

C A body temperature above 37 °C indicates hypothermia.

D A body temperature below 30 °C can lead to death.

Questions 12 and **13** refer to the following information about six students who took part in an investigation about peak flow.

Student 1 Fit male Age 15 Mass 60 kg	*Student 2* Fit male Age 15 Mass 65 kg	*Student 3* Fit male Age 30 Mass 60 kg
Student 4 Fit female Age 30 Mass 60 kg	*Student 5* Fit female Age 15 Mass 50 kg	*Student 6* Unfit female Age 30 Mass 50 kg

12. Which **two** students should be compared to investigate the effect of age on peak flow?

A Students 1 and 3

B Students 2 and 3

C Students 1 and 4

D Students 5 and 6

13. Which factor would be investigated if students 3 and 4 were compared?

A Age

B Fitness

C Mass

D Sex

14. Which line in the table below shows advice that a doctor might give to a patient to help reduce blood pressure?

	Salt content of diet	*Regular exercise*	*Weight*
A	↓	↑	↓
B	↑	↓	↓
C	↓	↑	↑
D	↑	↑	↓

KEY

↓ decrease

↑ increase

15. The steps in an investigation to measure tidal volume in male students are outlined below.

Step 1 Ten male students were randomly selected.

Step 2 The volume of air breathed in and out of the lungs in one normal breath was measured.

Step 3 The average tidal volume of all the students was calculated.

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

A Selecting ten males randomly

B Measuring the tidal volume in only one breath

C Selecting only male students

D Calculating the average for the male students

[Turn over

16. Which blood test can be used to detect leukaemia?

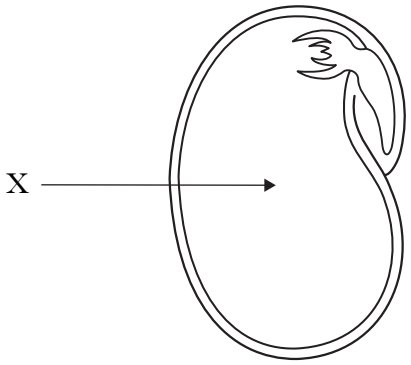
A Sugar content

B Iron content

C White blood cell count

D Presence of antibodies

17. The diagram below shows a broad bean seed with the outer coat removed.



The part labelled X is the

A food store which provides energy for growth

B embryo which will grow into the new plant

C embryo which provides energy for growth

D food store which will grow into the new plant.

18. Pelleted seeds are

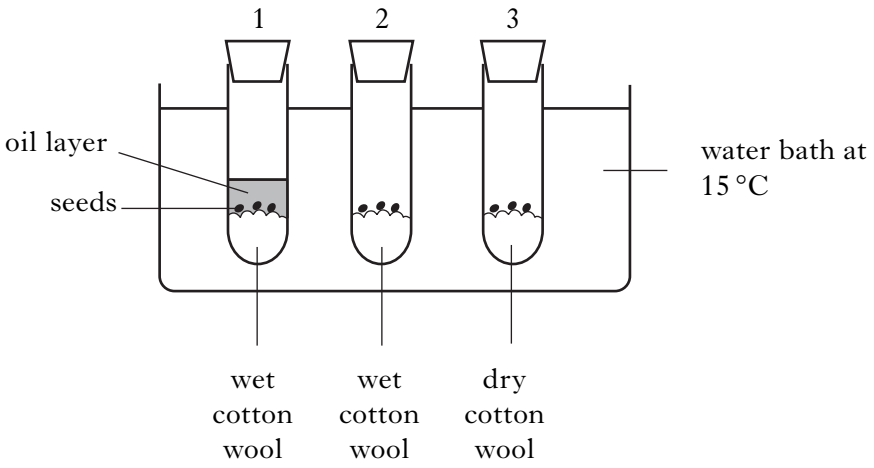
A enclosed in a small ball of clay

B germinated before sowing

C kept in a freezer for three weeks

D mixed with fine silver sand.

19. The following apparatus was set up to investigate germination.



In which test tube(s) would germination be most likely to take place?

A Test tube 1 only

B Test tubes 1 and 2 only

C Test tube 2 only

D Test tubes 2 and 3 only

20. 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.

	Colour produced		
Seed type	*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 stores only sugar?

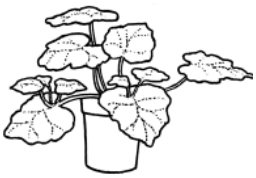
A Barley

B Pea

C Cabbage

D Mustard

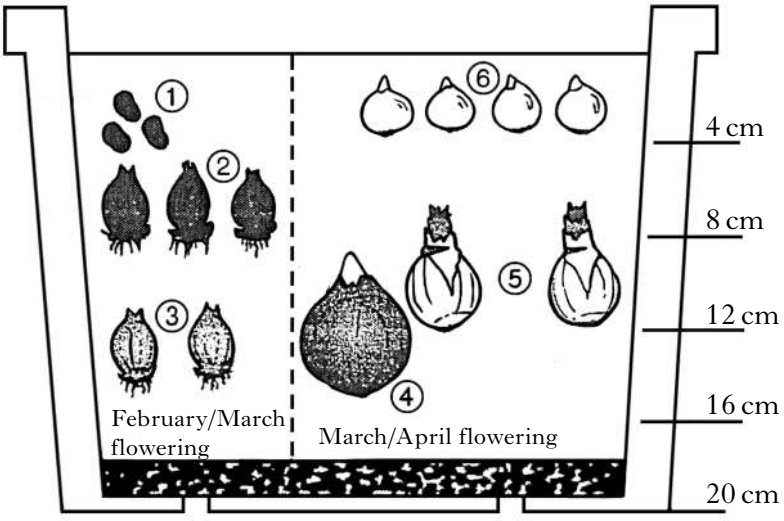
21. Which of the following plant propagation structures is an offset?

	Plant propagation structure	*Description*
A		A food storage organ
B		Small plants growing out of the soil at the base of the parent plant
C		Miniature plant attached to the parent plant
D		Stems with young plants growing at their ends

22. The diagram below shows the planting depths of a variety of bulbs and the months when the plants produce flowers.

KEY

① Anemone blanda
② Iris "Violet Beauty"
③ Iris danfordiae
④ Hyacinth "Carnegie"
⑤ Narcissus "Tête à Tête"
⑥ Crocus "Snowstorm"



Which of the following should be planted at a depth of 4–12 cm for flowering in April?

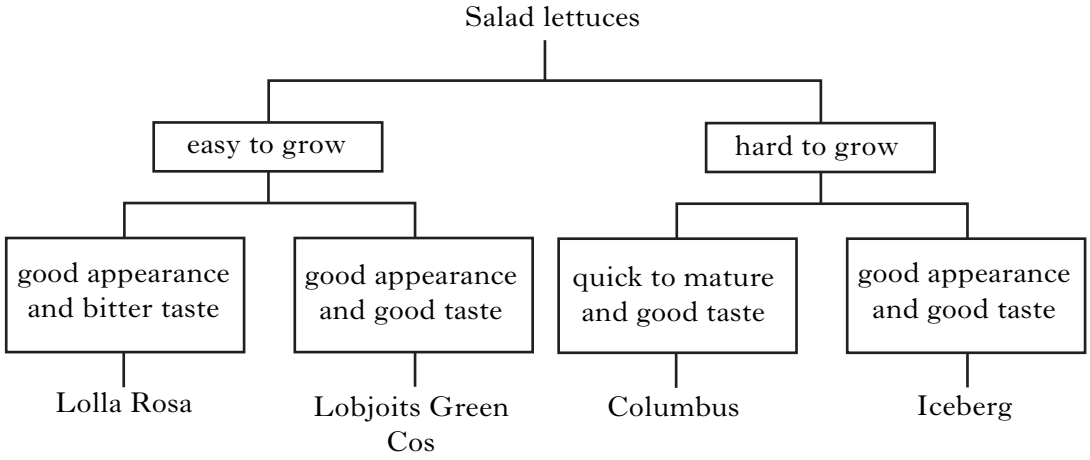
A Anemone blanda

B Iris danfordiae

C Narcissus "Tête à Tête"

D Crocus "Snowstorm"

23. The key below can be used to identify some varieties of salad lettuces.



Which of the following best describes Lobjoits Green Cos?

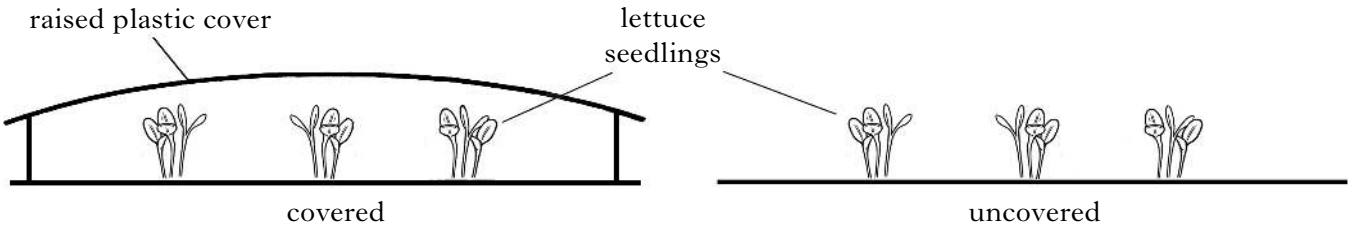
A Good appearance, good taste and hard to grow

B Good appearance, bitter taste and easy to grow

C Good taste, quick to mature and easy to grow

D Good appearance, good taste and easy to grow

24. An investigation was carried out into the effect that a plastic cover had on the growth of lettuce plants from seed.



The following measurements were taken during the investigation.

1 The final mass of all the covered plants
2 The final mass of all the uncovered plants
3 The temperature of the soil under the cover
4 The temperature of the uncovered soil

Which of the measurements would be used to investigate the effect of the cover on growth?

A 1 and 2 only

B 1 and 3 only

C 2 and 4 only

D 3 and 4 only

[Turn over

25. Which of the following is **not** a method of controlling aphids?

A Insecticide

B Soapy water

C Crushing

D Fungicide

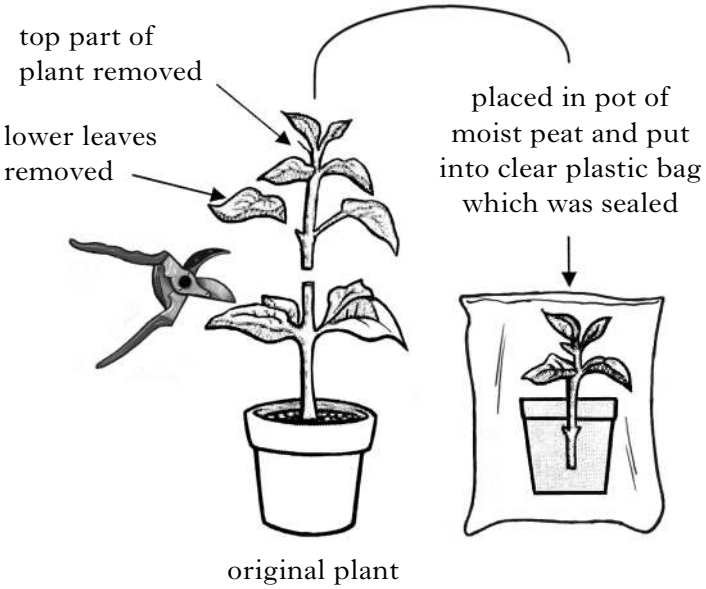
Candidates are reminded that the answer sheet for Section A MUST be returned <u>inside</u> this answer book.

Marks

SECTION B

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

1. The diagram below shows a method of artificial plant propagation.



(*a*) Name this method of artificial propagation.

_____ **1**

(*b*) State **one** feature in the diagram that reduces water loss.

_____

_____ **1**

(*c*) Describe an **additional** step which could be taken to encourage root growth.

_____ **1**

[Turn over

Marks

2. (*a*) A greenhouse is shown in the photograph below.

(i) What is the function of the thermostat in the greenhouse?

_____ **1**

(ii) Describe **one** method of providing ventilation in this greenhouse.

_____ **1**

(*b*) The table below shows the temperatures taken inside and outside a greenhouse over a 24 hour period in winter.

	Temperature (°C)	
Time (hours)	*Inside*	*Outside*
0	14	0
4	14	3
8	15	4
12	14	6
16	15	5
20	13	3
24	14	2

Marks

2. (*b*) (continued)

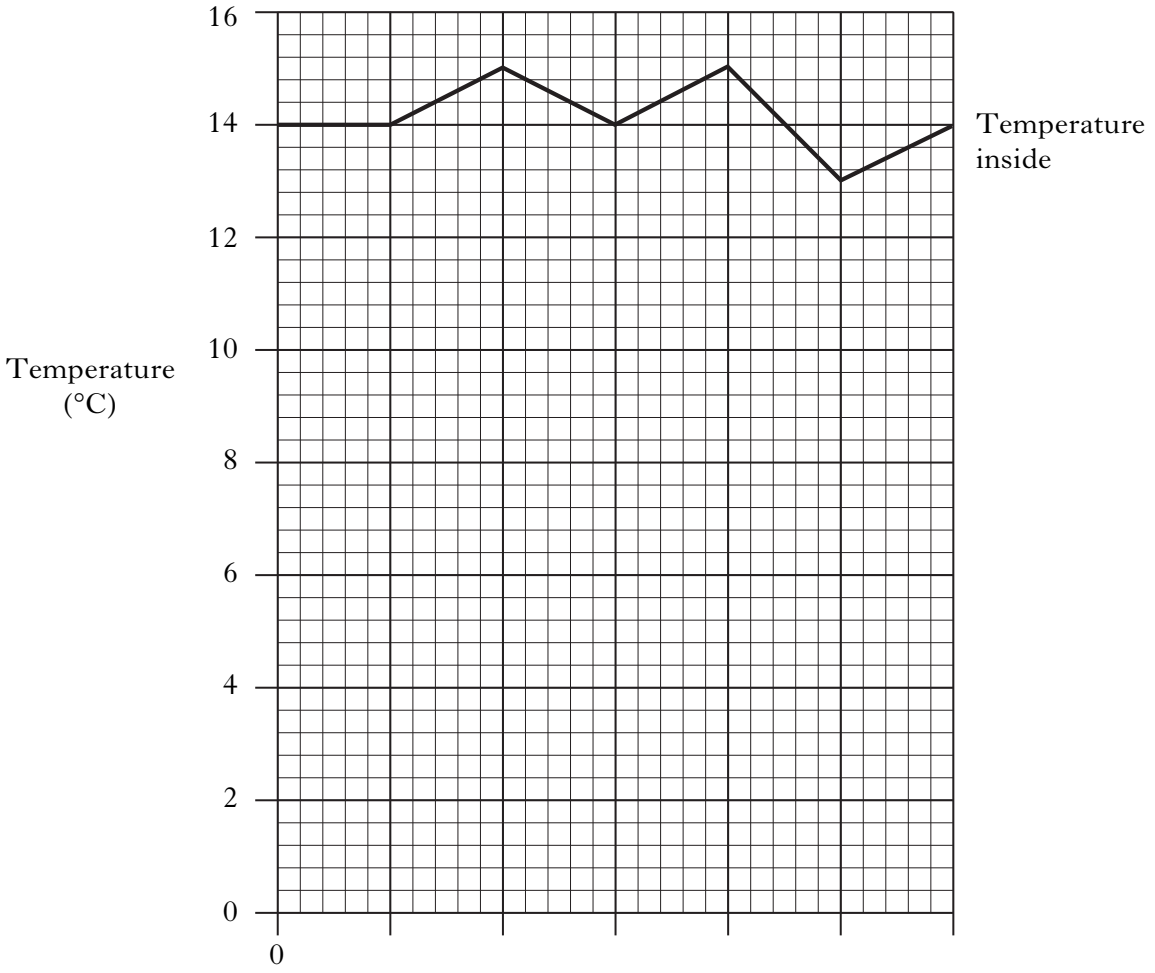
On the grid below, complete the **line graph** by:

(i) providing a scale for the horizontal axis; **1**

(ii) providing a label for the horizontal axis; **1**

(iii) plotting the results for the temperature **outside** the greenhouse. **1**

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



[Turn over

Marks

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

Different areas of the country have different types of soil. Some areas have clay soil which is heavy to dig, is made of small particles and has a high mineral content. It drains poorly and can easily become waterlogged and it has low air content.

Other areas have sandy soil which has large particles and a low mineral content. It is light to dig, has high air content and drains freely.

Loam soil is also found in some areas. Loam has medium-sized particles, is easy to dig, is rich in organic matter and minerals and has good air content. It doesn't drain too quickly, or become waterlogged.

Use information **in the passage** to answer the following questions.

(i) Complete the table below.

Type of soil	*Ease of digging*	*Air content*	
clay		low	small
	easy	good	medium-sized
	light		

2

(ii) Which type of soil becomes easily waterlogged?

_____ **1**

(iii) Compare the mineral content of clay soil with that of sandy soil.

_____

_____ **1**

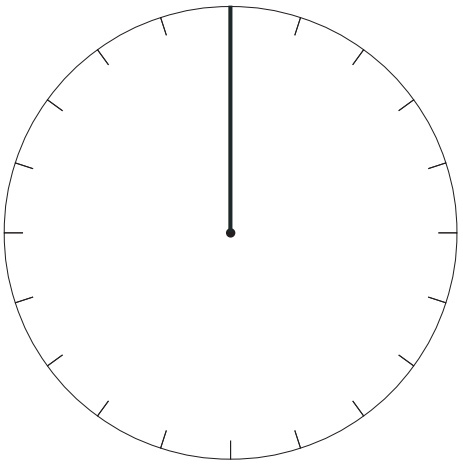
Marks

3. (continued)

(*b*) The table below shows the percentage composition of a loam soil.

Component	*Composition* (%)
Air	25
Minerals	40
Organic matter	10
Water	25

(i) Present the information in the table in the form of a pie chart.
(An additional pie chart, if required, may be found on *Page thirty*.)



2

(ii) Calculate the simple whole number ratio of minerals to organic matter in the **loam soil**.
Space for calculation

_____ : _____ **1**
minerals organic matter

(*c*) Name **one** mineral needed for plant growth.

_____ **1**

[Turn over

Marks

4. (*a*) The table below shows information about different varieties of lily.

Variety of lily	*Time of first bud appearing*	*Time of first flower appearing*	*Time of last flower appearing*
Angel's Braid	Mid June	Late June	Early October
Baby Blanket	Mid June	Late June	Mid July
Mexican Siesta	Early June	Early July	Mid July
Milano Maraschin	Early June	Mid June	Early July
Octavian Orchid	Early June	Mid July	Early October

Use the information to answer the questions below.

(i) In which variety of lily is there **one month** between the first bud appearing and the first flower appearing?

_____ **1**

(ii) Which variety of lily has flowers for the longest time?

_____ **1**

(iii) How many varieties of lily would be expected to have flowers in late June?

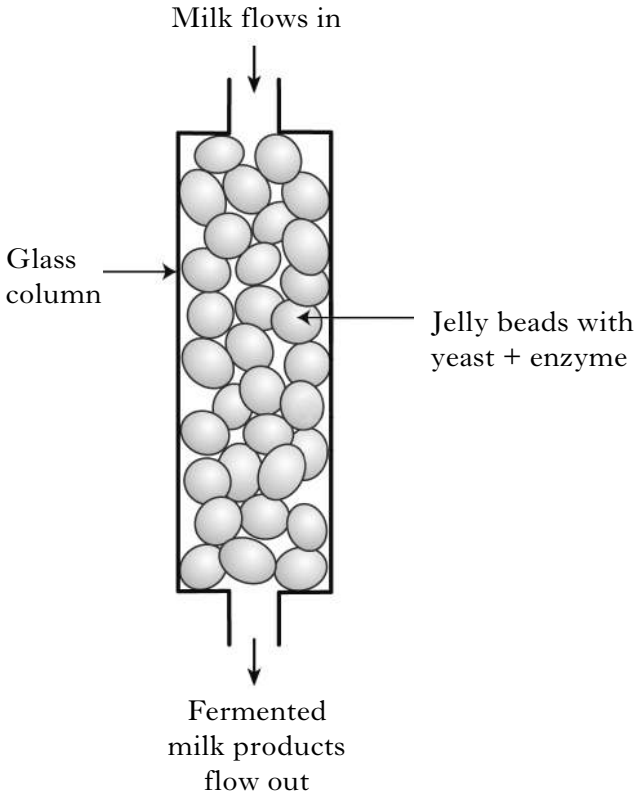
_____ **1**

(*b*) Draw lines to connect each plant maintenance problem to its correct solution.

Plant maintenance problem	***Solution***	
Overcrowded conditions	Dead heading	
Roots growing out of container	Potting on	
Plant flowering coming to an end	Pricking out	**1**

Marks

5. Fermented milk drinks can be made using the following apparatus.



(*a*) Name the technique used to trap the enzyme and yeast in the jelly beads.

_____ **1**

(*b*) State **one** advantage of using this technique.

_____ **1**

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

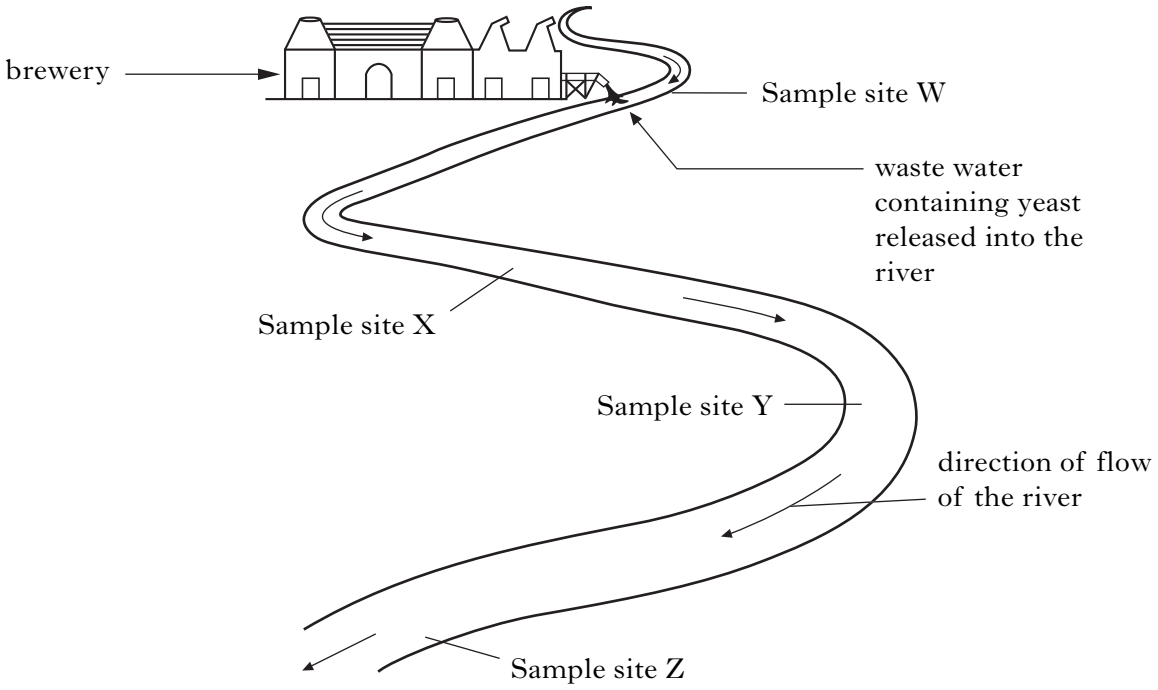
(i) The enzyme converts some {lactic acid / sugar} to {lactic acid / sugar}. **1**

(ii) The yeast converts some {sugar / lactic acid} to alcohol and {oxygen / carbon dioxide}. **1**

[Turn over

6. (*a*) Waste water containing yeast from a brewery was accidentally released into a river.

One sample of water was taken at each of four sample sites as shown in the diagram below.



The oxygen content of each sample was measured.

The results are shown in the table.

Sample site	*Oxygen content* (units)
W	10
X	4
Y	7
Z	8

Marks

6. (*a*) (continued)

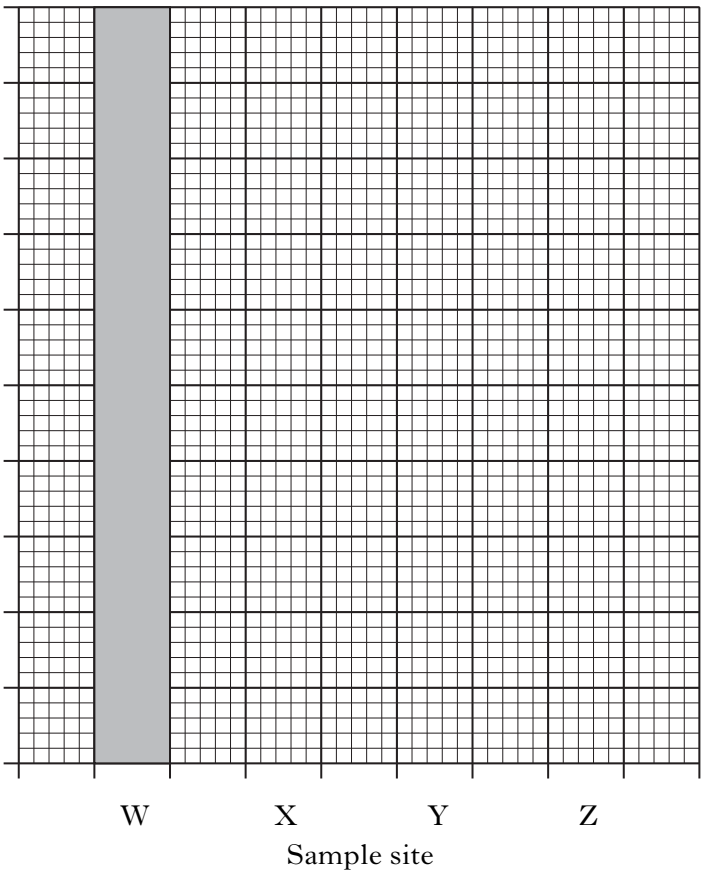
(i) On the grid below, complete the **bar graph** by:

1 putting a scale on the vertical axis; **1**

2 providing a label for the vertical axis; **1**

3 plotting the remaining results. **1**

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



(ii) Suggest an improvement which would make the results more **reliable**.

_____ **1**

(iii) Complete the table below by placing **one** tick (✓) in **each row** to show the effects of the release of this waste at **sample site X** compared to **sample site W**.

	Decreases	*Stays the same*	*Increases*
Availability of oxygen			
Number of bacteria			
Number of other organisms			

2

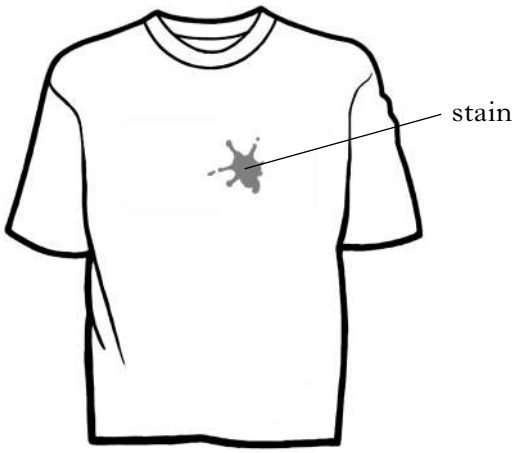
(*b*) Name **one** product which can be made by upgrading waste from yeast-based industries.

_____ **1**

Marks

7. (*a*) A student carried out an investigation to compare the effectiveness of detergents on stain removal.

He used two types of detergents on two different materials at two different temperatures.



The results are shown in the table below.

Type of detergent	*T-shirt material*	*Temperature* (°C)	*Percentage stain remaining*
Biological	Cotton	30	10
Non-biological	Polyester	40	15
Biological	Cotton	40	0
Non-biological	Cotton	30	25

(i) Which conditions left the t-shirt with **most** stain remaining?

Type of detergent _____

T-shirt material _____

Temperature _____ °C **1**

(ii) What percentage of stain was **removed** by the biological detergent from the cotton t-shirt at 30 °C?

Space for calculation

_____ % **1**

Marks

7. (*a*) (continued)

(iii) The student stated that non-biological washing powder works best at 40 °C.

Explain why this is **not** a valid conclusion from these results.

_____

_____ **1**

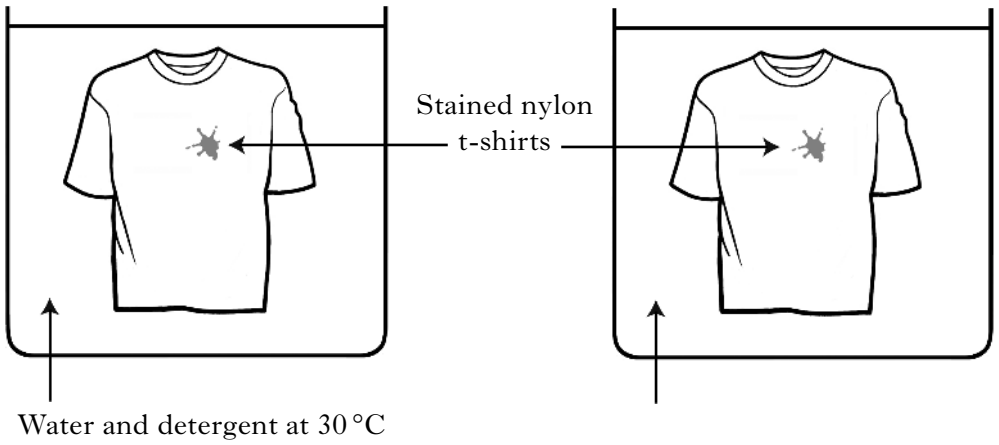
(iv) What valid conclusion can be drawn about the effectiveness of **biological** detergents from this investigation?

_____

_____ **1**

(v) The student carried out a further investigation into the effect of a detergent on a nylon t-shirt at 30 °C.

Complete the diagram below to show a suitable control for this investigation.



_____

_____ **1**

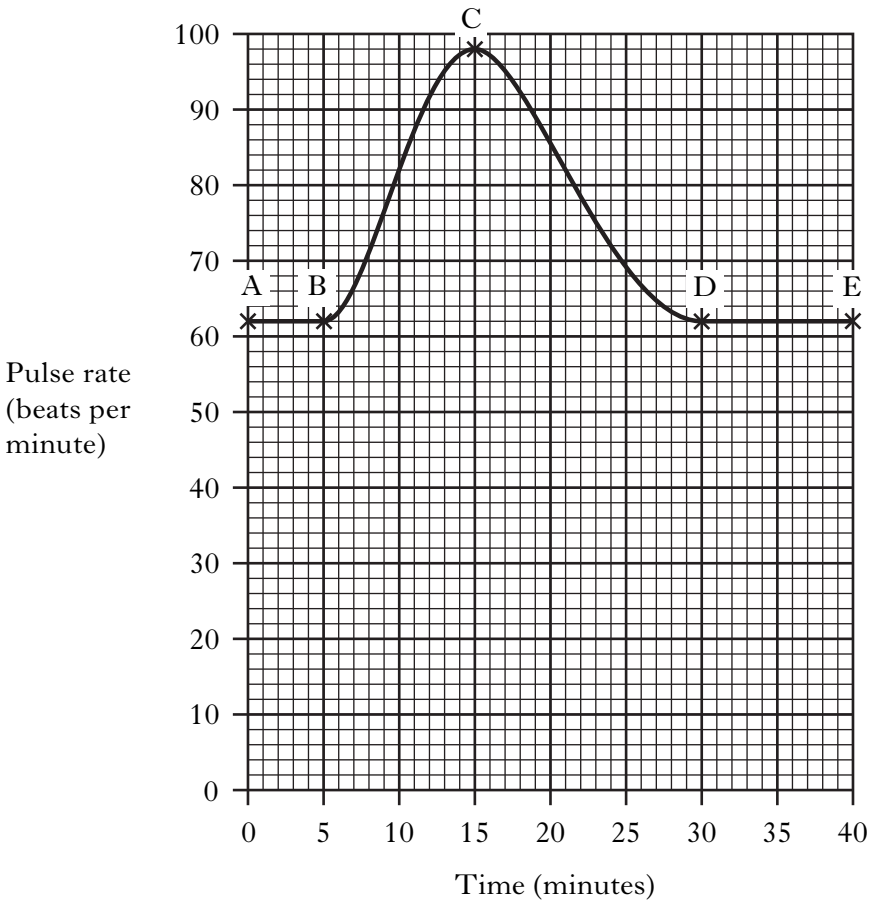
(*b*) Describe **one** environmental effect of detergents in waste water.

_____ **1**

[Turn over

Marks

8. (*a*) The graph below shows the pulse rate of a 16 year old girl before, during and after exercise.



Use the graph to answer the following questions.

(i) What was the girl's resting pulse rate?

_____ beats per minute **1**

(ii) What was the girl's maximum pulse rate?

_____ beats per minute **1**

(iii) Insert **two** letters in the sentence below to indicate the part of the graph which shows her recovery time.

Her recovery time is shown between points _____ and _____ . **1**

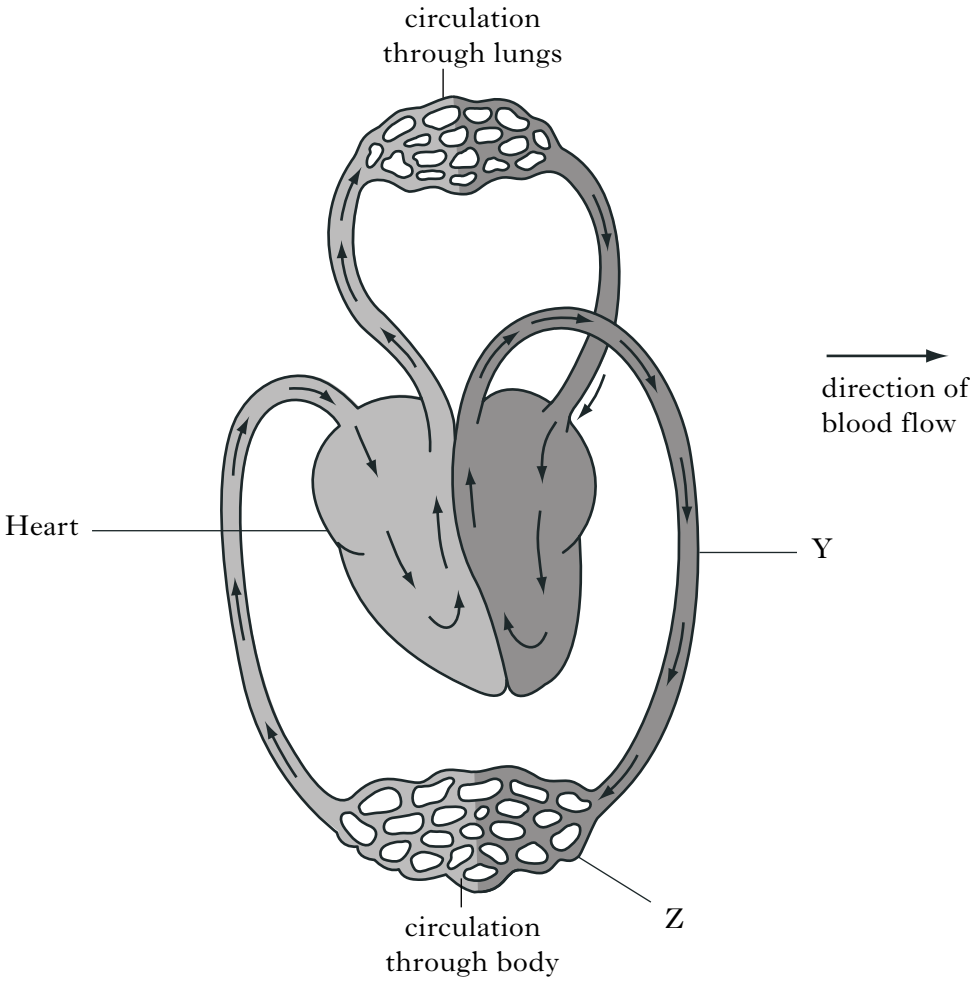
(*b*) What effect does regular exercise have on a person's resting pulse rate?

_____ **1**

DO NOT WRITE IN THIS MARGIN

Marks

9. The diagram below shows the heart and blood vessels in the human circulatory system (not drawn to scale).



(*a*) (i) Label the diagram with the letter "**X**" to show a blood vessel carrying blood with a **high oxygen** content. **1**

(ii) Name **one** substance, other than oxygen, that is carried in the blood.

_____ **1**

(*b*) There are three main types of blood vessel: arteries, capillaries and veins.

Name the types of blood vessels labelled Y and Z in the diagram.

(i) Blood vessel Y _____

(ii) Blood vessel Z _____ **1**

[Turn over

Marks

10. (*a*) The recommended percentages of different substances in the human body are shown in the table below.

Substance	*Recommended percentage* (%)
Protein	14
Fat	
Carbohydrate	1
Water	63
Minerals	2
Total	**100**

Complete the table by calculating the recommended percentage of fat in the human body.

Space for calculation

1

(*b*) Name an instrument used to measure body fat.

_____ **1**

(*c*) What is the main use of protein in the human body?

_____ **1**

(*d*) Name **one** health condition which may be indicated by a person being underweight.

_____ **1**

Marks

11. (*a*) A survey was carried out into the alcohol drinking habits of 50 males and 50 females.

The percentages of males and females who drank more alcohol than the recommended weekly allowance are shown in the table below.

	Percentage who drank more alcohol than the recommended weekly allowance	
Age group (years)	*Males*	*Females*
16–24	41	23
25–34	37	20
35–44	36	17
45–54	34	16

Calculate the average percentage of **males** aged 16 to 54 who drank more alcohol than the recommended weekly allowance.

Space for calculation

_____% **1**

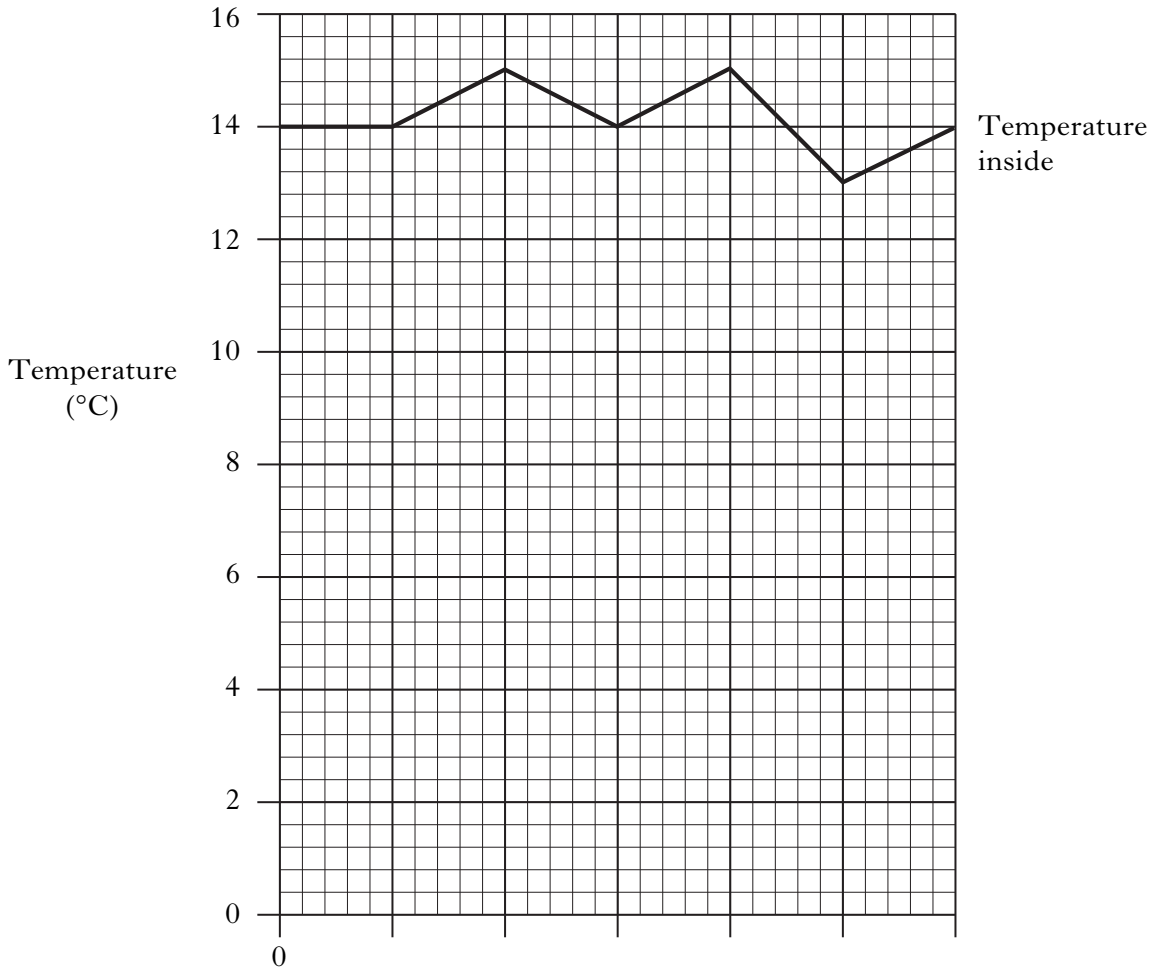
(*b*) State one **short** term effect of drinking alcohol on the body.

_____ **1**

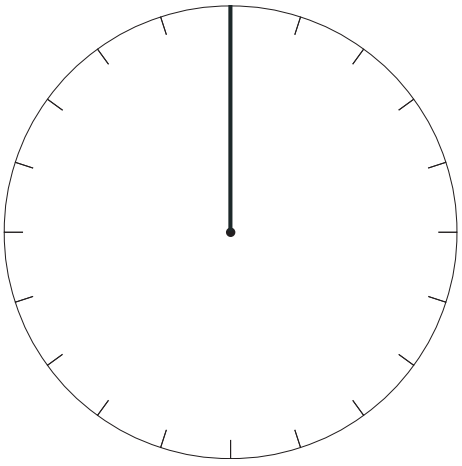
[*END OF QUESTION PAPER*]

SPACE FOR ANSWERS

ADDITIONAL GRAPH PAPER FOR QUESTION 2(*b*)

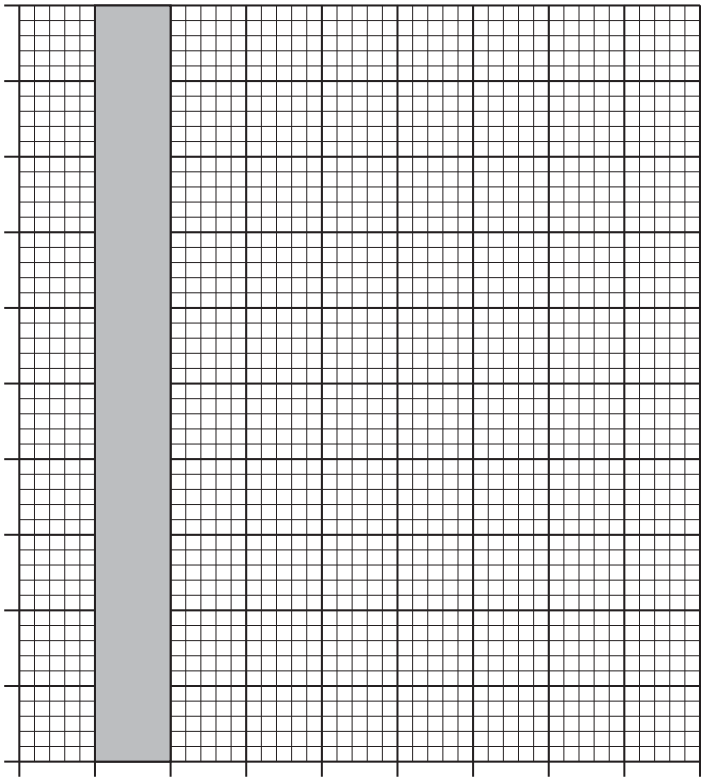


ADDITIONAL PIE CHART FOR QUESTION 3(*b*)(i)



SPACE FOR ANSWERS

ADDITIONAL GRAPH PAPER FOR QUESTION 6(*a*)(i)



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SPACE FOR ANSWERS