Plant nutrition – 2021 IGCSE 0610

1. March/2021/Paper_12/No.12

In which process is oxygen a waste product?

A active transport

B aerobic respiration

C anaerobic respiration

D photosynthesis

2. March/2021/Paper_12/No.2

Which species can breed with *Prunella vulgaris* to produce fertile offspring?

	Prunella modularis	*Vespula vulgaris*
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

key

✓ = yes

✗ = no

3. March/2021/Paper_32/No.5

(a) A student investigated the effect of the concentration of carbon dioxide on the rate of photosynthesis in an aquatic plant.

Table 5.1 shows the results of the investigation.

Table 5.1

concentration of carbon dioxide / ppm	rate of release of oxygen / cm^3 per hour
0	0.0
100	11.2
300	26.1

(i) Describe **and** explain the results shown in Table 5.1.

.....

.....

.....

.....

.....

.....

..... [3]

(ii) State why the temperature should have been kept constant during this investigation.

.....

.....

..... [1]

(b) Carbon dioxide is an example of a greenhouse gas.

(i) State the name of **one other** greenhouse gas.

..... [1]

(ii) State the name of the chemical used to test for the presence of carbon dioxide and state the result of a positive test.

chemical .....

positive result .....

[2]

(c) Farmers use fertilisers on crops to improve crop growth. These fertilisers can cause pollution when washed into rivers.

State the names of **two other** substances used to improve crop yield that can cause pollution.

1 .....

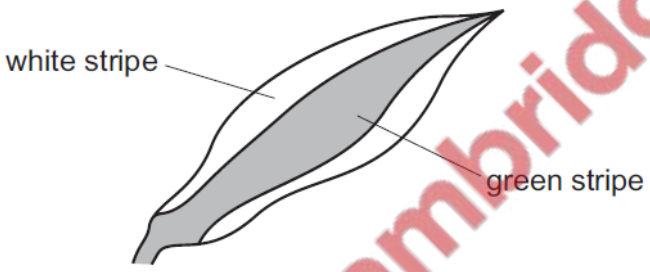
2 .....

[2]

[Total: 9]

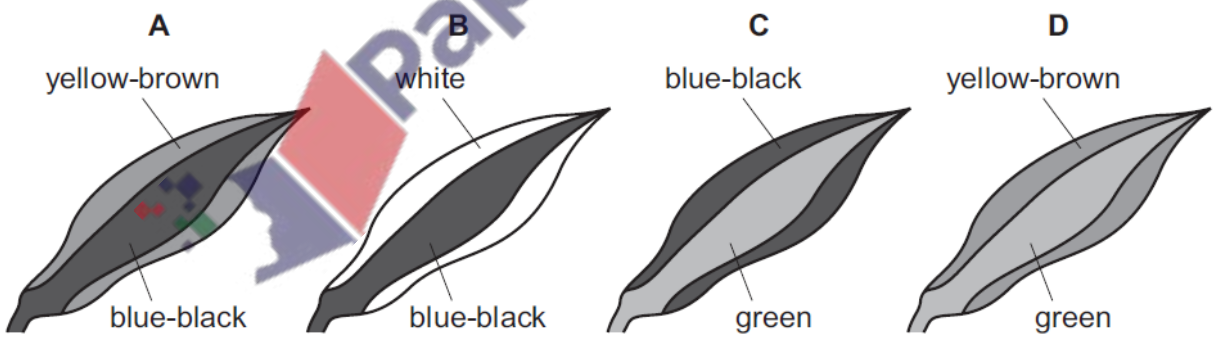
4. June/2021/Paper_11/No.12

A plant with striped leaves was kept in bright light for six hours.



A leaf was taken from the plant and the chlorophyll was removed. The leaf was then tested for starch using iodine solution.

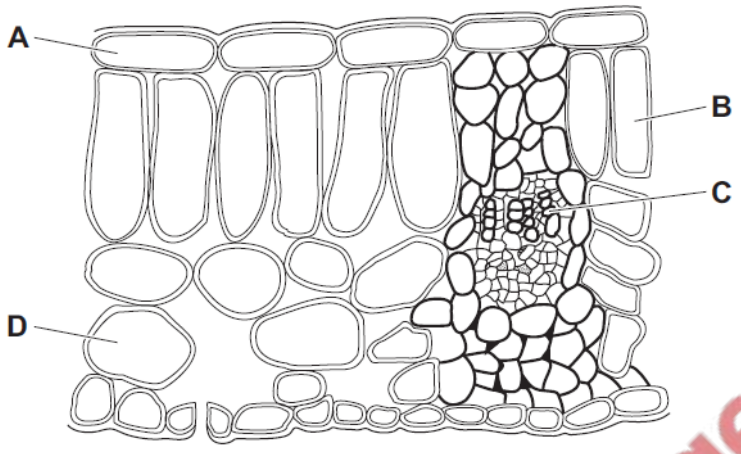
Which diagram shows the result of the test?



5. June/2021/Paper_11/No.13

The diagram shows a section through the leaf of a plant.

Which label shows a palisade mesophyll cell?



6. June/2021/Paper_12/No.4

Which part of a cell makes glucose?

A cell membrane

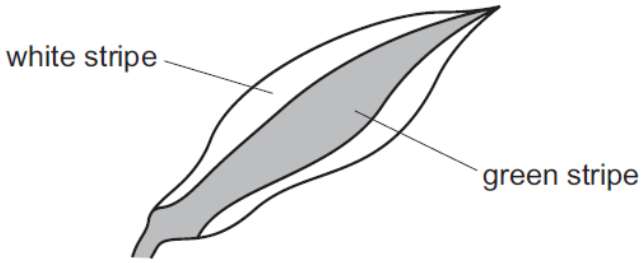
B chloroplast

C nucleus

D vacuole

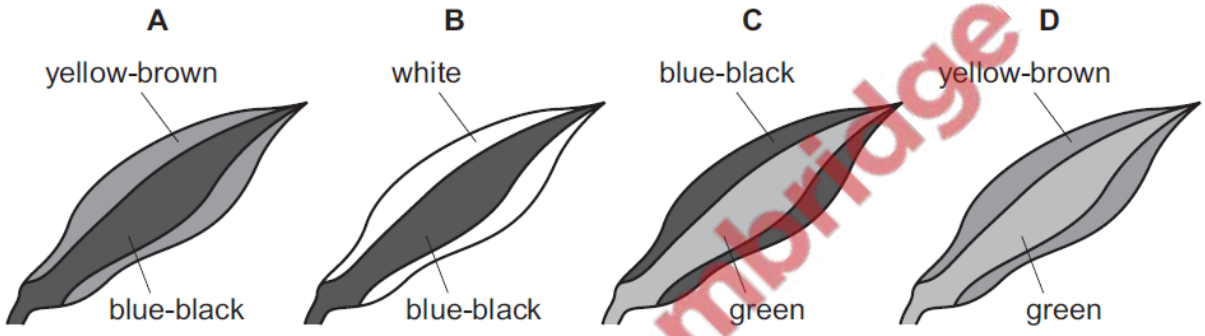
7. June/2021/Paper_12/No.12

A plant with striped leaves was kept in bright light for six hours.



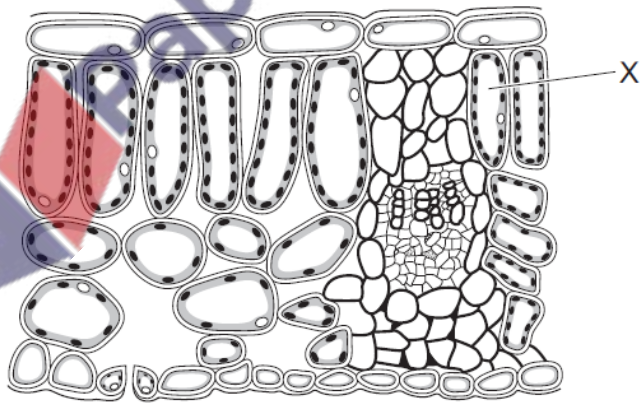
A leaf was taken from the plant and the chlorophyll was removed. The leaf was then tested for starch using iodine solution.

Which diagram shows the result of the test?



8. June/2021/Paper_12/No.13

The diagram shows a cross-section of a leaf.



What is the name of cell X?

A epidermal

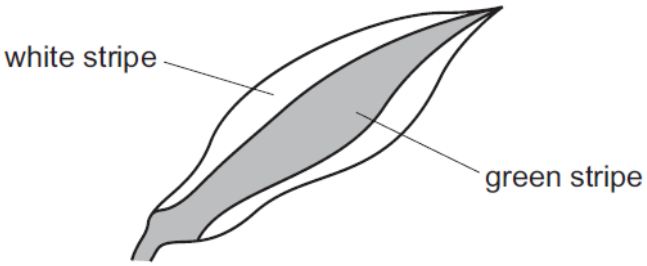
B guard

C palisade mesophyll

D spongy mesophyll

9. June/2021/Paper_13/No.12

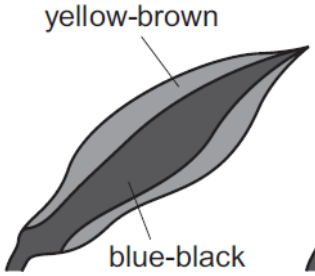
A plant with striped leaves was kept in bright light for six hours.



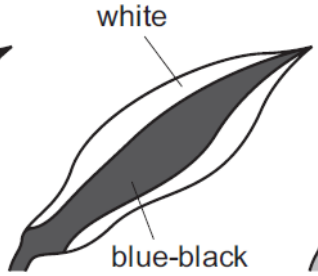
A leaf was taken from the plant and the chlorophyll was removed. The leaf was then tested for starch using iodine solution.

Which diagram shows the result of the test?

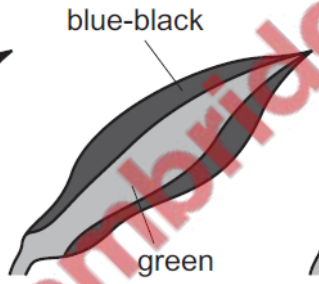
A



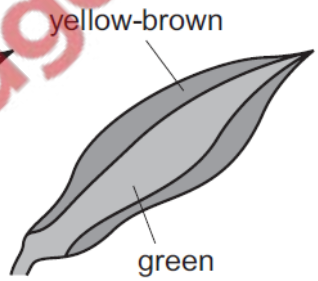
B



C



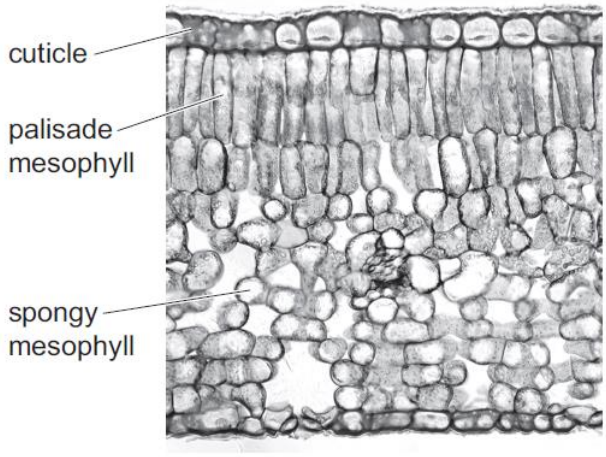
D



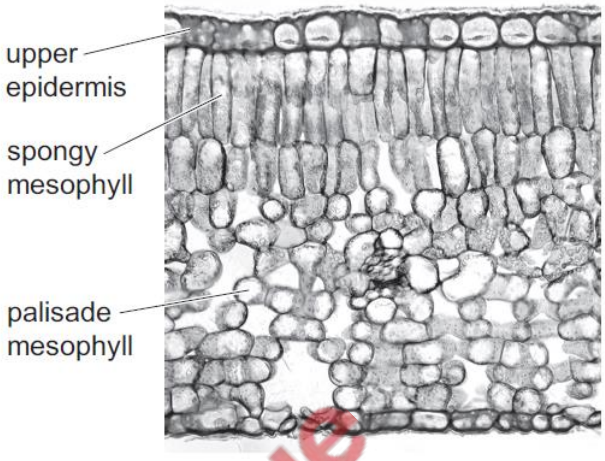
10. June/2021/Paper_13/No.13

Which photomicrograph of the leaf section has been correctly labelled?

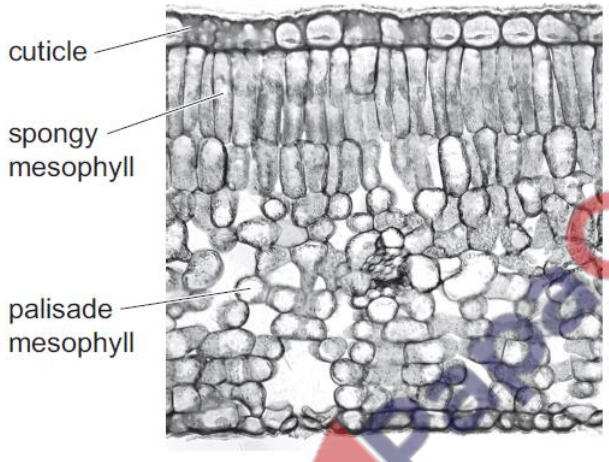
A



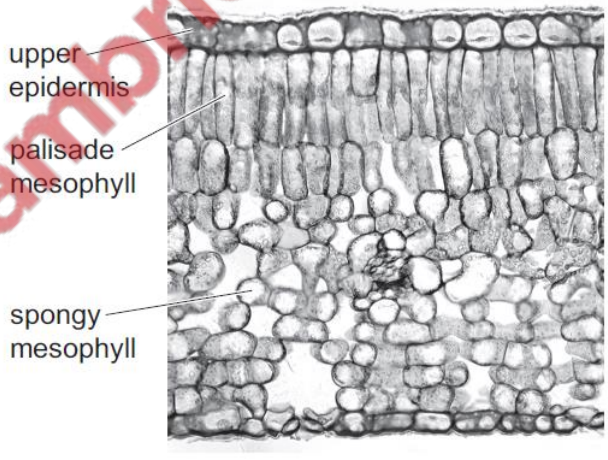
B



C

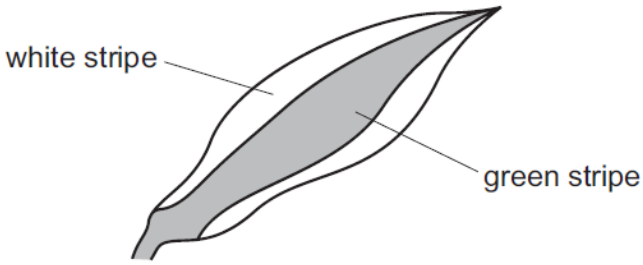


D



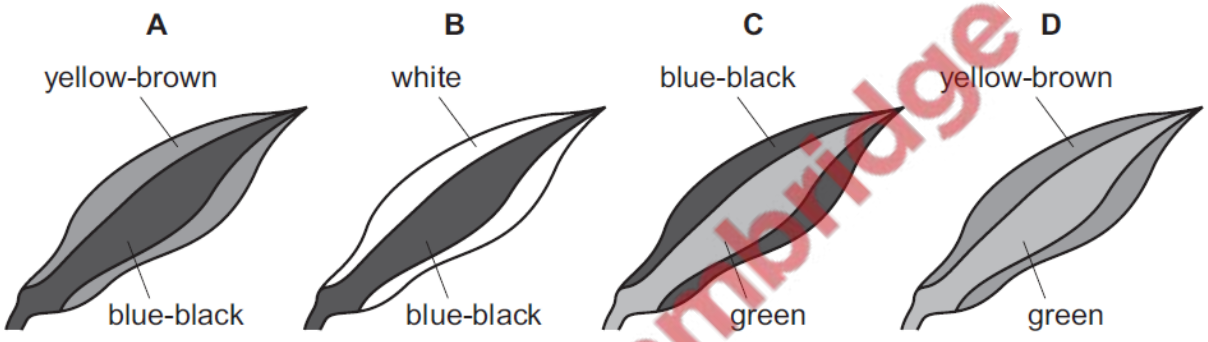
11. June/2021/Paper_21/No.13

A plant with striped leaves was kept in bright light for six hours.



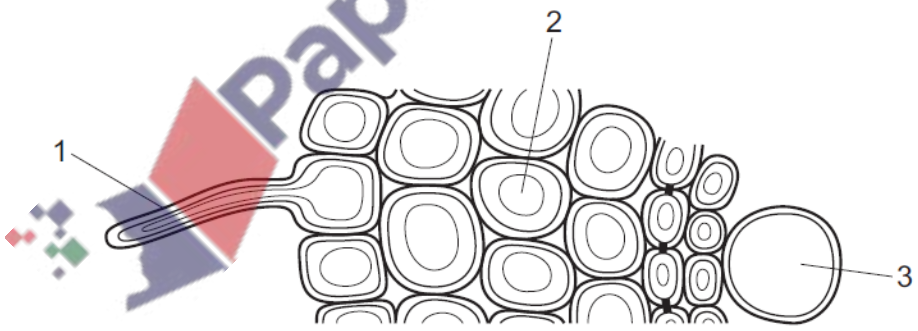
A leaf was taken from the plant and the chlorophyll was removed. The leaf was then tested for starch using iodine solution.

Which diagram shows the result of the test?



12. June/2021/Paper_21/No.18

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



What are cells 1, 2 and 3?

	1	2	3
A	root cortex cell	root hair cell	mesophyll cell
B	root hair cell	root cortex cell	xylem
C	root hair cell	root cortex cell	mesophyll cell
D	root cortex cell	root hair cell	xylem

13. June/2021/Paper_22/No.4

Which part of a cell makes glucose?

A cell membrane

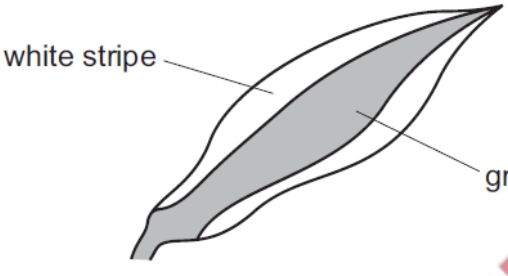
B chloroplast

C nucleus

D vacuole

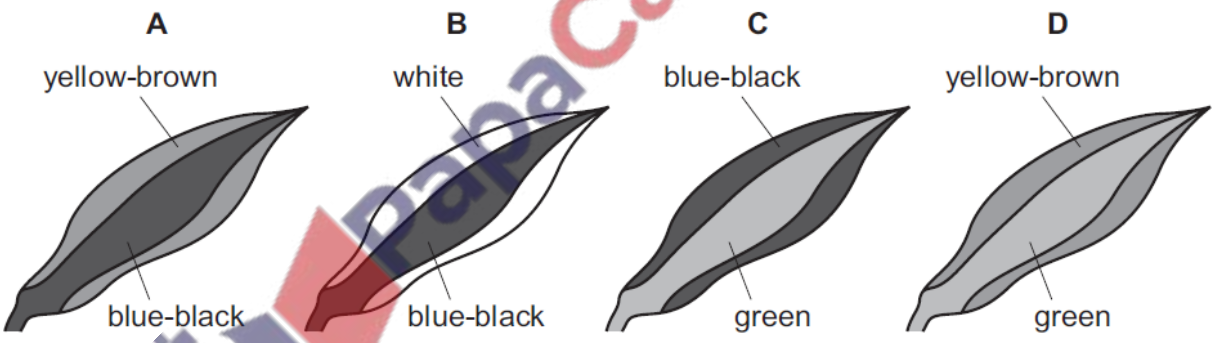
14. June/2021/Paper_22/No.13

A plant with striped leaves was kept in bright light for six hours.



A leaf was taken from the plant and the chlorophyll was removed. The leaf was then tested for starch using iodine solution.

Which diagram shows the result of the test?



15. June/2021/Paper_23/No.4

In which part of a cell does photosynthesis take place?

A vacuole

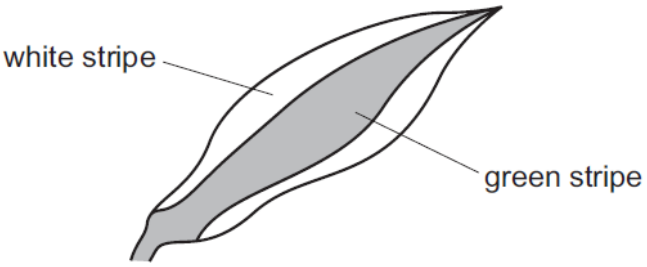
B nucleus

C chloroplast

D cytoplasm

16. June/2021/Paper_23/No.13

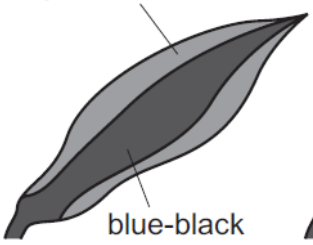
A plant with striped leaves was kept in bright light for six hours.



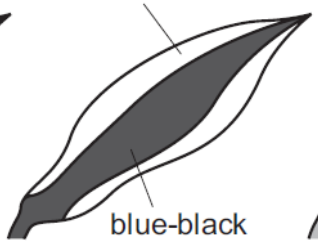
A leaf was taken from the plant and the chlorophyll was removed. The leaf was then tested for starch using iodine solution.

Which diagram shows the result of the test?

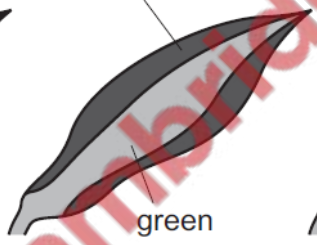
A



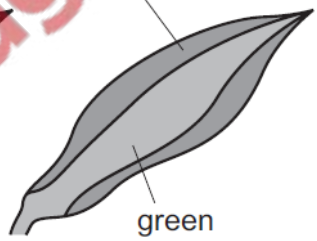
B



C



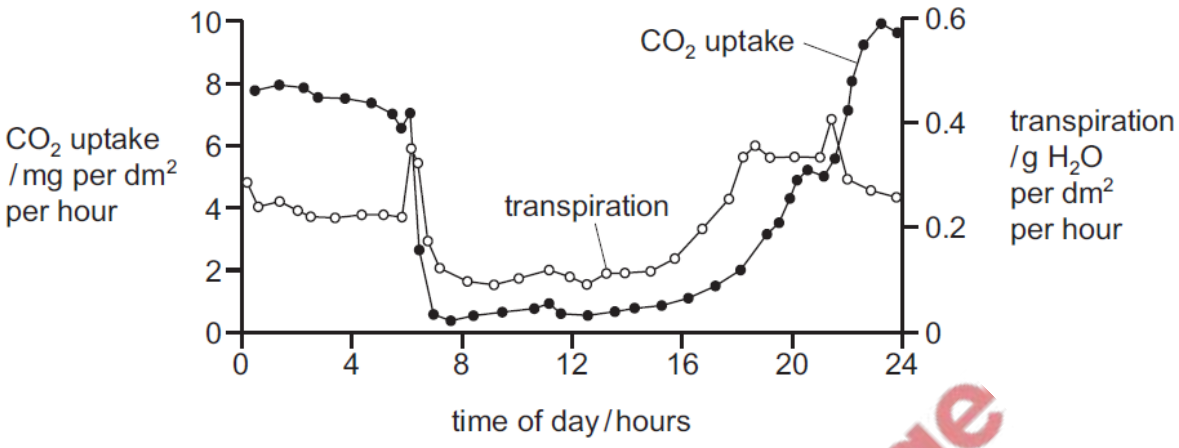
D



17. June/2021/Paper_23/No.14

The graph shows daily carbon dioxide uptake and transpiration by the plant *Agave americana*.

The plant is adapted to live in very dry conditions.



What can be concluded from this graph?

A More stomata are closed during dark periods.

B More stomata are closed during light periods.

C There is no carbon dioxide uptake during dark periods.

D There is no water uptake during light periods.

18. June/2021/Paper_32/No.2

(a) **(i)** List the chemical elements in a carbohydrate.

..... [1]

(ii) State the name of **one** chemical element that is found in a protein but is **not** found in a carbohydrate.

..... [1]

(b) Fig. 2.1 shows a variegated leaf which uses photosynthesis to make carbohydrates.

A variegated leaf has green parts that contain chlorophyll and white parts that do **not** contain chlorophyll.

Fig. 2.1

(i) State the word equation for photosynthesis.

..... [2]

(ii) The carbohydrate produced by photosynthesis can be stored as starch in the leaf.

A plant with variegated leaves used up its store of starch because it was placed in the dark.

Explain why the plant used up its store of starch when it was placed in the dark.

.....

.....

.....

.....

..... [2]

(iii) The plant with variegated leaves was then left in a warm, sunny place. After a few days, a leaf from this plant was removed and tested for starch.

Predict the results of the starch test by placing ticks (✓) in Table 2.1.

Table 2.1

part of leaf	starch present	starch absent
green		
white		

[1]

(iv) State the name of the mineral ion that is needed to make chlorophyll.

..... [1]

(c) Starch is a large molecule.

The boxes on the left show the names of some other large molecules.

The boxes on the right show some sentence endings.

Draw **five** lines to make five correct sentences.

large molecule	**sentence endings**
Cellulose	is made from amino acids.
DNA	is made from fatty acids and glycerol.
Glycogen	is made from glucose.
Oil	is the genetic material.
Protein	

[5]

[Total: 13]

19. June/2021/Paper_33/No.2

(a) **(i)** State the name of the process that occurs in the presence of chlorophyll.

..... [1]

(ii) State the name of the mineral ion the plant needs to make chlorophyll.

..... [1]

(iii) State the name of the structure that contains chlorophyll in a plant cell.

..... [1]

(b) Fig. 2.1 shows a diagram of a cross-section of a leaf.

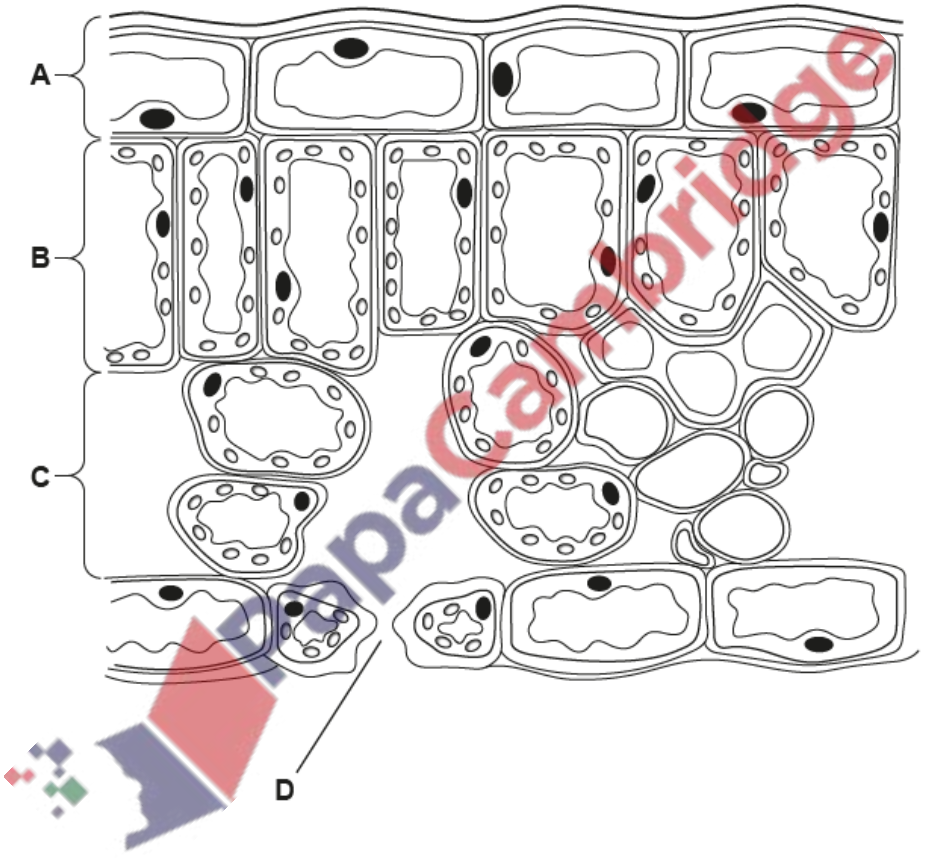


Fig. 2.1

(i) State the letter that identifies the part of the leaf that contains the most chlorophyll in Fig. 2.1.

..... [1]

(ii) State the name of the tissue in the leaf that does **not** contain chlorophyll.

..... [1]

[Total: 5]

20. June/2021/Paper_43/No.3

Scientists measured the rate of photosynthesis in the leaves of a sunflower plant, *Helianthus annuus*.

The scientists used the apparatus shown in Fig. 3.1 to measure the rate of photosynthesis.

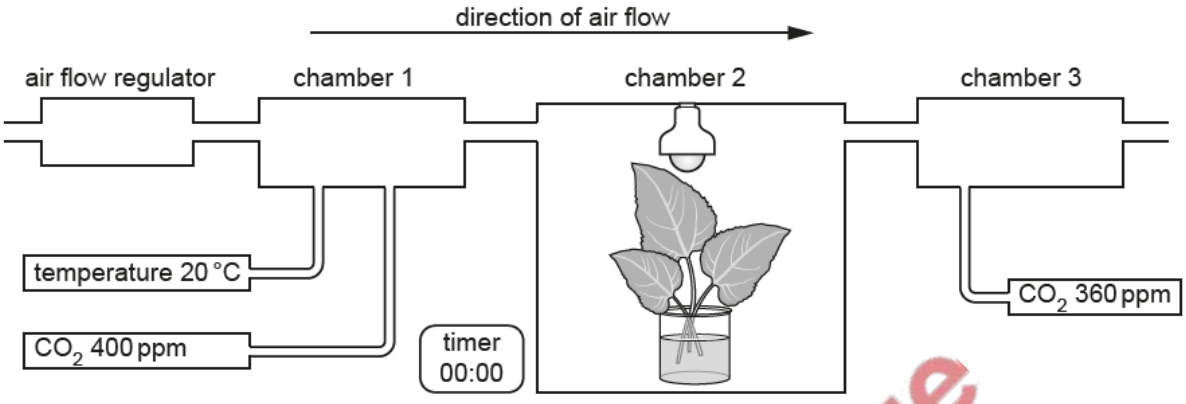


Fig. 3.1

(a) The apparatus in Fig. 3.1 maintains a constant temperature and a constant humidity.

(i) Explain why temperature has an effect on the rate of photosynthesis.

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

(ii) Explain why the rate of photosynthesis will decrease if the humidity in the apparatus becomes very low.

.....

.....

.....

.....

.....

.....

..... [3]

(iii) The apparatus was left for 15 minutes.

Explain how the scientists would use the readings for the concentration of carbon dioxide in chambers 1 and 3 to calculate the rate of photosynthesis.

.....

.....

.....

.....

..... [2]

(b) The scientists carried out another investigation using the same apparatus at different temperatures.

They measured the rate of uptake of carbon dioxide in the light and then they measured the rate of release of carbon dioxide in the dark.

The results are shown in Fig. 3.2.

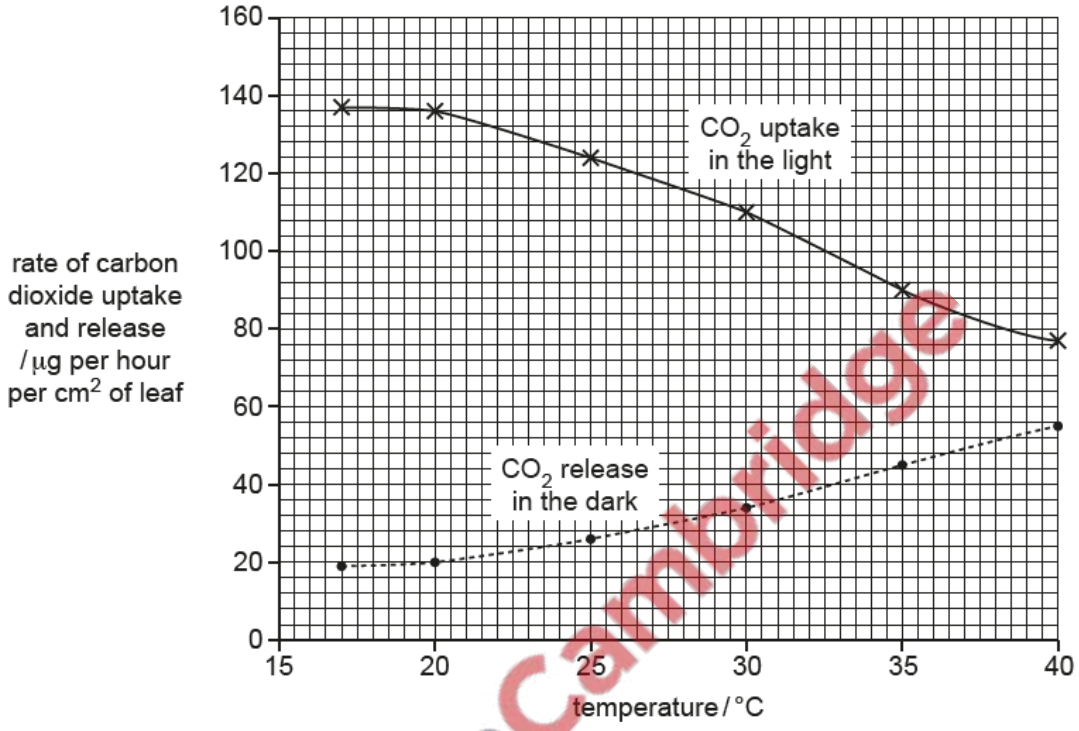


Fig. 3.2

(i) Use the information in Fig. 3.2 to complete Table 3.1.

Table 3.1

temperature / °C	rate of uptake of carbon dioxide in the light / μg per hour per cm^2 of leaf	rate of release of carbon dioxide in the dark / μg per hour per cm^2 of leaf
20		
35	90	45

[2]

(ii) The scientists determined that photosynthesis in the leaves at 35 °C used carbon dioxide at a rate of 135 μg per hour per cm^2 of leaf. Fig. 3.2 shows that the rate of carbon dioxide uptake at 35 °C was 90 μg per hour per cm^2 of leaf.

Explain why the rate at which carbon dioxide is used in photosynthesis is greater than the rate of carbon dioxide uptake.

.....

.....

.....

.....

..... [2]

(iii) Explain why the results in Table 3.1 are expressed as 'per cm^2 of leaf' rather than 'per leaf'.

.....

.....

..... [1]

(c) Some crops are grown in controlled environments. Glasshouses are an example of a controlled environment. Fig. 3.3 shows a glasshouse where lettuces are growing.

Fig. 3.3

Discuss the advantages of growing crops in glasshouses.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [6]

[Total: 20]