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Mark

NATIONAL QUALIFICATIONS 2012

BIOLOGY
INTERMEDIATE 1

X0071002

WEDNESDAY, 23 MAY
9.00 AM – 10.30 AM

X007/10/02

Fill in these boxes and read what is printed below.

Full name of centre

Town

Forename(s)

Surname

Number of seat

Date of birth
Day Month Year

Scottish candidate number

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.

SQA ©

X0071002 01

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

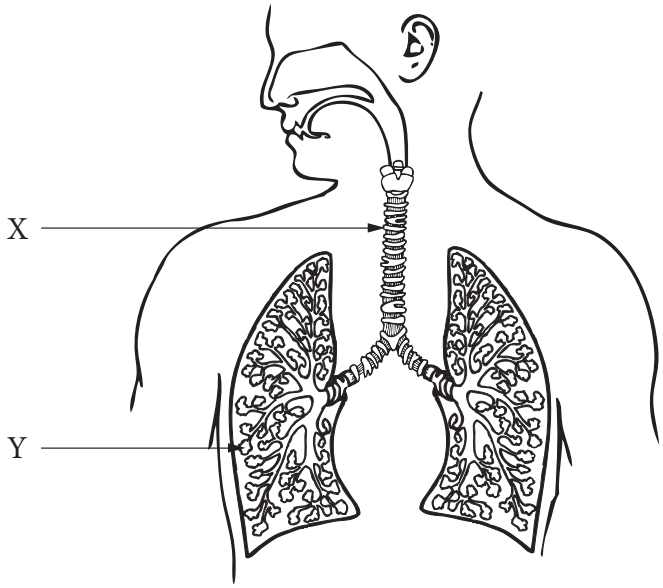
If you decide to change your answer, carefully erase your first answer and, using your pencil, fill in the answer you want. The answer below has been changed to **D**.

SECTION A

All questions in this section should be attempted.

Answers should be given on the separate answer sheet provided.

1. The diagram below shows the human breathing system.



Which line in the table correctly identifies structures X and Y?

	X	*Y*
A	bronchus	air sacs
B	windpipe	air sacs
C	windpipe	bronchus
D	bronchus	bronchioles

2. A student measured her breathing rate for 20 seconds.

She counted 7 breaths.

Her breathing rate in **breaths per minute** was

A 7

B 20

C 21

D 140.

3. Which line in the table below correctly shows a low tech and a high tech instrument for measuring blood pressure?

	Low tech	*High tech*
A	Digital sphygmomanometer	Pulsometer
B	Heart rate monitor	Stethoscope and mercury manometer
C	Pulsometer	Heart rate monitor
D	Stethoscope and mercury manometer	Digital sphygmomanometer

4. **High** blood pressure can lead to

A fainting, angina and heart attack

B stroke, fainting and angina

C stroke, angina and heart attack

D fainting, stroke and heart attack.

5. The following list refers to medical conditions.

1 Arthritis

2 Diabetes

3 Anaemia

Being overweight can lead to an increased risk of conditions

A 1 and 2 only

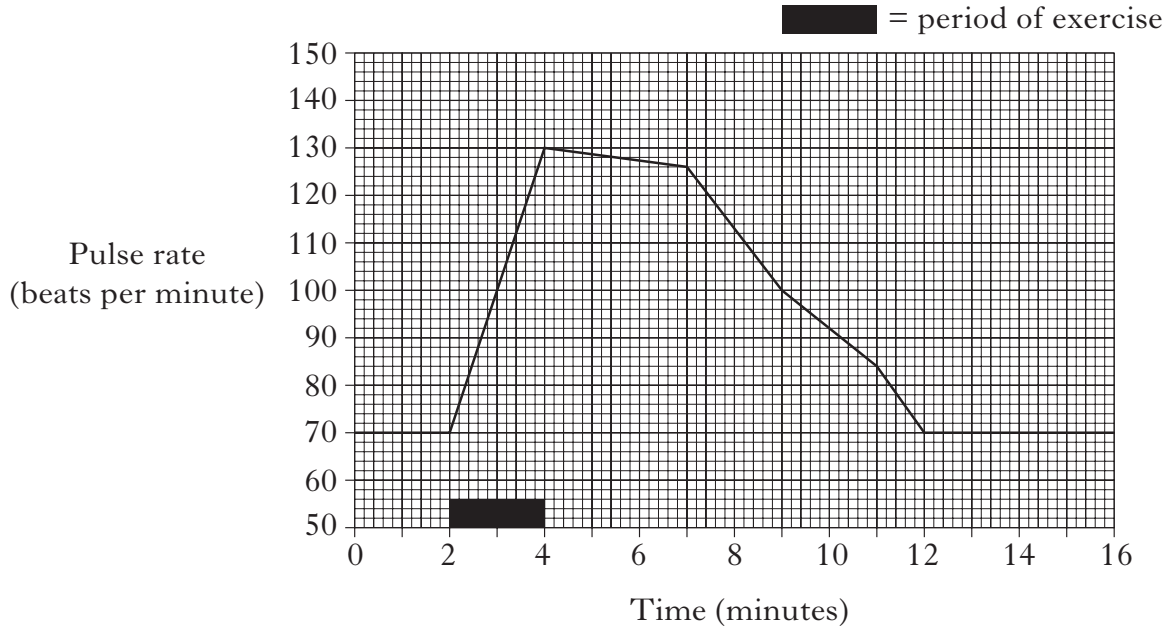
B 1 and 3 only

C 2 and 3 only

D 1, 2 and 3.

6. The pulse rate of a student was recorded before, during and after two minutes of exercise.

The results are shown in the graph below.



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

A 8 minutes

B 10 minutes

C 12 minutes

D 16 minutes

7. The grid below shows information about six groups of people involved in an investigation into factors which affect pulse rate.

Group 1 20 year old fit males	*Group 2* 60 year old unfit males	*Group 3* 20 year old fit females
Group 4 20 year old unfit males	*Group 5* 60 year old unfit females	*Group 6* 60 year old fit females

Which two groups should be compared to investigate the effect of age on resting pulse rate?

A 1 and 2

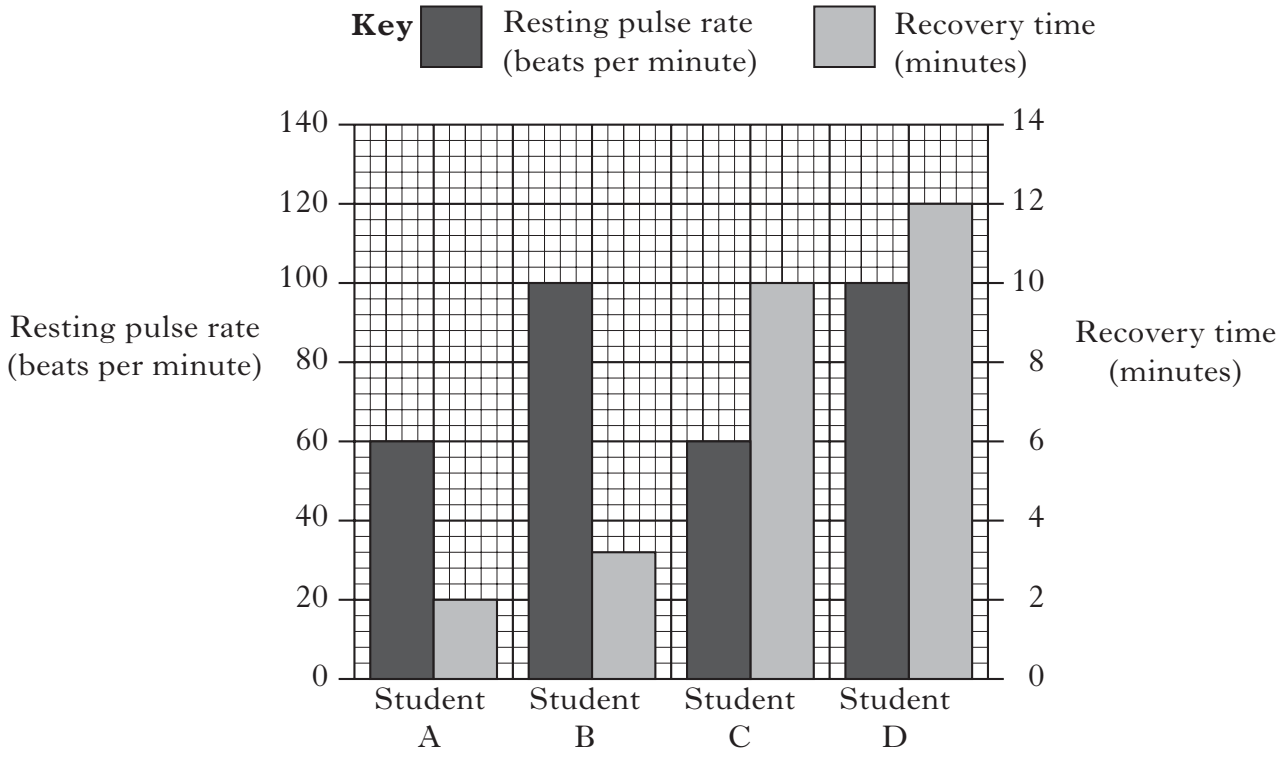
B 2 and 3

C 4 and 5

D 3 and 6

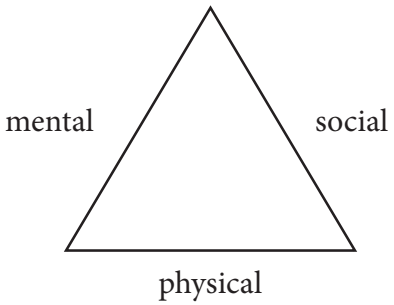
8. In an investigation, the pulse rate and recovery times of four students were measured.

The results are shown in the graph below.



Which student is most likely to be fittest?

9. The three aspects of health are shown in the diagram below.



Which of the following activities would involve **both** physical and social aspects of health?

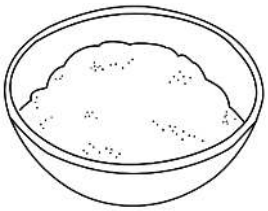
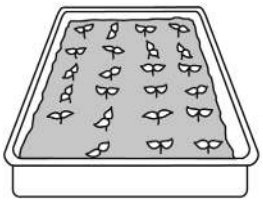
A Playing a computer game on your own

B Watching a video with friends

C Hill walking with friends

D Running on your own

10. The table below shows information about growing cauliflowers.

Sowing	*Pricking out or thinning*	*Transplanting*	*Harvesting*
			
In a frame September to October	Prick out to 5 cm apart	April	July
In a greenhouse January to February	Prick out to 5 cm apart	March	July
In the open ground August	Thin to 45 cm apart	Not transplanted	July of the following year

When would the cauliflowers grown in a greenhouse be transplanted?

A January to February

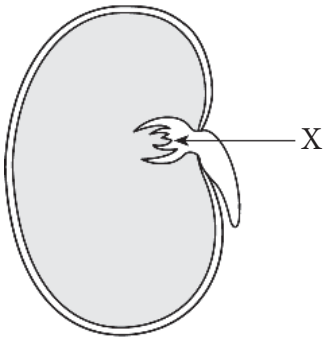
B March

C April

D July

[Turn over

11. The diagram below shows the structure of a seed.



Which line in the following table correctly identifies the name and function of the part labelled X?

	Name	*Function*
A	Food store	Grows into new plant
B	Embryo	Grows into new plant
C	Embryo	Provides energy for growth
D	Food store	Provides energy for growth

12. Which of the following are **all** required for seed germination?

A Light, water and oxygen

B Water, suitable temperature and light

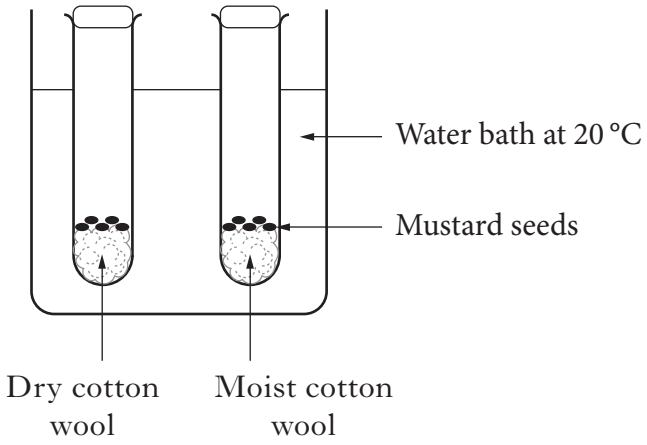
C Light, suitable temperature and oxygen

D Water, oxygen and suitable temperature

13. Which line in the table below describes correctly germination of pelleted seeds compared to non-pelleted seeds?

	Type of seed	*Water required*	*Germination time*
A	pelleted	more	longer
B	pelleted	less	shorter
C	non-pelleted	more	shorter
D	non-pelleted	less	longer

14. The diagram below shows the apparatus used in an investigation into the conditions needed for germination of mustard seeds.



The variable being investigated was

A water

B temperature

C light

D number of seeds.

15. In plants, which process produces food that can be used for growth?

A Dormancy

B Photosynthesis

C Germination

D Propagation

[Turn over

16. The table below shows the average mass of sugar present in one food storage organ of two plants, X and Y.

Plant	*Average mass of sugar per food storage organ* (g)
X	54
Y	6

The number of food storage organs of plant Y needed to give the same average mass of sugar as one food storage organ of plant X is

A 6

B 9

C 48

D 54.

17. Which of the following are **both** examples of food storage organs in plants?

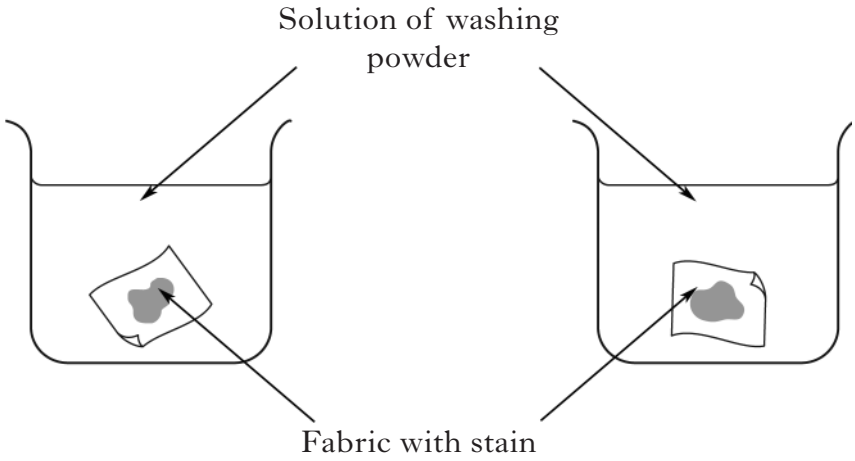
A Bulbs and runners

B Tubers and offsets

C Tubers and plantlets

D Bulbs and tubers

18. The diagram below shows an experiment to investigate stain removal by two different washing powders.



Which of the following factors should be kept constant?

1 Type of washing powder
2 Type of fabric
3 Type of stain

A 1 and 2 only

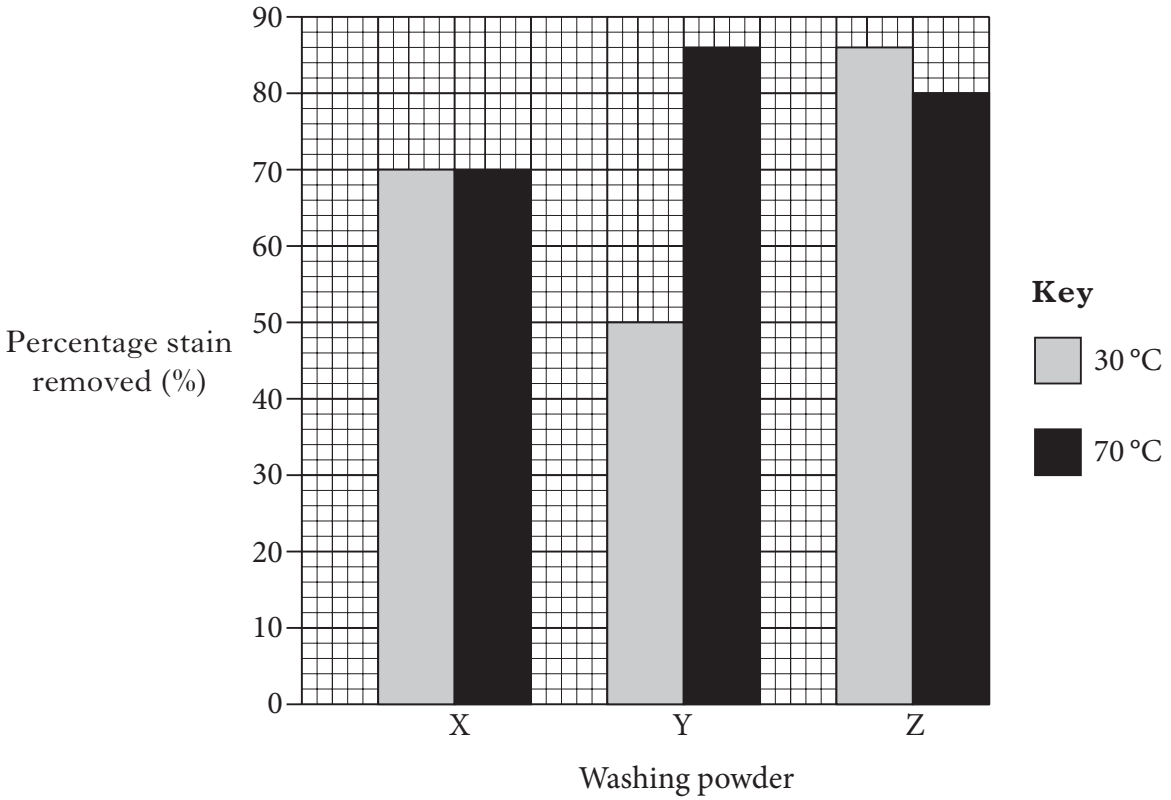
B 1 and 3 only

C 2 and 3 only

D 1, 2 and 3

[Turn over

19. The graph below shows the percentage of stain removed by three different washing powders (X, Y and Z) when used at different temperatures.



Which line in the following table correctly shows the washing powder that worked best at each temperature?

	Washing powder which worked best at	
	30 °C	*70* °C
A	X	X
B	Y	Z
C	Z	Y
D	Z	Z

20. Detergents released into lakes and rivers can

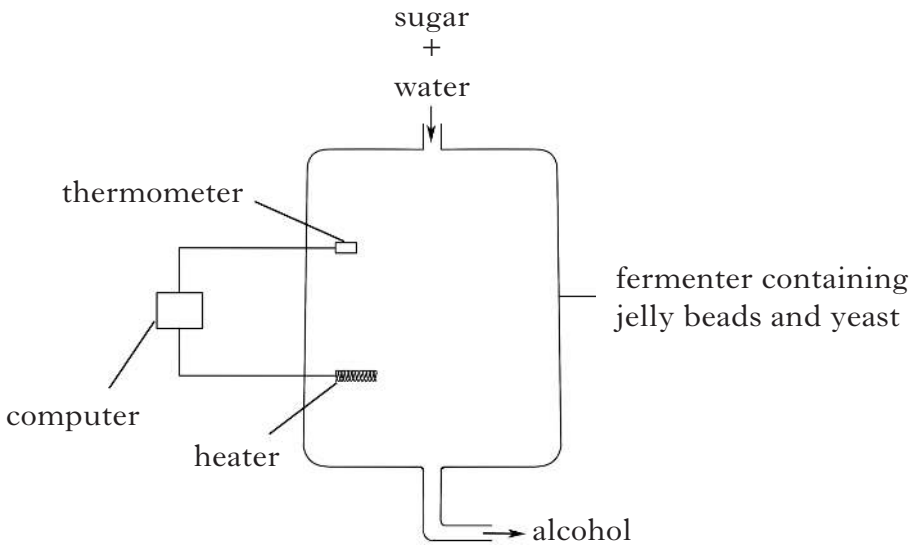
A increase the growth of algae

B increase the availability of oxygen

C decrease the number of bacteria

D increase the number of fish.

21. The diagram below shows a simple fermenter.



The computer is being used to monitor and adjust

A yeast

B sugar

C alcohol

D temperature.

22. A student carried out an investigation into the effect of temperature on the growth of yeast cells.

The results are shown in the table below.

Temperature (°C)	*Number of yeast cells at start* (per mm^3)	*Number of yeast cells after 2 hours* (per mm^3)
10	50	60
20	55	100
30	50	560
40	45	140

Which of the following improvements would make this investigation more **valid**?

A Use the same number of yeast cells at the start

B Repeat the experiment

C Count the number of yeast cells after one hour

D Use a wider range of temperatures

23. Waste whey can be upgraded to produce a creamy alcoholic drink.

Which of the following uses whey as a food source in this process?

A Sugar

B Bacteria

C Yeast

D Lactic acid

24. Rennet is used in cheese making.

Rennet is added to milk to clot

A protein to form curds

B protein to form whey

C sugar to form curds

D sugar to form whey.

25. Which of the following are **both** sources of rennet?

A Bacteria and genetically engineered fungi

B Calves and genetically engineered fungi

C Bacteria and calves

D Yeast and bacteria

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

[Turn over for SECTION B on *Page sixteen*

DO NOT WRITE ON THIS PAGE

SECTION B

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

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

Asthma – What are the symptoms?

Asthma can occur with one or more of four main symptoms: wheezing, cough, chest-tightness and breathlessness. The most well-recognised symptoms of asthma are wheezing and breathlessness. Asthma can sometimes occur for no obvious reason.

One symptom, often not recognised as being caused by asthma, is a cough. This can result in a diagnosis of bronchitis. Bronchitis is usually treated by antibiotics which is not an appropriate treatment for asthma.

In older patients, chest-tightness can occur during exercise. This is often diagnosed as angina when, in fact, it may have been caused by asthma.

An asthma attack can wake patients and this is often a problem in the morning. Waking at night with an asthma attack may mean that the treatment is not working effectively.

Children with asthma frequently find that exercise can trigger an attack. However, if the asthma is properly controlled, it should not be a barrier to sports and other activities.

1. (*a*) (continued)

Marks

DO NOT WRITE IN THIS MARGIN

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

(i) Name the **two** most well-recognised symptoms of asthma.

_____ **1**

(ii) Which symptom of asthma can be mistaken for angina?

_____ **1**

(iii) What could waking at night with an asthma attack indicate?

_____ **1**

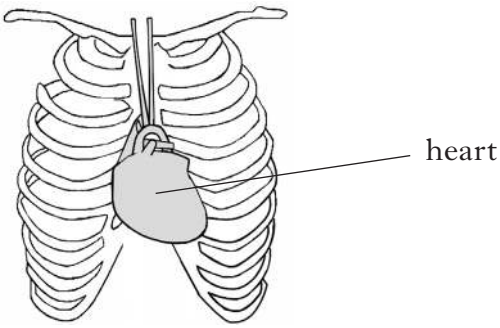
(*b*) Name an instrument used to diagnose and manage asthma.

_____ **1**

[Turn over

Marks

2. The diagram below shows the position of a human heart in the chest.



(*a*) Name the type of tissue that the heart is made of.

_____ **1**

(*b*) Draw a line to connect each blood vessel to the correct description of blood flow in the blood vessel.

Blood Vessel	***Description of Blood Flow***
Vein	through the tissues
Capillary	away from the heart
Artery	towards the heart

2

(*c*) Name **one** substance that is carried in the blood.

_____ **1**

DO NOT WRITE IN THIS MARGIN

Marks

3. (*a*) The table below shows the recommended **daily** intake of food groups necessary for a healthy diet.

Food group	*Recommended daily intake* (measures)
Carbohydrate	5–14
Fruit/vegetables	5–9
Dairy	2–3
Meat	2–3
Fat	0–3
Sugar	1

1 measure = 25 grams (g)

(i) Which **two** food groups should a person have an intake of 50–75 g per day?

_____ and _____ **1**

(ii) Calculate the **maximum** number of recommended fat measures **in one week** which would be considered healthy.

Space for calculation

_____ measures per week. **1**

(iii) Calculate how many **grams** of sugar are recommended **in one week**.

Space for calculation

_____ grams per week. **1**

(*b*) What is the main use of carbohydrates and fats in the body?

_____ **1**

DO NOT WRITE IN THIS MARGIN

Marks

4. (*a*) A student measured her reaction time using a computer game.

The game involved three rounds: visual (using only sight), auditory (using only hearing) and both visual and auditory together.

Her results are shown in the table below.

Round	*Reaction time* (milliseconds)
1. Visual	500
2. Auditory	540
3. Visual and auditory	550

(i) In which round did the student have the fastest reaction time?

_____ **1**

(ii) Calculate the student's average reaction time over the three rounds.

Space for calculation

_____ milliseconds **1**

(*b*) Practice and drinking alcohol can affect reaction time.

Complete the table below by inserting a tick (✓) for each factor to show whether it results in an increase or decrease in reaction time.

Factor	*Increases reaction time*	*Decreases reaction time*
Practice		
Drinking alcohol		

1

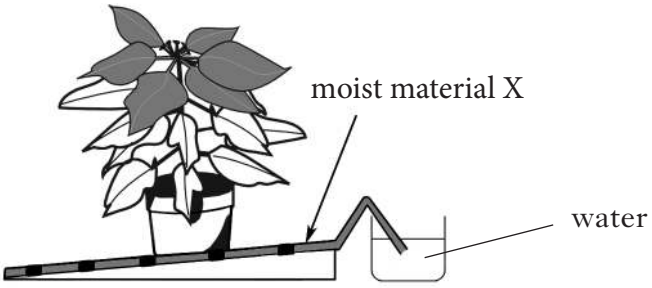
(*c*) Name **one** health condition that can be indicated by a long reaction time.

_____ **1**

DO NOT WRITE IN THIS MARGIN

Marks

5. The diagram below shows a house plant being watered from beneath.



(*a*) Name the moist material X that supplies the plant with water.

_____ **1**

(*b*) Describe another method by which the plants could be supplied with water.

_____

_____ **1**

(*c*) **<u>Underline</u>** one option in each set of brackets to make the sentences below correct.

Drainage of loam soil can be improved by adding { peat / sand }.

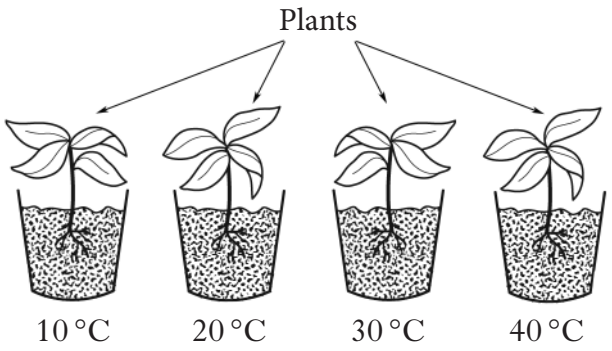
Adding { perlite / fertiliser } can improve the nutrient content of soil. **1**

[Turn over

DO NOT WRITE IN THIS MARGIN

Marks

6. (*a*) A student carried out an investigation into the effect of temperature on the growth of four plants.



The heights of the plants were measured at the start and after four weeks.

The results are shown in the table below.

Temperature (°C)	*Height of plants* (cm)		
	At start	*After 4 weeks*	*Change in height*
10	20	25	5
20	20	32	12
30	20	36	16
40	20	28	8

(i) Identify **two** variables that should have been kept the same when setting up this investigation.

Variable 1: _____

Variable 2: _____ **2**

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

_____

_____ **1**

Marks

6. (*a*) (continued)

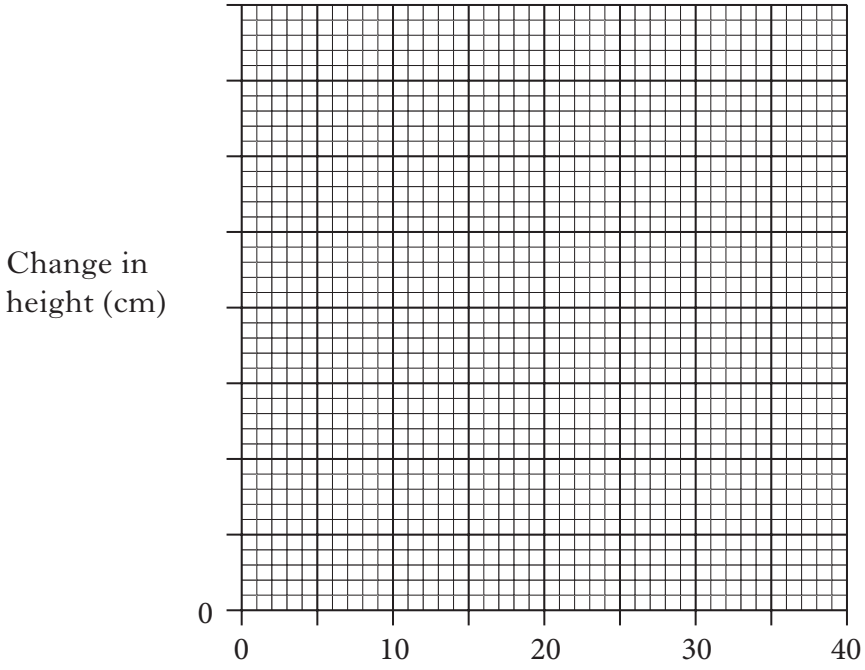
(iii) On the grid below, complete the line graph to show the **change in height** of the plants grown at different temperatures after four weeks by:

1 providing a label for the horizontal 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 thirty-four*.)



(iv) State **one** conclusion which can be drawn from these results.

_____

_____ **1**

Marks

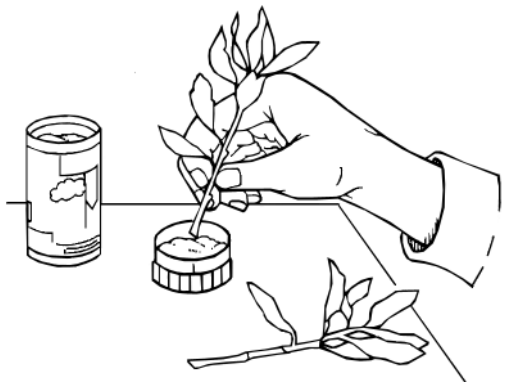
6. (continued)

(*b*) When taking a cutting, the stem is cut at a point where growth takes place.

What name is given to this growing point?

_____ **1**

(*c*) Cuttings are often dipped into a powder before planting as shown in the diagram below.



What is the purpose of the powder?

_____ **1**

[Turn over for Question 7 on *Page twenty-six*

DO NOT WRITE ON THIS PAGE

DO NOT WRITE IN THIS MARGIN

Marks

7. (*a*) The picture below shows protected cultivation of lettuces.

Other than protection from pests and disease, state **one** advantage to the plants of using the plastic tunnel.

_____

_____ **1**

(*b*) The results of an investigation into the benefits of using protected cultivation are shown in the table below.

	Without *protected cultivation*	***With*** *protected cultivation*
Cost of pesticides (per hectare/year)	£9 500	£6 400
Yield (tonnes per hectare/year)	125	375

(i) Calculate how much money was saved on pesticides by using protected cultivation.

Space for calculation

£ _____ **1**

Marks

7. (*b*) (continued)

(ii) How many times greater was the yield of lettuces with protection compared to without protection?

Space for calculation

_____ times greater **1**

(*c*) Various methods are used to control pests and disease.

Decide if each statement is **true** or **false** and tick (✓) the appropriate box.

If the statement is **false**, write out the correct word or phrase in the **correction** box to replace the phrase underlined.

Statement	*True*	*False*	*Correction*
Fungicides can be used to control insect pests			
Using a natural predator to remove a pest is called biological control			

2

[Turn over

DO NOT WRITE IN THIS MARGIN

Marks

8. (*a*) The table below shows the alcohol content of four different cask-conditioned beers ("real ales").

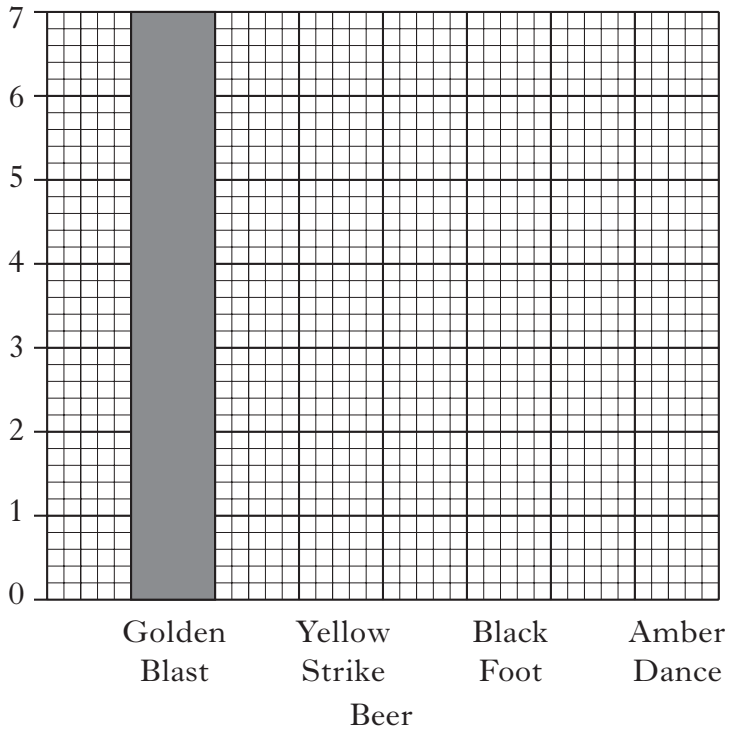
Beer	*Alcohol content* (%)
Golden Blast	7
Yellow Strike	4
Black Foot	4
Amber Dance	5

On the grid below, complete the bar graph by:

(i) providing a label on the vertical axis; **1**

(ii) plotting the remaining bars. **1**

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



(*b*) Name **one** factor which can affect the alcohol content of beer.

_____ **1**

DO NOT WRITE IN THIS MARGIN

Marks

8. (continued)

(*c*) One way in which cask-conditioned beer differs from other beer is that the yeast is not removed.

Name the process which continues in the cask due to the presence of yeast.

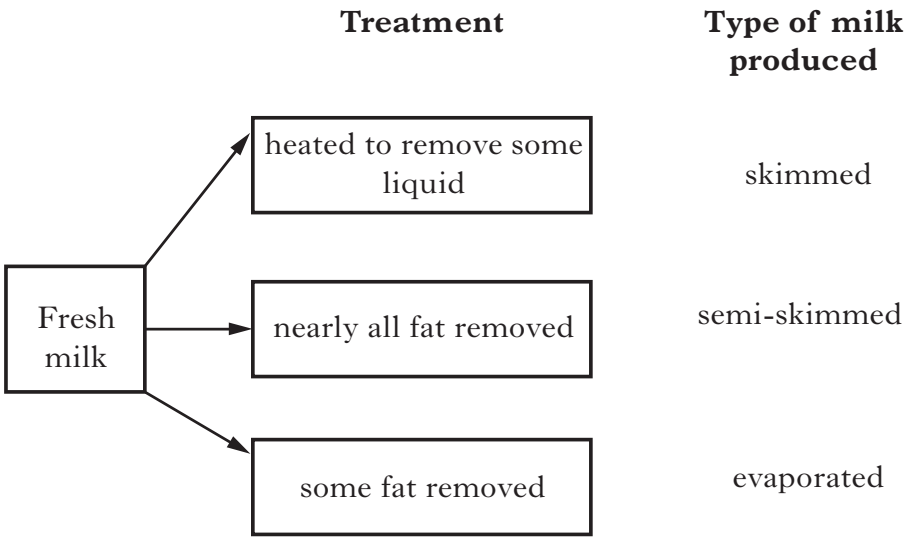
_____ **1**

[Turn over

DO NOT WRITE IN THIS MARGIN

Marks

9. (*a*) The diagram below shows information about some milk treatments.



Complete the diagram by drawing lines to join each treatment with the correct type of milk produced. **1**

(*b*) Samples of milk are tested with resazurin before the milk reaches the supermarket.

What does the resazurin test detect in the milk samples?

_____ **1**

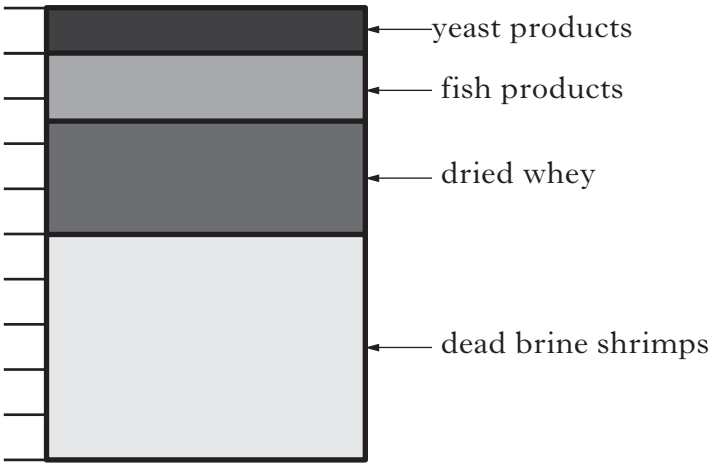
(*c*) Name the micro-organism which is added to pasteurised milk to produce yoghurt.

_____ **1**

DO NOT WRITE IN THIS MARGIN

Marks

10. The diagram below shows the ingredients of a type of fish food.



(*a*) Which ingredient makes up 15% of the fish food?

_____ **1**

(*b*) Calculate the simple whole number ratio of dead brine shrimps to dried whey.

Space for calculation

_____ : _____ **1**

dead brine shrimps | dried whey

(*c*) Which ingredient is used to colour salmon flesh?

_____ **1**

[Turn over

DO NOT WRITE IN THIS MARGIN

Marks

11. The table below shows the percentage of ingredients in a washing powder.

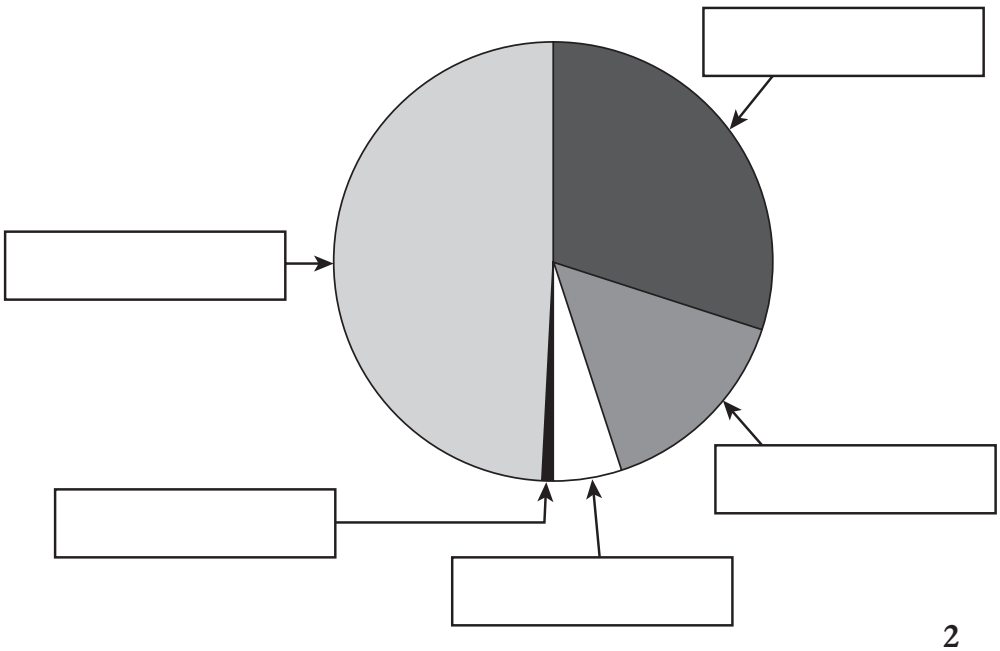
Ingredient	*Percentage* (%)
bleach	15
builder	
optical brightener	1
soap	5
surfactant	30

(*a*) Complete the table by calculating the percentage of builder in the detergent.

Space for calculation

1

(*b*) Use the information in the table to label the pie chart correctly.



2

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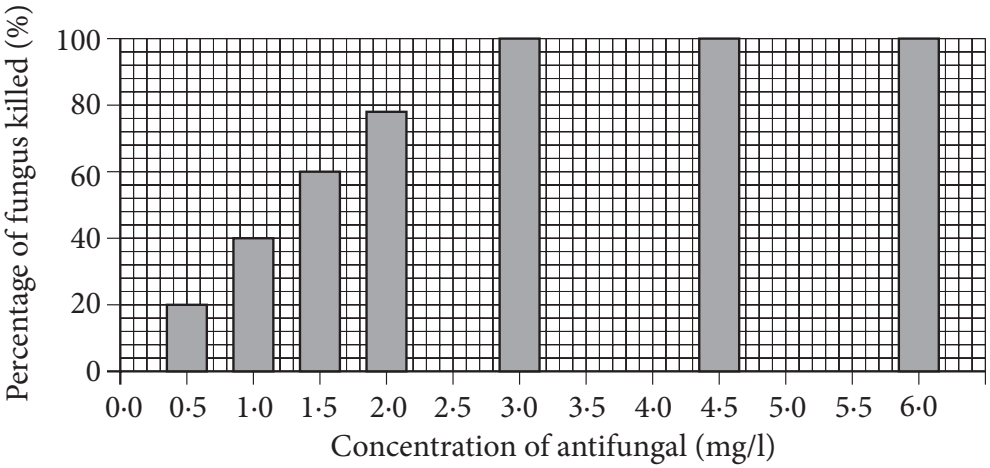
Marks

12. (*a*) The graph below gives information about the effectiveness of an antifungal on killing a fungus.



Use the information in the graph to answer the following questions.

(i) What percentage of the fungus is killed by 1·0 mg/l of antifungal?

_____ % **1**

(ii) What is the lowest concentration of antifungal that kills 100% of the fungus?

_____ mg/l **1**

(*b*) Name **one** fungal infection that can affect humans.

_____ **1**

(*c*) What name is given to the type of micro-organism that antibiotics destroy?

_____ **1**

[*END OF QUESTION PAPER*]

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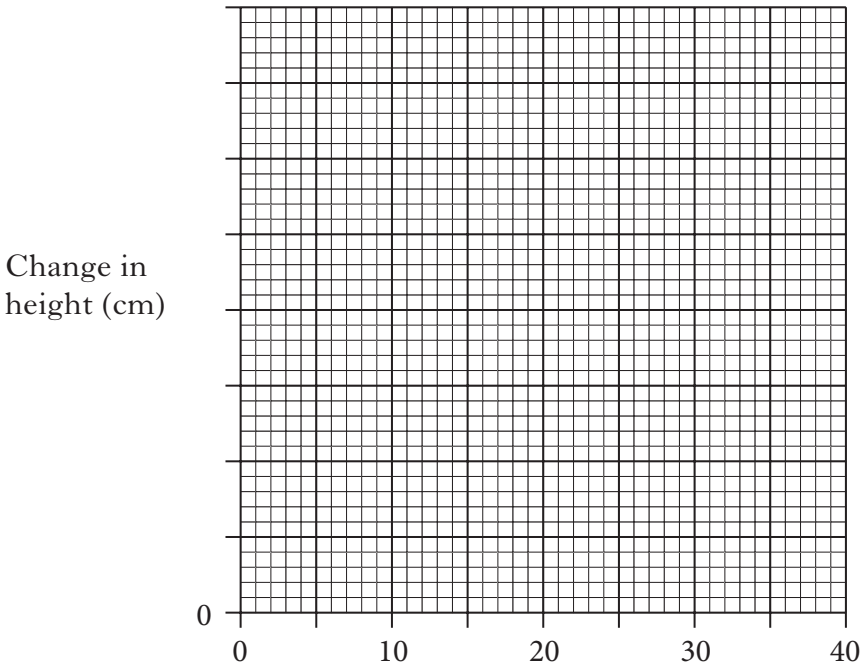
SPACE FOR ANSWERS

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



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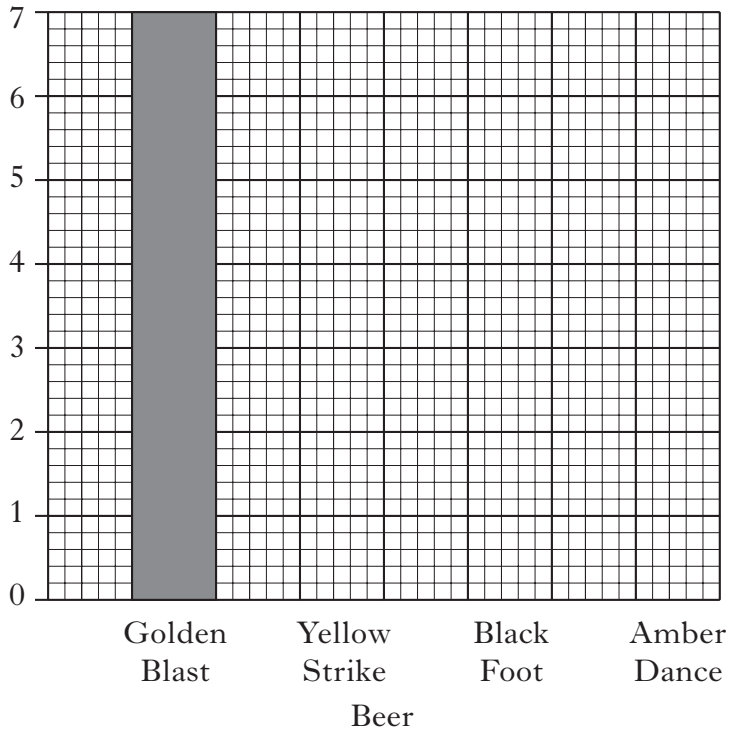
ADDITIONAL GRAPH PAPER FOR QUESTION 8(*a*)



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