**Transport in plants – 2023 June IGCSE Biology 0610**

**1.** June/2023/Paper_0610/11/No.17

Which row shows the functions of xylem and phloem?

| | transports amino acids | transports mineral ions | transports sucrose |
|---|---|---|---|
| **A** | phloem | xylem | phloem |
| **B** | xylem | xylem | phloem |
| **C** | xylem | phloem | xylem |
| **D** | phloem | phloem | xylem |

**2.** June/2023/Paper_0610/11/No.18

What is the effect on a plant of **not** having any root hairs?

**A** The plant absorbs less water from the soil.

**B** The plant absorbs more water from the soil.

**C** The plant loses water to the soil.

**D** The plant loses mineral ions to the soil.



**3.** June/2023/Paper_0610/12/No.17

Which pathway is taken by water through a plant?

**A** root hair → root cortex → xylem → mesophyll → stomata

**B** root hair → xylem → mesophyll → root cortex → stomata

**C** stomata → root cortex → xylem → mesophyll → root hair

**D** stomata → root hair → root cortex → xylem → mesophyll

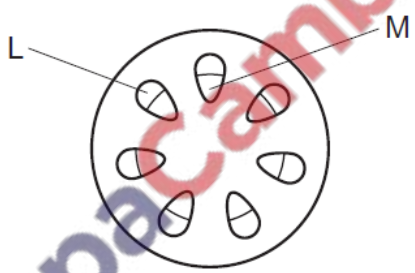
**4.** June/2023/Paper_0610/12/No.18

Which row shows the transpiration rate for the conditions described?

| | wind speed | atmospheric temperature | transpiration rate |
|---|---|---|---|
| **A** | low | low | fast |
| **B** | high | high | slow |
| **C** | low | high | slow |
| **D** | low | low | slow |

**5.** June/2023/Paper_0610/13/No.17

A stem was cut from a plant. The base of the stem was placed into a beaker containing water and a red stain for two hours. The diagram shows a cross-section of the plant stem.




In which tissue will the red stain be found and what is the name of the tissue?

| | red stain located in | name of tissue |
|---|---|---|
| **A** | L | phloem |
| **B** | L | xylem |
| **C** | M | phloem |
| **D** | M | xylem |

6. June/2023/Paper_0610/13/No.18

Which pair of processes causes transpiration in plant leaves?

| | at the surface of mesophyll cells | through the stomata |
|---|---|---|
| **A** | absorption of water | evaporation of water |
| **B** | absorption of water | diffusion of water vapour |
| **C** | diffusion of water vapour | evaporation of water |
| **D** | evaporation of water | diffusion of water vapour |

7. June/2023/Paper_0610/21/No.15

Which statement describes the effect of atmospheric humidity on the rate of transpiration?

**A** In high humidity, the transpiration rate is high because there is slow diffusion of water vapour through stomata.

**B** In high humidity, the transpiration rate is low because there is rapid diffusion of water vapour through stomata.

**C** In low humidity, the transpiration rate is high because there is rapid diffusion of water vapour through stomata.

**D** In low humidity, the transpiration rate is low because there is slow diffusion of water vapour through stomata.

**8.** June/2023/Paper_0610/21/No.16

Sucrose and amino acids move around a plant from sources to sinks.

Which row shows the sources and sinks?

| | root cortex cells | xylem vessels | palisade mesophyll cells |
|---|---|---|---|
| **A** | source and sink | neither | source |
| **B** | sink | sink | source and sink |
| **C** | neither | source and sink | sink |
| **D** | source and sink | source | neither |

**9.** June/2023/Paper_0610/22/No.15

Humidity and wind speed are two factors that affect the rate of transpiration.

How do these two factors affect the concentration gradient of water molecules between the inside of the leaf and the outside atmosphere?

| | high humidity | high wind speed |
|---|---|---|
| **A** | lowers concentration gradient | raises concentration gradient |
| **B** | raises concentration gradient | raises concentration gradient |
| **C** | lowers concentration gradient | lowers concentration gradient |
| **D** | raises concentration gradient | lowers concentration gradient |



**10.** June/2023/Paper_0610/23/No.15

Which combination of environmental factors will cause the largest increase in the transpiration rate in a plant?

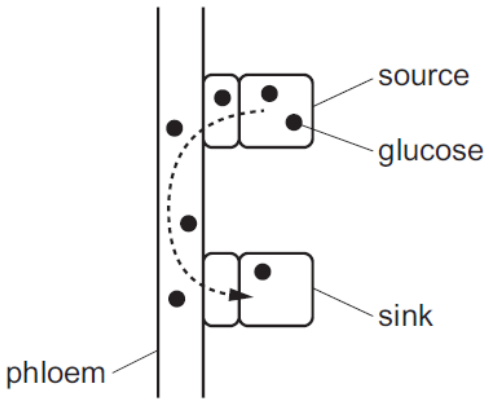
| | wind speed | humidity | temperature | light intensity |
|---|---|---|---|---|
| **A** | high | high | low | low |
| **B** | high | low | high | high |
| **C** | low | high | low | high |
| **D** | low | low | high | low |

**11.** June/2023/Paper_0610/23/No.16

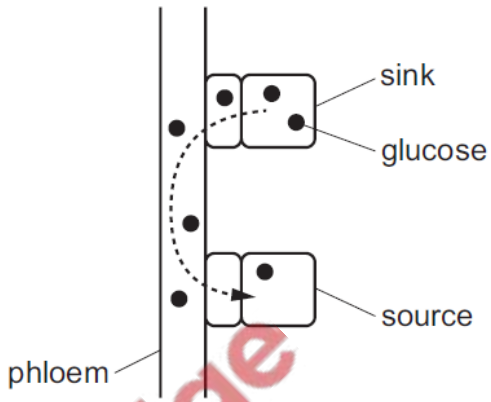
The diagrams represent the movement of substances between plant cells. The arrows indicate the direction the substance is moving in.

Which diagram of translocation is correctly labelled?

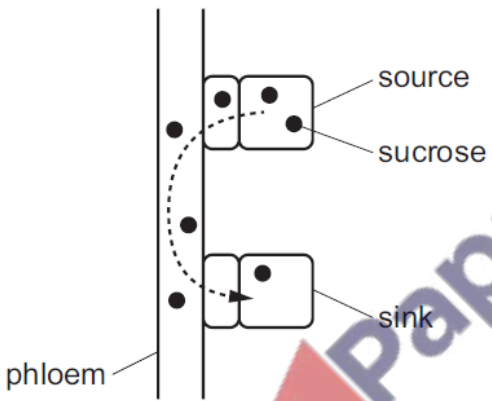
**A**



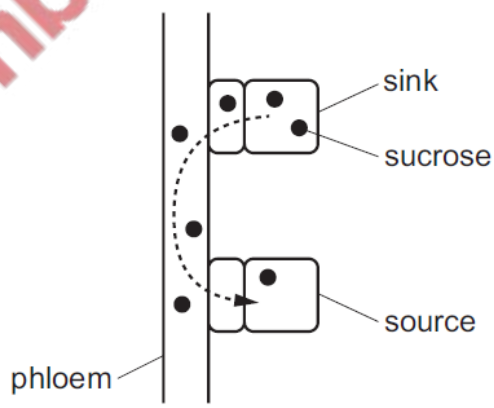

**B**




**C**




**D**



**12.** June/2023/Paper_0610/31/No.4

**(a)** Fig. 4.1 is a diagram of a cross-section of a root.

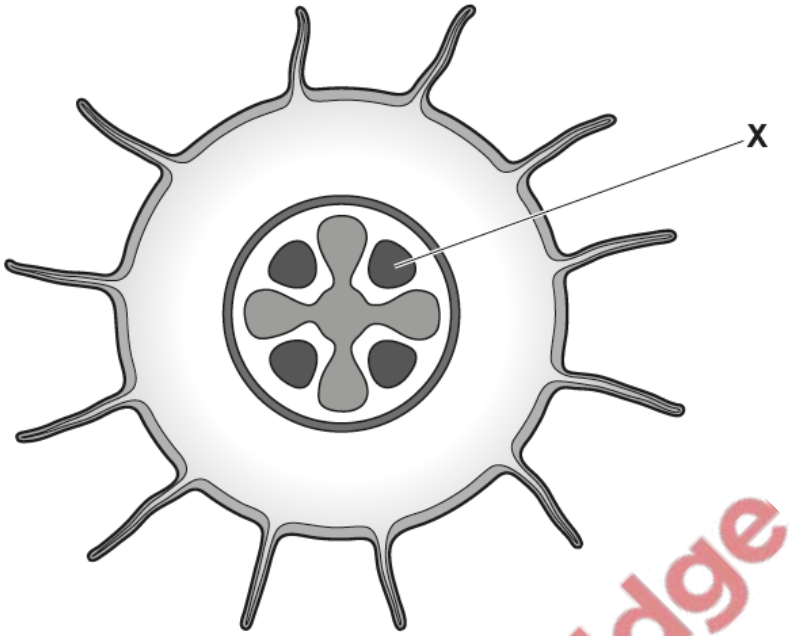



**Fig. 4.1**

**(i)** (Circle) **two** substances transported by the part labelled **X** in Fig. 4.1.

**amino acids** **cellulose** **fatty acids** **glucose**

**glycogen** **starch** **sucrose**

[2]

**(ii)** Label the part of the root in Fig. 4.1 that absorbs mineral ions from the soil with a label line and the correct name. [2]

**(b)** Mineral ions are absorbed by active transport and are transported with water in the xylem.

**(i)** Describe what is meant by the term active transport.

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..... [3]

**(ii)** State **one** function of xylem other than transport.

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**(c)** Transpiration is the loss of water vapour from leaves.

State **two** environmental factors that affect the rate of transpiration.

1 .....

2 .....

[2]

[Total: 10]

**13.** June/2023/Paper_0610/43/No.2

Transpiration is the loss of water vapour from the leaves of a plant.

**(a)** Complete the sentence describing transpiration.

Water evaporates from the surfaces of the ..... cells into the air spaces and then ..... out of the leaves, through the stomata, as water vapour.

[2]

**(b)** Explain how water moves upwards in the xylem.

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..... [3]

**(c)** A student investigated the effect of wind speed on the rate of transpiration in a small *Pachira aquatica* tree.

They measured the rate of transpiration when the plant was placed in different wind speeds in both the light and the dark. The tree was given an adequate supply of water.

The results of this investigation are shown in Fig. 2.1.

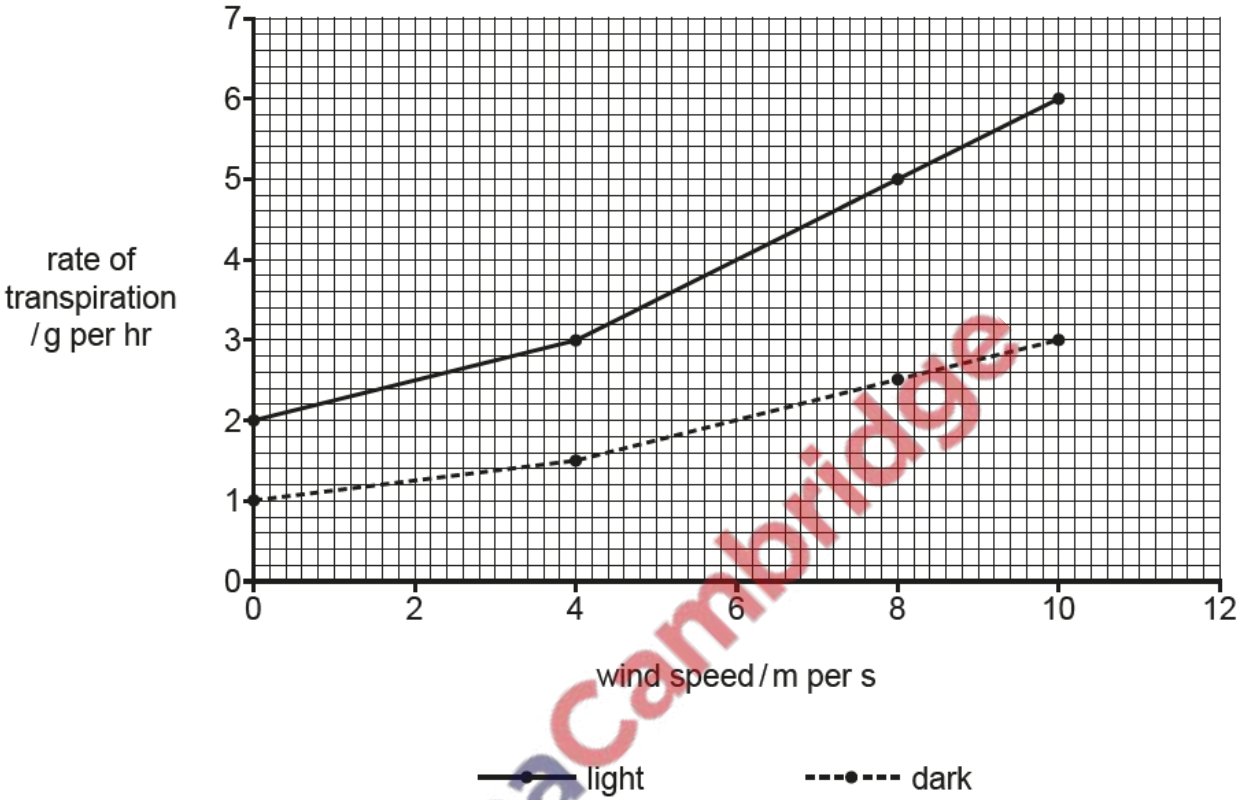


**Fig. 2.1**

**(i)** Describe and explain the results shown in Fig. 2.1.

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..... [4]

**(ii)** The investigation was repeated in the light with the same species of tree in an environment where the humidity was higher.

Draw a line **on Fig. 2.1** to predict the results in the **light** with increased humidity. [1]

**(iii)** The investigation described in **2(c)** was repeated (different wind speeds in both the light and the dark).

However, the tree was **not** given an adequate supply of water during the investigation.

Predict the result and explain your prediction.

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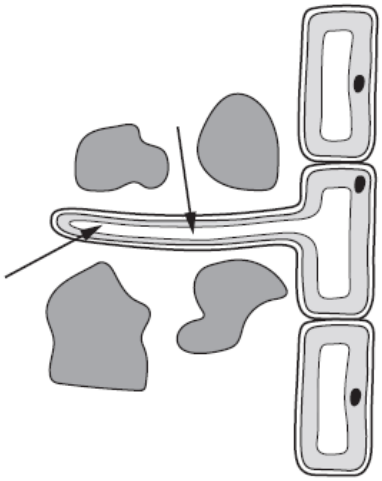
..... [4]

[Total: 14]

**14.** March/2023/Paper_ 0610/12,22/No.17,15

The arrows show the movement of substances from the soil into a root hair cell.



Which substances move from the soil into the root hair cell?

**A** carbon dioxide and oxygen

**B** glucose and water

**C** mineral ions and glucose

**D** water and mineral ions



**15.** March/2023/Paper_ 0610/12/No.18

By which process does water escape from stomata in the leaves?

**A** active transport

**B** diffusion

**C** evaporation

**D** osmosis

**16.** March/2023/Paper_ 0610/22/No.16

By which process does water escape from stomata in the leaves?

**A** active transport

**B** diffusion

**C** evaporation

**D** osmosis

**(a)** A student investigated the rate of water loss from leaves at two different temperatures.

The student measured the mass of one leaf at the same time every day for seven days.

The leaf was kept at 15 °C.

The student repeated this with a similar-sized leaf kept at 25 °C.

Fig. 2.1 shows some of the apparatus used.

**Fig. 2.1**

The results are shown in Fig. 2.2.

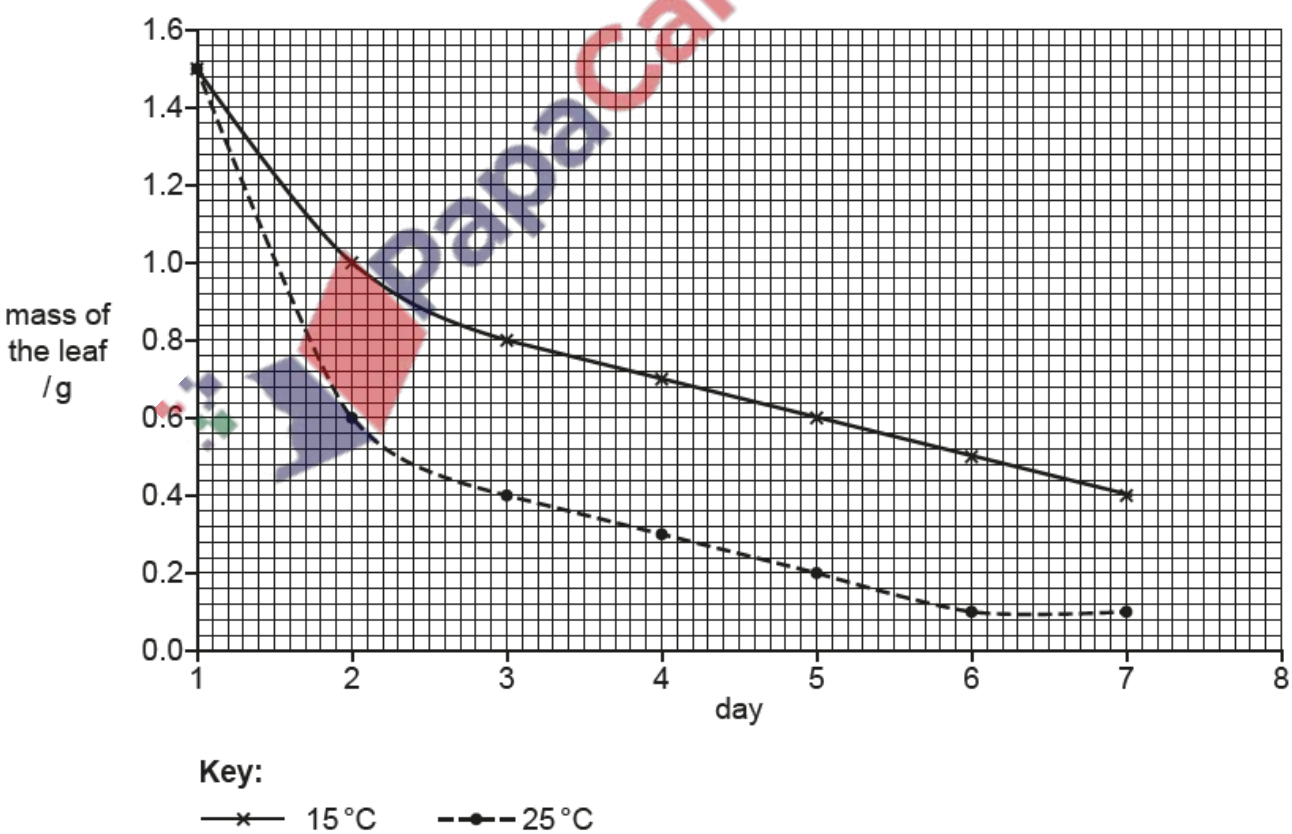



**Fig. 2.2**

**(i)** Describe the results shown in Fig. 2.2.

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..... [3]

**(ii)** Complete the sentences to explain the process shown by the results in Fig. 2.2.

Water evaporates from the surfaces of the ..... cells in the leaf.

The water evaporates into the ..... spaces.

Water vapour moves out of the leaf through the ..... by diffusion.

This process is called ..... .

[4]

**(iii)** State the name of the vessels that transport water to the leaves from the roots.

..... [1]

**(b)** Fig. 2.3 is a photomicrograph of the lower surface of a leaf.

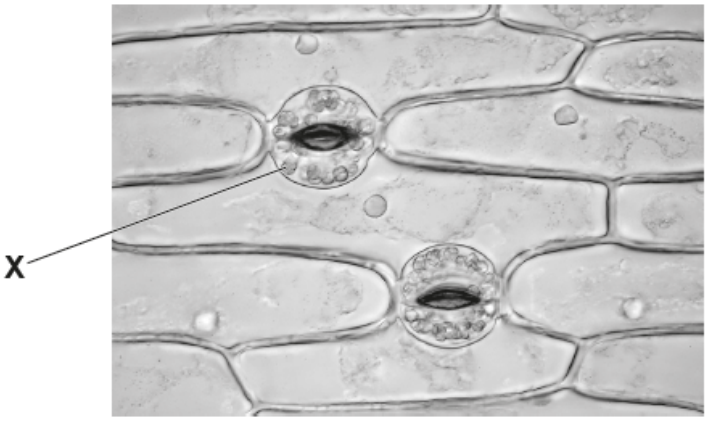


**Fig. 2.3**

**(i)** State the name of the cell labelled **X** in Fig. 2.3.

..... [1]

**(ii)** Identify **one** structure that identifies the cells in Fig. 2.3 as plant cells.

..... [1]

**(c)** Explain why leaves usually have a large surface area.

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..... [2]

[Total: 12]

**18.** March/2023/Paper_ 0610/42/No.4

**(a)** Fig. 4.1 is a photograph of a tree that has been girdled.

Girdling involves removing a complete circle of bark and phloem from around the tree.

Fig. 4.1

**(i)** Explain why the area above the girdle in Fig. 4.1 will become swollen.

Use the terms source and sink in your answer.

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..... [4]

(ii) Explain why the leaves in girdled trees are still able to receive mineral ions from the roots.

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**(b)** Explain why glucose made during photosynthesis is required for the absorption of mineral ions by the roots.

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**(c)** State the balanced symbol equation for photosynthesis.

..... [2]

[Total: 11]