

FOR OFFICIAL USE

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Section B
Total

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X007/101

NATIONAL
QUALIFICATIONS
2001

MONDAY, 21 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 paper 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.

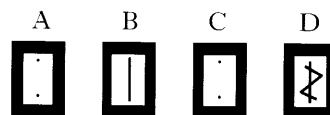
Sample Question

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

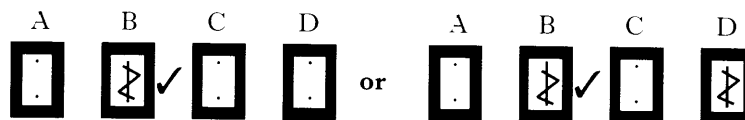
- A Bread
- B Butter
- C Sugar
- D Apple

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:

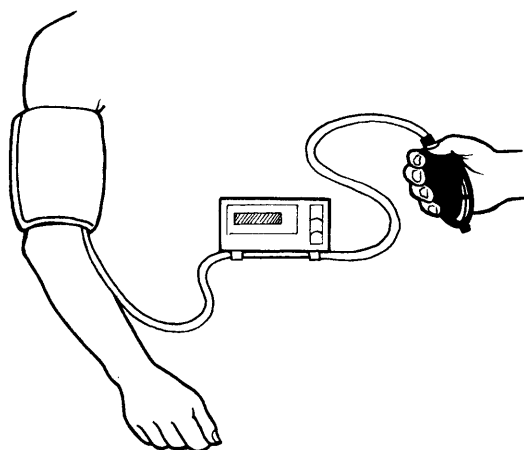


SECTION A

All questions in this Section should be attempted.

Answers should be given on the separate answer sheet provided.

1. A sphygmomanometer is used to measure blood pressure as shown in the diagram below.



Blood pressure is taken as two pressure readings.

Which of the following readings is within the normal range?

- A 160/100
 - B 110/75
 - C 60/80
 - D 70/110
2. Which of the following is used for body building?
- A Protein
 - B Fat
 - C Carbohydrates
 - D Vitamins
3. Which of the following can indicate fitness?
- A A high resting pulse rate and a short recovery time after exercise.
 - B A low resting pulse rate and a short recovery time after exercise.
 - C A high resting pulse rate and a long recovery time after exercise.
 - D A low resting pulse rate and a long recovery time after exercise.
4. A short term effect of drinking alcohol can be
- A a longer reaction time
 - B sharper vision
 - C better muscle control
 - D improved judgement.

5. The list below contains some of the steps in the procedure for using a clinical thermometer.

- 1 Record the temperature accurately.
- 2 Remove the thermometer from the mouth.
- 3 Clean the thermometer with alcohol.
- 4 Place the thermometer under the tongue for two minutes.
- 5 Reset the mercury column.

Which of the following shows the correct sequence of steps?

- A 5 → 4 → 1 → 2 → 5 → 3
B 1 → 5 → 4 → 2 → 1 → 3
C 3 → 5 → 4 → 2 → 1 → 3
D 4 → 3 → 2 → 1 → 5 → 3

Questions 6 and 7 refer to the table of results below.

A student investigated the effect of exercise on her pulse rate.

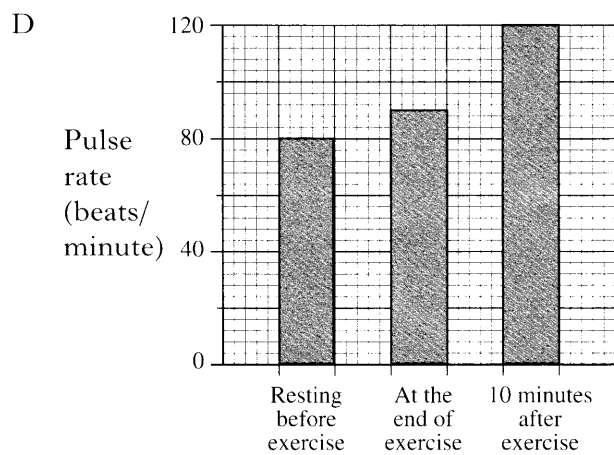
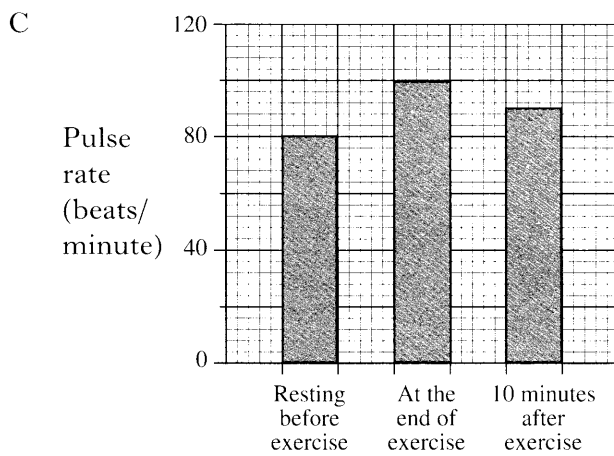
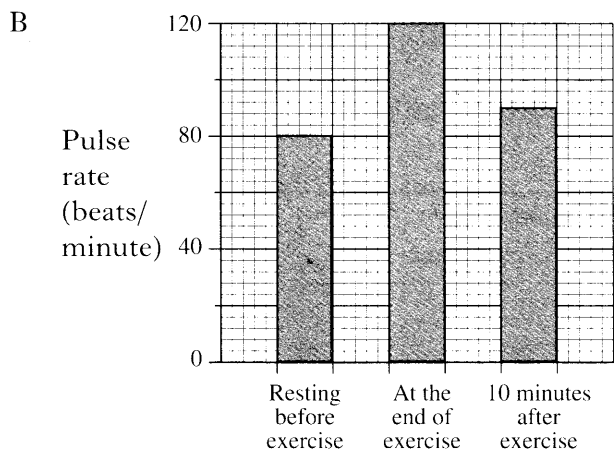
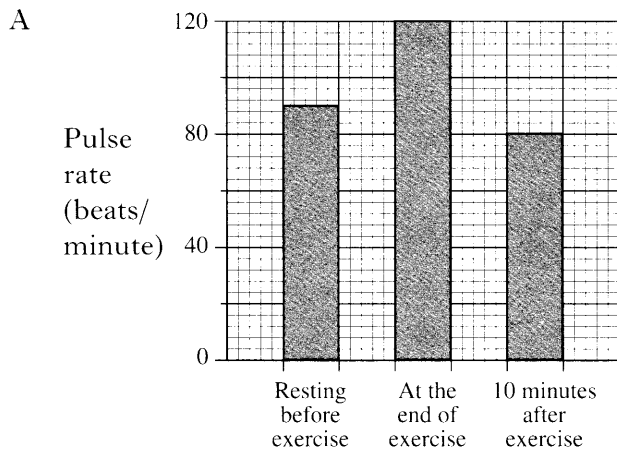
Her results are shown below.

<i>Stage</i>	<i>Pulse rate</i> (beats/ minute)
Resting before exercise	80
At the end of exercise	120
10 minutes after exercise	90

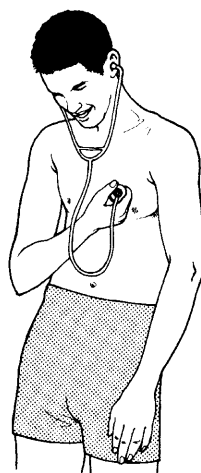
6. The increase in pulse rate due to exercise was

- A 10 beats/minute
B 12 beats/minute
C 32 beats/minute
D 40 beats/minute.

7. Which bar chart shows the results plotted correctly?



8. A student used a stethoscope to listen to his heart beat as shown in the diagram below.



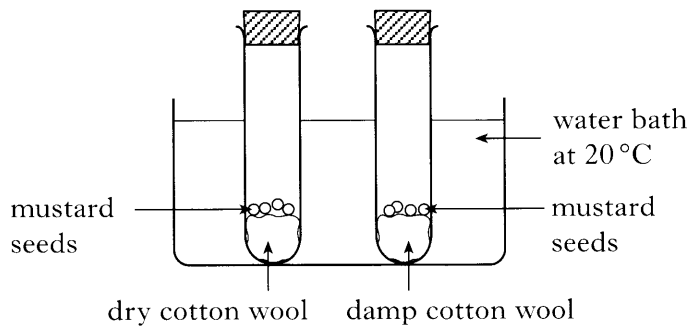
He counted the number of times his heart beat in a **10 second period**.
His results are shown in the table below.

<i>Attempt</i>	<i>Number of beats in 10 seconds</i>
1st	10
2nd	12
3rd	11
4th	11

His average heart rate in **beats per minute** was

- A 11
- B 44
- C 66
- D 72.

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



The variable being investigated is

- A water
 - B temperature
 - C light
 - D number of seeds.
10. The table below shows the results of an investigation into the effect of heat on the rooting success of cuttings.

<i>Plant</i>	<i>Successful rooting without heat (%)</i>	<i>Successful rooting with heat (%)</i>
<i>Wisteria</i>	63	67
<i>Azalea</i>	93	90
<i>Acer</i>	10	0
<i>Camellia</i>	30	67

Use the information in the table to select the correct conclusion.

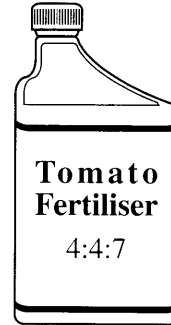
- A *Acer* and *Wisteria* root better with heat.
- B Heat makes no difference to the rooting of *Azalea* and *Acer*.
- C *Camellia* and *Wisteria* root better without heat.
- D Heat improves the rooting of *Camellia* and *Wisteria*.

[Turn over

11. Which statement is true for a loam compost?
- A It contains peat to improve drainage and aeration.
 - B It contains fertiliser to increase the level of plant nutrients.
 - C It contains sharp sand to improve water holding.
 - D It contains rooting powder for cuttings.

12. A fertiliser has a nutrient ratio of 4:4:7.
To which plant nutrient does the 7 refer?

- A Phosphorous (P)
- B Nitrogen (N)
- C Potassium (K)
- D A trace element



13. The plant in the diagram needs to be

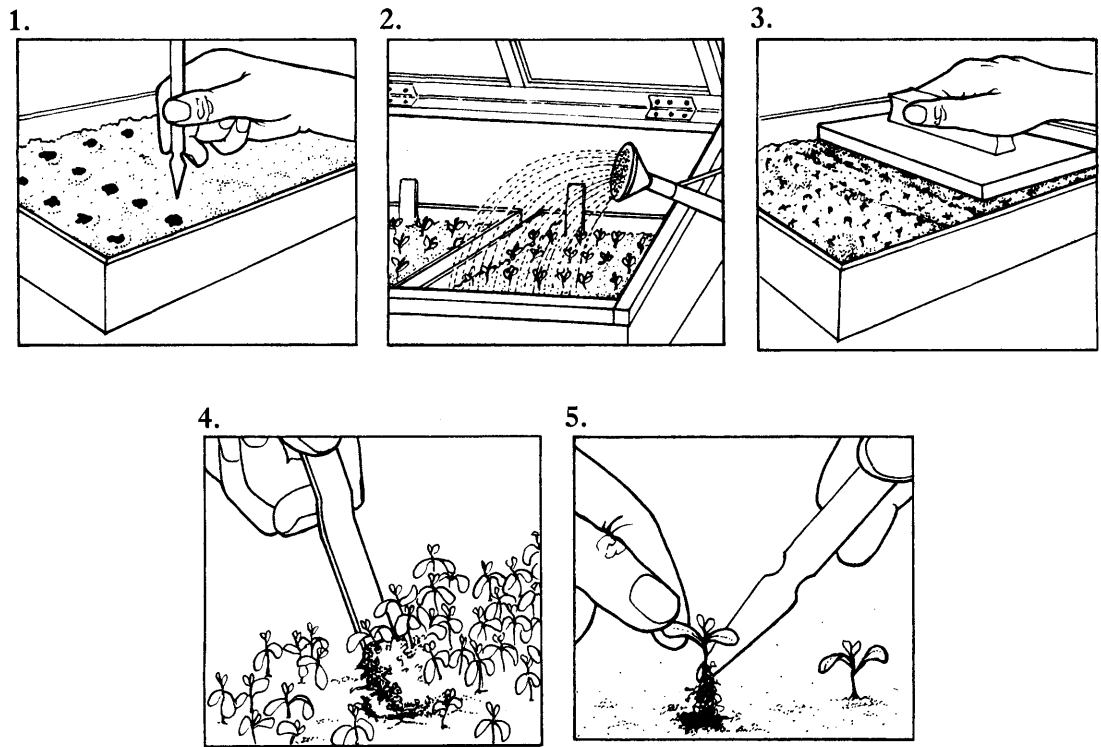
- A watered
- B pricked out
- C dead headed
- D potted on.



14. Dormant seeds do not germinate until they have passed through

- A winter
- B spring
- C summer
- D autumn.

15. The following stages in pricking out seedlings are not in the correct order.



Which of the following shows the correct sequence of steps?

- A 4 → 3 → 5 → 1 → 2
- B 3 → 1 → 4 → 5 → 2
- C 4 → 5 → 3 → 2 → 1
- D 5 → 2 → 4 → 3 → 1

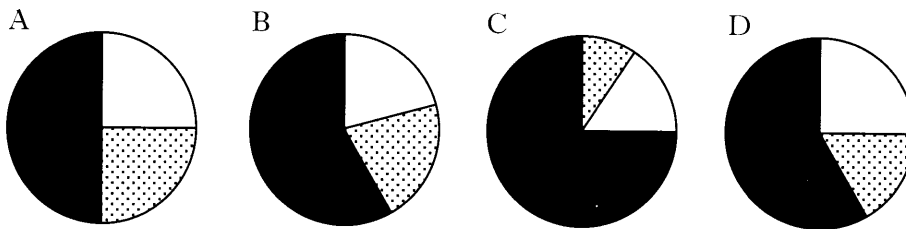
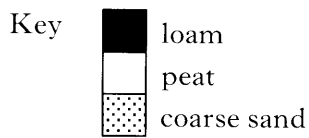
16. Cuttings will grow roots more successfully if

- A they are well ventilated
- B they are kept in the dark
- C most of their leaves have been removed
- D the compost is allowed to dry out.

17. A gardener made loam potting compost as shown in the table below.

	<i>Number of 10 litre buckets</i>
Loam	7
Peat	3
Coarse sand	2

Which pie chart shows the correct proportions?



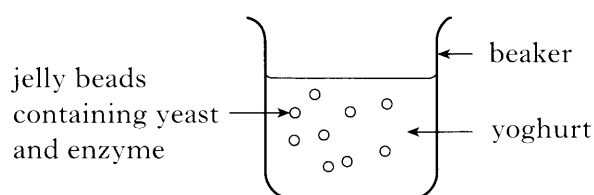
18. The table below shows information taken from the labels on four types of milk.

	<i>Whole milk</i>	<i>Semi-skimmed milk</i>	<i>Skimmed milk</i>	<i>Evaporated milk</i>
Energy (kJ/100 g)	284	193	138	676
Protein (g/100 g)	3.2	3.2	3.3	7.8
Fat (g/100 g)	3.9	1.6	0.1	9.2

Which conclusion is correct?

- A Whole milk has the most energy.
- B Skimmed milk has the least fat.
- C Evaporated milk has the lowest protein content.
- D Semi-skimmed milk provides less energy than skimmed milk.

19. Which treatment produces pasteurised milk?
- A Heating milk to 140 °C for 5 seconds
 - B Removing half the water from the milk
 - C Heating milk to 71 °C for 15 seconds
 - D Removing half the fat from the milk
20. Which of the following statements about cheese-making is correct?
- A Cheese is made from the whey part of milk.
 - B Rennet makes the milk fat clot.
 - C Cheese is always made from UHT milk.
 - D The rennet may come from genetically engineered yeast.
21. Which statement is true for brewery conditioned beer?
- A There is live yeast in the cask.
 - B It has a short shelf life.
 - C Sugar has been added to the cask.
 - D Yeast and solids have been filtered out.
22. An investigation was carried out to show that immobilised yeast and an enzyme are required to convert yoghurt into a fermented drink.
- The diagram below shows the apparatus used.



The control for this investigation should be exactly the same, except

- A the jelly beads would not contain yeast and enzyme
- B the jelly beads would contain yeast but not enzyme
- C the yoghurt would be replaced with water
- D the number of jelly beads would be doubled.

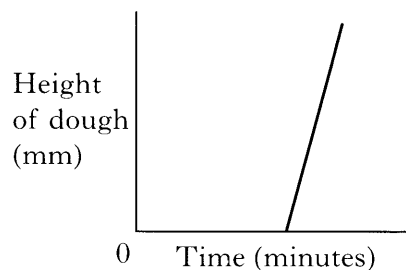
[Turn over

23. The results from an investigation on the rising of bread dough are shown below.

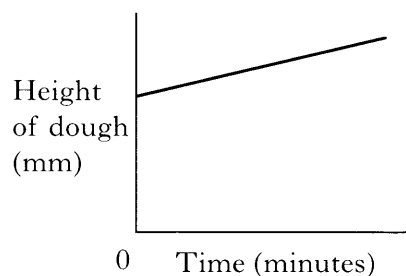
<i>Time</i> (minutes)	0	20	40	60
<i>Height of dough</i> (mm)	50	52	54	56

Which graph presents the results correctly?

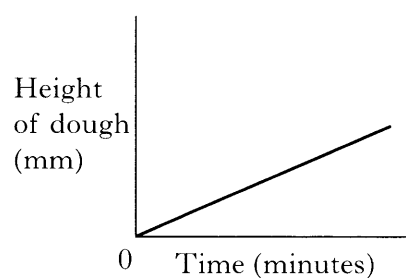
A



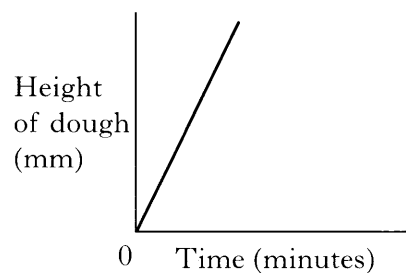
B



C



D



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

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

25. Which of the following correctly describes antibiotics?

Antibiotics

- A prevent the growth of bacteria
- B are made by yeast
- C cure diseases caused by viruses
- D are made by bacteria.

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


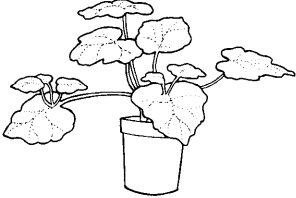

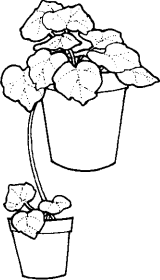
[Turn over for Section B on *Page fourteen*

Marks

SECTION B

All questions in this Section should be attempted.

1. The table contains drawings and descriptions of plant propagation structures. Complete the table below by writing in the correct word or description.

<i>Drawing</i>	<i>Description</i>	<i>Plant propagation structure</i>
	<p>A food storage organ.</p>	
		<p>plantlets</p>
	<p>Small plants growing out of the soil at the base of the plant.</p>	
	<p>Stems with young plants growing at their ends.</p>	

3

Marks

2. Many people enter competitions to grow the tallest sunflower plant and success usually depends on growing the best variety.

In an investigation, ten seeds of each of five different varieties of sunflower were sown and grown until they reached their maximum height.

- (a) Explain why ten seeds of each variety were sown.

1

- (b) The table below shows the average maximum height for each variety of sunflower.

<i>Sunflower variety</i>	<i>Average maximum height (cm)</i>
Big smile	50
Incredible	60
Moonwalker	200
Sonja	100
Valentine	120

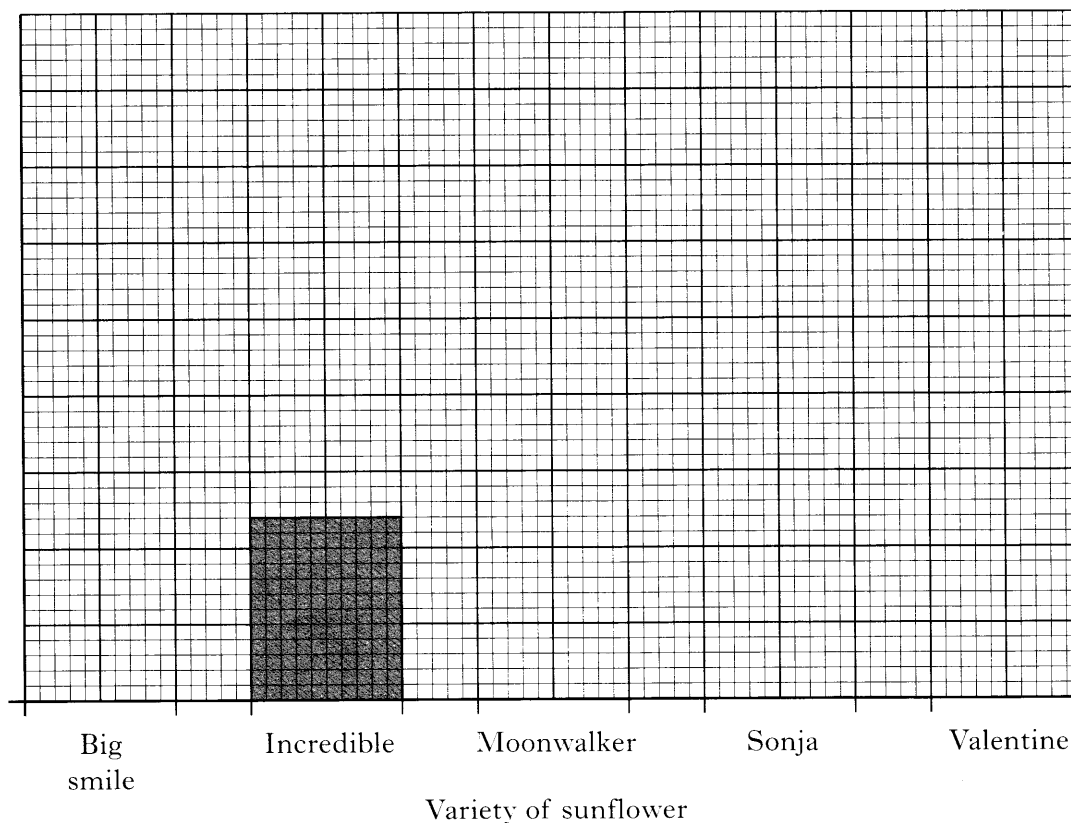
- (i) Provide a suitable scale on the vertical axis on the grid below.

1

- (ii) Complete the bar chart by drawing the bars for the other varieties of sunflower.

1

(Additional graph paper, if required, will be found on page 32.)



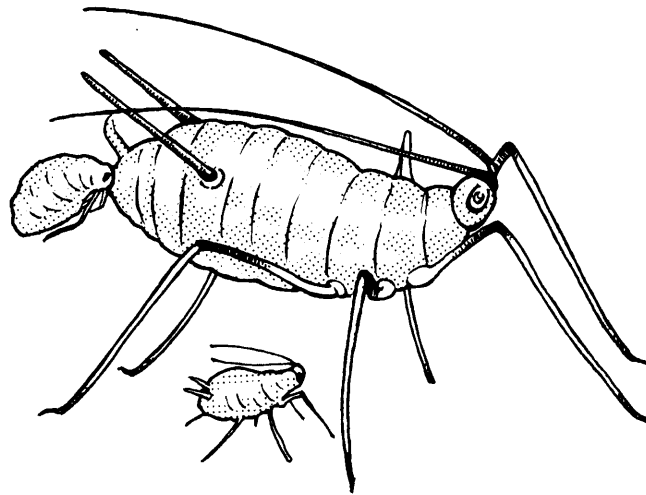
3. Read the following passage carefully.

Adapted from *Gardening Which?* magazine.

There are over 500 different species of aphid in Britain. Only a few are gardening pests. Most feed on only one or two plant species, while others, like the peach potato aphid, target a whole range.

Weakened, curled leaves are a sure sign that something is wrong. Some species of aphid are hidden in the twisted leaves. As numbers increase, a sticky layer of honeydew builds up on the foliage below. This encourages the growth of moulds.

Aphids are unusual insects as they normally give birth to live young. In spring and summer they produce only female live young. In autumn both male and female live young are produced and mating takes place. Eggs are then laid and it is in this form that most species survive the winter.



Ladybirds, lacewings and parasitic wasps feed on aphids and so help to reduce their numbers. The use of insecticides can kill these beneficial insects and so in the majority of cases it is better to do nothing. When numbers become very high the aphids can be squashed with the fingers or sprayed with soapy water.

Answer the questions below using the information from the passage.

- (a) What grows on the sticky honeydew made by the aphids?

1

Marks

3. (continued)

(b) Complete the table below.

<i>Stage in life cycle of aphids</i>	<i>Season of the year</i>
eggs laid	
	spring and summer
males and females produced	autumn

1

(c) Give **one** example of an insect that feeds on aphids.

1

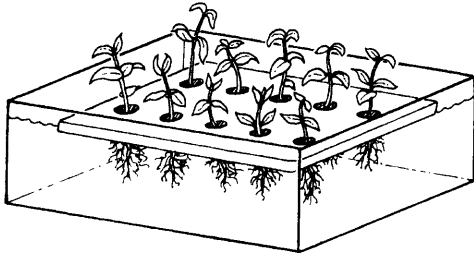
(d) Describe **one** disadvantage of using an insecticide.

1

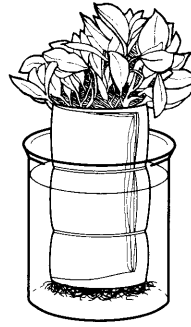
[Turn over

Marks

4. (a) Two methods of rooting fuchsia cuttings were compared as shown in the diagrams below.



Rooted in water



Rolled in newspaper

- (i) The results are shown in the table.

Set	Number successfully rooted in water (per set of 10 cuttings)	Number successfully rooted rolled in newspaper (per set of 20 cuttings)
1	9	7
2	9	14
3	10	9
4	8	10
Success rate		50%

Calculate the percentage of cuttings that successfully rooted in water.

Space for calculation

_____ %

1

- (ii) Suggest **one** way in which the method could be improved to make the comparison **valid**.

1

- (b) Explain why cuttings may be treated with rooting powder.

1

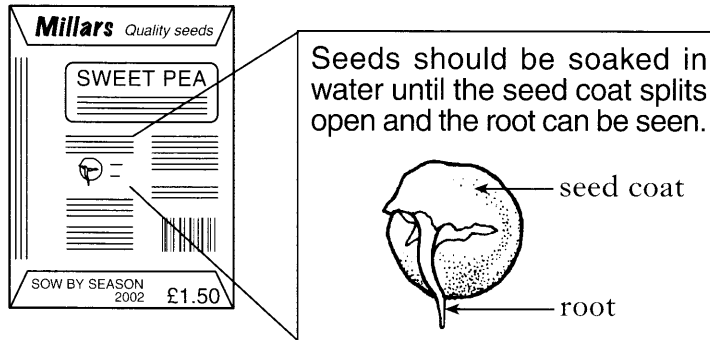
- (c) Some plants are difficult to root from cuttings and instead a shoot is wounded and then pegged down under the soil.

Name this method of plant propagation.

1

Marks

5. (a) There are a number of different methods of sowing seeds.
The drawing below gives information about sowing sweet pea seeds.



What is the process of germinating seeds before sowing called?

1

- (b) Give **one** advantage of sowing pelleted seeds.

1

- (c) What type of seeds are sown mixed with sand?

1

[Turn over

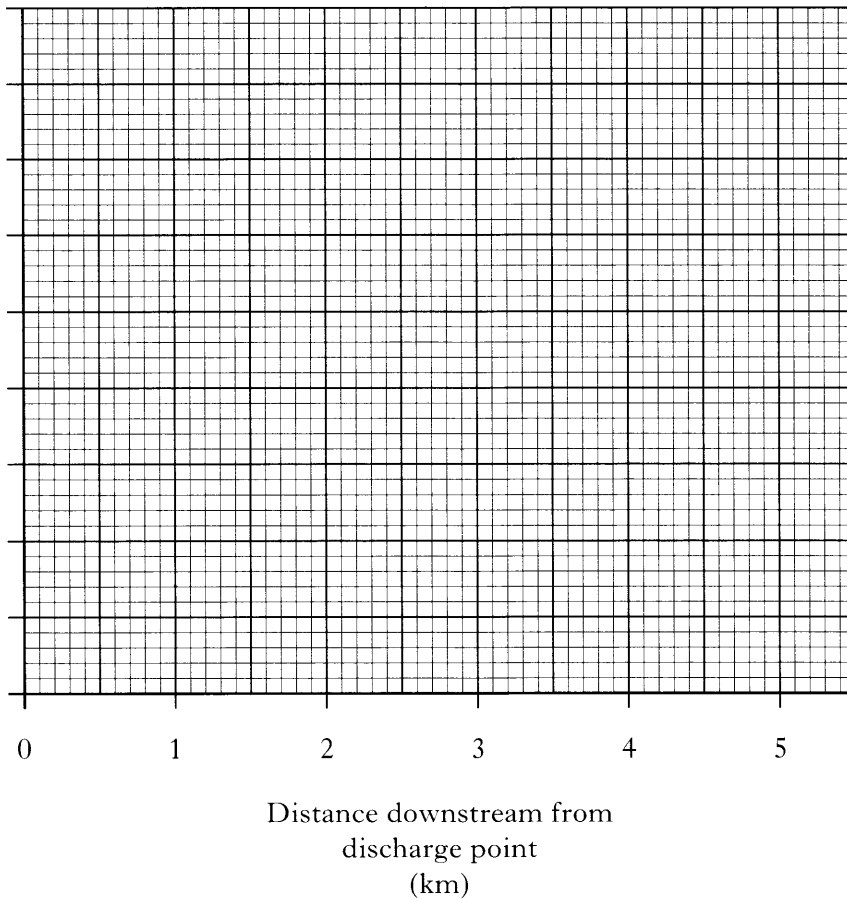
Marks

6. (a) The table below shows the oxygen concentration of river water at different distances downstream from a point where they was accidentally discharged.

<i>Distance downstream from discharge point (km)</i>	<i>Oxygen concentration (units)</i>
0	10
1	15
2	40
3	65
4	80
5	80

- (i) Provide a suitable scale on the vertical axis on the grid below. 1
- (ii) Present the results in the table as a line graph. 1
- (Additional graph paper, if required, will be found on page 33.)

Oxygen concentration (units)



Marks

6. (a) (continued)

- (iii) Whey in the river affects the numbers of bacteria and other organisms such as fish.

At what distance from the whey discharge point would the greatest number of bacteria be found?

_____ km

1

- (iv) At what distance downstream from the whey discharge point would the greatest number of fish be found?

_____ km

1

- (b) Which industry produces whey as a waste product?

1

- (c) Describe **one** use made of waste whey.

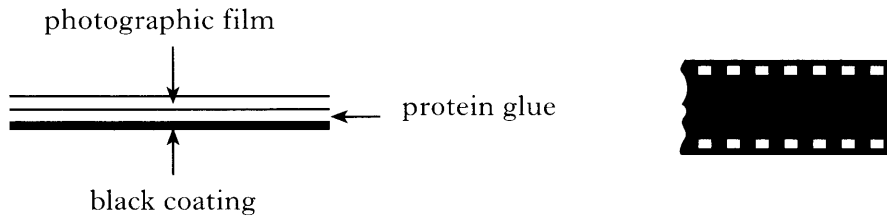
1

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Marks

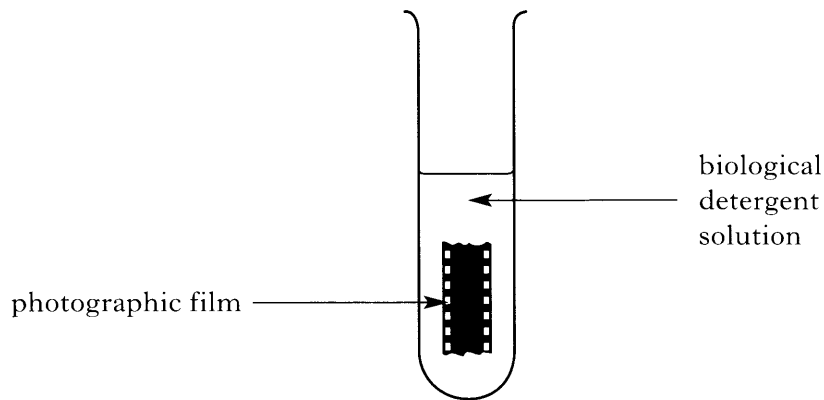
7. (a) Photographic film has a coating of a black chemical.

A protein glue is used to make the black chemical stick on to the photographic film.



The following description outlines the steps in an investigation into the effect of **temperature** on the activity of a biological detergent.

1. A piece of photographic film was placed in each of 8 identical test-tubes.
2. Biological detergent solution was poured into each test-tube.
3. The test-tubes were placed in different temperatures for 2 hours.
4. The percentage of the black chemical removed was estimated.



(i) Identify **two** variables that should be kept the same when setting up the test-tubes.

1 _____

2 _____

2

Marks

7. (a) (continued)

(ii) The table below shows the results from the investigation.

<i>Temperature</i> (°C)	0	10	20	30	40	50	60	70
<i>Black chemical</i> <i>removed</i> (%)	0	20	100	100	100	30	0	0

What evidence suggests that the results should have been taken earlier?

1

(b) What did the biological detergent contain that digested the protein glue?

1

(c) How does the manufacturer of a biological detergent reduce the chance of it causing an allergic reaction?

1

[Turn over

Marks

8. (a) The passage below gives the results from resazurin tests on milk from three different farms.

When mixed with resazurin, the milk from Farm A was purple when observed after 10 minutes but at 15 minutes it changed to pink. It stayed pink until the end of the test at 20 minutes.

The milk from Farm B changed from purple to mauve after 5 minutes. At 10 minutes it became pink and remained that colour until 15 minutes when it changed to white. It was still white after 20 minutes.

The milk from Farm C was purple until 15 minutes when it became mauve. It remained mauve until the test was complete after 20 minutes.

- (i) Use the information above to complete the table below.

<i>Time</i> (minutes)	<i>Resazurin colour</i>		
0	purple		
5	purple		
10	purple		
15	pink		
20	pink		

2

- (ii) Milk from which farm is unfit for human consumption?

Farm _____

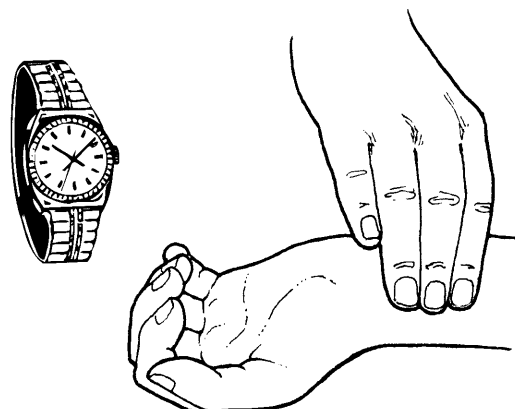
1

- (b) What does the resazurin test detect in the milk samples?

1

Marks

9. The diagram below shows part of the procedure carried out to obtain a measurement of the pulse rate.



- (a) Complete the list of steps below to show how you would obtain a **reliable** measurement of the resting pulse rate of a student in beats per minute.

1. Make the student sit quietly for five minutes.

2. Locate the pulse in the wrist correctly.

3. _____

4. _____

5. _____

6. Calculate the average pulse rate.

2

- (b) The value of the resting pulse rate can indicate the level of fitness.

(i) What change in lifestyle could result in a lower resting pulse rate?

1

(ii) What might be the result of a high resting pulse rate over a number of years?

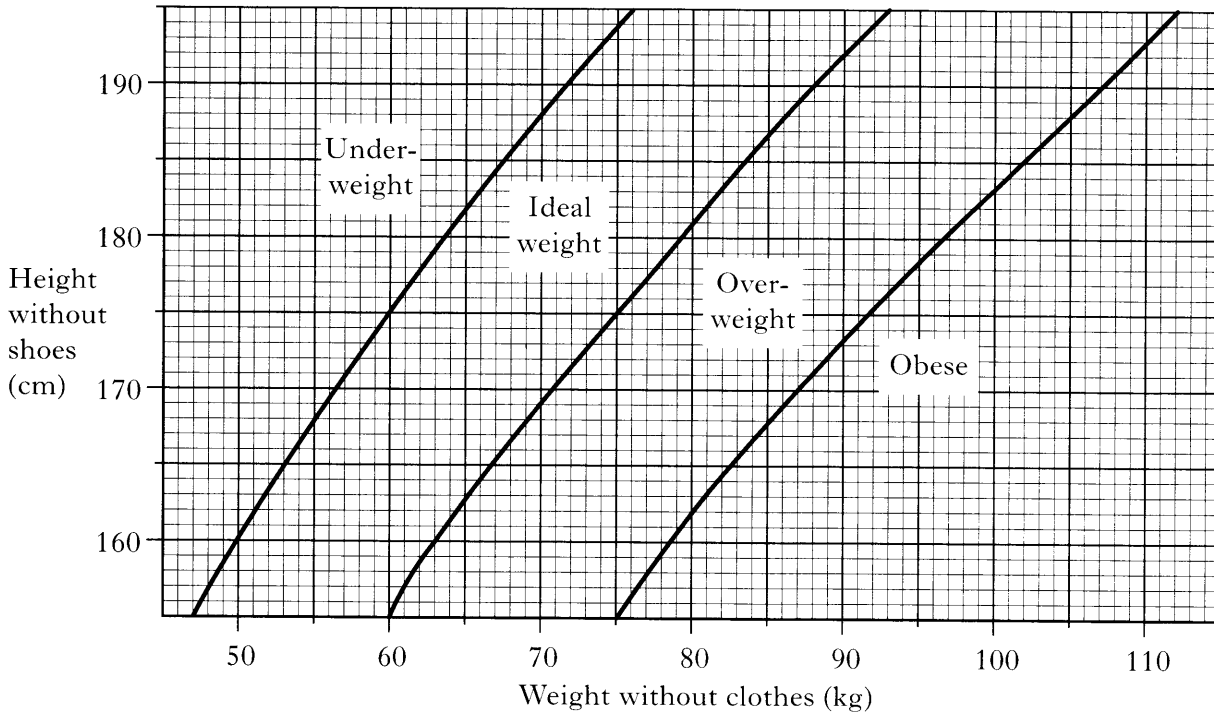
1

[Turn over

Marks

10. The chart below shows the relationship between body weight and height for adult males.

The four areas marked on the chart show, for each height, the ranges of body weight which indicate that a person is underweight, of ideal weight, overweight or obese.



(a) What is the maximum body weight, within the ideal weight range, for a person of height 160 cm?

_____ kg

1

(b) (i) What term from the chart describes the weight of a person of 175 cm height who weighs 95 kg?

1

(ii) What mass would this person need to lose to just reach an ideal weight?

_____ kg

1

(c) (i) Name **one** health condition which might occur as a result of being very obese.

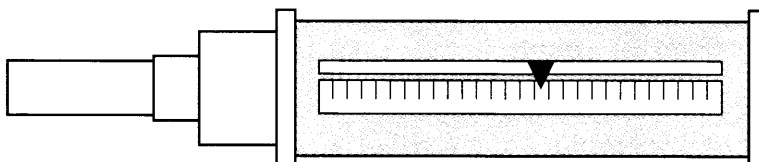
1

(ii) Name **one** illness which may result in a rapid weight loss.

1

Marks

11. (a) The diagram below shows a peak flow meter.



A peak flow meter is used to measure peak flow rate.

The table below shows the results of peak flow measurement for a 15 year old healthy male student.

	<i>Reading</i> 1	<i>Reading</i> 2	<i>Reading</i> 3	<i>Reading</i> 4	<i>Reading</i> 5
Peak flow reading (litres/minute)	520	540	510	530	525

- (i) What is his peak flow rate?

_____ litres/minute

1

- (ii) How would you expect the peak flow rate of a 15 year old healthy girl to differ from that of a boy of the same age?

1

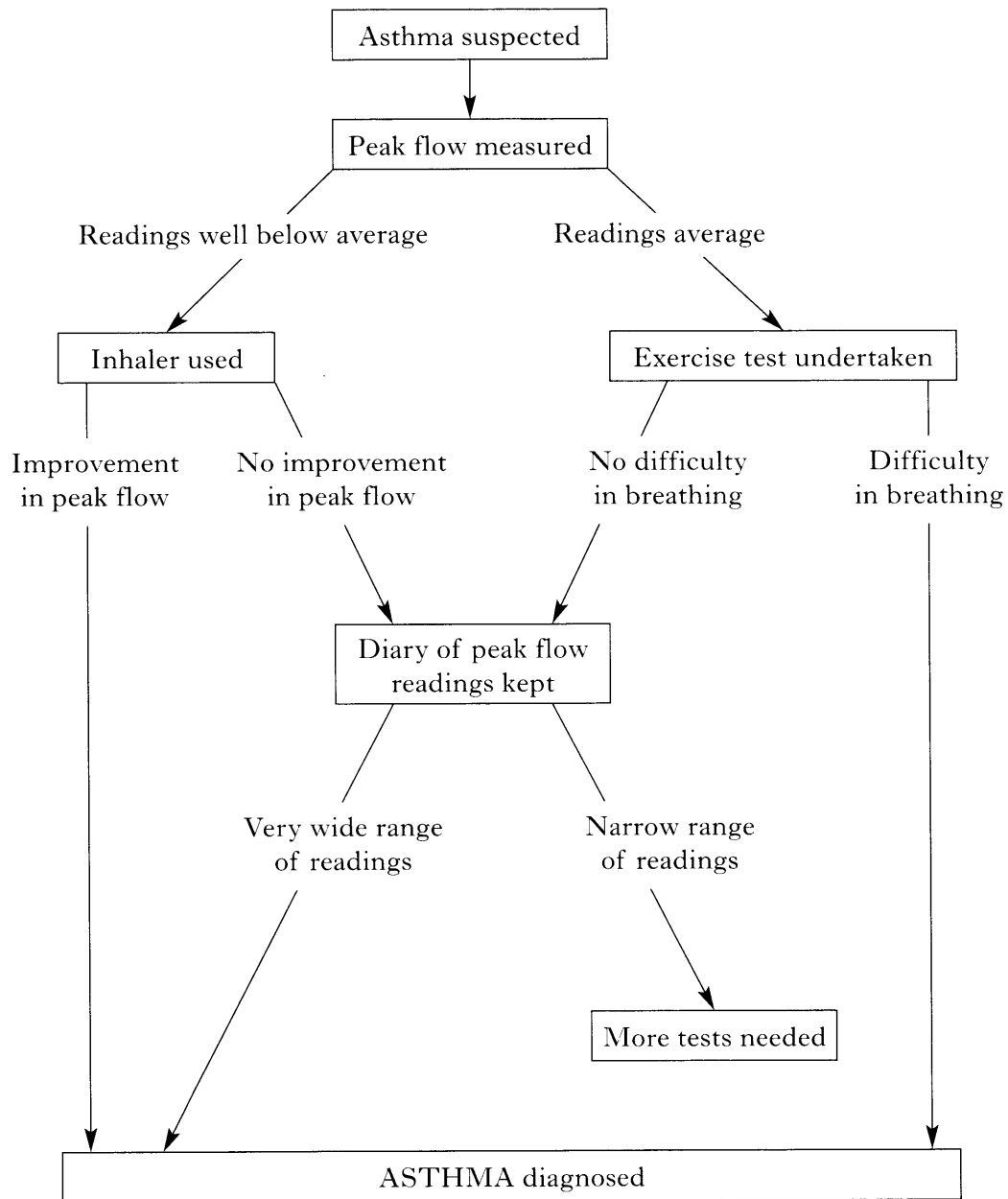
- (b) Explain the meaning of the term peak flow rate.

1

[Turn over

11. (continued)

(c) The flowchart below gives some information about the medical tests carried out to decide if a person has asthma.



Marks

11. (c) (continued)

Use the flowchart to answer the questions.

- (i) If the person had peak flow readings which were average for his/her age, size and gender, what test would be carried out next?

1

- (ii) What effect does using an inhaler have on a person with asthma?

1

- (d) Antibiotics are used in the treatment of some lung infections.

Explain why the over-use of antibiotics is discouraged.

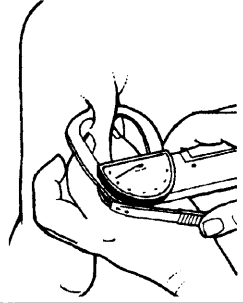
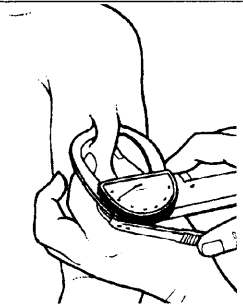

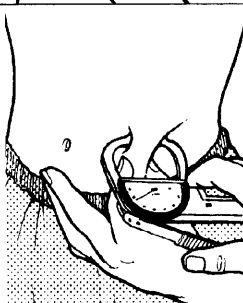
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12. An estimate of the total body fat of a person can be obtained by measuring the thickness of folds of skin at four points on the body.

The results of a set of skinfold measurements for a 15 year old girl are shown in the table below.

<i>Location</i>	<i>Diagram</i>	<i>Skinfold thickness (mm)</i>
Back of upper arm		9.0
Front of upper arm		12.0
Back below shoulder blade		8.0
Side of waist		8.0

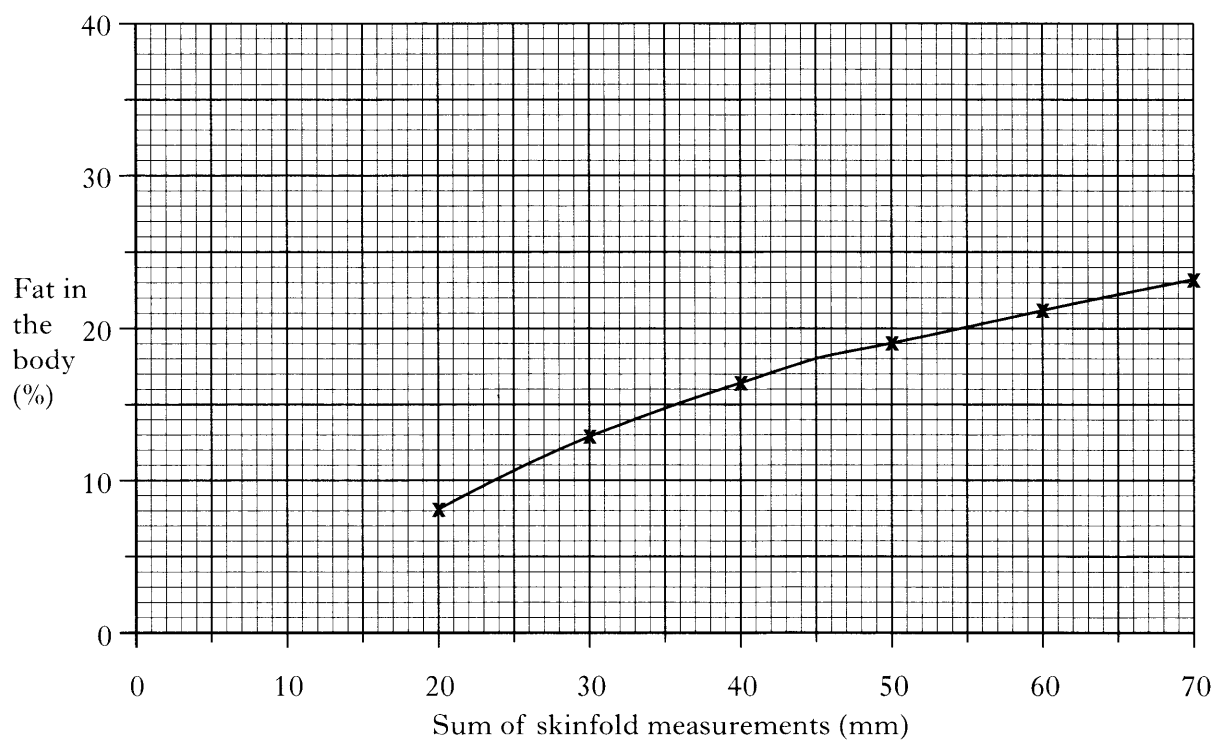
- (a) Calculate the total skinfold thickness.

_____ mm

1

12. (continued)

- (b) The sum of the four skinfold thickness measurements is related to the percentage of fat in the body as shown in the graph below.



A male student has a total skinfold thickness of 45 mm.

What percentage of body fat does he have?

_____ %

1

- (c) What would be a normal value for the percentage of body fat in a healthy person?

_____ %

1

[END OF QUESTION PAPER]