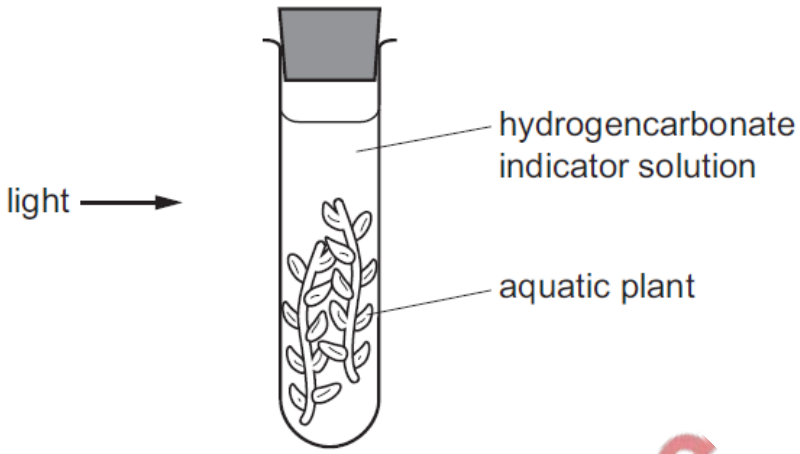
Plant nutrition – 2023 June IGCSE Biology 0610

1. June/2023/Paper_0610/11/No.12

An experiment is set up to investigate gas exchange in aquatic plants.



The hydrogencarbonate indicator solution is orange at the start.

Which colour is it after three hours?

A blue-black

B orange

C purple

D yellow

2. June/2023/Paper_0610/11/No.13

How are most leaves adapted for photosynthesis?

A They have a large surface area and are thick.

B They have a large surface area and are thin.

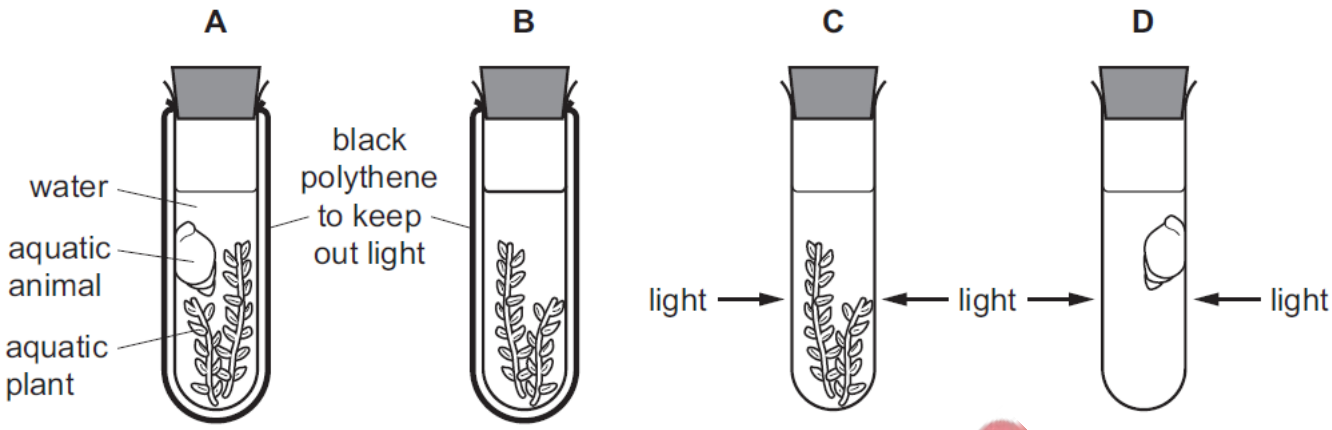
C They have a small surface area and are thick.

D They have a small surface area and are thin.

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

Four test-tubes are set up as shown.

Which test-tube contains the least carbon dioxide after one hour?



4. June/2023/Paper_0610/12/No.13

Which row shows the uses of some carbohydrates in plants?

	glucose	starch	sucrose
A	cell walls	transport	energy storage
B	energy storage	cell walls	respiration
C	respiration	energy storage	transport
D	transport	respiration	cell walls

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

By which process does oxygen pass out of a leaf?

A diffusion

B osmosis

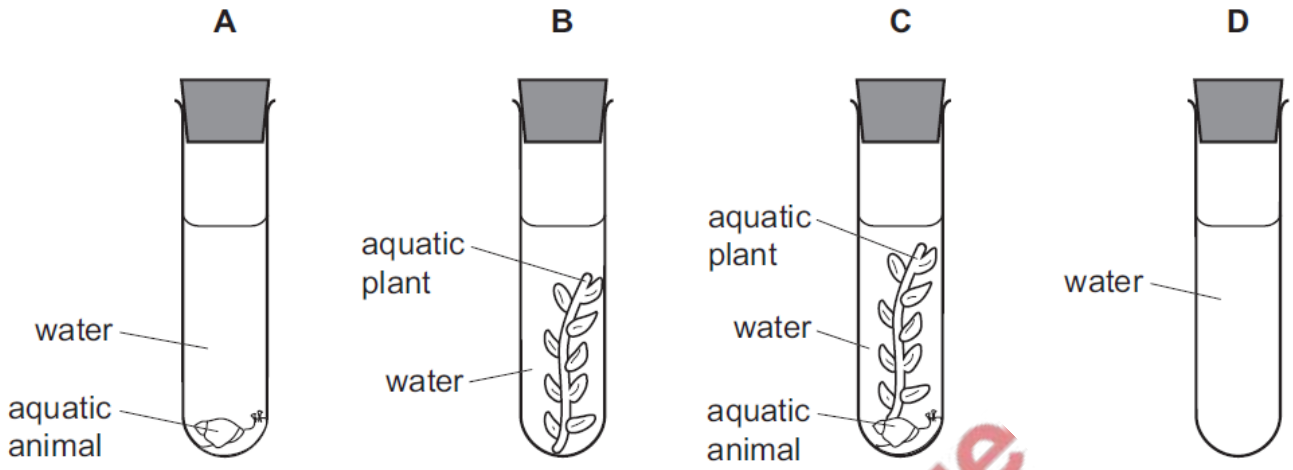
C egestion

D transpiration

6. June/2023/Paper_0610/13/No.12

Four test-tubes are set up as shown and left in bright sunlight.

After several hours, which test-tube contains the most oxygen?



7. June/2023/Paper_0610/13/No.13

Which statement about photosynthesis is correct?

A Carbon dioxide and glucose are the raw materials.

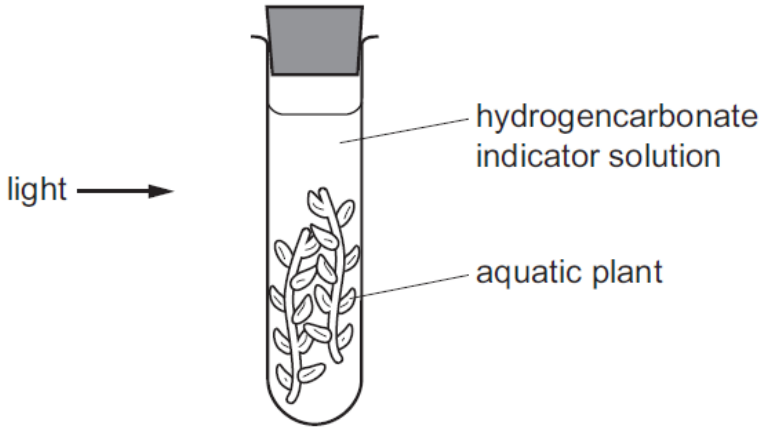
B Carbon dioxide and glucose are produced.

C Oxygen and glucose are produced.

D Oxygen and glucose are the raw materials.

8. June/2023/Paper_0610/21/No.11

An experiment is set up to investigate gas exchange in aquatic plants.



The hydrogencarbonate indicator solution is orange at the start.

Which colour is it after three hours?

A blue-black

B orange

C purple

D yellow

9. June/2023/Paper_0610/21/No.12

Certain factors are needed for photosynthesis.

If a factor is in short supply, it limits the rate of photosynthesis.

Which of these could be limiting factors?

1 carbon dioxide

2 oxygen

3 light intensity

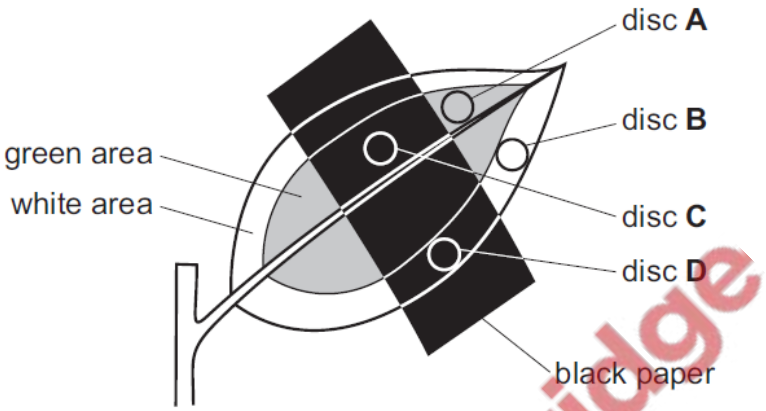
A 1 and 2 **B** 1 and 3 **C** 2 and 3 **D** 3 only

10. June/2023/Paper_0610/22/No.11

The diagram shows a leaf on a plant used in a photosynthesis experiment. At the start of the experiment, there is no starch in the leaf.

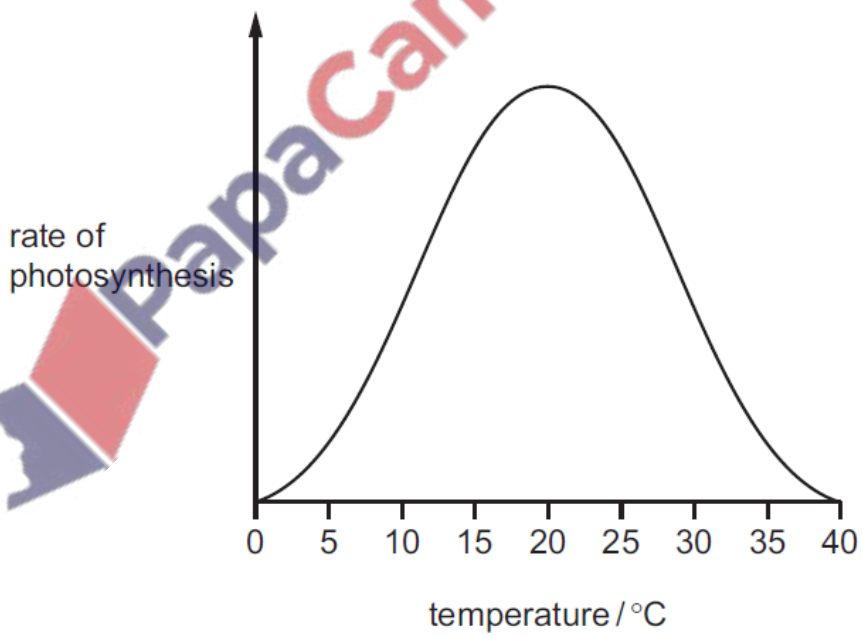
A piece of black paper is attached to the upper surface of the leaf. The plant is placed in bright light for 12 hours. Four discs are then cut from the leaf in the positions shown on the diagram. The discs are tested for starch.

Which disc contains starch?



11. June/2023/Paper_0610/22/No.12

The graph shows the effect of temperature on the rate of photosynthesis.



Which statement explains the change in rate of photosynthesis between 15 °C and 20 °C?

A Chlorophyll is able to transfer more energy in chemicals to energy in light.

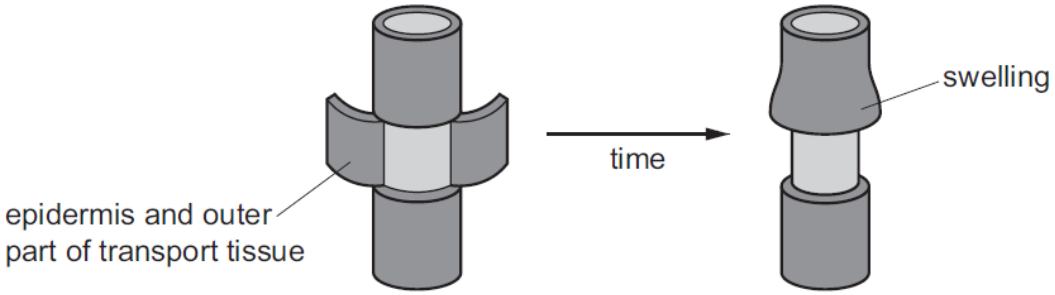
B Enzymes involved in photosynthesis have denatured.

C Kinetic energy of molecules is increasing, resulting in more effective collisions.

D Light intensity and **not** temperature is limiting the rate of photosynthesis.

12. June/2023/Paper_0610/22/No.16

During an investigation into the movement of substances in a plant, a ring of tissue containing the outer part of the transport tissue is removed, as shown.



Which statement explains why a swelling develops in the stem?

A Phloem has been removed causing a build up of sucrose and amino acids.

B Phloem has been removed causing a build up of water and mineral ions.

C Xylem has been removed causing a build up of sucrose and amino acids.

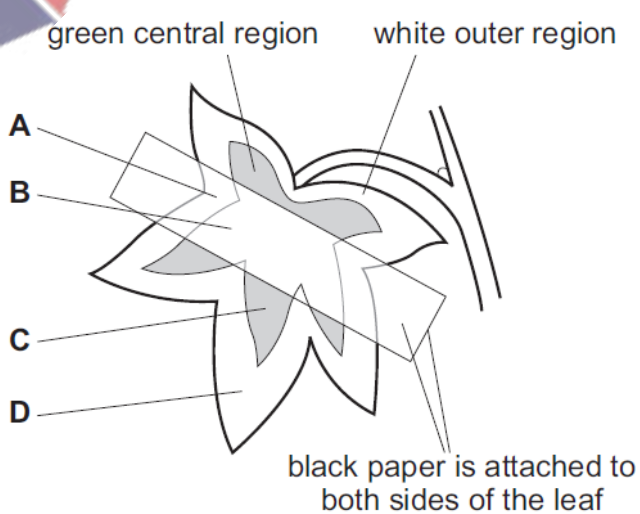
D Xylem has been removed causing a build up of water and mineral ions.

13. June/2023/Paper_0610/23/No.11

A plant with variegated leaves was placed in a dark cupboard for 48 hours so that all the starch was removed from the leaves. The variegated leaves have green parts and white parts.

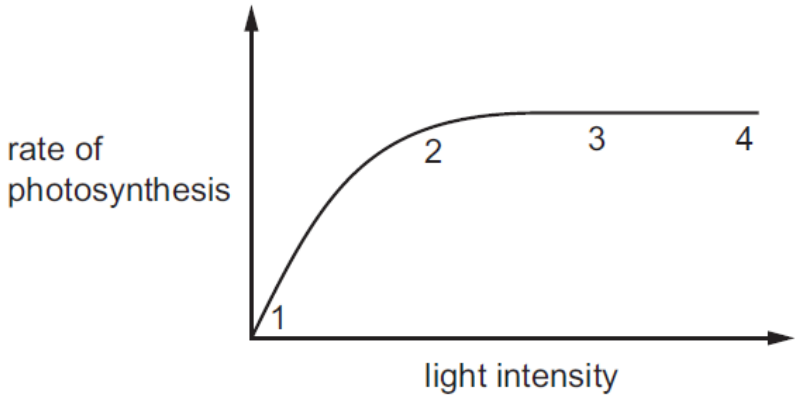
Black paper was then fixed on one leaf and the plant was exposed to the light.

After 24 hours, which region of the leaf contained starch?



14. June/2023/Paper_0610/23/No.12

The graph shows the rate of photosynthesis with increasing light intensity.



Where is light intensity a limiting factor for photosynthesis?

A between 1 and 2

B between 1 and 3

C between 2 and 4

D between 3 and 4

15. June/2023/Paper_0610/41/No.2d

Explain the effect of a lack of magnesium ions on the colour of plant leaves.

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..... [2]

16. June/2023/Paper_0610/41/No.4

(a) Fig. 4.1 shows the effect of light intensity on the rate of photosynthesis at different temperatures and concentrations of carbon dioxide.

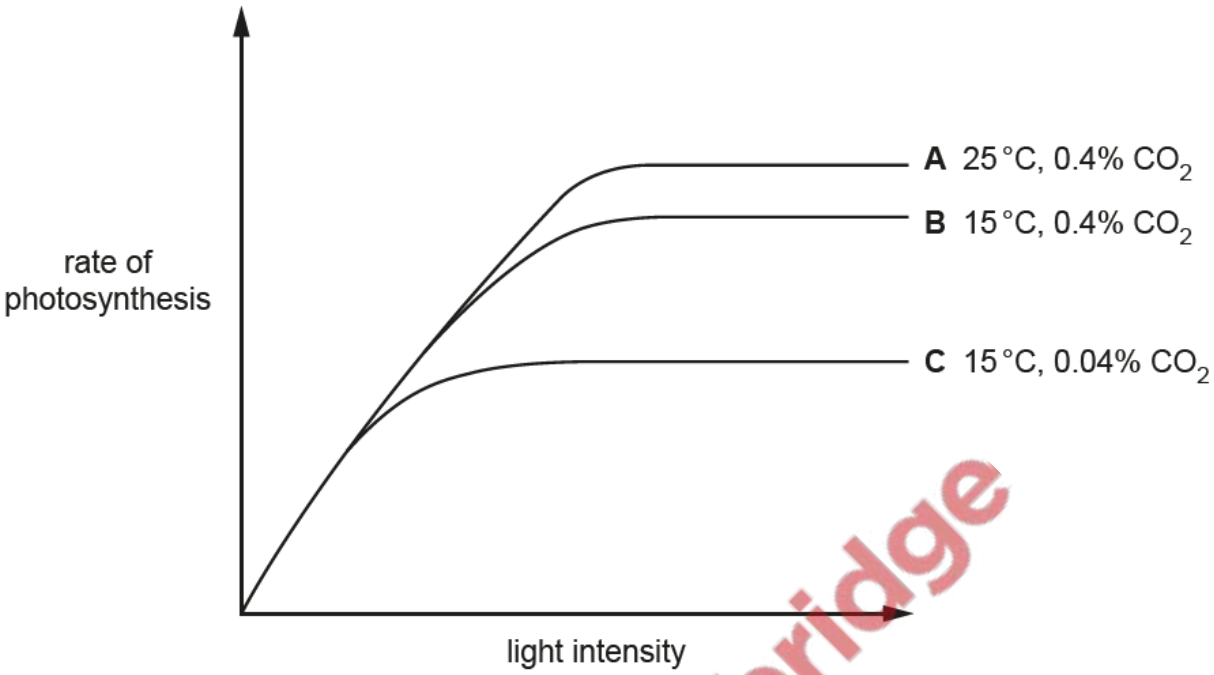

Fig. 4.1

Describe **and** explain the reasons for the shape of lines **B** and **C** in Fig. 4.1.

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(b) $C_6H_{12}O_6$ is one of the products of photosynthesis.

State the chemical formula of the **other** product.

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(c) Outline how the carbohydrates made during photosynthesis are used in plants.

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..... [4]

[Total: 11]

17. June/2023/Paper_0610/42/No.1

Fig. 1.1 is a diagram of part of a cross-section of a leaf.

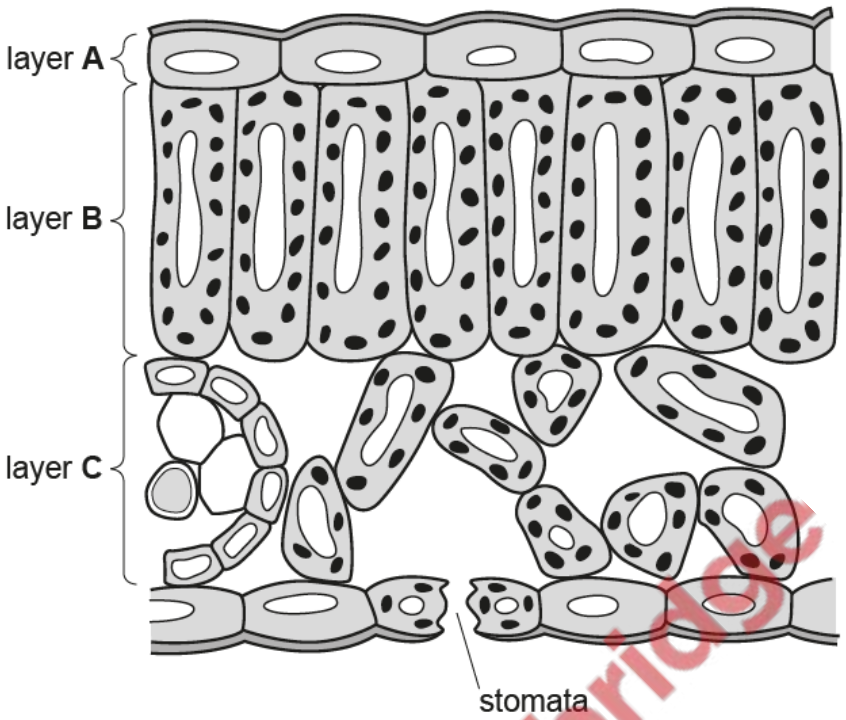

Fig. 1.1

(a) Explain why a leaf is considered to be an organ.

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(b) Explain how layer **B** and layer **C** in Fig. 1.1 are adapted for their functions.

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(c) A student placed a plant in a very hot room for 12 hours. There was a bright light in the room and the plant was not given any water during the 12-hour period.

Fig. 1.2 shows a series of sketches that the student made of the stomata during the investigation.

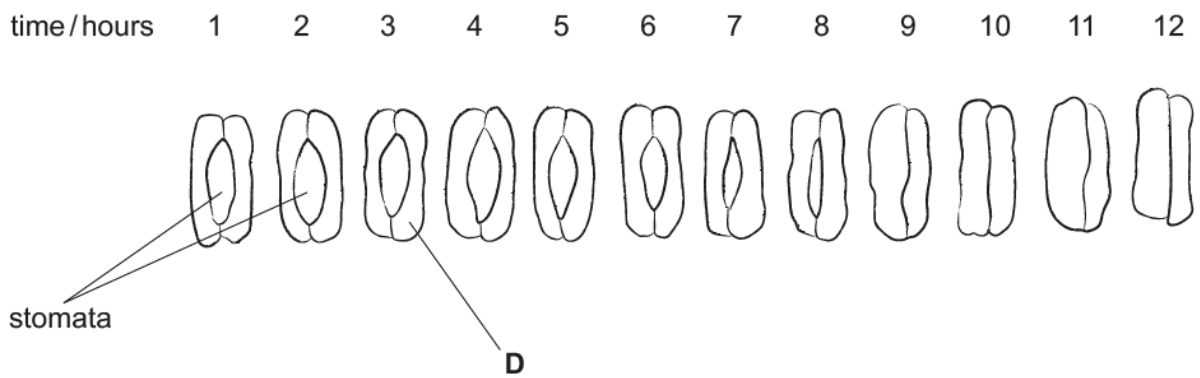

Fig. 1.2

(i) Identify the cell labelled **D** on Fig. 1.2.

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(ii) State the main function of the stomata.

..... [1]

(iii) State the advantage to the plant of the change to the stomata shown in Fig. 1.2.

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(d) The student increased the humidity in the room and repeated the investigation.

Predict and explain the effect of high humidity on the stomata.

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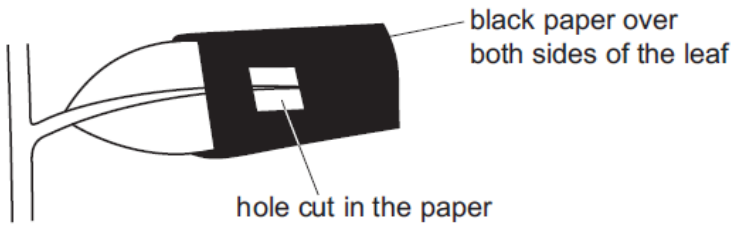
..... [3]

[Total: 14]

18. March/2023/Paper_ 0610/12,22/No.12,11

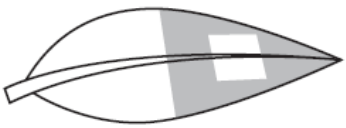
A plant is placed in the dark until all its stored starch is used up. The plant is placed in light with black paper over part of one green leaf.



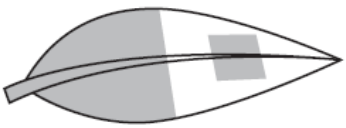
After eight hours, the leaf is tested for starch.

Which diagram shows the appearance of the leaf after this test?

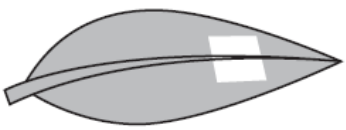
A



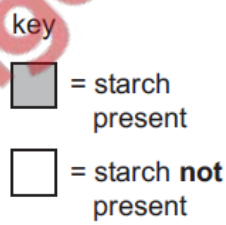
B



C

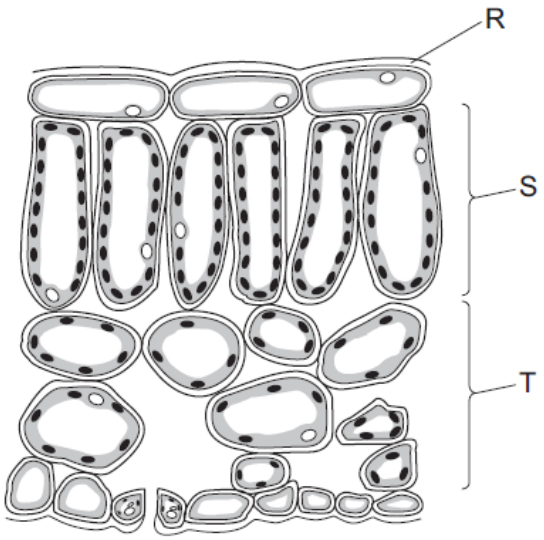


D



19. March/2023/Paper_ 0610/12/No.13

The diagram shows part of a cross-section of a leaf.



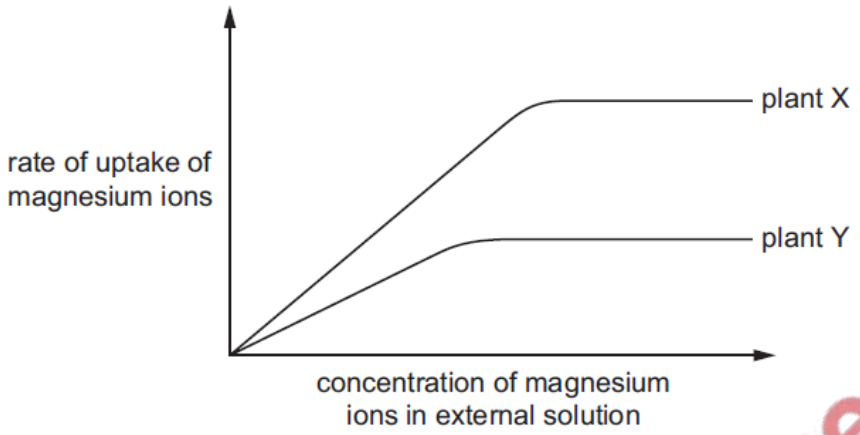
Which row shows the correct labels?

	R	S	T
A	cuticle	palisade mesophyll	spongy mesophyll
B	cuticle	spongy mesophyll	palisade mesophyll
C	epidermis	palisade mesophyll	spongy mesophyll
D	epidermis	spongy mesophyll	palisade mesophyll

20. March/2023/Paper_ 0610/22/No.6

The graph shows the rate of uptake of magnesium ions by two similar plants, X and Y.

The roots of each plant were placed in a range of solutions. Each solution contained a different concentration of magnesium ions. All other conditions were kept constant.



What is a possible explanation for the difference in the results for the two plants?

A Plant Y has fewer protein carriers for magnesium ions in its cell membranes.

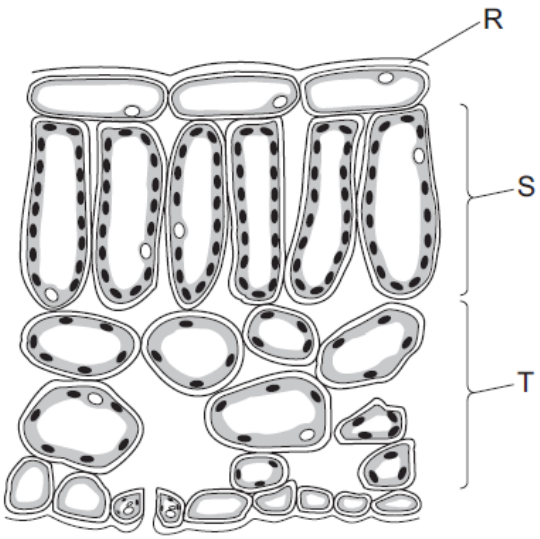
B Plant Y has a higher rate of respiration.

C Plant Y has more root hair cells.

D The root hair cells in plant Y have a lower water potential.

21. March/2023/Paper_ 0610/22/No.12

The diagram shows part of a cross-section of a leaf.



Which row shows the correct labels?

	R	S	T
A	cuticle	palisade mesophyll	spongy mesophyll
B	cuticle	spongy mesophyll	palisade mesophyll
C	epidermis	palisade mesophyll	spongy mesophyll
D	epidermis	spongy mesophyll	palisade mesophyll