Cambridge IGCSE

Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME: **SOLVED BY SMART EXAM RESOURCES-SMART EDU HUB**

CENTRE NUMBER

CANDIDATE NUMBER

2800213093

BIOLOGY **0610/62**

Paper 6 Alternative to Practical **October/November 2019**

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.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.

Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

This syllabus is regulated for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **11** printed pages and **1** blank page.

DC (LEG/CB) 173051/3

Cambridge Assessment International Education

[Turn over

1 A student investigated the effect of the enzyme amylase on the breakdown of a starch suspension. The starch suspension was placed inside a bag made from dialysis tubing.

$$\text{starch} \xrightarrow{\text{amylase}} \text{reducing sugars}$$

Dialysis tubing is made from a type of membrane that is partially permeable. Only small molecules can pass through this membrane.

Step 1 Two large test-tubes were put into a water-bath. Each large test-tube contained 20 cm^3 of distilled water. The temperature of the water-bath was 40 °C.

Step 2 A knot was tied at the end of one piece of dialysis tubing, to form a bag.

Step 3 5 cm^3 of the starch suspension was put into the dialysis tubing bag.

Step 4 A clean syringe was used to put 5 cm^3 of amylase solution into the dialysis tubing bag.

Step 5 The contents of the dialysis tubing bag were mixed well and the outside of the bag was rinsed with distilled water.

Step 6 The student repeated steps 2 to 5 using 5 cm^3 of distilled water in step 4 instead of the amylase solution.

Step 7 The dialysis tubing bags were placed into the large test-tubes as shown in Fig. 1.1.

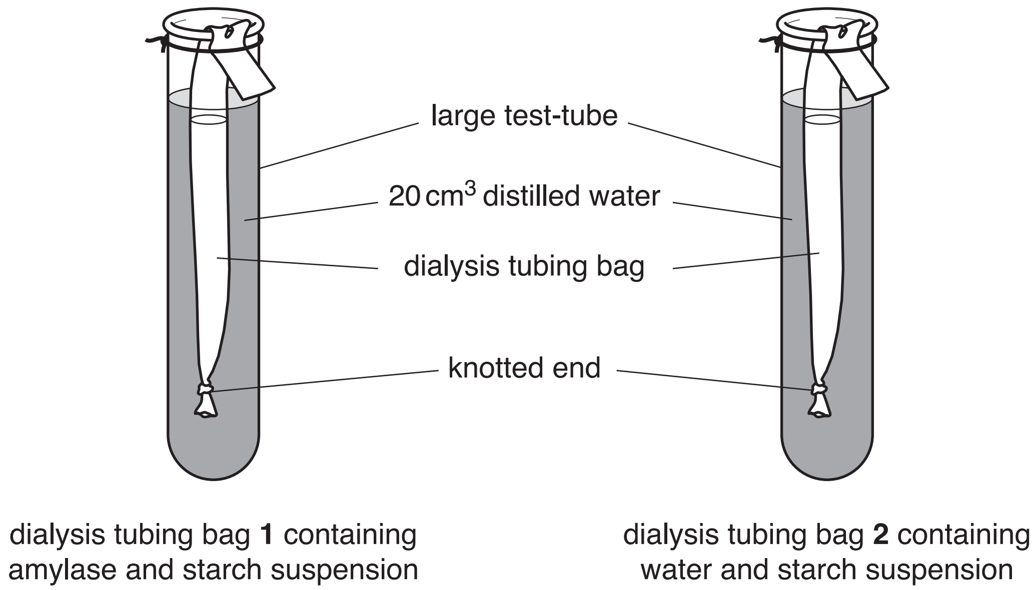

Fig. 1.1

Step 8 Both large test-tubes were placed back into the water-bath and left for 10 minutes.

Step 9 After 10 minutes the dialysis tubing bags were removed from the two large test-tubes.

Step 10 The contents of the two large test-tubes and the two dialysis tubing bags were tested for reducing sugars and starch.

(a) State the name of the solution that the student would use to test substances for starch.

Iodine solution

.... [1]

(b) Describe how the student would test substances for reducing sugars.

Add Benedict's solution and heat it.

....

....

....

....

.... [2]

(c) Suggest why the outside of the dialysis tubing bag was rinsed in Step 5.

To remove contamination

....

.... [1]

The student's observations for the starch and reducing sugar tests in step 10 are shown in Fig. 1.2.

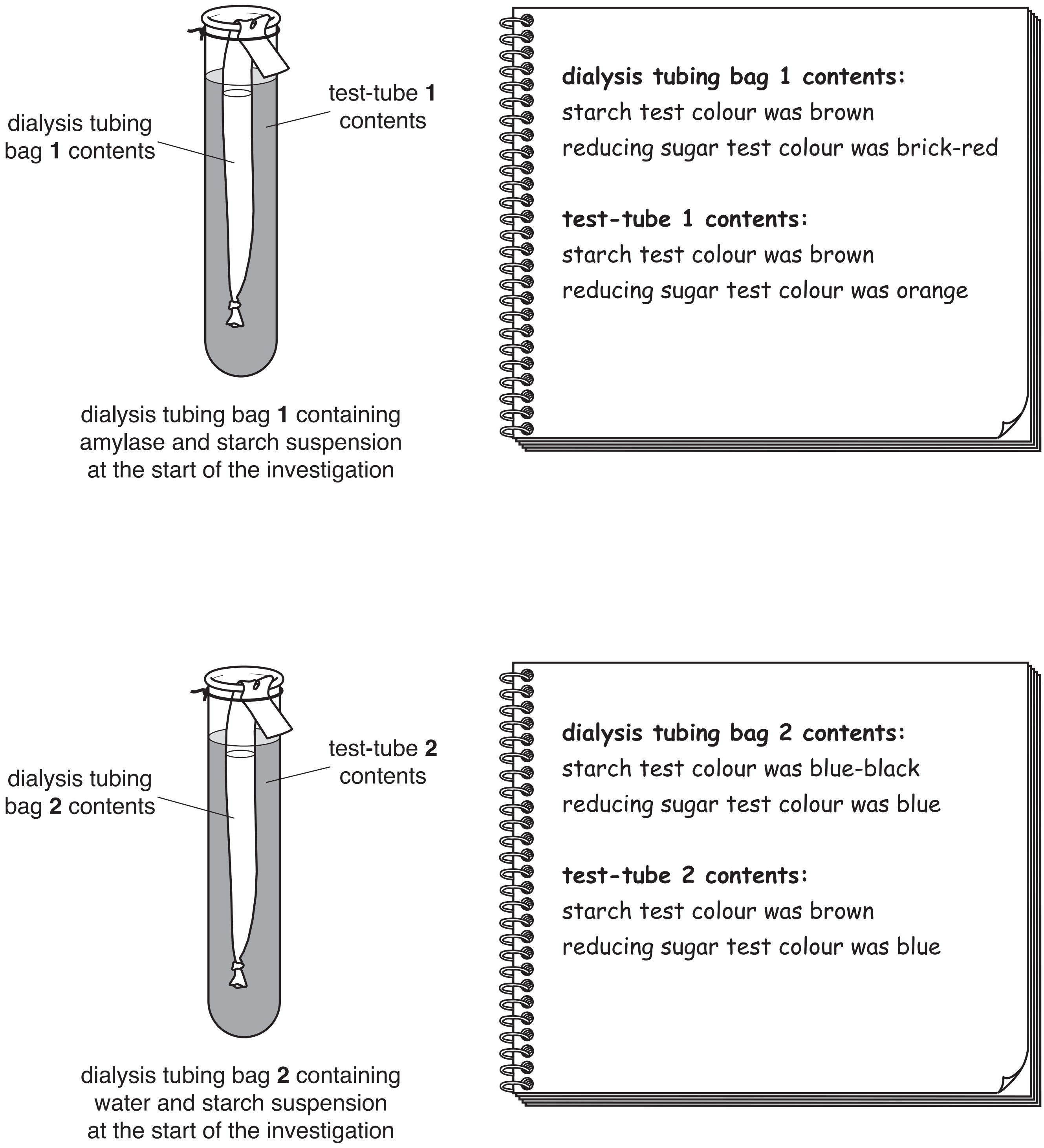

Fig. 1.2

(d) **(i)** Prepare a table and record the results of the starch and reducing sugar tests from Fig. 1.2 in the space provided.

	Starch test	Reducing sugar test
Dialysis tubing bag 1	Brown	---------
Tets-tube 1 contents	---------	Brick -red
Dialysis tubing bag 2	Blue-black	---------
Tets-tube 2 contents	---------	Blue

[3]

(ii) State **three** conclusions for the results shown in Fig. 1.2.

1. Negative starch test in bag 1
2. Starch present in bag 2

[3]

(e) State **two** variables that were kept constant during this investigation.

1 Volume of starch solution

2 Volume of amylase solution

[2]

(f) Plan an investigation **using dialysis tubing** to determine the effect of temperature on the activity of the enzyme amylase.

We make use of two different temperatures. Each time a constant temperature is maintained by using a water bath.
Experimental method:

- Add the enzyme amylase solution to the starch suspension in the dialysis tubing
- Rinse the tubing and place in test-tubes with distilled water
- Test the solution with iodine
- Again take the same volume of enzyme-amylase
- And the same volume of starch and also
- Same volume of distilled water in test-tubes.
- maintain the water in this test tube at a higher temperature using a thermostatically controlled heater.
- Note the time needed for the colour change of Benedicta solution.
- A higher temperature will denature the enzymes and hence there might not be any colour change observed.
- Take two more repeats of the experiment for each of the above temperatures
- Make use of gloves and goggles throughout the experiment to avoid injuries.

.... [6]

(g) The student wanted to find out if the amylase enzyme passed through the dialysis tubing into the large test-tube. Amylase is made of protein.

Describe how the student could find out if the solution in the large test-tube contained protein.

Use a Biuret solution. A positive test gives a colour change to lilac.

....

....

....

....

.... [2]

[Total: 20]

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7

2 An investigation was performed to determine the effect of light intensity on leaf size in one species of plant.

Plants were grown in three different light intensities. The maximum width of each leaf was recorded. The results were recorded in Table 2.1 and an average value was calculated.

The results for three leaves grown in high light intensity are shown in Fig. 2.1. The horizontal line on each leaf indicates its maximum width.

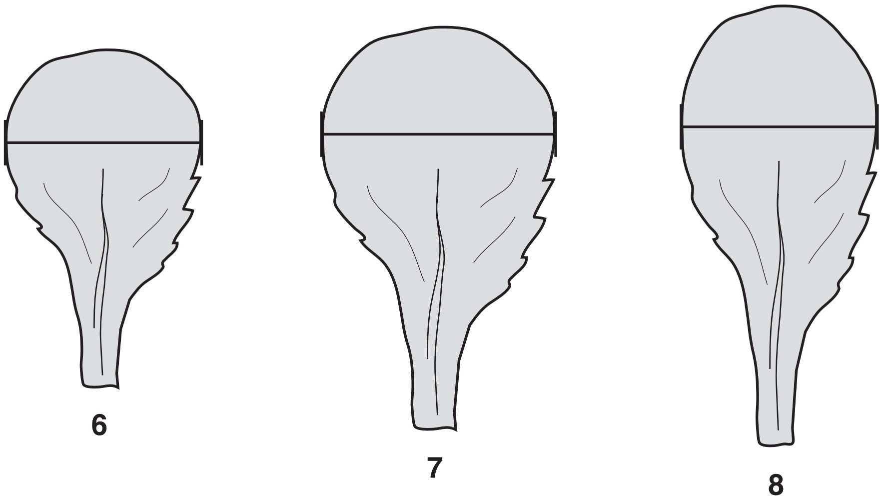


Fig. 2.1

(a) **(i)** Measure the widths of leaves **6**, **7** and **8** in Fig. 2.1 and record these values in Table 2.1. [1]

Table 2.1

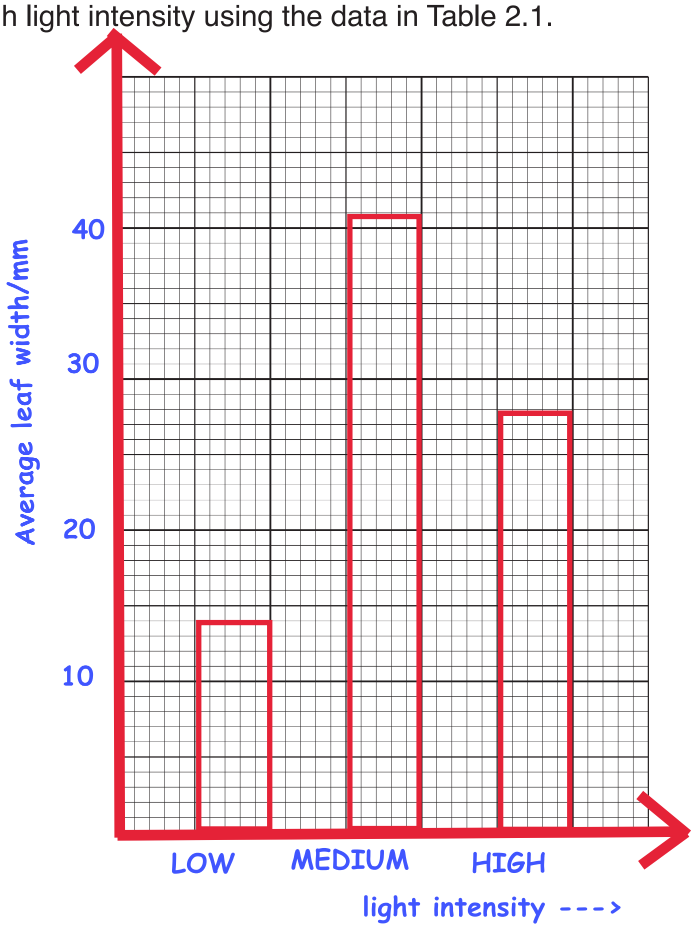
leaf	maximum width of leaves / mm		
	low light intensity	medium light intensity	high light intensity
1	15	43	27
2	12	45	32
3	13	48	26
4	13	44	28
5	15	47	27
6	14	43	26
7	12	12	31
8	15	46	26
average	14	41	28

(ii) Calculate the average width of the leaves grown in a high light intensity in Table 2.1. Record this value in Table 2.1.

[14+41]/2
=27.5=28

[1]

(iii) Plot a bar chart on the grid of the **average** leaf width for leaves grown in low, medium and high light intensity using the data in Table 2.1.



[3]

(iv) Circle **one** measurement in Table 2.1 that could be considered to be anomalous.

Give a reason for your choice.

reason Result is different from other results

.... [2]

(b) (i) State the variable that was changed in this investigation (the independent variable).

Light intensity [1]

(ii) State the variable that was measured in this investigation (the dependent variable).

Maximum leaf width [1]

(c) Fig. 2.2 is a photomicrograph of a cross-section of a root.

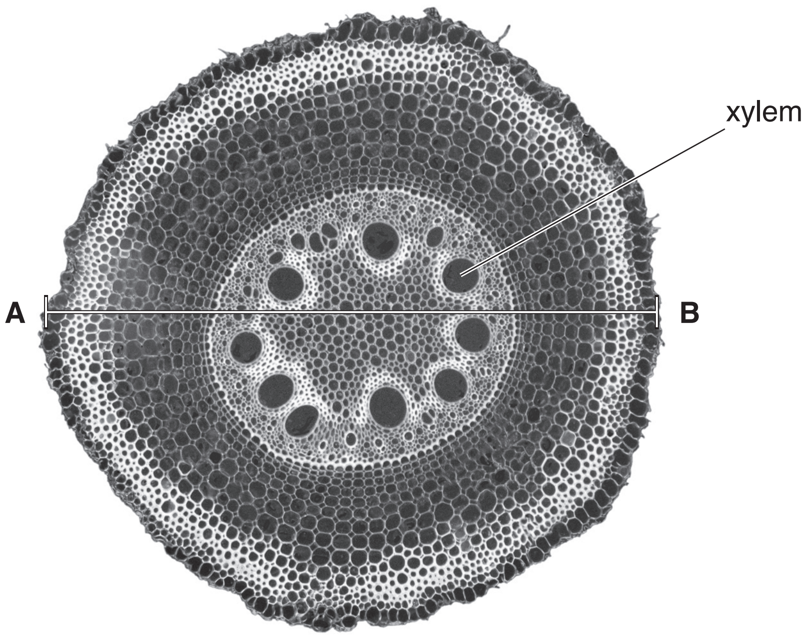
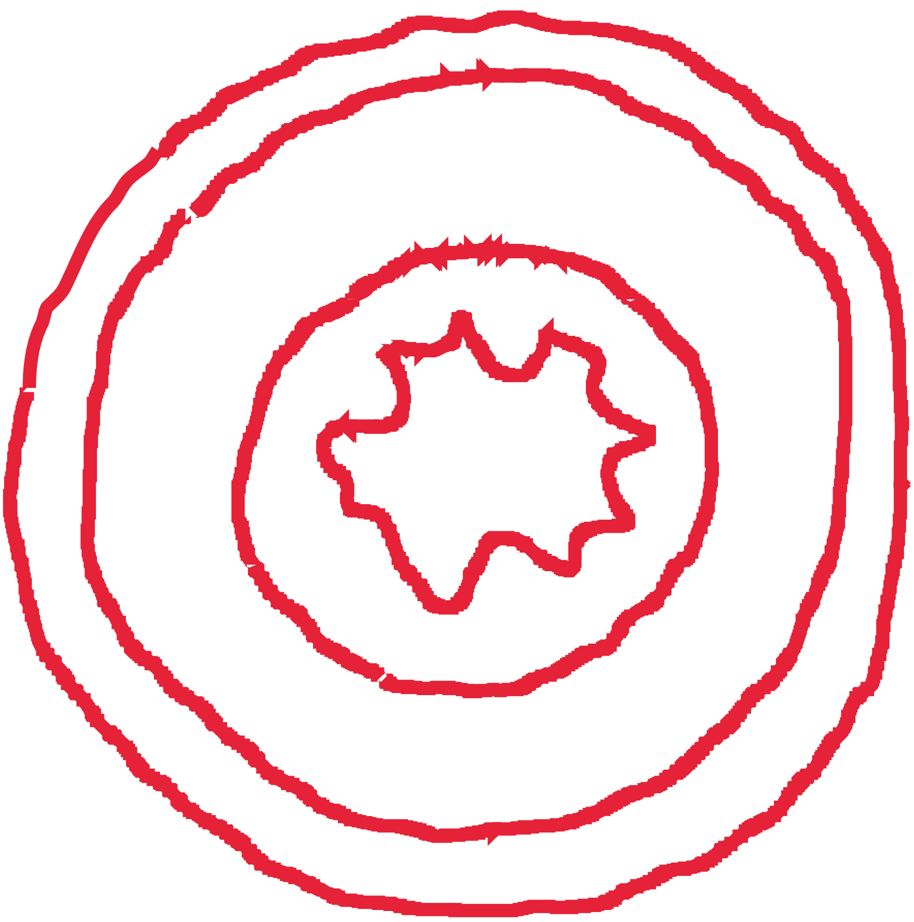


Fig. 2.2

(i) Make a large drawing of the cross-section of the root in Fig. 2.2 to show the different areas of the root.

Do **not** draw individual cells.



[4]

(ii) Measure line **AB** on Fig. 2.2 in millimetres.

length of line **AB** ......81mm...... mm

The actual diameter of the root shown in Fig. 2.2 is 2 mm.

Calculate the magnification of Fig. 2.2 using the equation.

$$\text{magnification} = \frac{\text{length of line } \mathbf{AB} \text{ on Fig. 2.2}}{\text{actual diameter of the root}}$$

= 81/2
=41

× 41
.... [2]

(iii) Fig. 2.3 is a photomicrograph of a cross-section of a stem.

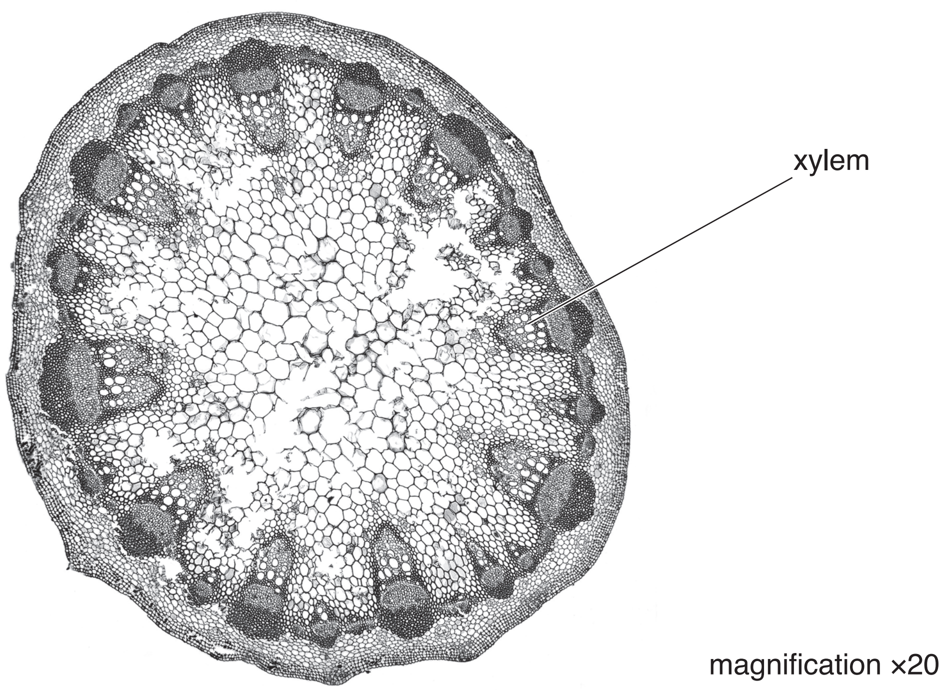


Fig. 2.3

State **two** differences between the root in Fig. 2.2 and the stem in Fig. 2.3.

1 Outer surface is uneven

....

2 Outer shape is circular

.... [2]

(d) A student suggested that measuring leaf area is better than measuring leaf width.

(i) Describe how the area of a leaf could be measured.

- Draw around the outline of leaf on a grid
- Count the number of squares occupied
- Count squares at least half occupied as one square
- Add up the values to obtain the area of the leaf

.... [2]

(ii) Suggest why measuring leaf area is better than measuring leaf width.

Because the leaves may differ in length

.... [1]

[Total: 20]