Transport in plants

Question Paper

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Transport in plants
Sub-Topic	
Paper Type	Alternative to Practical
Booklet	Question Paper

Time Allowed: **57 minutes**

Score: **/47**

Percentage: **/100**

1 Fig. 3.1 shows sections through ginger (*Zingiber officinale*) and lotus (*Nelumbo nucifera*) stems.

ginger lotus

Fig. 3.1

(a) (i) State one **visible** similarity between the two stems.

..... [1]

(ii) Complete Table 3.1 to show three **visible** differences between the two stems.

Table 3.1

difference	stem	
	ginger	lotus
1	....	....
2	....	....
3	....	....

[3]

(b) Lotus plants live in water.

Suggest and explain an adaptation of the lotus stem to its water habitat.

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..... [2]

(c) The cells of lotus roots contain starch grains.

Describe how you would prepare a microscope slide of the cells of a lotus stem to show the starch grains.

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..... [4]

[Total: 10]

2 Thin slices of dandelion stem were cut and placed into different salt solutions and left for 30 minutes.

Fig. 1.1 shows how these slices were cut. Fig. 1.2 shows the appearance of these pieces of dandelion stem after 30 minutes in the different salt solutions.

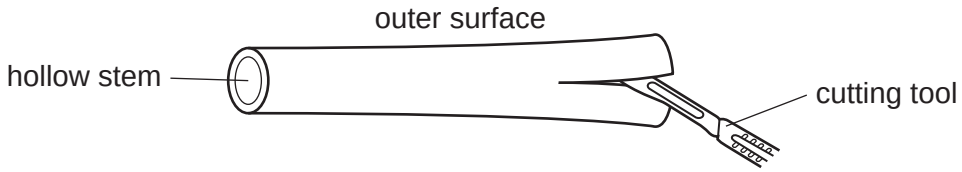

Fig.1.1

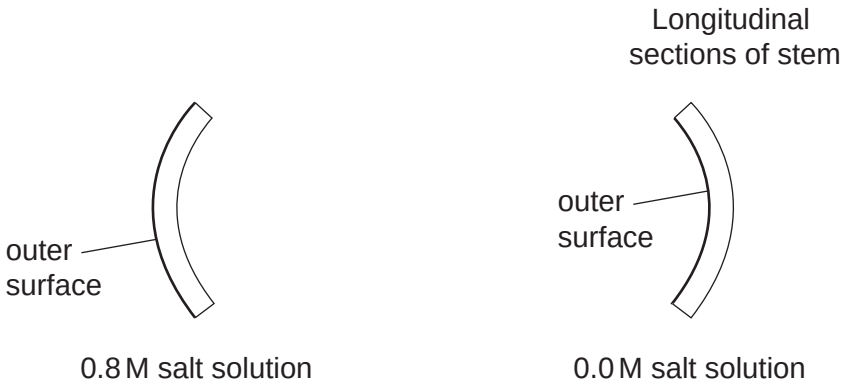

Fig. 1.2

(a) (i) Describe the appearance of the pieces of dandelion stem in Fig. 1.2.

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..... [2]

(ii) Explain what causes the two pieces of dandelion stem to change in the way you have described in **(a)(i)**.

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..... [4]

(b) Suggest how you could plan an investigation to find the concentration of salt solution which would produce no change from that shown in the original dandelion stem before being cut in Fig. 1.1.

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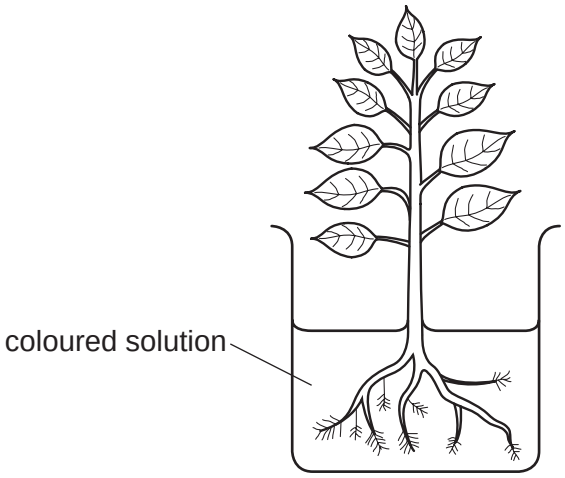
..... [4]

[Total: 10]

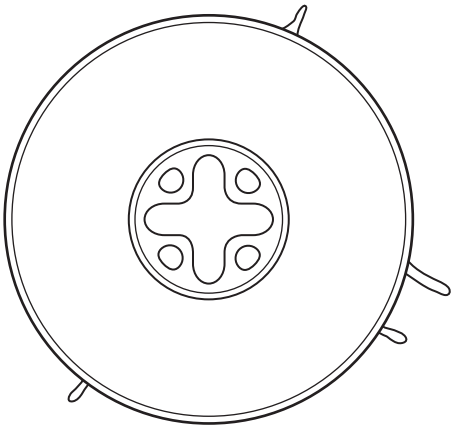
3 Fig. 1.1 shows a young plant with its roots submerged in a container filled with a solution containing mineral salts and a coloured dye.



(not to scale)

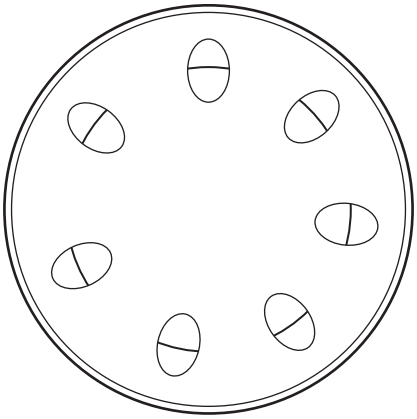
Fig. 1.1

Fig. 1.2 shows a section of a root and Fig. 1.3 shows a section of a stem.



root

Fig. 1.2



stem

Fig. 1.3

(a) (i) Shade in the tissue to identify where the coloured solution may be found in the section of the root, Fig. 1.2 and stem, Fig. 1.3.

[2]

(ii) Name the tissue, in both Fig. 1.2 and Fig. 1.3, that you have shaded.

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[1]

(b) (i) Name the structures through which most of the solution will be absorbed into the roots.

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[1]

(ii) Indicate by means of an arrow on Fig. 1.1, **one** place where these structures are shown. [1]

(c) Describe how you would compare the rate of uptake of the coloured solution by the plant in Fig. 1.1 with another plant that has had its roots cut off.

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[6]

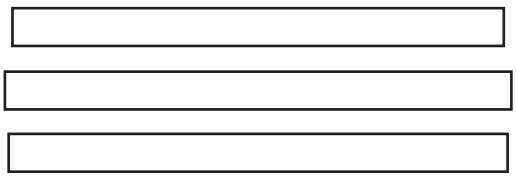
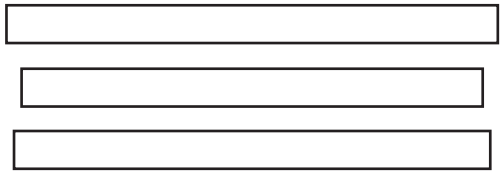
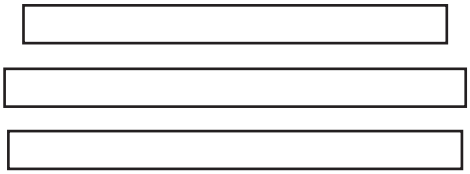
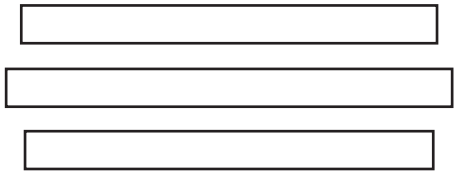
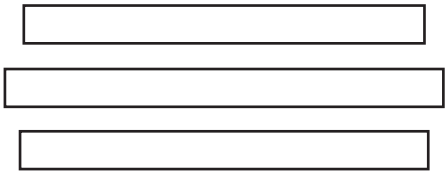
[Total: 11]

4 Fifteen pieces of raw Irish potato, *Solanum tuberosum*, were cut carefully to a length of 60mm.

Three pieces were placed in each of five different concentrations of glucose solution and left for 2 hours. The pieces were removed and their lengths measured.

Table 1.1 shows the appearance of these pieces at the end of the two hours.

Table 1.1

concentration of glucose solution / mol dm^{-3}	potato pieces after being left in glucose solutions	length of potato / mm	change in length / mm
0.2		1 65 2 67 3 66 mean 66	.....
0.4		1 65 2 61 3 63 mean 63	.....
0.6		1 56 2 61 3 60 mean 59	.....
0.8		1 ..... 2 ..... 3 ..... mean	.....
1.0		1 ..... 2 ..... 3 ..... mean	.....

(a) (i) Measure the length of each piece carefully and record these measurements in Table 1.1. Write in the figures on the dotted lines. Nine measurements have been completed for you.

[1]

(ii) Calculate the mean [average] length of the potato pieces. The first three rows have been completed for you.

[1]

(iii) Calculate the change in mean length in **all** five concentrations of glucose solutions.

[2]

(iv) Explain why three pieces of potato were used in each solution and not just one piece.

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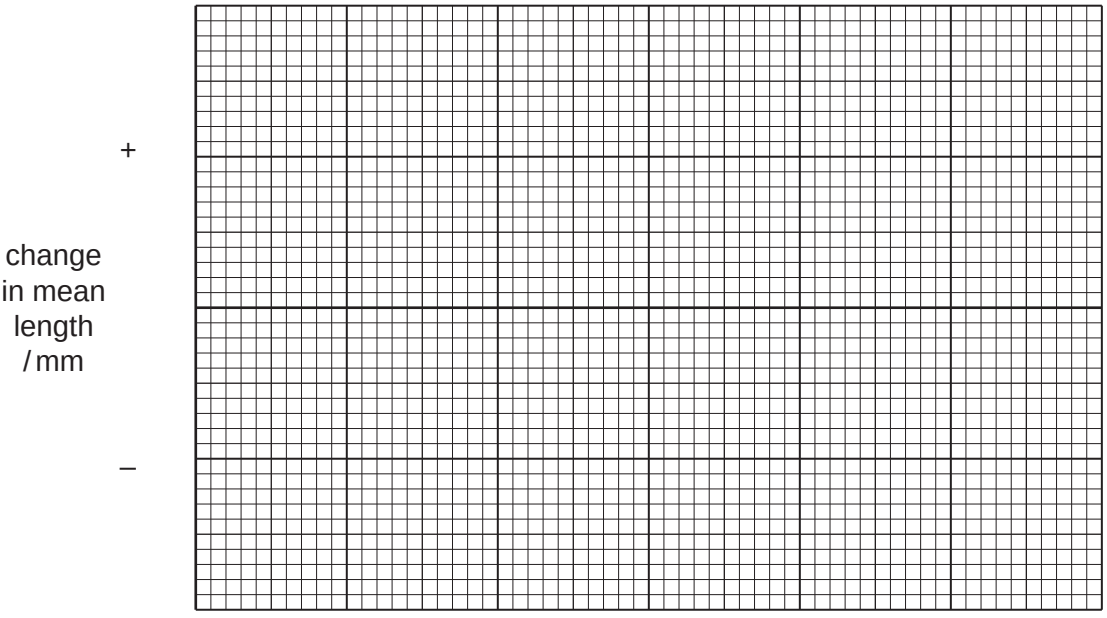
..... [1]

(b) (i) Plot the change in mean length of potato against concentration of glucose solution on the grid below.

Draw a line of best fit through the points.



[4]

(ii) Describe and explain the changes in mean length of the potato pieces in the different glucose solutions.

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..... [4]

(c) **(i)** Using the information from the graph, estimate the glucose concentration which results in no change in mean length.

..... [1]

(ii) Suggest why, at this glucose concentration, there is no change in length.

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..... [2]

total [16]