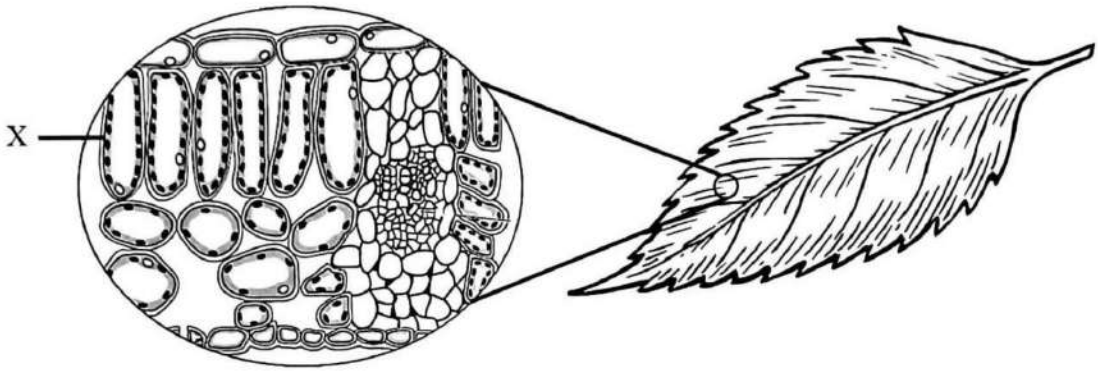
1 Rajah 1 menunjukkan keratan rentas daun.
Diagram 1 shows the cross section of leaf.



Rajah 1/ *Diagram* 1

(a) (i) Namakan sel X.
Name cell X.

Sel mesofil palisad / *Palisade mesophyll cell*

[1 markah /*mark*]

1(a)(i) 1

(ii) Nyatakan **satu** organel yang banyak terdapat di dalam sel X.
*State **one** organelle that is found abundantly in cell* X.

Kloroplas / *Chloroplasts*

[1 markah /*mark*]

1(a)(ii) 1

(iii) Nyatakan **dua** kepentingan organel di a(ii) kepada tumbuhan hijau.
*State **two** importance of organelle in* a(ii) *to green plants.*

P1 Mengandungi **klorofil** / *Contains chlorophylls*

P2 **Menyerap cahaya Matahari** / *Absorbs sunlight*

P3 untuk menjalankan fotosintesis //
menukarkan tenaga cahaya kepada tenaga kimia
to carry out photosynthesis // converts light energy to chemical energy

P4 Menghasilkan **glukosa** / sukrosa // *Produce glucose / sucrose*

P5 Menghasilkan **tenaga** / *Produce energy*

[2 markah /*marks*]

1(a)(iii) 2

(b) Kebanyakan daun yang kelihatan berwarna hijau. Terangkan mengapa.
Most leaves seen as green in colour. Explain why.

P1 Daun mengandungi **klorofil** / *Leaves contain chlorophylls*

P2 **Cahaya** berwarna **merah dan biru diserap**
Blue and red lights are absorbed

P3 **Cahaya hijau dipantulkan**
Green light is reflected

P4 Maka mata hanya dapat melihat warna hijau pada daun
Thus the eyes can only see green colour on the leaves

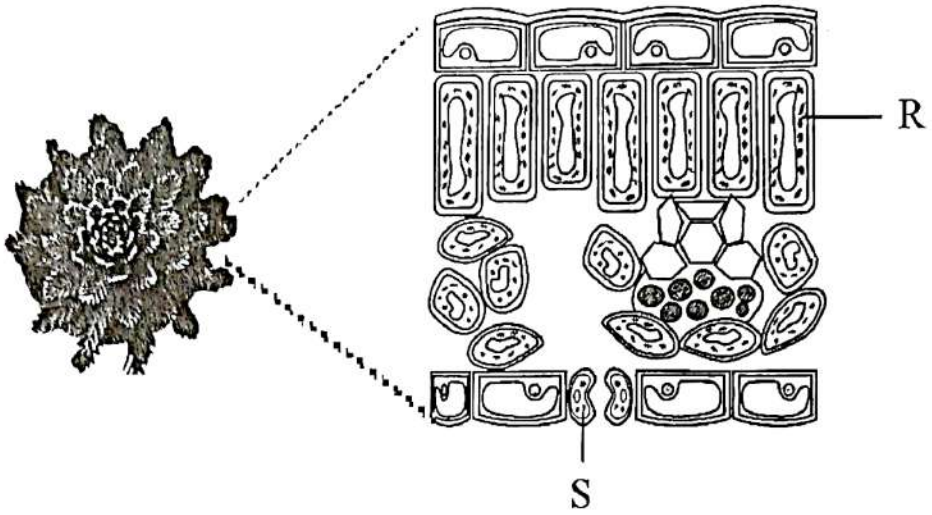
[2 markah / *marks*]

1(b) 2

Total 6

For Examiner's Use

3. Rajah 3.1 menunjukkan corak susunan daun.
Rajah 3.2 menunjukkan struktur dalaman lamina daun.
Diagram 3.1 shows the arrangement of leaves.
Diagram 3.2 shows the internal structures of leaf lamina.



Rajah 3.1
Diagram 3.1

Rajah 3.2
Diagram 3.2

(a) Berdasarkan Rajah 3.1,
Based on Diagram 3.1,

3(a)(i) 1

(i) Namakan corak susunan daun.
Name the pattern arrangement of leaves.

Mozek daun / *Leaf mosaic*

[1 markah/*mark*]

3(a)(ii) 1

(ii) Nyatakan **satu** kelebihan corak susunan di 1(a)(i) kepada tumbuhan.
*State **one** advantage of the pattern arrangement in 1(a)(i) to the plant.*

P1 Daun **menerima cahaya Matahari yang optimum** / Kloroplas menyerap cahaya Matahari yang maksimum
Leaves can receive optimum sunlight / Chloroplasts can absorb maximum sunlight [1 markah/*mark*]

P2 untuk **meningkatkan kadar fotosintesis**
To increase rate of photosynthesis

For Examiner's Use

(b) Struktur S mengawalatur pembukaan dan penutupan stoma. Terangkan mekanisme yang berlaku dalam struktur ini apabila ketiadaan cahaya.
Structure S control the opening and closing of stoma. Explain the mechanism that occur in this structure during the absence of light.

P1 Tanpa kehadiran cahaya, **fotosintesis tidak berlaku**.
In the absence of light, photosynthesis does not occur.

P2 **Kepekatan sukrosa** di dalam sel pengawal menjadi **rendah**.
The sucrose concentration in the guard cells becomes low.

P3 **Keupayaan air** di dalam sel pengawal **meningkat.**
The water potential in the guard cells increases.

[3 markah/*marks*]

3(b) 3

P4 **Molekul air meresap keluar** dari sel pengawal ke sel-sel epidermis secara **osmosis**.
The water molecules diffuse out from the guard cells to the epidermal cells by osmosis.

P5 **Sel pengawal** menjadi **flasid** / *The guard cells become flaccid.*

P6 **Stoma tertutup** / *The stoma closes*

(c) Encik K seorang pengusaha ladang timun secara komersial mendapati semua pokok timunnya layu dan mati kerana suhu panas 'El Nino'. Pegawai pertanian menasihati beliau untuk membina rumah hijau bagi mengatasi masalah tersebut.
Berdasarkan pengetahuan biologi anda, terangkan bagaimana suhu di dalam rumah hijau dikawal untuk meningkatkan hasil tanaman.

Mr. K is the owner of commercialised cucumber farm found that all the cucumber plants wilt and died because of the hot temperature of 'El Nino'. Agriculture officials advised him to build a greenhouse to overcome this problem.
Based on your knowledge of biology, explain how temperature in greenhouse is controlled to increase the yield of crops.

P1 Menggunakan **lampu LED**
Using LED Lights

P2 untuk mengekalkan **suhu optimum** / julat suhu 25-30°C
to maintain optimum temperature / range 25-30°C

P3 untuk **meningkatkan aktiviti enzim / kadar fotosintesis**
to increases enzyme activity / rate of photosynthesis

[2 markah/*marks*]

3(c) 2

P4 **lebih banyak buah dihasilkan**
more fruits are produced

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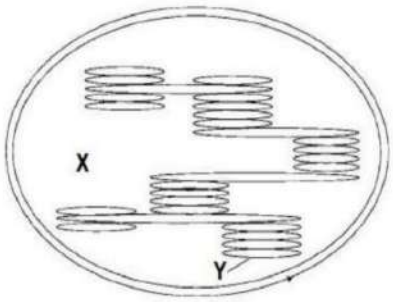
8. Rajah 8.1 menunjukkan struktur kloroplas
Diagram 8.1 shows a chloroplast structure.



Rajah 8.1 / *Diagram 8.1*

(a) (i) Nyatakan nama bagi bahagian yang berlabel
State the name of the labeled section

X : Stroma / *Stroma*

Y : Tilakoid / *Thylakoid*

[2 markah/*marks*]

(ii) Terdapat dua peringkat utama dalam proses fotosintesis. Namakan **dua** peringkat tersebut.
*There are two main stages in the photosynthesis process. Name the **two** stages.*

Tindak balas bersandarkan cahaya / *Light-dependent reaction*

Tindak balas tidak bersandarkan cahaya / *Light-dependent reaction*

[2 markah/*marks*]

(iii) Berdasarkan Rajah 8.1, tuliskan persamaan yang menerangkan proses fotosintesis yang berlaku di dalam komponen tersebut.
Based on Diagram 8.1, write an equation that describes the process of photosynthesis that takes place in the component.

[1 markah/*mark*]

$$12H_2O + 6CO_2 \xrightarrow[\text{Klorofil}]{\text{cahaya}} C_6H_{12}O_6 + 6O_2 + 6H_2O$$

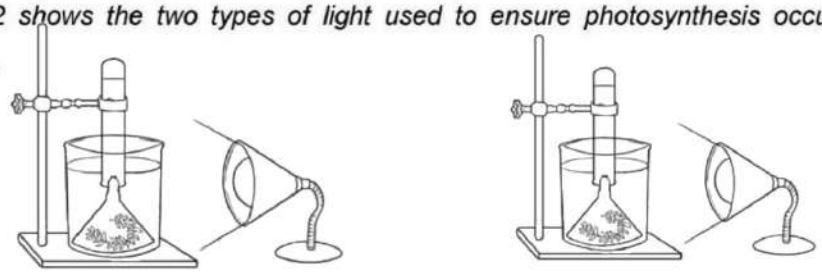
Air, Karbon dioksida → Glukosa, Oksigen, Air

$$12H_2O + 6CO_2 \xrightarrow[\text{Chlorophyll}]{\text{Light energy}} C_6H_{12}O_6 + 6O_2 + 6H_2O$$

Water, Carbon dioxide → Glucose, Oxygen, Water

(b) (i) Rajah 8.2 menunjukkan satu eskperimen untuk menguji kadar fotosintesis apabila menggunakan dua jenis cahaya lampu yang berbeza bagi memastikan fotosintesis berlaku dengan kadar optimum.

Diagram 8.2 shows the two types of light used to ensure photosynthesis occurs at an optimal rate.



Cahaya lampu LED biru
Blue LED light

Cahaya lampu kalimantang
Fluoroscent light

Rajah 8.2 / *Diagram 8.2*

Berdasarkan Rajah 8.2, terangkan perbezaan yang dapat diperhatikan pada kadar fotosintesis apabila menggunakan dua jenis cahaya yang berbeza.

Terangkan satu perbezaan yang dapat diperhatikan dengan menggunakan jenis warna cahaya lampu yang berbeza.

Based on Diagram 8.2, explain the difference that can be observed in the rate of photosynthesis when using two different types of light.

P1 Tumbuhan yang menggunakan **cahaya lampu LED biru mempunyai kadar fotosintesis yang lebih tinggi** berbanding tumbuhan yang menggunakan cahaya lampu kalimantang
The plant using blue LED light has a higher photosynthesis rate compare to fluorescent light

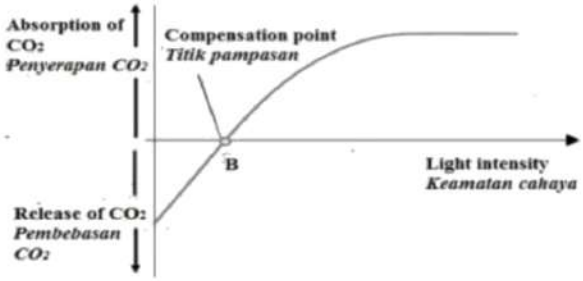
P2 sebab **cahaya biru diserap oleh pigmen karotenoid** sebelum dipindahkan ke klorofil
as blue light is absorbed by carotenoid pigments before being transferred to chlorophyll

[2 markah/*marks*]

P3 mempunyai **jumlah tenaga yang cukup untuk menguja elektron** dalam tindak balas bersandarkan cahaya
has enough amount of energy to excite electrons in the light-dependent reaction

(c) (ii) Graf 1 menunjukkan satu titik B yang dipanggil titik pampasan.

Graph 1 shows a point B called the compensation point.



Graf 1 / *Graph 1*

Terangkan apakah yang berlaku apabila keamatan cahaya melepasi titik pampasan.

Explain what happens if the intensity of light continues to increase.

P1 **Kadar fotosintesis menjadi lebih tinggi** berbanding kadar respirasi
The rate of photosynthesis becomes faster compare to the rate of respiration

P2 **Gas oksigen berlebihan dibebaskan** ke atmosfera
Excessive oxygen is released into the atmosphere

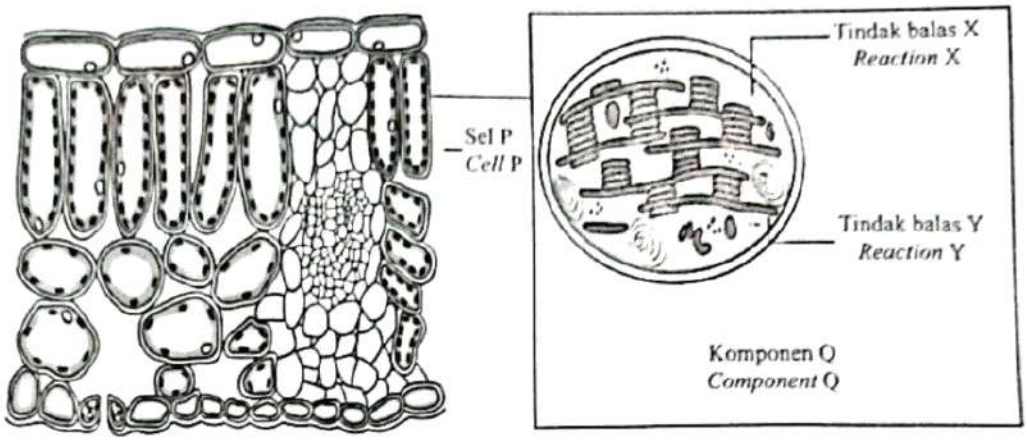
[2 markah/*marks*]

P3 **Kadar penghasilan glukosa melebihi** kadar penggunaan glukosa
The rate of glucose production exceeds than the rate of glucose usage

P4 **Glukosa berlebihan disimpan** dalam bentuk **kanji oleh tumbuhan**
Excess glucose is stored in the form of starch by the plant

7. Rajah 7(a) menunjukkan keratan rentas daun. Rajah 7(b) menunjukkan tindak balas X dan tindak balas Y yang berlaku dalam komponen Q.

Diagram 7(a) shows the cross section of a leaf. Diagram 7(b) shows reaction X and reaction Y that occur in component Q.



Rajah 7(a)
Diagram 7(a)

Rajah 7(b)
Diagram 7(b)

a. Nyatakan nama sel P.
State the name of cell P.

Sel P: Sel mesofil palisad / *Palisade mesophyll cell*
Cell P

[1 markah]
[1 *mark*]

b. (i) Terangkan tindak balas Y.

Explain reaction Y.

P1 Tindak balas Y **berlaku di tilakoid / granum / grana**

Reaction Y occurs in thylakoid / granum / grana

P2 Berlaku **fotolisis air** / Molekul air diuraikan dengan kehadiran cahaya

Photolysis of water occurs / Water molecules are broken down in the presence of light energy

P3 membentuk **ion hidrogen** dan **ion hidroksida**

to form hydrogen ions and hydroxide ions

[3 markah]
[3 *marks*]

P4 Ion hidroksida (kehilangan electron) membentuk **oksigen dan air**

Hydroxide ions (lose electrons) tand form oxygen and water

(ii) Wajarkan kepentingan tindak balas Y ke atas tindak balas X.

Justify the importance of reaction Y on reaction X.

P1 Tindak balas Y **membekalkan atom hidrogen** / ATP

Y reaction supplies hydrogen atoms / ATP

P2 untuk **menurunkan / mengikat karbon dioksida**

to reduce / fix carbon dioxide

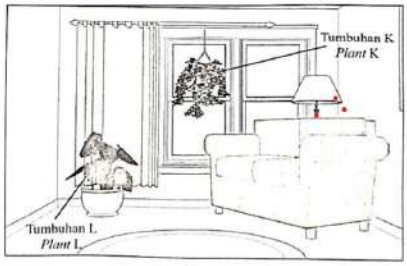
P3 untuk **menghasilkan glukosa**

to produce glucose

[2 markah]
[2 *marks*]

c. Rajah 7(c) menunjukkan dua tumbuhan di dalam sebuah bilik. Tumbuhan K berada berhampiran tingkap yang cerah manakala tumbuhan L berjauhan dari tingkap.

Diagram 7(c) shows two plants in a room. Plant K is close to a bright window while plant L is far from the window.



Terangkan kesan kedudukan tumbuhan K dan tumbuhan L ke atas kadar fotosintesis berdasarkan titik pampasan.

Explain the effect of position of plant K and plant L on the rate of photosynthesis based on compensation point.

P1 **Tumbuhan K menerima keamatan cahaya melebihi titik pampasan**

P2 Tumbuhan L menerima keamatan cahaya pada / kurang drpd titik pampasan

P2 **Kadar fotosintesis tumbuhan K lebih tinggi** berbanding tumbuhan L

The rate of photosynthesis becomes faster compare to the rate of respiration

P3 **Tumbuhan K membebaskan gas oksigen berlebihan** ke atmosfera

Plant K releases excessive oxygen into the atmosphere

[3 markah]
[3 *marks*]

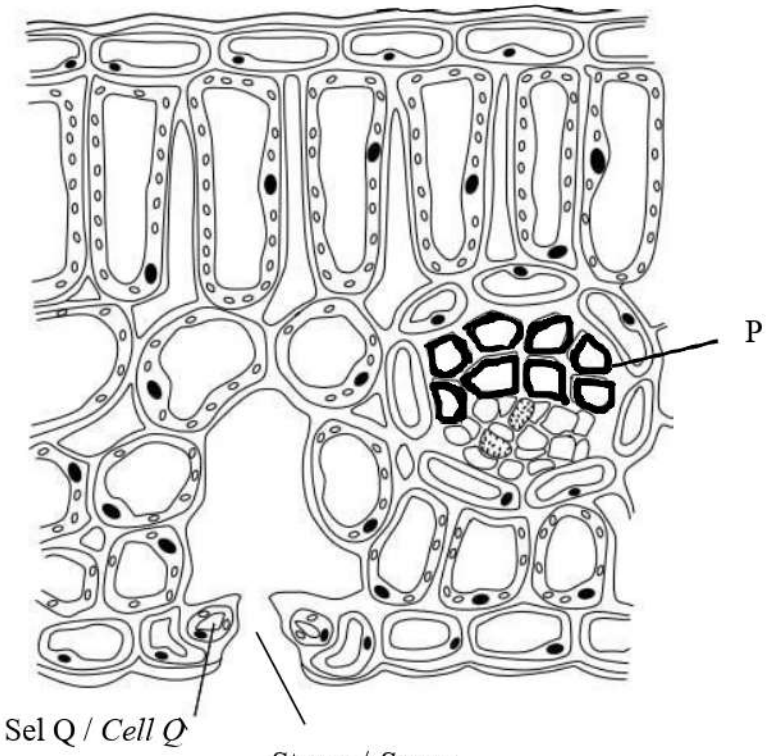
P4 **Kadar penghasilan glukosa tumbuhan K melebihi** kadar penggunaan glukosa

The rate of glucose production in plant K exceeds the rate of glucose usage

P5 **Glukosa berlebihan disimpan** dalam bentuk **kanji oleh tumbuhan K**

Excess glucose is stored in the form of starch by plant K

6 Rajah 6.1 menunjukkan keratan rentas lamina daun.
Diagram 6.1 shows the cross-section of a leaf lamina.



Rajah 6.1 / *Diagram 6.1*

(a) (i) Namakan struktur yang berlabel P dan sel Q.
Name the structures labelled P and cell Q.

P: Xilem / *Xylem*

Q: Sel pengawal / *Guard cells*

[2 markah/*marks*]

(b) Nyatakan satu fungsi P.
State one function of P.

P1 Mengangkut air dan garam mineral (dari akar ke bahagian lain)
Transport water and mineral salts (from the roots to other parts)

P2 Memberikan sokongan mekanikal kepada tumbuhan
Provides mechanical support to the plant

[1 markah/*mark*]

BIOT5B2

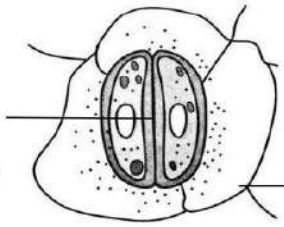
(ii) Terangkan penyesuaian struktur P berdasarkan fungsi yang dinyatakan dalam 6(a)(ii).
Explain the structural adaptation of P based on the function stated in 6(a)(ii).

6(a)(iii) 2

F1 Merupakan **sel mati / Tiada sitoplasma**
Consists of dead cells / Does not have cytoplasm
E1 untuk **memudahkan pengangkutan air**
to allow the flow of water easily
F2 **Tersusun memanjang dari hujung ke hujung**
Arranged longitudinally from end to end
E2 untuk memudahkan pengangkutan air
to allow the flow of water easily
F3 **Dinding struktur P mempunyai penebalan lignin** (tidak sekata)
The walls of the structure P vessel have (uneven) lignin thickening
E3 untuk **memberikan kekuatan supaya struktur P tidak ranap**
to give strength to structure P to prevent from collapsing
F4 Dinding struktur P mempunyai penebalan lignin (tidak sekata)
The walls of the structure P vessel have (uneven) lignin thickening
E4 untuk **menyokong pokok dari lenturan**
to prevent the plant from being bent

[2 markah/*marks*]

(b) Rajah 6.2 menunjukkan keadaan sel Q dalam tumbuhan yang layu.
Diagram 6.2 shows the condition of cell Q in a wilted plant.



Rajah 6.2 / *Diagram 6.2*

6(b)(i) 1

(i) Apakah yang berlaku kepada sel Q?
What happen to cell Q?

Sel Q flasid / kurang segah
Cell Q flaccid / less turgid

[1 markah/*mark*]

6(a)(ii) 2

(ii) Terangkan kepentingan stoma tertutup apabila tumbuhan kekurangan air semasa cuaca panas.
Explain the importance of stomatal closure when plant lacks water on a hot day.

P1 Utk **mengelakkan kehilangan lebih banyak air** / mengurangkan kadar trasnpirasi
To prevent esxcessive loss of water / reduce the rate of transpiration

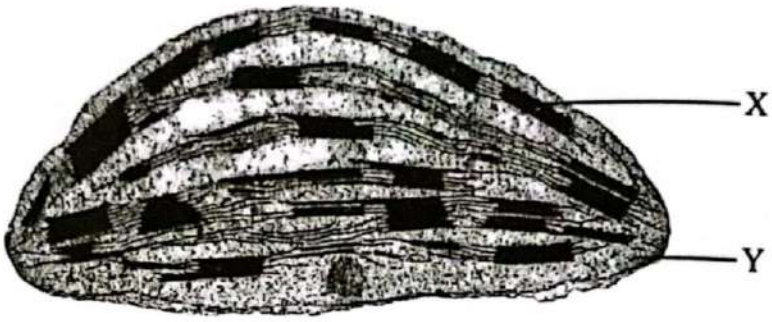
P2 Utk memastikan tumbuhan terus hidup / mengekalkan kesegahan
To ensure the survival of the plant / maintain turgidity

[2 markah/*marks*]

Total A6 8

3 Rajah 3.1 menunjukkan struktur terperinci bagi organel W yang dilihat di bawah mikroskop elektron.

Diagram 3.1 shows the detail structure of organelle W seen under electron microscope



Rajah 3.1
Diagram 3.1

(*a*) Namakan satu organ dalam tumbuhan di mana W didapati dengan banyaknya.
Beri satu sebab bagi jawapan anda.

Name an organ in a plant where W is found abundantly.
Give a reason for your answer.

Nama organ : Daun / Leaf
Name of the organ

Sebab : Mempunyai banyak sel mesofil palisad / tapak fotosintesis
Reason *Has many palisades mesophyll cells / photosynthesis sites*

[2 *markah*]
[2 *marks*]

Untuk Kegunaan Pemeriksa

(*b*) Semasa fotosintesis, bahagian X ialah tempat di mana tindak balas bersandarkan cahaya berlaku dan bahagian Y ialah tempat di mana tindak balas tidak bersandarkan cahaya berlaku.

During photosynthesis, part X is the site where light-dependant reaction occurs and part Y is the site where light-independent reaction occurs.

(i) Terangkan bagaimana tindak balas bersandarkan cahaya berlaku di bahagian X.

Explain how light-dependant reaction occurs in part X.

P1 X mempunyai **banyak klorofil** / *X has plenty of chlorophyl*

P2 untuk **memerangkap tenaga cahaya** / *to absorb light energy*

P3 untuk **menghasilkan tenaga kimia** / ATP
To produce chemical energy / ATP

P4 untuk **memecahkan molekul air** / fotolisis air
To break down water molecules

P5 menghasilkan **ion hidrogen** dan **ion hidroksida**
To form hydrogen ion and hydroxide ion

[2 *markah*]
[2 *marks*]

3(*b*)(i) 2

(ii) Terangkan kesan kepada tindak balas tidak bersandarkan cahaya yang berlaku di bahagian Y jika tiada kehadiran cahaya.

Explain the effect to the light-independant reaction in part Y if light is absent.

P1 **NADPH / ATP** tidak dihasilkan
NADPH / ATP are not produced

P2 **Karbon dioksida** tidak dapat diikat kepada **sebatian organik 5 karbon**
Carbon dioxide cannot be bind to 5-carbon organic compound

P3 **Sebatian organik 6 karbon** tidak dihasilkan
6-carbon organic compound is not formed

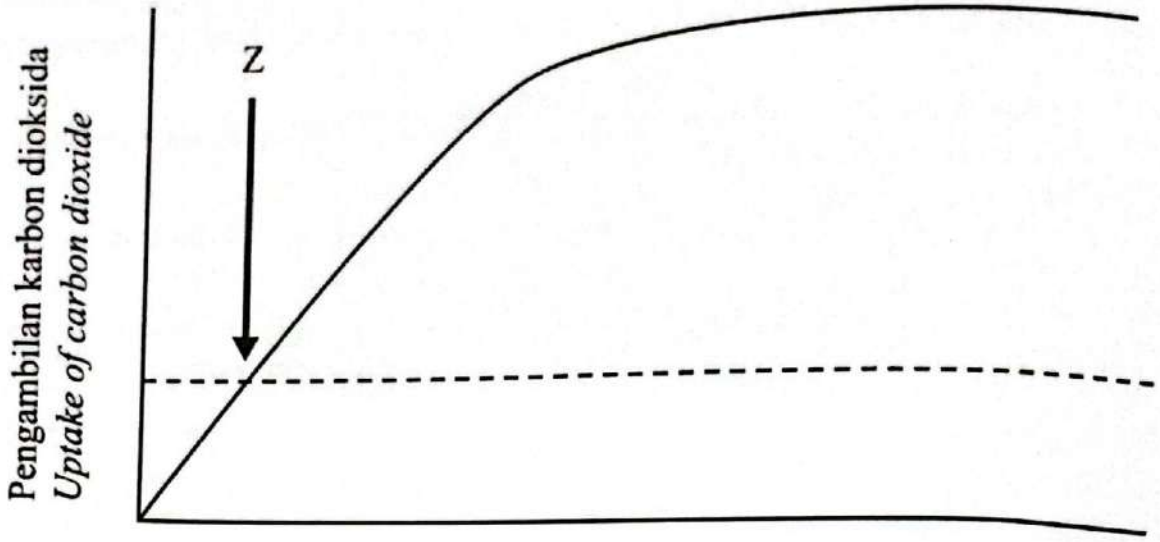
P4 NADPH/ATP **tidak dapat menurunkan sebatian organik** kepada glukosa
NADPH/ATP cannot reduce organic compound to glucose

P5 **Glukosa tidak dihasilkan** / *No glucose is produced*

[2 *markah*]
[2 *marks*]

3(*b*)(ii) 2

(c) Rajah 3.2 menunjukkan graf pengambilan karbon dioksida melawan keamatan cahaya.
Diagram 3.2 shows a graph of carbon dioxide uptake against light intensity.



Keamatan cahaya meningkat
Increasing light intensity

Rajah 3.2
Diagram 3.2

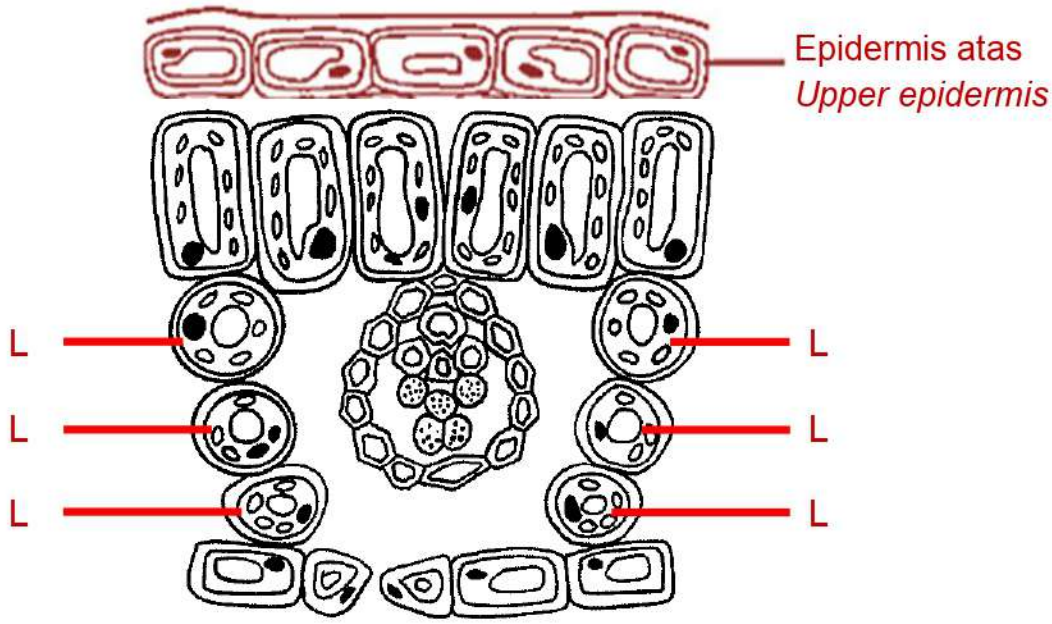
Nyatakan kesan keamatan cahaya ke atas kadar fotosintesis pada titik Z.
State the effect of light intensity on the rate of photosynthesis at point Z.

Pada titik Z, kadar fotosintesis sama dengan kadar respirasi
At point Z, the rate of photosynthesis is equal to the rate of respiration

[1 *markah*]
[1 *mark*]

4. Rajah 4.1 menunjukkan sebahagian struktur dalaman daun.

Diagram 4.1 *shows a part of the internal leaf structure.*



Rajah 4.1
Diagram 4.1

4(*a*) (*a*) Label sel mesofil berspan sebagai **L** pada Rajah 4.1. [1 *markah*]

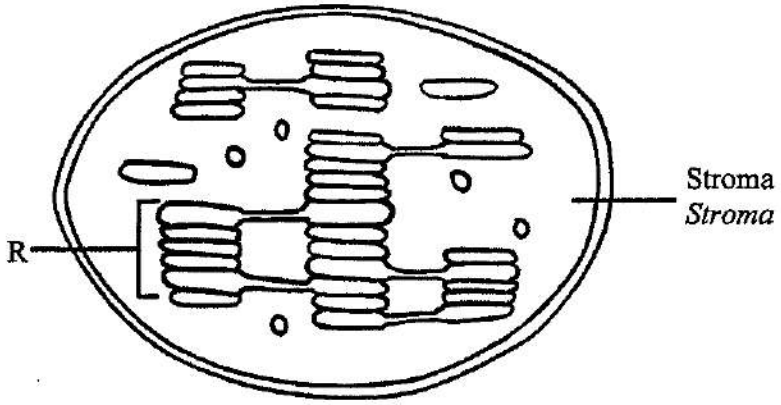
Label the spongy mesophyll cell as **L** *in Diagram* 4.1. [1 *mark*]

4(*b*) (*b*) Lengkapkan Rajah 4.1 dengan melukis lapisan epidermis atas. [2 *markah*]

Complete Diagram 4.1 *by drawing upper epidermal layer.* [2 *marks*]

(*c*) Rajah 4.2 menunjukkan satu komponen sel yang terlibat dalam proses fotosintesis.

Diagram 4.2 shows a cell component which involved in photosynthesis process.



Rajah 4.2
Diagram 4.2

Namakan tindak balas yang berlaku di dalam stroma.

Name the reaction that occurs in stroma.

Tindak balas tidak bersandarkan cahaya
Light-independent reaction

[1 *markah*]
[1 *mark*]

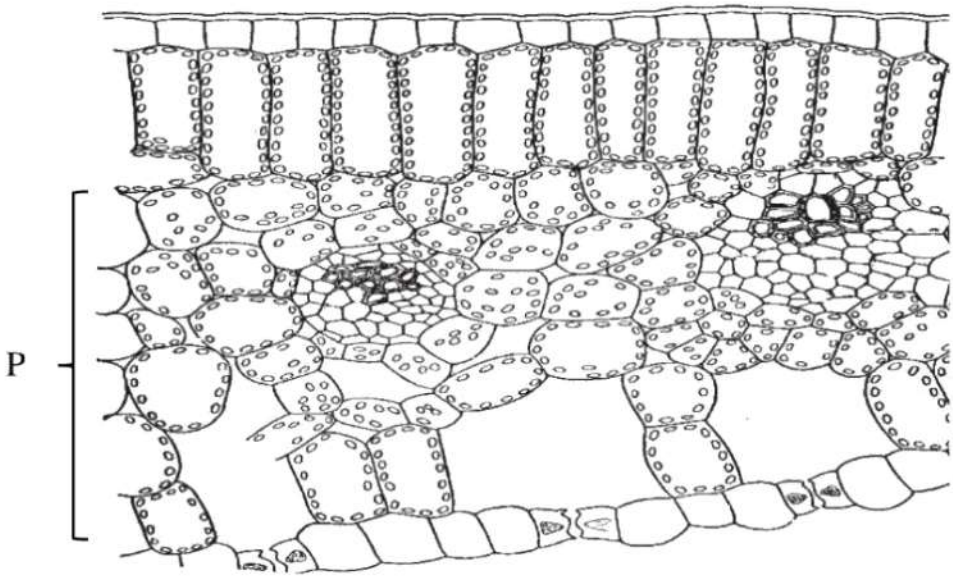
(*d*) Bezakan tindak balas yang berlaku pada R dan stroma mengikut aspek yang dinyatakan.

Differentiate the reactions that occur at R *and stroma according to the aspect stated.*

Tindak balas pada R *Reaction at* R	Aspek *Aspect*	Tindak balas pada stroma *Reaction at stroma*
Fotolisis air *Photolysis of water*	Proses terlibat *Process involved*	Penurunan karbon dioksida *Reduction of carbon dioxide*
Air *Water*	Bahan tindak balas *Reaction substance*	Karbon dioksida *Carbon dioxide*
Oksigen dan air *Oxygen and water*	Hasil tindak balas *Reaction product*	Glukosa *Glucose*

[3 *markah*]
[3 *marks*]

7. Rajah 7 menunjukkan keratan rentas sejenis daun.
Diagram 7 shows a cross section of a type of leaf.



Rajah 7
Diagram 7

(a) (i) Namakan sel P.
Name cell P.

Sel mesofil berspan
Spongy mesophyll cell

[1 markah/ *1 mark*]

(ii) Terangkan penyesuaian sel P untuk proses fotosintesis.

Explain the adaptations of cell P for photosynthesis process.

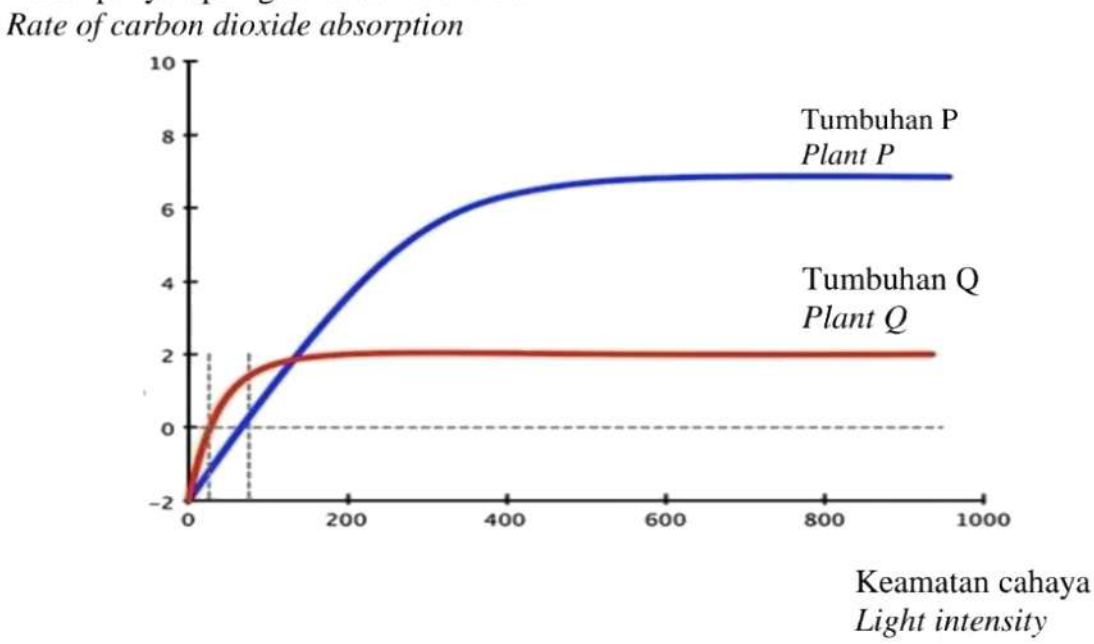
P1 Mempunyai **banyak ruang udara**
Has lots of air spaces

P2 untuk **membenarkan pertukaran gas dengan cekap**
to allow gas exchange efficiently

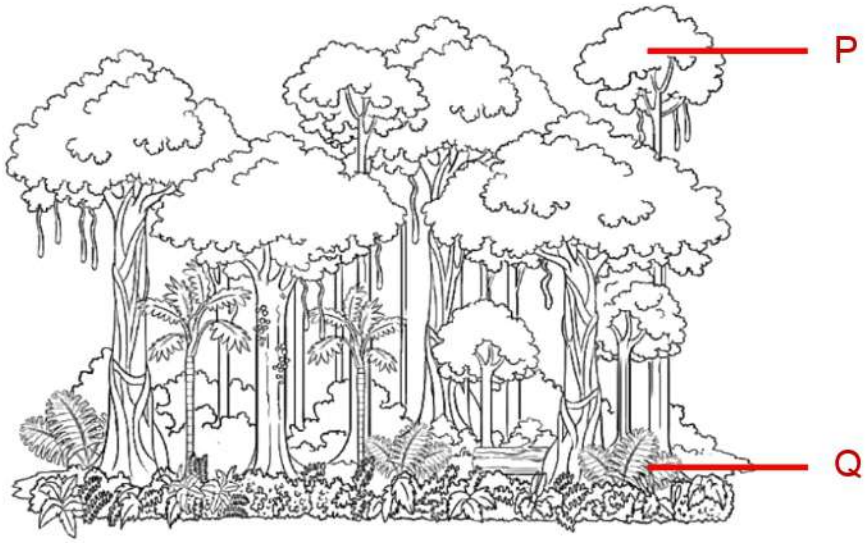
[2 markah/ *2 marks*]

(b) Rajah 7.1 menunjukkan titik pampasan bagi dua jenis tumbuhan yang tumbuh pada lokasi yang terdedah kepada keamatan cahaya yang berbeza dalam hutan hujan tropika.
Diagram 7.1 shows compensation point of two type of plants which grow on different location that are exposed to different light intensity in a tropical rainforest.

Rajah 7.2 menunjukkan lapisan tumbuhan dalam hutan hujan tropika.
Diagram 7.2 shows layers of plants in a tropical rainforest.



Rajah 7.1
Diagram 7.1



Rajah 7.2
Diagram 7.2

(i) Pada rajah 7.2, labelkan kedudukan bagi tumbuhan P dan Q.
On Diagram 7.2, label the position of plant P and Q.

[2 markah/ *2 marks*]

(ii) Dengan merujuk graf, terangkan jawapan anda pada b (i).
By referring to the graph, explain your answer in b (i).

P1 Pada P, **keamatan cahaya paling tinggi**
At P, light intensity at the highest

P2 menyebabkan daun dapat **menyerap cahaya Matahari paling banyak**
causing the leaves can absorb most sunlight

[2 markah/ *2 marks*]

P3 untuk **menjalankan fotosintesis**
to carry out photosynthesis

P4 Pada Q, keamatan cahaya paling rendah
At P, light intensity at the highest

P5 menyebabkan daun dapat menyerap cahaya Matahari paling rendah
causing the leaves can absorb least sunlight

P6 untuk menjalankan fotosintesis
to carry out photosynthesis

(c) Pada titik pampasan, kadar fotosintesis dan kadar respirasi sel adalah sama. Terangkan apakah yang akan berlaku kepada kadar penghasilan glukosa apabila keamatan cahaya terus meningkat melepasi titik pampasan.
At compensation point, rate of photosynthesis and rate of cellular respiration are the same.
Explain what will happen to the rate of glucose production as light intensity continues to increase beyond the compensation point.

P1 **Kadar penghasilan glukosa meningkat** melebihi kadar penggunaan glukosa / Untung bersih dalam glukosa
The rate of glucose production increase exceeds the rate of glucose usage / net gain in glucose

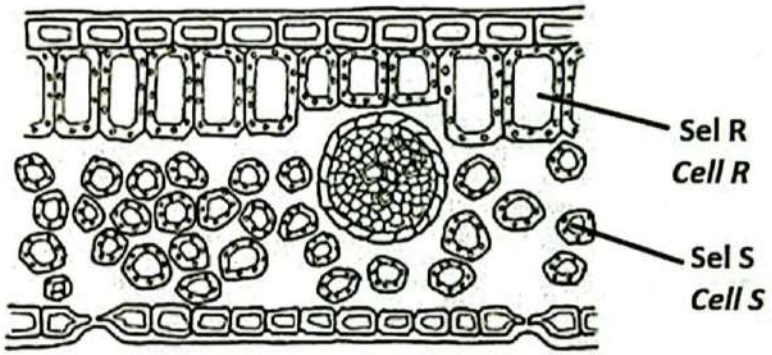
P2 kerana **kadar fotosintesis lebih tinggi** berbanding kadar respirasi
because the rate of photosynthesis is higher compare to the rate of respiration

[2 markah/ *2 marks*]

TRIAL KEDAH 2023

1. (a) (i) Rajah 1.1 menunjukkan keratan rentas satu daun.

Diagram 1.1 shows the cross section of a leaf.



Rajah 1.1

Diagram 1.1

Nyatakan nama sel R dan sel S.

State the name of cell R and cell S.

Sel R : Sel mesofil palisad / *Palisade mesophyll cell*
Cell R
Sel S: Sel mesofil berspan / *Spongy mesophyll cell*
Cell S

[2 markah]

[*2 marks*]

(ii) Nyatakan satu perbezaan struktur antara sel R dan sel S.

State one structural difference between cell R and cell S.

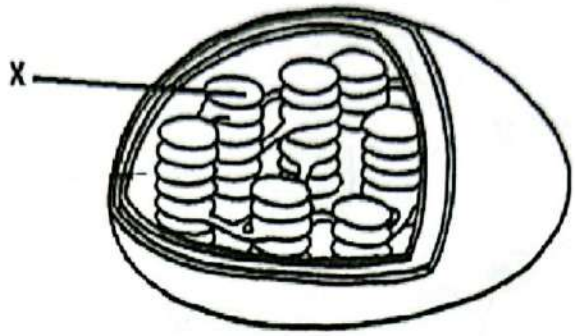
P1 Sel R **tersusun tegak / padat**,
*sel S **tersusun longgar / banyak rongga udara***
Cell R are arranged vertically / closely-packed,
cell S loosely-arranged / has many intercellular air spaces

[1 markah]

[*1 mark*]

P2 Sel R mempunyai **banyak kloroplas**, sel S mempunyai **kurang kloroplas**
Cell R contains many chloroplasts, cell S contains less numbers of chloroplasts

(b) Rajah 1.2 menunjukkan struktur satu komponen dalam sel tumbuhan.
Diagram 1.2 shows the structure of a component in plant cell.



Rajah 1.2
Diagram 1.2

(i) Apakah fungsi komponen yang ditunjukkan pada Rajah 1.2?
What is the function of the component shown in Diagram 1.2?
Tapak fotosintesis / *Site for photosynthesis*
.....
.....

[1 markah]
[*1 mark*]

(ii) Nyatakan nama struktur X dan peringkat fotosintesis yang berlaku pada struktur X.
State the name of structure X and the stage of photosynthesis that occurs in structure X.
P1 Tilakoid / *Thylakoid*
.....
P2 Tindak balas bersandarkan cahaya
.....
Light-independent reaction

[2 markah]
[*2 marks*]

10. (a) (i) Daun adalah organ utama untuk transpirasi dalam tumbuhan. Terangkan maksud transpirasi.

Leaf is the main organ for transpiration in a plant. Explain the meaning of transpiration.

P1 Proses kehilangan air dalam bentuk wap air
Process of water loss in the form of water vapour [2 markah]

P2 secara sejatan daripada tumbuhan ke atmosfera [2 marks]
through evaporation from the plants to the atmosphere

P3 melalui liang stoma daun / batang / bunga
through stomata pores in leaves / stem / flower

(ii) Rajah 10.1 menunjukkan keadaan sel mesofil palisad akibat transpirasi pada hari yang panas dan kering.

Diagram 10.1 shows the condition of palisade mesophyll cell caused by transpiration during hot and dry day.

Rajah 10.1
Diagram 10.1

Huraikan bagaimana faktor persekitaran tersebut mempengaruhi keadaan sel mesofil palisad dalam Rajah 10.1 melalui proses transpirasi.

Describe how do the surrounding factors affect the condition of palisade mesophyll cell in Diagram 10.1 through transpiration process.

[8 markah]
[8 marks]

Faktor suhu

P1 **Suhu persekitaran** tinggi / *High surrounding temperature*

P2 Molekul air dlm sel mesofil palisad **menyerap lebih byk tenaga haba** dari persekitaran
Water molecules in palisade mesophyll cell absorb more heat energy from surrounding

P3 **Tenaga kinetik** dlm molekul air / Perlanggaran antara moleku air meningkat
Kinetic energy in water molecules/ The collision between water molecules increases

P4 **Lebih banyak molekul air tersejat** daripada sel mesofil palisad ke udara
More water molecules evaporate from palisade mesophyll cell to the air space

P5 **Kepekatan wap air di ruang udara** meningkat
The concentration of water vapour in the air space increases

P6 **Lebih banyak wap air meresap** dari ruang udara ke persekitaran
More water vapour diffuses from air space to the surrounding

Faktor kelembapan

P7 Kelembapan persekitaran rendah / *Lower relative air humidity in the surrounding*

P8 Kepekatan wap air di dalam ruang udara daun lebih tinggi drpd persekitaran
The water vapour concentration in the leave air space is higher than the surrounding

P9 Wap air meresap daripada ruang udara daun ke persekitaran
Water vapour diffuse from air space to surrounding

P10 Menuruni kecerunan kepekatan wap air
Down concentration gradient of water vapour

P11 Kehilangan air yang banyak drpd sel mesofil palisad menyebabkan plasmolisis
Excessive loss of water vapour causes mesophyll palisade cell undergoes plasmolysis.