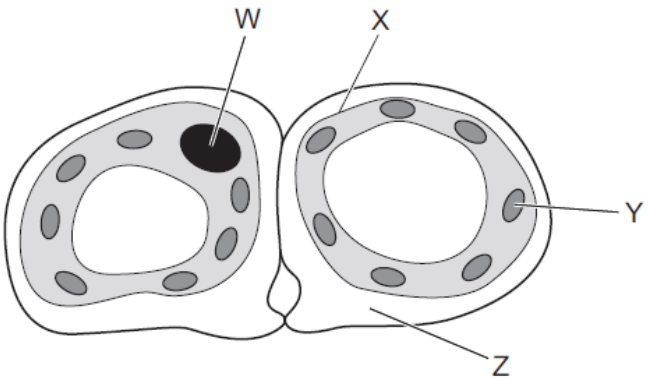
Plant nutrition – 2022 June IGCSE 0610

1. June/2022/Paper_ 11/No.4

The diagram shows a cross-section through two guard cells of a leaf.



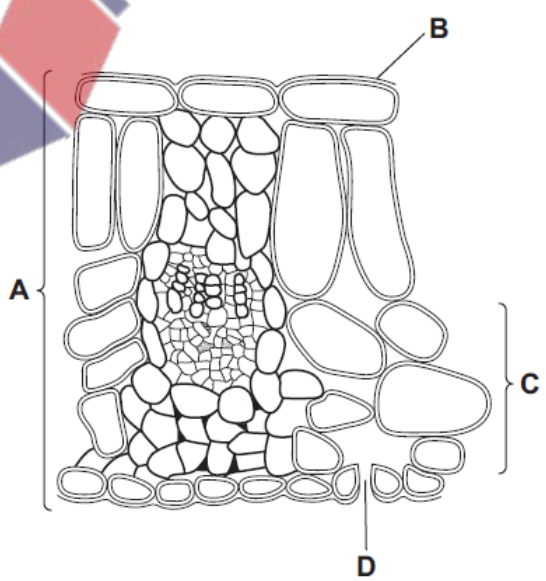
Which labelled structures would also be found in an animal cell?

A W and X **B** X and Y **C** Y and Z **D** Z and W

2. June/2022/Paper_ 11/No.5

The diagram shows a cross-section through a leaf.

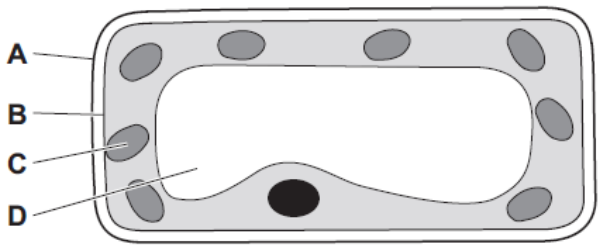
Which label shows a tissue?



3. June/2022/Paper_ 11/No.8

The diagram shows a section through a mesophyll cell of a leaf.

Which part is partially permeable?



4. June/2022/Paper_ 11/No.12

Which chemical is a product of photosynthesis that moves out of a green leaf through its stomata?

A carbon dioxide

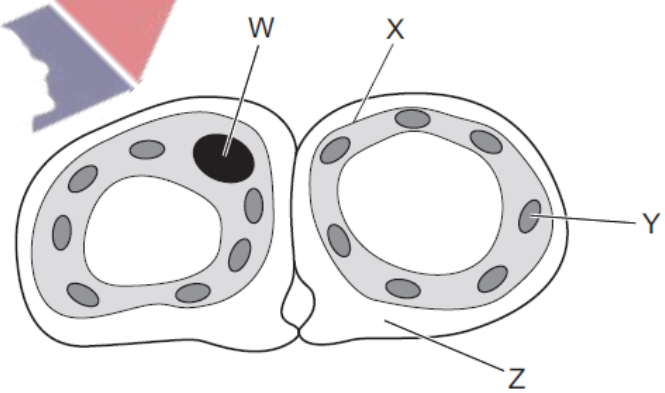
B glucose

C oxygen

D water

5. June/2022/Paper_ 12/No.4

The diagram shows a cross-section through two guard cells of a leaf.



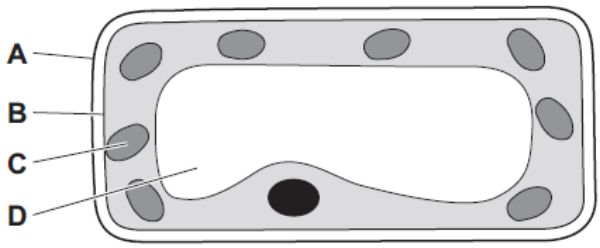
Which labelled structures would also be found in an animal cell?

A W and X **B** X and Y **C** Y and Z **D** Z and W

6. June/2022/Paper_ 12/No.8

The diagram shows a section through a mesophyll cell of a leaf.

Which part is partially permeable?



7. June/2022/Paper_ 12/No.12

Which chemical is a product of photosynthesis that moves out of a green leaf through its stomata?

A carbon dioxide

B glucose

C oxygen

D water

8. June/2022/Paper_ 12/No.13

In a leaf, water moves from the surface of a mesophyll cell and then out of the leaf into the atmosphere.

What is the correct order of the processes involved?

A active transport → osmosis

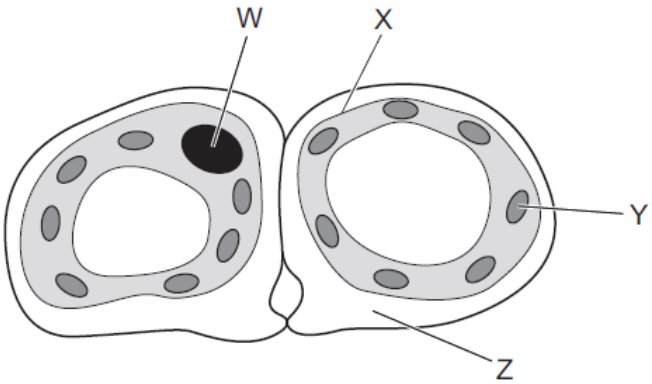
B diffusion → evaporation

C evaporation → diffusion

D osmosis → active transport

9. June/2022/Paper_ 13/No.4

The diagram shows a cross-section through two guard cells of a leaf.



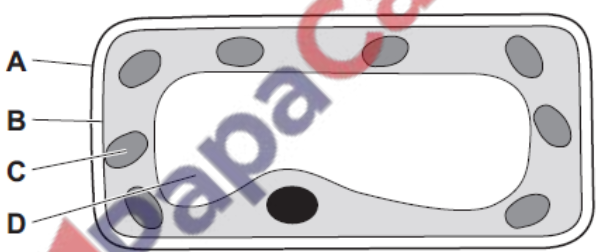
Which labelled structures would also be found in an animal cell?

A W and X **B** X and Y **C** Y and Z **D** Z and W

10. June/2022/Paper_ 13/No.8

The diagram shows a section through a mesophyll cell of a leaf.

Which part is partially permeable?



11. June/2022/Paper_ 13/No.12

Which chemical is a product of photosynthesis that moves out of a green leaf through its stomata?

A carbon dioxide

B glucose

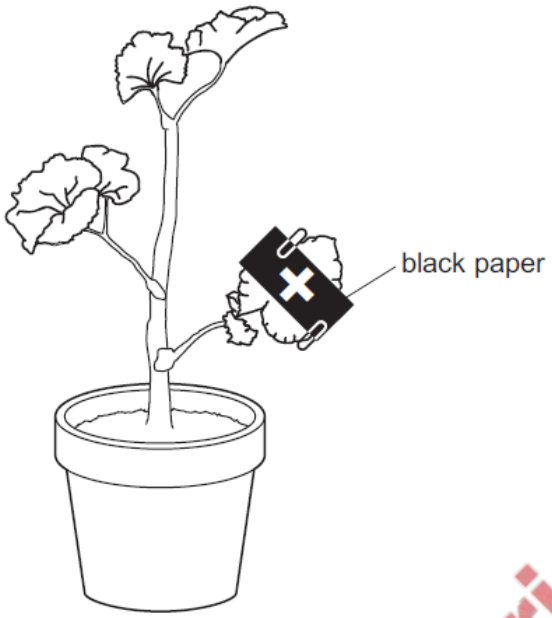
C oxygen

D water

12. June/2022/Paper_ 13/No.13

A student investigated one of the factors that affects photosynthesis.

Part of a leaf was covered with black paper, as shown.



After two days the student tested the leaf for the presence of starch.

Which factor did the student investigate?

A carbon dioxide

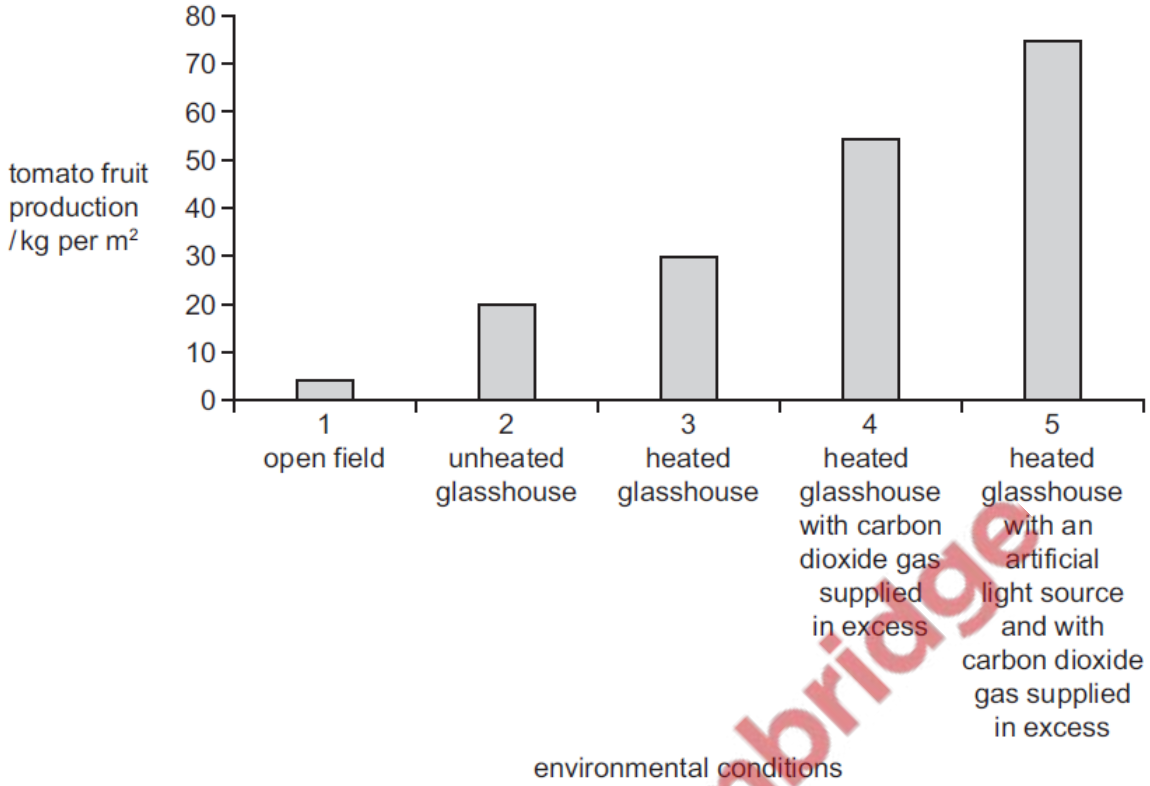
B chlorophyll

C light

D oxygen

13. June/2022/Paper_ 21/No.11

Tomato fruit production was measured in five different environmental conditions.



What is a correct conclusion for the data shown in the graph?

A There are no limiting factors in 1, so tomato fruit production is the lowest.

B Temperature is the limiting factor in 3.

C Carbon dioxide is the limiting factor in all five environmental conditions.

D Light is the limiting factor in 4.

14. June/2022/Paper_ 21/No.12

How do the air spaces in the spongy mesophyll of a leaf help to adapt it for photosynthesis?

A They act as a store of oxygen.

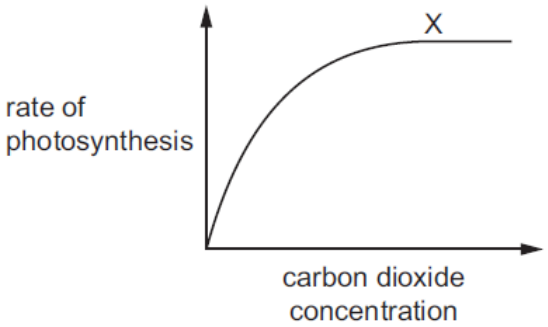
B They allow carbon dioxide gas to diffuse through the leaf more rapidly.

C They increase the surface area for absorption of light energy.

D They let rainwater enter the leaf tissues.

15. June/2022/Paper_ 23/No.11

The graph shows the rate of photosynthesis at different carbon dioxide concentrations.



What could be the limiting factor of photosynthesis at X on the graph?

A oxygen

B carbon dioxide

C glucose

D light intensity

16. June/2022/Paper_ 23/No.12

The list shows features of a plant leaf.

1 air spaces between spongy mesophyll cells

2 chloroplasts in mesophyll cells

3 contains a natural insecticide

4 xylem vessels close to mesophyll cells

Which features are adaptations for photosynthesis?

A 1, 2 and 3 **B** 1, 2 and 4 **C** 1, 3 and 4 **D** 2, 3 and 4

17. June/2022/Paper_ 32/No.7(c)

(c) Complete the sentences.

Seeds contain proteins for the ..... of developing shoots and roots. Proteins contain the elements ..... , oxygen, ... and nitrogen.

The new leaves of a seedling need the mineral ion ..... to make the green pigment ..... .

This green pigment is needed to carry out the process of ....., in the presence of light.

[6]

18. June/2022/Paper_ 33/No.2(a_ c)

Photosynthesis is a process that occurs in plant cells.

(a) **(i)** State the word equation for photosynthesis.

..... [2]

(ii) State the type of energy required for photosynthesis.

..... [1]

(b) Fig. 2.1 is a diagram of a section through a leaf.

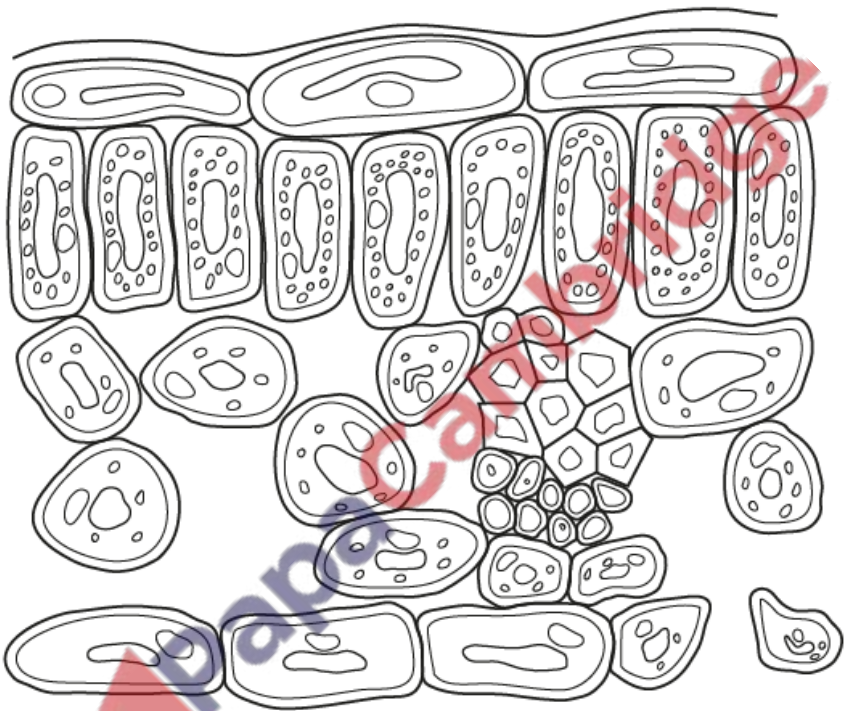


Fig. 2.1

(i) On Fig. 2.1:

- label with a label line **and** the letter **A** the type of cell where most photosynthesis takes place.
- label with a label line **and** the letter **B** the type of cell which conducts water through the plant.

[2]

(ii) State the name of the cell structure where photosynthesis happens.

..... [1]

(c) A student investigated the rate of photosynthesis in a plant at different temperatures.

The results are shown in Table 2.1.

Table 2.1

temperature / °C	rate of photosynthesis / arbitrary units
20	42
25	61
30	77
35	92
40	45

(i) State the temperature at which the rate of photosynthesis is highest.

..... °C [1]

(ii) Calculate the percentage increase in the rate of photosynthesis from 20 °C to 30 °C.

Give your answer to **three** significant figures.

Space for working.

..... %
[3]

19. June/2022/Paper_ 43/No.5(a_ b)

Glasshouses are designed to maximise crop plant yield.

(a) (i) Explain why carbon dioxide enrichment is used in many glasshouses to increase crop plant yield.

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..... [3]

(ii) Suggest how the carbon dioxide concentration in a glasshouse can be enriched.

.....

.....

..... [1]

(iii) Outline how carbon dioxide in a glasshouse moves into leaves.

.....

.....

.....

.....

..... [2]

(b) Additional lighting is often installed in glasshouses in countries with temperate climates.

Table 5.1 summarises some of the factors that are considered by plant growers when choosing the type of lamps to install in a glasshouse.

Table 5.1

type of lamp	electrical energy used by the lamp / J per s	light intensity output / arbitrary units	notes
sodium	1041	1767	• releases lots of heat • best when used in addition to sunlight
LED	423	378	• releases very little heat • can be used as an alternative to sunlight
metal halide	651	817	• releases some heat • can be used as an alternative to sunlight
fluorescent	394	374	• releases some heat • best when used in addition to sunlight

(i) Calculate the percentage increase in the energy used by the metal halide lamp compared to the energy used by the fluorescent lamp.

Give your answer to **two** significant figures.

Space for working.

..... %
[2]

(ii) State which type of lamp has the highest light intensity output per unit of electrical energy used.

..... [1]

(iii) Some types of lamp release a lot of heat.

Explain the possible effects of excessive heat on the plants in a glasshouse.

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..... [3]