بسم الله الرحمن الرحيم

مقابل هذا المجهود ارجو منكم الدعاء لي بالمغفرة ولابنائي الهداية والنجاح والتوفيق

أرجو ان يساعد هذا المجهود على مساعدة ابنائنا طلبة ال IGCSE الثانوية البريطانية وتحصيلهم على افضل واحسن واعلى الدرجات انشاء الله.
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In the name of god

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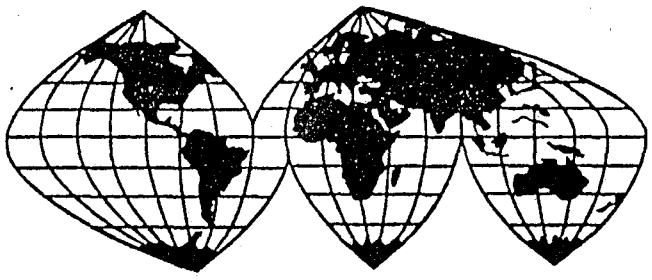


IGCSE

BIOLOGY

Examination

PAPER

6

Good luck

UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE
INTERNATIONAL EXAMINATIONS

Biology O.L

contents

Centre Number	Candidate Number

Candidate Name ....

0610/6 IGCSE JUNE

BIOLOGY

PAPER 6 ALTERNATIVE TO PRACTICAL

Thursday 3 JUNE 1993 Afternoon 1 hour

Candidates answer on the question paper.
No additional materials are required.

UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE
INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

Instructions to candidates:

Write your name and examination number in the spaces provided at the top of this page.

Answer all *the questions.*

Written answers should be kept to the lines provided and drawings should be made in the spaces provided.

Use sharp pencils for your drawings.

Coloured pencils or crayons should not be used.

No additional sheets of paper should be inserted in this book.

The intended marks for questions or parts of questions are given in brackets [ ].

Question No.	(Examiner's use only)
1	
2	
3	
4	
TOTAL	

This Question Paper consists of 10 printed pages and 2 blank pages.

SB(SC)

[Turn over

1 Fig. 1 shows some human blood cells as seen under the microscope.

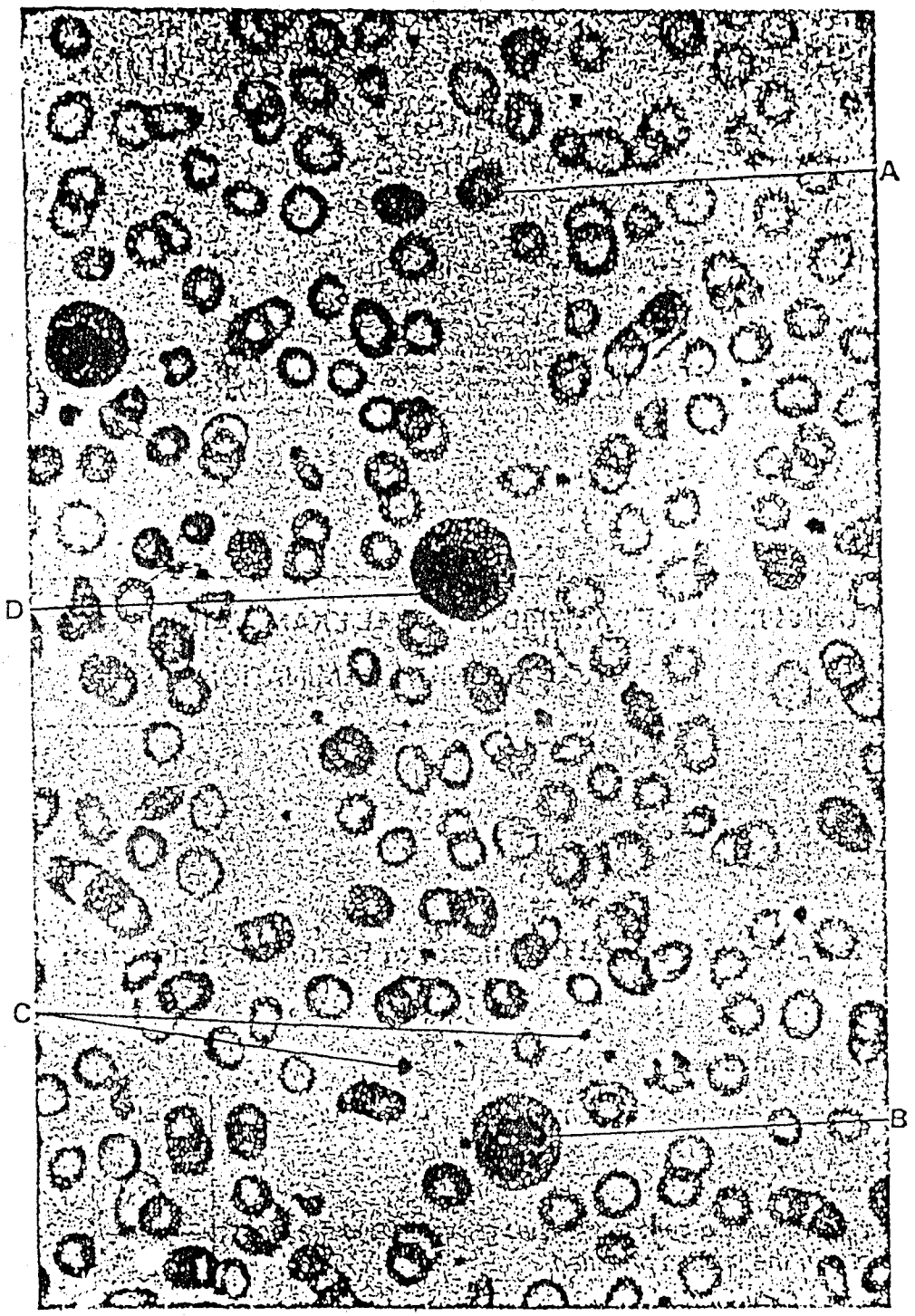


Fig. 1 *Magnification x 1000*

(a) (i) List **three** visible differences between cell **A** and cell **B**.

1. .....

2. .....

3. ..... [3]

(ii) Suggest what the blood component **C** may be.

..... [1]

(b) In the space below, make a large, labelled drawing of cell **D**.

[5]

(c) Measure the diameter of Cell **D**, in the photograph and in your drawing. Record your measurements below:

Diameter of **D** *in photograph* .....

Diameter of **D** *in drawing* .....

In the photograph, the cells are shown magnified x 1000. In the space below, use this information, and the measurements you made, to calculate the magnification of the cells in your drawing. Show your working.

3

Magnification ..... [3]

2 The apparatus shown in Fig. 2 was set up to measure the rate of oxygen uptake by an insect larva over a period of time.

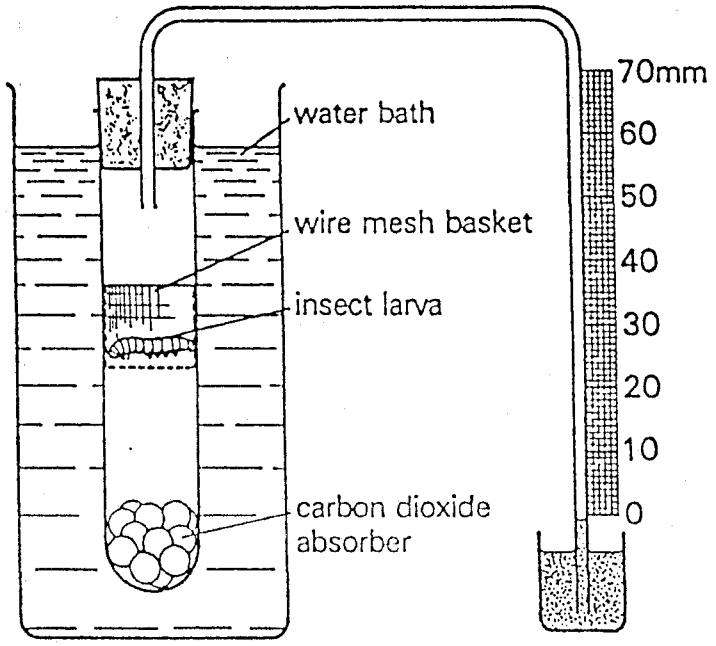


Fig. 2

During respiration, the larva took in oxygen and released carbon dioxide. Because the carbon dioxide released was absorbed by the chemical in the tube, the volume of gas inside the apparatus fell as oxygen was taken in by the larva. This caused the level of liquid in the narrow tube to rise. The levels of the liquid and the times at which the student took readings, are shown in Fig. 3.

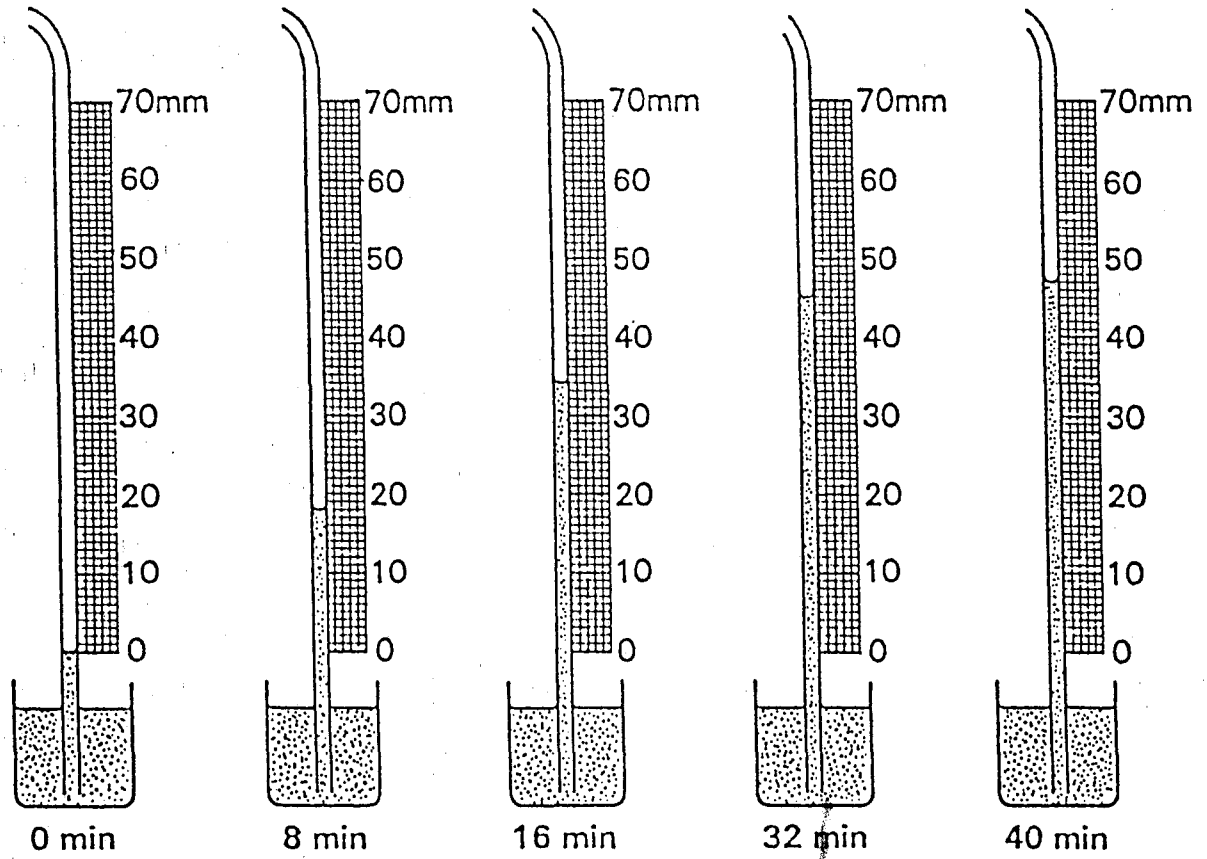


Fig. 3

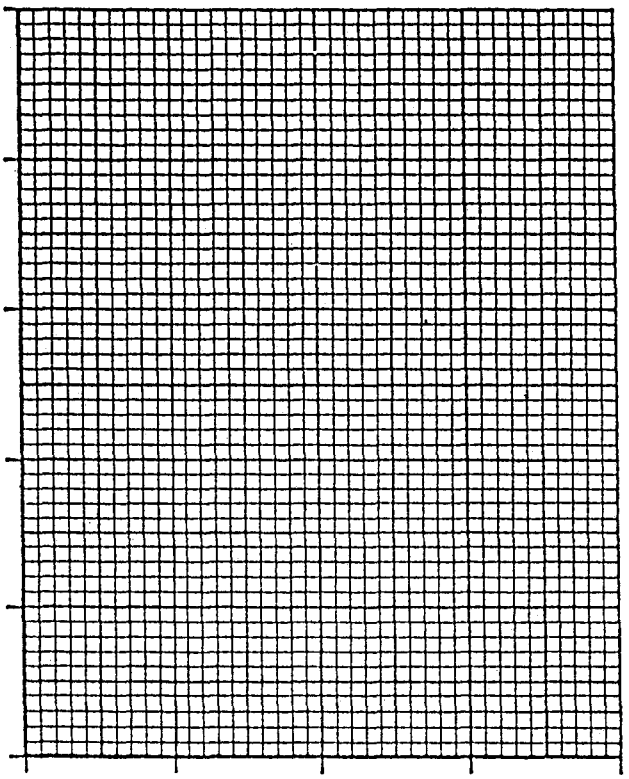
(a) Place a suitable heading in the right hand column of Table 1 and then enter the readings in the spaces provided.

Time/min	...../ .....

Table 1

[3]

(b) Plot the results on the graph paper below.



[3]

(c) Use the graph to suggest the height of the liquid at 24 minutes. ..... [1]

(d) Suggest a reason for the slowing down of the rate of oxygen uptake towards the end of the investigation.

.....

..... [1]

(e) Suggest a suitable control for this investigation.

.....

..... [1]

(f) Explain why a water bath was used.

.....

.....

..... [1]

3 **(a)** Fig. 4 shows a mature fruit of a pea plant, with one half of the fruit wall removed.

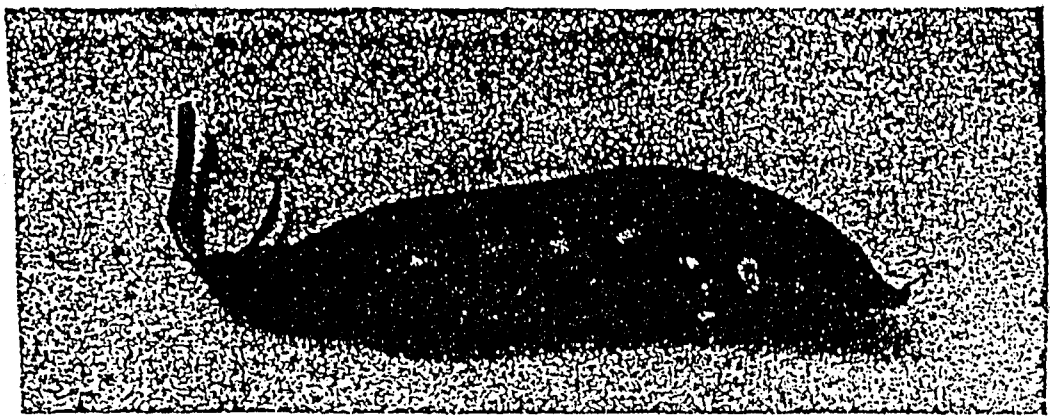


Fig. 4

In the space below, make a **large** drawing of the fruit. On your drawing label the following structures:

remains of style; *cut part of fruit wall*; *mature seed*; *undeveloped seed*; *remains of a sepal*;

[7]

(b) Fig. 5 shows all of the seeds collected from a pea plant, the flowers of which had been allowed to self-pollinate. There were two different types of seeds, which are grouped separately in Fig. 5.

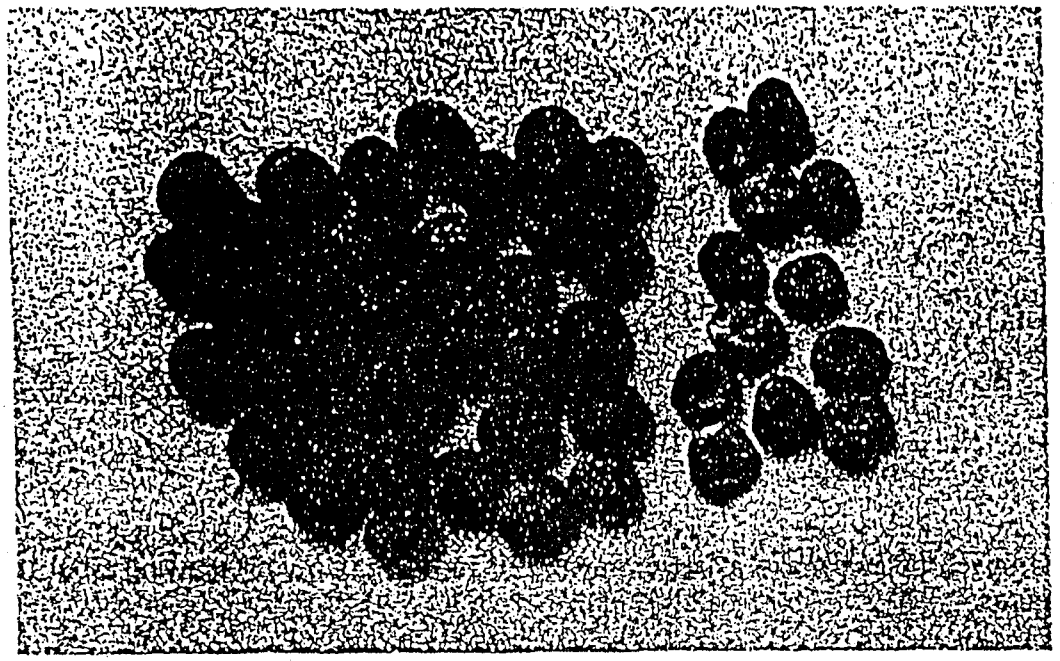


Fig. 5

(i) Describe **one** difference, apart from size, between the two types of seeds and state how many seeds of each type are shown in Fig. 5.

.....

.....

.....

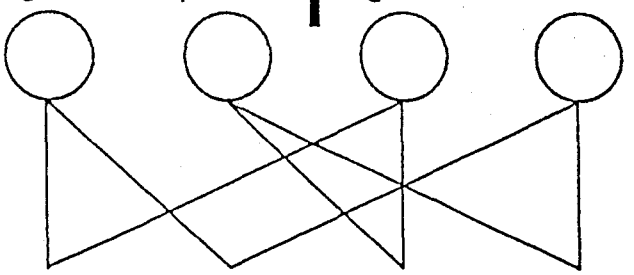
(ii) The difference you described in **(i)** is genetically determined by one pair of alleles. Complete the genetic diagram below to explain the results of self-pollination of the pea flowers.

Use the symbol **A** *for the dominant allele and* **a** *for the recessive allele.*

genotype of parent plant ——

gametes in pollen | gametes in ovules

alleles in gametes



genotypes of F_1 seeds —— —— —— ——

[5]

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QUESTION 4 IS OVERLEAF

4 Some algae (microscopic green plants) grow on the surface of tree trunks, forming easily-visible patches. On a particular tree, it was noticed that the patches of algae seemed to occur mainly on the north-facing surface. To investigate this, a strip of transparent plastic, marked with 16 equal squares, was placed on the north-facing surface of the tree trunk, as shown in Fig. 6.

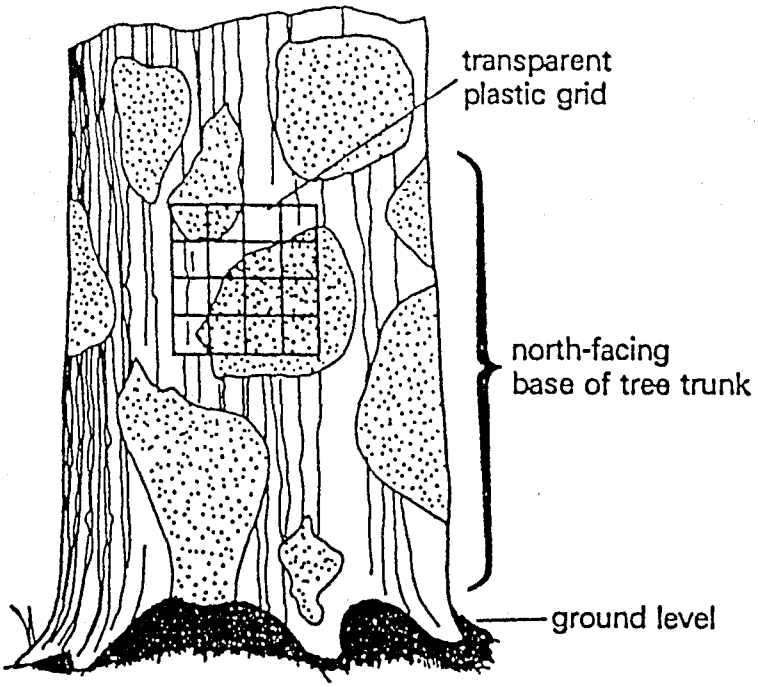

Fig. 6

The number of squares that had half or more of their area occupied by the algae was counted. Squares with less than half of their area occupied were ignored. This was then repeated for the east, south and west-facing surfaces of the tree trunk and the results for these three surfaces are shown in Table 2 below.

Direction faced	*Number of squares at least 50% occupied*
north	
south	3
east	7
west	8

Table 2

(a) Use Fig. 6 to obtain the result for the north-facing surface and complete Table 2. [1]

(b) (i) Explain why some of the squares **partly** occupied by algae were counted but others were ignored.

.....

.....

(ii) Suggest **one** precaution that should be taken when deciding where to place the plastic strip on each of the four surfaces of the tree.

.....

(iii) Suggest **one** way in which this investigation should be extended before general conclusions about the distribution of algae on tree trunks are made.

.....

..... [3]

(c) Suggest **two** factors in the environment which may help algae to grow better on surfaces facing in a particular direction.

1. .....

2. ..... [2]

Centre Number	Candidate Number

Candidate Name ....

0610/6 IGCSE NOV

BIOLOGY

PAPER 6 ALTERNATIVE TO PRACTICAL

Thursday 4 NOVEMBER 1993 Morning 1 hour

Candidates answer on the question paper.
No additional materials are required.

UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

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Question Number	Examiner's use only
1	
2	
3	
4	
TOTAL	

12

This Question Paper consists of 10 printed pages and 2 blank pages.

SB(SM)

[Turn over

1 Figure 1 shows part of the human dentition.

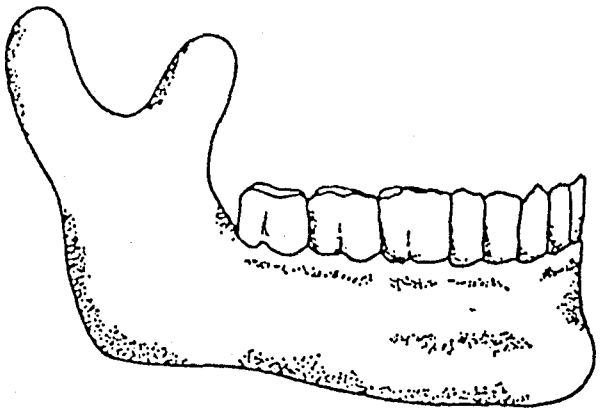

Fig. 1

Figure 2A shows part of the dentition of a different species of animal.

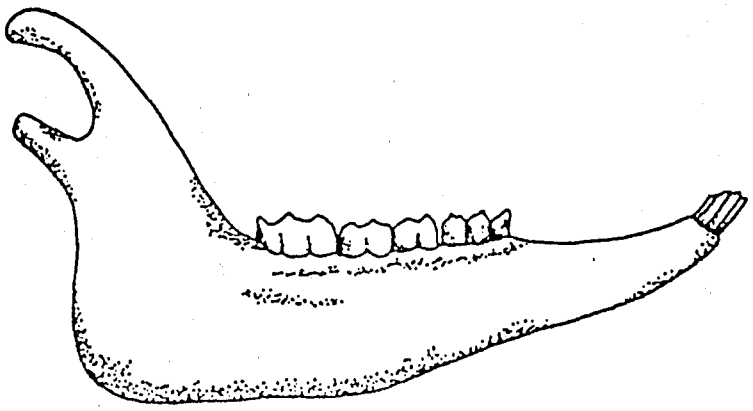

Fig. 2A

(a) State **three** ways in which the dentition shown in Fig. 1 differs from the dentition shown in Fig. 2A.

	Fig. 1	Fig. 2A
1.	.....	.....
	.....	.....
	.....	.....
2	.....	.....
	.....	.....
	.....	.....
3.	.....	.....
	.....	.....
	.....	..... [3]

(b) Suggest how the different types of teeth shown in the figures are adapted for their roles in the process of feeding.

Fig. 1 .....

.....

.....

.....

.....

Fig. 2A .....

.....

.....

.....

..... [4]

Figure 2B shows an enlargement of some of the teeth in Fig. 2A, photographed to show structural detail.

Fig. 2B × 1.5

(c) (i) Make a labelled drawing of one tooth from Fig. 2B to show the visible structure of the tooth, including details of its biting surface.

(II) Measure on Fig. 2B the tooth you have drawn and indicate the part measured by drawing a line (◄——►) on Fig. 2B. Remembering that the photograph shows the teeth enlarged x 1.5, use the measurement to calculate the magnification of your drawing. Show your working.

measurement .....

calculation

magnification ..... [5]

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2 (a) Figure 3 shows apparatus set up for an experiment on gaseous exchange. The arrows show the flow of air while breathing in through the mouthpiece.

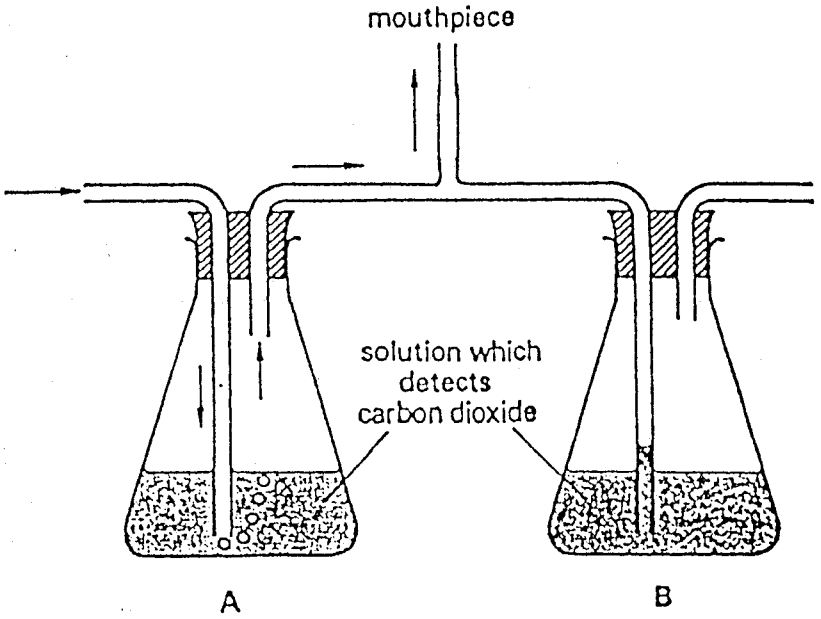


Fig. 3

(i) Draw arrows and bubbles on the diagram to represent the flow of air which would take place when someone breathes out through the mouthpiece.

(ii) Suggest why you should breathe out **slowly** during this experiment.

.....

.....

(iii) Name a suitable solution for flasks A and B.

.....

(iv) What is the purpose of this experiment?

.....

.....

(v) What visible change would there be

in flask A? .....

in flask B? .....

(vi) What conclusion could be drawn from these results?

.....

.....

..... [7]

(b) When leaves of some plants are placed in hot water, bubbles immediately appear on the lower surface. Suggest an explanation of this observation.

.....

.....

.....

..... [2]

3 (a) If you were provided with a sample of powdered food,

(i) describe in detail how you would demonstrate that the powder contained reducing sugar;

.....

.....

.....

.....

(ii) describe in detail how you would use the biuret test to demonstrate the presence of another food substance in the powder.

.....

.....

.....

..... [4]

(b) A student had to identify four powders, **A**, **B**, **C** and **D**, each of which contained **any two** of the following substances:

glucose;

sucrose ; (a sugar which does not react with Benedict's solution),

bicarbonate of soda (sodium hydrogencarbonate), which gives an alkaline reaction;

protein.

Benedict's solution, biuret reagents and red litmus paper (red, acid pH $\rightleftharpoons$ blue, alkaline pH), were provided and these were used in testing the four powders. The observations made during the tests are set out in Table 1.

powder	*test with Benedict's solution*	*test with biuret reagents*	*test with red litmus paper*
A	orange-red colour	remained blue	remained red
B	orange-red colour	mauve (violet) colour	remained red
C	orange-red colour	remained blue	turned blue
D	remained blue	remained blue	turned blue

Table 1

Complete Table 2, using the information given in Table 1, setting out the **conclusion** which could be drawn from each test, and the composition of each of the four powders, **A**, **B**, **C** and **D**.

	conclusions from			
powder	*test with Benedict's solution*	*test with biuret reagents*	*test with red litmus paper*	*composition of powder*
A				
B				
C				
D				

Table 2 [5]

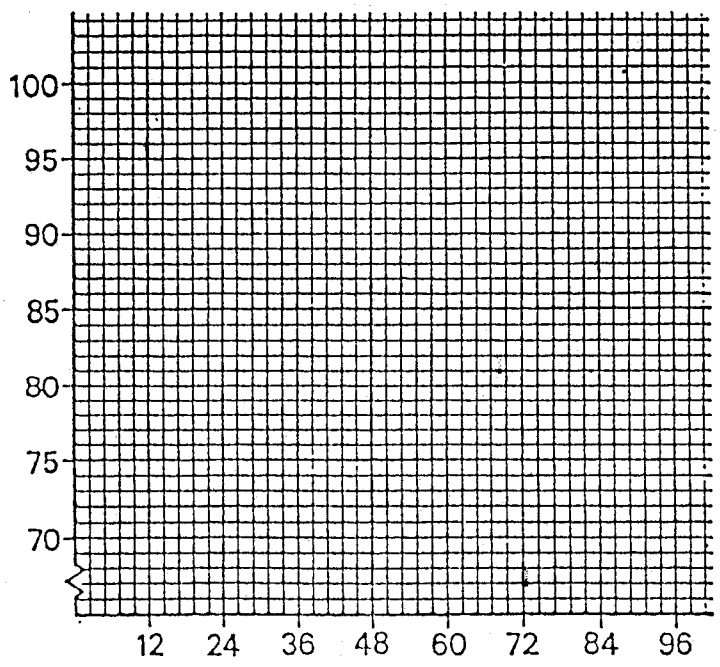
20

4 Some fresh seeds were divided into two samples of 100 g each. The first of these, called sample A, was placed in an incubator (or oven). The second, sample B, was left in the open air. At intervals of 12 hours the two samples were reweighed and the readings are recorded in Table 3.

time /hours	*sample* A *mass/g*	*sample* B *mass/g*
0	100	100
12	87.5	95
24	77.5	85
36	72.5	80
48	71	78
60	71	73
72	–	72.5
84	–	71
96	–	71

Table 3

(a) Plot the results for the two samples, and complete the graph, on the grid provided. Make a clear distinction between the curves for the two samples.



[4]

Using the graph, and your own knowledge, answer the following questions.

(b) (i) What was the mass of the seeds after 18 hours

1. in sample A ? .....

2. in sample B ? .....

(ii) Suggest why the loss of mass in sample B was smaller between 36 and 48 hours than the loss between 48 and 60 hours.

.....

.....

.....

(iii) Why was it not necessary to continue weighing sample A after 60 hours?

.....

..... [3]

(c) (i) Suggest a suitable temperature for the incubator (oven) used to dry sample A.

.....

(ii) Suggest reasons for this being a suitable temperature.

.....

.....

.....

..... [2]

(d) What was the percentage of water in the seeds used in this experiment?

..... [1]

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Centre Number	Candidate Number

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International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

BIOLOGY 0610/6

PAPER 6 Alternative to Practical

Thursday 2 JUNE 1994 Afternoon 1 hour

Candidates answer on the question paper
No additional materials are required.

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page.
Answer all questions.
Write your answers in the spaces provided on the question paper.
Use sharp pencils for your drawings. Coloured pencils or crayons should not be used.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.

FOR EXAMINER'S USE

This question paper consists of 9 printed pages and 3 blank pages.

1 Fig. 1 and Fig. 2 below show flowers of jute and of sugar cane.

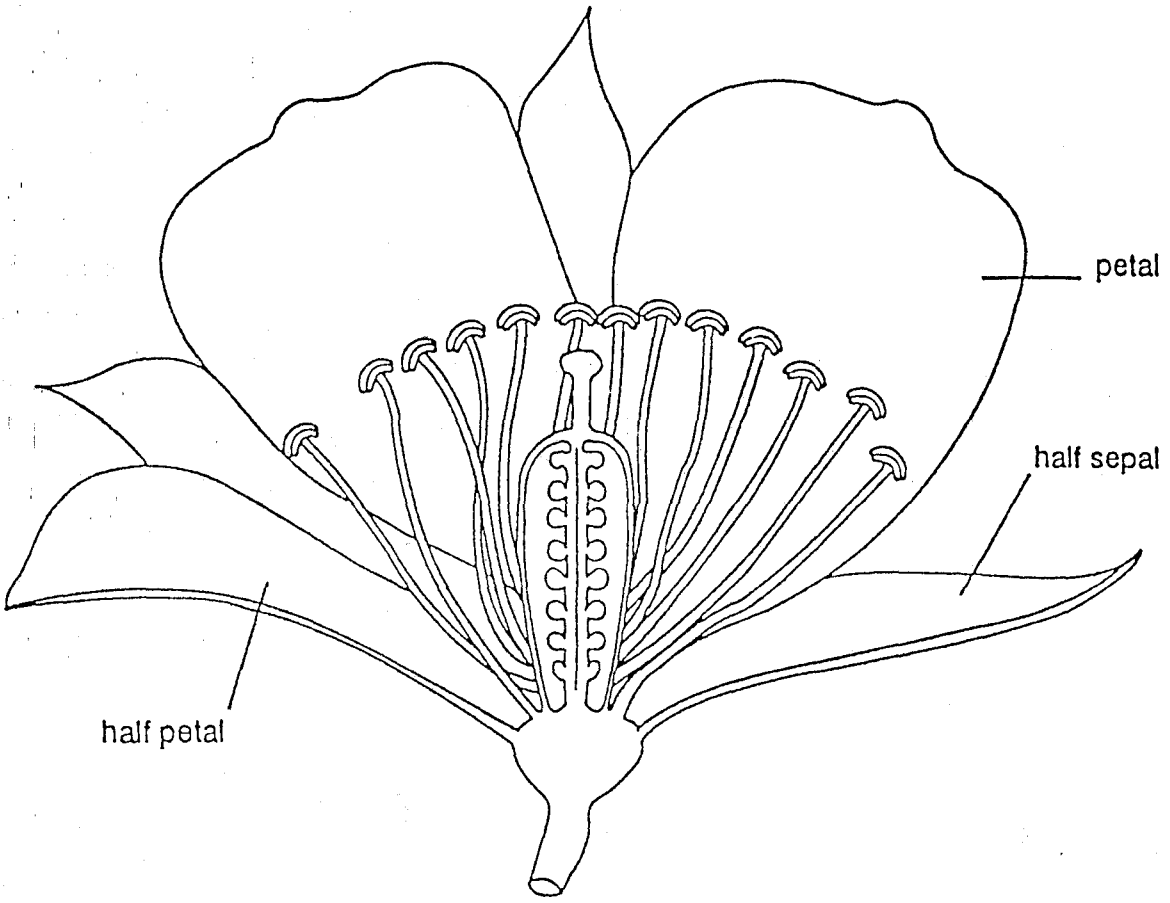


Fig. 1: jute flower, cut in half vertically. *Magnification x 20*

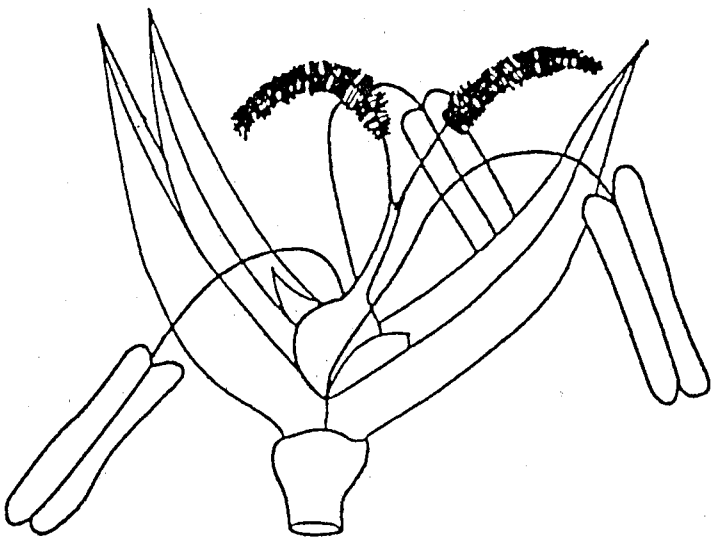


Fig. 2: sugar cane flower, opened out. *Magnification x 15*

(a) (i) On Fig.1, label an *anther*, an *ovule*, the *stigma*. [3]

(ii) State the number of petals in a complete flower of jute. .....[1]

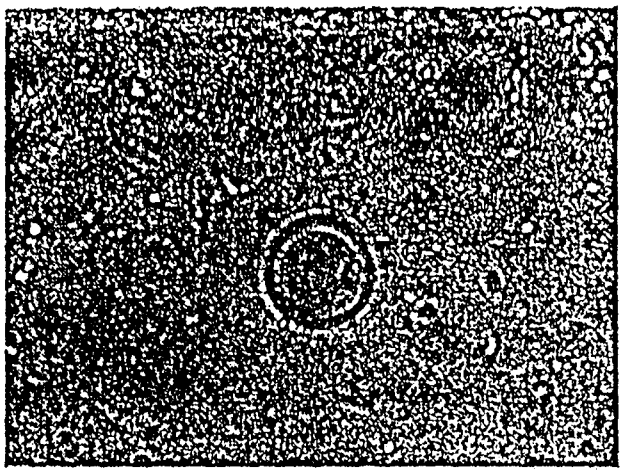
(b) (I) By reference to the male and female parts, suggest how sugar cane flowers are suited to wind pollination.

.....

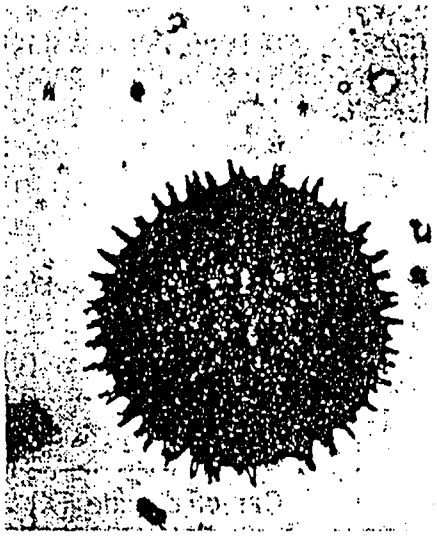
.....

.....[2]

(II) The photographs in Fig. 3 below show two types of pollen grain, highly magnified. One type of pollen is from an insect-pollinated flower, the other from a wind-pollinated flower.



Pollen type A *x 400*



Pollen type B *x 400*

Fig. 3

Which type of pollen, A or B, is more likely to belong to jute? Explain your answer.

Suggested pollen type for jute: .....

Explanation: .....

.....[2]

(c) Draw a straight line across Fig. 1, joining the tips of the two complete sepals.

(I) Measure the line you have drawn and record the measurement:

.....

(II) What was this measurement in the actual flower? Show your working.

Working:

Measurement in actual flower:..... [2]

2 A locust was placed for a short time in a transparent container, as shown in Fig.4.

The pumping movements made by the insect's abdomen each time it breathed were then observed. These movements are similar to those made by the thorax (chest) of mammals.

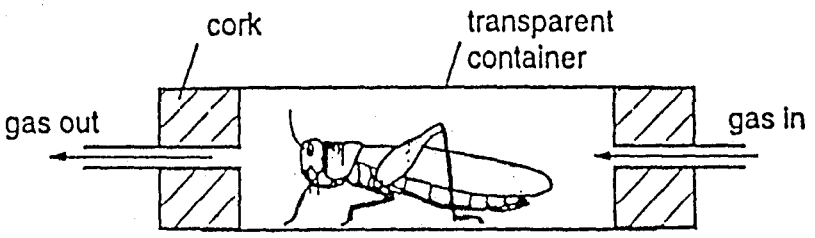


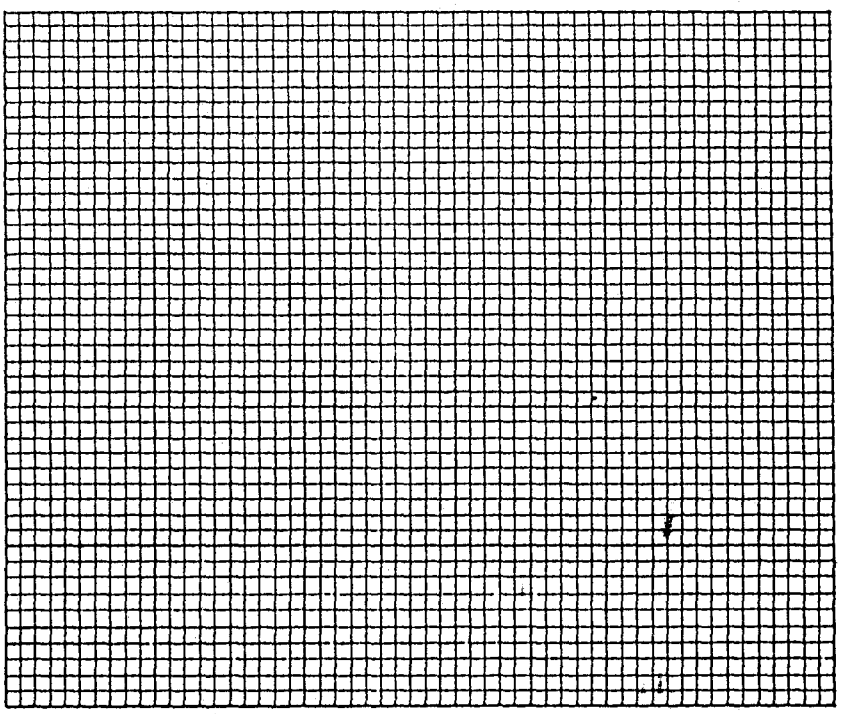
Fig.4

Various gases were passed through the container, in turn, and the number of breathing movements made in each gas was counted for a period of 30 seconds. The results are shown in Table 1.

Table 1

Gas passed through container	*Breathing movements per 30 seconds*
Air from the room (V)	15
Air exhaled by a student (W)	30
Carbon dioxide (X)	41
Oxygen (Y)	2
Air from the room (Z)	16

(a) On the grid below, plot the results in the form of a **bar chart**, (using letters V to Z).



[4]

(b) Suggest an explanation for the result when oxygen was used.

.....

.....[1]

(c) The part of the experiment which investigated the effect of exhaled air was criticised because it included some uncontrolled variables, such as temperature.

(i) Explain the likely effect on the rate of breathing movements if the temperature of the exhaled air was higher than room air temperature.

.....

.....[2]

(ii) State one way, (other than temperature and oxygen and carbon dioxide content), in which exhaled air is likely to be different from air in the room.

.....[1]

(d) At the end of the investigation, why was a measurement made using air from the room for a second time?

.....

.....[1]

(e) Suggest how the investigation needed to be extended before valid conclusions could be made about the effects, on locust breathing movements, of the gases used in the experiment.

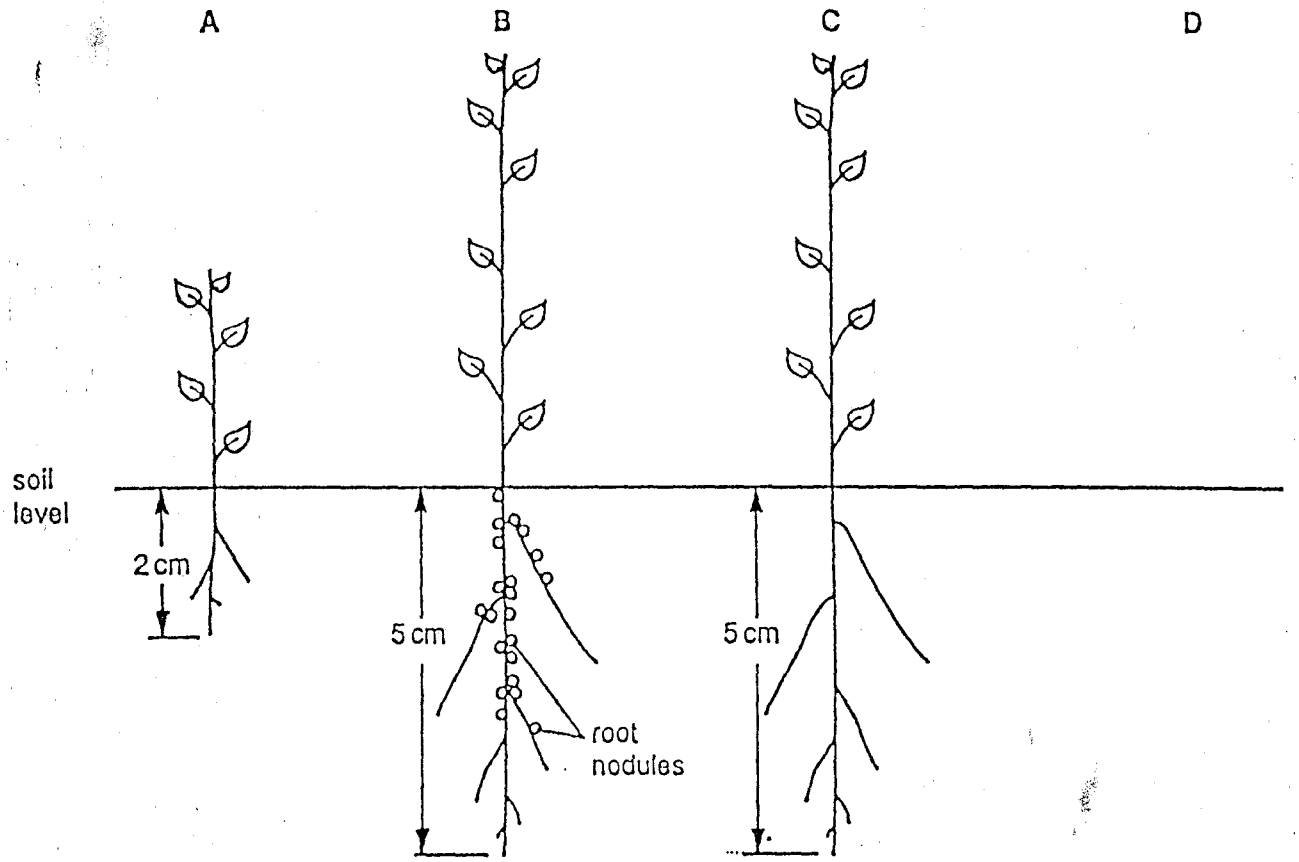
.....

.....[1]

For Examiner's Use

3 Plants such as peas, beans and clover (legumes) can develop swellings, called nodules, on their roots. Each root nodule contains millions of nitrogen-fixing bacteria.

Three batches of legume seeds were sown. Each batch was sown in soil that had been given a different treatment, as shown in Fig. 5. Fig. 5. also shows how much a typical seedling had grown after a few weeks and how many root nodules had developed. Fig. 5 is drawn one fifth of the actual size.



soil sterilised	soil not sterilised	soil not sterilised	1 .....
no nitrates added	no nitrates added	nitrates added	2 .....

Fig. 5

1

29

For Examiner's Use

a) Table 2 shows the actual length of the main root of each typical seedling.

Table 2

	A	B	C
Length of root/cm	10	25	25
Length of stem/ cm			

(I) Determine the actual length of the stem of each seedling and record it in Table 2. [2]

(II) Complete the bottom line of Table 2 to show the total number of leaves on each seedling. [2]

(b) Using the information in Fig. 5, suggest two conditions which may prevent the formation of root nodules.

1. .....

2. .....[2]

(c) (I) On the lines labelled 1 and 2 in Fig. 5, suggest **two** soil conditions for a fourth batch of seeds, **D**, which would provide extra evidence for your answer to (b). [2]

(II) In the space labelled **D** in Fig. 5, make a simple drawing to show the likely appearance of a typical seedling from batch **D**, after the same time period used for batches **A**, **B** and **C**. [2]

For Examiner's Use

4 The enzyme amylase, present in saliva, speeds up the breakdown of starch into reducing sugar. Starch consists of large molecules, but the molecules of reducing sugar are much smaller.

To demonstrate the action and importance of amylase, some students set up the investigation shown in Fig. 6.

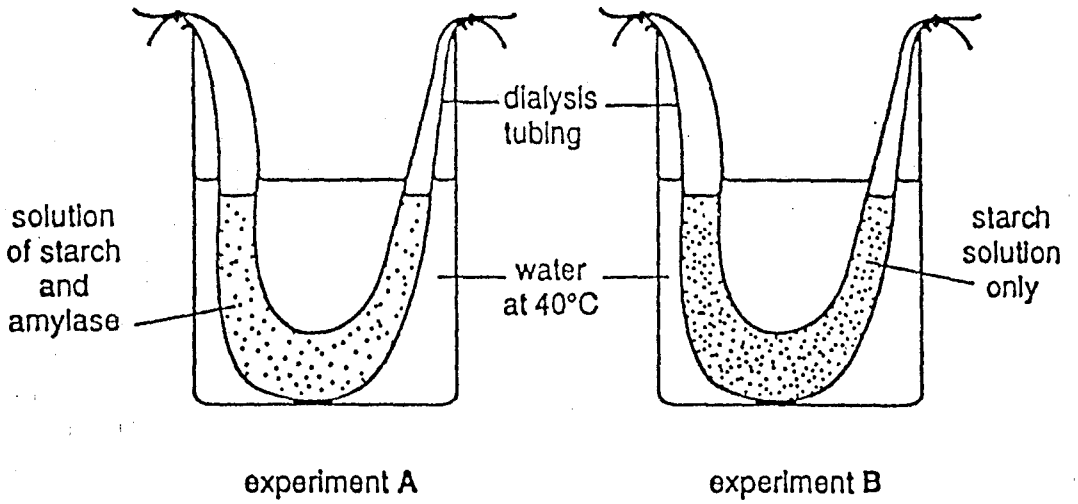


Fig. 6

After 20 minutes, samples of the contents of the dialysis tubing and of the beaker were tested separately for both starch and reducing sugar. The results are shown in Tables 3 and 4.

Experiment A

Table 3

	starch	*reducing sugar*
contents of tubing	absent	present
contents of beaker	absent	present

Experiment B

Table 4

	starch	*reducing sugar*
contents of tubing	present	absent
contents of beaker	absent	absent

(a) (i) What do the results suggest about the properties of dialysis tubing?

.....

.....[1]

(II) In this investigation, which region of the body does the dialysis tubing represent?

.....[1]

(b) Describe how you would test a sample of one of the liquids for reducing sugar. Give full practical details, including any safety precaution(s) and describe the observation which would indicate a positive result.

.....

.....

.....

.....

.....

.....[4]

(c) (I) Suggest one reason why water at 40 °C was used in the investigation.

.....[1]

(II) In the investigation, amylase was used rather than saliva. Suggest one reason for this.

.....[1]

(d) In another experiment, C, amylase solution which had been boiled and cooled was mixed with starch solution inside some dialysis tubing. The tubing was again left in a beaker of water at 40 °C for 20 minutes. Complete Table 5 to show the expected results for this extra experiment.

Experiment C

Table 5

	starch	*reducing sugar*
contents of tubing	.....	.....
contents of beaker	.....	.....

Explain your answer.

.....

.....[2]

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BIOLOGY 0610/6

PAPER 6 Alternative to Practical

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FOR EXAMINER'S USE	
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[Turn over

For Examiner Use

1 In an experiment, two solutions, A and B, were used. Samples of each were first tested for the presence of starch, protein and reducing sugar. Table 1 shows the colours obtained at the completion of each test.

Table 1

solution tested	*colour of solution after testing for:*		
	1. *starch*	2. *protein*	3. *reducing sugar*
A	brown	mauve (violet)	blue
B	black	blue	blue

(a) (I) Name the reagents you would use to carry out tests for:

1. starch .....

2. protein .....

3. reducing sugar .....

(II) Complete Table 2, giving the conclusions which might be drawn from the observations recorded in Table 1.

Table 2

solution tested	*conclusions from results of tests for:*		
	1. *starch*	2. *protein*	3. *reducing sugar*
A			
B			

[4]

For Examiner's Use

(b) Solution A was added to solution B; the mixture in the test-tube was then placed in a water bath, stirred, and tested for starch and reducing sugar at intervals of one minute, giving the observations recorded in Table 3.

Table 3

time/minutes	*colour of solution after testing for:*	
	starch	*reducing sugar*
1	black	blue
2	black	blue-green
3	blue-black	yellow-green
4	blue-black	yellow
5	pale blue-black	yellow-orange
6	paler blue-black	orange
7	brown	orange-red
8	brown	orange-red

(I) What conclusions may be drawn from the observed results of the starch test between 2 and 7 minutes?

.....

.....

.....

(II) Explain the range of colours recorded for the reducing sugar test and again draw a conclusion.

.....

.....

..... [5]

(c) (I) State the class of biological substance to which solution A belongs and suggest its name.

class of substance ..... *name* .....

(II) If the test for reducing sugar was carried out in a water bath and the experiment in part (b) was also carried out in a water bath, suggest suitable temperatures for each water bath:

1. for the reducing sugar test, ...

2. for the experiment. .....[2]

(d) Suggest where and when this reaction might occur in a plant.

.....

.....[1]

2 Fig. 1 shows an experiment being carried out in still air.

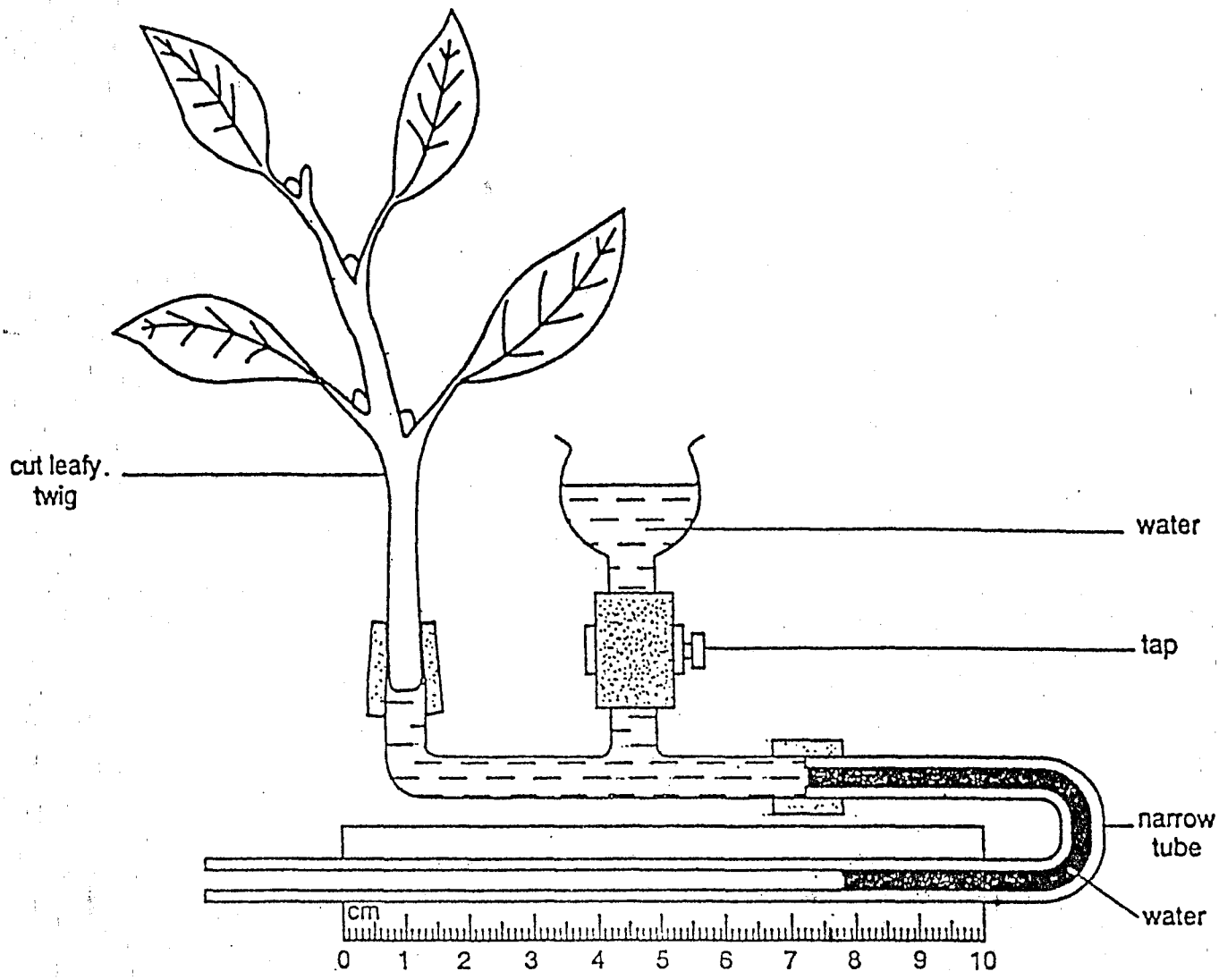


Fig. 1

For Examiner's Use

The scale was read every two minutes. After five minutes a fan was switched on so that a current of air blew over the shoot.

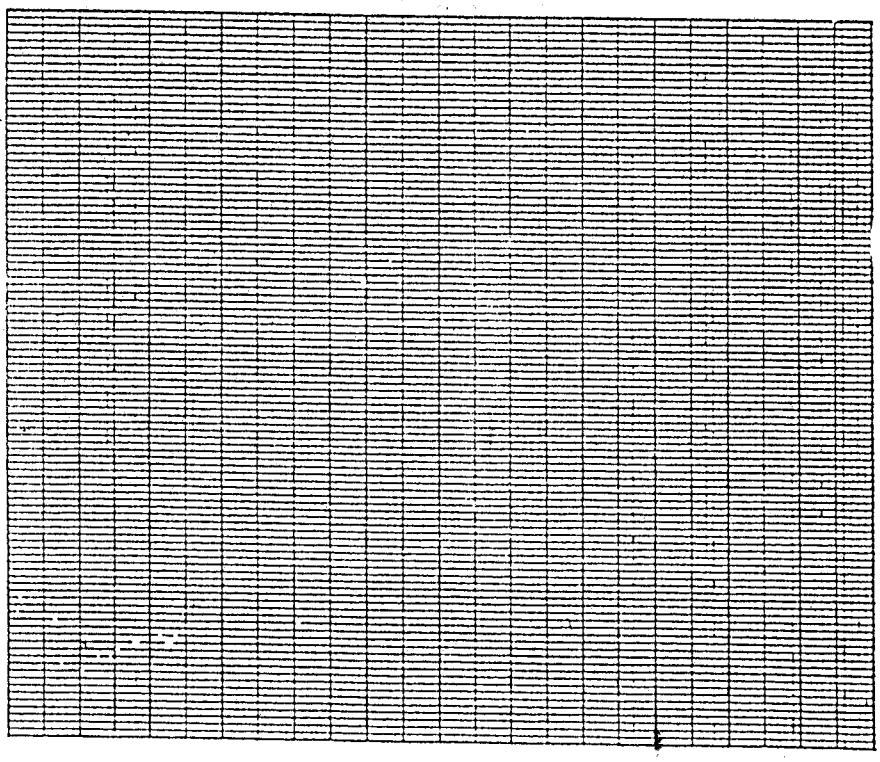
The readings are shown in Table 4. The reading at 10 minutes is not recorded but Fig. 1 shows the apparatus as it was at that time. Read the scale in order to complete the table.

Table 4

time/minutes	*distance*/cm
2	0.8
4	1.6
6	3.0
8	5.2
10	

(a) (i) Construct a graph from the information in Table 4.

(ii) Mark on the axis the point at which the fan was started.



[4]

(b) Use your graph to determine what the reading would have been at 9 minutes.

.....

[1]

(c) State the effect of the fan and suggest a reason for this effect.

.....

.....

.....[2]

(d) Explain briefly what caused the movement of water along the scale.

.....

.....

.....[2]

(e) How could the scale be reset to zero after 10 minutes?

.....

.....[1]

3 Fig. 2 is a photograph which shows a young fruit developing from a flower.

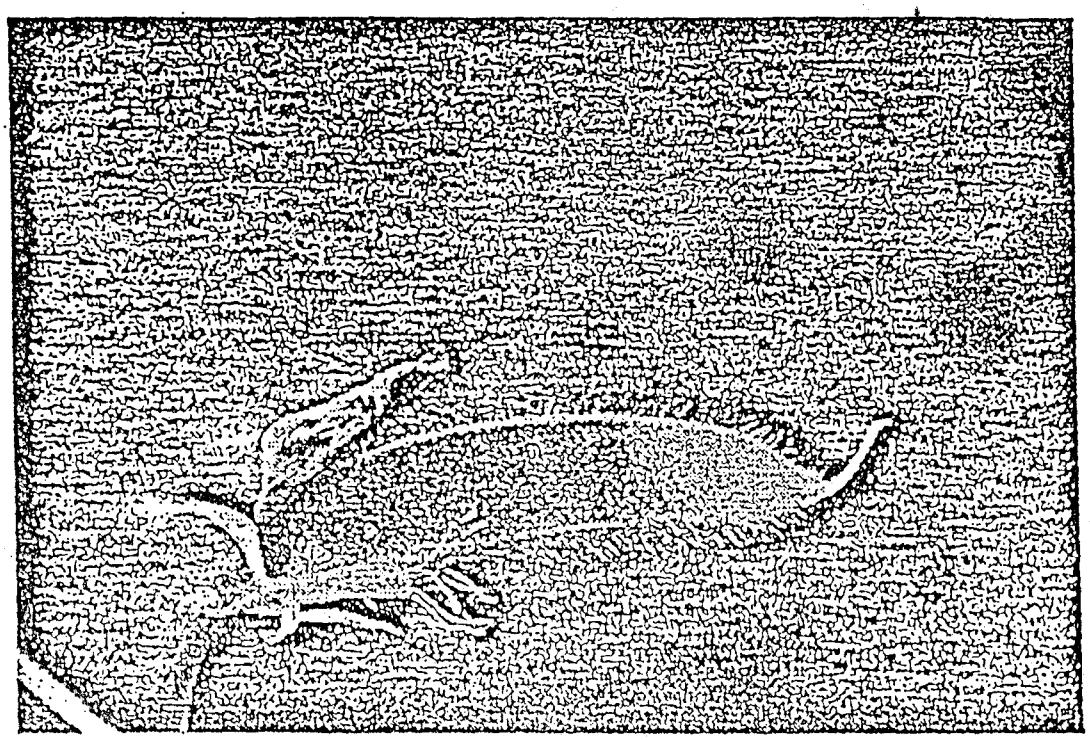


Fig. 2

For Examiner's Use

(a) • Make a large, fully labelled drawing of the structures shown in the photograph.

[7]

(b) The fruit shown in Fig. 2 is magnified x 3.

Measure the length of your drawing of the fruit, indicating on your drawing exactly where you measured it. Measure the corresponding distance on the photograph. Record these measurements and use them to calculate the magnification of the fruit in your drawing. Show your working.

measurement of drawing .....

measurement of photograph .....

magnification = ...[2]

(c) Suggest three changes which might be seen after this fruit had developed for another 2 to 3 weeks.

1. .....

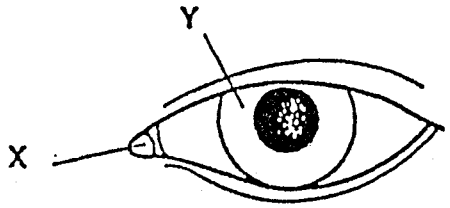
2. .....

3. .....[2]

39

For Examiner's Use

4 Fig. 3A and Fig. 3B show how the appearance of a person's eye may change as you observe it.



.....

Fig.3A

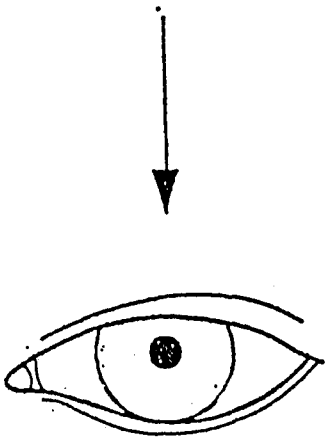


Fig.3B

(a) (I) Label, on Fig. 3A, *sclera* (sclerotic coat), *iris*, *pupil*.

(II) On Fig. 3A, name the structure marked **X**. [2]

(b) (I) Which eye, left or right, is shown in Fig. 3? .....

(II) What stimulus would cause the change from Fig. 3A to Fig. 3B?

.....[2]

(c) Explain how the structure of region **Y** can change the appearance of the eye as shown in Fig. 3A to that of Fig. 3B.

.....

.....

.....[3]

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BIOLOGY 0610/6

PAPER 6 Alternative to Practical

Thursday 1 JUNE 1995 Morning 1 hour

Candidates answer on the question paper
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Answer all questions.
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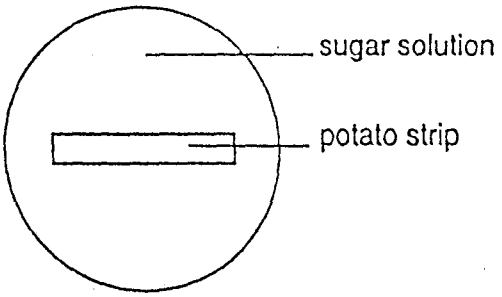
1 Six thin strips, each 100 mm long, were cut from a potato tuber. One strip was placed in each of six dishes containing sugar solutions of different concentrations. One dish is shown in Fig. 1.



Mag. X 0.25

Fig. 1

After an hour, all the strips were removed and placed on a flat surface. These are shown in Fig. 2, together with the concentrations of the sugar solutions from which they were taken.

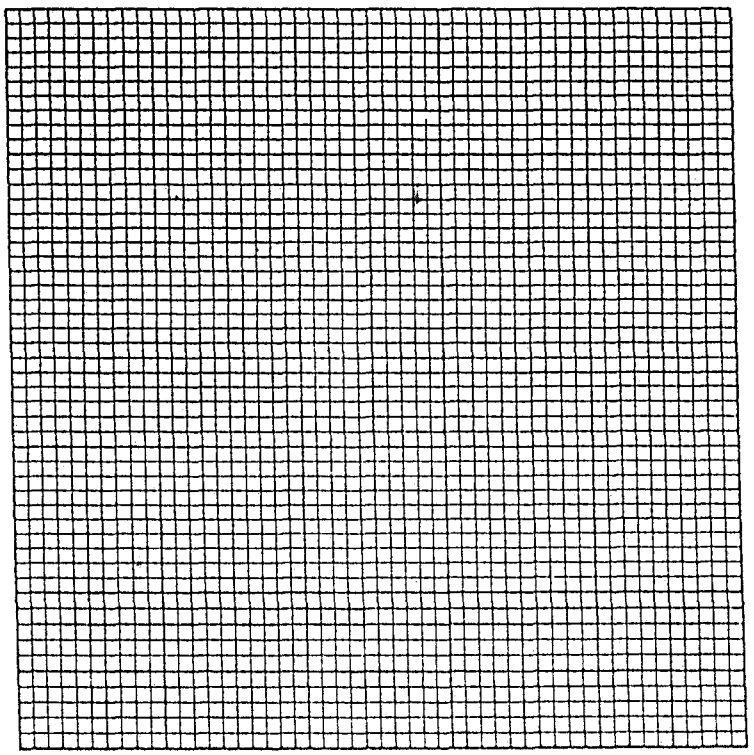
strips after an hour	concentration of sugar solution / mol per dm^3
	0.1
	0.2
	0.4
	0.5
	0.7
	0.9

Fig. 2

(a) Measure the length of each strip shown in Fig. 2 as accurately as possible. Record these measurements in a suitable table, constructed with neat, ruled lines in the space below. Calculate the **changes** in length and record these in the same table.

[4]

(b) Construct a graph to show the relationship between the **changes** in length of the strips and the concentrations of the sugar solutions. Join the points, using straight lines.



[4]

(c) Account for the change in length of the strip placed in the sugar solution with a concentration of 0.7 mol per dm^3.

.....

.....[2]

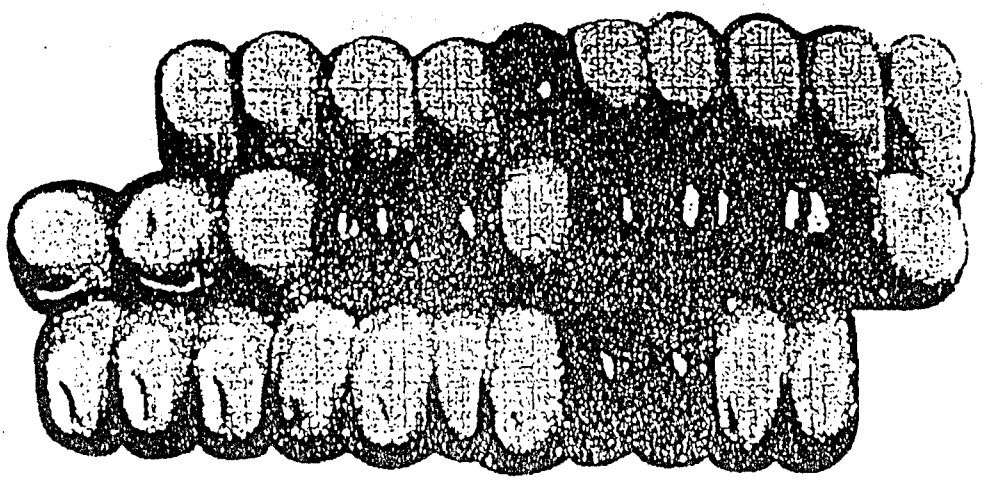
2 Female flowers of maize each produce a fruit called a grain. The grains are grouped together to form cobs.

The colour of a grain is determined genetically. Usually, grains are **pale**, but some varieties of maize form **dark** grains.

When certain varieties of maize are crossed, the cobs produced by the F_2 plants have both **pale** and **dark** grains. An example of such a cob is shown in Fig. 3. Fig. 4 shows part of the same cob enlarged.

A whole maize cob (x0.5)

Fig. 3



Part of the maize cob shown in Fig. 3 (x2.7)

Fig. 4

For Examiner's Use

(a) In the space below, make a large drawing of the middle horizontal row of grains shown in Fig. 4.

[4]

(b) (i) Count the **total** number of each kind of grain shown in Fig. 4:

*Number of **pale** grains:* .....

*Number of **dark** grains:* .....

(ii) What simple **genetic ratio** do these numbers represent?

Suggested ratio: .....

(iii) Given the **whole** cob shown in Fig. 3, how would you confirm this ratio?

.....

.....

[4]

(c) Taking into account your answer to (b) (i),

(i) suggest a suitable **letter** to represent the allele for each of the two grain colours:

*allele for **pale** grain:* .....

*allele for **dark** grain:* .....,

(ii) use these letters to show the genotype of each of the maize plants that were crossed to produced the cob shown.

genotypes ..... X .....

[2]

For Examiner's Use

3 Six, soaked seeds were rinsed with disinfectant and then cut in half. Three of the halves were placed with their cut surfaces on sterile agar jelly, in each of four Petri dishes. The agar jelly contained starch. A lid was placed on each sterile dish and the dishes were each left at a different temperature for three days. The dishes are shown in Fig. 5.

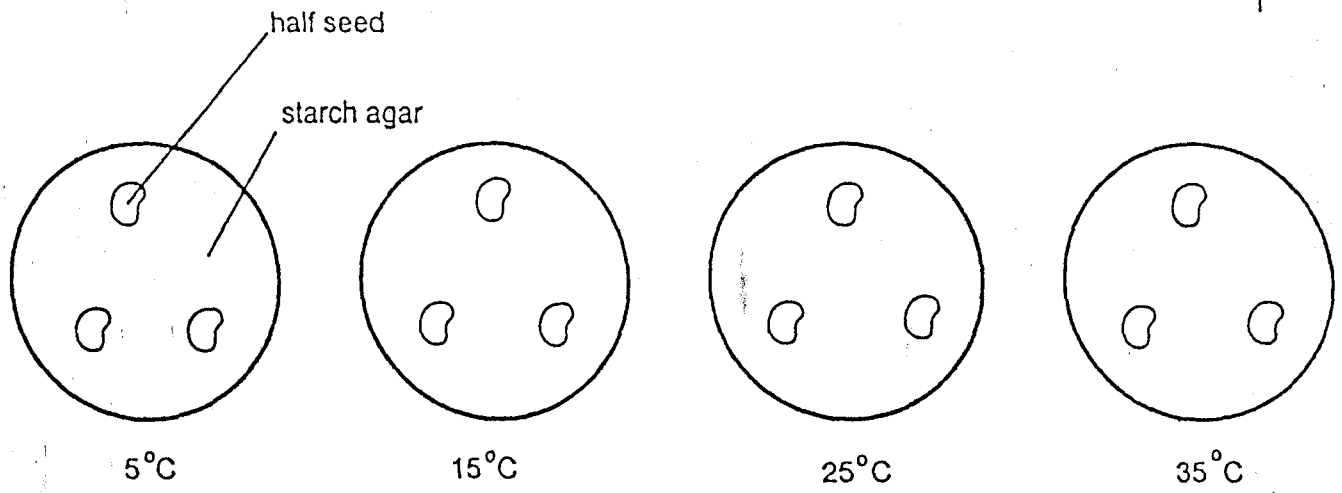


Fig. 5

After three days, the seeds were removed and the agar jelly surface flooded with iodine solution. The results are shown in Fig. 6.

Key:

yellowish areas

blue-black areas

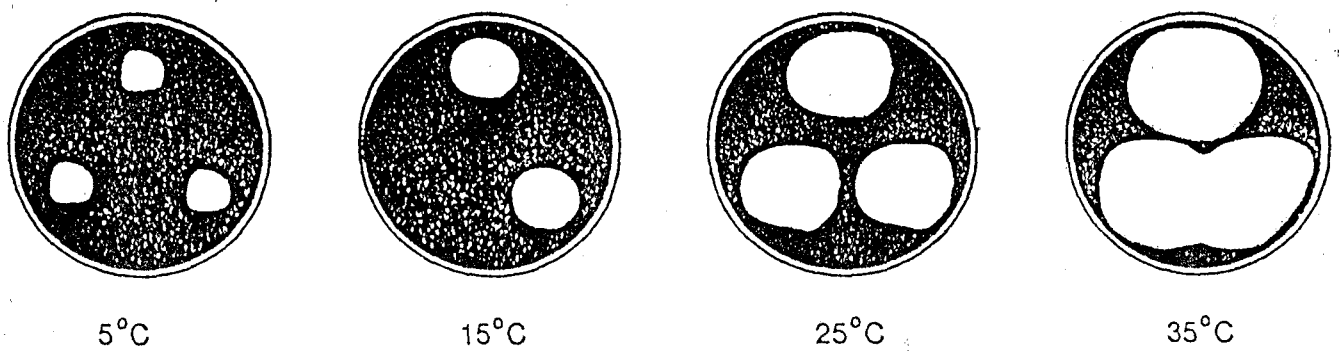


Fig. 6

For Examiner's Use

(a) (i) Suggest what had happened to the starch in the agar jelly where the seeds had been placed.

.....

.....

(ii) Explain how you arrived at this suggestion.

.....

.....

[3]

(b) Suggest **two** reasons for the difference in the results for the dishes kept at 25 °C and 35 °C.

1 .....

.....

2 .....

.....[2]

(c) Complete the table below to suggest and explain what observations might have been made after three days in the dish kept at 25 °C, if the seeds and agar jelly had **not** been sterilised.

Dish contents not sterilised; after 3 days at 25 °C:

	observation	*explanation*
before adding iodine	.....	.....
after adding iodine	.....	.....

[4]

(d) Suggest why three half-seeds, instead of just one, were used in each dish. Support your answer by reference to Fig. 6.

.....

.....

.....[1]

4 A student investigated the responses to light and to humidity (moisture) of a species of small beetle, collected from beneath leaves in the forest. The student set up the apparatus shown in Fig. 7.

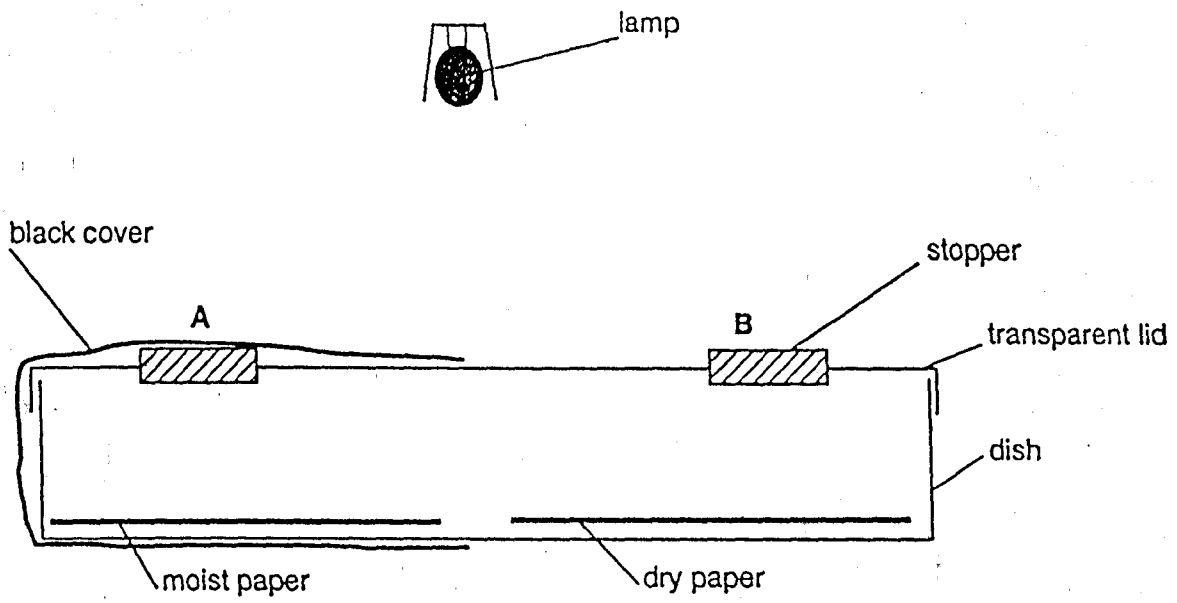


Fig. 7

After 15 minutes she placed two beetles into the dish, one through hole **A** and one through hole **B**. She then replaced the stoppers. After a further 15 minutes she observed that both beetles had settled on the moist paper. The student concluded that this species of beetle preferred moist, dark conditions rather than light, dry conditions.

(a) (i) Suggest why the student waited for 15 minutes before putting the beetles into the apparatus.

.....

.....

(ii) Why did she place one beetle through each hole instead of both through the same hole?

.....

.....

[2]

For Examiner's Use

(b) (I) Why was dry paper placed in the illuminated half of the dish?

.....

.....

(II) It was suggested that the experiment could have been improved by placing a chemical drying agent on the paper in the illuminated half of the dish. Suggest **one** advantage and **one** disadvantage of doing this.

Advantage .....

.....

Disadvantage .....

.....

[3]

(c) Suggest **one** likely difference in conditions between the two halves of the dish, apart from light and moisture, and state what could cause this difference.

.....

.....[1]

(d) The experiment did not investigate the possibility that the beetles might respond to light **only** or to moisture **only.** Suggest briefly how the experiment could be re-designed in order to study responses of the beetles to these two factors separately. (You may include one or more diagrams.)

.....

.....

.....

.....

.....

[4]

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BIOLOGY 0610/6

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For Examiner's Use

1 Fig.1 shows a freshly picked leaf.

Fig.2 shows the same leaf after treatment, in preparation for the final stage of the starch test.

Fig.1

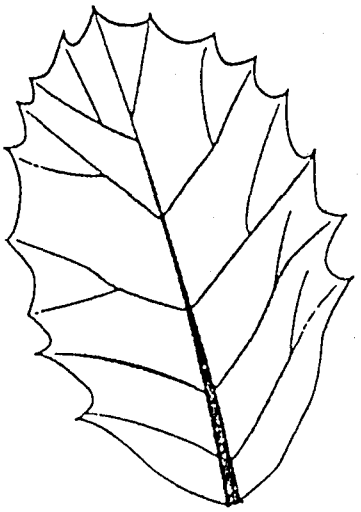


Fig.2

(a) Make a large, labelled drawing of the leaf shown in Fig.1. [4]

For Examiner's Use

(b) Suggest how the leaf shown in Fig.2 had been prepared.

.....

.....

.....

..... [2]

(c) (I) Describe how you would complete the starch test on the leaf shown in Fig.2.

.....

.....

(II) On Fig.2, show, by means of shading and labelling, the results you would expect.

(III) Explain these results and state the conclusions which could be drawn from them.

.....

.....

.....

..... [5]

2 Five seeds, which had been soaked in water for 24 hours, were placed in a test-tube. Metal gauze was used to hold them in position. The test-tube was then filled with cooking oil and inverted in a dish of the same oil. Fig.3 shows the experiment after two days.

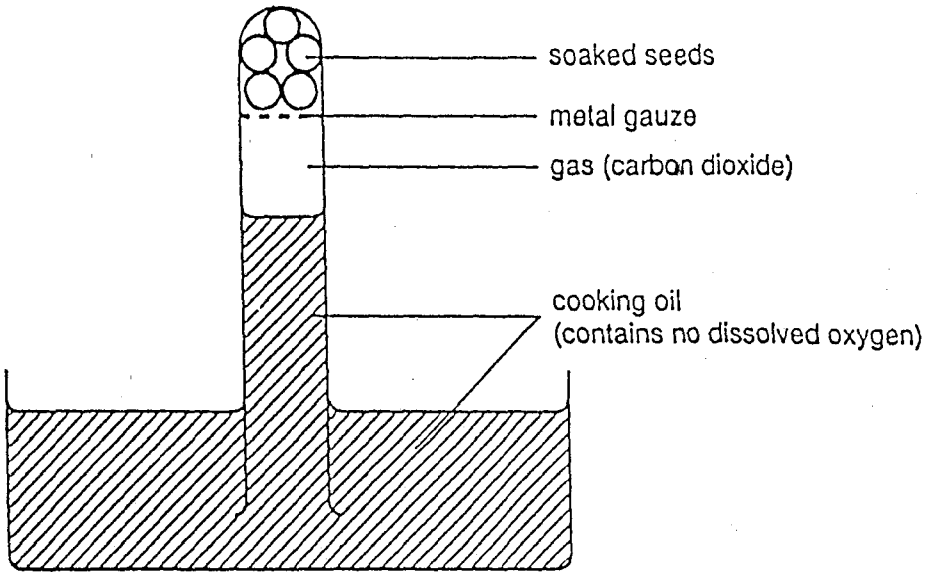


Fig.3

(a) (I) Why were the seeds first soaked in water?

.....

.....

(II) Explain briefly how you would set up the test-tube in the dish of oil, as shown, without spilling the oil.

.....

.....

.....

(III) Suggest why cooking oil, rather than water, was used in setting up the experiment.

.....

..... [4]

(b) Name the process which produced the gas in the test-tube.

..... [1]

For Examiner's Use

(c) (i) Suggest **one** way in which the process might be of use to the plant during the germination of the seed.

.....

.....

(ii) A process similar to the one being investigated takes place in muscles during exercise, and in the brewing of beer.

Name the product (other than the gas) formed in each process.

Product formed during exercise .....

Product of brewing ..... [4]

(d) Describe briefly how you would set up a control in order to verify the results of this experiment.

.....

..... [2]

3 Hydrogen peroxide is a poisonous compound which sometimes forms in living tissues. As a safeguard, substances within the cells are able to break down this compound, releasing molecules of oxygen in the process.

Some plant material was cut into pieces and then ground in a mortar with sand and water. The resulting material was filtered. Fresh pieces of filter paper were soaked in the filtrate, dried in an oven at 40 °C and then cut into 1cm squares.

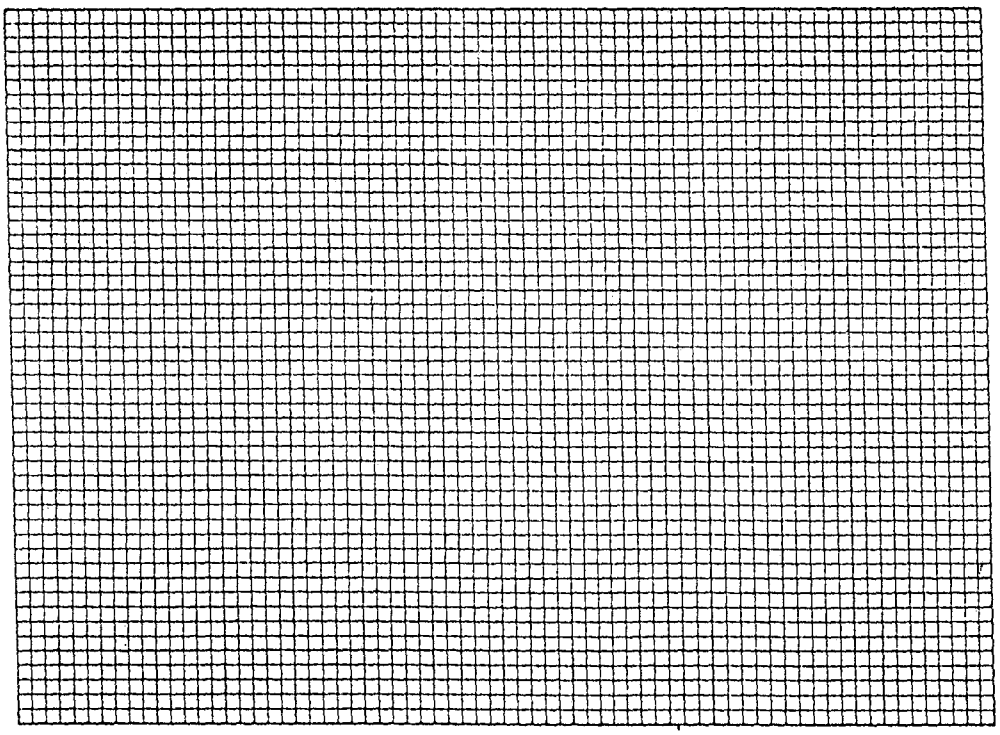
Six test-tubes, each containing 30 cm^3 of hydrogen peroxide, were placed in water baths at different temperatures. Pieces of the treated filter paper were added to each test-tube. The filter paper sank to the bottom for a while; all the pieces then rose to the surface.

The time taken for the filter paper to float to the surface was noted for each test-tube. The results are given in Table 1.

Table 1

temperature /°C	*time* /seconds
5	70
15	38
25	24
35	14
45	10
55	36

(a) Construct a graph from the results given in Table 1.



[3]

For Examiner's Use

(b) (i) Why were 1. sand, and 2. water added to the tissue before grinding?

1. *sand* .....

.....

2. *water* .....

.....

(ii) Draw a simple diagram of the apparatus you would use to filter the material after grinding.

(iii) Suggest why the soaked filter paper was not dried more quickly, in an oven at 85 °C.

.....

..... [3]

(c) (i) Suggest why the filter paper eventually rose to the surface in each test-tube.

.....

.....

.....

.....

(ii) What additional observation might have been made to confirm your explanation?

.....

..... [3]

(d) Suggest why the curve, after falling steadily to the 45 °C reading, began to rise at 55 °C.

.....

.....

..... [2]

For Examiner's Use

(e) Curves which relate enzyme activity to temperature usually rise to a peak, as shown in Fig.4.

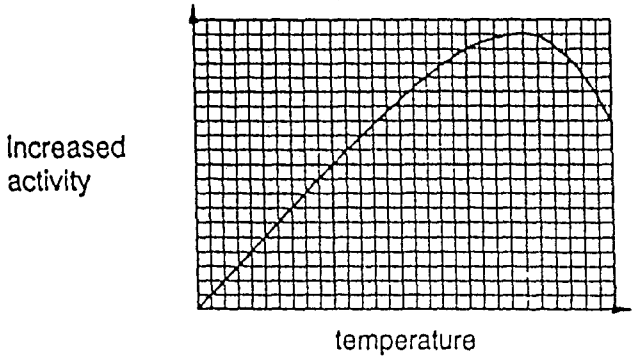


Fig.4

Suggest how the information given in Table 1 might be used to obtain a graph of this type.

.....

.....

.....

..... [1]

For Examiner's Use

4 Fig.5 shows an apparatus which is used for driving small animals out of leaf litter and then collecting them.

Freshly collected leaf litter was placed in the top of the funnel, as shown, and the light was switched on. After several hours a number of animals had been collected in the beaker.

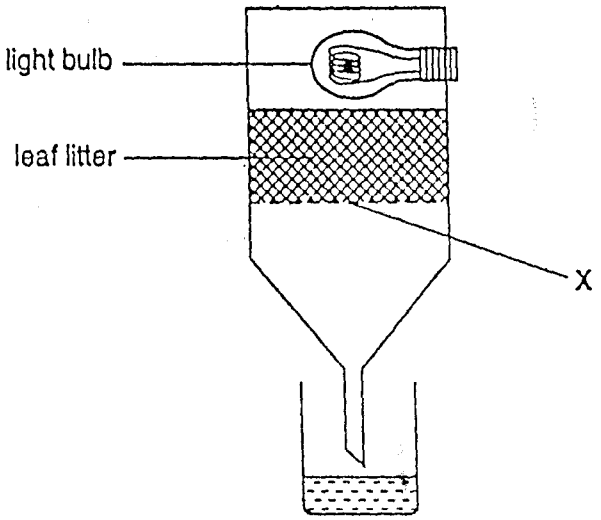


Fig.5

(a) (i) Suggest two reasons why it is necessary to have a liquid in the collecting beaker.

1. .....

2. .....

(ii) Suggest a chemical which is suitable for use as the liquid.

..... [3]

(b) What is the purpose of the metal gauze, X?

.....

..... [1]

(c) Suggest two effects, caused by the light bulb, which made the animals move down, out of the leaf litter.

1. .....

2. ..... [2]

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BIOLOGY 0610/6

PAPER 6 Alternative to Practical

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TIME 1 hour

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For Examiner's Use

1 Fig. 1 below shows 20 leaves from the same plant.

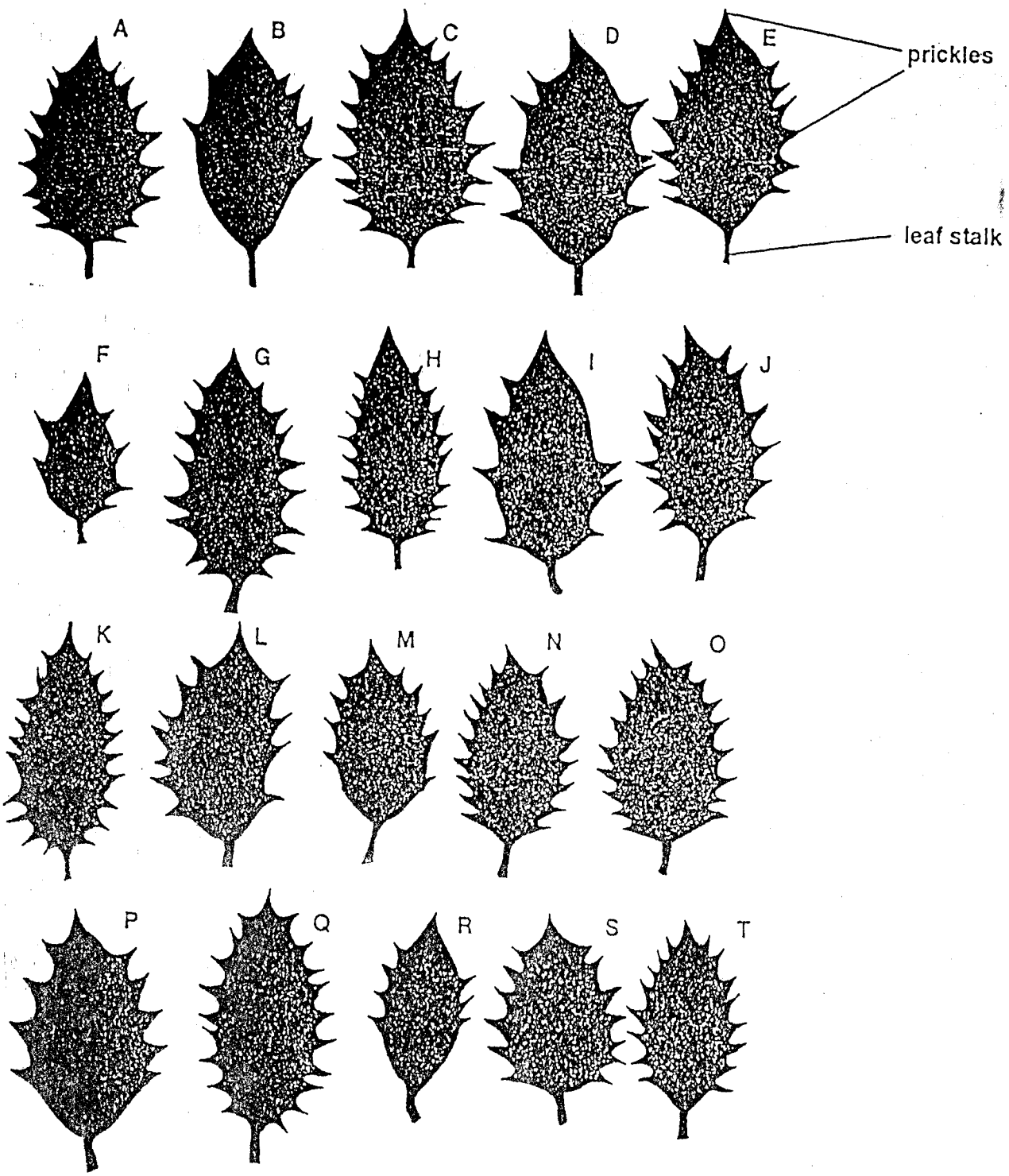


Fig. 1

(a) (i) Count the number of prickles on each leaf. Record the results in Table 1.

Table 1

leaf letter	A	B	C	D	E	F	G	H	I	J
number of prickles										

leaf letter	K	L	M	N	O	P	Q	R	S	T
number of prickles										

(ii) Using the data from Table 1, complete Table 2 to give a frequency distribution of leaf prickles.

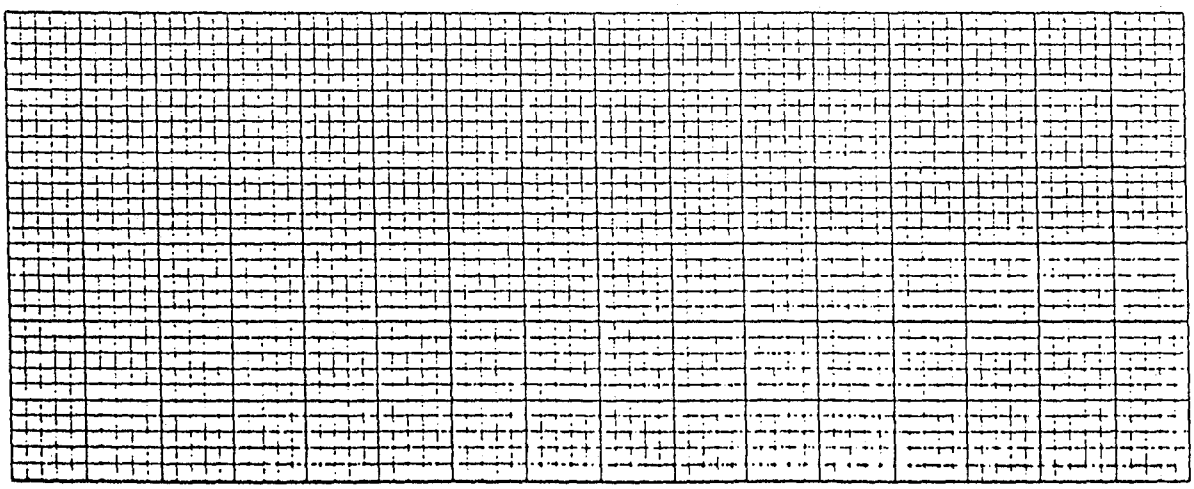
Table 2

number of prickles	6	7	8	9	10	11	12	13
number of leaves	0							

number of prickles	14	15	16	17	18	19	20	21
number of leaves								

[3]

(b) On the grid below, present the data from Table 2 in a diagrammatic form, to show the frequency distribution as clearly as possible.



2 Two test-tubes, each containing 20 cm^3 of starch solution, were placed in two water baths at different temperatures. After 5 minutes, 1 cm^3 of a solution of an enzyme, amylase, was added to each test-tube, and the mixture shaken. The water baths and their contents are shown in Fig. 2.

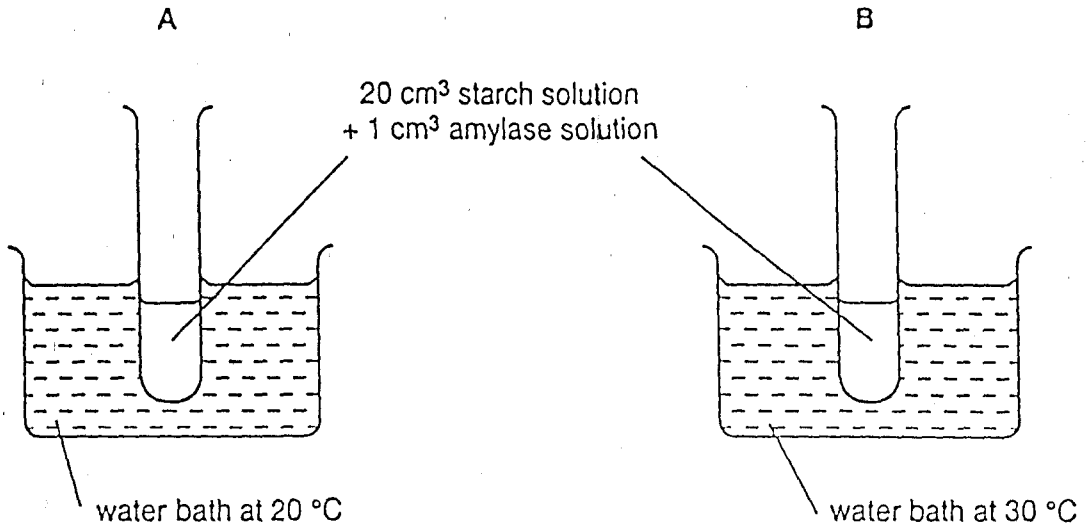


Fig. 2

At intervals of 1 minute, small samples of the liquid were removed from each tube. These samples were then tested for starch and for reducing sugar. The results of the tests are shown in Table 3.

Table 3

		time / min							
tube	*tested for*	1	2	3	4	5	6	7	8
A	starch	+	+	+	+	+	+	+	–
	reducing sugar	–	–	–	–	+	+	+	+
B	starch	+	+	+	–	–	–	–	–
	reducing sugar	–	–	+	+	+	+	+	+

key

+ = present

– = absent

(a) Describe how you would carry out a test for reducing sugar, stating what observation would indicate a positive result.

.....

.....

.....

.....[3]

For Examiner's Use

(b) Referring to Table 3:

(i) explain why the test results after 8 minutes were different from those after 1 minute;

.....

.....

.....

(ii) explain why the test results for tube A after 4 minutes were different from those for tube B after 4 minutes;

.....

.....

.....

(iii) state why both starch and reducing sugar were present in some of the samples.

.....

.....

[3]

(c) (i) Suggest **one** precaution that should have been taken if the same dropper or pipette had been used to remove each sample.

.....

.....

(ii) Describe a suitable control that could have been included in the investigation.

.....

.....

.....

[2]

(d) Some students extended the experiment to include a wider range of temperatures. They then plotted a graph to show the rate of starch disappearance at different temperatures. The result is shown in Fig. 3.

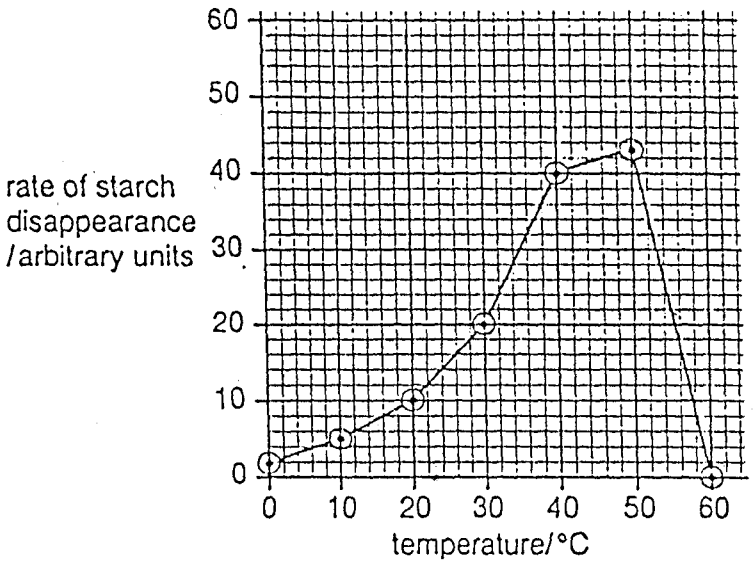


Fig. 3

(i) Explain the result obtained at 60 °C.

.....

.....

(ii) Suggest why, on the basis of their results, the students could not be certain that amylase works best at a temperature of 50 °C.

.....

.....

.....

.....

.....

[3]

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QUESTION 3 STARTS
ON PAGE 8

3 Some students each set up apparatus, as shown in Fig. 4, to demonstrate that germinating seeds use oxygen. The two tubes, P and Q, were in identical conditions of light and temperature.

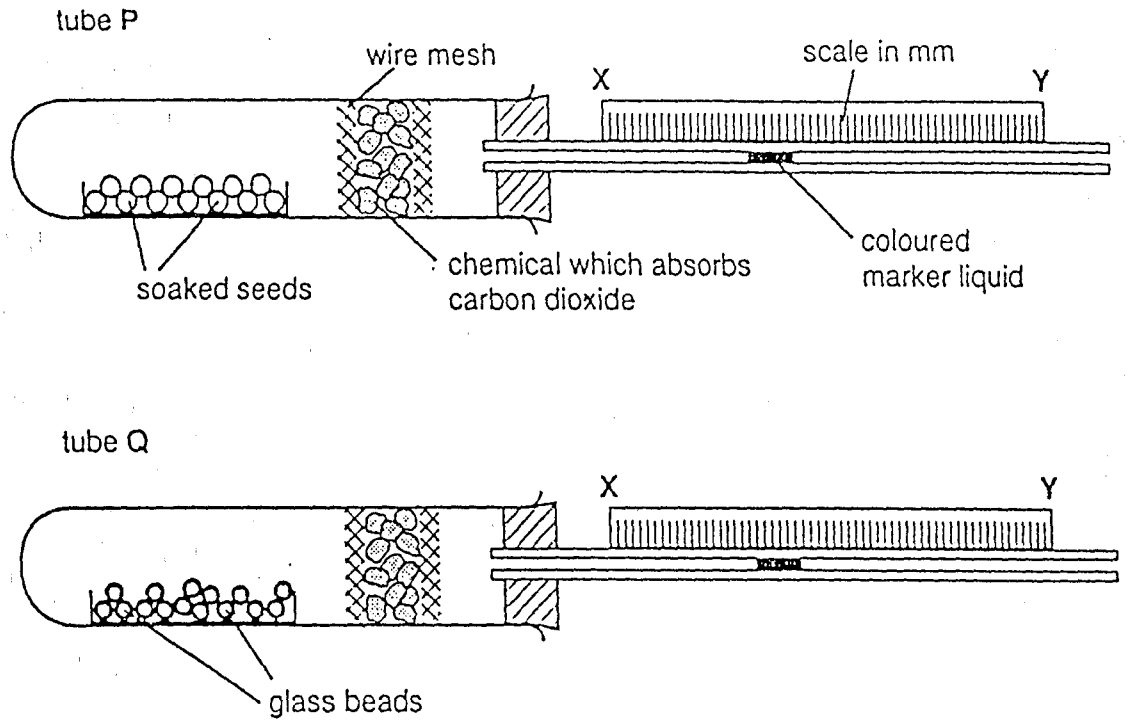


Fig. 4

As the seeds respired, they took in oxygen and released carbon dioxide. The carbon dioxide was immediately absorbed by the chemical in the tube, so that the volume of the gas in the tube fell. This made the coloured marker liquid move towards X.

(a) Most of the students found that the marker liquid in P moved towards X as expected, whilst the marker liquid in Q did not move.

(i) Why was tube Q, which contained glass beads instead of seeds, used?

.....

.....

.....

(ii) Explain why the marker liquid in Q did not move.

.....

.....

.....

[3]

(b) One student obtained different results. He found that the marker liquid in P moved 10 mm to the left (towards X, as expected), but that the liquid in Q also moved, travelling 3 mm to the right (towards Y).

(i) Suggest **one** reason for this unexpected movement of the marker liquid in Q.

.....

.....

(ii) Explain how he could use the measured movement in Q to obtain an accurate result for the amount of oxygen used by the seeds in P.

.....

.....

.....

[3]

(c) Some of the students repeated the experiment, using small seedlings, in tube P, instead of germinating seeds. These seedlings had green leaves. The marker liquid did not move in either P or Q.

(i) Suggest why the liquid in P did not move.

.....

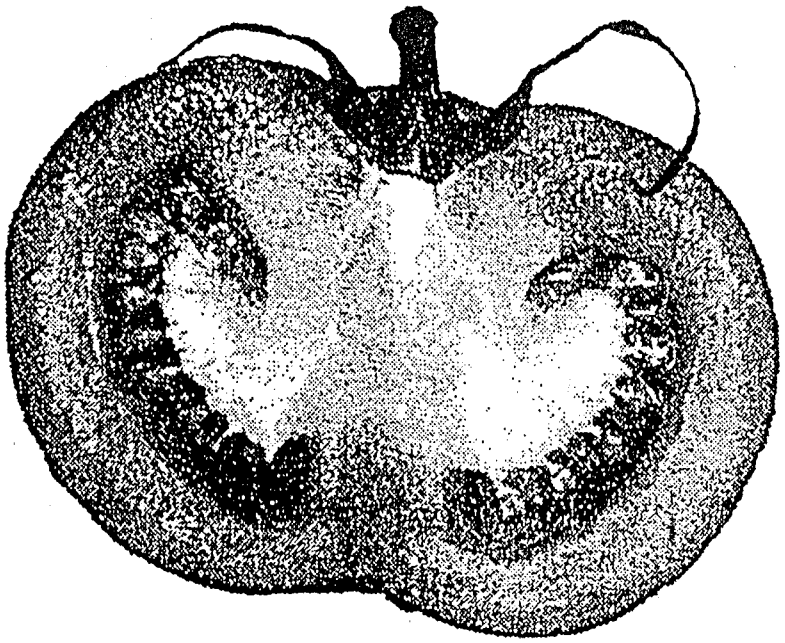
.....

(ii) State how the conditions in which the tubes were placed could have been changed so that the results using the green seedlings would have been similar to those obtained using germinating seeds.

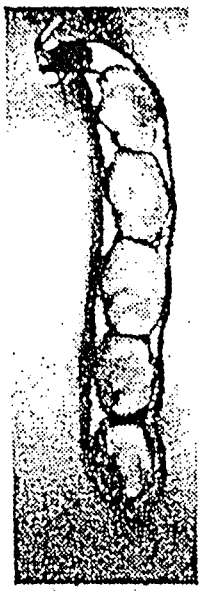
.....

[3]

4 The photographs below show the structure of two fruits.



Fruit A *mag. X 1*



Fruit B *mag. X 0.5*

(a) In the space provided, make a large drawing of fruit A.

No labels are required.

Drawing of fruit A:

68

[4]

(b) Complete Table 4 to describe four visible differences between fruit A and fruit B.

Table 4

fruit A	*fruit* B
1.	....
2.	....
3.	....
4.	....

[3]

(c) Draw a line along the photograph of fruit B, passing through all the seeds.

(i) Measure the length of the row of seeds, along the line you have drawn.

Record this measurement: .....

(ii) What was the *actual* length of this row of seeds in the fruit that was photographed?

Show your working.

Working:

Answer: .....

(iii) Calculate the mean (average) original seed length.

Show your working.

Working:

Answer: .....

[4]

Candidate Name _____

Centre Number	Candidate Number

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

BIOLOGY 0610/6

PAPER 6 Alternative to Practical

Thursday 7 NOVEMBER 1996 Morning 1 hour

Candidates answer on the question paper.
Additional materials:
Ruler (mm)

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page.
Answer **all** questions.
Write your answers in the spaces provided on the question paper.
Use sharp pencils for your drawings. Coloured pencils or crayons should not be used.

INFORMATION FOR CANDIDATES

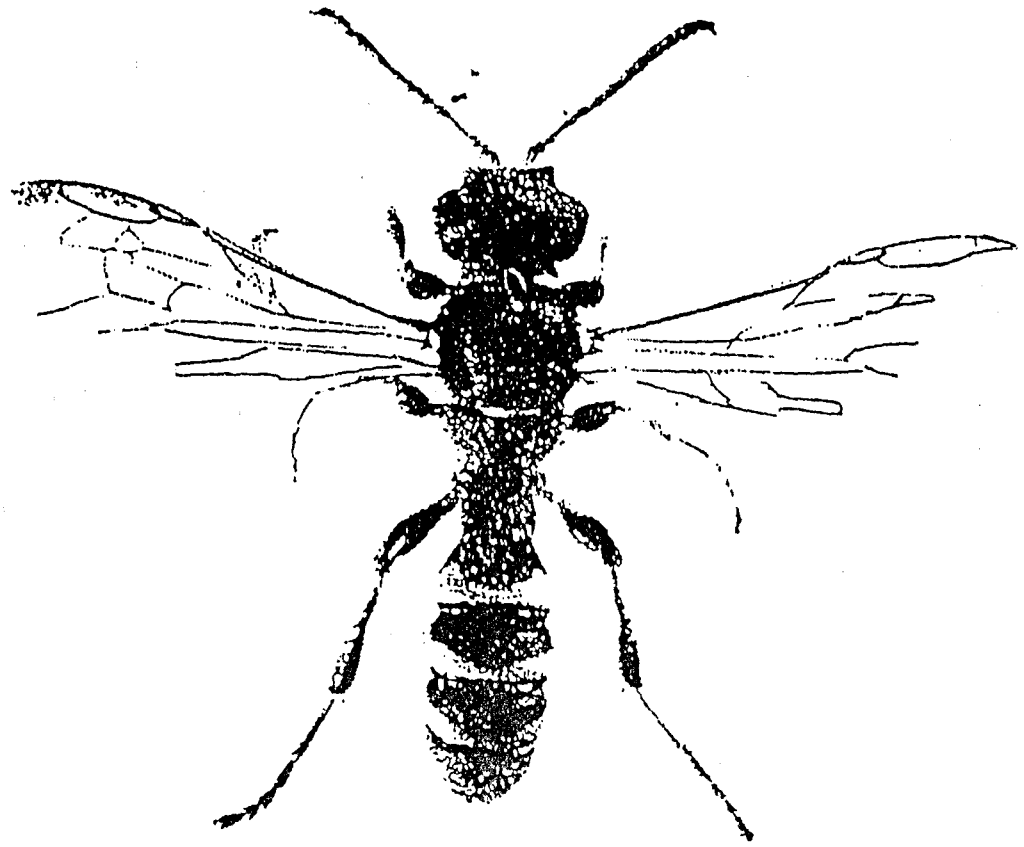
The number of marks is given in brackets [ ] at the end of each question or part question.

FOR EXAMINER'S USE	
1	
2	
3	
TOTAL	

This question paper consists of 8 printed pages and 4 blank pages.

SB (SIA) QK67850
CAMBRIDGE 1996

1 (a) Fig. 1 is a photograph of insect Y.

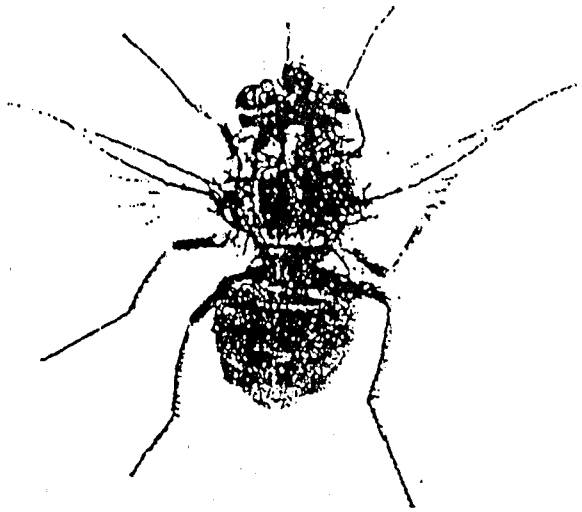


insect Y

Fig. 1

Make a large drawing of the back leg on the left side of insect Y. (Labels are not required.)

(b) Fig. 2 is a photograph of insect Z.



insect Z

Fig. 2

(i) List **three** similarities which are visible in the photographs of the two insects.

1. .....

2. .....

3. .....

[3]

(ii) Construct a table, with ruled lines, and record three visible differences, other than size, between the two insects.

For Examiner's Use

(c) The photograph in Fig. 1 shows insect Y magnified x10.

Draw a straight line on Fig. 1 from the base of the left, back leg to its tip.

Measure this line and use this measurement to calculate the magnification of your drawing, allowing for the x10 magnification of the photograph.

Show clearly the stages of your working.

Length of line on photograph .....

Length between base and tip of leg on your drawing .....

Magnification of your drawing ..... [4]

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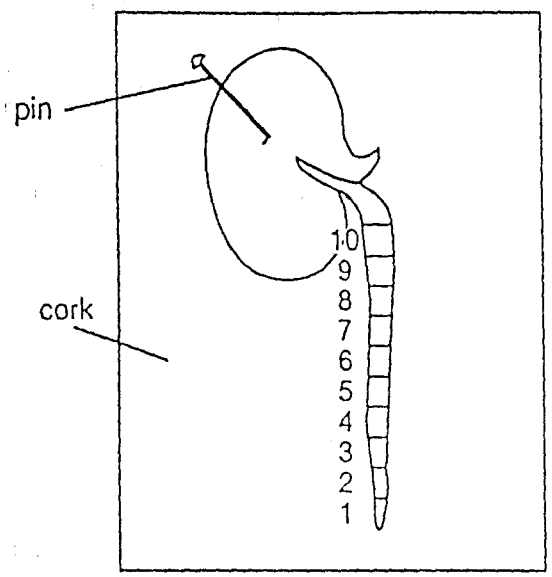
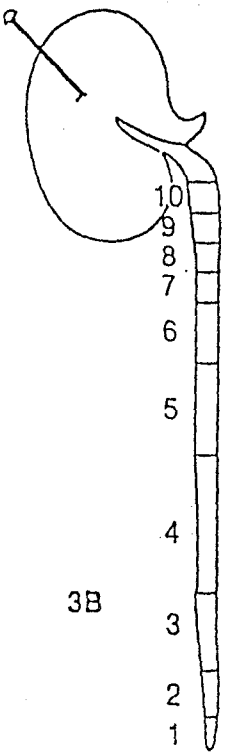
2 Fig. 3 shows a bean seedling, pinned with the root growing vertically downwards. The root was marked with equally spaced lines with waterproof ink (Fig. 3A). Two days later the root appeared as shown in Fig. 3B.



3A



3B

Fig. 3

(a) (i) Measure, on Fig. 3A, the regions numbered 1 to 10. Record your measurements in the table provided. Record also the final length of each region from Fig. 3B.

(ii) Complete the table by calculating the amount of growth that took place in each region.

region number	1	2	3	4	5	6	7	8	9	10
original length/ mm (Fig. 3A)										
final length/mm (Fig. 3B)										
*amount of growth/*mm										

[4]

For Examiner's Use

(b) Describe the variation in growth over each of the following regions:

(i) regions 1 to 4;

.....

.....

.....

.....

(ii) regions 5 to 10.

.....

.....

.....

.....

[6]

(c) Another marked seedling was pinned with its root horizontal, as shown in Fig. 4.

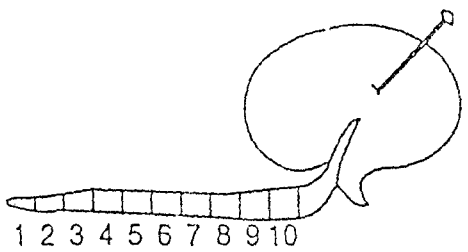


Fig. 4

(i) Suggest, by drawing a simple diagram, what it would look like two days later.

(ii) Explain your answer.

.....

.....

.....

3 A student was asked to identify the contents of four test-tubes, labelled A to D. They contained solutions (not necessarily in this order) of:

glucose and an alkali,

glucose and a protein,

protein and an acid,

glucose only.

The student was provided with a supply of litmus paper, biuret reagents and Benedict's solution. (Litmus paper is red in acidic and blue in alkaline solutions.)

After carrying out tests on the four solutions, the student recorded the conclusions which are set out in Table 1.

Table 1

	test-tube A	*test-tube* B	*test-tube* C	*test-tube* D
conclusion from biuret test	no protein	protein present	protein present	no protein
conclusion from Benedict's test	reducing sugar present	reducing sugar present	no reducing sugar	reducing sugar present
conclusion from litmus tests	neutral solution	neutral solution	acidic solution	alkaline solution

For Examiner's Use

(a) Study Table 1, then complete Table 2 with your suggestions of the test results upon which the student's conclusions were based.

Table 2

basis for conclusions		*test-tube* A	*test-tube* B	*test-tube* C	*test-tube* D
results of biuret test					
results of Benedict's test					
results of litmus tests	*red litmus*				
	blue litmus				

[6]

(b) Identify the solutions contained in the four test-tubes:

test-tube A .....

test-tube B .....

test-tube C .....

test-tube D .....

[3]

(c) Name one region of the alimentary canal where

(i) protein is digested in conditions of low pH;

.....

(ii) glucose is produced in conditions of high pH.

.....

[2]

Centre Number	Candidate Number

Candidate Name _____

International General Certificate of Secondary Education

UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

BIOLOGY 0610/6

PAPER 6 Alternative to Practical

Wednesday 11 JUNE 1997 Morning 1 hour

Candidates answer on the question paper.
No additional materials are required.

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page.
Answer all questions.
Write your answers in the spaces provided on the question paper.
Use sharp pencils for your drawings. Coloured pencils or crayons should not be used.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.

FOR EXAMINER'S USE	
1	
2	
3	
TOTAL	

This question paper consists of 9 printed pages and 3 blank pages.

1 An experiment was carried out to investigate the effect of light on growth.

Five maize grains were planted in moist soil, in each of two containers. One container, **A**, was placed in a box and lit by lamps placed above it. The other container, **B**, was placed in a similar box, but in the dark. Fig. 1 shows the heights of the seedlings after 6 days. Not all of the grains germinated.

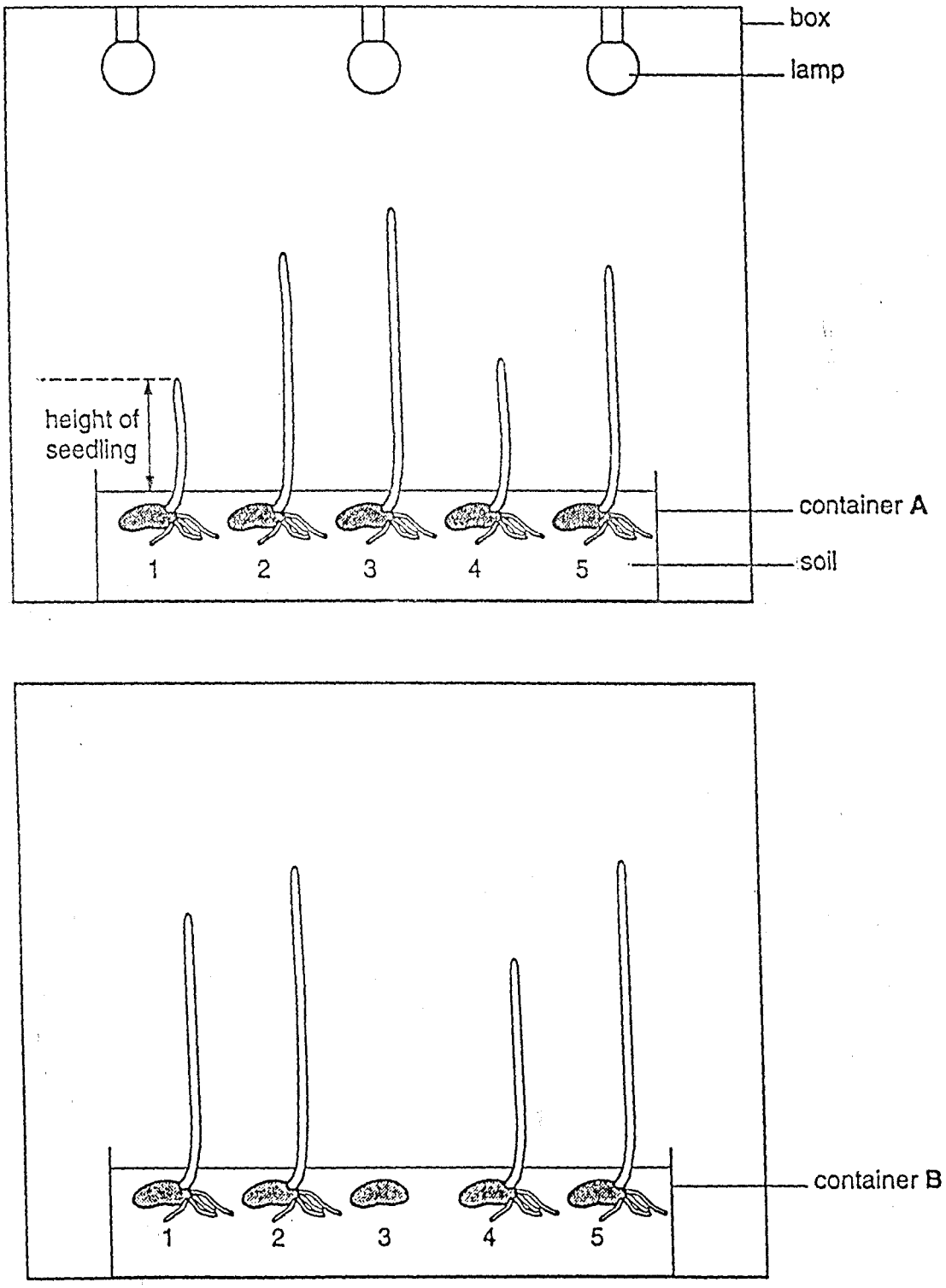


Fig. 1

(a) Read the instructions in this section then, in the space below, construct a table in which to enter the measurements.

Measure, in mm, the heights of the seedlings in container A. (Measure from the tip of each seedling to the soil surface, as shown in Fig. 1). Then measure the heights of the seedlings in container B. Record the two sets of measurements in your table.

[4]

(b) (i) Calculate the mean (average) height of the seedlings in each container and record the result below. Show your working.

Container A	*Container* B
Working:	*Working:*
Mean height	*Mean height* .....

(ii) Suggest **one** condition, apart from light, which may have caused differences between the mean heights of these two groups of seedlings.

.....[5]

(c) Suggest **two** reasons why it was decided to plant several grains in each container, rather than just one. Support each reason by reference to the results shown in Fig. 1.

1. .....

.....

.....

2. .....

.....

..... 31

(d) Suggest why the lamps were placed above the seedlings in container **A**, rather than at one side.

.....

.....

.....[2]

2 Fig. 2 is a photograph of a flower, with some of the outer parts removed.

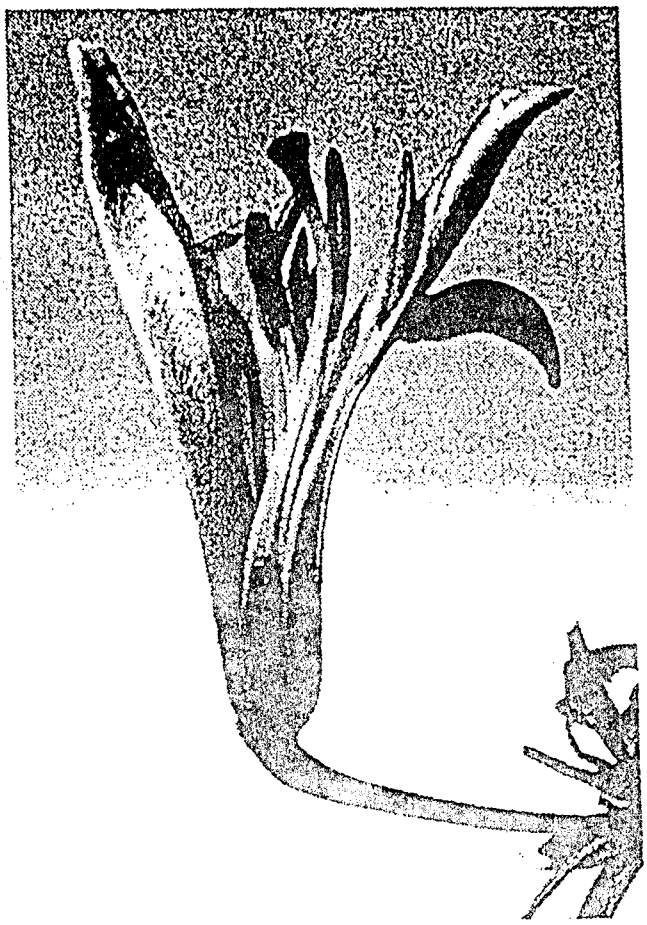


Fig. 2

For Examiner's Use

(a) In the space below, make a large, labelled drawing of the flower, as shown in Fig. 2.

[8]

(b) A fruit of the flower shown in Fig. 2 was cut across. Fig. 3 shows a drawing of the cut surface.

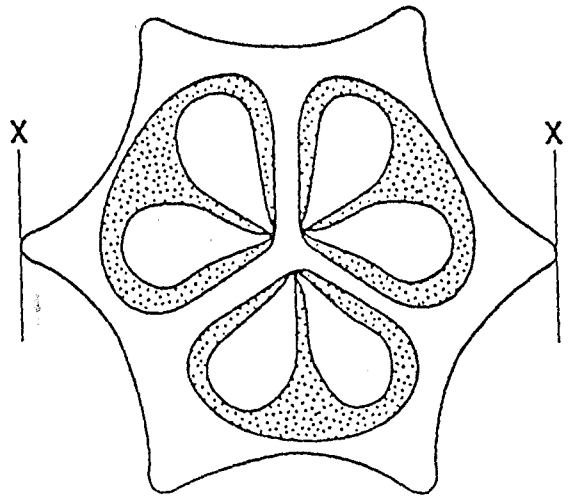


Fig. 3

(i) Label **two** of the structures shown in Fig. 3.

(ii) The actual width of the fruit drawn in Fig. 3, between the lines marked **X**, was 8 mm.

What is the magnification of Fig. 3? Show your working.

Working:

Magnification ..... [5]

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QUESTION 3 STARTS
ON PAGE 8.

3 Fig. 4 shows apparatus which can be used to investigate the effect of different light intensities on the rate of photosynthesis.

Bubbles of gas containing oxygen were produced by the pond plant during photosynthesis. These bubbles rose to the top of the test-tube. This forced water into the capillary tube, causing the air bubble to move along the tube.

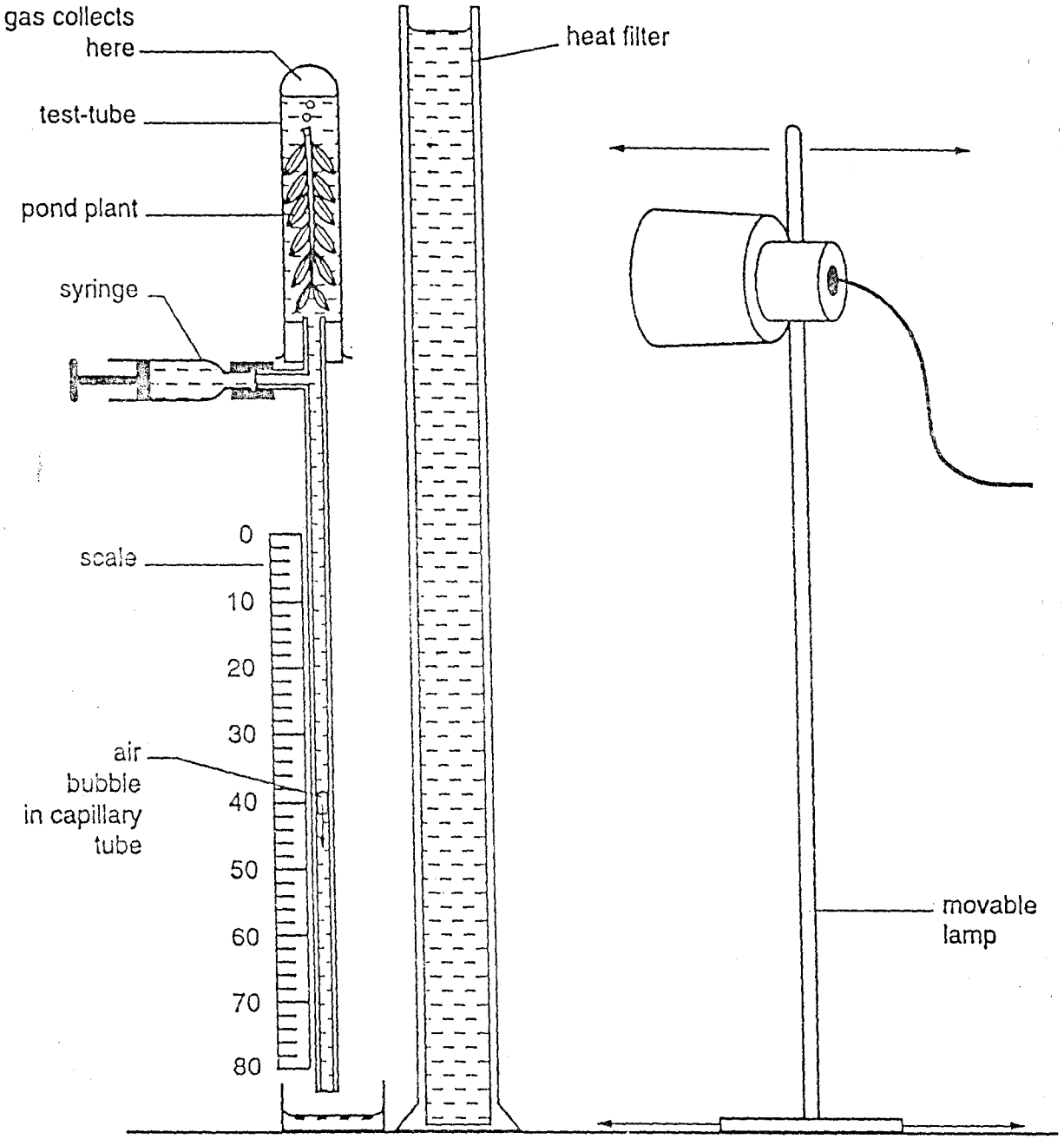


Fig. 4

The lamp was placed at different distances from the plant. The intensity of light reaching the test-tube, and the distance moved by the air bubble in 4 minutes, were measured and recorded each time the lamp was moved.

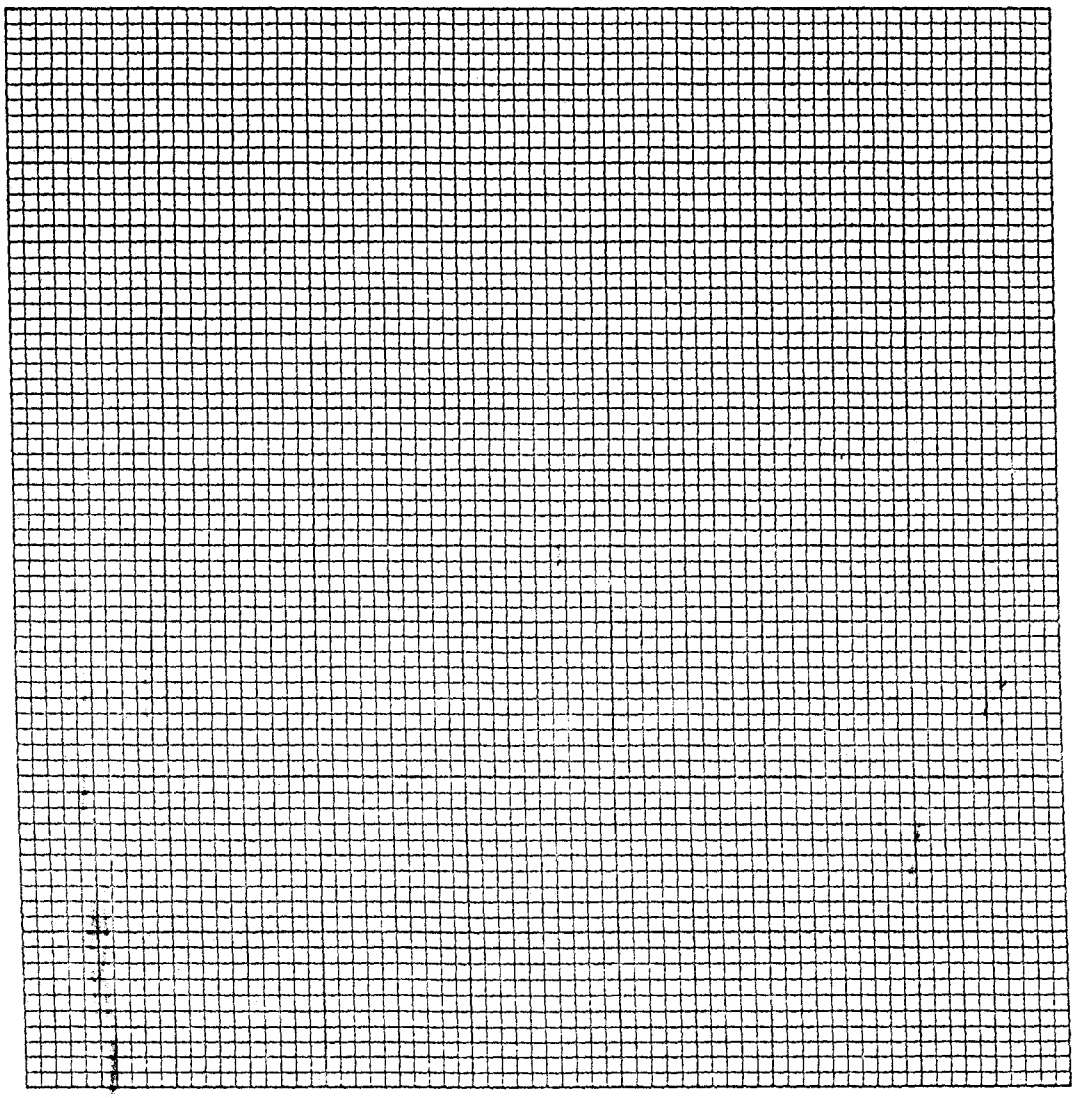
The syringe was used to bring the bubble back to 0 on the scale, at the start of each 4 minute period.

The results are shown in Table 1.

Table 1

light intensity / arbitrary units	*distance moved by bubble in the 4 min period / mm*
0.5	0
1.0	6
2.0	18
3.0	30
4.0	42
5.0	54
6.0	58
7.0	58

(a) Plot the results on the grid below.



87

[5]

(b) Why was a heat filter needed?

.....

.....

.....[1]

(c) Each time the lamp was moved to a new position, an interval of 5 minutes was allowed before starting to time a 4 minute period for movement of the air bubble. Suggest a reason for this 5 minute interval.

.....

.....[1]

(d) Suggest why the rate of movement of the air bubble was the same at 6.0 units as at 7.0 units of light intensity.

.....

.....

.....[2]

(e) Suggest why the air bubble did not move when the light intensity was 0.5 units.

.....

.....

.....[2]

(f) Suggest a suitable control for this investigation.

.....

.....[1]

Centre Number	Candidate Number

Candidate Name _____

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

BIOLOGY 0610/6

PAPER 6 Alternative to Practical

Thursday 6 NOVEMBER 1997 Morning 1 hour

Candidates answer on the question paper.
No additional materials are required.

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page.
Answer all questions.
Write your answers in the spaces provided on the question paper.
Use sharp pencils for your drawings. Coloured pencils or crayons should not be used.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.

FOR EXAMINER'S USE	
1	
2	
3	
4	
TOTAL	

This question paper consists of 9 printed pages and 3 blank pages.

SB (SLC) QK73100

[Turn over

1 Fig. 1 shows how four different food tests (1, 2, 3 and 4), were carried out. Each gave a positive result.

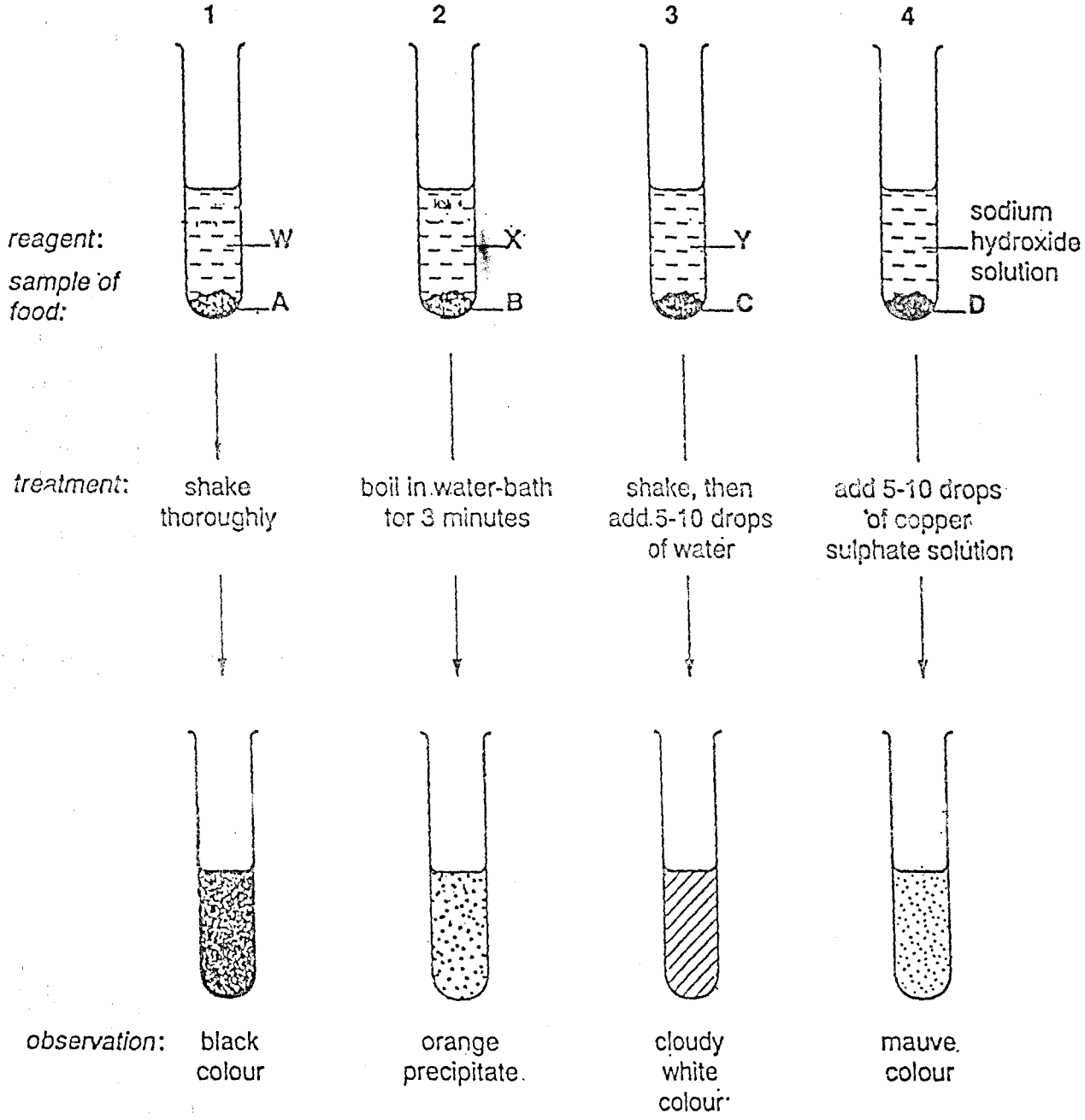


Fig. 1

(a) Complete Table 1, giving the names of the reagents W, X and Y, and the type of nutrient shown to be present by each of the four tests.

Table 1

	test			
	1	2	3	4
reagent				
nutrient in sample of food				

[5]

(b) State the colours you would have seen if the results were negative in:

test 1 .....

test 2 .....

test 4 .....

[3]

(c) (i) Suggest two possible items of a person's diet which are rich in the nutrient in food C.

..... and .....

(ii) Suggest two possible items of a person's diet which are rich in the nutrient in food D.

..... and .....

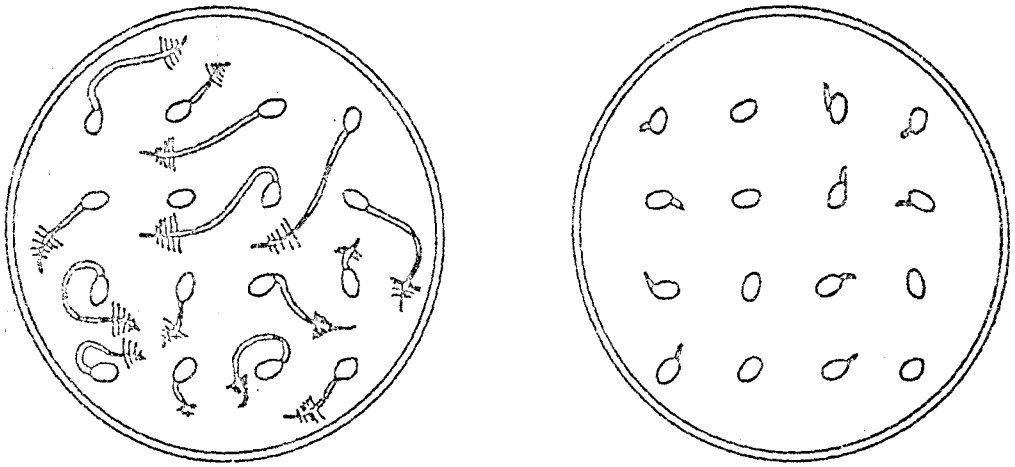
[2]

91

2 Two batches of tomato seeds were placed in dishes to germinate. Water was added to the seeds in dish A.

A 25% solution of the juice from a fresh tomato was added to the seeds in dish B.

Fig. 2 shows the two batches after 4 days.



Dish A Dish B

Fig. 2

(a) State two conditions, other than water, which are needed for the germination of the seeds.

1. ..... 2. ..... [1]

(b) (i) Describe briefly the results shown:

in dish A; .....

.....

.....

in dish B. .....

.....

.....

(ii) Make an enlarged, labelled drawing of one of the seedlings from dish A.

[5]

(c) (i) Suggest what has caused the difference between the two batches of seeds.

.....

.....

.....

(ii) Suggest how you would find out whether this factor, which affects the germination of tomato seeds, also affects the germination of other types of seeds.

.....

.....

.....

.....

[4]

3 Fig. 3 is a graph of the mean (average) mass (weight) of human babies during their first year.

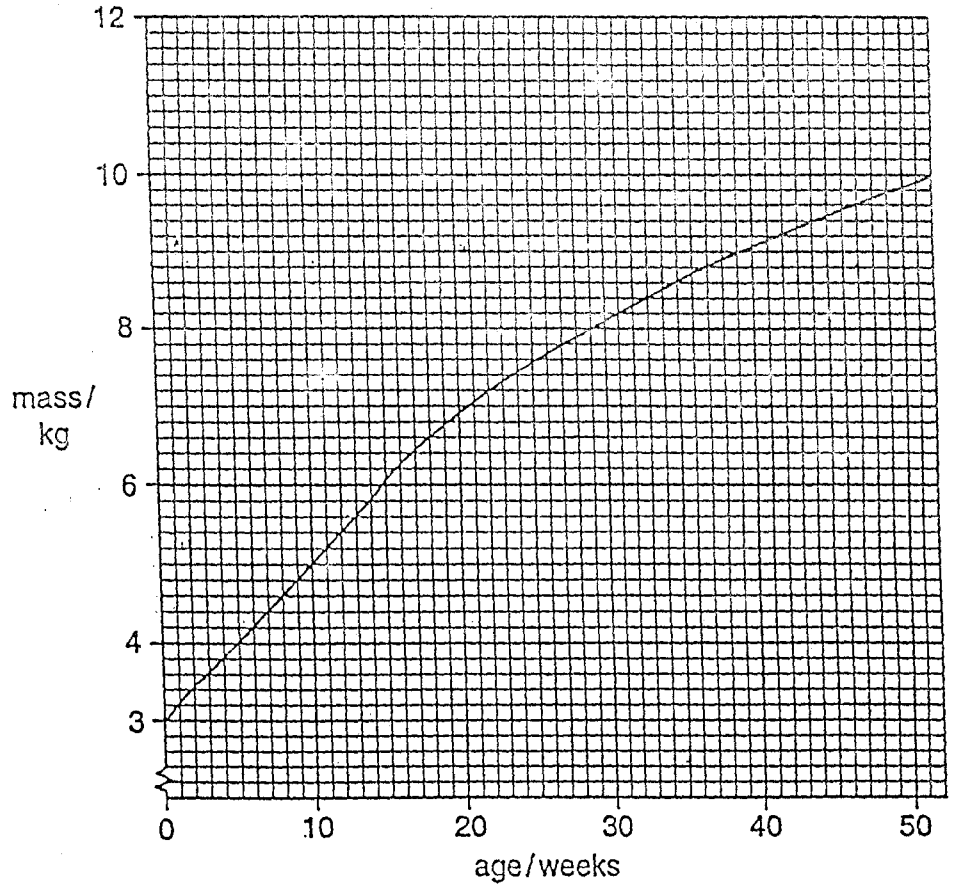


Fig. 3

Table 2 gives the mass of two babies, A and B, during their first year.

Table 2

	age/weeks				
	2	10	20	35	50
baby A/kg	3.4	5.4	7.2	8.8	10.5
baby B/kg	3.4	4.8	6.0	7.8	9.5

(a) (i) On Fig. 3, plot the mass of baby A. Show the points clearly and join them by ruled lines.

(ii) Using the same axes, plot the mass of baby B. The two completed curves should be distinct and clearly labelled.

[5]

(b) (i) What was the mass of baby B at 30 weeks? .....

(ii) At what age did baby A have a mass of 8 kg? .....

[2]

(c) Suggest **two** possible reasons for the shape of the graph of baby B, explaining particularly why it fell so far below the mean.

1. .....

.....

2. .....

..... [3]

For Examiner's Use

4 Fig. 4 is a photograph which shows a leaf attached to a stem.

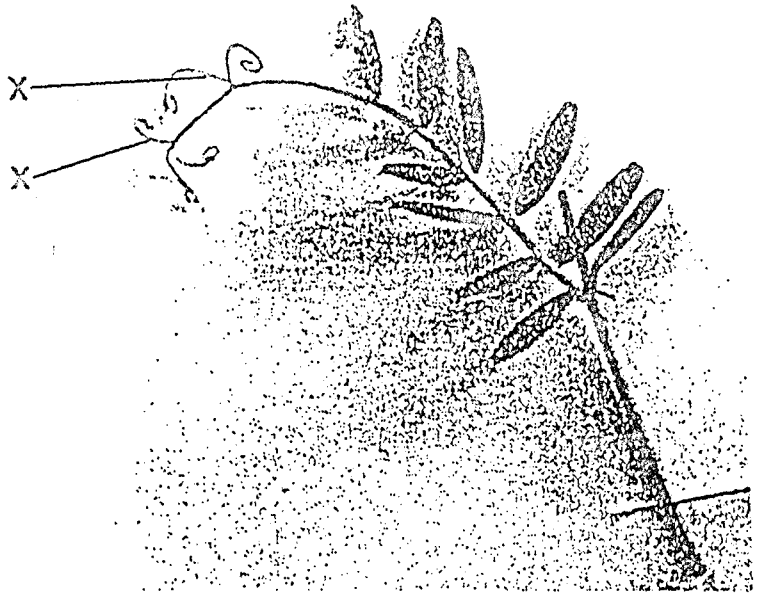


Fig. 4

(a) Make a large, labelled drawing from Fig. 4, of the two lowest pairs of leaflets and the piece of stem to which the leaf is attached.

[5]

(b) Suggest one advantage and one disadvantage to the plant, of having some leaflets modified into the structures labelled X.

Advantage .....

Disadvantage .....

[2]

96

For Examiner's Use

(c) Fig. 5 shows two more leaves, Y and Z, from different species of plants.

Fig. 5

(i) List **two** features, seen in both Y and Z, which are typical of leaves.

1. .....

2. .....

[1]

(ii) State **two** ways in which leaf Y can be seen to differ from leaf Z.

1. .....

.....

2. .....

.....

[2]

Centre Number	Candidate Number

Candidate Name _____

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

BIOLOGY 0610/6

PAPER 6 Alternative to Practical

Thursday 11 JUNE 1998 Morning 1 hour

Candidates answer on the question paper.
Additional materials:
Ruler (mm)

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page.
Answer all questions.
Write your answers in the spaces provided on the question paper.
Use sharp pencils for your drawings. Coloured pencils or crayons should not be used.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.

FOR EXAMINER'S USE	
1	
2	
3	
4	
TOTAL	

This question paper consists of 10 printed pages and 2 blank pages. 98

[Turn over

For Examiner's Use

1 Fungi are important decomposers and are often seen growing on organic remains. The photograph, Fig 1, shows part of such a fungus producing spores (magnification x 3000).

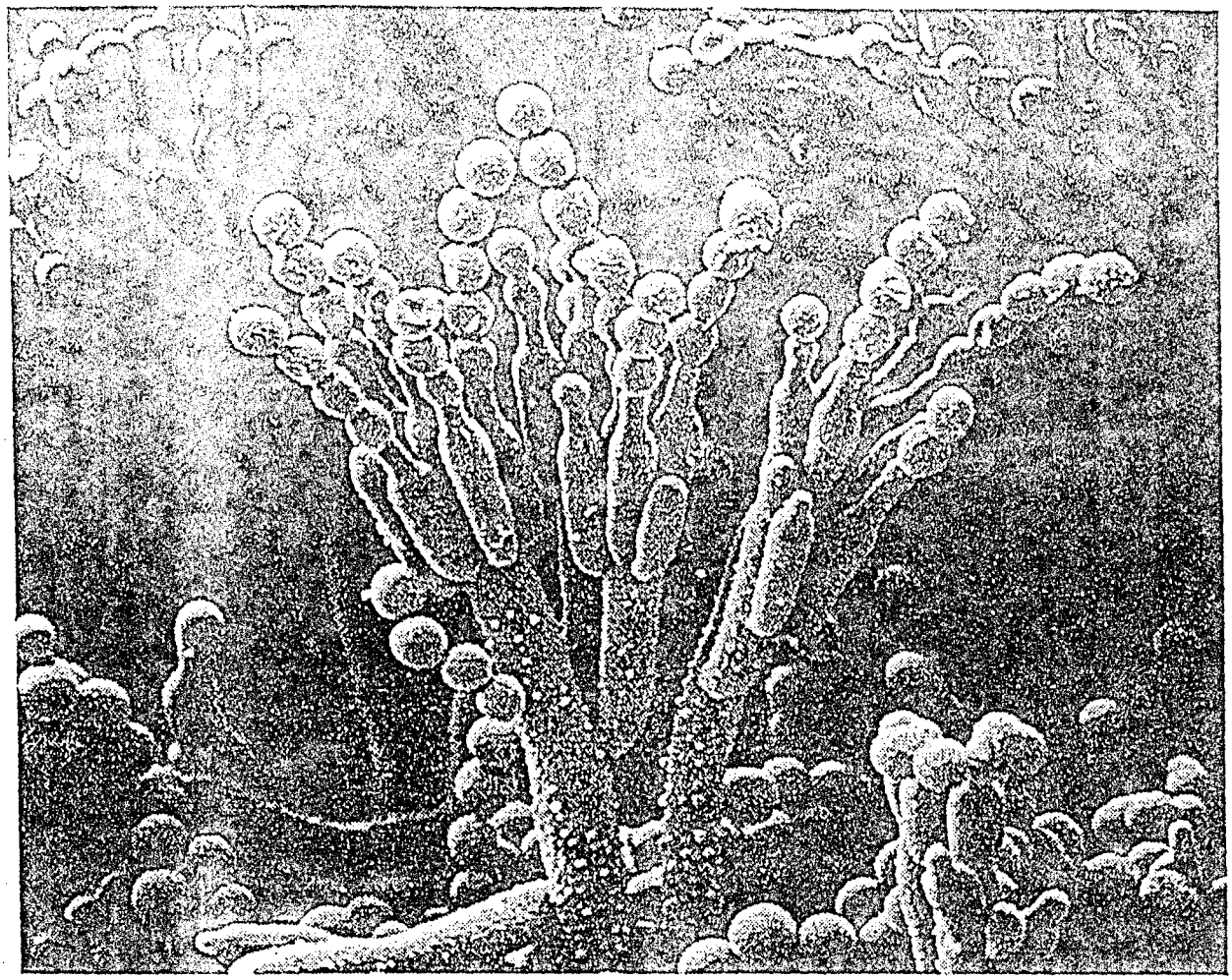


Fig. 1

For Examiner's Use

(a) Make a large drawing of **one** spore-producing structure with the chains of spores attached, and the hypha that it is developing from.

[5]

(b) Draw a line through the middle of **one** spore on your drawing.

(i) Measure the width of the spore on the drawing.

Width ..... mm [1]

(ii) Measure the width of this spore on the photograph.

Width ..... mm [1]

(iii) Calculate the magnification of your drawing compared with the actual size of the spore. Show your working.

Magnification .....
[2]

100

2 An experiment was carried out using three plants of the same species. Each one was kept in a dark cupboard for 12 hours before the experiment was carried out.

One leaf was detached from each plant and immediately placed in test-tubes, labelled A, B and C as shown in Fig. 2. The tubes were then closed using bungs.

Red sodium hydrogencarbonate indicator solution was placed in each of the three tubes.

The indicator is

red in normal air;
purple when there is less carbon dioxide than in normal air;
yellow when there is more carbon dioxide than in normal air.

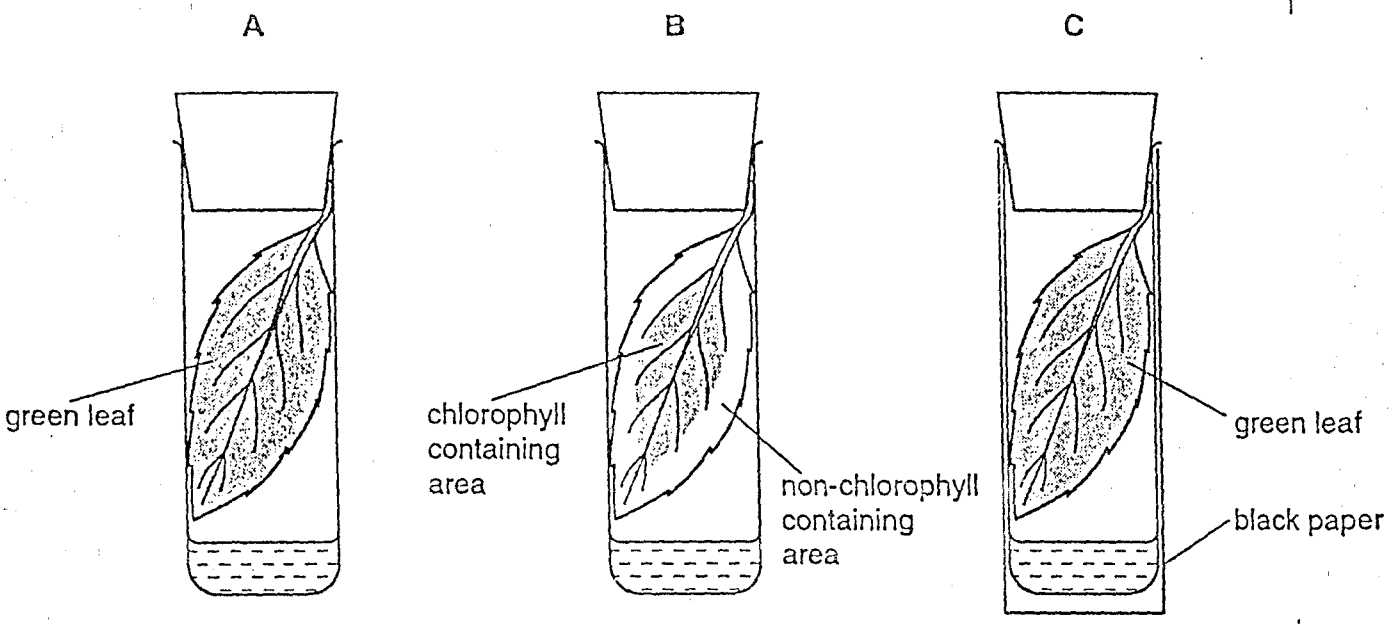


Fig. 2

The test-tubes were then left in bright sunlight for 3 hours. The colour of the indicator solution was found to have changed in some of the test-tubes.

(a) (i) Suggest the colour of the indicator in each test-tube after 3 hours.

Tube A .....

Tube B .....

Tube C .....[2]

(ii) Explain each answer given in (a)(i).

Tube A .....

.....

Tube B .....

.....

Tube C .....

.....[4]

(b) (i) Describe how a green leaf may be tested to show the presence of starch. State what safety precautions should be taken.

.....

.....

.....

.....

.....

.....[4]

(ii) On Fig. 3, shade the area of each leaf which would show the presence of starch.

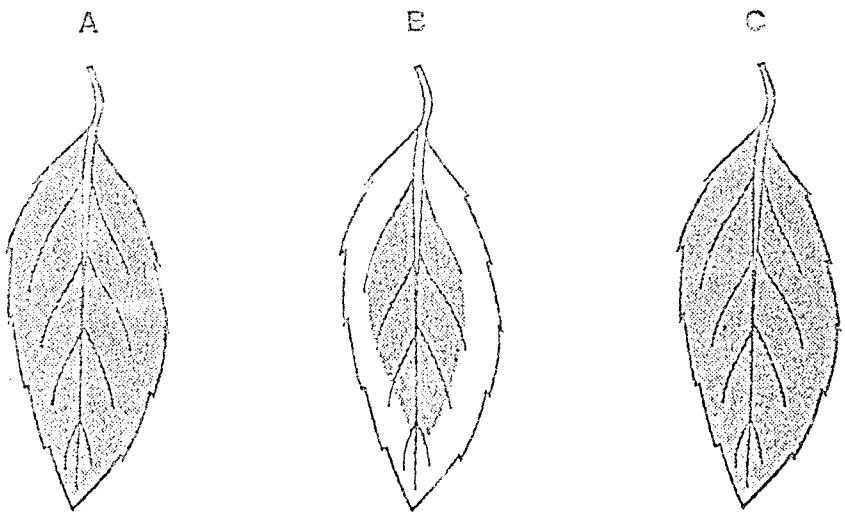


Fig. 3

[3]

For Examiner's Use

3 Petal colour in peas can be controlled by two alleles. Some varieties produce red flowers, others are always white-flowered.

(a) Suggest how a red-flowered plant could be cross-bred with a white-flowered plant by a scientist in a laboratory.

.....

.....

.....

.....[3]

The seeds from this cross were collected and grown the following year. Only red-flowered plants were produced.

(b) State why no white-flowered plants were produced.

.....

.....[1]

The scientist wants the red-flowered plants to self-pollinate.

(c) How can he ensure that no cross-pollination takes place?

.....

.....

.....[1]

103

(c) The seeds from these self-pollinated plants were grown to produce another generation of plants. Fig. 4 shows a flower from each plant of this new generation.

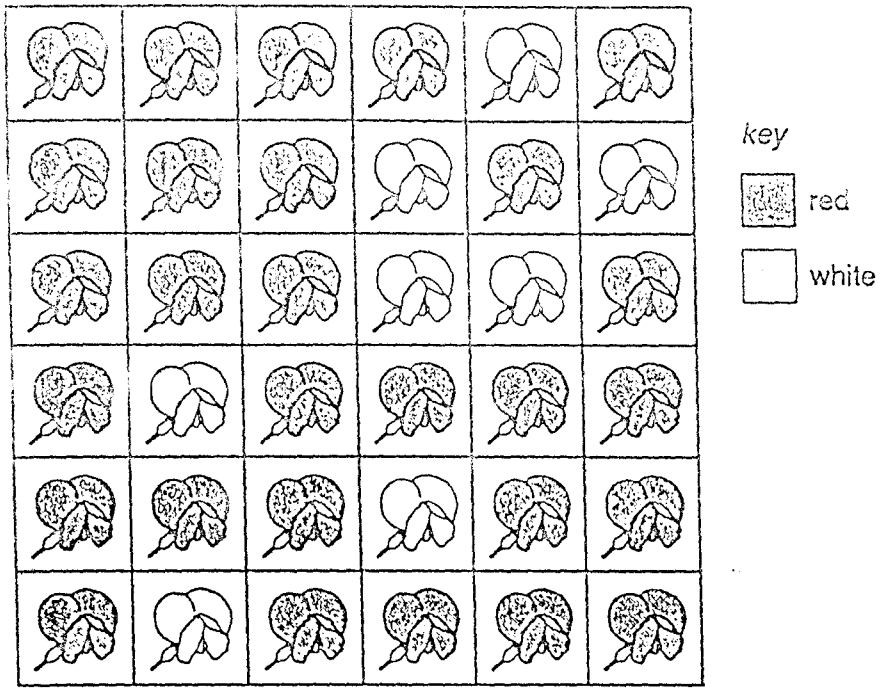


Fig. 4

(i) Count the number of flowers of each colour and record these in a suitable table in the space below.

[1]

(ii) Calculate the ratio of red flowers to white flowers.

Ratio .....[1]

(iii) What genetic ratio does this represent?

.....

(iv) Explain why this ratio was obtained.

.....

.....[2]

4 Fig. 5 shows a device which can be used to test the response of the skin to touch.

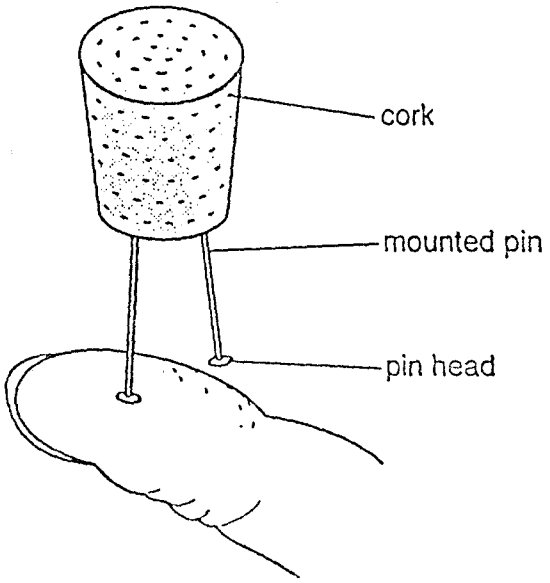


Fig. 5

An experiment was carried out on a student, whose skin was touched either by one pin-head only, or by both pin-heads together. This was repeated ten times on different parts of the body. The student being tested was not allowed to see the number of the pin-heads which touched the skin.

The number of times the student correctly stated whether one or two pins touched the skin was recorded. The experiment was carried out on a total of three students A, B and C. The number of correct responses for each student is shown in Table 1.

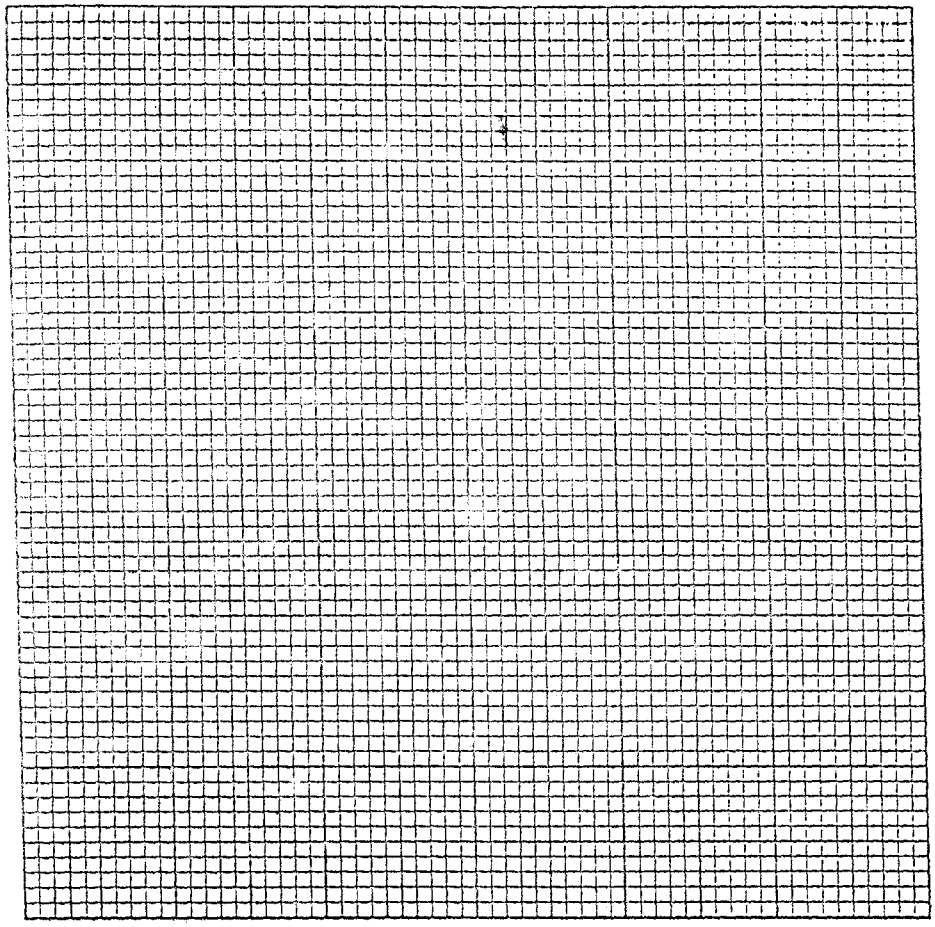
Table 1

student	*number of correct responses*			
	finger	*palm of hand*	*back of hand*	*back of neck*
A	10	9	8	5
B	9	9	7	4
C	10	7	5	3
Total				
Average				

(a) (i) Complete Table 1 for each part of the body to show

1. the total number of correct responses and
2. the average number of correct responses.

(ii) On the grid below, draw a bar chart to show the average number of correct responses for each part of the body.



[4]

(iii) Using the bar chart, which of the four parts of the body is

1. most sensitive to touch?

.....

2. least sensitive to touch?

.....[2]

(iv) Suggest an explanation for the difference in sensitivity between these two areas.

.....

.....

.....[1]

(b) Suggest how the students could be prevented from seeing the pin-heads touching the skin.

.....

Centre Number	Candidate Number

Candidate Name _____

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

BIOLOGY 0610/6

PAPER 6 Alternative to Practical

Tuesday **3 NOVEMBER 1998** Morning 1 hour

Candidates answer on the question paper.
Additional materials:
Ruler (mm)

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page.
Answer **all** questions.
Write your answers in the spaces provided on the question paper.
Use sharp pencils for your drawings. Coloured pencils or crayons should not be used.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.

FOR EXAMINER'S USE	
1	
2	
3	
4	
TOTAL	

This question paper consists of 9 printed pages and 3 blank pages. 107

[Turn over

1 Fig. 1 shows the pulse rates of two students, A and B, before, during and after a short period of vigorous exercise.

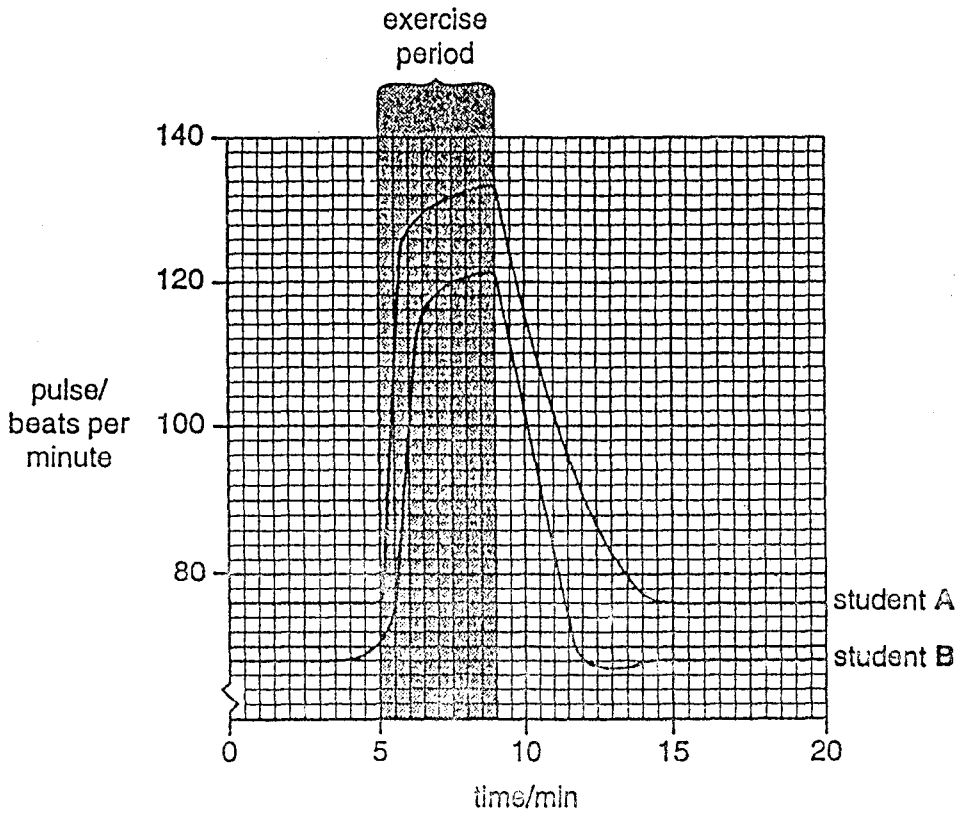


Fig. 1

(a) How long was the period of exercise? .....[1]

(b) (i) State three differences between the curve for student A and the curve for student B.

1. .....

2. .....

3. .....[3]

(ii) Suggest two reasons why the results were different.

1. .....

2. .....[2]

For Examiner's Use

(c) State **three** ways in which the increase in pulse rate during and after exercise would affect the metabolism of student **A**.

1. .....

.....

2. .....

.....

3. .....

.....[3]

(d) (i) Suggest a suitable form of exercise for a class of students who were doing this experiment.

.....

.....[1]

(ii) Describe how you would measure your pulse rate.

.....

.....

.....[1]

2 Fig. 2 shows two seedlings, A and B, which are the same age. One seedling was grown in darkness and the other in normal conditions of day and night.

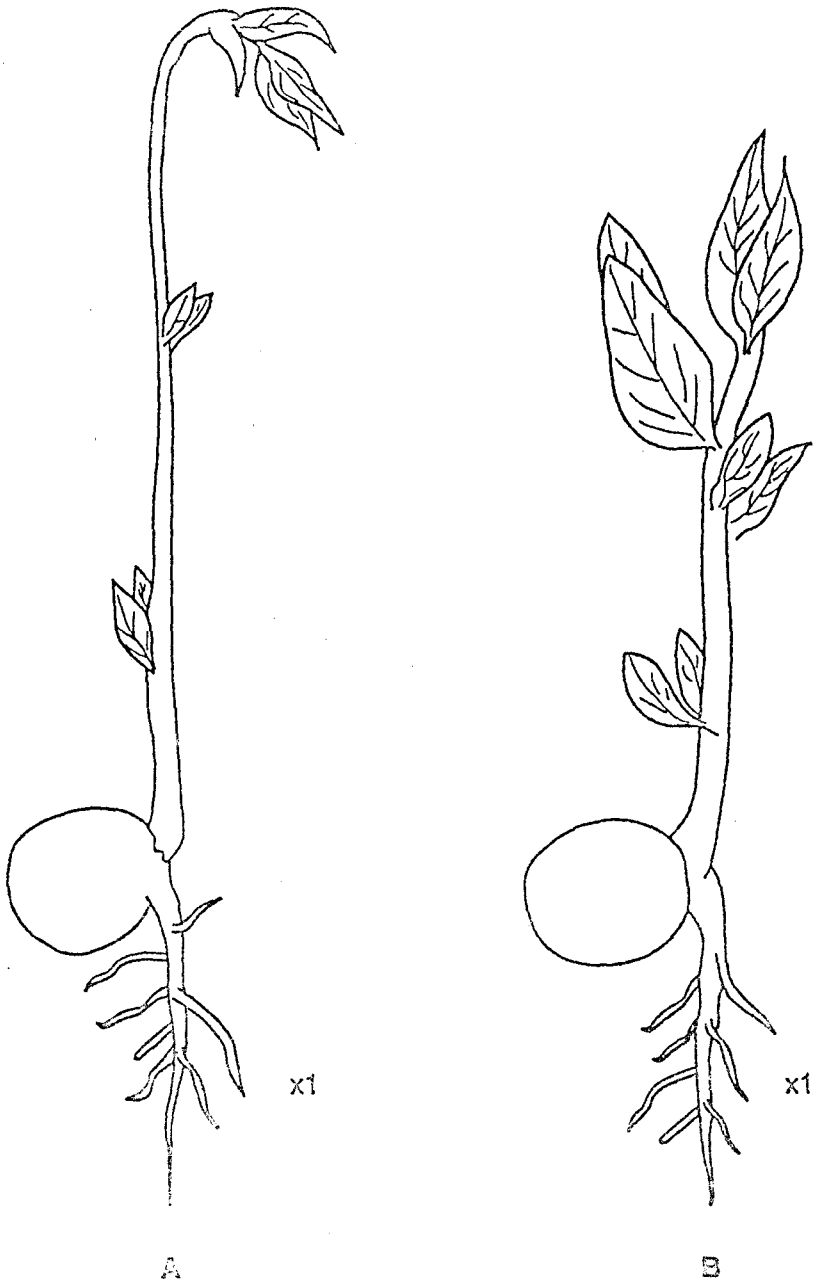


Fig. 2

(a) (i) State two visible similarities between the two seedlings.

1. .....

2. .....[2]

(ii) State **three** visible differences between the two seedlings.

	A	B
1.	.....	.....
	.....	.....
2.	.....	.....
	.....	.....
3.	.....	.....
	.....	.....

[3]

(b) (i) What environmental condition caused the differences between **A** and **B**?

.....[1]

(ii) Seedling **B** was placed on its side and allowed to continue growing. Draw a simple labelled diagram, in the space below, to show what it would look like after a week.

[1]

(iii) Name the substance which controls the response shown in your diagram.

.....[1]

(iv) Suggest how this substance might have caused the differences between seedlings A and B.

.....

.....

.....[1]

(c) Describe, giving practical details, how you would produce seedlings similar to B, without using soil.

.....

.....

3 Fig. 3 shows a partly decayed leaf.

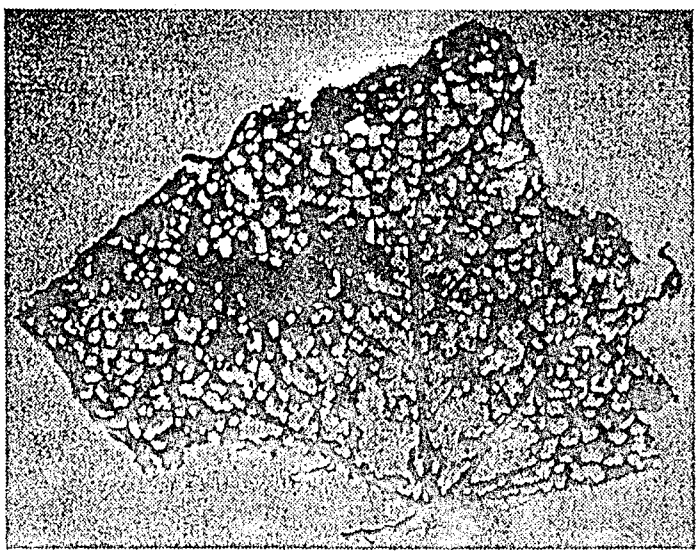


Fig. 3

(a) Suggest reasons for the appearance of the leaf.

(i) Reasons for the holes in the leaf.

.....

.....

.....[2]

(ii) Reasons for the network of tissue which remains.

.....

.....

.....[2]

(b) To which main group of flowering plants did the leaf belong? .....

State a reason for your answer.

.....

.....[2]

(c) (i) Describe how you would demonstrate the presence of water-conducting tissue in the petals of a flower, using a solution of a dye.

.....

.....

.....

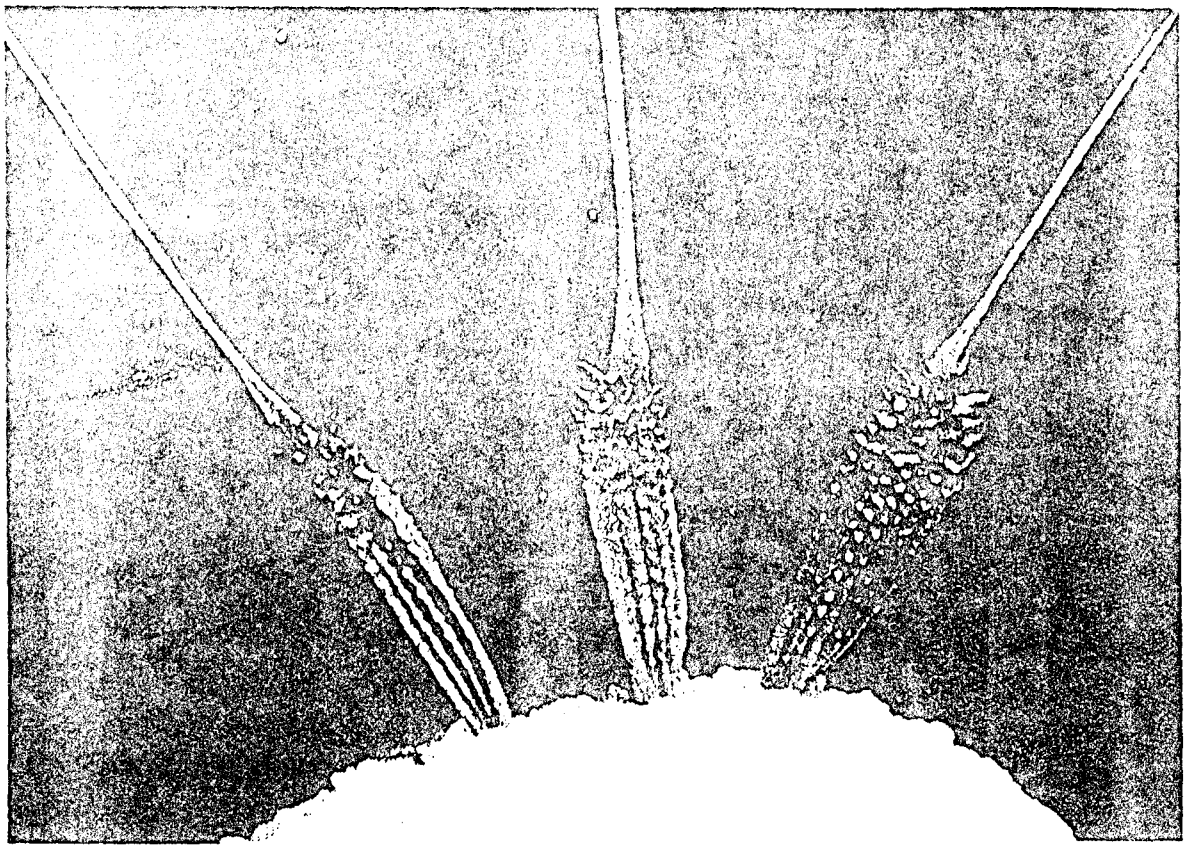
.....[2]

(ii) Draw a simple diagram to show the appearance of this water-conducting tissue, as you would expect to see it, in longitudinal section, under a microscope.

[2]

For Examiner's Use

4 Fig. 4 is a photograph of three small fruits on the fruiting structure of a plant.



x 16

Fig. 4

(a) (i) In the space below, make a drawing of **one** of the three small fruits shown in the photograph. **Labels are not required.**

[3]

(ii) Measure the length of the fruit on the photograph, and then on your drawing. Calculate the magnification of your drawing compared with the size of the structure from which the photograph was taken. Show your working.

Magnification ..... [3]

(b) Small fruits of the type shown may be adapted for dispersal. Draw, in the spaces below, **two** simple diagrams to suggest **two** ways in which the top of the fruit you have drawn in **(a) (i)** might be adapted for dispersal.

State the dispersal agent in each case.

Dispersal agent .....

Dispersal agent ..... [3]

Centre Number	Candidate Number

Candidate Name _____

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

BIOLOGY 0610/6

PAPER 6 Alternative to Practical

Thursday **17 JUNE 1999** Morning 1 hour

Candidates answer on the question paper.
No additional materials are required.

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page.
Answer all questions.
Write your answers in the spaces provided on the question paper.
Use sharp pencils for your drawings. Coloured pencils or crayons should not be used.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.
You may use a calculator.

FOR EXAMINER'S USE	
1	
2	
3	
4	
TOTAL	

This question paper consists of 9 printed pages and 3 blank pages.

SB (SLC/DJ) QF91691/3

[Turn over

1 Fig. 1 shows the external appearance of three species of animal, A, B and C.

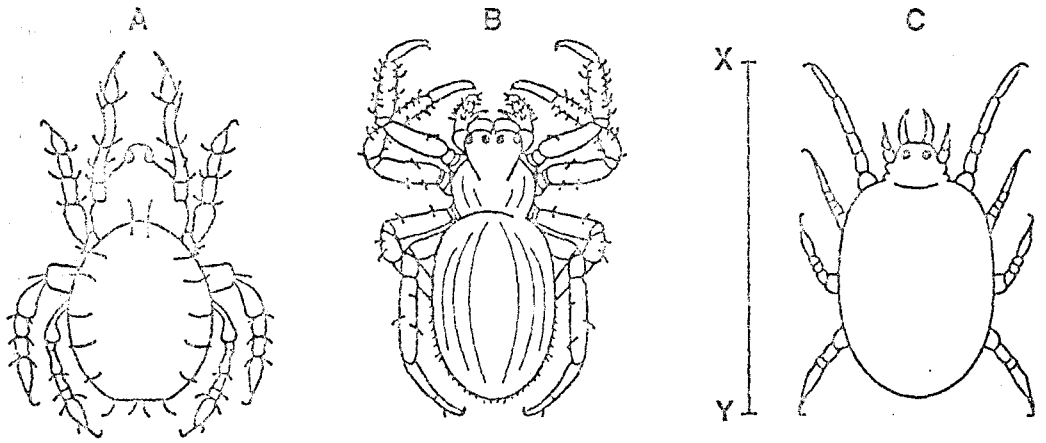


Fig. 1

(a) (i) List four visible features they have in common.

1. .....

2. .....

3. .....

4. .....[4]

(ii) Measure the length of animal **C** along the line **X Y**. Record this measurement.

Length .....

The **actual** length of animal **C** was 0.4 mm. Calculate the magnification of the diagram. Show your working.

Magnification .....[3]

Animals of species **D** and **E** were kept in a laboratory. Species **D** is herbivorous and feeds on oranges. Species **E** is carnivorous and feeds on species **D**.

50 individuals of species **D** were placed in a container with plenty of food at the start of the investigation. After 15 days, 50 individuals of species **E** were added to the container.

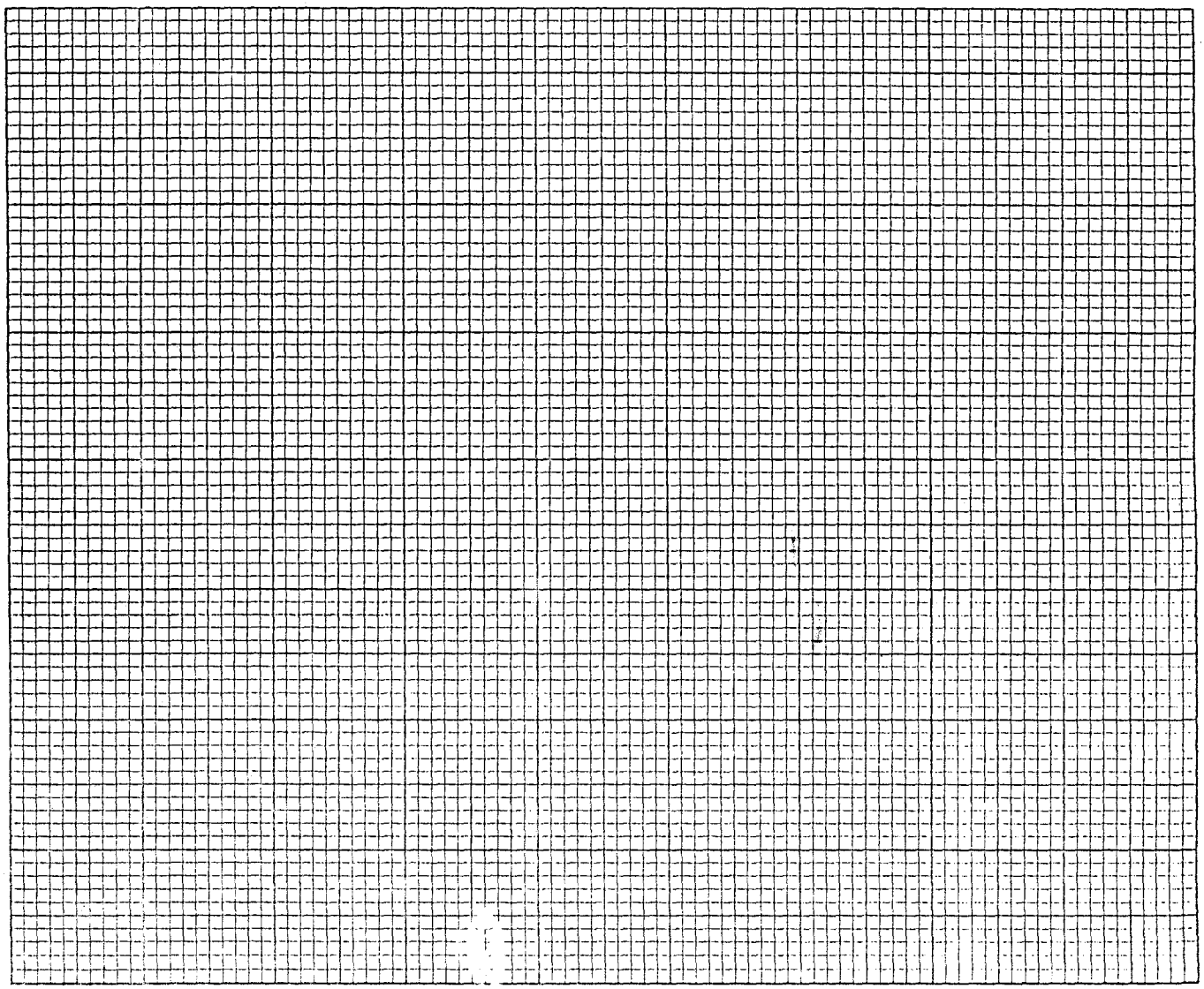
Table 1 shows how the number of individuals of each species changed over 35 days.

For Examiner's Use

Table 1

time/days	number of individuals	
	D	E
0	50	–
5	100	–
12	480	–
15	650	50
20	1250	400
24	1400	700
28	1150	1000
31	850	1300
35	500	1000

(b) (i) Plot the information given in Table 1 as two curves on the axes below. The two curves should be distinct and clearly labelled.



[5]

(ii) Suggest the approximate number of species **E** that might have been present on day 40.

.....[1]

(c) Account for the changes in the number of individuals of species **E**.

.....

.....

.....

.....[4]

[Total : 17]

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Question 2 begins on page 6

For Examiner's Use

2 Fig. 2 shows three sets of apparatus, **A**, **B** and **C**, used to measure different biological processes.

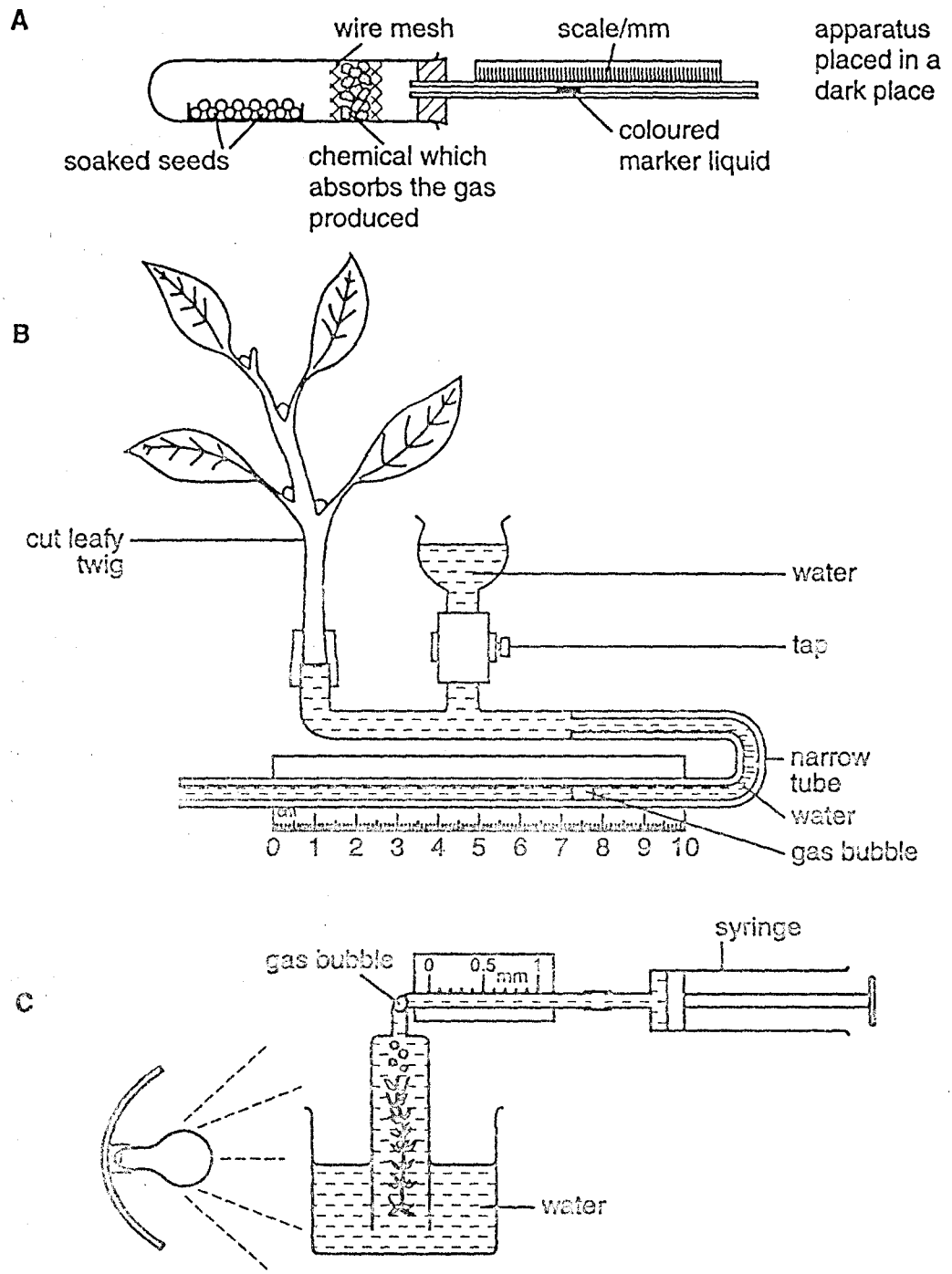

Fig. 2

(a) Name the process that can be measured by each apparatus.

A .....

B .....

C .....[3]

For Examiner's Use

(b) (i) Name the gas which is produced by the process measured using apparatus **A**.

.....[1]

(ii) Suggest **one** possible control for an experiment using apparatus **A**.

.....

.....[1]

(c) When using apparatus **B**, it is possible to vary the external conditions.
Suggest how changing **one named** external condition would affect the biological process measured by apparatus **B**.

.....

.....

.....[1]

(d) (i) Name the gas produced by the process measured using apparatus **C**.

.....[1]

(ii) How would you keep **one named** external factor constant when using apparatus **C**?

.....[1]

[Total : 8]

For Examiner's Use

3 Fig. 3 shows part of the lower surface of a leaf viewed under the high power of a microscope.

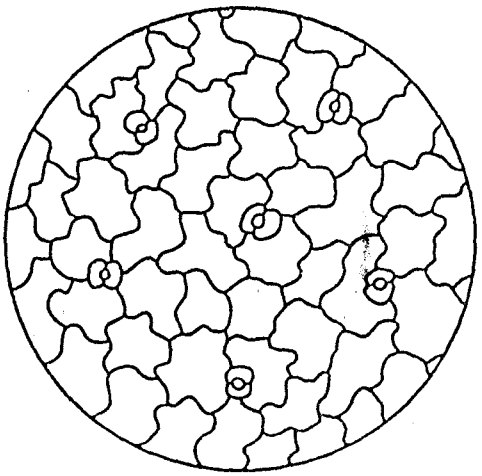

Fig. 3

(a) (i) Name this lower layer of cells.

.....[1]

(ii) How would Fig. 3 be different if the lower surface were viewed under low power?

.....

.....[2]

(iii) Describe how you would make a suitable preparation (slide) of the lower surface of the leaf, to be viewed under a microscope, as seen in Fig. 3.

.....

.....

.....

.....[3]

Fig. 4 shows a stoma and some surrounding cells.

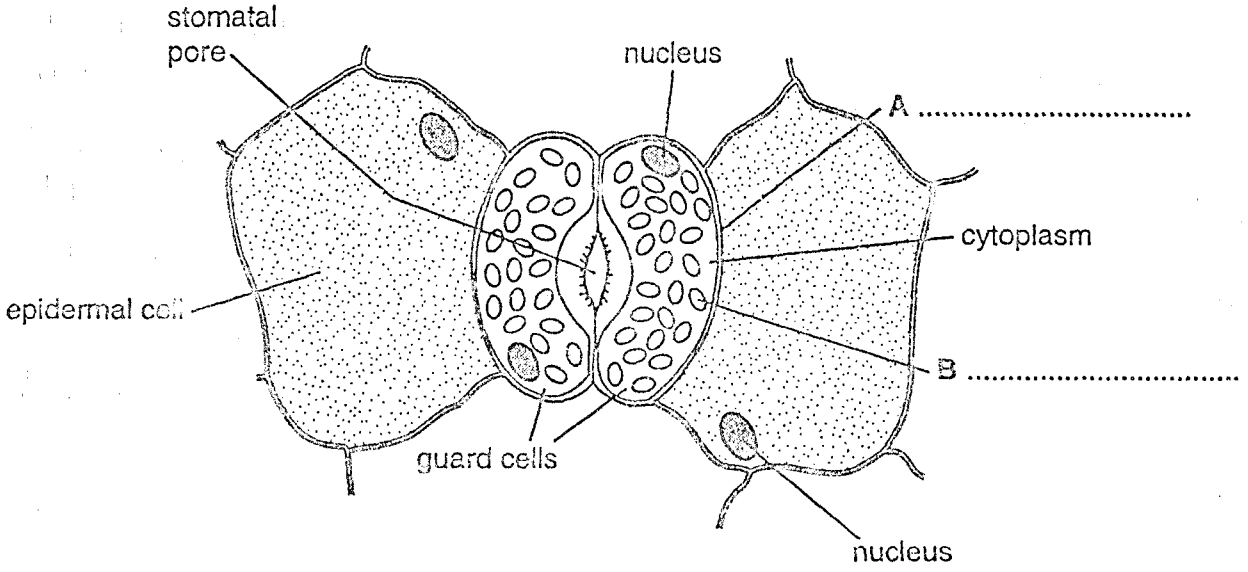

Fig. 4

(b) (i) Name, on Fig. 4, the structures labelled A and B. [2]

(ii) State two differences, other than size, between a guard cell and an epidermal cell.

1. .....

.....

2. .....

.....[2]

[Total : 10]

For Examiner's Use

4 Hold this page at arms length. Close your left eye and look at the + below with your right eye. **Slowly** bring the page towards your face and continue to look at the +, with your right eye.

+ ●

(a) (i) What happens to the ● when the page is moved closer to your face?

.....[1]

(ii) Explain your observation.

.....

.....[1]

(b) Fig. 5 shows a horizontal section through a human eye.

Draw, on Fig. 5, the image of the arrow which is formed inside the eye.

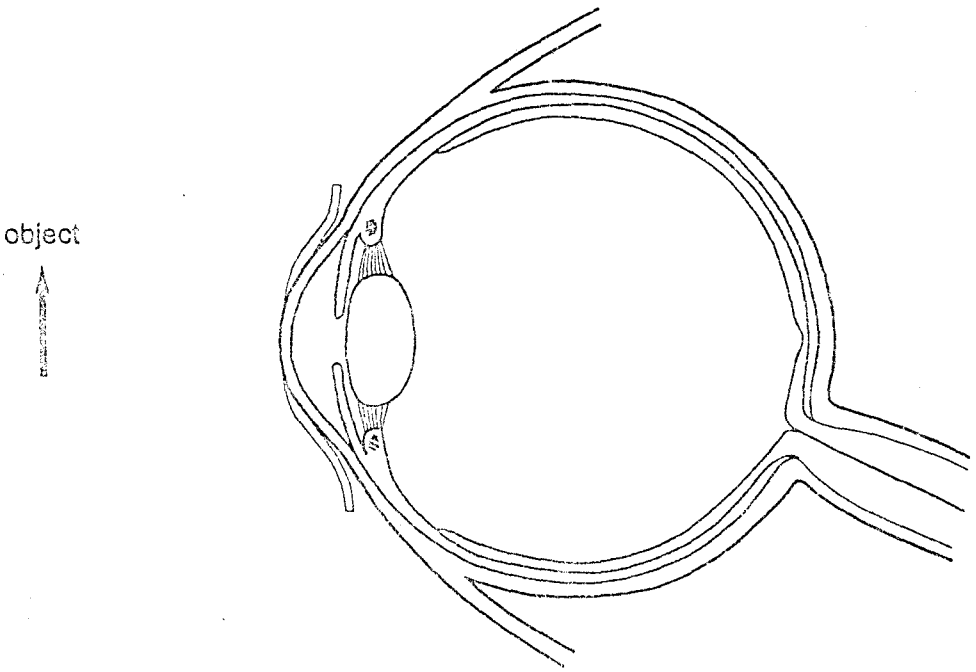

Fig. 5

[3]

[Total : 5]

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Centre Number	Candidate Number

Candidate Name _____

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

BIOLOGY 0610/6

PAPER 6 Alternative to Practical

Tuesday 2 NOVEMBER 1999 Morning 1 hour

Candidates answer on the question paper.
No additional materials are required.

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page.
Answer all questions.
Write your answers in the spaces provided on the question paper.
Use a sharp pencil for your drawings. Coloured pencils or crayons should not be used.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.

FOR EXAMINER'S USE	
1	
2	
3	
4	
TOTAL	

This question paper consists of 10 printed pages and 2 blank pages.

[Turn over

BLANK PAGE

Do not write on this page.

1 (a) (i) Describe how you would carry out a test to show the presence of fat in a biscuit. What observation would indicate the presence of fat?

Test .....

.....

Observation .....

.....[3]

(ii) Describe how you would use this test to compare the fat content of two different types of biscuit.

.....

.....

.....[2]

(b) Complete the equation below to summarise the process of fat digestion.

fat + water $\xrightarrow[\text{(enzyme)}]{\text{.....}}$ ..... + ... [3]

[Total : 8]

2 Fig. 1 shows an experiment to investigate the rate of cooling of water in two glass containers, A and B.

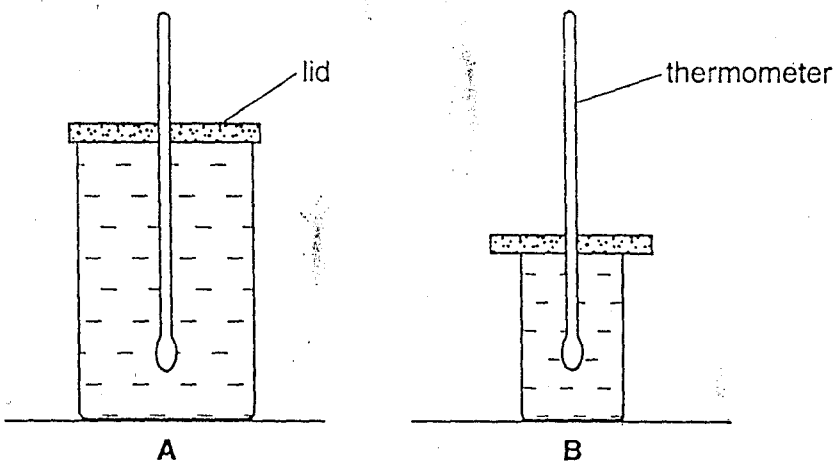

Fig. 1

Table 1 shows the surface areas and volumes of containers **A** and **B**.

Table 1

	container **A**	container **B**
surface area/ cm^2	300	102
volume/cm^3	500	100

The results of this investigation are shown in Table 2.

Table 2

time/min	temperature/°C	
	container **A**	container **B**
0	66.0	66.0
1	65.5	64.5
3	64.5	62.0
5	63.5	60.0
7	62.5	58.0
8	62.0	57.0
9	60.0	54.0
10	59.5	53.0

(a) Plot the results in Table 2 as two curves on one set of axes. The two curves should be distinct and clearly labelled.

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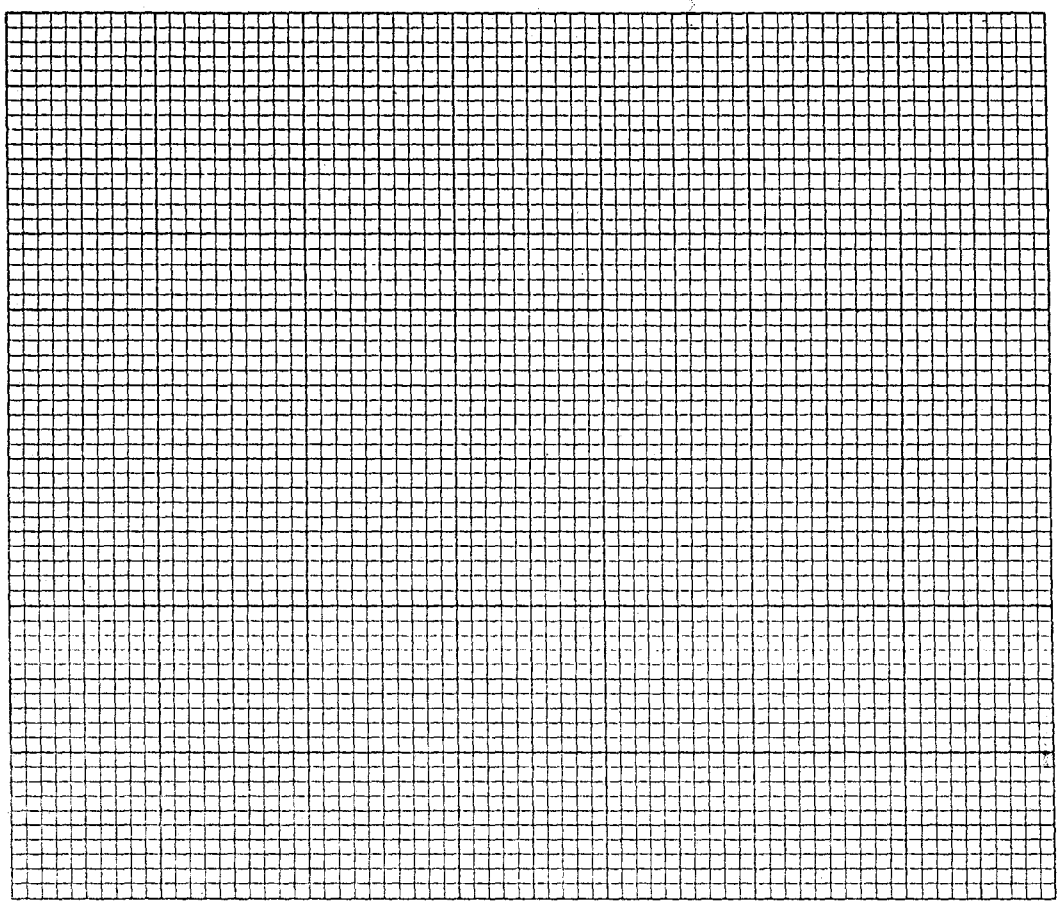


[6]

(b) (i) The surface area to volume ratio for container A is 0.6 : 1.

Calculate the ratio for container B. Show your working.

Ratio .....[2]

(ii) Using the graph and the information in (b) (i), describe the relationship between the rate of cooling and the surface area to volume ratio.

.....

.....

.....[2]

(c) The fall in temperature between 8 and 9 minutes is faster than between any other pair of readings. What might have happened to cause this more rapid fall in temperature?

.....

.....[1]

(d) Explain how, at the north pole, a large polar bear and her small cub are able to maintain the same internal temperatures but the temperatures of the large and small containers do not remain the same.

.....

.....[2]

[Total : 13]

3 Fig. 2 is a photograph of a dry broad bean seed, A, and a broad bean seed that has been soaked in water, B.

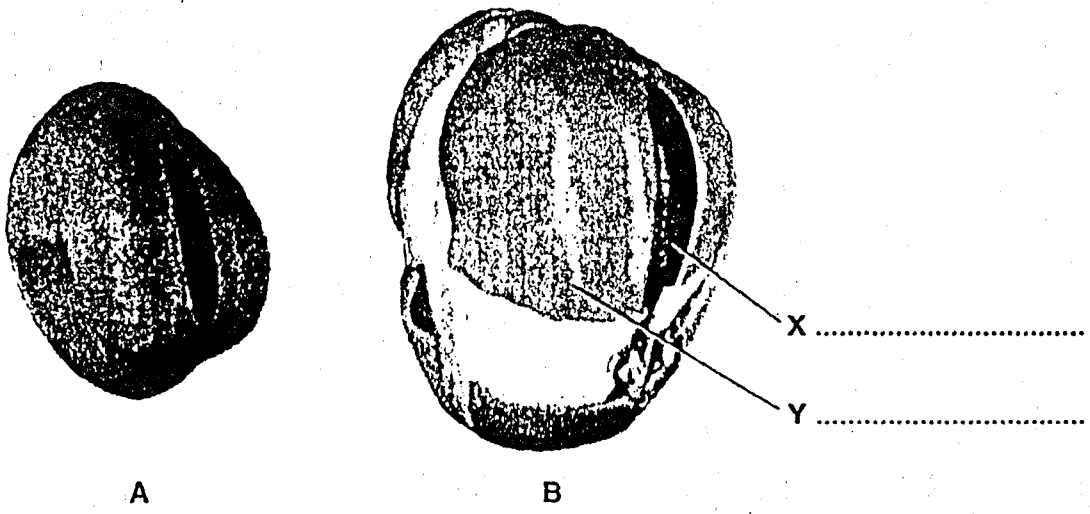


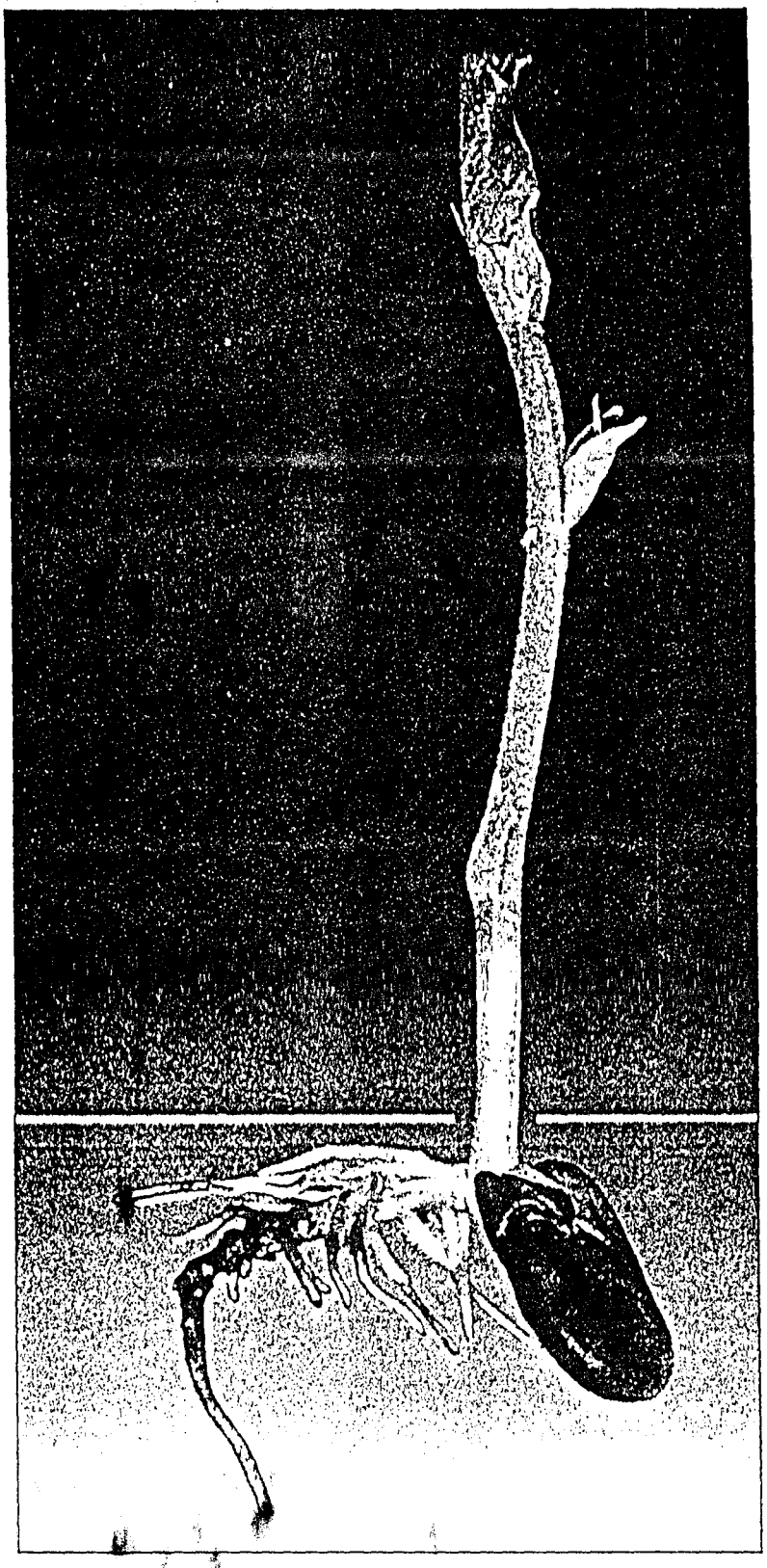
Fig. 2

(a) Name **X** and **Y** on Fig. 2. [2]

Fig. 3 opposite, is a photograph of a broad bean seedling.

(b) (i) Make a large labelled drawing of Fig. 3 in the space below.

[7]



broad bean seedling

Fig. 3

(ii) Make a simple drawing to show the appearance of the seedling between the stages shown in Fig. 2B and Fig. 3. Labels are **not** required.

[1]

Fig. 4 opposite, shows a mung bean at approximately the same age as the broad bean in Fig. 3.

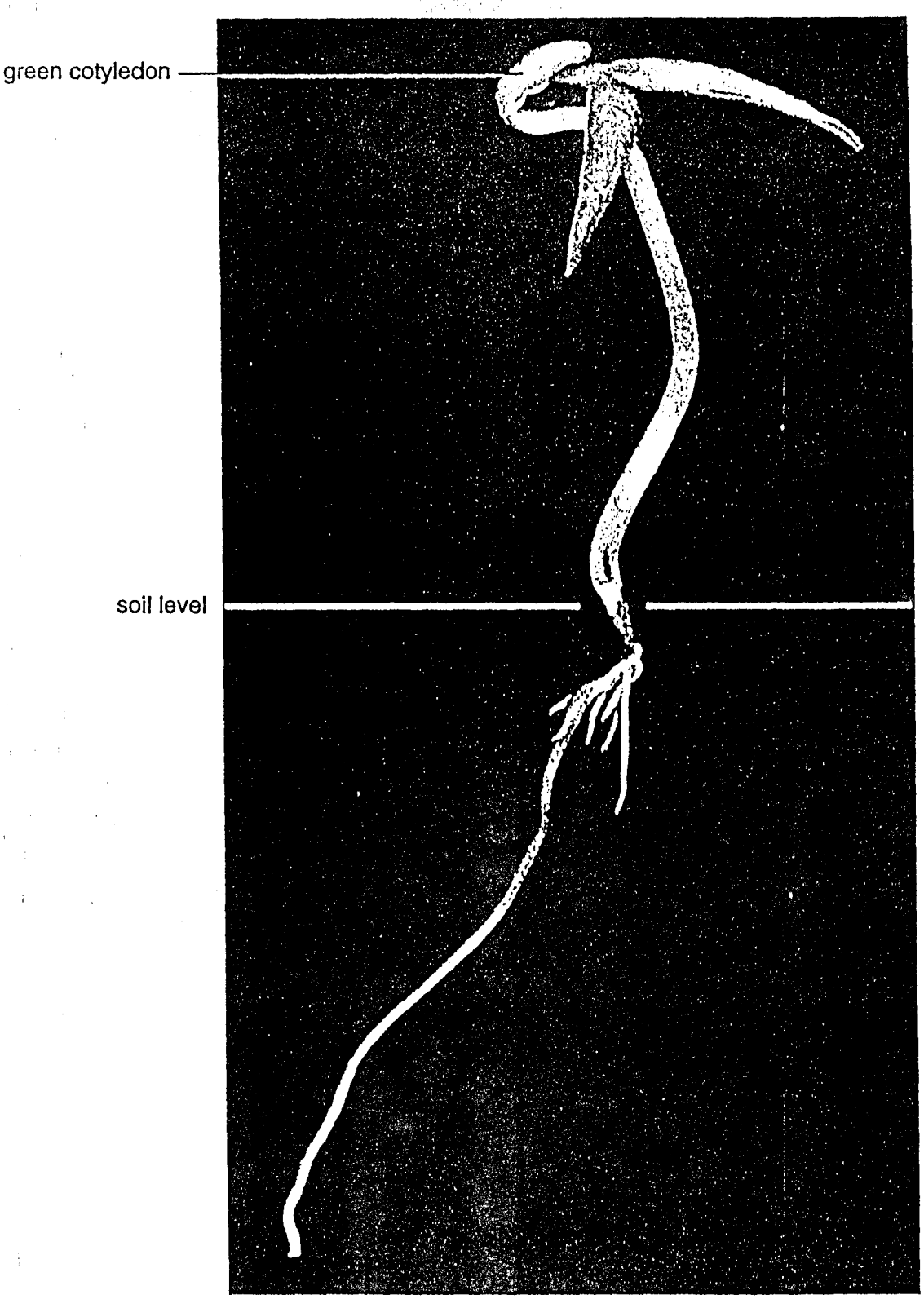
(c) Complete the table below to show **three** visible differences, other than size, which you can see between the two bean seedlings.

broad bean	mung bean
1.	
2.	
3.	

[3]

[Total : 13]

133



mung bean seedling

Fig. 4

For Examiner's Use

4 Fig. 5 shows a food web for a freshwater pond.

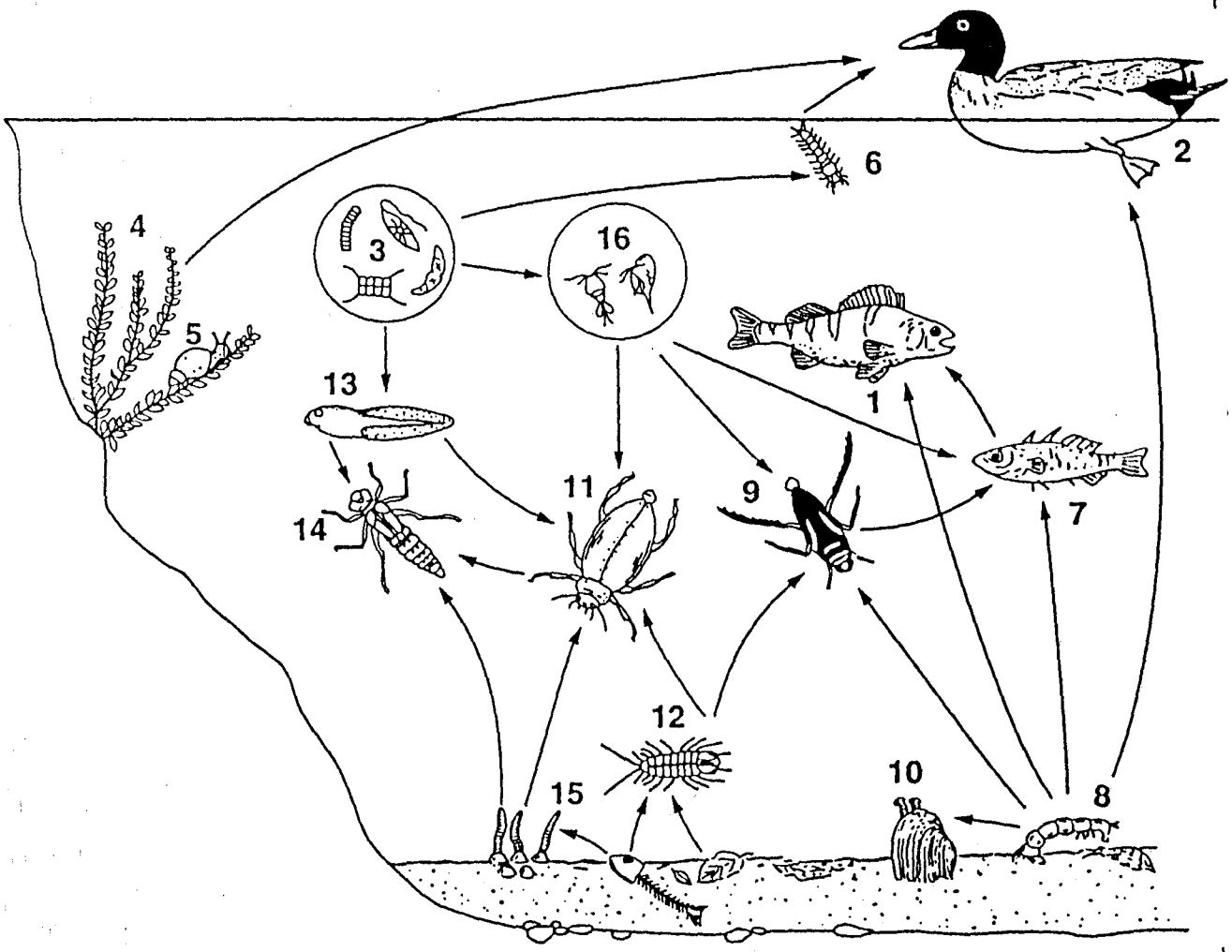


Fig. 5

(organisms 3 and 16 are greatly enlarged)

(a) Two trophic levels are listed below. For each level, state **two** examples from Fig. 5. Identify them by their **numbers**.

(i) *Primary consumers (herbivores)* ..... and .....

(ii) *Secondary consumers (carnivores)* ..... and .....

[2]

(b) Using only the numbers in Fig. 5, construct a simple food chain with **five** stages.

.....[2]

(c) Suggest how you could collect large numbers of the microscopic organisms numbered **3** in Fig. 5.

.....

.....[2]

[Total : 6]

Centre Number	Candidate Number

Candidate Name _____

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

BIOLOGY 0610/6

PAPER 6 Alternative to Practical

MAY/JUNE SESSION 2000 1 hour

Candidates answer on the question paper.
No additional materials are required.

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page.
Answer all questions.
Write your answers in the spaces provided on the question paper.
Use a sharp pencil for your drawings. Coloured pencils or crayons should not be used.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.
You may use a calculator.

FOR EXAMINER'S USE	
1	
2	
3	
4	
TOTAL	

This question paper consists of 11 printed pages and 1 blank page.

[Turn over

1 Fig. 1.1 is a photograph of flower A, cut in half to show its structure.

Flower A

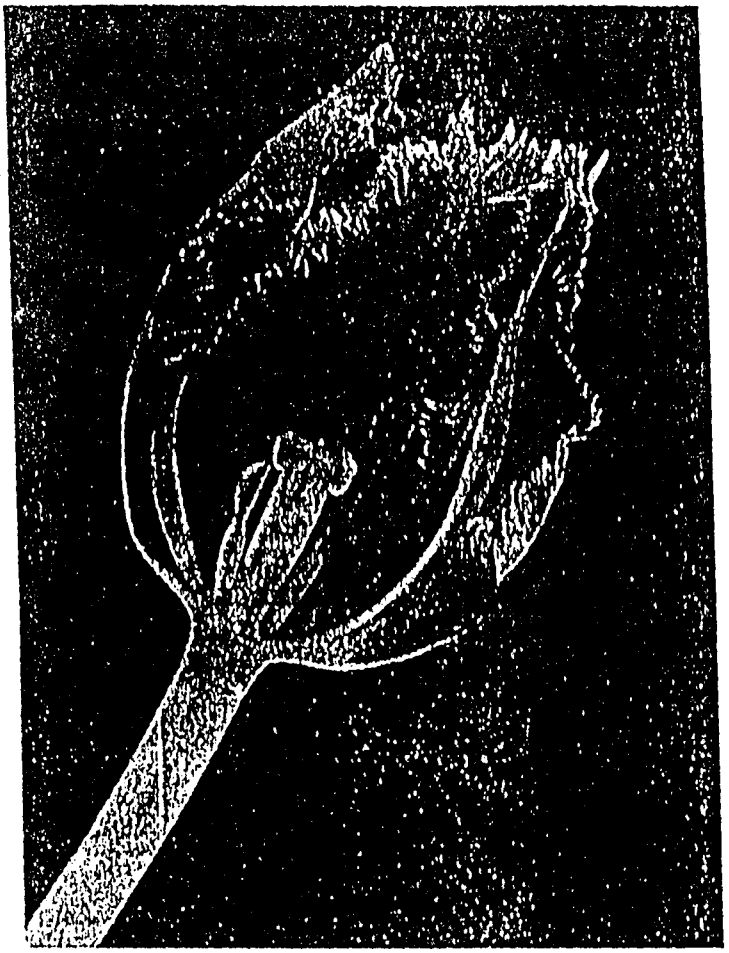
Fig. 1.1

For Examiner's Use

(a) Make a large, labelled drawing of the half-flower in Fig. 1.1, to show details of its structure.

[6]

Fig. 1.2 shows another flower of a different species, flower B.



Flower B

Fig. 1.2

(b) Construct a table, in the space below, to show **four visible differences between** flower A and flower B.

[4]

[Total : 10]

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[question 2 starts on page 6]

2 Samples of animals living on the surface of logs in a woodland were collected.

The animals found on the top and sides were brushed carefully into a tray.

The animals found on the underside of the logs were brushed carefully into a second tray.

The animals were identified, sorted into groups and counted. This information was recorded in Table 2.1.

Table 2.1

animal group	feeding category	number of animals	
		top and sides of log	underside of log
snails	herbivores	4	3
mites	herbivores	12	9
larvae of flies	herbivores	1	8
centipedes	carnivores	0	5
spiders	carnivores	2	7
beetles	carnivores	2	4
woodlice	detritivores*	2	10
millipedes	detritivores*	1	4

* Detritivores are animals that eat dead matter such as fallen leaves.

(a) (i) Complete Table 2.2 to show the numbers of animals in each feeding category expressed as a percentage of the total number of animals found on the underside of the logs.

Table 2.2

feeding category	number of animals found on the underside of the logs	percentage %
herbivores	20	
carnivores	16	
detritivores	14	
total	50	100

[2]

For Examiner's Use

(a) (ii) Using Fig. 2.1, construct a pie chart to show the proportion of herbivores, carnivores and detritivores collected from the underside of the logs.

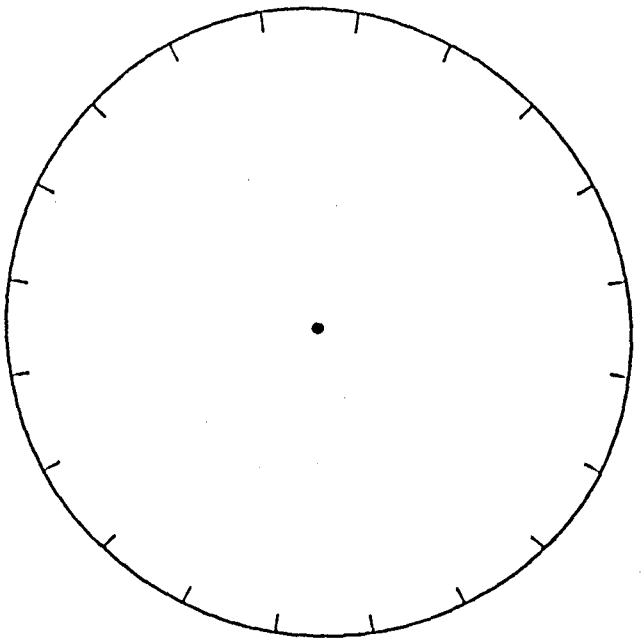


Fig. 2.1

[2]

(b) Suggest two reasons why most animals were found on the underside of the logs.

1. .....

.....

2. .....

.....[2]

(c) Describe an investigation you could carry out to compare the number of animals living amongst fallen leaves in two different woodland habitats.

.....

.....

.....

.....

.....[4]

[Total : 10]

3 Fig. 3.1 shows the apparatus that was used to investigate the activity of yeast in a glucose solution.

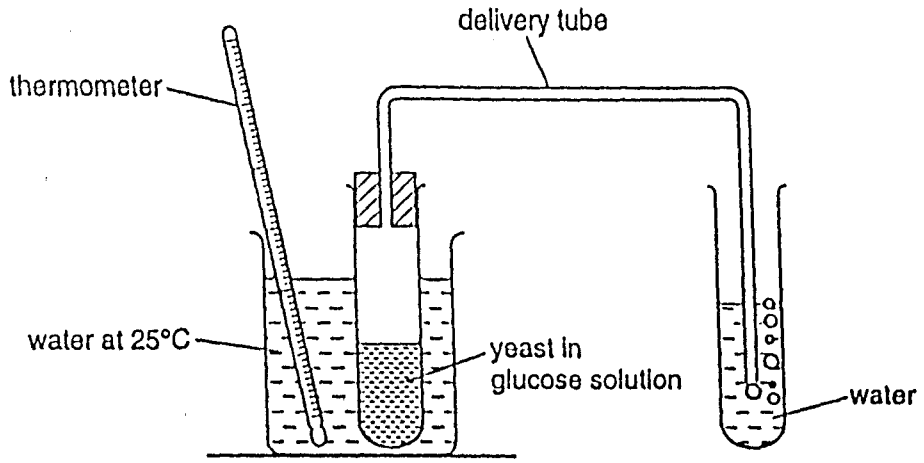


Fig. 3.1

The number of bubbles released in one minute was counted. This was repeated another four times.

The temperature in the water bath was then raised to 35 °C and five more counts were made.

Table 3.1

	number of bubbles released in one minute	
	25 °C	35 °C
1	11	17
2	12	19
3	14	20
4	13	16
5	10	18
total		
mean (average)		

(a) (i) Complete Table 3.1 to show the totals and mean numbers of bubbles released at each temperature. [2]

(ii) Name the physiological process in yeast which is investigated in this experiment.

.....[1]

(iii) State the effect of raising the temperature on the activity of yeast.

Explain your answer.

Effect .....

Explanation .....

.....[3]

(b) (i) Name the gas present in the bubbles.

.....

(ii) Describe a test you could use to identify this gas.

.....

.....[2]

(c) Explain why it is better to leave the apparatus for a few minutes at each temperature before beginning to count the bubbles.

.....

.....

.....[2]

[Total : 10]

4 An experiment was carried out to investigate the effect of different concentrations of sucrose solution on the length of potato strips.

Five test-tubes were set up, each containing a different concentration of sucrose solution. Another tube was set up containing the same volume of distilled water.

A strip of potato tissue was placed in each tube. The strips were of equal size and as shown in Fig. 4.1.

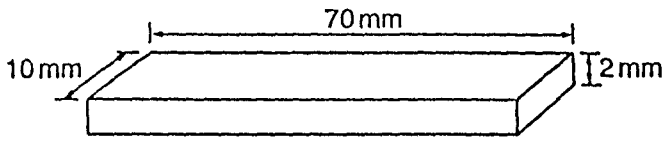


Fig. 4.1

These strips were completely covered by the solutions and were left in the tubes for 30 minutes. The potato strips were removed and measured. The results are shown in Table 4.1.

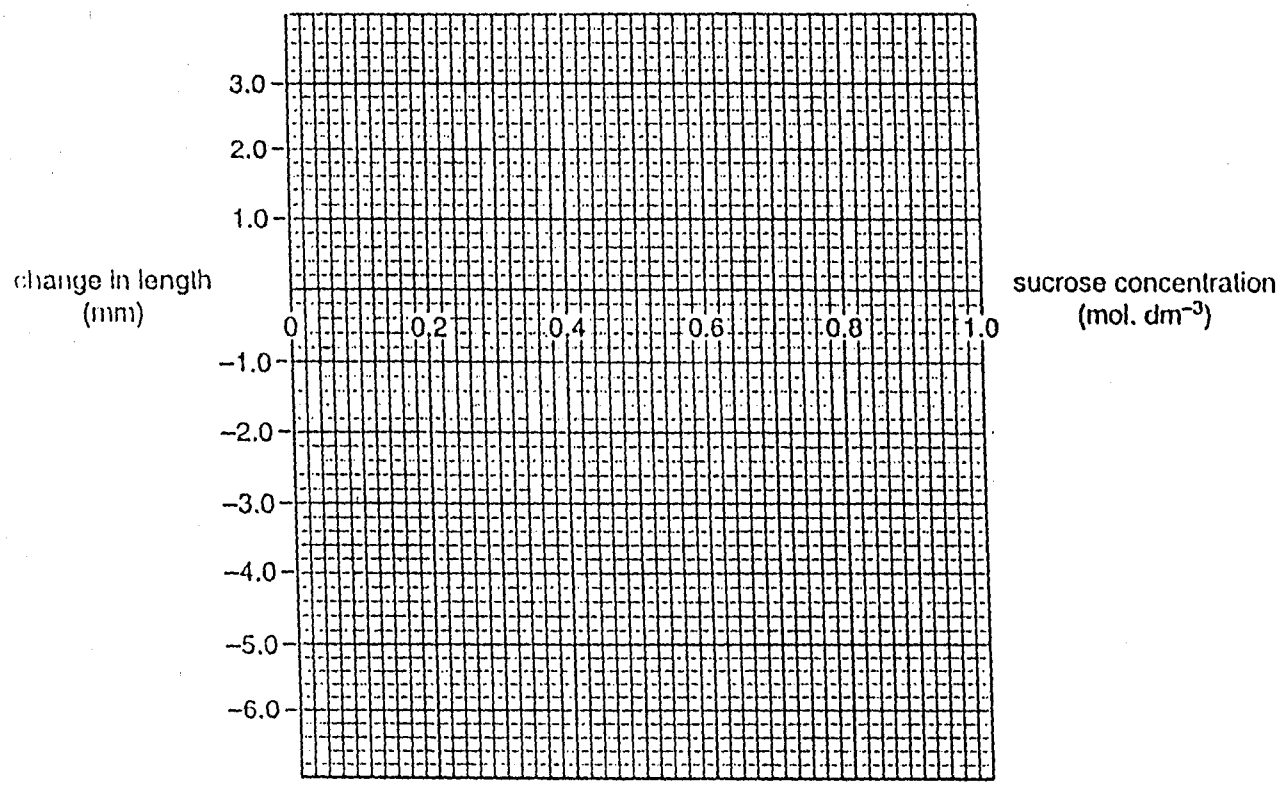
Table 4.1

concentration of sucrose solution (mol dm^{-3})	initial length (mm)	final length (mm)	change in length (mm)
0	70	73.0	
0.2	70	71.5	
0.4	70	69.0	
0.6	70	67.0	
0.8	70	66.0	
1.0	70	64.5	

For Examiner's Use

(a) (i) Complete Table 4.1 to show the change in length of each strip. [1]

(ii) Plot the changes in length against the concentration of sucrose solution on the axes provided. Join the points using ruled lines.



[3]

(b) (i) What conclusions can be drawn from these results?

.....

.....

.....

.....

.....[3]

(ii) Name the process that has taken place to bring about these changes in the lengths of the potato strips.

.....[1]

For Examiner's Use

(c) State two improvements to this experiment which would increase the reliability of these results.

1. .....

.....

2. .....

.....[2]

[Total : 10]

Centre Number	Candidate Number

Candidate Name _____

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

BIOLOGY **0610/6**

PAPER 6 Alternative to Practical

Tuesday **31 OCTOBER 2000** Morning 1 hour

Candidates answer on the question paper.
No additional materials are required.

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page.
Answer **all** questions.
Write your answers in the spaces provided on the question paper.
Use a sharp pencil for your drawings. Coloured pencils or crayons should not be used.

INFORMATION FOR CANDIDATES

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FOR EXAMINER'S USE	
1	
2	
3	
4	
TOTAL	

This question paper consists of 12 printed pages.

1 Fig. 1.1 is a photograph of a flight feather of a bird.

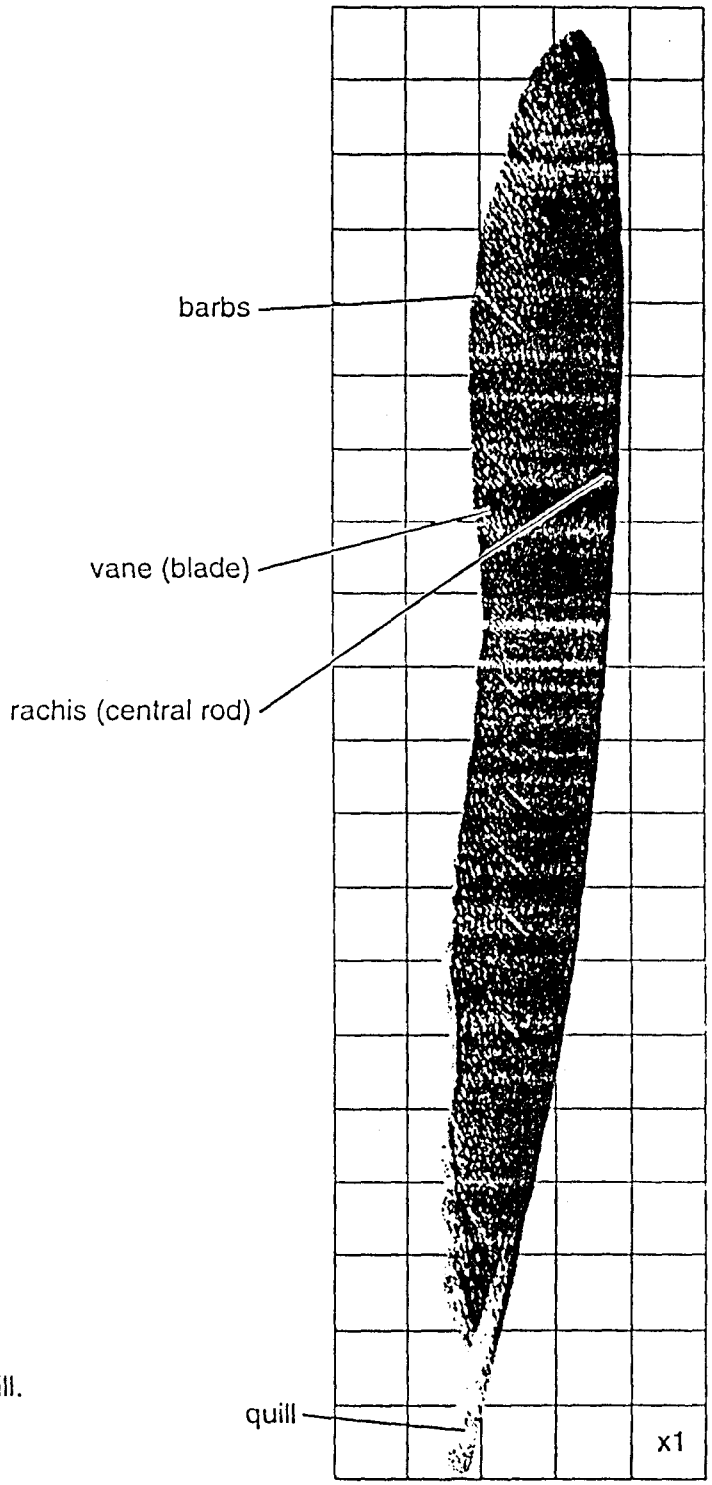


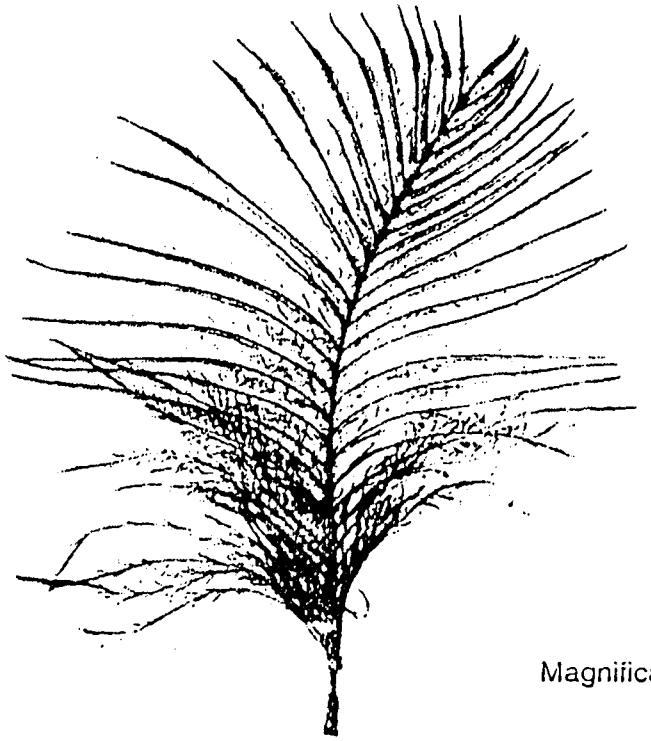
Fig. 1.1

(a) Determine the surface area of the feather, excluding the quill.

Show your working.

Surface area of feather .....cm^2 [3]

Fig. 1.2 is a photograph of a down feather. These feathers form a dense layer close to the skin surface of a bird.



Magnification x 4

Fig. 1.2

(b) Complete Table 1.1 to show **three visible** differences between the flight feather in Fig. 1.1 and the down feather in Fig. 1.2.

Table 1.1

	flight feather	down feather
1	....	....
2	....	....
3	....	....

[3]

(c) (i) Suggest how the down feathers may be important especially to young birds in cold climates.

.....

.....

.....

.....[2]

(ii) Using a beaker of hot water to represent a young bird, describe an experiment you could carry out to support your suggestion in (c) (i).

.....

.....

.....

.....

.....[3]

[Total : 11]

2 Maize or sweet corn, *Zea mays*, is an important food source. Each female flower of maize produces a grain and the grains are grouped together to form cobs. The yields of maize crops have been increased over many years by selective breeding.

Fig. 2.1 shows two maize plants.

Plant **A** is a maize plant and cob before the introduction of selective breeding.

Plant **B** is a modern maize plant and cob, the result of selective breeding.

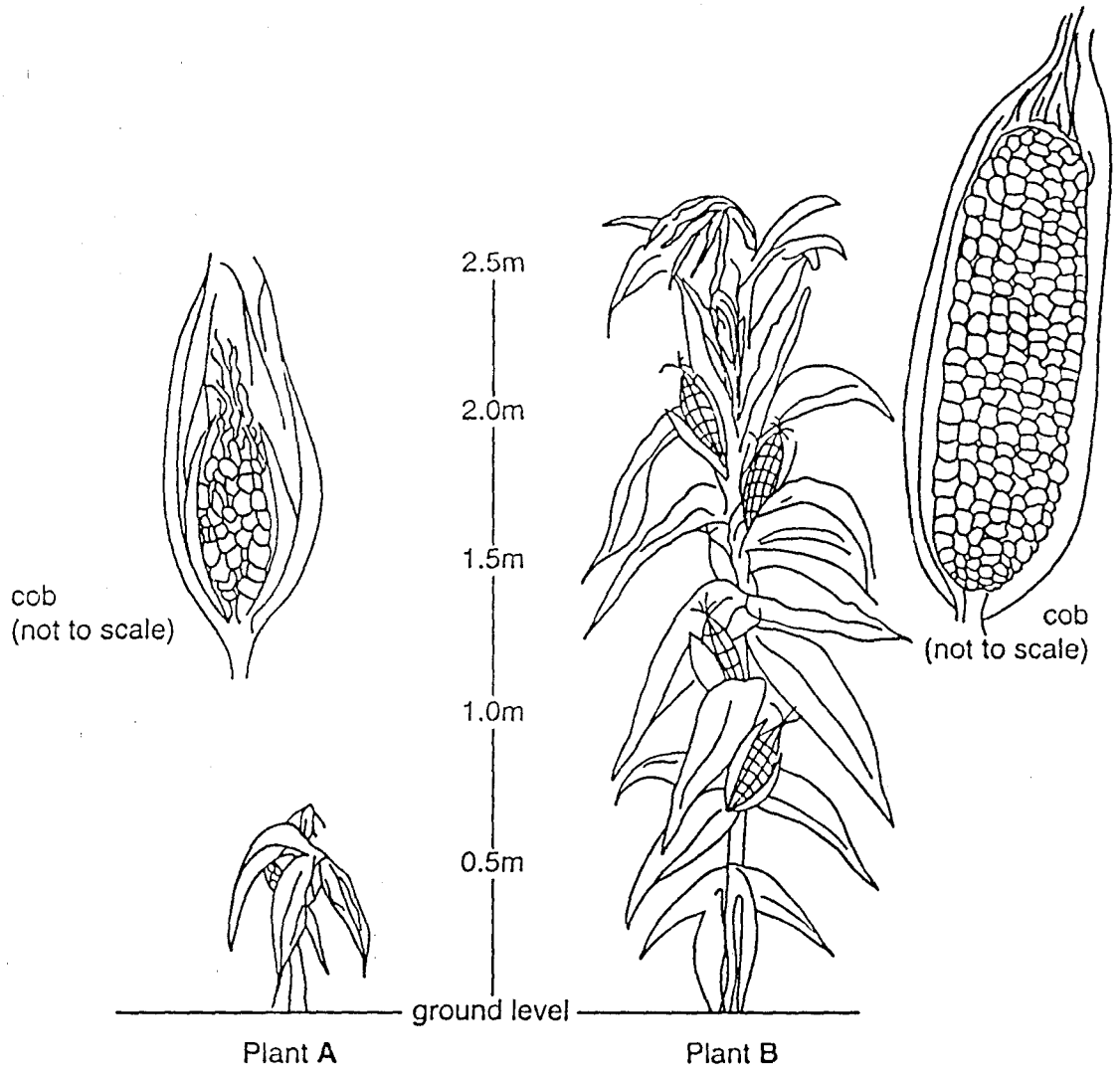


Fig. 2.1

(a) State **three** differences between plant **A** and plant **B** in Fig. 2.1.

1. .....

2. .....

3. .....[3]

(b) Explain how selective breeding is carried out to improve yield.

.....

.....

.....

.....

.....[3]

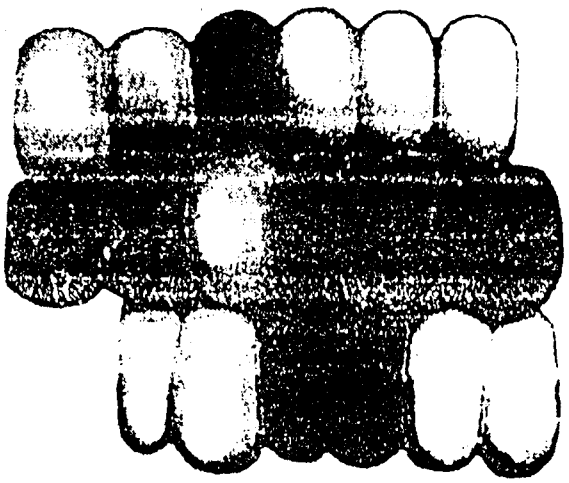
The colour of grains is determined genetically. The grains of maize used for food are usually pale in colour but some varieties of maize form dark coloured grains.

When certain varieties of maize are crossed, the cobs produced have both pale and dark coloured grains. An example of such is shown in Fig. 2.2.

Fig. 2.3 shows part of the same cob enlarged.

a whole maize cob (x 0.5)

Fig. 2.2



part of the same maize cob enlarged (x 2.7)

Fig. 2.3

(c) (i) Count the number of each colour of grain shown in Fig. 2.3.

Number of **pale** grains .....

Number of **dark** grains .....[1]

(ii) Suggest which genetic ratio these numbers represent.

.....[1]

(iii) How might this estimated ratio be confirmed if you were given the whole cob as shown in Fig. 2.2?

.....

.....[1]

(d) Suggest a suitable letter as a symbol to represent the allele of each of the two grain colours:

*allele for **pale** grain* ..... *allele for **dark** grain* .....

Using these letters suggest the genotype of each of the maize plants that were crossed to produce the cob shown in Figs 2.2 and 2.3.

Genotype ..... x ..... [2]

[Total : 11]

3 Fig. 3.1 shows a rotating clinostat with five seedlings attached.

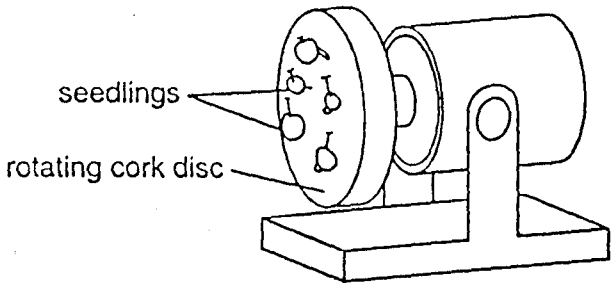
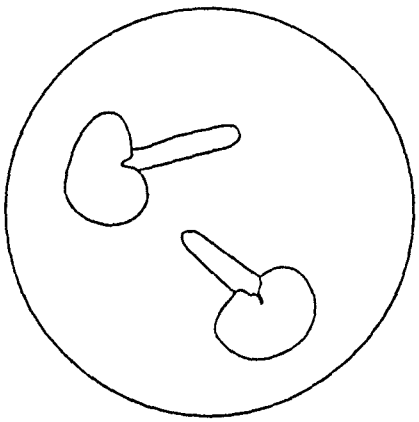


Fig. 3.1

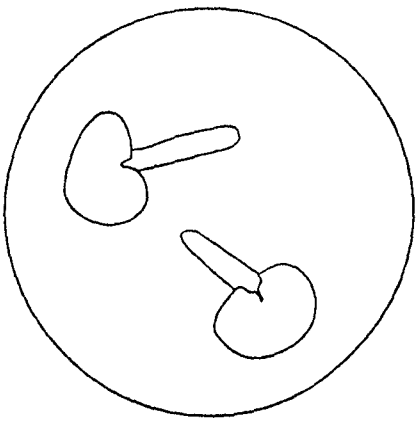
The cork disc is rotated slowly so that all sides of the seedlings are equally exposed to the stimulus of gravity.

(a) (i) On the diagram below, show the appearance of the seedlings after being attached to the rotating clinostat for two days. No labels are required.



[1]

(ii) On the diagram below, show the appearance of the seedlings after two days if the clinostat had **not** been rotating.



[2]

(iii) Explain the new appearance of the seedlings in (a) (ii) after two days.

.....

.....

.....

.....[2]

(b) (i) What condition must be provided to ensure continued growth of the seedlings over the two day period?

.....

.....[1]

(ii) How could this be achieved?

.....

.....[1]

(c) Describe how you would ensure that **only** the response to gravity is being investigated.

.....

.....[1]

[Total : 8]

4 Catalase is an enzyme which can be found in living cells. It breaks down toxic hydrogen peroxide which is a by-product of metabolism.

$$\text{hydrogen peroxide} \xrightarrow{\text{catalase}} \text{oxygen} + \text{water}$$

Fig. 4.1 shows the apparatus used to investigate the effect of pH on the activity of catalase.

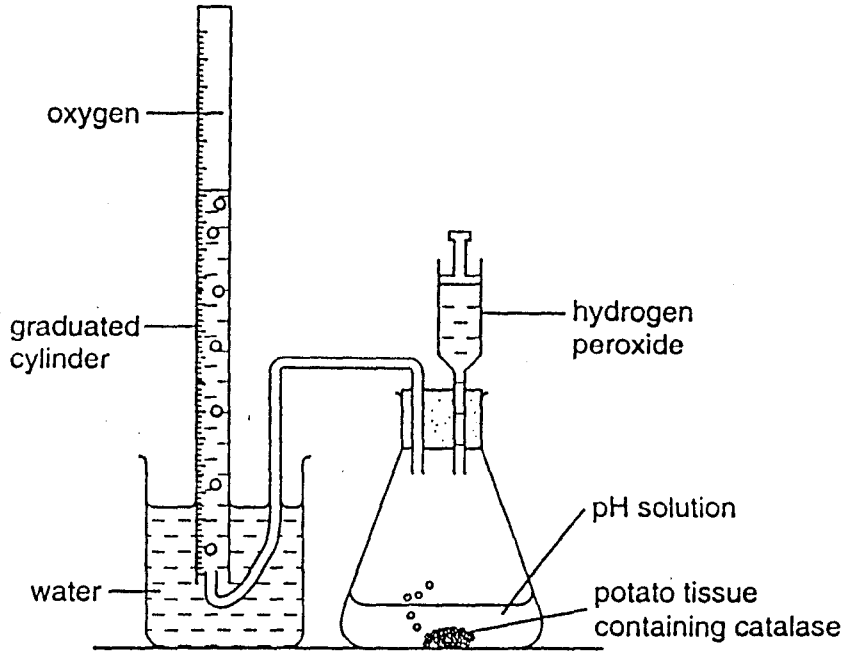


Fig. 4.1

The volume of oxygen produced in 5 minutes, at different pH levels, was measured.

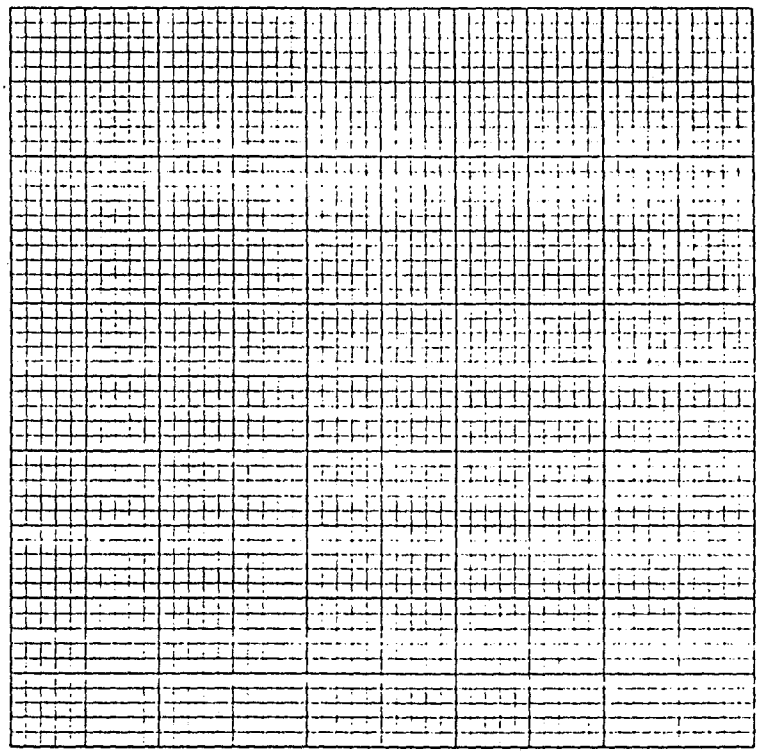
The results are shown in Table 4.1.

Table 4.1

pH	oxygen produced in 5 min (cm^3)
2	15
3	16
4	20
5	40
6	48
7	38
8	20

For Examiner's Use

(a) Construct a graph using the information shown in Table 4.1. Join the points using ruled lines.



[4]

(b) With reference to the graph, describe the effect of pH on the activity of catalase.

.....

.....

.....

.....

.....[4]

(c) State **two** ways in which you might improve the reliability of this investigation.

1. .....

.....

2. .....

.....[2]

[Total : 10]

159

Centre Number	Candidate Number

Candidate Name _____

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

BIOLOGY 0610/6

PAPER 6 Alternative to Practical

MAY/JUNE SESSION 2001 1 hour

Candidates answer on the question paper.
No additional materials are required.

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page.
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INFORMATION FOR CANDIDATES

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FOR EXAMINER'S USE	
1	
2	
3	
4	
TOTAL	

This question paper consists of 8 printed pages. 160

1 (a) Complete Fig. 1.1 and Fig. 1.2 to show the appearance of the eye in the two light intensities shown.

Label the structures you have drawn and indicate the colour of each part.

(i) appearance in dim light

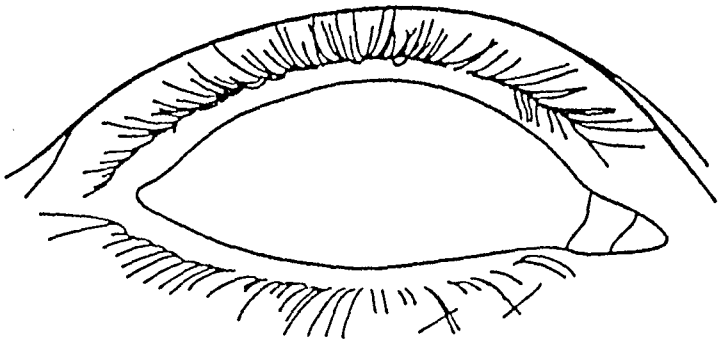


Fig. 1.1 [2]

(ii) appearance in bright light

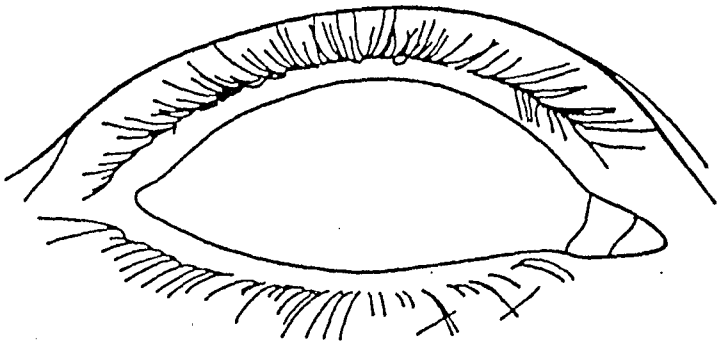


Fig. 1.2 [2]

(b) Account for these changes in the eye.

.....

.....

.....[3]

[Total : 7]

2 Fig. 2.1 shows a side view of an adult locust.

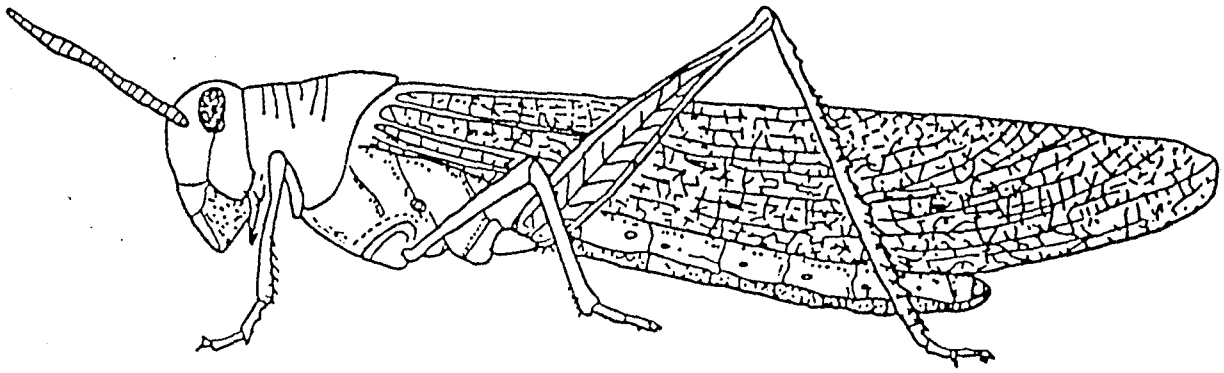


Fig. 2.1 scale x2

(a) Make a **large** drawing of the back leg of the locust to show all parts of the limb. Labels are **not** required.

[3]

(b) (i) Measure the length of the complete back leg on Fig. 2.1 and on your drawing.

length of leg on Fig. 2.1

.....

length of leg on your drawing

.....[1]

(ii) Calculate the magnification of your drawing.
Show your working.

magnification.....[1]

[Total : 5]

Examiner's Use

3 The enzyme amylase speeds up the break down of starch into reducing sugar. Amylase is present in saliva.

Equal volumes of starch and amylase solutions were mixed thoroughly in a container. A sample was removed immediately and tested for the presence of starch, protein and reducing sugar. The remaining mixture was placed in a water-bath at 40 °C and left for one hour. During this time, the contents were stirred with a clean glass rod at regular intervals. After one hour, a second sample was removed and tested in the same way.

(a) Describe how you would carry out a simple test for starch, for protein and for reducing sugar. In each case, state the colour changes that would occur if the results were positive.

test for starch

.....

.....

.....[2]

test for protein

.....

.....

.....[2]

test for reducing sugar

.....

.....

.....

.....[3]

(b) (i) Record the results of the tests for the sample taken immediately after mixing the starch and amylase solutions and for the second sample taken one hour later.

test	sample tested immediately	sample tested after one hour
starch		
protein		
reducing sugar		

[3]

(ii) Suggest **one** reason why the water-bath used in this investigation was set at 40 °C.

.....[1]

(iii) State **one** reason why the mixture was stirred at regular intervals.

.....[1]

(c) In another investigation, the amylase solution was boiled and cooled and then mixed with the starch solution. A sample was removed immediately and tested, as before. The remaining mixture was kept at 40 °C and sampled again after one hour.

Suggest and explain how these results would differ from those obtained in **(b)((i)**.

.....

.....

.....

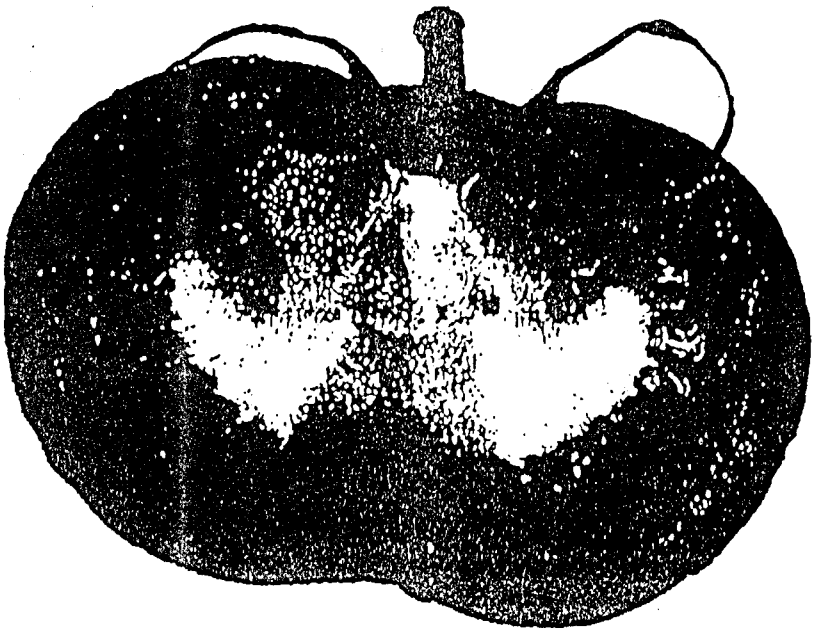
.....

.....[3]

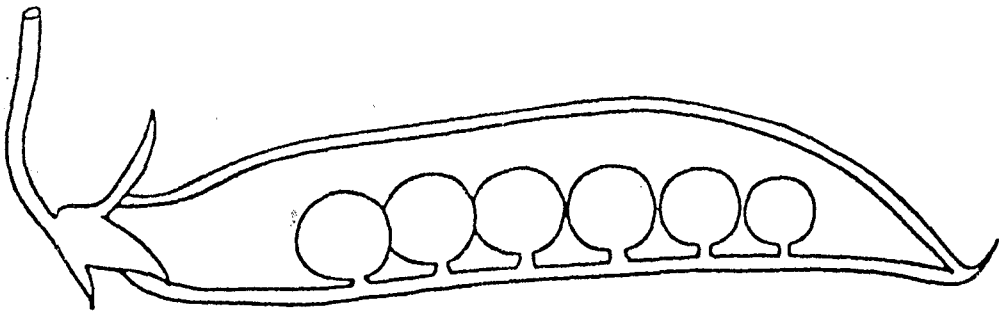
[Total : 15]

Examiner's Use

4 The photograph **A** and the diagram **B** in Fig. 4.1 show vertical sections through two different fruits.



A scale x2



B scale x1.5

Fig. 4.1

(a) (i) On Fig. 4.1, label the remains of the stigma and sepals of fruit **B**. [2]

(ii) Shade in the fruit wall of **B** to show the thickness of this structure. [1]

(b) Complete the table to show three **visible** differences between the fruits **A** and **B**.

	A	B
1		
2		
3		

[3]

For Examiner's Use

(c) The mass of 30 individual fruits, similar to B, from a kilogram of freshly gathered fruits was measured and recorded.

(I) In the table below, record the number of fruits in each group of masses, using tally marks. One example has been completed for you.

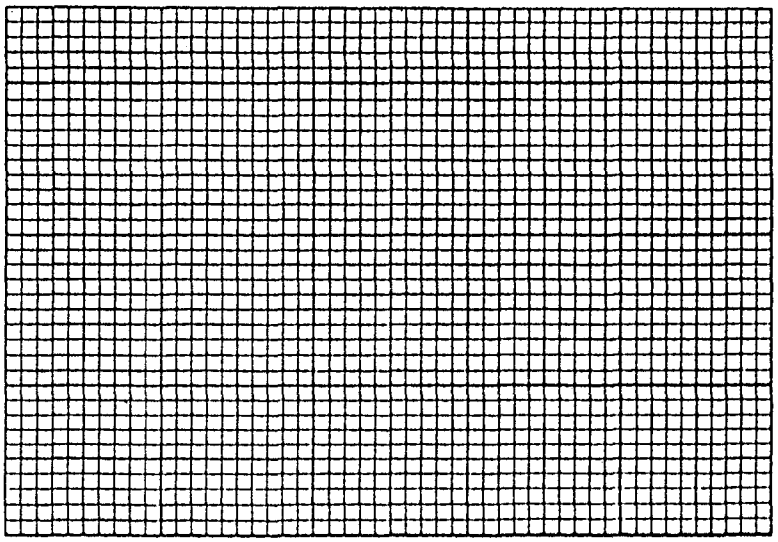
mass of individual fruits (g)

5.31; 4.61; 4.67; 4.67; 5.09; 6.22; 3.94; 4.48; 3.94; 4.94;
6.23; 4.94; 2.87; 4.41; 5.80; 6.13; 5.13; 5.85; 5.36; 4.35;
4.46; 5.10; 6.65; 4.39; 5.47; 6.17; 5.23; 5.98; 4.43; 6.34.

group by mass (g)	number of fruits
0–3.49	
3.50–3.99	
4.00–4.49	𝍸 I
4.50–4.99	
5.00–5.49	
5.50–5.99	
6.00–6.49	
6.50–6.99	

[2]

(II) On the grid below, present the data you have recorded to show the frequency distribution of the masses.



[4]

(III) State the type of variation shown by the data.

.....[1]

[Total : 13]

Centre Number	Candidate Number

Candidate Name _____

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE

BIOLOGY 0610/6

PAPER 6 Alternative to Practical
OCTOBER/NOVEMBER SESSION 2001 1 hour

Candidates answer on the question paper.
No additional materials are required.

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page.
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Write your answers in the spaces provided on the question paper.
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INFORMATION FOR CANDIDATES

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FOR EXAMINER'S USE	
1	
2	
3	
4	
TOTAL	

This question paper consists of 10 printed pages and 2 blank pages. 168

[Turn over

1 Fig. 1.1 shows a strip of 'Irish' potato tuber, **A**, immersed in water.

Fig. 1.2 shows a similar strip, **B**, in a concentrated sugar solution. Both strips are fixed to a support at one end and have identical masses firmly attached to the other end.

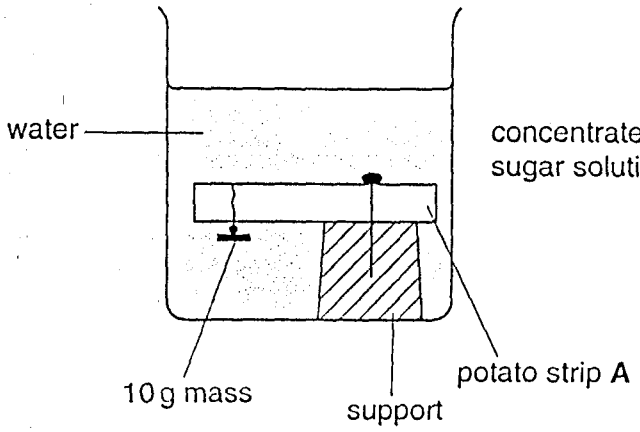


Fig. 1.1

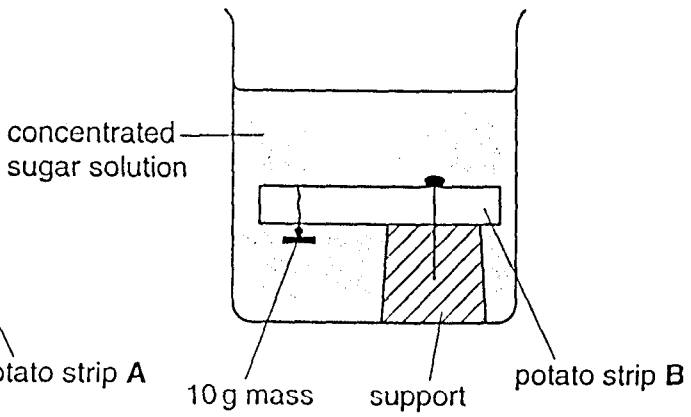
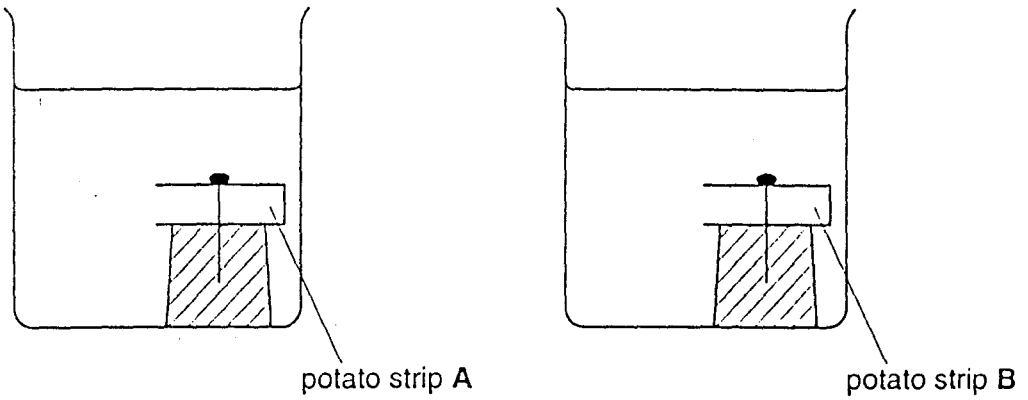


Fig. 1.2

(a) (i) Complete the diagrams below to show how the potato strips would appear after the apparatus had been left for five hours.



[2]

(ii) Explain what has happened to potato strip **B**.

.....

.....

.....

.....

.....

.....[4]

(iii) Sketch a single cell from potato strip B as it might appear when viewed under the microscope. Labels are **not** required.

[1]

(b) Describe what would happen to red blood cells if they were placed in water for five hours. Explain your answer.

.....

.....

.....

.....

.....[3]

[Total : 10]

2 Fig. 2.1 shows the external features of a five-year old cod.

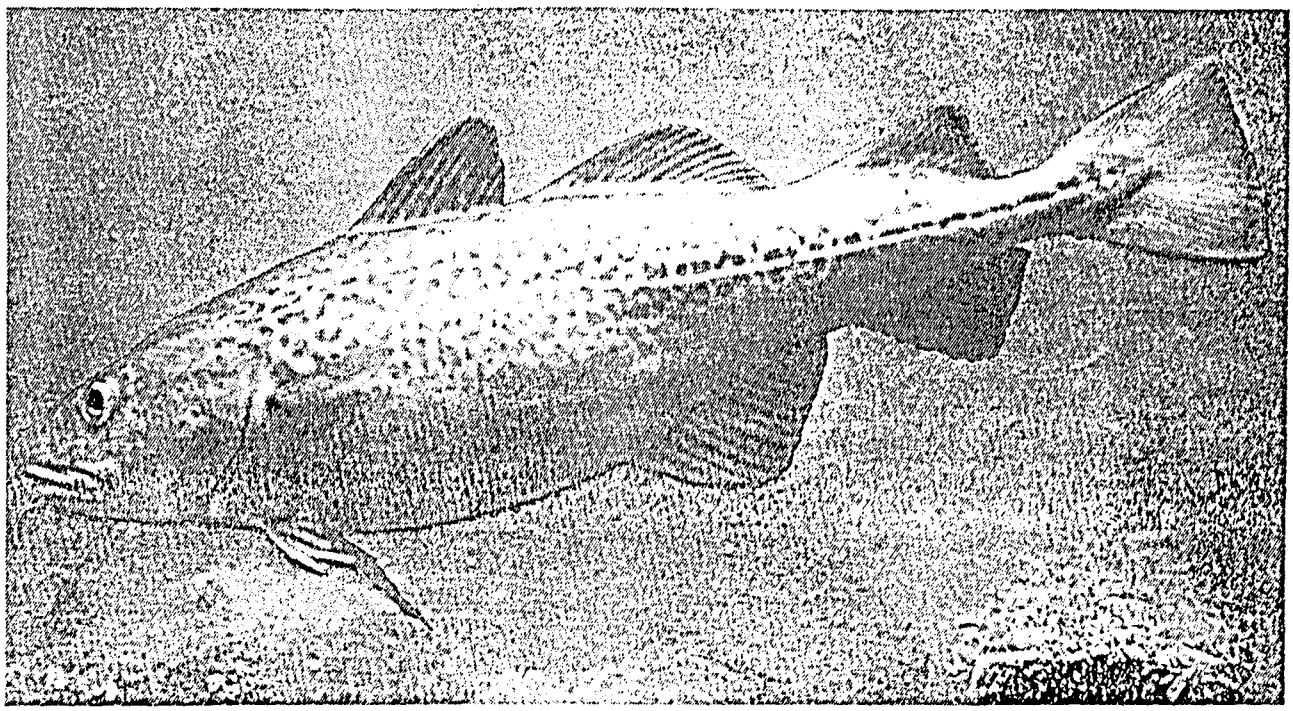


Fig. 2.1

(a) (i) In the space below, make a drawing to show the main external features of the cod. Your drawing should be as large as the fish shown in Fig. 2.1. Do **not** shade your drawing.

[4]

(ii) Label, with the letters **X** and **Y**, **two** external features on your drawing that show that the cod is adapted for movement in an aquatic environment. [2]

(iii) Explain the roles of **X** and **Y** in the process of movement.

X .....

.....

Y .....

.....[2]

(iv) Indicate clearly on your drawing where the structures that carry out gaseous exchange are located. [1]

(b) A five-year old cod measures 70 cm in length.

Measure the length of the fish in Fig. 2.1.

length .....

Calculate the magnification of Fig. 2.1. Show your working.

magnification .....[2]

[Total : 11]

3 Four similar leaves were removed from the lower branches of a tree and a piece of thread was attached to each leaf stalk (petiole), as shown in Fig. 3.1. A thin, waterproof covering of Vaseline was applied to the leaf surfaces, as shown below, and over the exposed end of each leaf stalk.

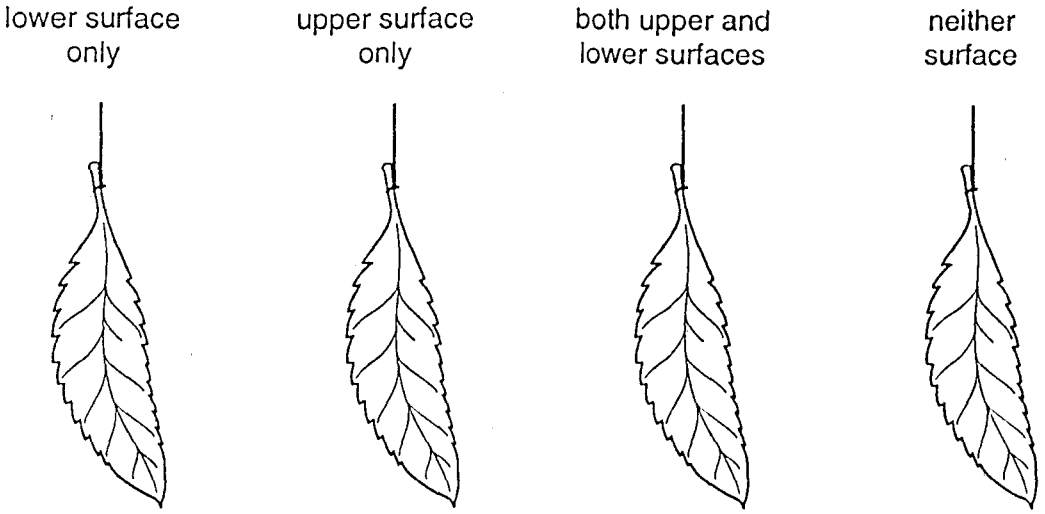


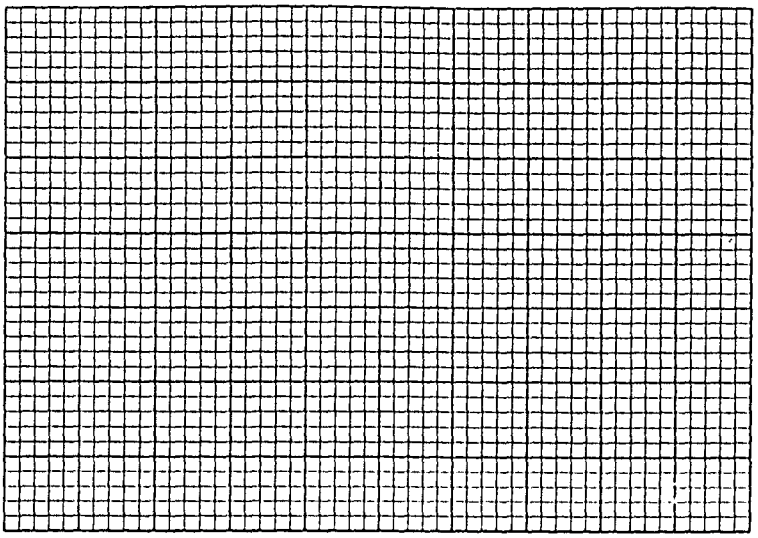
Fig. 3.1

Each leaf was then weighed and its mass was recorded.
The leaves were suspended from stands to allow air to circulate freely.
The mass of each leaf was recorded every 2 hours, as shown in Table 3.1.

Table 3.1

surface to which Vaseline was applied	mass (g)				
	0 hours	2 hours	4 hours	6 hours	8 hours
lower surface only	6.8	6.7	6.6	6.6	6.5
upper surface only	6.9	6.2	5.8	5.5	5.3
both surfaces	7.0	7.0	6.9	6.8	6.8
neither surface	6.5	5.8	5.1	4.9	4.7

(a) On the grid below, plot mass against time for each leaf. The four sets of data should be plotted on the same axes. Each curve should be distinct and clearly labelled.



[4]

(b) (i) Calculate which leaf lost the most mass.

.....[1]

(ii) Explain how this loss of mass occurred.

.....

.....

.....

.....[3]

(iii) Describe a simple procedure to investigate why the leaf Vaselined only on the lower surface still lost mass.

.....

.....

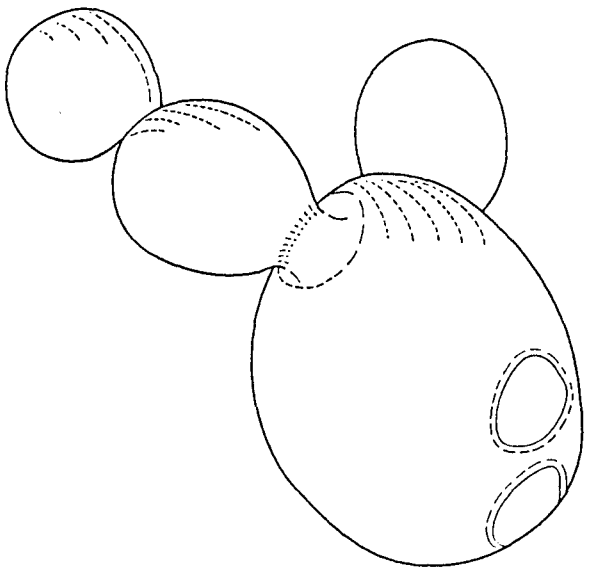
.....

.....

.....[3]

[Total : 11]

4 Under suitable conditions, yeast cells grow and produce daughter cells so rapidly that they form short chains or clumps, as shown in Fig. 4.1.



(x7100)

Fig. 4.1

(a) Name the process that results in the formation of new cells, as shown in Fig. 4.1.

.....[1]

(b) (i) Suggest two requirements for the rapid growth of yeast.

1. .....

2. .....[2]

(ii) When yeast grows, it produces a gas.

Draw a labelled diagram of the apparatus that you might use to collect this gas.

175

(iii) Describe a simple test to identify the gas collected and the result you would expect.

.....

.....

.....

.....[2]

[Total : 8]

Centre Number	Candidate Number

Candidate Name _____

International General Certificate of Secondary Education
CAMBRIDGE INTERNATIONAL EXAMINATIONS

BIOLOGY 0610/6

PAPER 6 Alternative to Practical

MAY/JUNE SESSION 2002
1 hour

Candidates answer on the question paper.
No additional materials are required.

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page.
Answer **all** questions.
Write your answers in the spaces provided on the question paper.
Use a sharp pencil for your drawings. Coloured pencils or crayons should **not** be used.

INFORMATION FOR CANDIDATES

The intended number of marks is given in brackets [ ] at the end of each question or part question.

FOR EXAMINER'S USE	
1	
2	
3	
4	
TOTAL	

This question paper consists of 10 printed pages and 2 blank pages.

177

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

[Turn over

1 A 15 cm length of Visking tubing was knotted at one end to make a small tube. A 10 cm^3 sample of a mixture of active yeast in 2% sucrose solution was placed in the tube and the tube was knotted at the top. The tube was suspended in a small beaker containing limewater, as shown in Fig. 1.1. The apparatus was left for 30 minutes at room temperature (22 °C) and then observed.

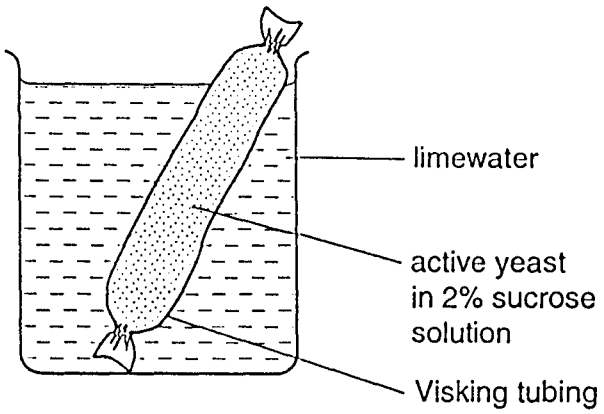


Fig. 1.1

(a) (i) Suggest what changes you might expect to observe in the contents of the tube and the beaker.

.....

.....

.....

.....[3]

(ii) State the metabolic process responsible for these changes.

.....[1]

(b) A similar apparatus was set up but the limewater was replaced by distilled water. The apparatus was left at room temperature for one hour.

The contents of the Visking tubing and the beaker were tested using both the biuret test for protein and Benedict's test for reducing sugar.

The results of the biuret test are shown in Table 1.1 and the conclusions from the Benedict's test are shown in Table 1.2.

Table 1.1

	colour after biuret test
tube contents	purple
beaker contents	blue

Table 1.2

	conclusion after Benedict's test
tube contents	reducing sugar present
beaker contents	reducing sugar present

(i) Suggest an explanation for the result of the biuret test on the contents of the beaker.

.....

.....

.....[2]

(ii) What colour would have been observed in the Benedict's test for reducing sugar?

.....[1]

(iii) Suggest an explanation for the presence of reducing sugar in the beaker after one hour, when none was present in the original mixture of active yeast and sucrose.

.....

.....

.....

.....[3]

[Total : 10]

2 Fig. 2.1 shows a group of invertebrates found living on the land. Other members of the same group occur in aquatic habitats, both freshwater and saltwater.

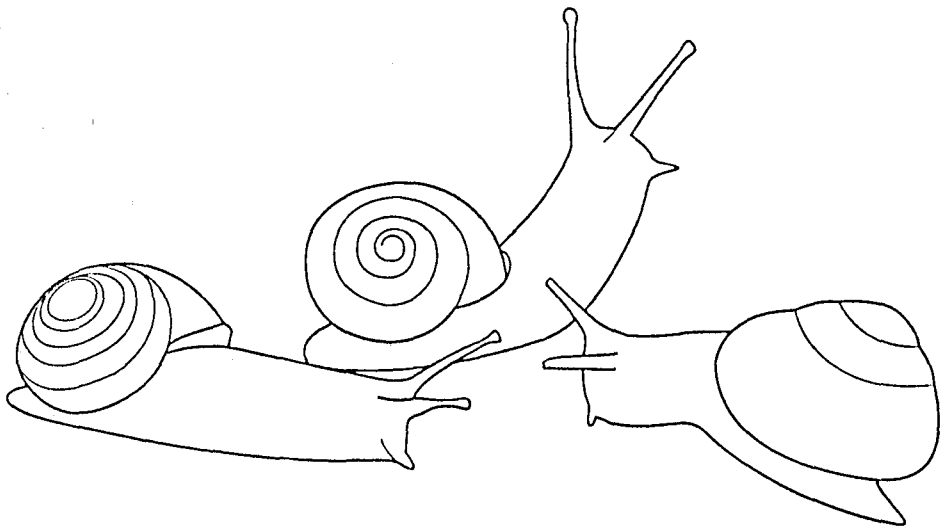


Fig. 2.1

(a) Make a large, clear drawing of one of these invertebrates to show the main features that enable you to classify it. Label **two** of these distinguishing features.

[5]

(b) Name the group to which these invertebrates belong.

.....[1]

[Total : 6]

For Examiner's Use

3 (a) Fig. 3.1 shows a bean seedling with its root system. When transplanting young seedlings, care has to be taken of the delicate root system.

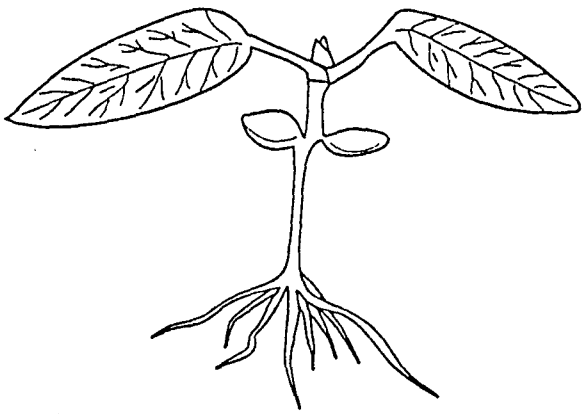


Fig. 3.1

(i) Describe the appearance, shortly after transplanting, of a similar seedling whose roots had been damaged;

.....

.....

whose roots had **not** been damaged.

.....

.....[2]

(ii) State two visible reasons for identifying the young seedling shown in Fig. 3.1 as a dicotyledon.

1. .....

2. .....[2]

Question 3 continues on the next page.

Seedlings were grown in two plots, one in full sun and the other in shade.

(b) One leaf was removed from a plant growing in the shade, placed on a piece of graph paper and an outline of this leaf drawn, as shown in Fig. 3.2.

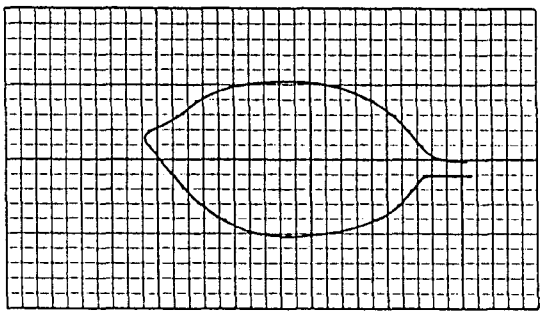


Fig. 3.2

Explain how you would determine the area of this leaf.

.....

.....

.....

.....[2]

Table 3.1 shows the leaf area of seedlings from both plots.

Table 3.1

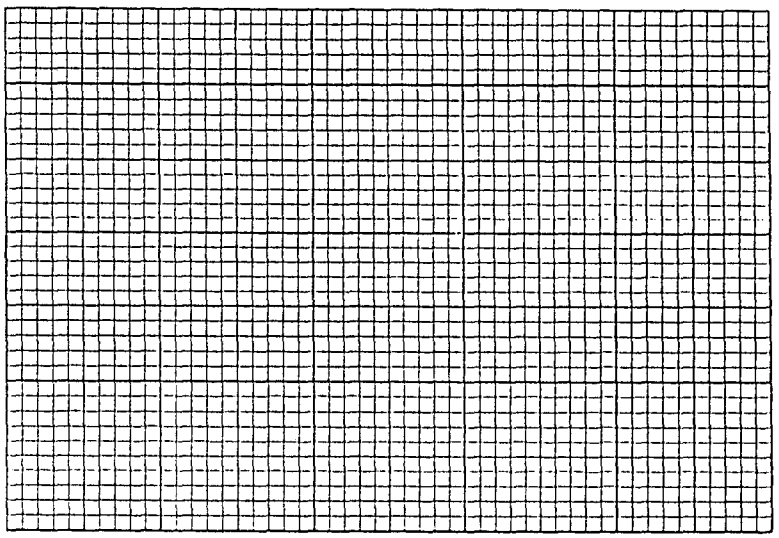
leaf area in cm^2 for leaves from plot in shade	leaf area in cm^2 for leaves from plot in full sun
6.0, 4.5, 4.3, 5.0, 5.5, 5.4, 4.9, 5.2, 5.6, 4.6, 4.4, 5.1, 4.5, 5.4	3.5, 2.8, 3.1, 3.4, 2.7, 4.2, 3.6, 3.6, 3.3, 3.1, 2.9, 4.5, 3.8, 3.9

(c) (i) Arrange these two sets of leaf area data into classes, using the tally chart below. One entry has been completed for you.

class size in cm^2	leaf area in cm^2 from shaded plot	leaf area in cm^2 from sunlit plot
2.5 – 2.9		
3.0 – 3.4		
3.5 – 3.9		
4.0 – 4.4		
4.5 – 4.9		
5.0 – 5.4		
5.5 – 5.9		
6.0 – 6.4		

[2]

(ii) Draw a histogram to show the range of leaf area in classes from the two plots. Distinguish carefully between the two sets of leaf area data.



[5]

(d) (i) Plant leaves expand as they grow, increasing in area.

Suggest how you would ensure that the differences in leaf area were due to differences in light intensity at the two plots, given that all other environmental factors were identical.

.....

.....[1]

(ii) What advantage is there for the plants in the shade having larger leaves than the plants in full sun?

.....

.....[1]

[Total : 15]

4 Fig. 4.1 shows an apparatus used to measure the volume of air in lungs.

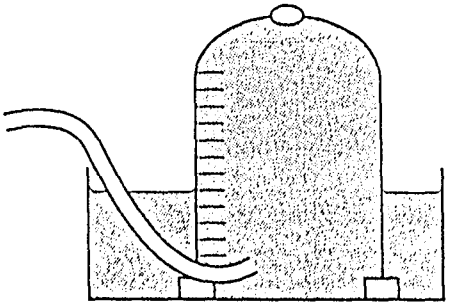


Fig. 4.1

(a) Describe how this apparatus could be used to measure the lung volume of a student.

.....

.....

.....

.....

.....[3]

(b) It is found that the lung volumes of different students of the same age vary.

Suggest three factors that may influence the lung volumes of such individuals.

1. .....

2. .....

3. .....[3]

(c) It is known that exhaled air contains more carbon dioxide than inhaled air.

Describe an experiment that would show this statement is correct. You may find it helpful to include a diagram in your answer.

.....

.....

.....

.....

.....[3]

[Total : 9]

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Centre Number	Candidate Number

Candidate Name _____

International General Certificate of Secondary Education
CAMBRIDGE INTERNATIONAL EXAMINATIONS

BIOLOGY 0610/6

PAPER 6 Alternative to Practical

OCTOBER/NOVEMBER SESSION 2002

1 hour

Candidates answer on the question paper.
No additional materials are required.

TIME 1 hour

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of this page.
Answer **all** questions.
Write your answers in the spaces provided on the question paper.
Use a sharp pencil for your drawings. Coloured pencils or crayons should **not** be used.

INFORMATION FOR CANDIDATES

The intended number of marks is given in brackets [ ] at the end of each question or part question.

FOR EXAMINER'S USE	
1	
2	
3	
4	
TOTAL	

This question paper consists of 11 printed pages and 1 blank page.

SP (AT/JG) S21867/3

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

1 (a) Fig. 1.1 shows a potato plant and one flower and one tuber are shown in detail.

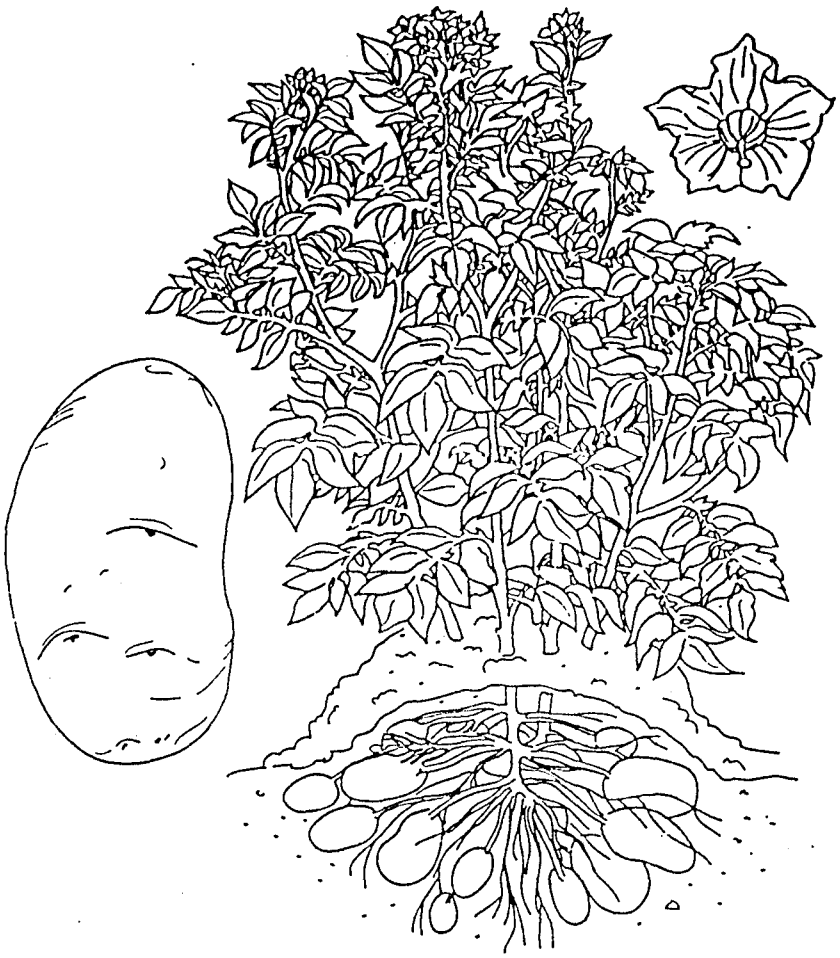


Fig. 1.1

(i) Make large, labelled drawings of the tuber and the flower shown in detail.

(ii) State the type of reproduction carried out by the tuber and the flower.

tuber .....

flower ..... [1]

(b) Humans use the potato tubers as a source of food. The main food component is a complex carbohydrate, starch.

Fig. 1.2 shows some starch grains found inside the cells of tubers.

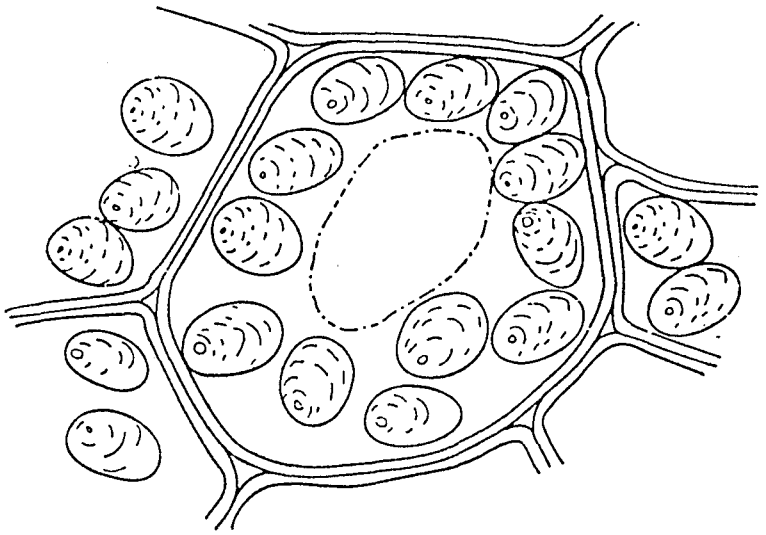


Fig. 1.2

(i) Determine the length of one starch grain in mm, given that the cells are magnified 860 times.
Show your working.

length of starch grain ..... mm [2]

(ii) Name the metabolic process by which plants make carbohydrate.

.....[1]

For Examiner's Use

(iii) Describe an experiment you could carry out to show the formation of starch in a green plant.

.....

.....

.....

.....

.....

.....[4]

[Total : 12]

192

For Examiner's Use

2 Ascorbic acid (vitamin C) is found in fresh fruits and vegetables. The amount in a known quantity of fruit juice can be determined by decolourising a blue dye, DCPIP.

(a) Students were provided with 0.1% ascorbic acid solution (0.1 g ascorbic acid in 100 cm^3 water) and 0.1% freshly prepared DCPIP solution.

1 cm^3 DCPIP was placed in a clean test-tube. The ascorbic acid was added, using a graduated pipette, until the blue colour disappeared.

The test was carried out five times and the results are shown in Table 2.1.

Table 2.1

test	volume of ascorbic acid (cm^3)
1	1.5
2	1.0
3	1.1
4	0.9
5	1.0
average	

(i) Complete Table 2.1 by calculating the average (mean) value of the data. [1]

(ii) Examine the data in Table 2.1.

Suggest a more reliable average value, stating a reason for your answer.

.....

.....[2]

(b) The test was repeated on a range of different fruit juices using 1 cm^3 of DCPIP each time.

Fig. 2.1 shows the results of these tests. Each graduated pipette originally contained 1 cm^3 of a different fruit juice.

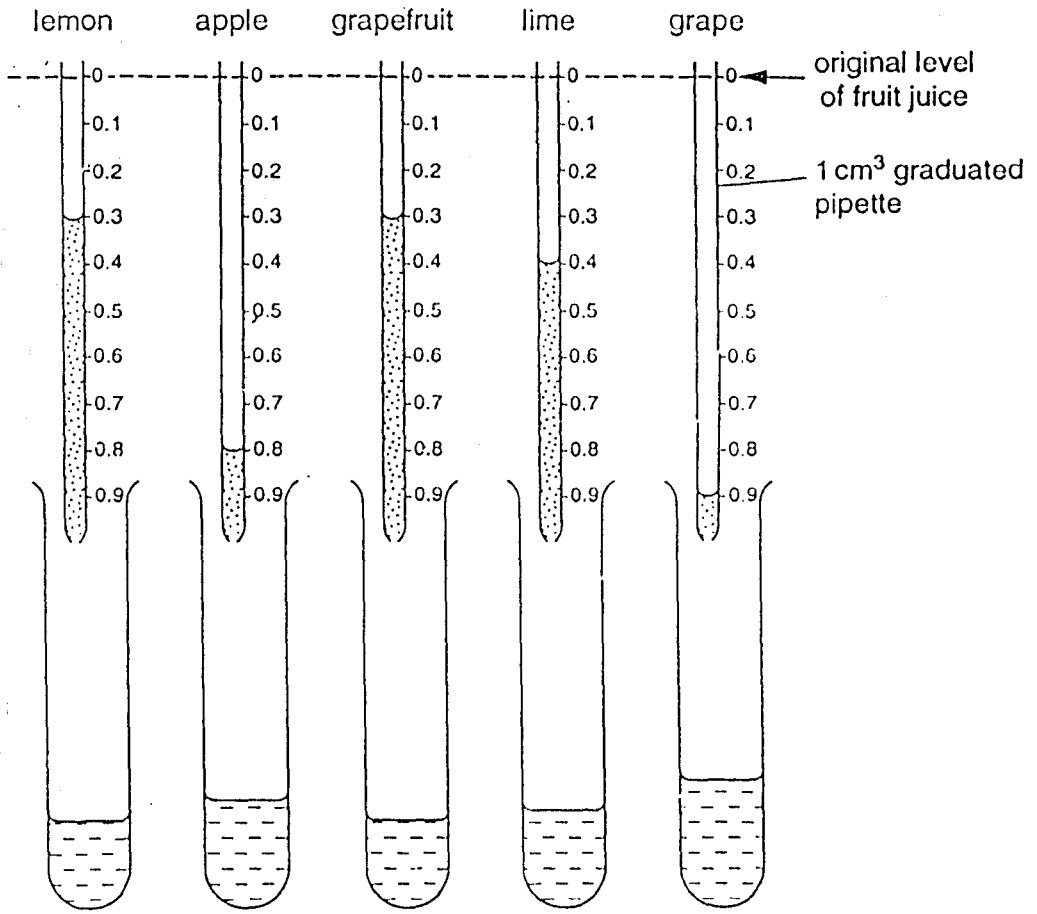


Fig. 2.1

In Table 2.2,

(i) record the volumes of fruit juice needed;

(ii) calculate and record the amount of ascorbic acid in each fruit juice using the formula

$\frac{n}{p}$ = concentration of ascorbic acid in a fruit juice in g per cm^3

where,

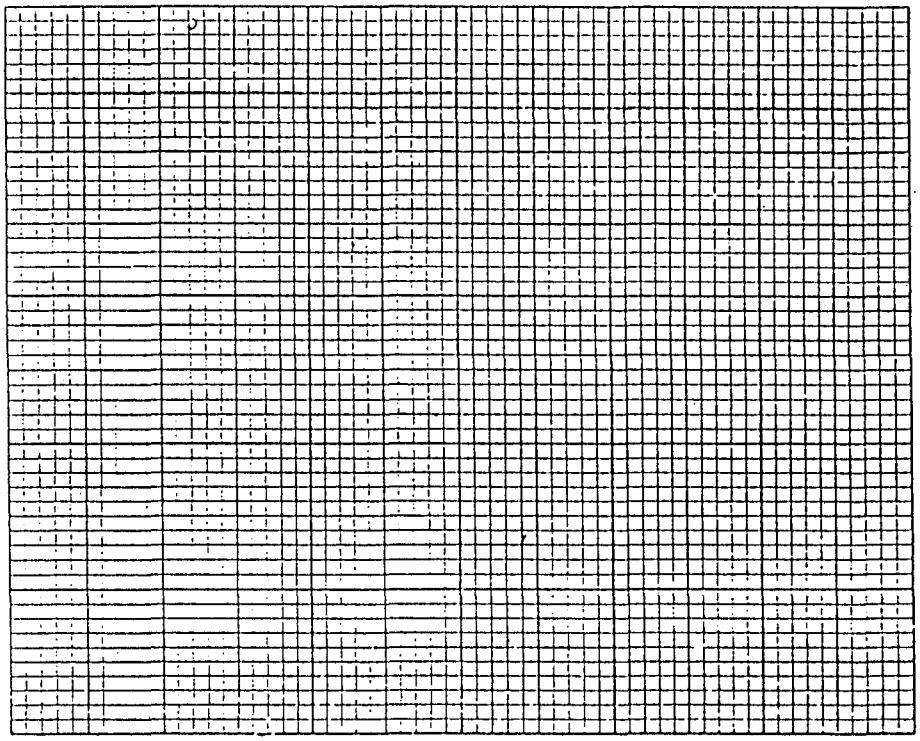
n = volume of ascorbic acid from (a)(ii);
p = volume of fruit juice needed to decolourise DCPIP.

Table 2.2

type of juice	lemon	apple	grapefruit	lime	grape
volume of juice used to decolourise DCPIP = p cm^3					
$\frac{n}{p}$ = g of ascorbic acid					

[5]

(iii) On the grid, show your results in an appropriate form to compare the ascorbic acid content of the five fruit juices.



[4]

(c) The concentration of ascorbic acid (vitamin C) is highest in **fresh** fruit juices.

Describe a simple investigation you could carry out to show the effect of storage on the ascorbic acid content of one of the five fruit juices.

.....

.....

.....

.....

.....

..... **195**

[Total : 15]

[Turn over

Examiner's Use

3 If your teeth are not cared for and cleaned regularly, plaque may build up.

(a) Fig. 3.1 shows, in outline, some human front teeth.

Carefully shade in the areas where plaque would be found.

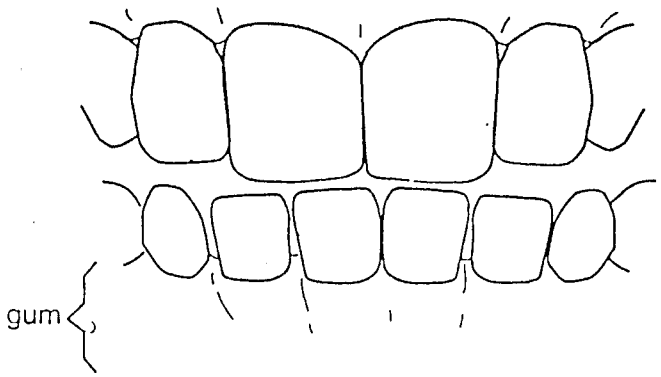


Fig. 3.1 [2]

(b) Plaque is acidic and can damage the enamel of the teeth.
A sample of plaque was removed from the teeth and the pH determined using a pH meter.
Fig. 3.2 shows the dial on the pH meter.

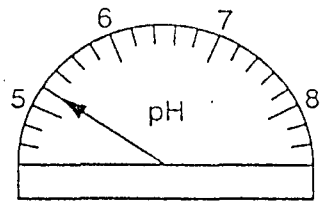


Fig. 3.2

(i) What is the pH reading? ..... [1]

(ii) Suggest an alternative way by which you could determine the pH of a similar sample of plaque and the observation you would expect to make.

.....

.....

.....

.....[2]

196

Examiner's Use

(c) Bacteria play an active part in causing tooth decay and in the formation of plaque.

Suggest **one** way in which you could show that these bacteria are living organisms.

.....

.....

.....

.....

.....

.....

.....[3]

[Total : 8]

For Examiner's Use

4 Figs. 4.1 and 4.2 show two samples of human blood cells as seen using a light microscope.

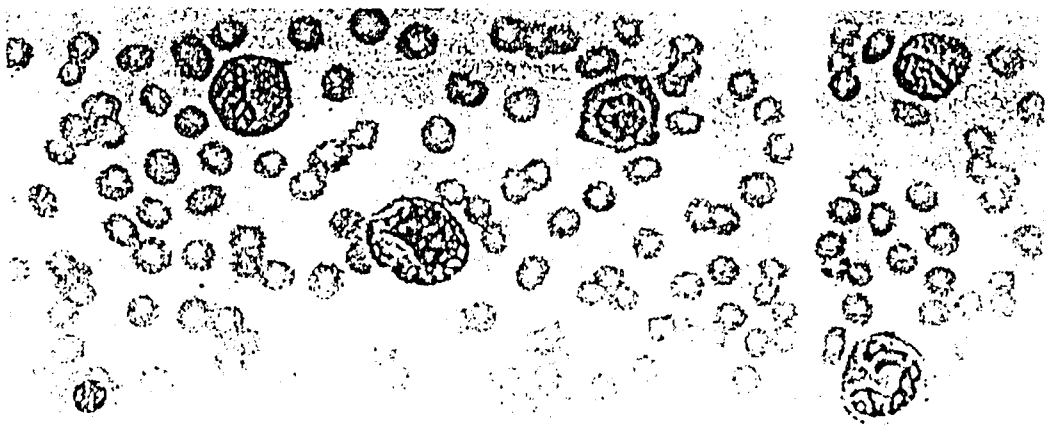


Fig. 4.1

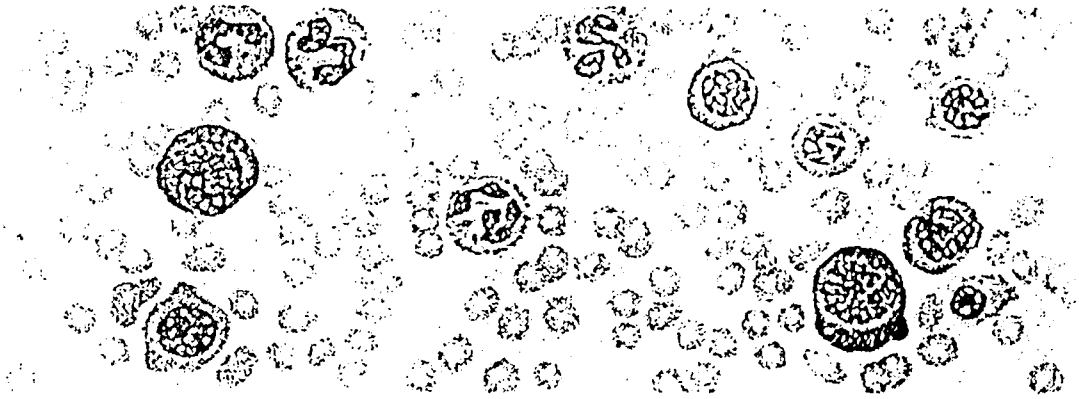


Fig. 4.2

(a) State how you would determine the ratio of red blood cells to white blood cells.

.....

.....[1]

(b) (i) Describe **three** differences between the samples shown in Figs. 4.1 and 4.2.

.....

.....

.....[3]

(ii) Suggest an explanation for these differences.

.....

.....[1]

[Total : 5]

198

Centre Number	Candidate Number	Name

CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

BIOLOGY **0610/06**

Paper 6 Alternative-to practical

May/June 2003

1 hour

Candidates answer on the Question Paper.
No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Centre Number, Candidate Number and Name on all the work you hand in.
Write in dark blue or black pen in the spaces provided on the Question Paper.
You may use a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer all questions.
The number of marks is given in brackets [ ] at the end of each question or part question.

If you have been given a label, look at the details. If any details are incorrect or missing, please fill in your correct details in the space given at the top of this page.

Stick your personal label here, if provided.

For Examiner's Use	
1	
2	
3	
4	
TOTAL	

This document consists of 9 printed pages and 3 blank pages. 199

UNIVERSITY of CAMBRIDGE
Local Examinations Syndicate

[Turn over

1 Three different dough mixtures, samples **A**, **B** and **C** are prepared using the same quantity of flour and water. Each sample of dough is carefully mixed, kneaded, shaped and placed in separate measuring cylinders and kept in a warm place.

Sample **A** contains warm water, sugar, flour and yeast.
Sample **B** contains warm water, sugar and flour.
Sample **C** contains warm water, sugar, flour, yeast, and substance **X**.

The highest level of the dough is marked on the side of each measuring cylinder, as shown in Fig. 1.1.

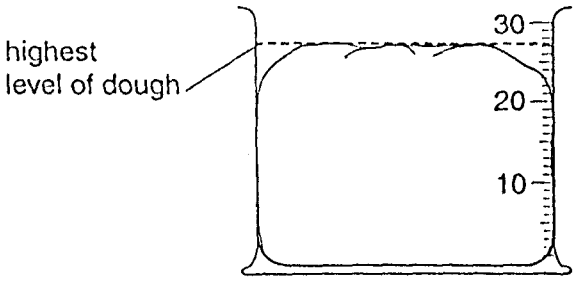


Fig. 1.1

(a) Suggest **two** other factors which should be kept constant to ensure that the results for the samples can be compared.

1. .....

2. .....[2]

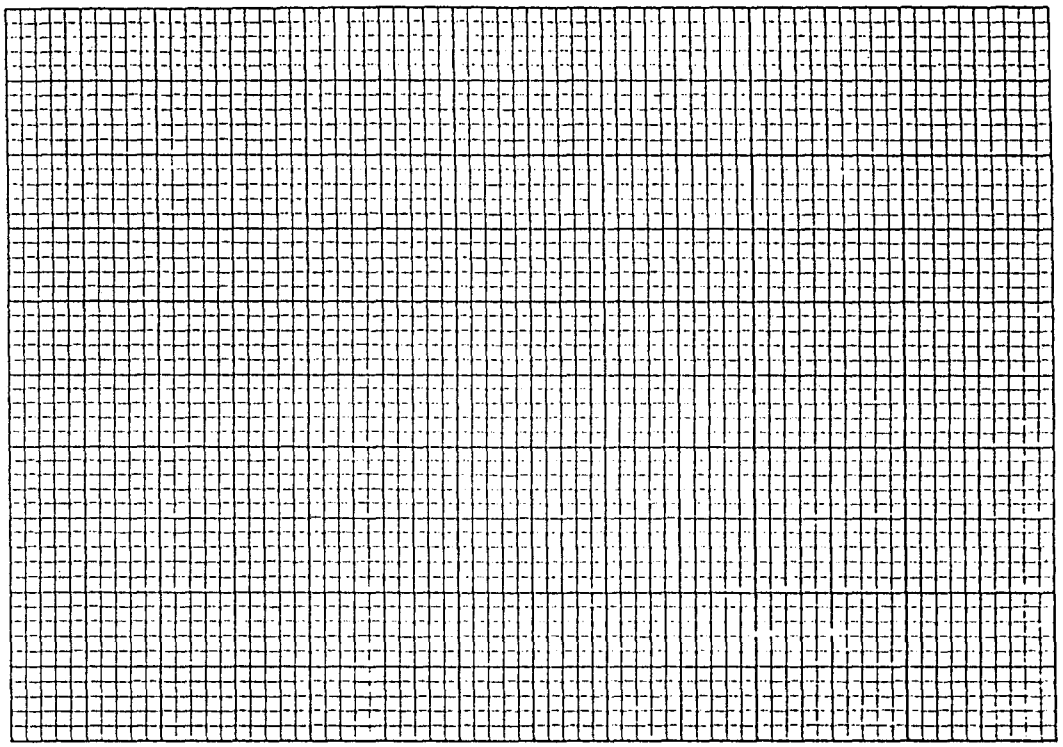
(b) At 20 minute intervals, the volume of each dough sample is measured and recorded. The results are shown in Table 1.1.

Table 1.1

time / min	volume of dough / cm^3		
	sample A	sample B	sample C
0	12	12	12
20	18	12	20
40	26	12	32
60	34	13	41
80	39	13	48
100	45	13	48
120	48	14	48

(i) On the grid opposite, plot the data shown in Table **1.1** for samples **A**, **B** and **C** as three curves on one set of axes.

200



[5]

(ii) Describe the curves you have drawn for the three samples.

.....

.....

.....

.....

.....[3]

(iii) Use your graph to find when there is the greatest difference in volume between samples **A** and **C**.

.....[1]

(iv) The volume of sample **A** changed differently to the volume of sample **B**. Suggest an explanation for this difference.

.....

.....

.....

.....[2]

(v) The volume of sample **A** changed differently to the volume of sample **C**. Suggest an explanation for this difference.

.....

.....

.....

.....[2]

[Total : 15]

For Examiner's Use

2 Fig. 2.1 shows three stages in the germination of a grain of maize.

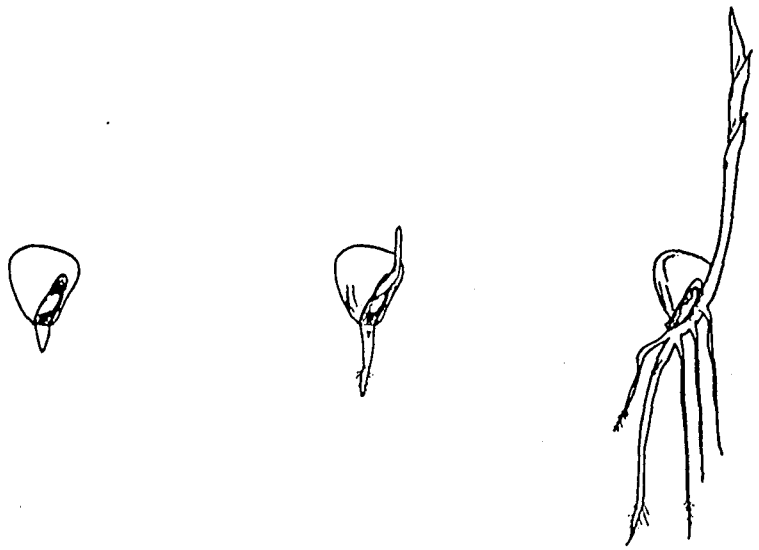


Fig. 2.1

(a) Name two conditions that are necessary for the successful germination of a seed, other than the presence of water.

1. ..... 2. .....[1]

(b) Describe an investigation that you could carry out to show the need in seed germination for one of the conditions you named in (a).

.....

.....

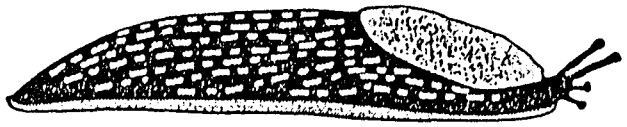
.....

.....

.....[3]

[Total : 4]

3 Fig. 3.1 shows the external appearance of animal A.



animal A

Fig. 3.1

(a) (i) Make a large, labelled drawing of animal A.

Label **two** features that are characteristic of this group of animals.

[4]

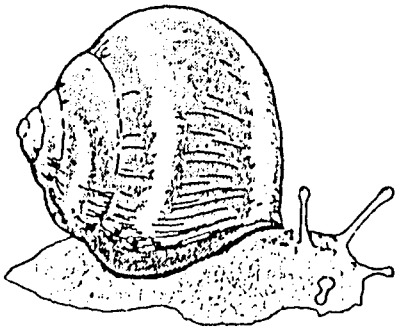
(ii) Measure the length of animal A in Fig. 3.1 and in your drawing. Calculate the magnification of your drawing.

length of animal A: in Fig. 3.1 .....

in drawing .....

magnification .....[2]

Fig. 3.2 shows the external appearance of animal B, which is classified in the same group as animal A.



animal B

Fig. 3.2

(iii) State one similarity which indicates that these two animals are classified in the same group and state one difference between them.

similarity .....

difference .....[2]

(iv) Name the group to which animals A and B belong.

.....[1]

[Total : 9]

For Examiner's Use

4 The apparatus shown in Fig. 4.1 was set up under bright light for a period of five hours. At the start the apparatus was completely full of water. During this time, a gas was collected at the top of the graduated tube.

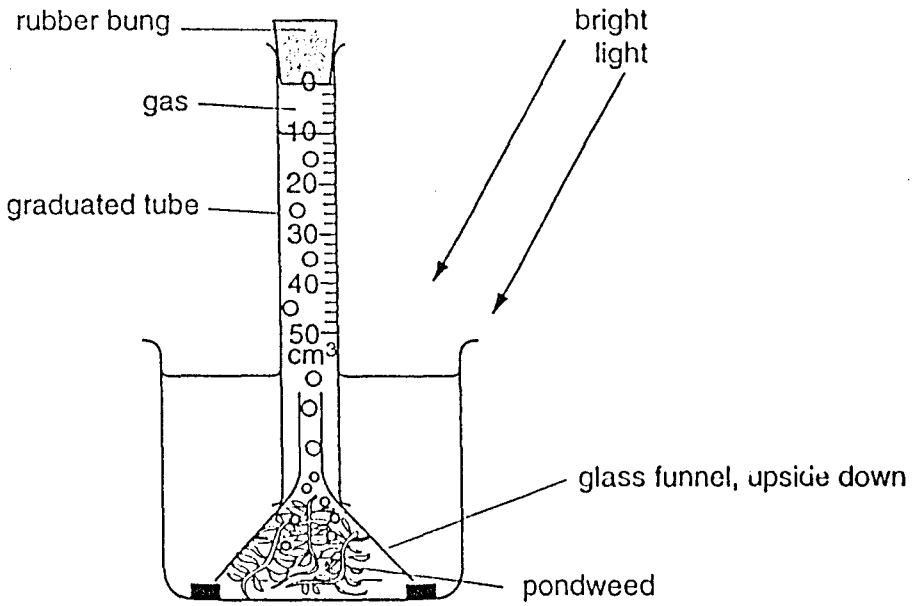


Fig. 4.1

(a) (i) How would you show this gas was oxygen?

.....[1]

(ii) Name the process within the plant responsible for the production of oxygen.

.....[1]

(iii) Determine the volume of gas collected in five hours and the rate of gas production per hour.

volume .....

rate .....[2]

(iv) How would you use this apparatus to obtain reliable results to show the effect of differing light intensities on the production of oxygen?

.....

.....

.....

.....[2]

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(b) The pondweed was placed in hydrogencarbonate indicator solution, which was red in colour when the tube was set up. The tube was left for five hours in bright light, as shown in Fig. 4.2.

(Hydrogencarbonate indicator is purple in alkaline conditions, red in neutral conditions and yellow in acidic conditions.)

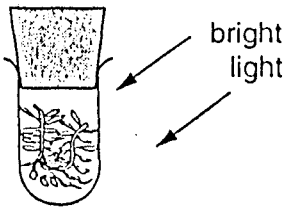

Fig. 4.2

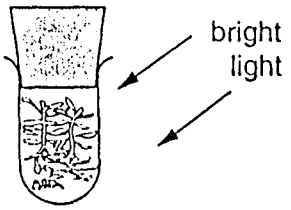

Fig. 4.3

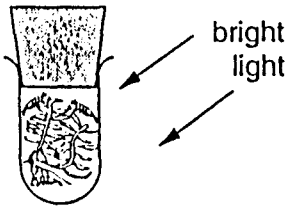

Fig. 4.4

(i) Suggest what colour you might observe in the tube in **Fig. 4.2** after five hours in bright light and give an explanation for this.

colour .....

explanation .....

.....[2]

(ii) One water shrimp was introduced into a similar tube with pondweed, **Fig. 4.3**, and, again, the tube was placed in bright light for five hours.

Suggest what colour you might observe and give an explanation for this.

colour .....

explanation .....

.....[2]

(iii) Three water shrimps were introduced into a similar tube with pondweed, **Fig. 4.4**, and, again, the tube was placed in bright light for five hours.

Suggest what colour you might observe and give an explanation for this.

colour .....

explanation .....

.....[2]

[Total : 12]

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Centre Number	Candidate Number	Name

CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

BIOLOGY 0610/06

Paper 6 Alternative to practical

October/November 2003

1 hour

Candidates answer on the Question Paper.
No additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name in the spaces provided at the top of this page.
Write in dark blue or black pen in the spaces provided on the Question Paper.
You may use a soft pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer all questions.
The number of marks is given in brackets [ ] at the end of each question or part question.

If you have been given a label, look at the details. If any details are incorrect or missing, please fill in your correct details in the space given at the top of this page.

Stick your personal label here, if provided.

FOR EXAMINER'S USE	
1	
2	
3	
TOTAL	

This document consists of 9 printed pages and 3 blank pages.

University of Cambridge
Local Examinations Syndicate

1 Warm-blooded animals need to maintain a constant internal temperature.

In cold weather some of these animals crowd closely together in a group.

To investigate the advantages of crowding together in such a group a student followed the drop in temperature of 10 cm^3 of water in a test tube.

- Test tube A was used to represent a single animal as shown in Fig. 1.1
- Test tubes B and C were used to represent part of a crowded group of animals using 7 tubes as shown in Fig. 1.2.

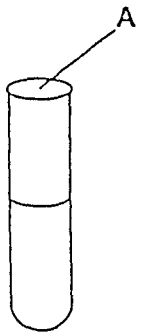


Fig. 1.1

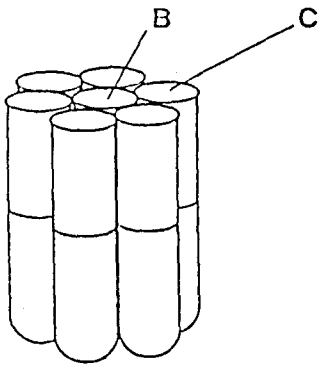


Fig. 1.2

The temperature of the tubes labelled A, B and C in Fig. 1.1 and Fig. 1.2 was measured using a thermometer, every 2 minutes for 10 minutes.

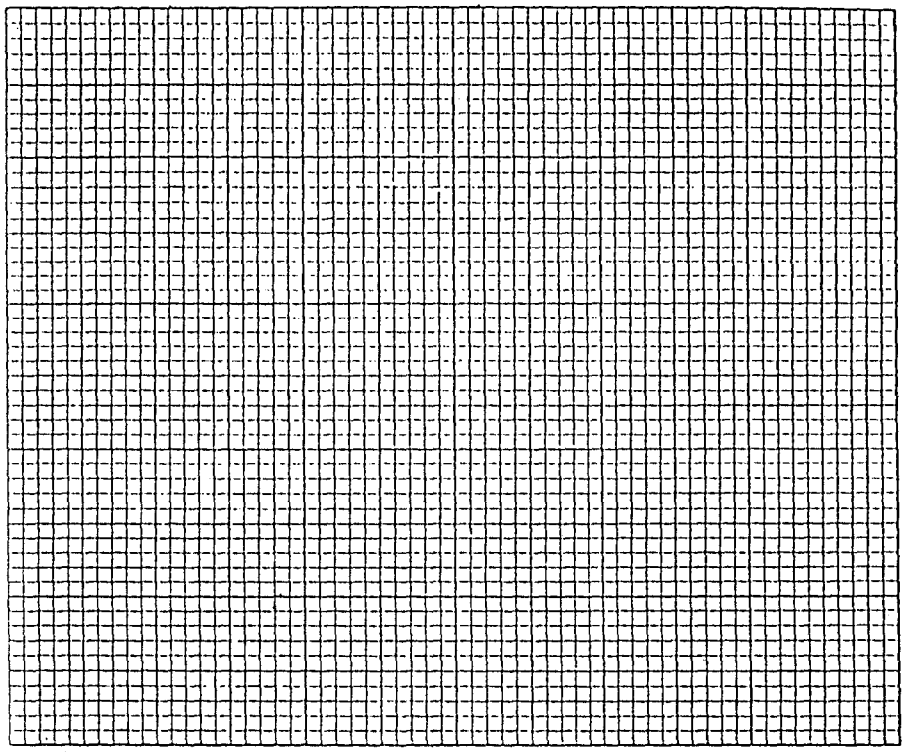
The results are shown in Table 1.1.

Table 1.1

	temperature of water in test-tubes / °C		
time / minutes	A (single test-tube)	B (tube at centre of group)	C (tube at edge of group)
0	55	55	55
2	44	54	52
4	41	54	50
6	39	53	49
8	37	52	47
10	36	52	46

For Examiner's Use

(a) (i) Plot a graph of the results to show clearly the difference between the three sets of data.



[7]

(ii) Describe the results for tube A.

.....

.....[2]

(iii) Describe the differences between the results for tube A and those for tubes B and C.

.....

.....

.....[2]

(iv) Explain how the results shown in the graph show the effect of crowding together of animals in cold conditions.

.....

.....

.....

.....

.....[2]

(b) Suggest **two** ways in which this investigation could have been improved to make the results more reliable.

.....

.....

.....

.....[2]

[Total : 15]

Examiner's Use

2 (a) (i) Fig. 2.1 shows a ground-living beetle.

Make a large drawing of the whole animal shown in Fig. 2.1. Label **three** features that enable you to classify this animal as an insect.

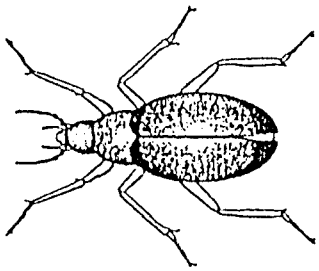


Fig. 2.1

[5]

(ii) Measure the length of the insect in Fig. 2.1 and the length of your drawing. Calculate the magnification of your drawing.

Length of insect in Fig. 2.1 .....

Length of drawing .....

Magnification .....[3]

(b) One method of estimating the population of insects, such as the ground-living beetle, is to use a pit-fall trap. A suitable container, such as an empty food tin, is set into the ground so the top is level with the surface of the soil, as shown in Fig. 2.2.

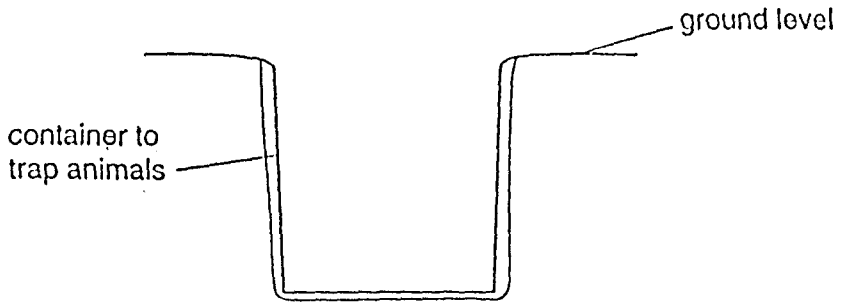


Fig. 2.2

Suggest and explain briefly two precautions that you might take when investigating populations of insects, such as ground-living beetles, using pit-falls traps.

1. .....

.....

.....

2. .....

.....

.....[4]

(c) Fig. 2.3 shows another insect.

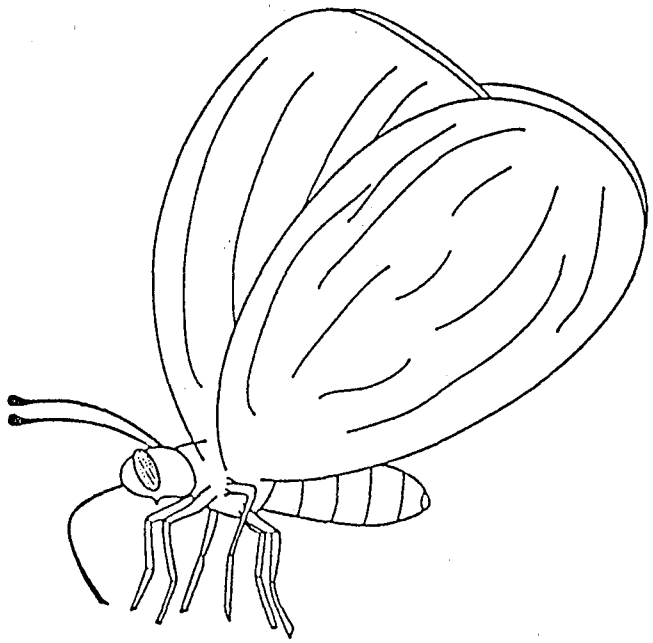


Fig. 2.3

Describe three visible differences in the structure of the insect in Fig. 2.3 from the insect in Fig. 2.1.

1. .....

.....

2. .....

.....

3. .....

.....[3]

[Total : 15]

For Examiner's Use

3 Water is lost from the aerial parts of plants by transpiration.

(a) Outline how you could show that water is lost from plant shoots.

.....

.....

.....[2]

Fig. 3.1 shows a simple apparatus to investigate the rate of transpiration by recording the mass of a potted plant over a period of time.

Fig. 3.2 shows the results over a number of hours.

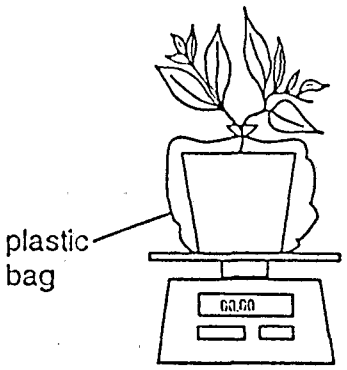


Fig. 3.1

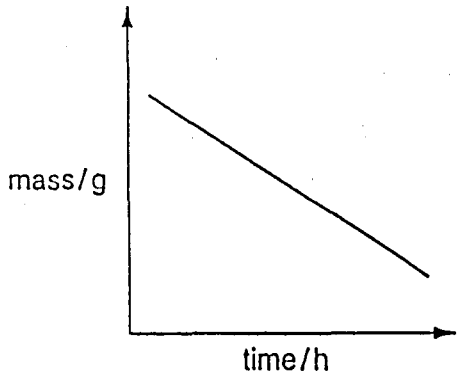


Fig. 3.2

(b) Suggest why the pot is enclosed in a plastic bag.

.....

.....[1]

(c) Describe how, using similar apparatus to that in Fig. 3.1, you could compare the transpiration rates of two different plants.

.....

.....

.....

.....

.....

.....[4]

1 Fig. 1.1 shows the appearance of a cell from the epidermis of a leaf.

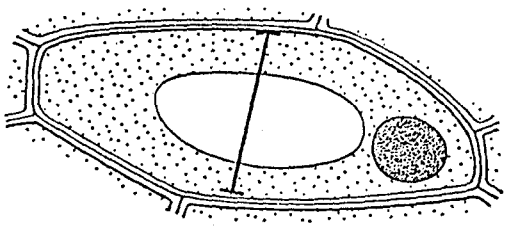


Fig. 1.1

Three similar pieces of epidermis have been placed in different solutions and left submerged for 30 minutes. One solution was pure water, another contained 1.5% sugar solution and the third 5% sugar solution.

Figs. 1.2, 1.3 and 1.4 show a cell from each of these three pieces of epidermis.

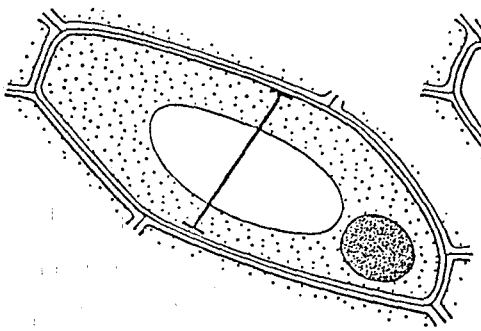


Fig. 1.2

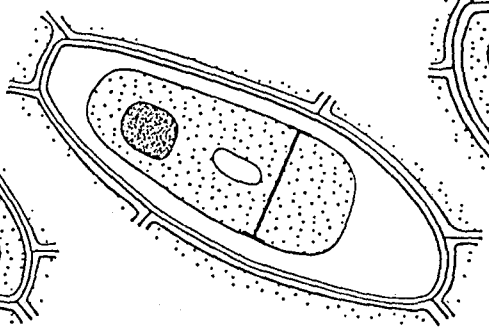


Fig. 1.3

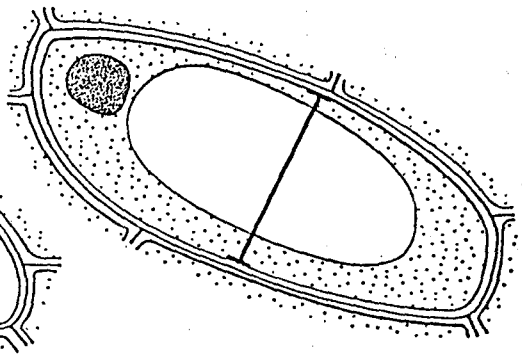


Fig. 1.4

(These cells are all drawn to the same magnification)

(a) Measure the width of the cell contents along the lines drawn across each cell.

Fig. 1.1 .....

Fig. 1.2 .....

Fig. 1.3 .....

Fig. 1.4 ..... [3]

For Examiner's Use

(b) Suggest in which solution each of the cells, in Figs. 1.2, 1.3 and 1.4, was placed and explain your choice.

Fig. 1.2 .....

explanation .....

.....

Fig. 1.3 .....

explanation .....

.....

Fig. 1.4 .....

explanation .....

.....[8]

[Total : 11]

2 Starch is broken down during digestion by an enzyme, amylase.
The test for starch uses iodine solution.
When all the starch has been completely digested, the orange brown iodine solution does not change colour.

(a) Three test tubes A, B and C each contained 5 cm^3 of 1% starch solution.

To tube **A**, 1 cm^3 of water and 2 cm^3 of 1% amylase solution were added.
The stop clock was started immediately and the mixture was stirred.
Every minute a drop was removed from the mixture and added to iodine solution on a white tile.

To tube B, 1 cm^3 of water an 2 cm^3 of boiled and cooled 1% amylase solution were added.
The same method of testing was used.

To tube **C**, 1 cm^3 of 0.5% sodium chloride solution and 2 cm^3 of 1% amylase solution were added.
The same method of testing was used.

The colours observed are shown in Table 2.1.
These investigations were carried out at room temperature.

Table 2.1

time / mins	tube **A**	tube B	tube **C**
1	black	black	black
2	black	black	dark brown
3	black	black	dark brown
4	black	black	lighter brown
5	dark brown	black	lighter brown
6	dark brown	black	orange brown
7	dark brown	black	orange brown
8	dark brown	black	orange brown
9	lighter brown	black	orange brown
10	lighter brown	black	orange brown
11	lighter brown	black	orange brown
12	lighter brown	black	orange brown
13	orange brown	black	orange brown
14	orange brown	black	orange brown
15	orange brown	black	orange brown

(i) State how long it took for the starch to be completely broken down in tubes **A** and **C**.

tube **A** ..... *tube* **C** .....[2]

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(ii) Describe the effect on the reaction of using sodium chloride solution.

.....

.....

.....[2]

(iii) State the purpose of tube B in this investigation.

.....

.....[1]

(b) In the human alimentary canal, starch is broken down by amylase. The pH of the alimentary canal varies between pH 2 and pH 8.5.

Suggest how you could investigate the effect of pH on the activity of amylase.

.....

.....

.....

.....

.....

.....

.....

.....[5]

[Total : 10]

3 Fig. 3.1 shows two joined mature *Acer* fruits.

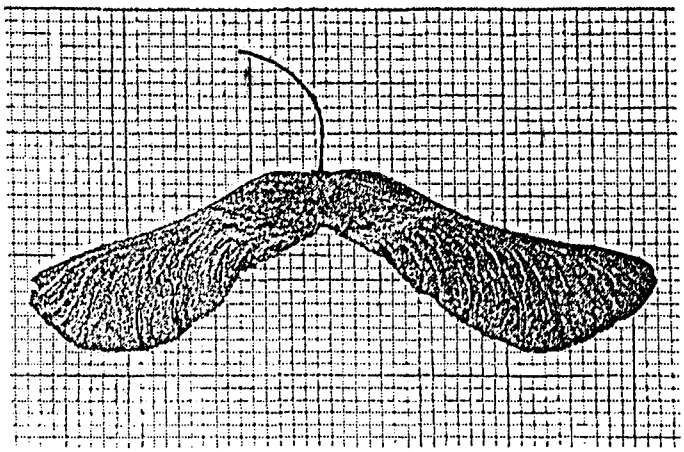

Fig. 3.1

(a) (i) Make a large drawing of **one** of these fruits in the space below.

Label the position of the seed.

[4]

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(ii) Calculate the magnification of your drawing using the maximum length of the fruit in Fig. 3.1 that you have drawn.

maximum length of your drawing of one fruit ..... cm

maximum length of the same fruit in Fig. 3.1 ..... cm

working:

magnification .....[2]

The background in Fig. 3.1 is a grid, with squares of 1 mm x 1 mm.

(iii) Determine the surface area of one of the fruits including the wing-like extension. Explain how you worked out your answer.

.....

.....

.....

.....[3]

(b) Using paper and plasticine to represent a wind dispersed fruit, such as *Acer*, it is possible to adjust the size of the wing. The effect of different wing size was investigated by dropping a model fruit with different surface areas, from the same height in the same wind conditions. The horizontal distance travelled by the model was measured. Each model fruit was dropped five times.

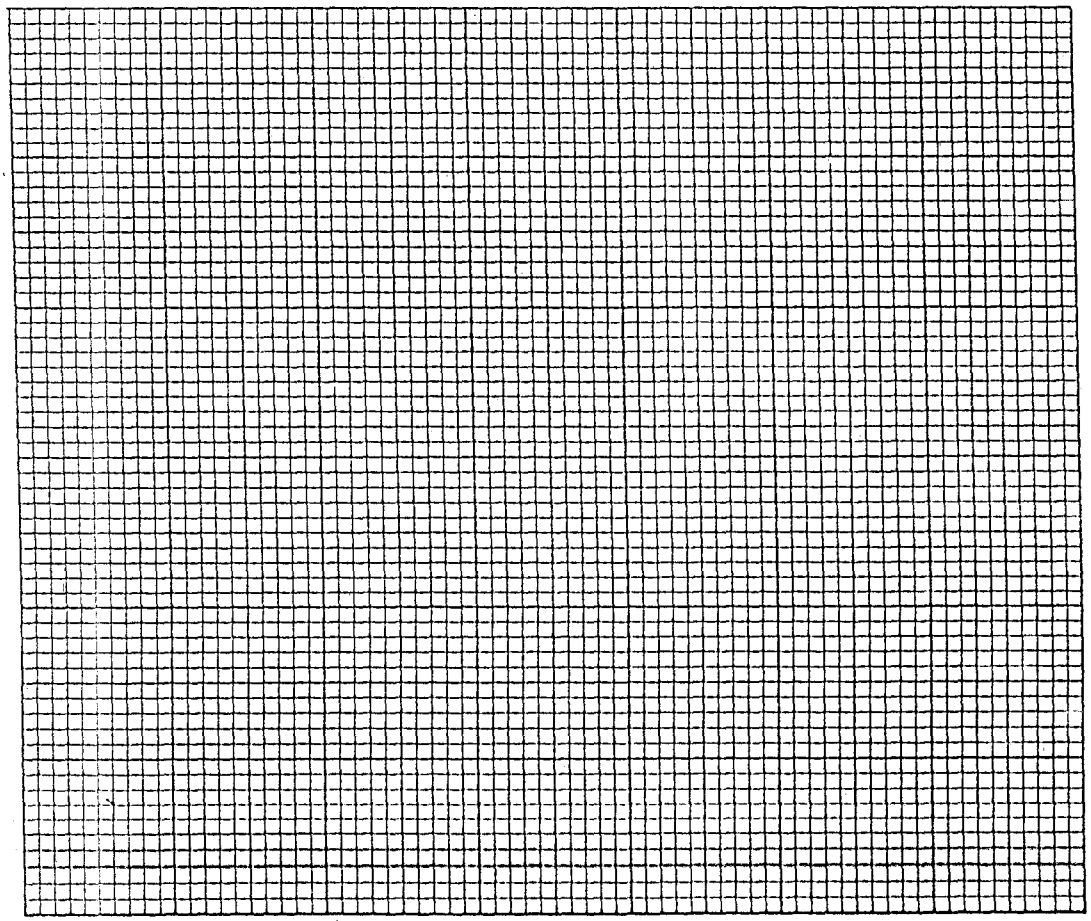
The results are shown below.

Table 3.1

surface area of wing-like extension / cm^2	distance travelled / cm					mean distance travelled / cm
	drop 1	drop 2	drop 3	drop 4	drop 5	
32	30	40	20	15	20	
64	20	30	30	25	40	
96	30	40	26	50	35	
128	45	20	40	45	65	
160	72	40	54	50	34	

(i) Complete Table 3.1 by calculating the mean (average) distance travelled by the model fruits. [2]

(ii) Plot the mean distance the model fruit travelled horizontally against the surface area of the model as a line graph. [4]



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(iii) Describe the relationship between the surface area and the mean distance travelled.

.....

.....[2]

(iv) Outline the importance of seed dispersal away from the parent plant.

.....

.....

.....[2]

[Total : 19]

225