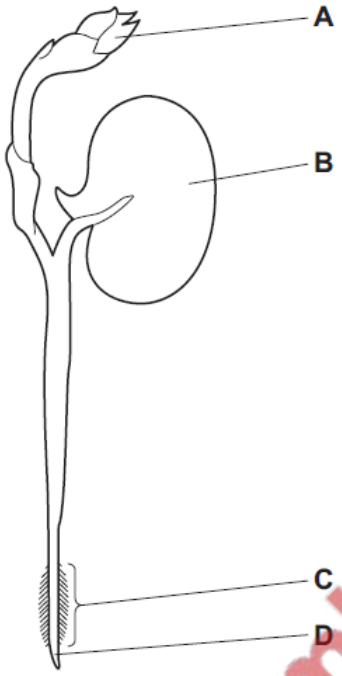
Transport in plants – 2022 November IGCSE 0610 Biology

1. Nov/2022/Paper_11/No.17

The diagram shows a bean seedling soon after it has germinated.

Where is most water absorbed?



2. Nov/2022/Paper_12/No.7

The roots of a plant were placed in a solution of red dye. After 24 hours, a section of root and a section of leaf were cut from the plant.

In which tissues will the red dye be visible?

A P and R **B** P and S **C** Q and R **D** Q and S

3. Nov/2022/Paper_12/No.18

Which process occurs during transpiration?

A evaporation of water from the xylem

B loss of water by osmosis from the guard cells

C movement of water vapour through the spongy mesophyll by active transport

D movement of water vapour through the stomata by diffusion

4. Nov/2022/Paper_13/No.18

Which process occurs during transpiration?

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5. Nov/2022/Paper_33/No.5

Fig. 5.1 is a diagram of a cross-section of a leaf.

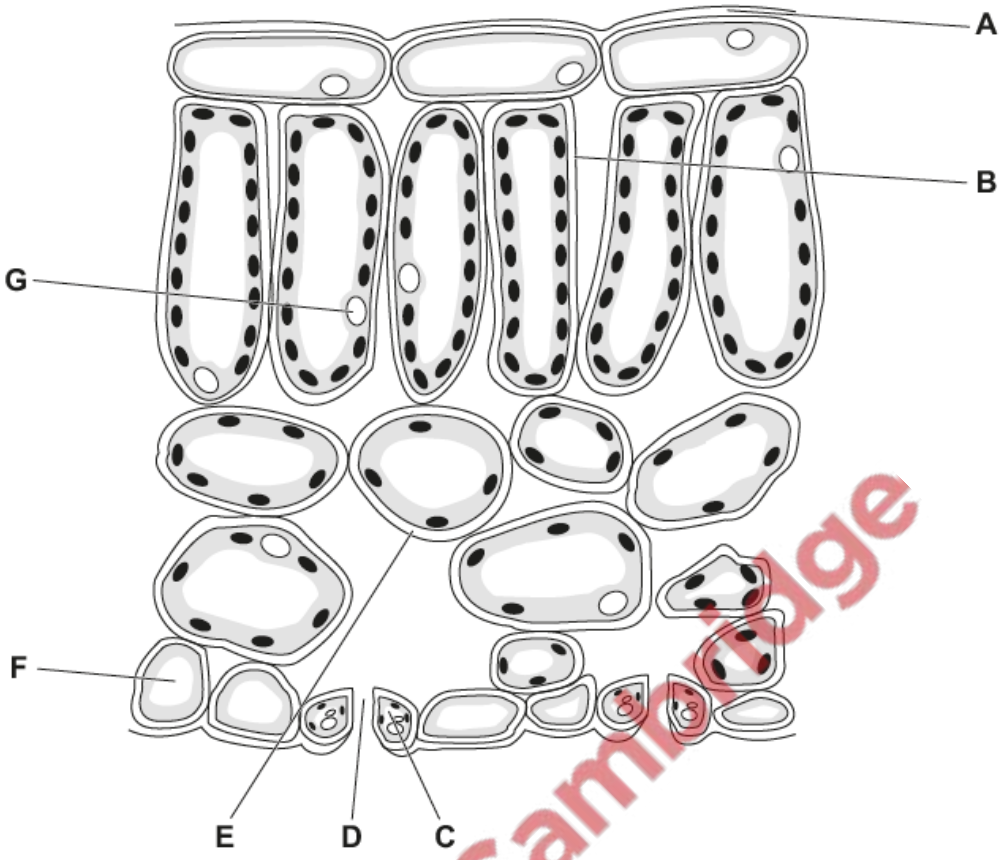

Fig. 5.1

(a) (i) State the letter in Fig. 5.1 which shows where water evaporates from during transpiration.

.....

[1]

(ii) State the letter in Fig. 5.1 which shows where water vapour moves out of the leaf during transpiration.

.....

[1]

(b) Some students investigated the effect of temperature on the rate of transpiration.

The apparatus they used is shown in Fig. 5.2.

They measured the rate of movement of the air bubble in the capillary tube.

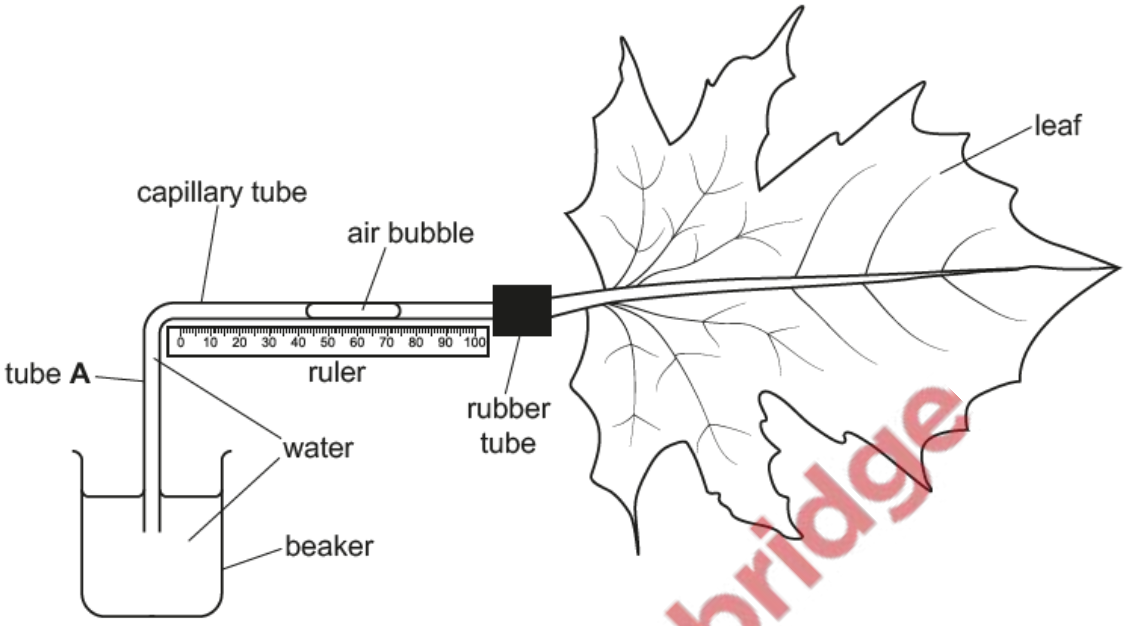

Fig. 5.2

(i) Water travels to the leaf along tube **A**.

State the name of the vessels in a plant stem that tube **A** represents.

..... [1]

The distance moved by the air bubble in three minutes was measured at different environmental temperatures.

Table 5.1 shows the results.

Table 5.1

environmental temperature / °C	distance moved in three minutes / mm	rate of movement of the air bubble / mm per minute
15	2	0.67
20	8	2.67
25	18	6.00
30	23	

(ii) Using the information in Table 5.1, calculate the rate of movement of the air bubble when the environmental temperature is 30 °C.

Give your answer to **two** decimal places.

..... mm per minute
[2]

(iii) Describe the effect of an increase in environmental temperature on the rate of transpiration shown in Table 5.1.

.....

.....

..... [1]

c) Water is absorbed by plants.

(i) State the name of the cells where water enters a plant.

..... [1]

(ii) State the name of the process by which water moves into plant cells.

..... [1]

[Total: 8]

6. Nov/2022/Paper_43/No.5(a_ b)

(a) Researchers investigated water pollution in the centre of a lake for 11 days.

Fig. 5.1 shows researchers collecting samples of aquatic organisms from the lake with a net which was placed at a specified water depth.

Fig. 5.1

Each day, the researchers collected 5 dm^3 of water from the lake. Fish and other large organisms were released back into the lake. The researchers extracted the chlorophyll from all the microorganisms that were collected in the sample of lake water.

They determined the concentration of chlorophyll by measuring the mass of chlorophyll extracted from each dm^3 of lake water.

Fig. 5.2 shows a researcher lowering a Secchi disc on a long string into a lake from a boat. A Secchi disc is a plastic disc which is divided into black and white sections. It is used to measure the transparency of water in lakes, rivers and oceans.

The researcher recorded the maximum water depth at which the Secchi disc was still visible.

Fig. 5.2

The results of the investigation are shown in Fig. 5.3.

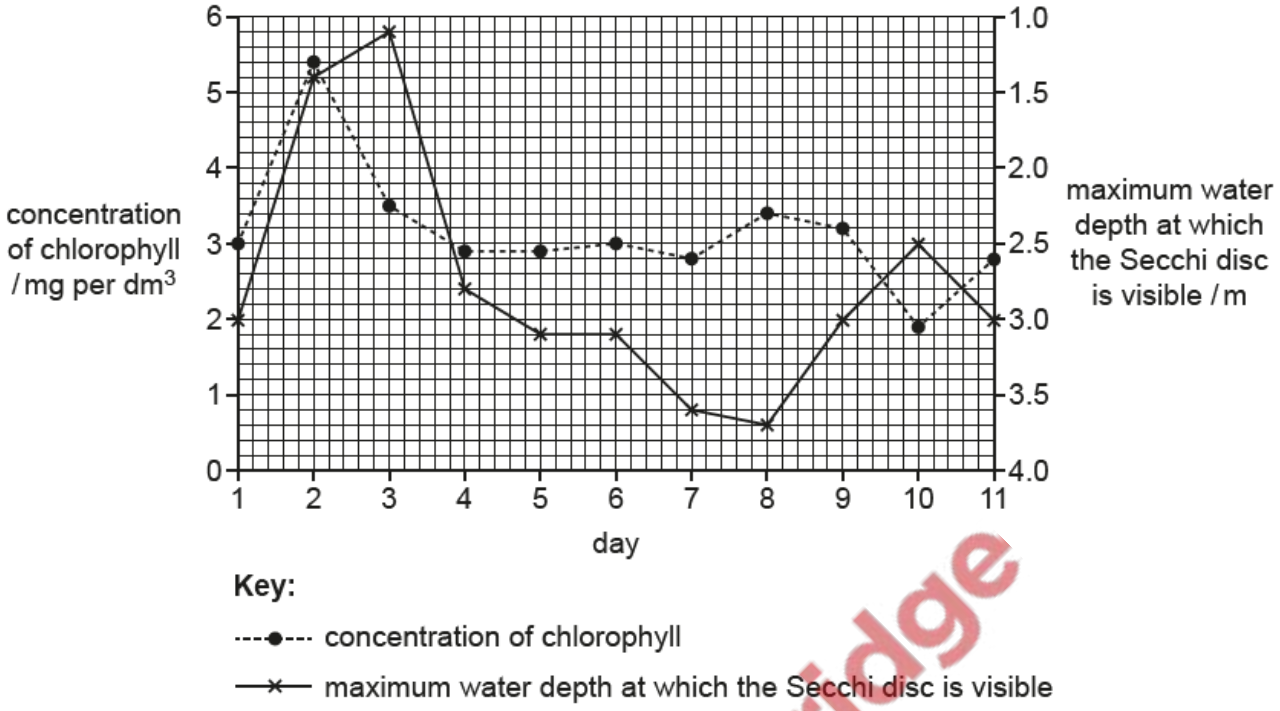

Fig. 5.3

(i) State the type of microorganism that contains chlorophyll.

..... [1]

(ii) The researchers collected 5 dm^3 of water from the lake each day. Using this information and the information in Fig. 5.3, calculate the total mass of chlorophyll in the sample on day 1.

Include the appropriate units with your answer.

.....
[2]

(iii) Suggest why the researchers determined the concentration of chlorophyll rather than counting the number of microorganisms in the sample.

.....

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..... [1]

(iv) Using the information in Fig. 5.3, identify the day when the water was the **most** transparent.

..... [1]

(v) Explain why the transparency of the water is important for organisms that contain chlorophyll.

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..... [2]

(b) (i) Heavy rainfall in nearby fields caused ions from fertilisers to wash into the lake on day 1 of the investigation.

State which ions can cause an increase in the number of organisms that contain chlorophyll in the lake.

..... [1]

(ii) Many of the organisms that contain chlorophyll died on day 2 of the investigation.

Explain the consequences of the death of these organisms to the lake ecosystem.

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..... [3]