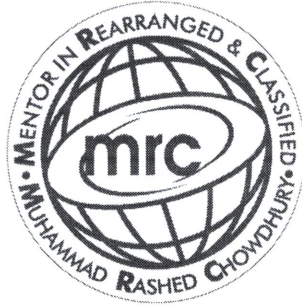


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TOPIC-PLANT NUTRITION

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W-(10)-V-1

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1 Photosynthesis takes place in the leaves of plants.

(a) (i) Leaves absorb light energy and this is converted into chemical energy.

State where in leaves this energy change takes place.

..... [1]

(ii) Complete the word equation for photosynthesis.

water + → oxygen + [2]

(b) Describe how water enters a plant from the soil.

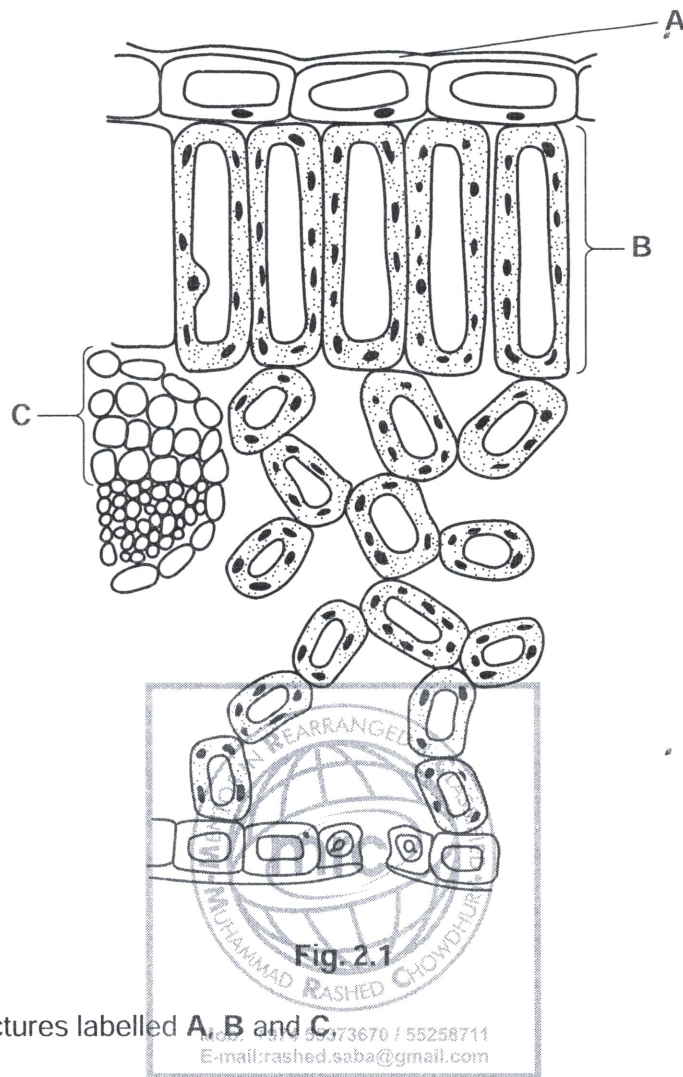
.....
.....
.....
.....
.....
.....
.....
.....
..... [3]

[Total: 6]



2 (a) Fig. 2.1 shows a vertical section through a leaf.

W-V-1



Name the structures labelled **A**, **B** and **C**.

Write your answers in the spaces below.

A

B

C

[3]

- (b) Potato plants produce new potato tubers underground as part of the process of asexual reproduction.

Fig. 2.2 shows the amount of carbohydrate stored in the leaves and new tubers of potato plants, grown in a country in the northern hemisphere, between May and September.

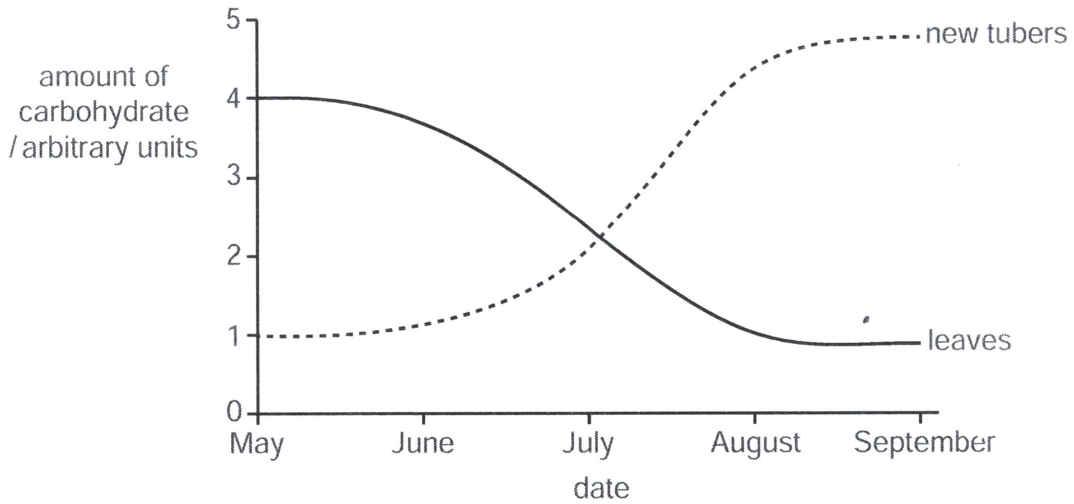


Fig. 2.2

- (i) Compare the amount of carbohydrate in the leaves and new tubers in May and September. Give an explanation for the differences. Use data from Fig. 2.2 in your answer.

May

difference

explanation

.....

September

difference

explanation

.....

[4]

(ii) State the form in which carbohydrate is stored in potato plants.

.....[1]

(iii) State **two** uses, other than storage, for the carbohydrate made by photosynthesis.

1

2

[2]

[Total: 10]



03

Fig. 8.1 shows a section through a leaf. The leaf is adapted to carry out photosynthesis in the plant.

W-V-2-(81)

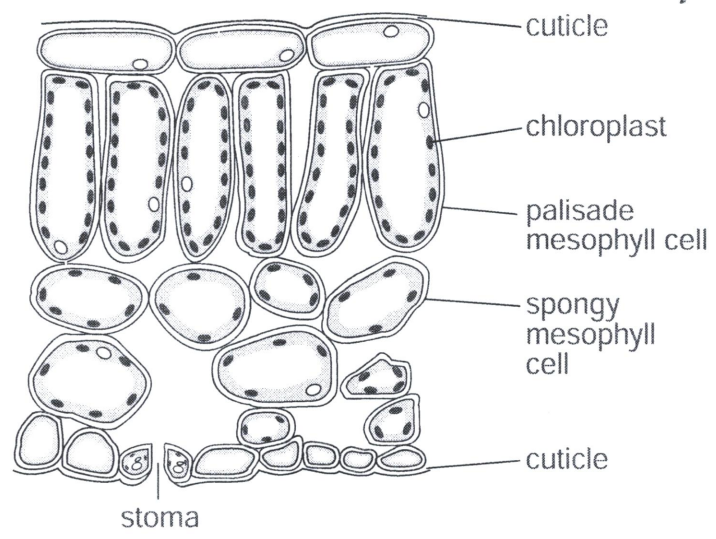
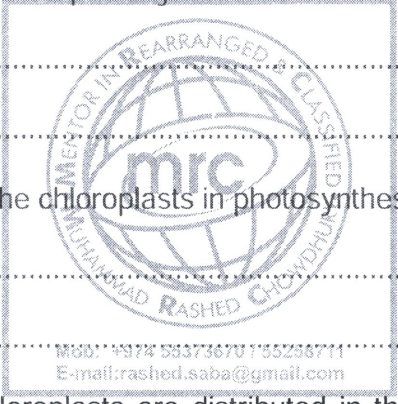


Fig. 8.1

(a) (i) Give the word equation for photosynthesis.



.....
 [2]

(ii) State the function of the chloroplasts in photosynthesis.

.....
 [2]

(iii) Describe how the chloroplasts are distributed in the mesophyll layers of the leaf and explain how this distribution is important for efficient photosynthesis.

description

.....

explanation

..... [2]

(b) (i) Explain the role of stomata in the process of photosynthesis.

.....
.....
.....
.....[2]

(ii) Explain the function of the cuticle in a leaf.

.....
.....
.....
.....[2]

(c) To grow, a plant needs a supply of nitrate ions.

Explain the reason for this.

.....
.....
.....
.....[2]



[Total: 12]

4 Fig. 4.1 shows a section through a leaf.

W-V-7

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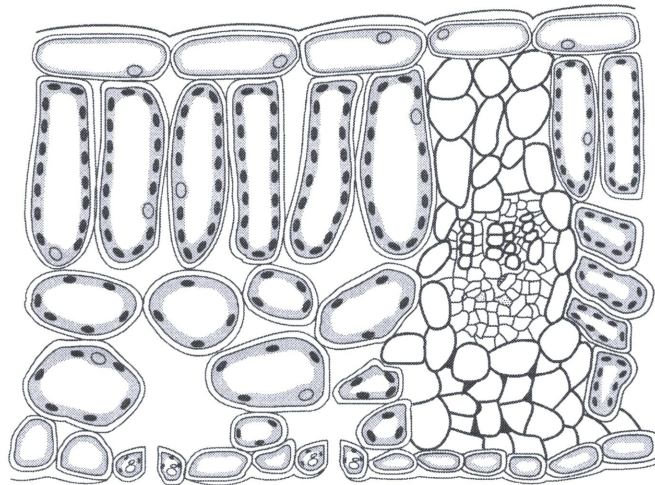


Fig. 4.1

(a) On Fig. 4.1, label a stoma, the cuticle and a vascular bundle.

Use label lines and the words 'stoma', 'cuticle' and 'vascular bundle' on Fig. 4.1. [3]

(b) (i) The upper layers of a leaf are transparent. Suggest an advantage to a plant of this feature.

..... [1]

(ii) The cuticle is made of a waxy material. Suggest an advantage to a plant of this feature.

..... [1]

(iii) State two functions of vascular bundles in leaves.

1.

2. [2]

(c) Most photosynthesis in plants happens in leaves.

(i) Name the two raw materials needed for photosynthesis.

- 1.
- 2. [2]

(ii) Photosynthesis produces glucose.

Describe how plants make use of this glucose.

.....

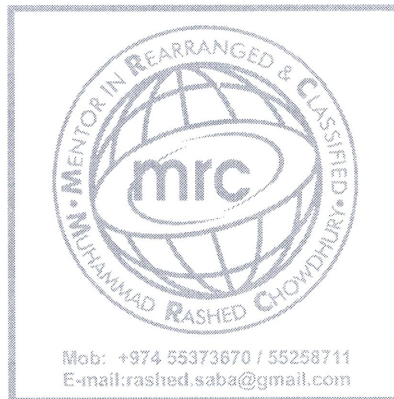
.....

.....

.....

..... [3]

[Total: 12]



5 (a) Fig. 5.1 shows a section through a leaf.

S-V-1

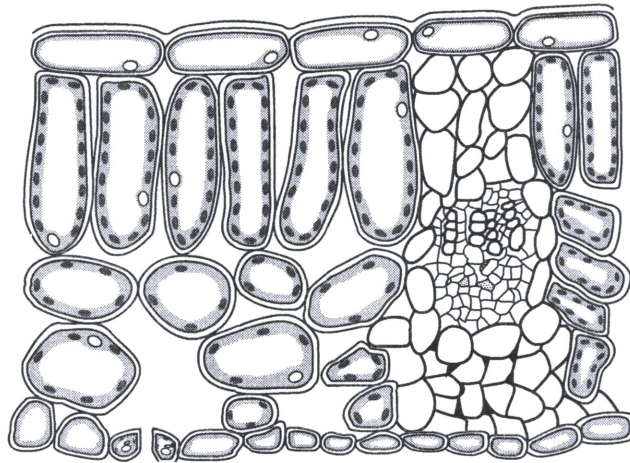


Fig. 5.1

Fig. 5.2 names some structures found in a leaf and states a function of each of these structures.

On Fig. 5.2, draw **one** straight line between **each** structure and the function it carries out.

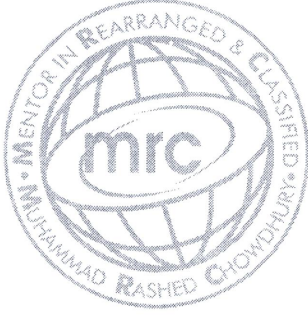
structure		function
cuticle	Mob: +974 55373670 / 55258711 E-mail: rashed.saba@gmail.com	allows gaseous exchange with surroundings
stoma		allows diffusion of gases within the leaf
palisade cell		waterproofs the leaf
phloem tissue		transports sucrose out of the leaf
spongy mesophyll		produces glucose

Fig. 5.2

[4]

(b) Xylem vessels transport water into the leaf.

State **two** other functions of xylem vessels.

1

2

[2]

(c) Some of the glucose made in the leaf is changed into another compound and stored by the plant.

Name this compound.

..... [1]

(d) Some of the structures in the leaf are involved in transpiration.

Define *transpiration*.

.....

.....

.....

.....

.....

..... [2]



[Total: 9]

6 Fig. 6.1 shows a section through a leaf.

N-

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Fig. 6.1

(a) Name the parts of the leaf labelled A and B.

A
B [2]

(b) One function of a leaf is gaseous exchange.

(i) Name the process by which gases move in or out of a leaf.
..... [1]

(ii) On Fig. 6.1 label the stoma. [1]

(iii) Complete Table 6.1 by placing a tick (✓) in the appropriate column to show the movement of gases or vapour through open stomata on a sunny, dry day. Give a reason for each of your answers.

Table 6.1

	movement of gas or vapour			reason for movement of gas or vapour
	into leaf	out of leaf	none	
carbon dioxide				
oxygen				
water vapour				

[3]

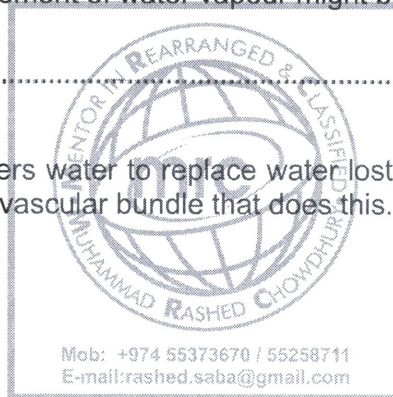
(iv) Suggest how the movement of water vapour might be different if it was raining.

..... [1]

(c) The vascular bundle delivers water to replace water lost by the leaf. On Fig. 6.1 name and label the tissue in the vascular bundle that does this.

[2]

[Total: 10]



7 Fig. 7.1 shows a section through a leaf.

(a) Name the structures labelled J and K.

Write your answers on Fig. 7.1.

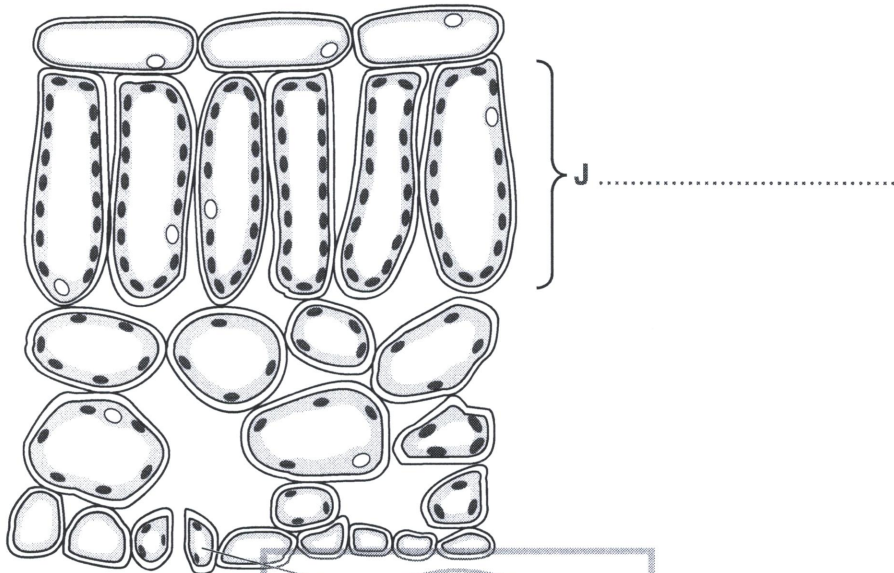


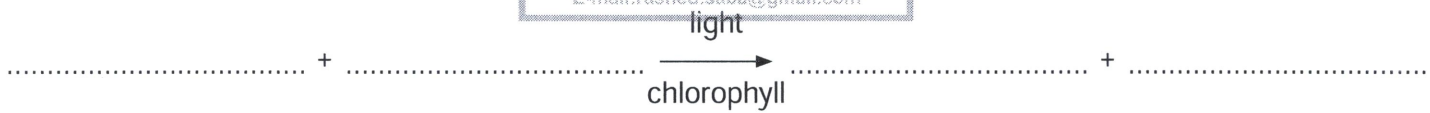
Fig. 7.1

Mentor in Rearranged & Classified
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 MUHAMMAD RASHED CHOWDHURY
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 E-mail: rashed.saba@gmail.com

[2]

(b) Leaves carry out photosynthesis.

Write the word equation for photosynthesis.



[2]

- (c) Maize plants photosynthesise to produce the chemicals needed to form corn cobs. Corn cobs are food for humans.

In an investigation, six similar fields of maize seedlings had different quantities of fertiliser added.

The mass of corn cobs produced by each field was calculated.

The results are shown in Fig. 7.2.

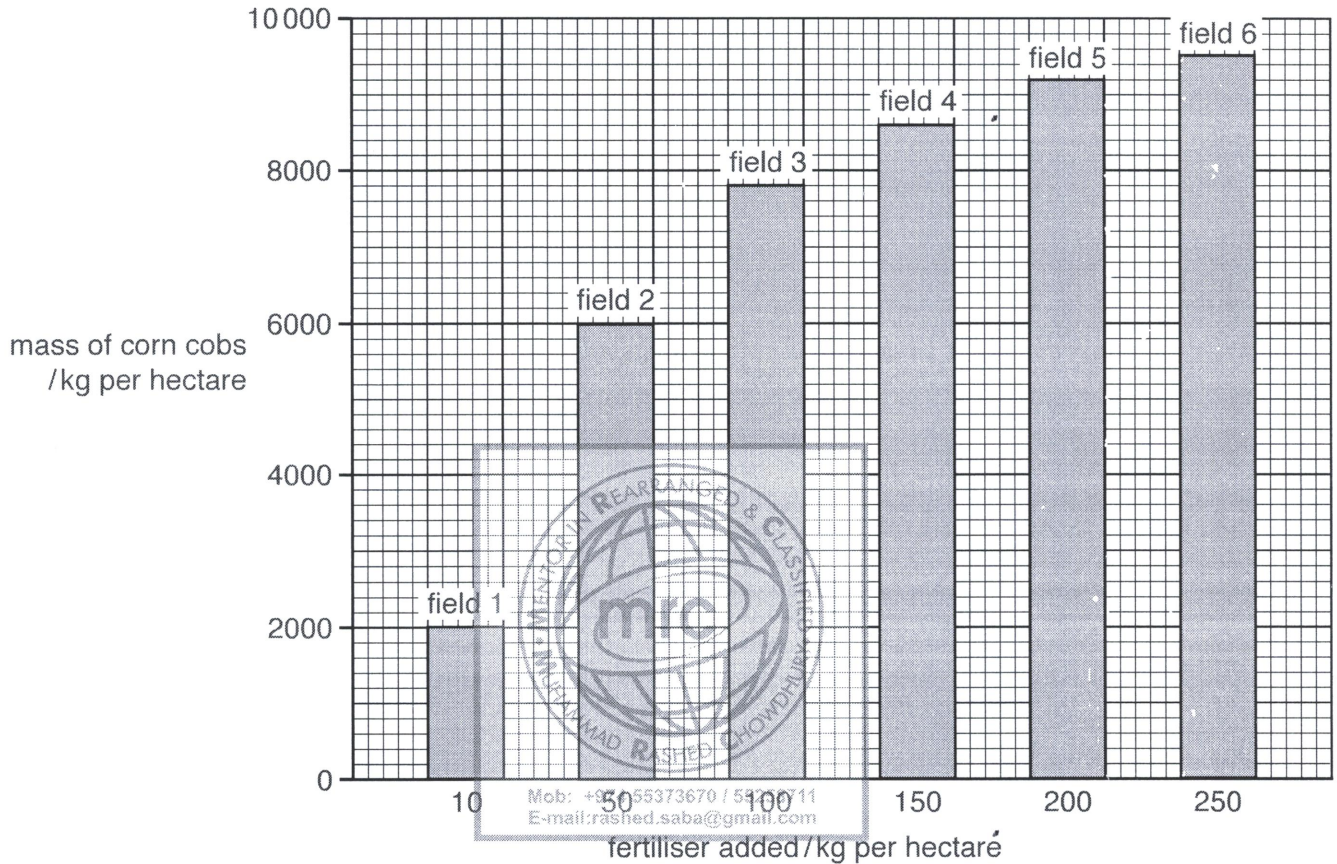


Fig. 7.2

- (i) Describe the results of the investigation shown in Fig. 7.2.

.....

.....

.....

..... [2]

- (ii) State **two** factors, other than adding fertiliser, which can affect the rate of photosynthesis.

1

2

[2]

(d) (i) Explain how the use of herbicides improves the yields from crop plants such as maize.

.....

.....

.....

.....

..... [2]

(ii) Suggest how genetic engineering could reduce the use of insecticides on farms.

.....

.....

.....

.....

..... [2]

[Total: 12]



- 8 (a) Fig. 8.1 shows a section through a leaf. A leaf is designed for photosynthesis and this process provides a supply of simple sugars for a plant.

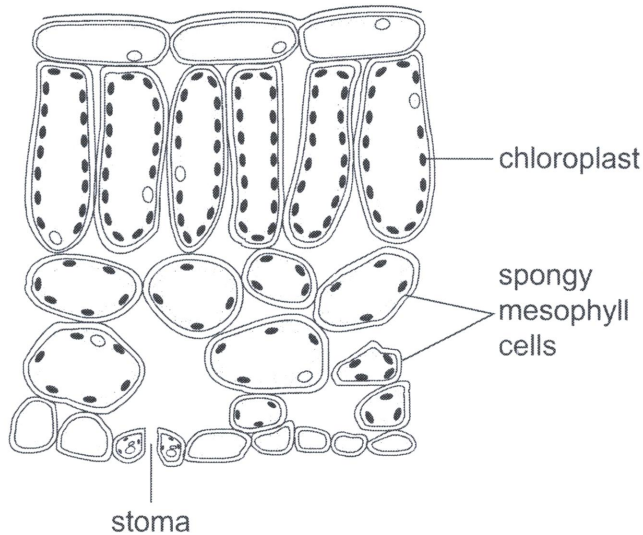


Fig. 8.1

- (i) State the function of the chloroplasts in photosynthesis.

.....
 [1]

- (ii) Describe and explain the advantage of the distribution of the chloroplasts as shown in Fig. 8.1.

.....
 [2]

- (iii) Suggest the function of the stomata and the spaces between the spongy mesophyll cells in the process of photosynthesis.

.....

 [3]

(b) (i) Name the tissue that transports the sugars made by photosynthesis to other parts of the plant.

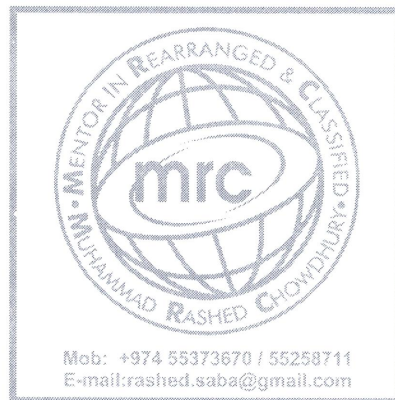
..... [1]

(ii) Name the mineral ion that is used to form proteins.

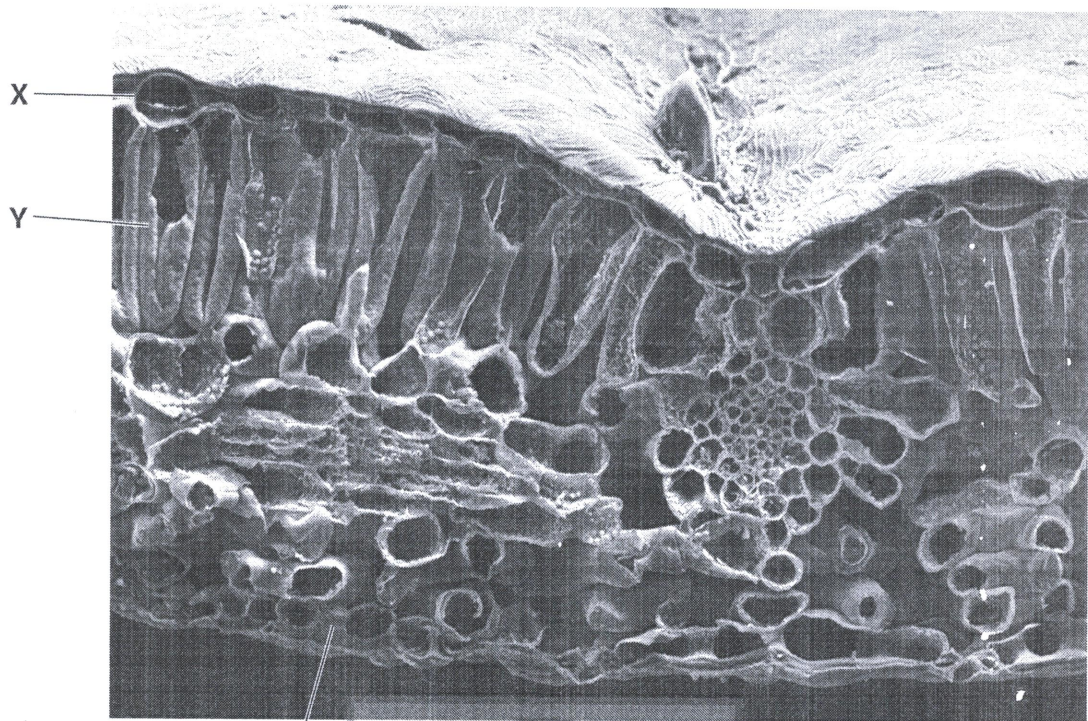
..... [1]

[Total: 8]

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9 Fig. 9.1 shows a photomicrograph of a section through a leaf.



magnification $\times 300$

Z



(a) (i) State the name of the layers of the leaf labelled X and Y in Fig. 9.1.

X

Y

[2]

(ii) The cells in layer X are transparent.

Suggest a reason for this.

.....
..... [1]

(b) (i) State the name of the structure labelled Z in Fig. 9.1.

..... [1]

(ii) State the name of the process by which gases move into and out of Z.

..... [1]

- (iii) Complete Table 9.1 by placing **one** tick in each row to show the net movement of gases through **Z** on a hot, dry, sunny day.

Table 9.1

name of gas	net movement of gas		
	into leaf	out of leaf	no movement
carbon dioxide			
oxygen			
water vapour			

[3]

- (c) (i) State **two** substances that are made during photosynthesis.

1

2

[2]

- (ii) State the name of the green pigment needed for photosynthesis.

.....

[1]

[Total: 11]



10 Fig. 7.1 shows a photograph of a section through a leaf.

7-2-2
(7)

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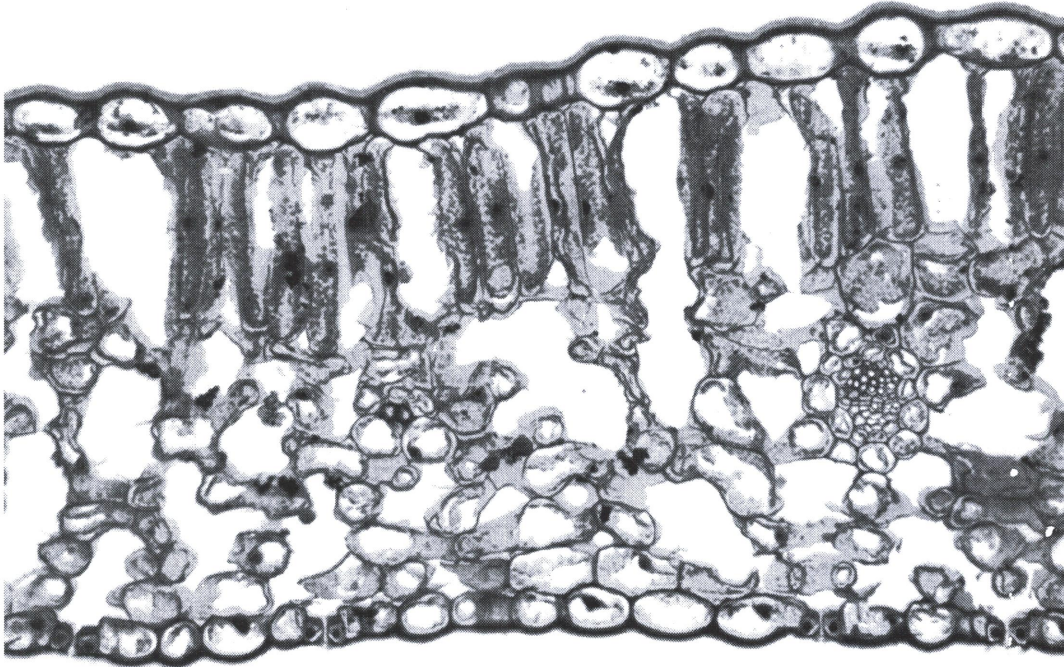


Fig. 7.1

(a) (i) Explain the functions of the cuticle of a leaf.

.....
.....
.....
.....

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Email: rashid.saba@gmail.com

(ii) Explain how carbon dioxide in the atmosphere passes to the cells inside the leaf.

.....
.....
.....
..... [2]

(b) The cells in the leaf use carbon dioxide to carry out photosynthesis.

State two environmental factors, apart from carbon dioxide, that can affect the rate of photosynthesis.

1. [2]
2. [2]

[Total: 6]

N - (4)

11 Photosynthesis is a vital process in plants.

(a) Write an equation for photosynthesis using either words or chemical symbols.

.....[2]

(b) (i) State where in a leaf cell photosynthesis occurs.....

.....[1]

(ii) Complete this sentence.

During photosynthesis energy is changed to energy. [2]

(c) The main product of photosynthesis can be converted into other chemicals.

Complete the table.

Use of main product of photosynthesis	Name of chemical it is converted into
Storage in leaf cells	
To make plant cell walls	

[2]

(d) The formation of new cells in the roots requires materials formed in the leaves.

Describe how these materials reach the roots from the leaves.

.....

 [3]

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(e) Forests are sometimes cleared by "slash and burn", in which the trees and other plants are cut down and burnt.

(i) Suggest two effects that "slash and burn" deforestation can have on the carbon cycle.

1

.....

2

.....[2]

(ii) State two undesirable effects that deforestation can have on the soil.

1

.....

2

.....[2]

[Total: 14]



2 (a) Fig. 2.1 shows a partly completed diagram of a palisade cell.

N-(2)

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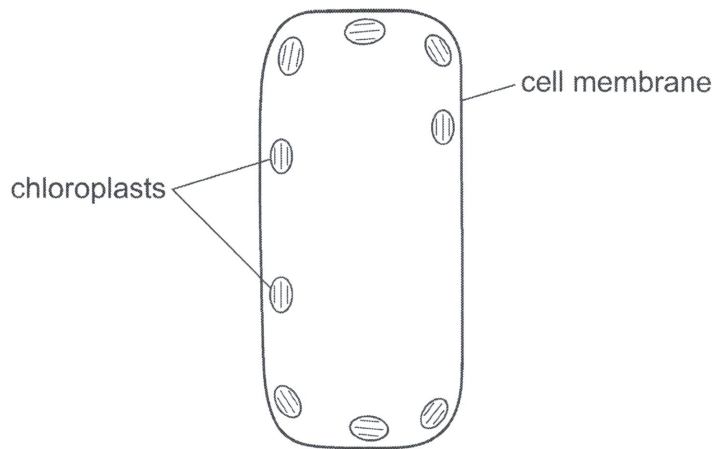


Fig. 2.1

Complete the diagram to show the other major components of this cell.

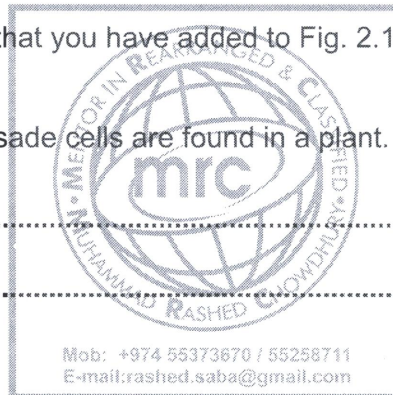
Label all the components that you have added to Fig. 2.1.

[4]

(b) State precisely where palisade cells are found in a plant.

.....
.....

[2]



[Total: 6]

13 (a) Water enters plants through the root hairs and escapes to the air from the leaves.

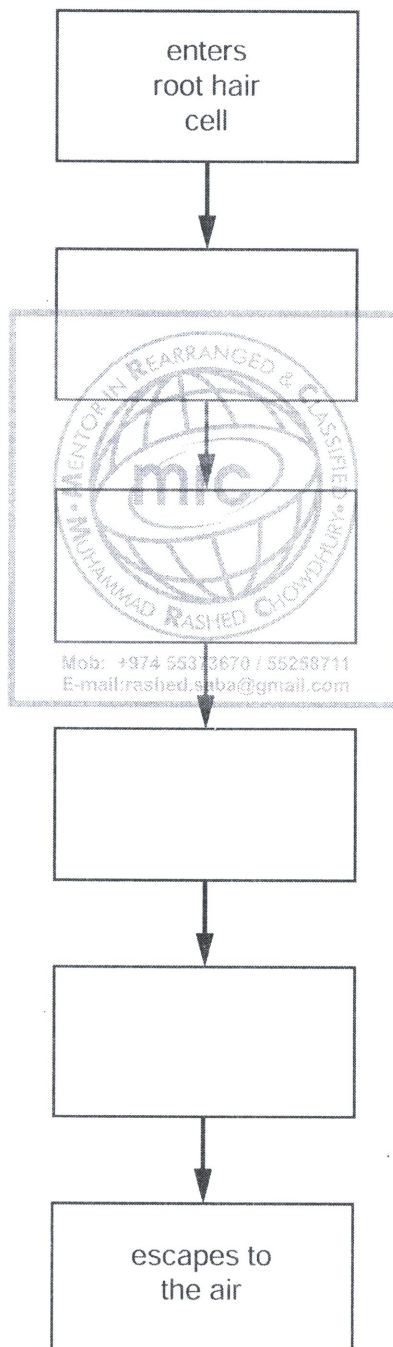
(i) Name the term that is used to describe the loss of water vapour from the leaves.

.....[1]

(ii) Complete the flow chart by writing in the boxes the names of the parts through which water passes after it enters the root hair cells.

Choose words from the list.

- mesophyll cells cortex cells stomata xylem



[3]

Fig. 3.1 shows a display of cut flowers in a shop.

At 6 am the flowers were placed in identical jars, **E**, **F**, **G** and **H**.

Each jar contained 500 cm^3 of water.

At 8 pm the jars all contained different volumes of water.

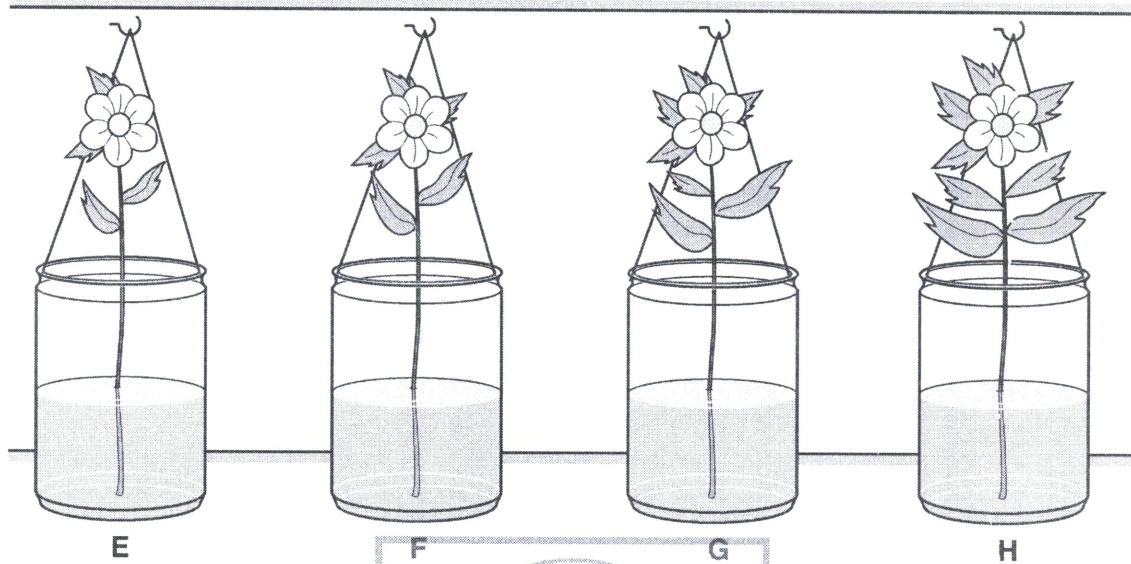


Fig. 3.1

- (b) The volume of water remaining in jars **E**, **F**, **G** and **H** was measured at intervals between 6 am and 8 pm.

The results are shown in the graph in Fig. 3.2.

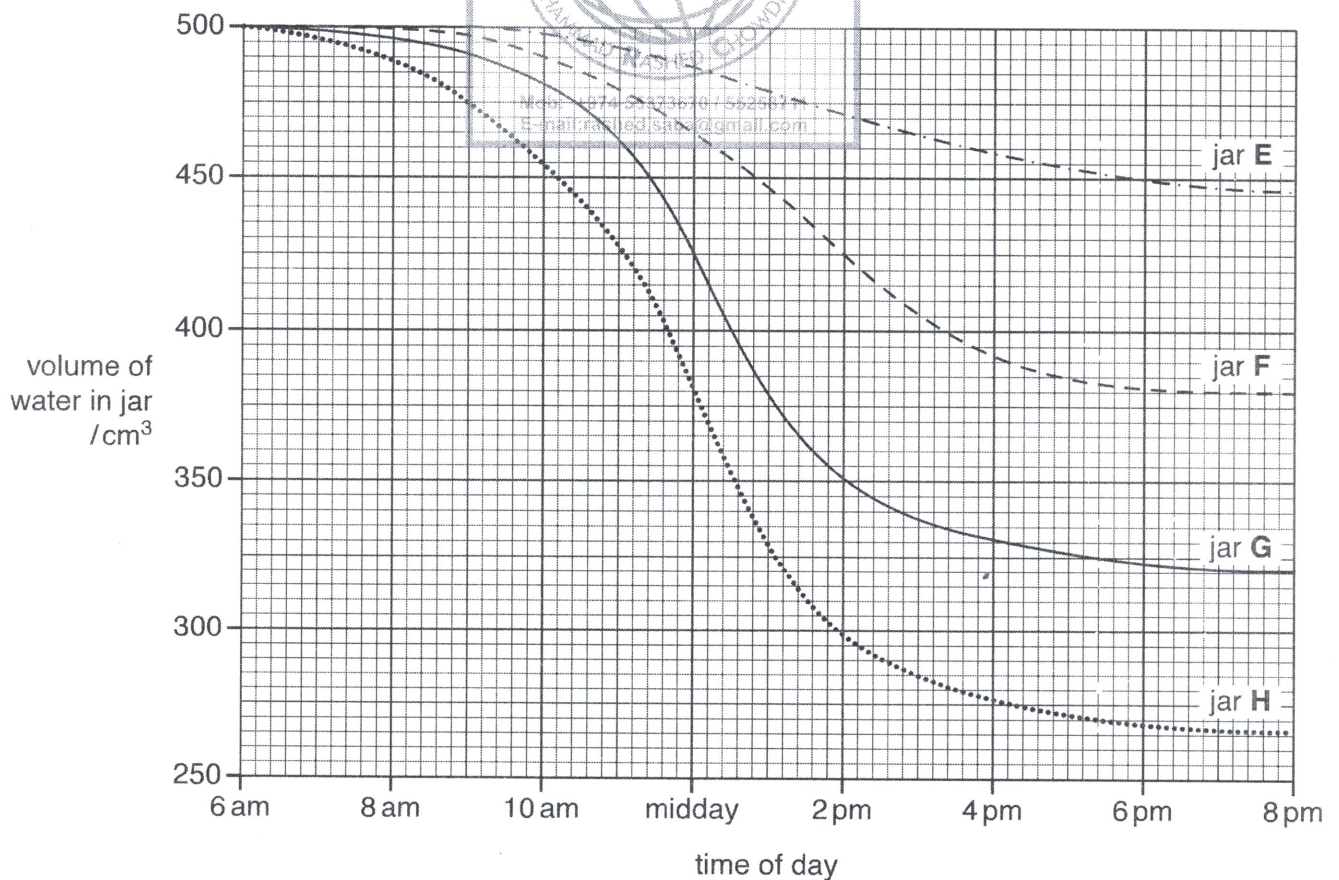


Fig. 3.2

14 (a) (i) Name the two raw materials needed by plants for photosynthesis.

1

2 [2]

(ii) Name the gas produced by photosynthesis.

..... [1]

(b) Fig. 4.1 shows a leaf, with white and green regions, that is attached to a plant. The plant had been kept in the dark for 48 hours and then a lightproof, black paper cover was placed over part of the leaf.

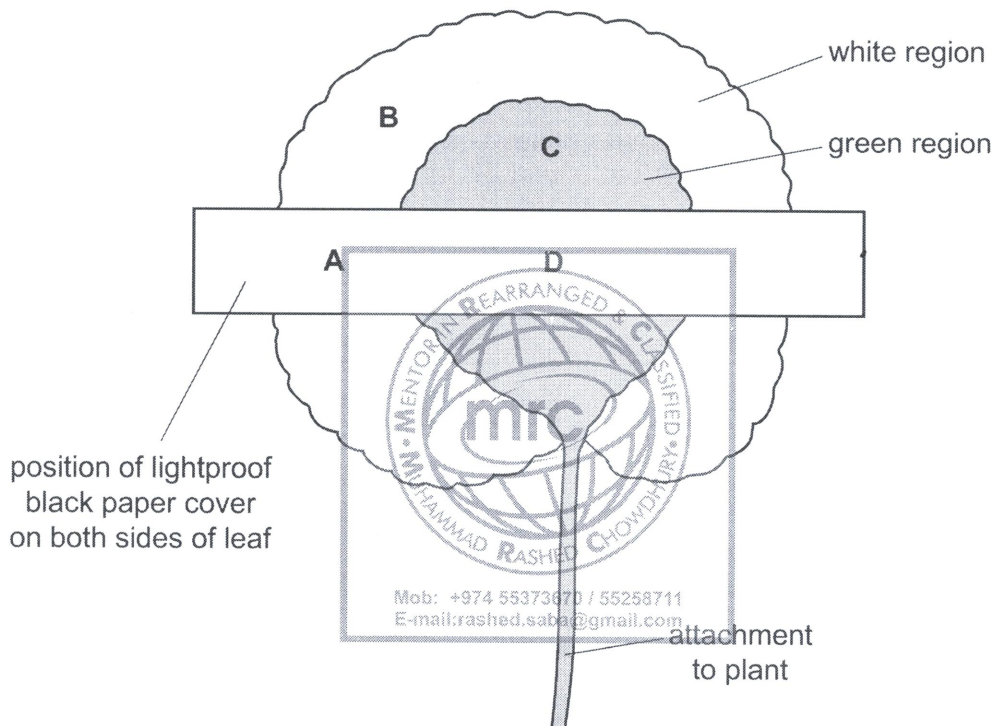


Fig. 4.1

The plant is left under a light for 24 hours. After this time the leaf is removed from the plant and is tested for the presence of starch.

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(i) Which chemical reagent is used to show the presence of starch?

..... [1]

(ii) Record the colour you would see, if you had carried out this test, in each of the areas **A**, **B**, **C**, and **D**.

area	colour
A	
B	
C	
D	

[4]

(iii) Explain the results for each of the following areas.

area B

.....

area D

.....



[2]

[Total: 10]

15 (a) Define the term *photosynthesis* and outline **one** reason why it is important to ecosystems.

.....
.....
.....
.....
.....[3]

(b) (i) Name the green substance that plants need for photosynthesis.

.....[1]

(ii) Name the gas that plants need for photosynthesis.

.....[1]

(iii) Name the gas that plants produce during photosynthesis.

.....[1]

(c) Fig. 4.1 shows the apparatus a student used to investigate how light intensity affects photosynthesis.

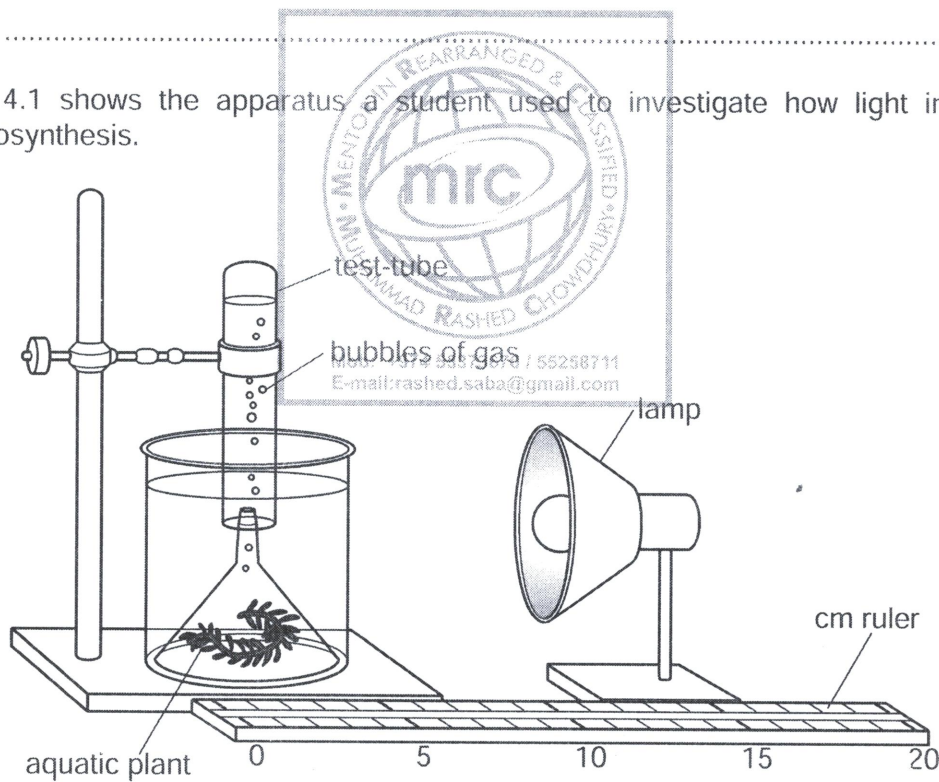


Fig. 4.1

The student placed an aquatic plant under a funnel in a beaker of water.

During the investigation she placed the lamp at different distances from the aquatic plant.

At each distance she counted how many bubbles the aquatic plant produced in one minute.

The bubbles of gas were then collected in the test-tube.

Fig. 4.2 shows the results of her investigation.

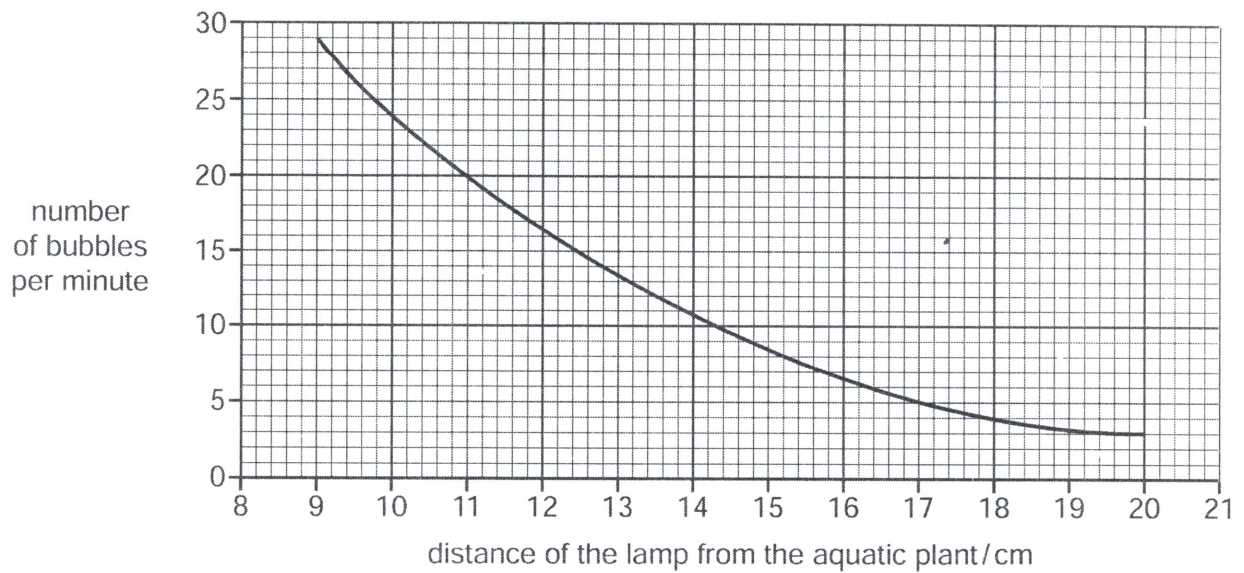
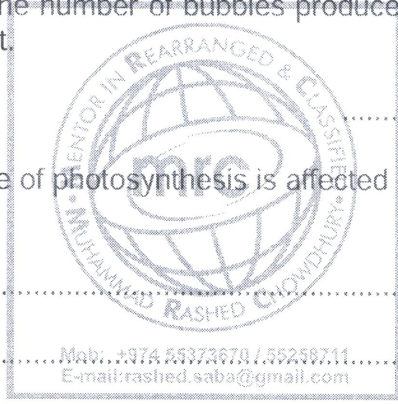


Fig. 4.2

- (i) Use Fig. 4.2 to find the number of bubbles produced when the lamp was placed 10 cm from the aquatic plant.



..... bubbles per minute [1]

- (ii) Describe how the rate of photosynthesis is affected by the distance of the lamp from the aquatic plant.

.....

 [2]

- (iii) Predict the number of bubbles that would be produced if the lamp was placed 21 cm from the aquatic plant.

..... bubbles per minute [1]

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

F-V-2

.....[2]

(ii) A plant needs chlorophyll to photosynthesise.

Name the part of a plant cell that contains chlorophyll.

.....[1]

(iii) State **two** types of specialised cell that contain chlorophyll.

1

2

[1]

(b) In an investigation, some students placed a plant in bright light.

They measured the rate of photosynthesis at different temperatures.

The results are shown in Fig. 6.1.

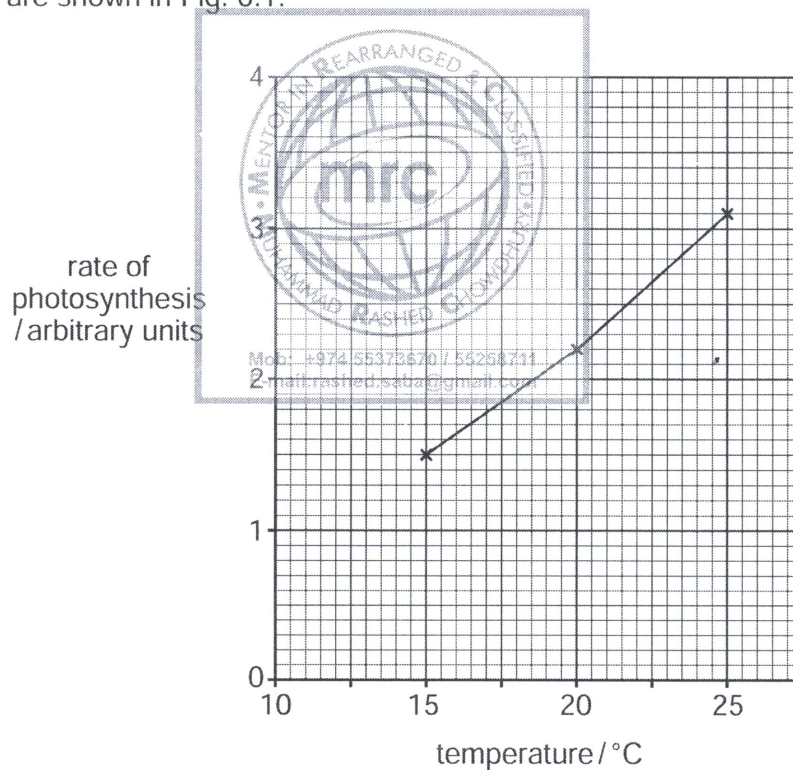


Fig. 6.1

(i) Describe the results shown in Fig. 6.1.

.....
.....
.....
..... [2]

(ii) Suggest an explanation for these results.

.....
.....
.....
..... [2]

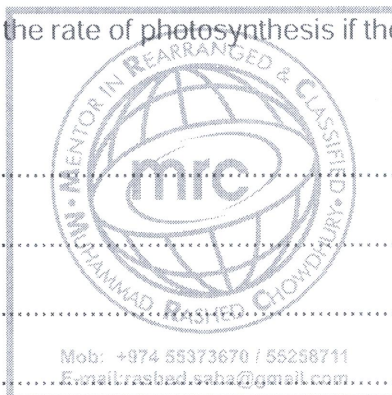
(iii) Predict the effects on the rate of photosynthesis if the investigation is carried out at 60 °C.

Explain your reason.

prediction

reason

.....
.....



[2]

[Total: 10]

17 (a) Fig. 3.1 shows variegated (green and white) leaves on a destarched plant. Part of one of the leaves was covered.

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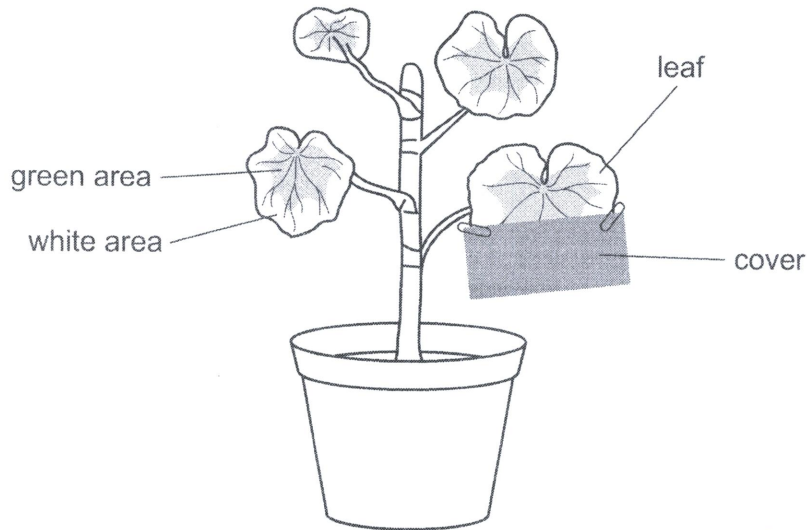


Fig. 3.1

(i) The plant was left in bright light for 24 hours and then the cover was removed from the leaf. The leaf was tested for the presence of starch.

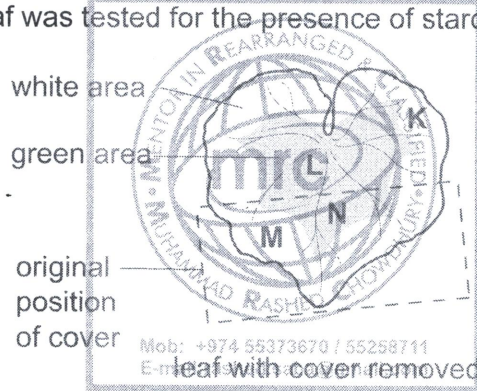


Fig. 3.2

Suggest which areas of the leaf, as shown in Fig. 3.2, would have contained starch after 24 hours.

Table 3.1

area	contains starch
K
L
M
N

key

✓ = starch present

x = starch absent

Record your suggestions in Table 3.1. [2]

(ii) Give reasons for your suggestions for areas **K** and **L**.

area **K**

.....

.....

area **L**

.....

..... [4]

(iii) Starch is formed from a simple carbohydrate.

Name the process, carried out by plants, that produces this simple carbohydrate.

..... [1]

(iv) State which gas is released from the leaf when this simple carbohydrate is being produced.

..... [1]

(b) Magnesium ions are needed to form the green pigment in the leaf.

(i) State where magnesium ions enter a plant.

..... [1]

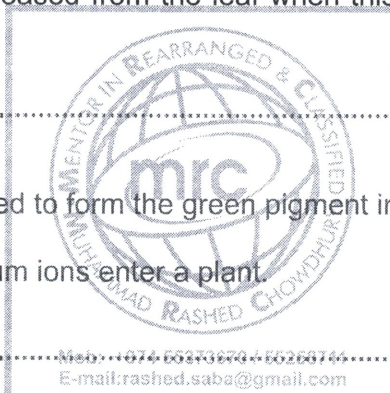
(ii) Suggest how magnesium ions enter a plant.

.....

.....

..... [2]

[Total: 11]



8 Fig. 8.1 shows a section through a leaf.

For
Examiner's
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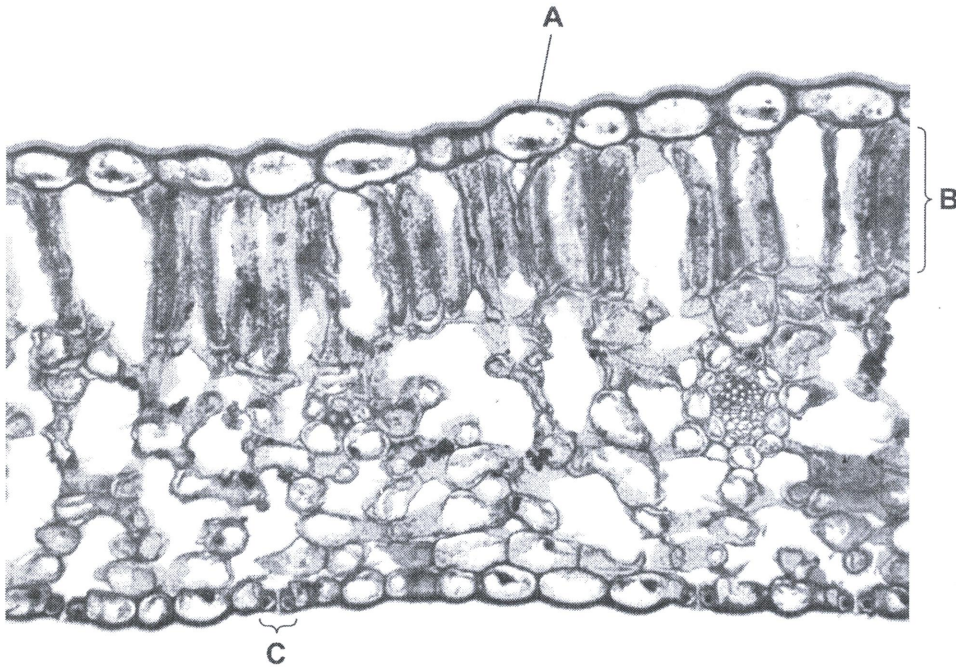


Fig. 8.1

(a) (i) Name layers A and B.

A

B [2]

(ii) State a function of layer A.

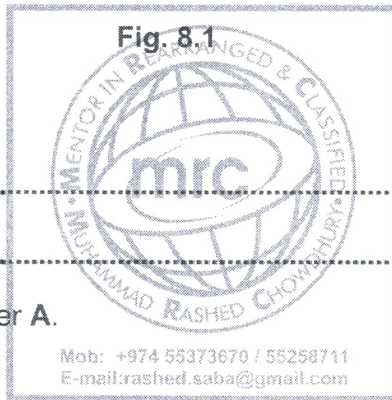
.....

..... [1]

(iii) Describe the function of C.

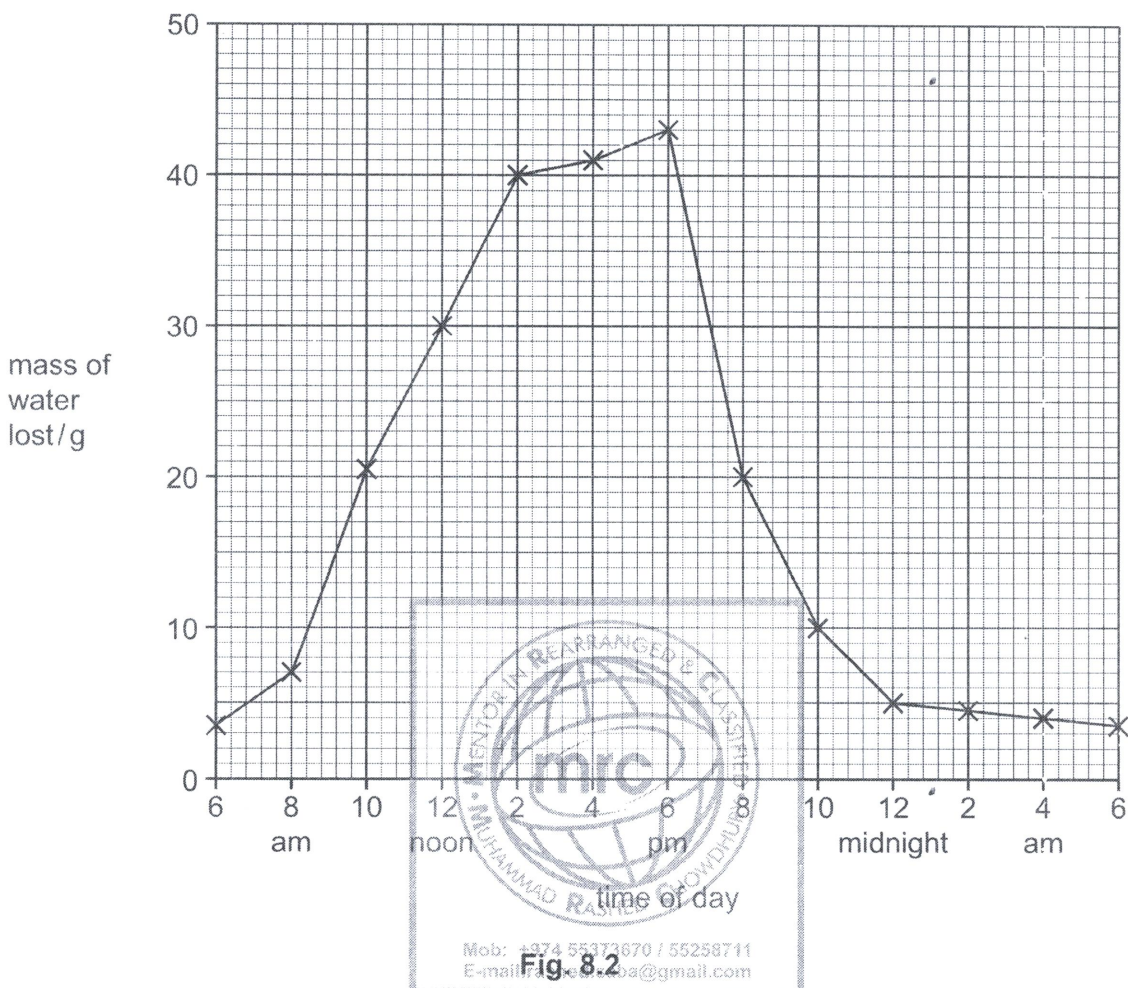
.....

..... [1]



- (b) Measurements were made of the mass of water taken in and lost by a plant every two hours for 24 hours.

Fig. 8.2 is a graph showing the mass of water lost from the plant by transpiration.



- (i) Use the graph, Fig. 8.2, to state the time when the mass of water lost was greatest.

..... [1]

19 This question is about photosynthesis.

Complete the sentences using words from the list.

Each word may be used once, more than once or not at all.

- | | | | |
|--------------------|--------------------|------------------|----------------|
| chlorophyll | chloroplast | epidermis | glucose |
| glycogen | membrane | palisade | starch |
| stigma | stomata | | |

When plants carry out photosynthesis the chemical called traps light energy.

The energy is used to combine raw materials to make

This process mainly happens in the layer of the leaf.

The gas needed for photosynthesis enters the leaf through the

These are found in the of the leaf.

Leaves appear green because they contain the chemical called

[6]

[Total: 6]



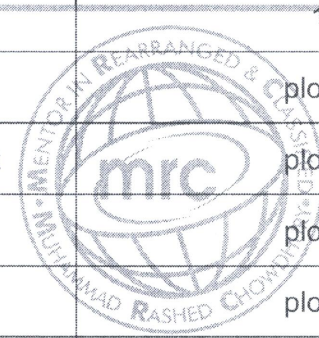
20

Table 8.1 shows the mass of water taken in by the plant every two hours. Some of the data has been plotted in Fig. 8.3.

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Table 8.1

time of day	mass of water taken in by plant / g
6 am	plotted
8 am	plotted
10 am	22
12 noon	40
2 pm	50
4 pm	44
6 pm	30
8 pm	10
10 pm	plotted
12 midnight	plotted
2 am	plotted
4 am	plotted
6 am	plotted



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Fig. 8.3 shows the mass of water lost and the mass of water taken in by the plant during the same period.

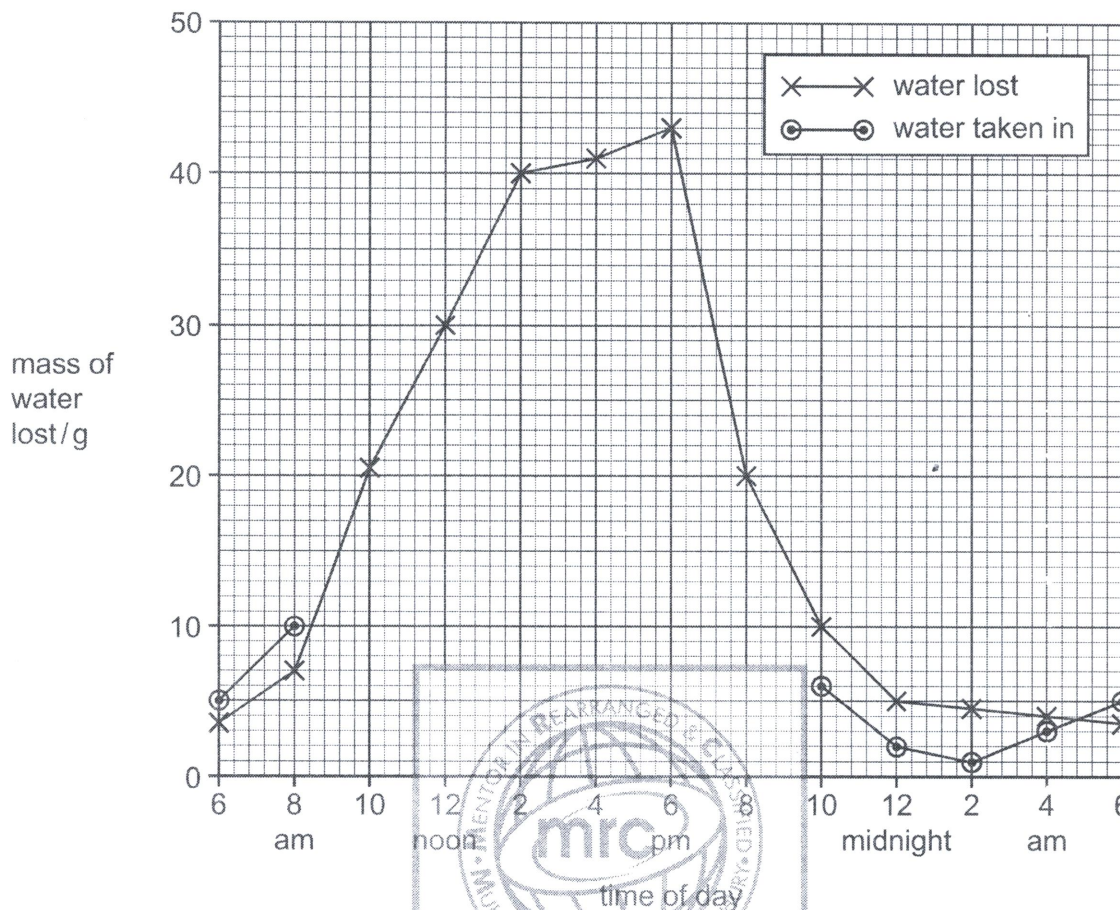


Fig. 8.3

- (ii) Complete the graph, Fig. 8.3, to show the mass of water taken in by the plant from 8 am to 10 pm.

Draw your graph on Fig. 8.3. [2]

- (iii) State the period of time during which water taken in was less than water lost.

..... [1]

- (iv) Describe the state of the stomata between 6 am and 2 pm.

..... [1]

- (v) Suggest **one** factor that caused the state in (b)(iv).

..... [1]

(vi) Name and explain **one** factor, other than your answer to (b)(v), that might increase the loss of water from a leaf during the day.

For
Examiner's
Use

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..... [3]

[Total: 13]

