

Plant Nutrition

Question Paper 2

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Plant Nutrition
Sub-Topic	
Paper Type	Alternative to Practical
Booklet	Question Paper 2

Time Allowed: 38 minutes

Score: /31

Percentage: /100

1 A student investigated the effect of solution **E** on cucumber.

A thin slice, approximately 2 mm thick, was cut from a cucumber as shown in Fig. 2.1.

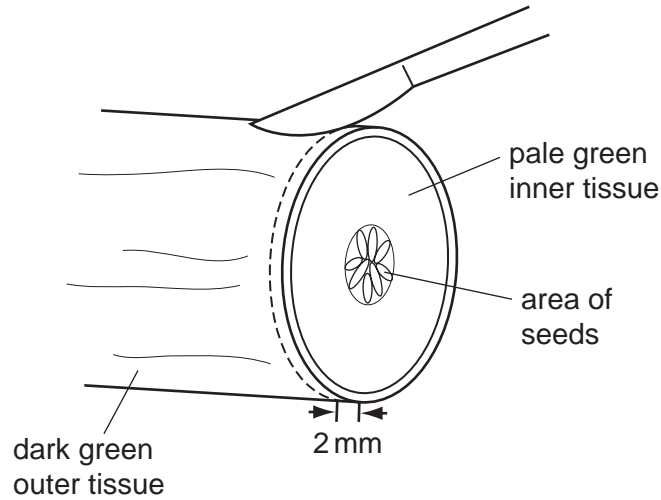


Fig. 2.1

The centre of the slice was removed as shown in Fig. 2.2A.

The slice was cut in half as shown in Fig. 2.2B.

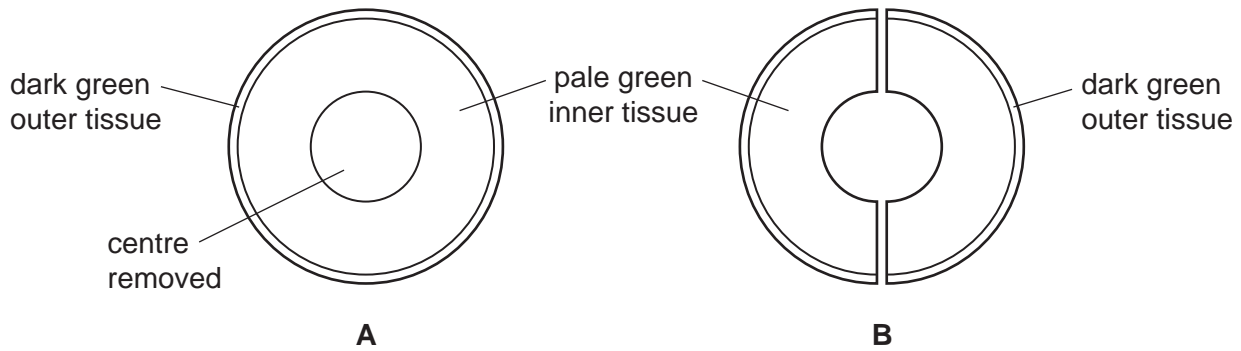


Fig. 2.2

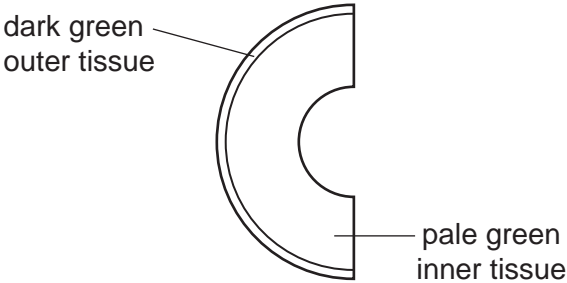
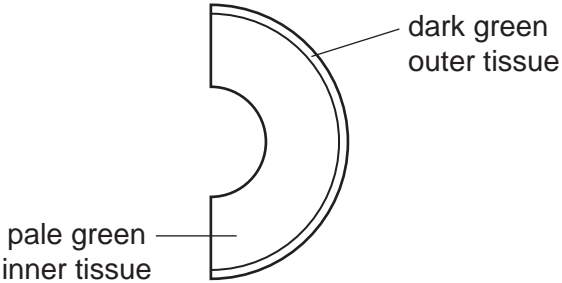
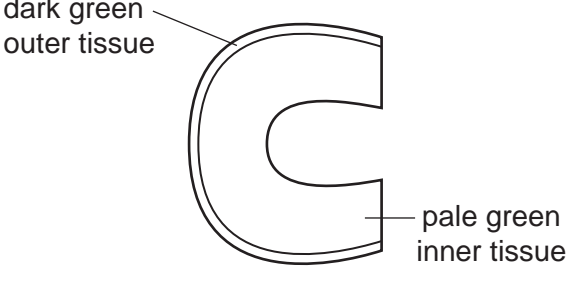
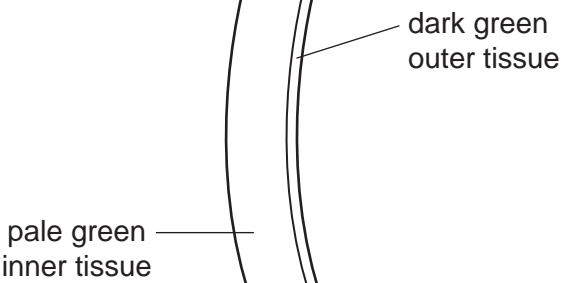
One piece (half slice) of cucumber was placed in solution **E**.

A second piece was placed in water.

After 5 minutes the shape of the pieces in solution **E** and water had changed.

Table 2.1 shows the pieces of cucumber before and after being placed in solution **E** and water.

Table 2.1

the shape of the piece of cucumber before being placed in solution E	the shape of the piece of cucumber before being placed in water
	
the shape of the piece of cucumber after being placed in solution E	the shape of the piece of cucumber after being placed in water
	

(a) Describe the effect of solution **E** and water on:

(i) the dark green outer tissue of the pieces of cucumber;

in solution **E**

.....

in water

.....

[2]

(ii) the pale green inner tissue of the pieces of cucumber.

in solution **E**

.....

in water

..... [2]

(b) Explain the effect of solution **E** on the tissues of the cucumber.

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..... [3]

(c) State **one** possible source of error in the method used in this investigation.

Suggest a suitable improvement.

source of error

.....

improvement

..... [2]

[Total: 9]

- 2 Some students investigated the effect of different conditions on onion leaves.

Fig.1.1 is a photograph of growing onion plants. They have tubular leaves that are hollow inside.



Fig. 1.1

In an experiment an onion leaf was cut into three pieces each 2 cm long.

Four cuts were made in each piece as shown in Fig. 1.2.

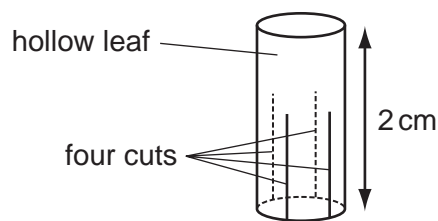


Fig. 1.2

The first piece was put into water.




The second piece was put into salt solution.

The third piece was put on dry filter paper.

The three pieces were left in their different conditions for 10 minutes after which the students made their observations.

Table 1.1 shows the shape of the pieces and how they felt when the students held them between their fingers.

Table 1.1

in water	in salt solution	in air
		
springy, firm	soft, slimy	soft, limp

(a) (i) Explain the reasons for any differences that were observed.

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..... [3]

(ii) Suggest how this investigation could be improved.

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..... [2]

(b) Fig. 1.3 is a photomicrograph of a section through a tubular onion leaf.

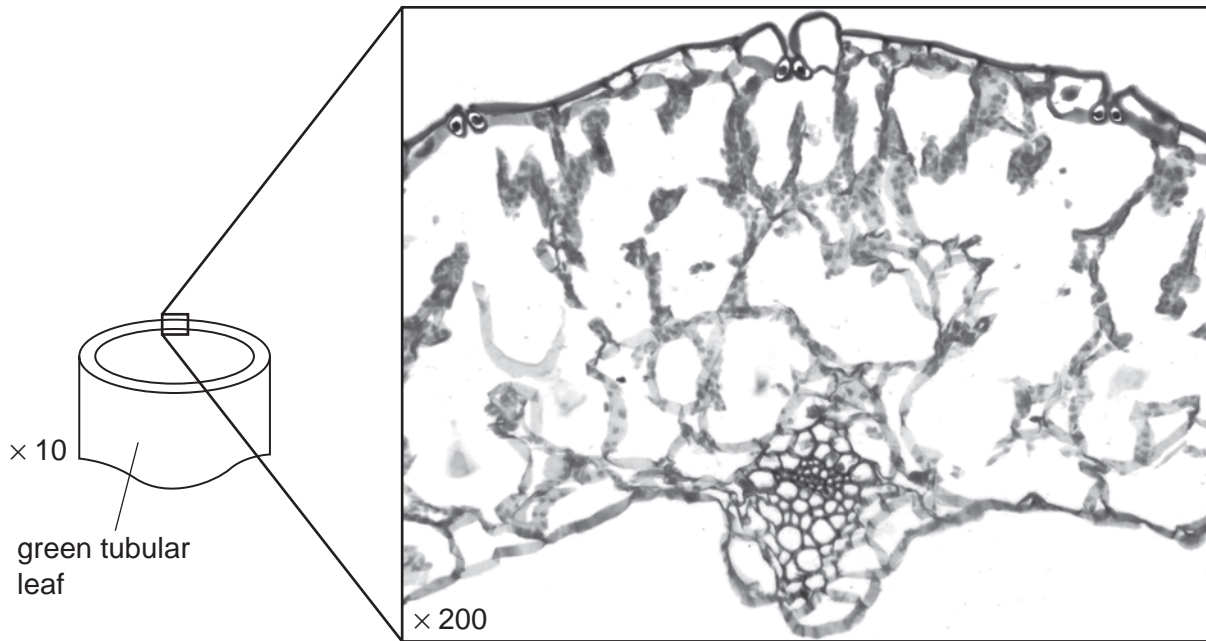


Fig. 1.3

(i) On Fig. 1.3, use lines and the letters **A**, **B** and **C** to label,

- A** - a mesophyll cell
- B** - a xylem vessel
- C** - an epidermal cell.

Draw the label lines with the letters **A**, **B** and **C** on Fig. 1.3. [3]

(ii) There are stomata on the leaf in Fig. 1.3. Draw a circle round **one** of them.

Draw the circle on Fig. 1.3. [1]

- (c) Fig. 1.4 shows a photograph of a section through the onion leaf. Its actual diameter was 5 mm.

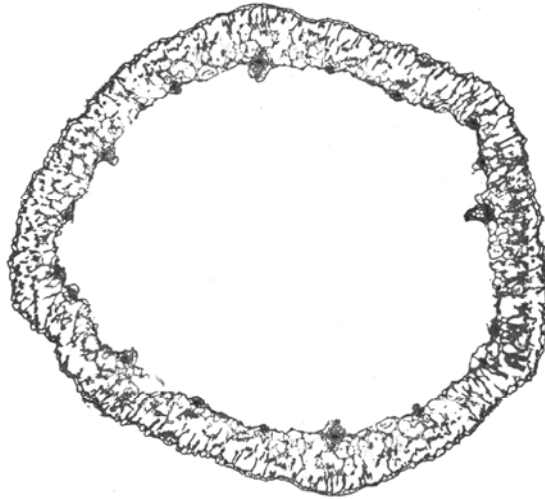


Fig. 1.4

Measure the diameter of the leaf shown in the photograph in Fig. 1.4.

diameter

Calculate the magnification of the onion leaf in the photograph in Fig. 1.4.

Show your working.

Magnification X [3]

(d) (i) Explain exactly how you would safely test another 2 cm piece of onion leaf for the presence of reducing sugar.

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..... [3]

(ii) The reducing sugar test can tell you that:

- reducing sugar is absent
- reducing sugar is present at a low concentration
- reducing sugar is present at a high concentration

Explain how you can tell the difference between these possible results.

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..... [3]

(e) Onion leaves are green. Students testing onion leaves for the presence of starch used the method shown in the four stages of Fig. 1.5.

Explain the reasons for the details shown in each stage. Write your answers on the lines below Fig. 1.5

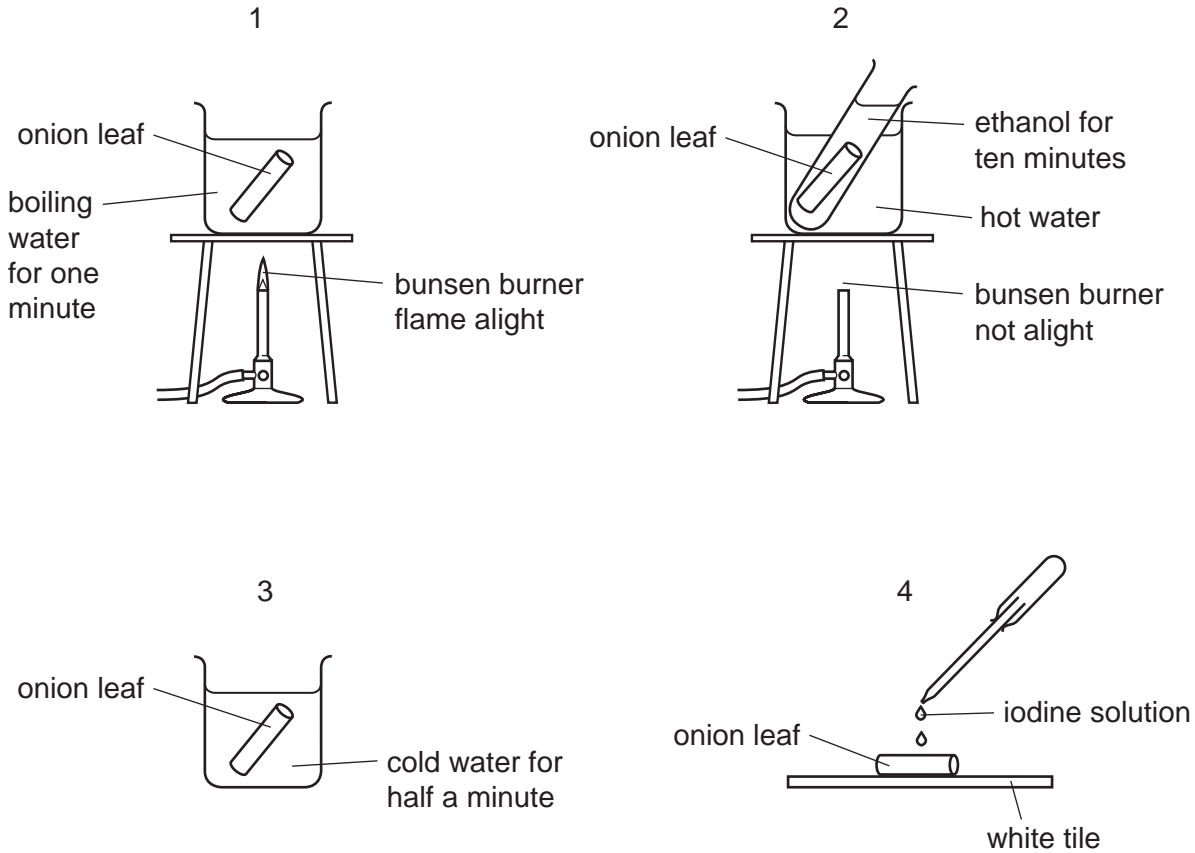


Fig. 1.5

reasons for stage 1

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reasons for stage 2

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reasons for stage 3

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reasons for stage 4

..... [4]

[Total: 22]