Photosynthesis

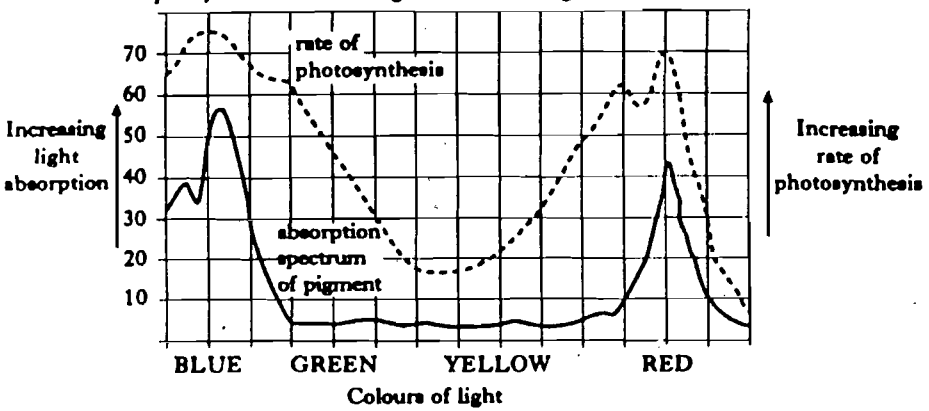
Homework

Question	Mark	Your mark	List areas you have done well in!
1	4		
2	3		
3	7		List areas that need some revision
4	10		
5	3		

1

Marks

(*a*) The following graph shows the absorption spectrum of a photosynthetic pigment and the rate of photosynthesis by a green plant, over the same range of colours of light.



(i) Name a photosynthetic pigment which shows this absorption spectrum.

Pigment _____ **(1)**

(ii) Not all of the light energy which strikes a leaf is absorbed.

State two possible fates of the light energy which is not absorbed.

1. _____

2. _____ **(1)**

(iii) Other pigments are involved in photosynthesis.

Explain how the data in the graph support this statement.

_____

_____ **(1)**

(*b*) The following processes occur in either the light-dependent stage or the Calvin cycle.

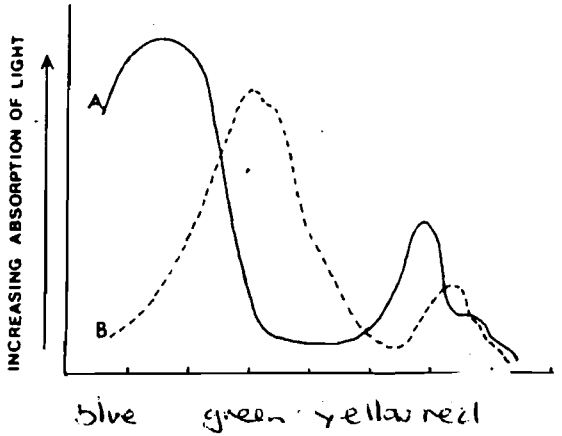
Place ticks (✓) in the appropriate boxes to indicate the two processes which occur in the light-dependent stage.

Processes	*Boxes*
Formation of GP (PGA)	☐
Splitting of water molecules	☐
Generation of ATP	☐
Release of hydrogen from the reduced hydrogen acceptor ($NADPH_2$)	☐

(1)

2

The graphs below show the absorption spectra for the leaf pigments extracted from two different species of plant.



(i) Name a pigment which would have an absorption spectrum like the one shown in graph A.

..... **(1)**

(ii) One of the plants is from a woodland canopy and the other is from the ground layer in the same community.

State which plant (A or B) is from the ground flora and give a reason for your answer.

Plant .....

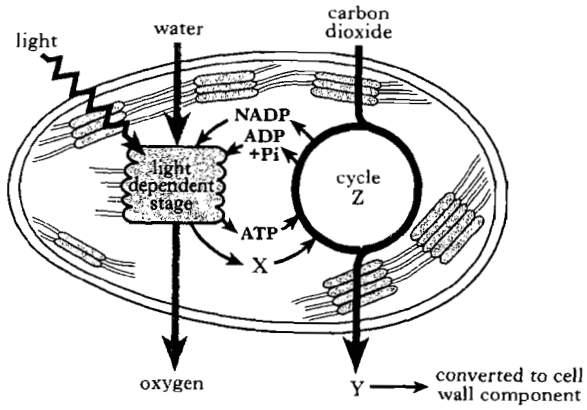
Reason .....

.....

..... **(2)**

3

(a) The diagram below summarises the process of photosynthesis in a chloroplast.



(i) Name molecules X and Y.

X _____

Y _____ 1

(ii) State the exact location of the light dependent stage within a chloroplast.

_____ 1

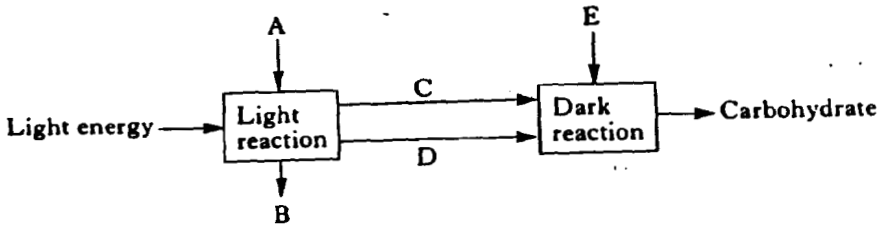
(iii) Name cycle Z.

_____ 1

(iv) Name the cell wall component referred to in the diagram.

_____ 1

The diagram below summarises the main stages of photosynthesis.



Complete the table by inserting substances **from the list** to identify A, B, C, D and E.

Use each substance once only.

List
$NADPH_2$
Carbon dioxide
Water
Oxygen
ATP

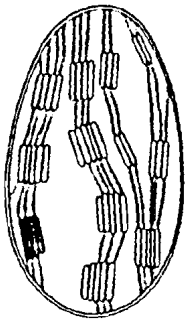
Letter	*Substance*
A	
B	
C	
D	
E	

(3)

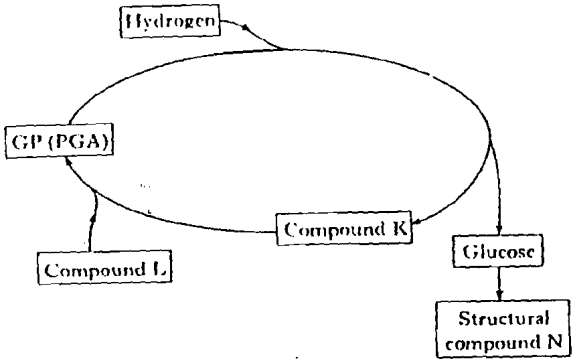
4

The diagrams below show a chloroplast and an outline of the Calvin cycle.

Chloroplast



Outline of Calvin cycle



(*a*) On the diagram of the chloroplast, **put an X** to show where the Calvin cycle takes place. **(1)**

(*b*) Name compounds K and L in the Calvin cycle.

Compound K _____

Compound L _____ **(1)**

(*c*) Complete the following sentence by **underlining one** of the words in each group.

Structural compound N is { starch / cellulose / glycogen } which is deposited in the cell wall as { fibres. / globules. / grains. } The cell wall is { permeable / impermeable / selectively permeable } to water. **(2)**

(d)

Marks

The hydrogen required for the Calvin cycle comes from the light stage of photosynthesis.

(i) Name the source of the hydrogen.

Source _____ **(1)**

(ii) Name the compound responsible for hydrogen transfer to the Calvin cycle.

Compound _____ **(1)**

(iii) Name one other product of the light stage which is required for the Calvin cycle.

Product _____ **(1)**

(e)

(i) A small proportion of the solar energy falling on a green leaf is absorbed. State two things which might happen to light which is not absorbed.

1. .....

2. ..... **(1)**

(ii) Complete the table by inserting products of the light stage of photosynthesis which fit the descriptions given.

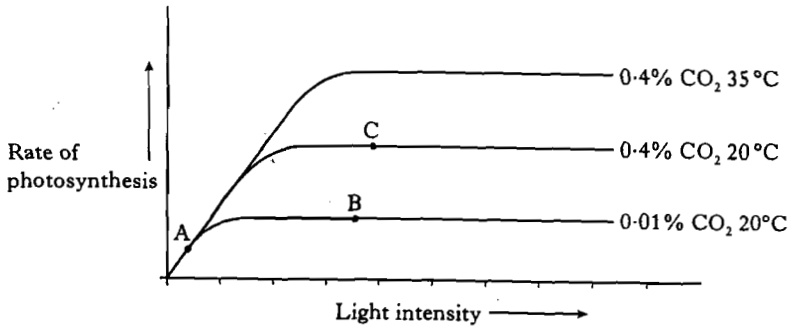
DESCRIPTION	*PRODUCT*
Evolved as a gas	
Provides energy for the dark stage	
Provides hydrogen for the dark stage	

(2)

5 (a)

Marks

The graph below shows the rate of photosynthesis under different conditions.



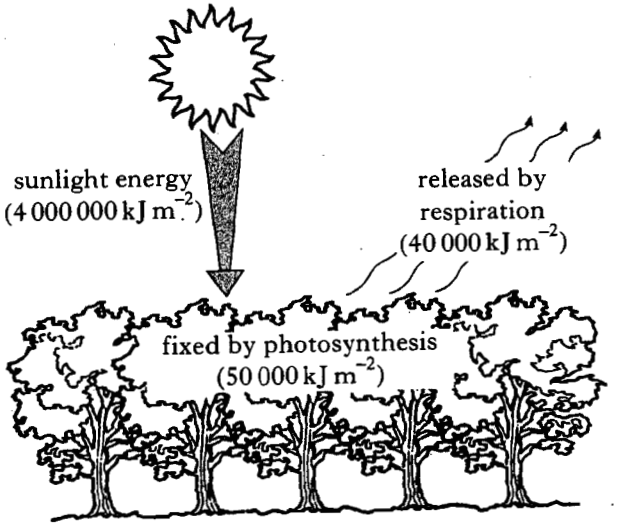
Use the information in the graph to complete the table below.
Tick (✓) **one** box in each row to indicate the factor that is limiting the rate of photosynthesis at points A, B and C.

Graph point	*Temperature*	*Light intensity*	*CO_2 concentration*
A			
B			
C			

(2)

(b)

The diagram below shows the energy flow in an area of forest canopy during 1 year.



What percentages of available sunlight energy are fixed by the trees in photosynthesis and are present in new growth and stored food?

	Percentage of available energy fixed in photosynthesis	*Percentage of available energy present in new growth and stored food*
A	0·25	2·25
B	1·00	1·25
C	1·25	0·25
D	2·25	1·00

(1)