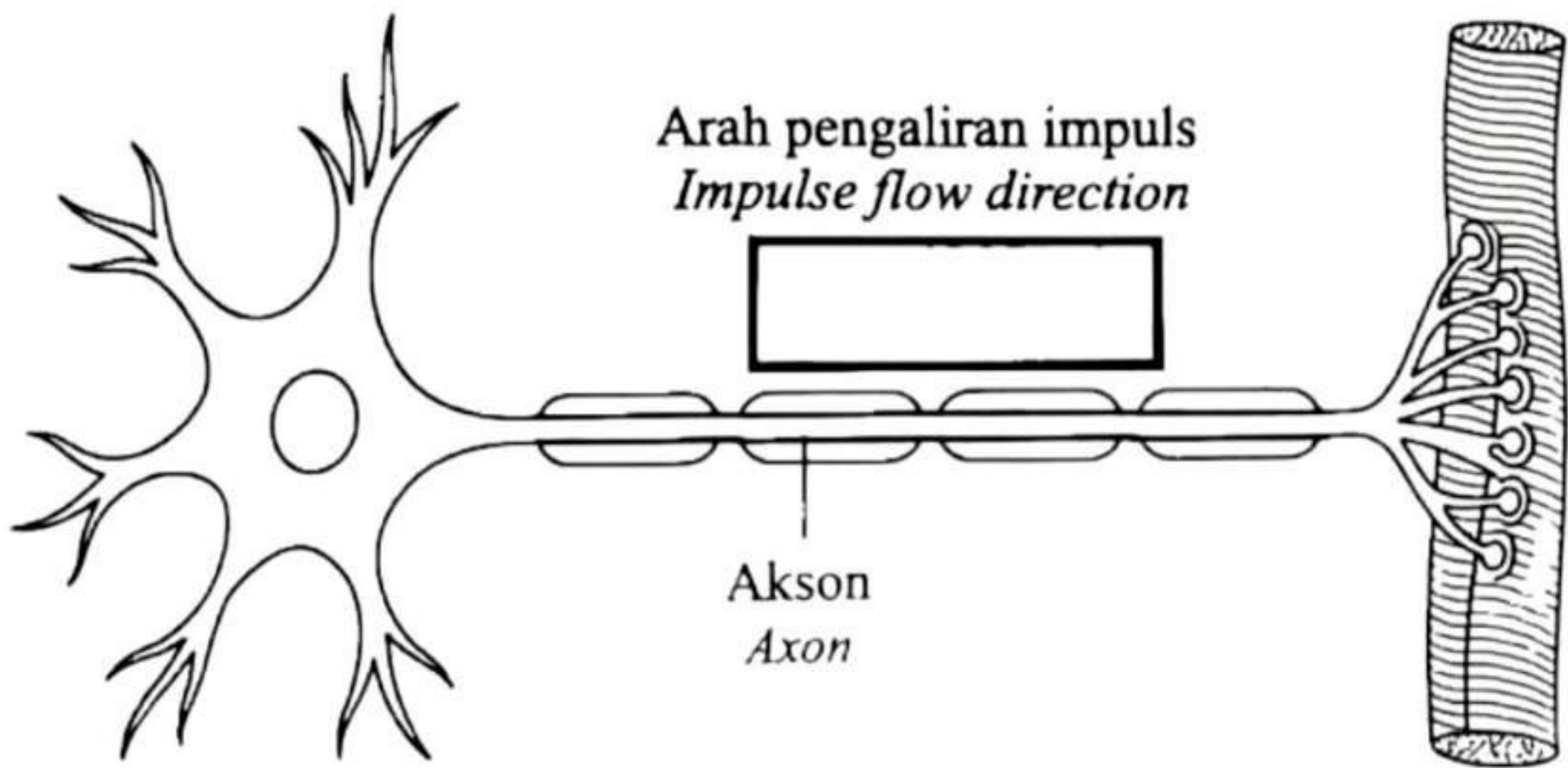


Bahagian A
[60 markah]
Jawab semua soalan.

- 1 (a) Rajah 1.1 menunjukkan struktur neuron M dalam sistem saraf.
Diagram 1.1 shows the structure of neuron M in nervous system.



Rajah 1.1
Diagram 1.1

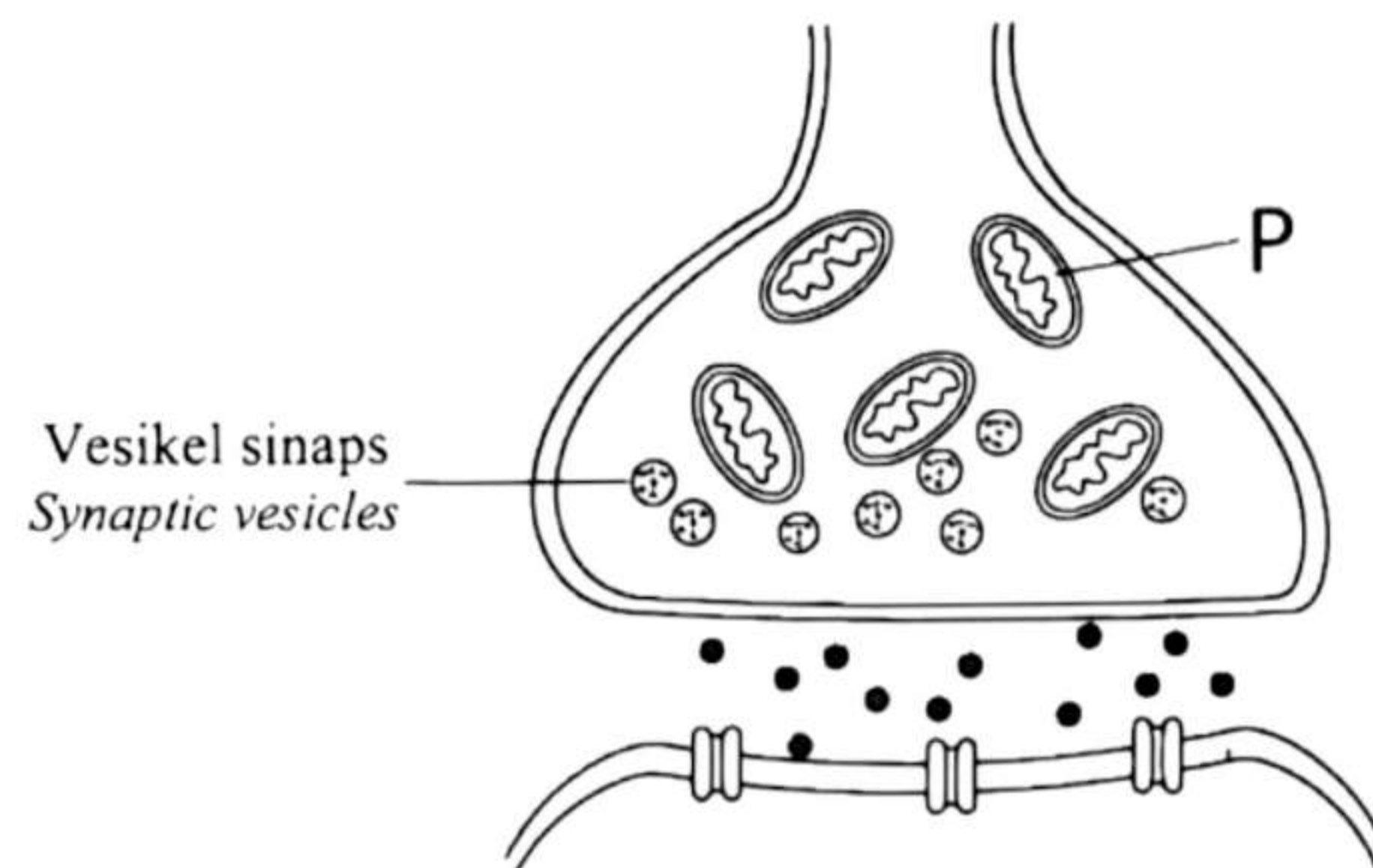
- (i) Nyatakan nama neuron M.
State the name of neurone M.

[1 markah]
[1 mark]

- (ii) Pada Rajah 1.1, lukiskan satu anak panah untuk menunjukkan arah pengaliran impuls di sepanjang akson dalam ruangan yang disediakan.
In Diagram 1.1 draw an arrow to show the direction of impulse flow along the axon in the space provided.

[1 markah]
[1 mark]

- (b) Rajah 1.2 menunjukkan struktur satu sinaps.
Diagram 1.2 shows the structure of a synapse.



Rajah 1.2
Diagram 1.2

Berdasarkan Rajah 1.2,
Based on Diagram 1.2

- (i) Nyatakan fungsi P.
State the function of P.

.....
[1 markah]
[1 mark]

- (ii) Nyatakan nama bahan kimia yang terkandung dalam vesikel sinaps.
State the name of the chemical substance contained in synaptic vesicles.

.....
[1 markah]
[1 mark]

- (c) Seorang doktor menyuntik sejenis dadah kepada seorang pesakit untuk mengurangkan rasa sakit.

Terangkan apa yang berlaku kepada penghantaran impuls apabila pembebasan neurotransmitter dihalang oleh dadah tersebut.

A doctor injects a type of drug to a patient to reduce pain.

Explain what happens to the transmission of impulse if the release of neurotransmitters is inhibited by the drug.

.....

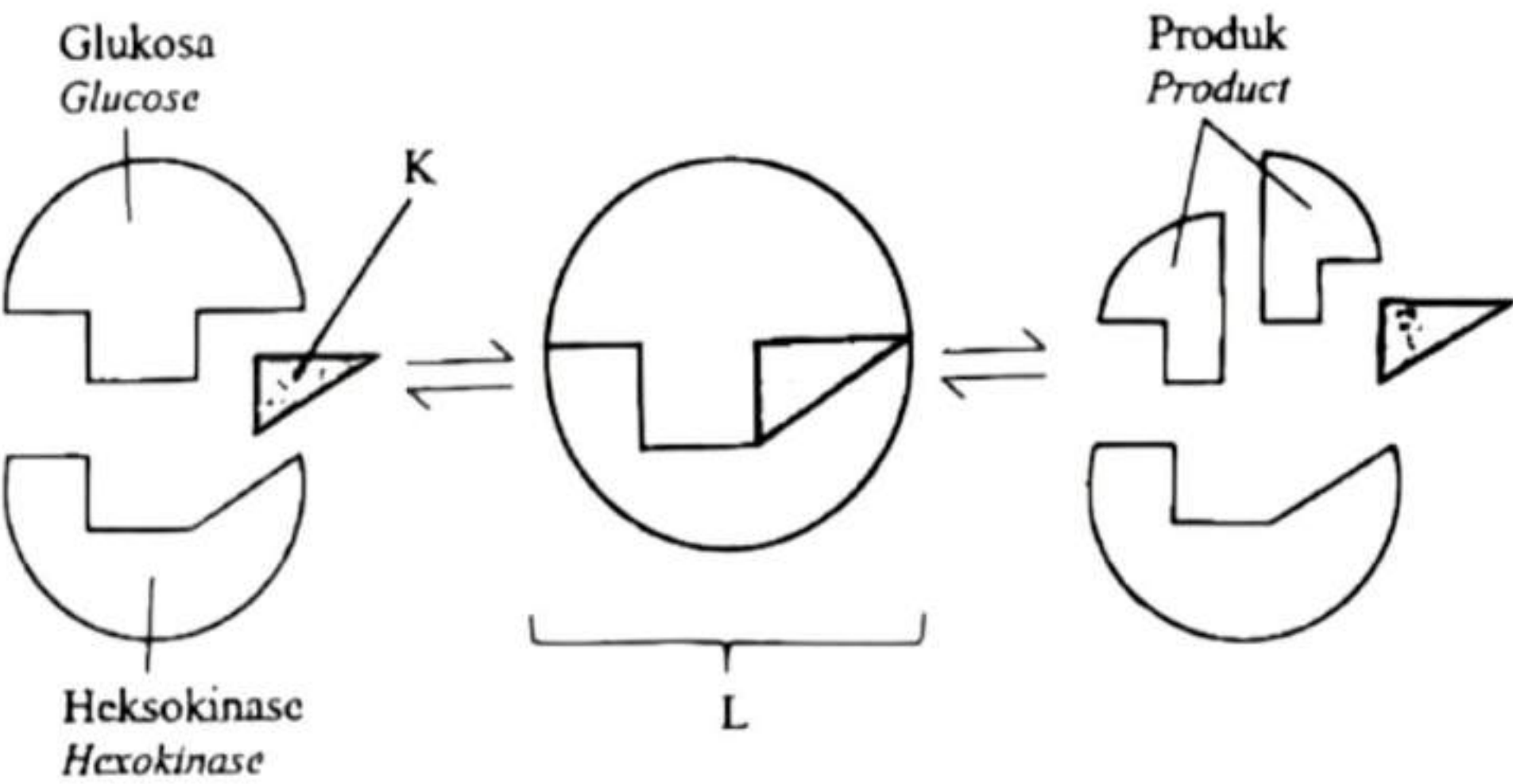
.....

.....

[2 markah]
[2 marks]

- 2 (a) Rajah 2.1 menunjukkan K yang diperlukan untuk membantu tindakan enzim heksokinase. Heksokinase merupakan salah satu enzim yang diperlukan untuk menguraikan glukosa kepada piruvat dalam proses glikolisis.

Diagram 2.1 shows K required to assist the action of the hexokinase enzyme. Hexokinase is one of enzymes required to break down glucose into pyruvate in the glycolysis process.



Rajah 2.1
Diagram 2.1

- (i) Nyatakan nama K.
State the name K.

.....

[1 markah]
[1 mark]

- (ii) Nyatakan kepentingan bahan K.
State the importance of substance K.

.....
[1 markah]
[1 mark]

- (iii) Namakan kompleks L.
Name complex L.

.....
[1 markah]
[1 mark]

- (b) Puan Y mempunyai sehelai baju yang terkena kotoran. Dia mencuci baju tersebut menggunakan detergen yang mengandungi enzim X dalam air yang sangat panas. Namun kotoran tersebut tetap tidak hilang.
Mrs. Y has a dress that is stained. She washes the dress using detergent containing enzyme X in very hot water. However, the stain still does not disappear.



Rajah 2.2
Diagram 2.2

- (i) Terangkan mengapa tindakan Puan Y tidak berkesan.
Explain why Mrs. Y's action was ineffective.

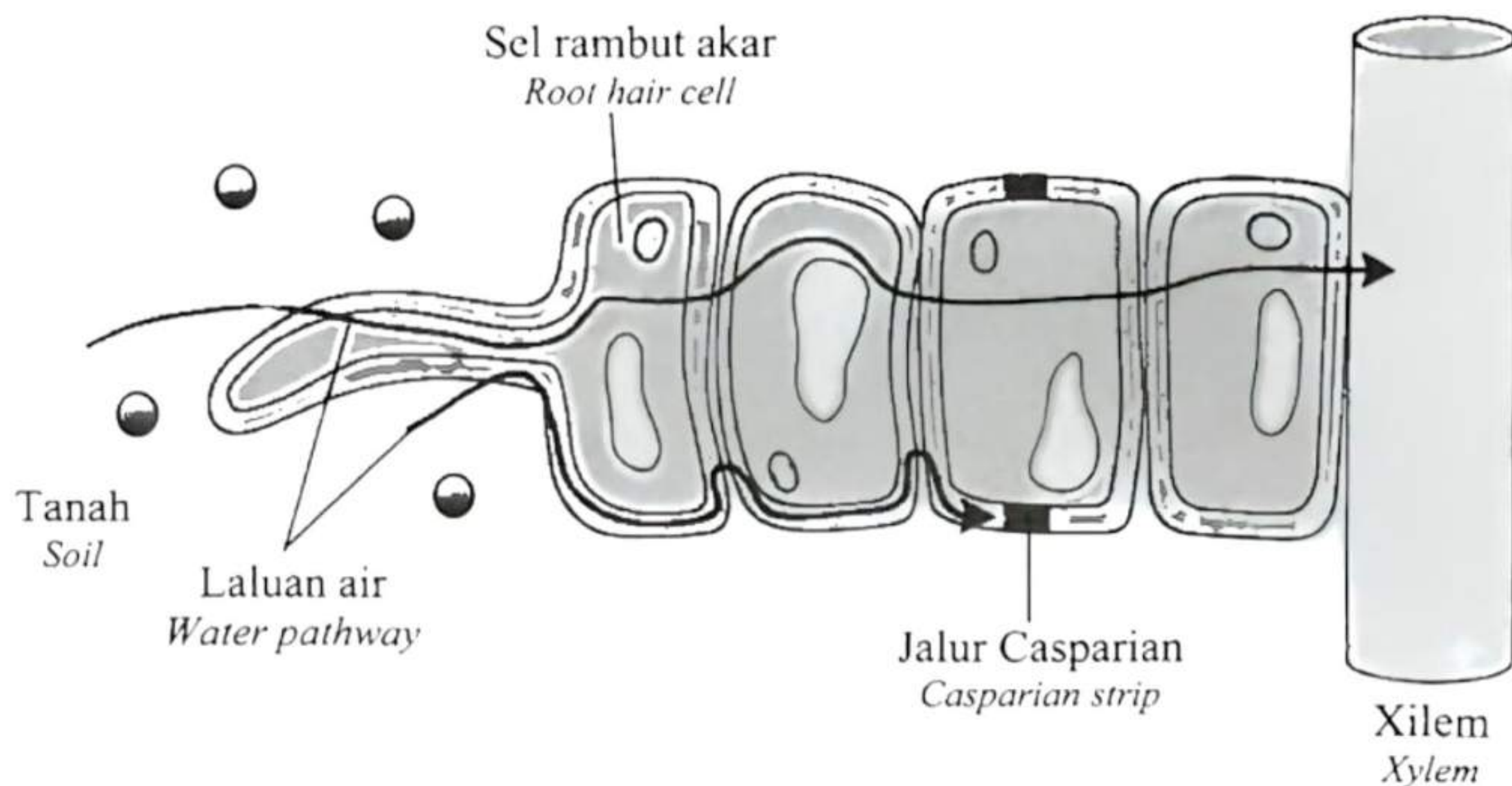
.....
.....
.....
[2 markah]
[2 marks]

- (ii) Berdasarkan Rajah 2.2 apakah enzim X?
Based on Diagram 2.2 what is enzyme X?

.....
 [1 markah]

[1 mark]

- 3 (a) Rajah 3.1 menunjukkan pergerakan air dari tanah ke xilem yang berlaku melalui dua laluan iaitu laluan simplas dan apoplas.
Diagram 3.1 shows the movement of water from the soil to the xylem that happens in two ways that are simplast and apoplast pathway.



Rajah 3.1
 Diagram 3.1

- (i) Berdasarkan Rajah 3.1, terangkan bagaimana pergerakan air berlaku daripada tanah ke dalam sel rambut akar.
Based on Diagram 3.1 explain how water moves from soil to the root hair cells.

.....
 [2 markah]

[2 marks]

- (ii) Labelkan laluan simplas sebagai X pada Rajah 3.1.
Label the simplast pathway as X in Diagram 3.1.

.....
 [1 markah]

[1 mark]

- (iii) Pergerakan air secara berterusan ke dalam xilem akan mewujudkan satu daya yang menolak air ke atas.
Nyatakan daya tersebut.

The continuous movement of water into the xylem will create a force that pushes the water upwards.

State the force.

.....
[1 markah]
[1 mark]

- (b) Satu mutasi genetik telah berlaku pada sejenis tumbuhan yang menyebabkan sel endodermis di akarnya gagal membentuk jalur Casparian.
Terangkan bagaimana mutasi ini mempengaruhi proses pergerakan bahan masuk ke xilem pada bahagian akar.

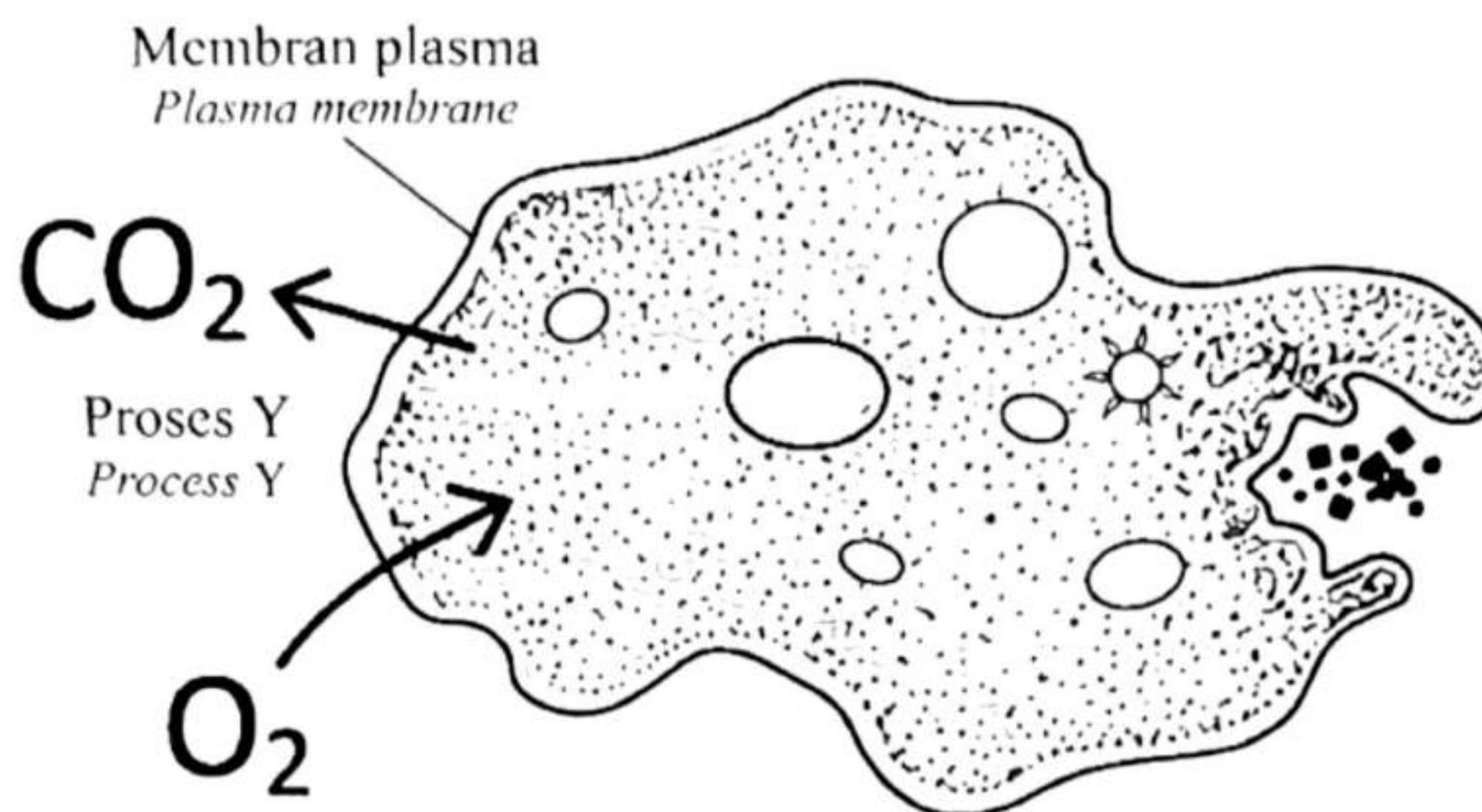
A genetic mutation has occurred in a type of plant that causes the endodermis cells in its roots fail to form Casparian strips.

Explain how this mutation affects the process of substance movement into the xylem at the roots.

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

[3 markah]
[3 marks]

- 4 (a) Rajah 4.1 menunjukkan satu *Amoeba* sp.
Diagram 4.1 shows an Amoeba sp.



Rajah 4.1
Diagram 4.1

- (i) Labelkan pseudopodium sebagai X pada Rajah 4.1.
Label the pseudopodium as X in Diagram 4.1.

[1 markah]
[1 mark]

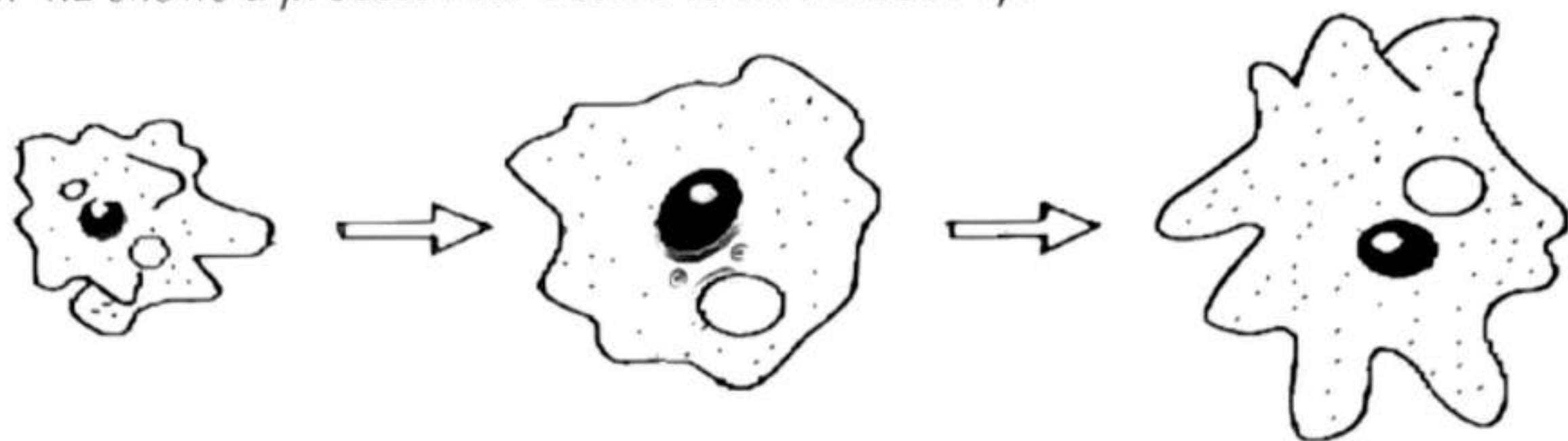
- (ii) Nyatakan satu fungsi pseudopodium.
State one function of pseudopodium.

.....
[1 markah]
[1 mark]

- (iii) Berdasarkan Rajah 4.1, nyatakan proses Y.
Based on Diagram 4.1 state process Y.

.....
[1 markah]
[1 mark]

- (b) Rajah 4.2 menunjukkan satu proses yang berlaku pada *Amoeba sp.*
Diagram 4.2 shows a process that occurs to an Amoeba sp.



Rajah 4.2
Diagram 4.2

- (i) Berdasarkan Rajah 4.2, terangkan proses tersebut.
Based on Diagram 4.2, explain the process.

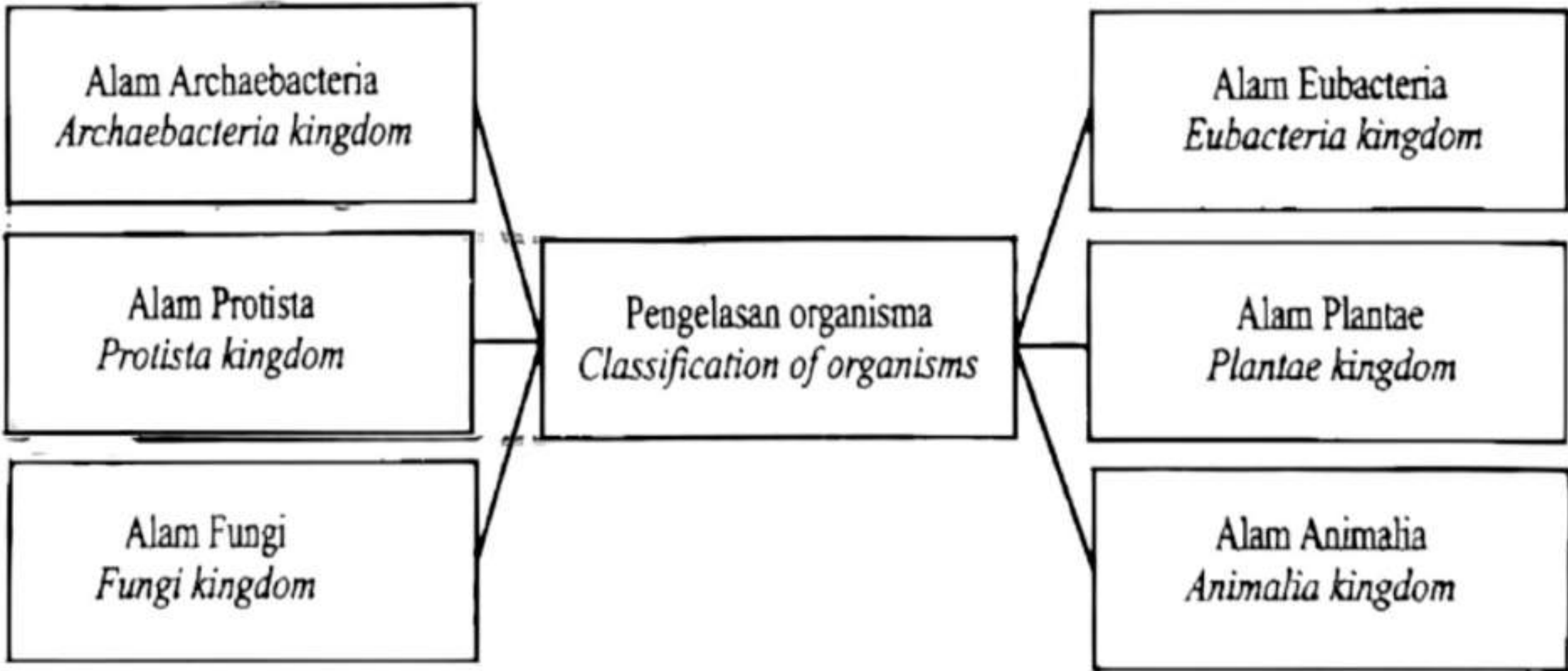
.....

.....

.....

[2 markah]
[2 marks]

- (ii) Rajah 4.3 menunjukkan sistem enam alam dalam pengelasan organisma.
Diagram 4.3 shows six kingdom system in classification of organisms.



Rajah 4.3
Diagram 4.3

Amoeba sp. dikelaskan ke dalam alam Protista. Nyatakan dua persamaan antara alam Protista dan alam Fungi.

Amocba sp. is classified into *Protista* kingdom. State two similarities between *Protista* kingdom and *Fungi* kingdom.

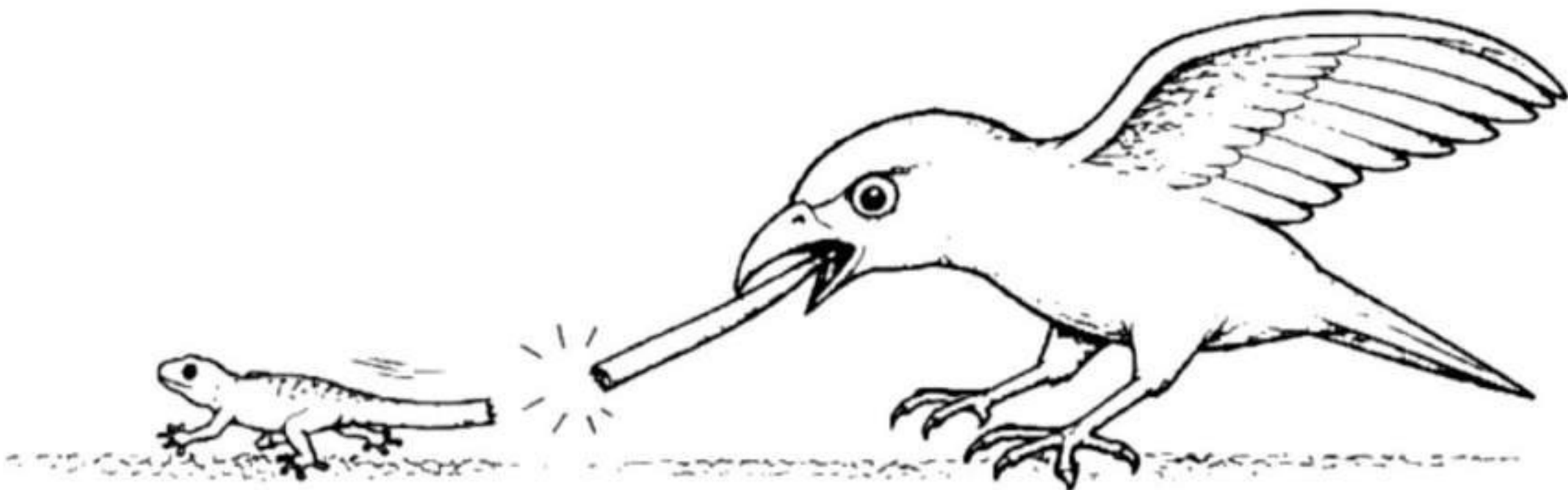
- 1:
- 2:

[2 markah]

[2 marks]

- 5
- (a) Rajah 5.1 menunjukkan tindakan seekor cicak apabila dikejar oleh seekor burung.

Diagram 5.1 shows the actions of a lizard when chased by a bird.



Rajah 5.1
Diagram 5.1

- (i) Nyatakan kepentingan tindakan ini.

State the importance of this action.

.....

[1 markah]

[1 mark]

(ii) Terangkan bagaimana cicak dapat membentuk semula ekor yang baharu.

Explain how lizards can regrow a new tail.

.....

.....

.....

[2 markah]

[2 marks]

10

SULIT

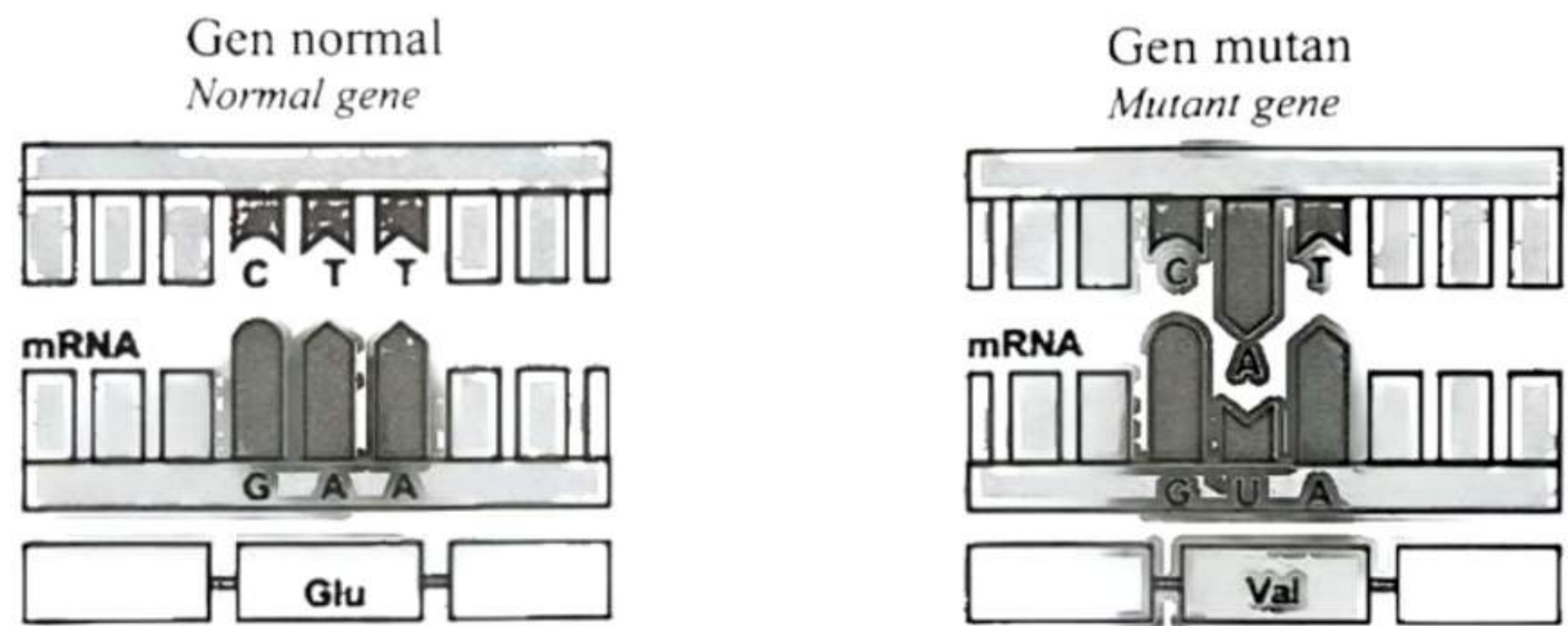
[LIHAT HALAMAN SEBELAH]

- (b) Rajah 5.2(a) menunjukkan sel darah merah bagi individu A manakala Rajah 5.2(b) menunjukkan proses mutasi yang berlaku semasa pembentukan gamet yang menjadi punca kepada pembentukan sel darah merah bagi individu A.

Diagram 5.2(a) shows the red blood cells of individual A while Diagram 5.2(b) shows the mutation process that occurs during the formation of gametes which is the cause of the formation of red blood cells of individual A.



Rajah 5.2(a)
Diagram 5.2(a)



Rajah 5.2(b)
Diagram 5.2(b)

- (i) Berdasarkan Rajah 5.2 (a), nyatakan satu ciri abnormal sel darah merah bagi individu A.
Based on Diagram 5.2 (a) state one abnormal characteristic of the red blood cells for individual A.

[1 markah]
[1 mark]

- (ii) Berdasarkan Rajah 5.2 (b),
Based on Diagram 5.2 (b)

Nyatakan perubahan yang berlaku pada urutan bes nukleotida bagi gen tersebut.
State the changes that occurred in the nucleotide base sequence of the gene.

.....
[1 markah]
[1 mark]

- (iii) Nyatakan jenis mutasi yang terlibat.
State the type of mutation involved.

.....
[1 markah]
[1 mark]

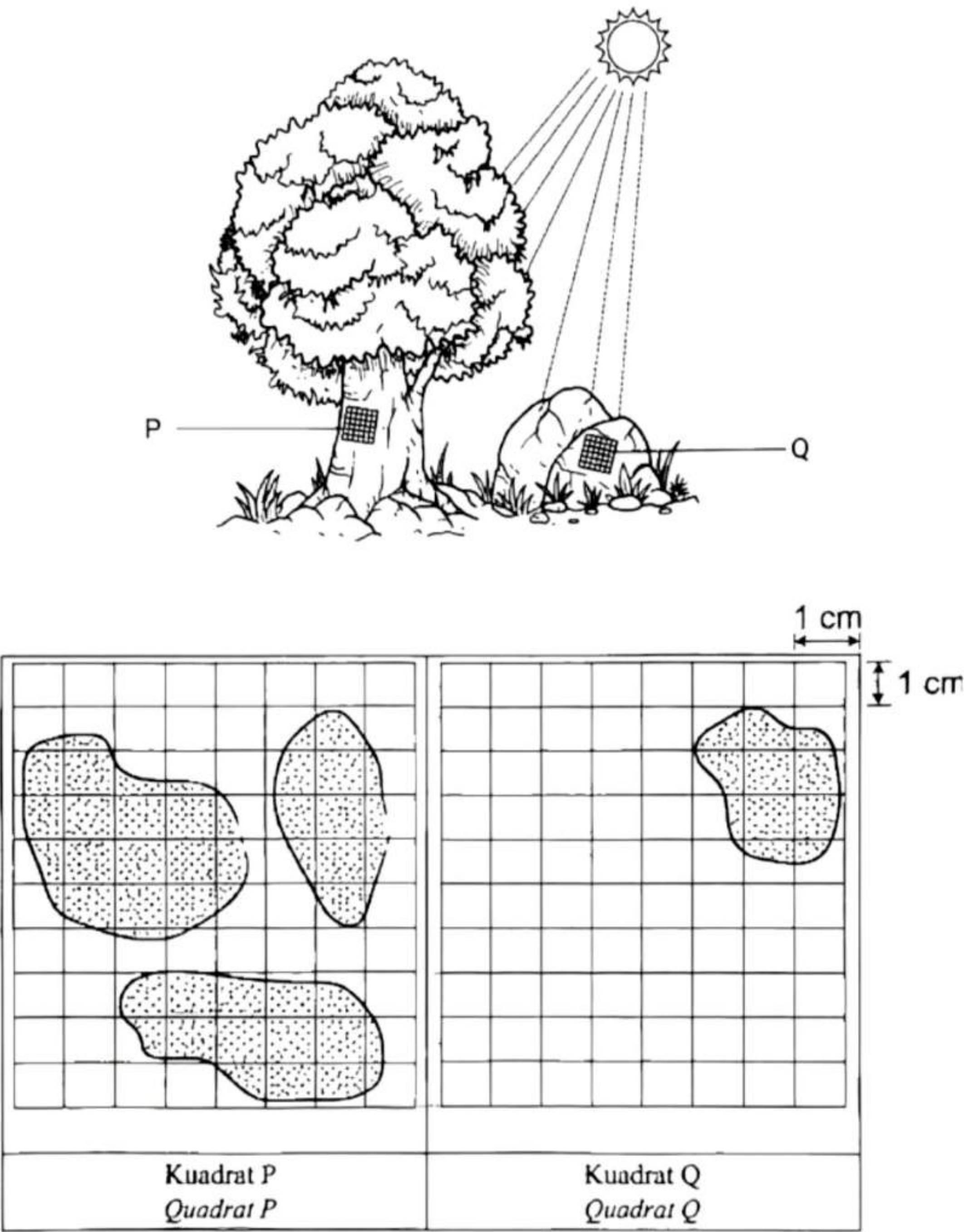
- (c) Individu B menghidap penyakit Sindrom Klinefelter. Penyakit ini juga disebabkan oleh mutasi di mana ini menyebabkan mandul dan gagal menghasilkan sperma.
Individual B suffers from Klinefelter Syndrome. This disease is also caused by a mutation which causes infertility and failure to produce sperm.

Bandingkan mutasi yang berlaku pada individu A dan individu B.
Compare the mutations that occur in individual A and individual B.

.....
.....
.....
.....
[2 markah]
[2 marks]

- 6 (a) Rajah 6.1 menunjukkan dua persampelan kuadrat, P dan Q. Kajian dijalankan untuk menganggar taburan populasi *Pleurococcus* sp. pada batang pokok dan batu.

Diagram 6.1 shows two quadrat samplings, P and Q. This study has been carried out to estimate the distribution of Pleurococcus sp. population on a tree trunk and a rock.



Rajah 6.1

Diagram 6.1

- (i) Berdasarkan Rajah 6.1, nyatakan satu komponen abiosis yang dapat diperhatikan.
Based on Diagram 6.1 state one abiotic component that can be observed.

.....
[1 markah]
[1 mark]

- (ii) Terangkan perbezaan taburan populasi *Pleurococcus* sp. dalam kuadrat P dengan kuadrat Q berdasarkan faktor yang dinyatakan dalam 6 (a)(i).
Explain the differences between the population distribution of Pleurococcus sp in quadrats P and Q based on the factors stated in 6(a)(i).

.....

.....

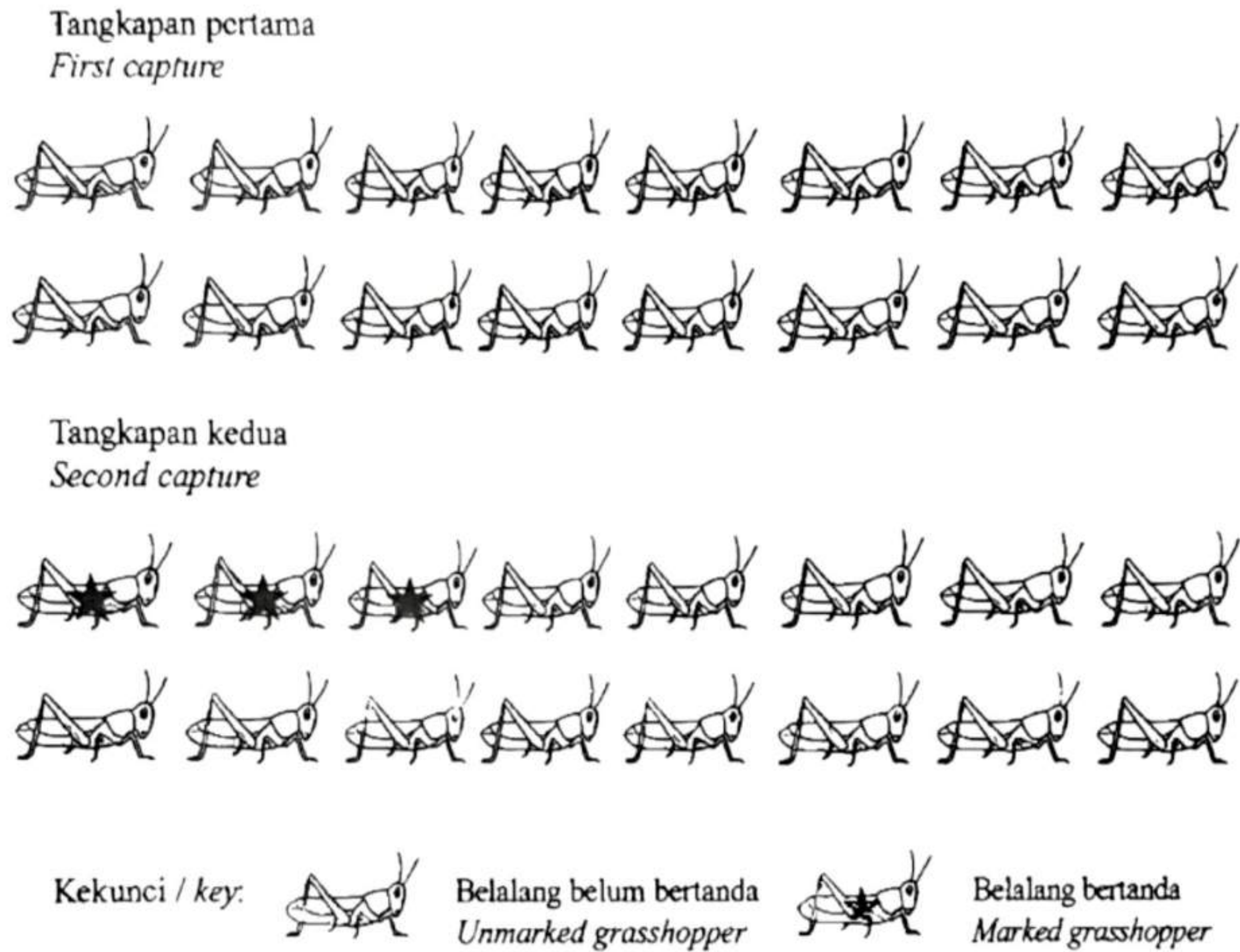
.....

[2 markah]
[2 marks]

- (iii) Hitung peratus litupan *Pleurococcus* sp. pada kuadrat Q.
Calculate the percentage coverage of Pleurococcus sp. on quadrat Q.

[3 markah]
[3 marks]

- (b) Sekumpulan pelajar menjalankan kajian lapangan untuk menganggarkan saiz populasi belalang di padang sekolah.
A group of students conducted a field study to estimate the size of grasshopper population in the school field.



Rajah 6.2
Diagram 6.2

- (i) Berdasarkan Rajah 6.2, nyatakan nama kaedah yang digunakan untuk menganggarkan saiz populasi belalang.
Based on Diagram 6.2 state the name of method used to estimate the population size of grasshopper.

.....

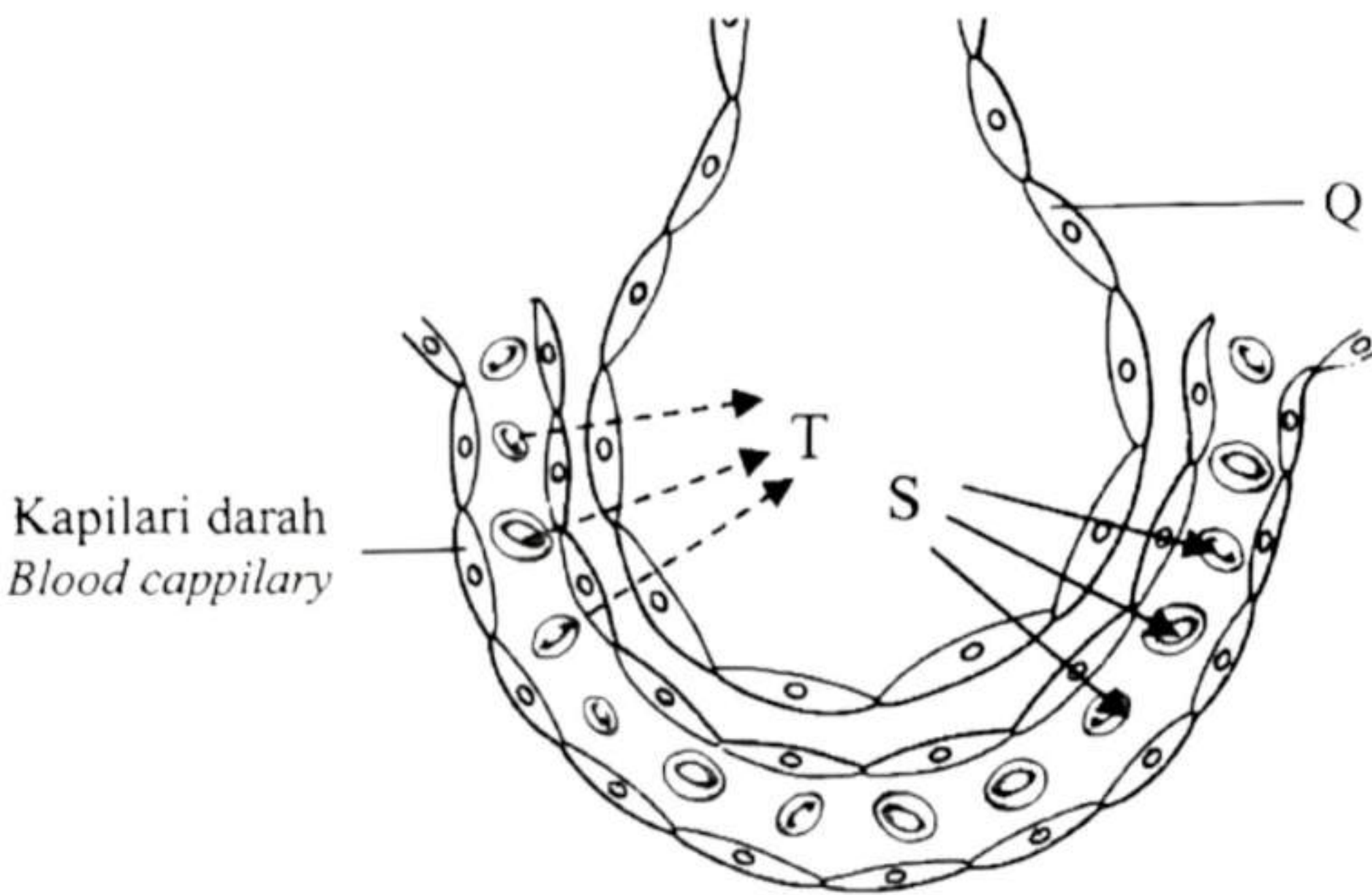
[1 markah]
[1 mark]

- (ii) Terangkan mengapa teknik ini tidak sesuai digunakan untuk ulat beluncas.
Explain why this technique is not suitable to be used for caterpillars.

.....
.....

[1 markah]
[1 mark]

- 7 (a) Rajah 7.1 menunjukkan pertukaran gas-gas yang berlaku antara struktur respirasi Q dengan kapilari darah.
Diagram 7.1 shows the exchange of gases that occurs between the respiratory structure Q and the blood capillaries.

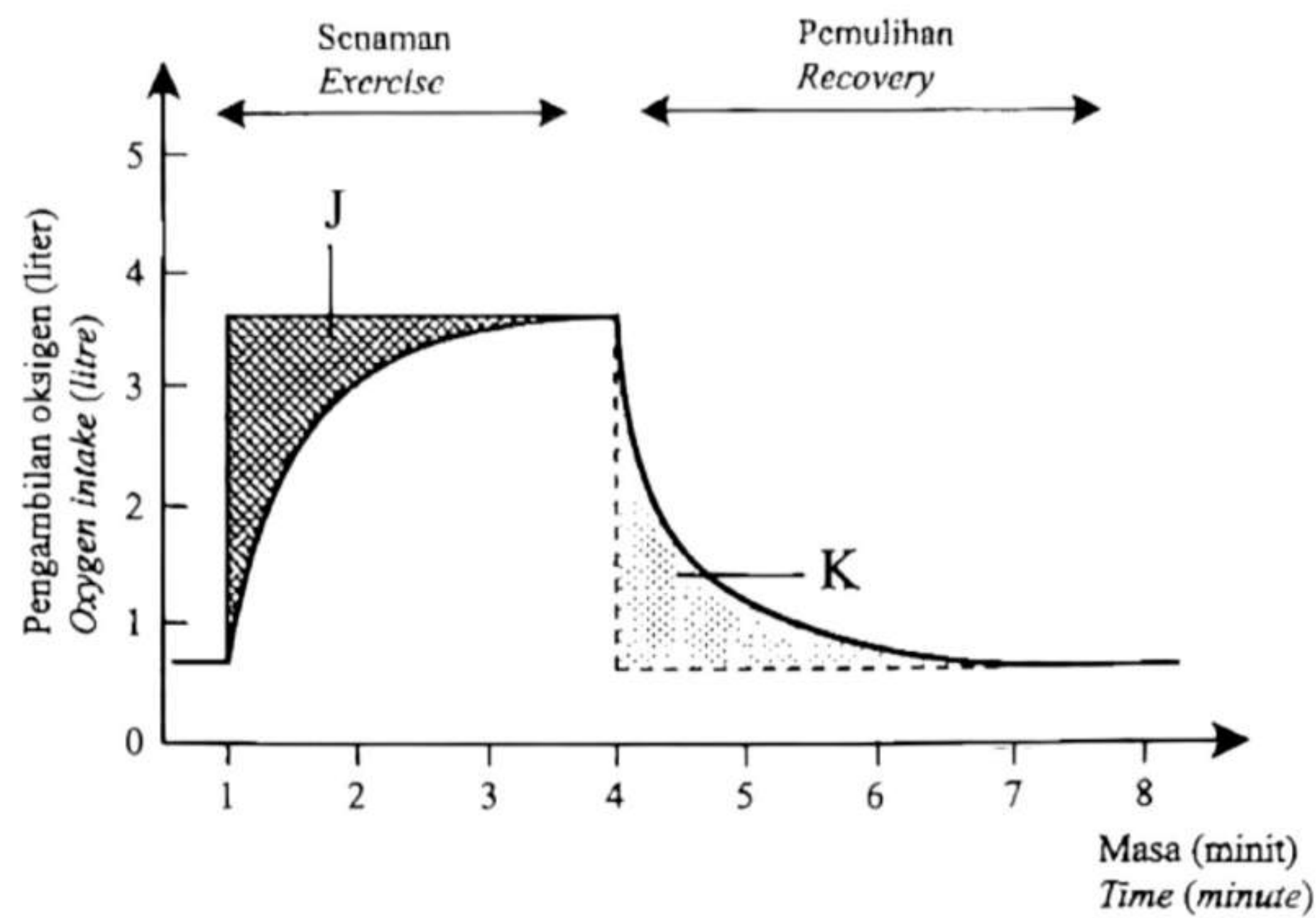


Rajah 7.1
Diagram 7.1

- (i) Nyatakan nama gas S.
State the name of gas S.
-
- [1 markah]
[1 mark]

- (ii) Terangkan **satu** penyesuaian struktur respirasi Q.
*Expalin **one** adaptation of respiratory structure Q.*
- Penyesuaian :
- Adaptation*
- Penerangan :
- Explanation*
- [2 markah]
[2 mark]

- (b) Rajah 7.2 menunjukkan graf pengambilan oksigen melawan masa yang dialami oleh seorang individu yang mengambil bahagian dalam acara larian 100 meter.
Diagram 7.2 shows a graph of oxygen intake against time experienced by an individual who took part in a 100 meter sprint event.



Rajah 7.2
Diagram 7.2

Berdasarkan Rajah 7.2,
Based on Diagram 7.2

- (i) Nyatakan keadaan otot ketika fasa J.
State the condition of muscle during stage J.

.....

[1 markah]
[1 mark]

- (ii) Terangkan bagaimana proses pemulihan berlaku semasa fasa K.
Explain how the recovery process occurs during phase K.

.....
.....

[2 markah]
[2 marks]



- (iii) Sebelum acara larian pecut 100 meter tersebut bermula, seorang guru menasihati muridnya supaya melakukan aktiviti regangan dan memanaskan badan untuk mengelakkan kekejangan otot semasa berlari.
Before the 100 meter sprint event began, a teacher advised his students to stretch and warm up to avoid muscle cramps while running.

Wajarkan tindakan guru tersebut dalam membantu murid menamatkan lariannya.
Justify the teacher's actions in helping the student finish his run.

.....

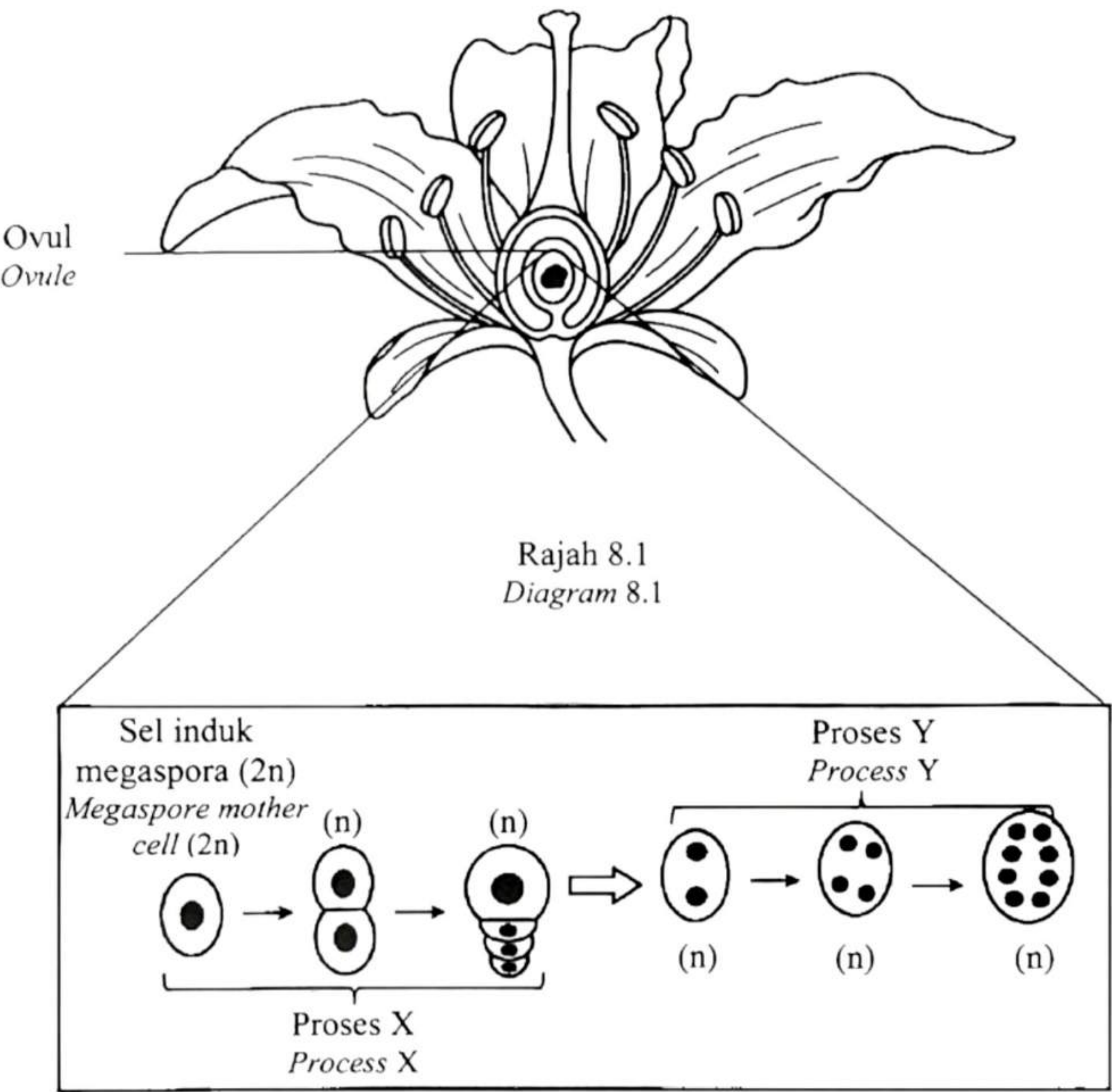
.....

.....

.....

[3 markah]
[3 marks]

- 8 (a) Rajah 8.1 (a) menunjukkan keratan membujur satu bunga dan Rajah 8.1 (b) menunjukkan pembentukan pundi embrio dalam bunga tersebut.
Diagram 8.1 (a) shows a longitudinal section of a flower and Diagram 8.1 (b) shows the formation of the embryo sac in the flower.



Rajah 8.2
Diagram 8.2

- (i) Berdasarkan Rajah 8.1 (a), bandingkan bahagian betina dan jantan bunga.
Based on Diagram 8.1 (a) compare the female and male parts of the flower.

.....

.....

.....

[2 markah]
[2 marks]

- (ii) Berdasarkan Rajah 8.1 (b), nyatakan dua perbezaan antara proses X dan proses Y.

Based on Diagram 8.1 (b) state two differences between process X and process Y.

.....

.....

.....

[2 markah]
[2 marks]

- (b) Seorang pekebun bercadang untuk menyimpan debunga untuk digunakan pada tahun berikutnya.

Cadangkan dua cara yang boleh dilakukan oleh pekebun tersebut untuk mengelakkan debunga bercambah.

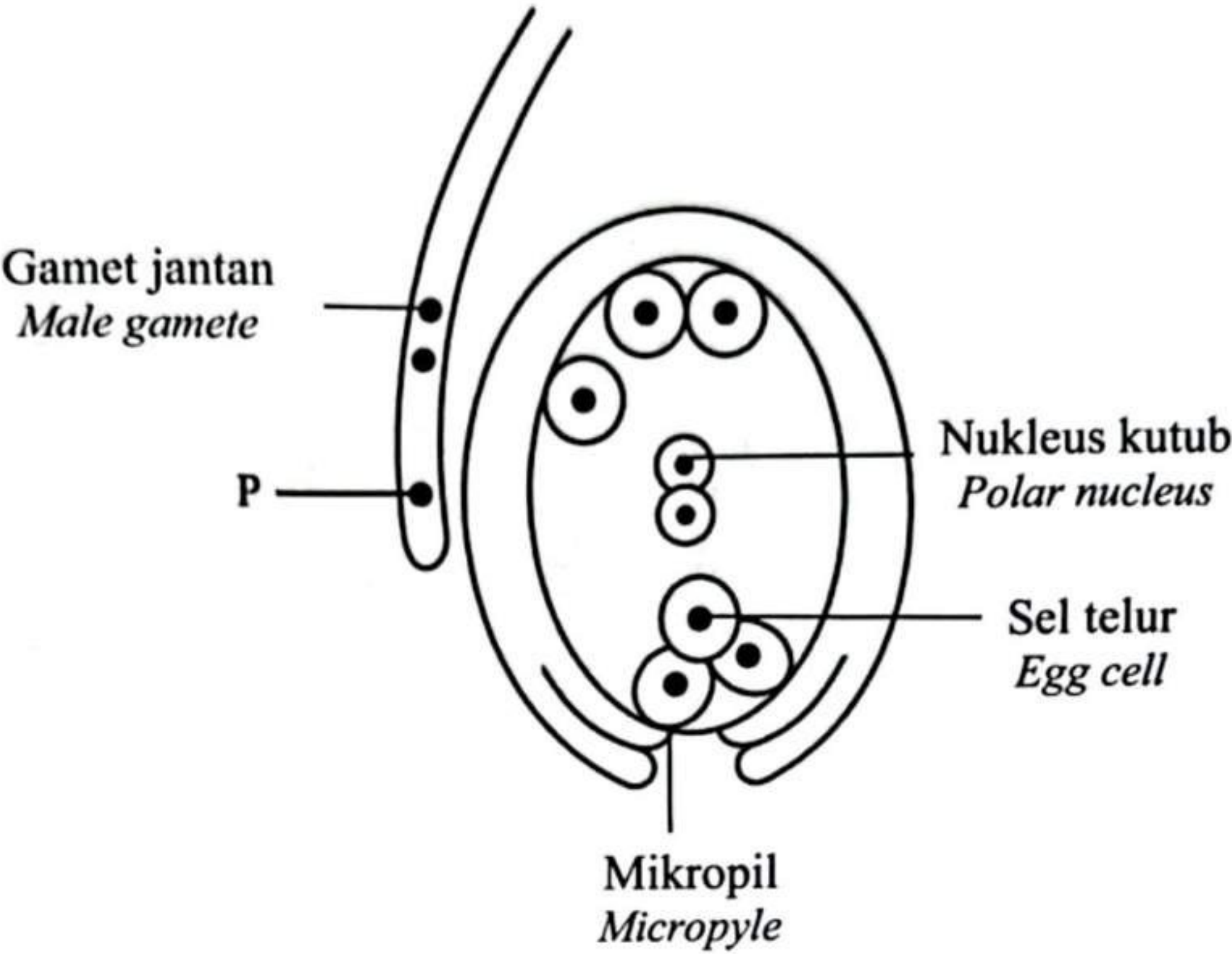
*A farmer intends to store the pollen grains to be used in the following year.
Suggest two ways that the farmer can do to prevent the pollen grains from germinating.*

1.....

2.

[2 markah]
[2 marks]

- (c) Rajah 8.2 menunjukkan satu proses yang berlaku dalam ovul satu bunga.
Diagram 8.2 shows a process that occurs in the ovule of a flower.



Rajah 8.2
Diagram 8.2

Terangkan apa yang berlaku sekiranya P tiada.
Explain what will happen if P is absent.

.....

.....

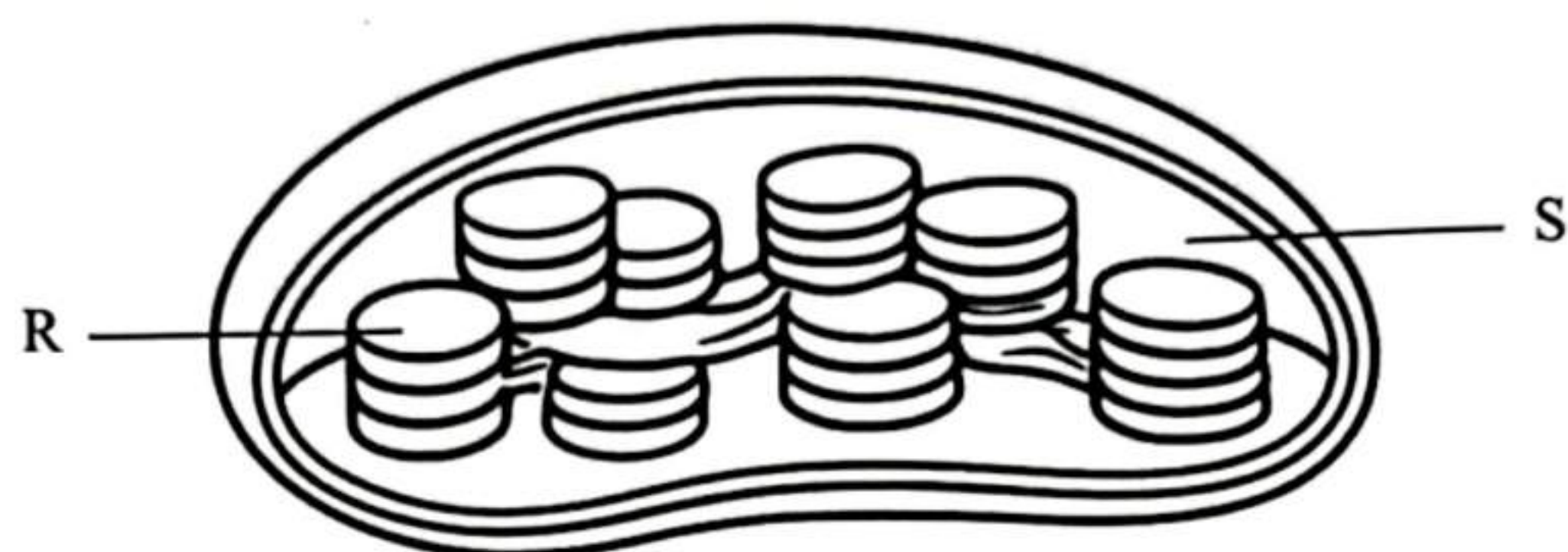
.....

.....

[3 markah]
[3 marks]

Bahagian B**[20 markah]***Bahagian ini mengandungi dua soalan. Jawab satu soalan.*

- 9 (a) Rajah 9.1 menunjukkan struktur komponen X.
Diagram 9.1 shows the structure of component X.



Rajah 9.1
 Diagram 9.1

- (i) Banding bezakan tindak balas yang berlaku dalam R dan S.
Compare and contrast the reactions that occur in R and S.

[5 markah]
 [5 marks]

- (ii) Rajah 9.2 menunjukkan keratan rentas sehelai daun.
Diagram 9.2 shows a cross section of a leaf.



Rajah 9.2
 Diagram 9.2

Terangkan mengapa sel Q mempunyai kepadatan komponen X yang tinggi berbanding sel P.

Explain why cell Q has higher density of component X compared to cell P.

[2 markah]
 [2 marks]

- (iii) Pernyataan di bawah menunjukkan maklumat berkaitan warna daun bagi tumbuhan di negara beriklim sederhana.

The statement below shows information related to the leaf color of plants in temperate climate countries.

Musim luruh di negara beriklim sederhana menyebabkan daun bertukar warna daripada hijau kepada kuning, jingga, merah atau coklat sebelum gugur.

Autumn in temperate climate countries causes leaves to change colour from green to yellow, orange, red or brown before falling.

Apakah kesan fenomena ini ke atas :

What are the effect of this phenomenon towards :

- kadar fotosintesis
rate of photosynthesis
- kadar transpirasi
rate of transpiration

[4 markah]

[4 marks]

- (b) Keladi gergaji merupakan sejenis tumbuhan yang memerlukan cahaya matahari dan air yang banyak untuk hidup.

Rajah 9.3 (a) menunjukkan tumbuhan keladi gergasi yang ditanam di dua kawasan yang berbeza iaitu kawasan terbuka A dan kawasan teduh B.

Rajah 9.3 (b) pula menunjukkan graf titik pampasan bagi tumbuhan tersebut.

"Keladi Gergasi" is a type of plant that requires lots of sunlight and water to live.

Diagram 9.3 (a) shows "Keladi Gergasi" plants grown in two different areas namely area A and shaded area B.

Diagram 9.3 (b) shows the compensation point graph for the plant.

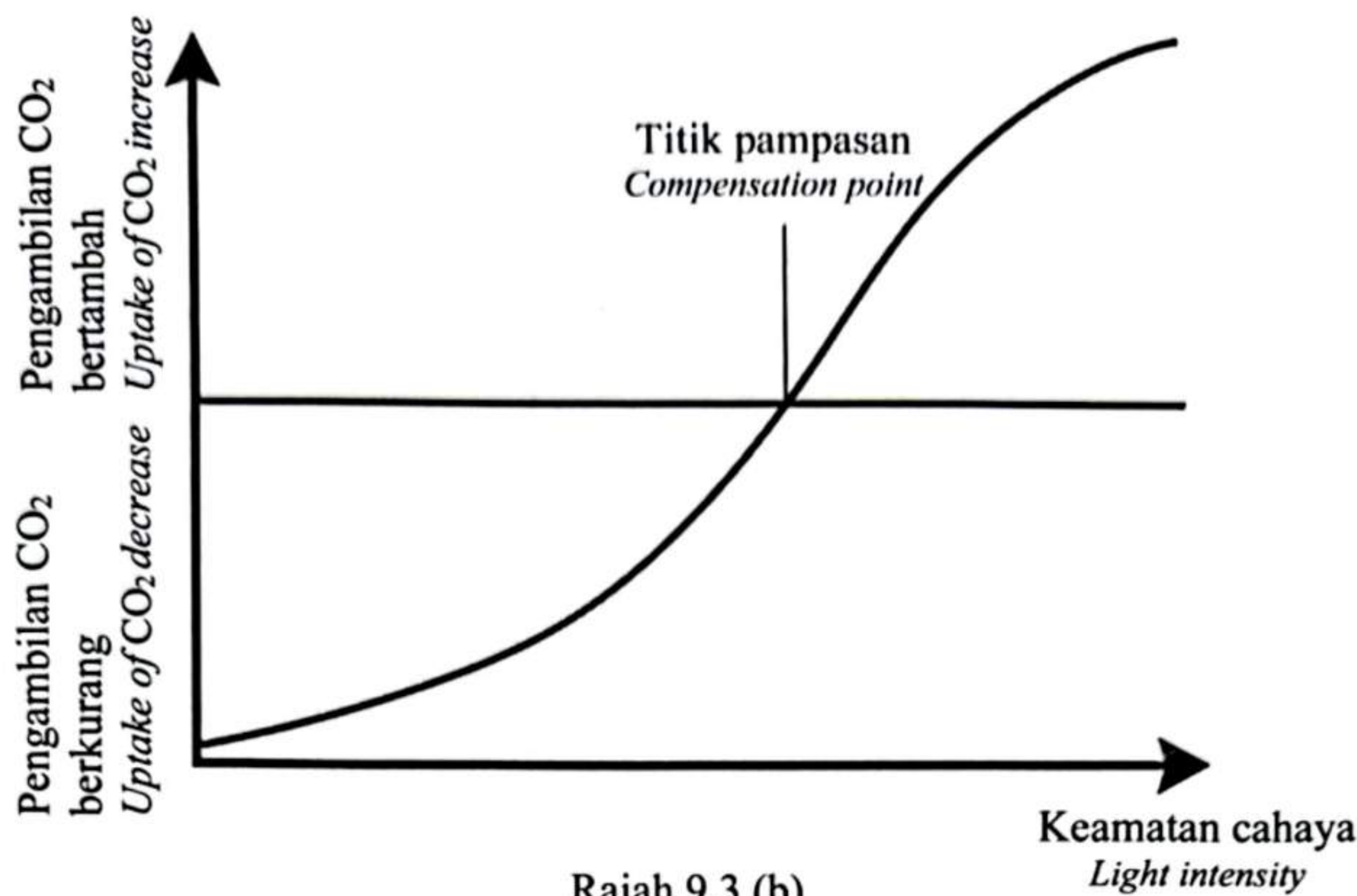


Kawasan A
Area A



Kawasan B
Area B

Rajah 9.3 (a)
Diagram 9.3 (a)



Berdasarkan Rajah 9.3 (a) dan Rajah 9.3 (b),
Based on Diagram 9.2 (a) and Diagram 9.3 (b)

- bezakan kadar fotosintesis bagi kedua-dua tumbuhan tersebut.
differentiate the rates of photosynthesis for the two plants
- analisis kesan terhadap kadar pertumbuhan sekiranya kedua-dua tumbuhan terus berada pada titik pampasan yang sama
analyse the effect on rate of growth if both plants remain at the same compensation point

[5 markah]
[5 marks]

- (c) Rajah 9.4 menunjukkan pokok cili organik yang ditanam oleh Encik X di dalam sebuah bilik. Suhu di dalam bilik tersebut adalah 18°C dan lampu kalimantang digunakan sebagai sumber cahaya.

Selepas sebulan, pokok cili Encik X tumbuh dengan sangat perlahan, daun pucat dan bunga kerap gugur sebelum berkembang menjadi buah.

Diagram 9.4 shows an organic chilli plant grown by Mr. X in a room. The temperature in the room is 18°C and fluorescent lamps were used as the light source.

After a month, Mr. X's chilli plant grows very slowly, the leaves are pale and the flowers often fall off before developing into fruit.



Rajah 9.4

Diagram 9.4

Berdasarkan maklumat yang diberi, terangkan

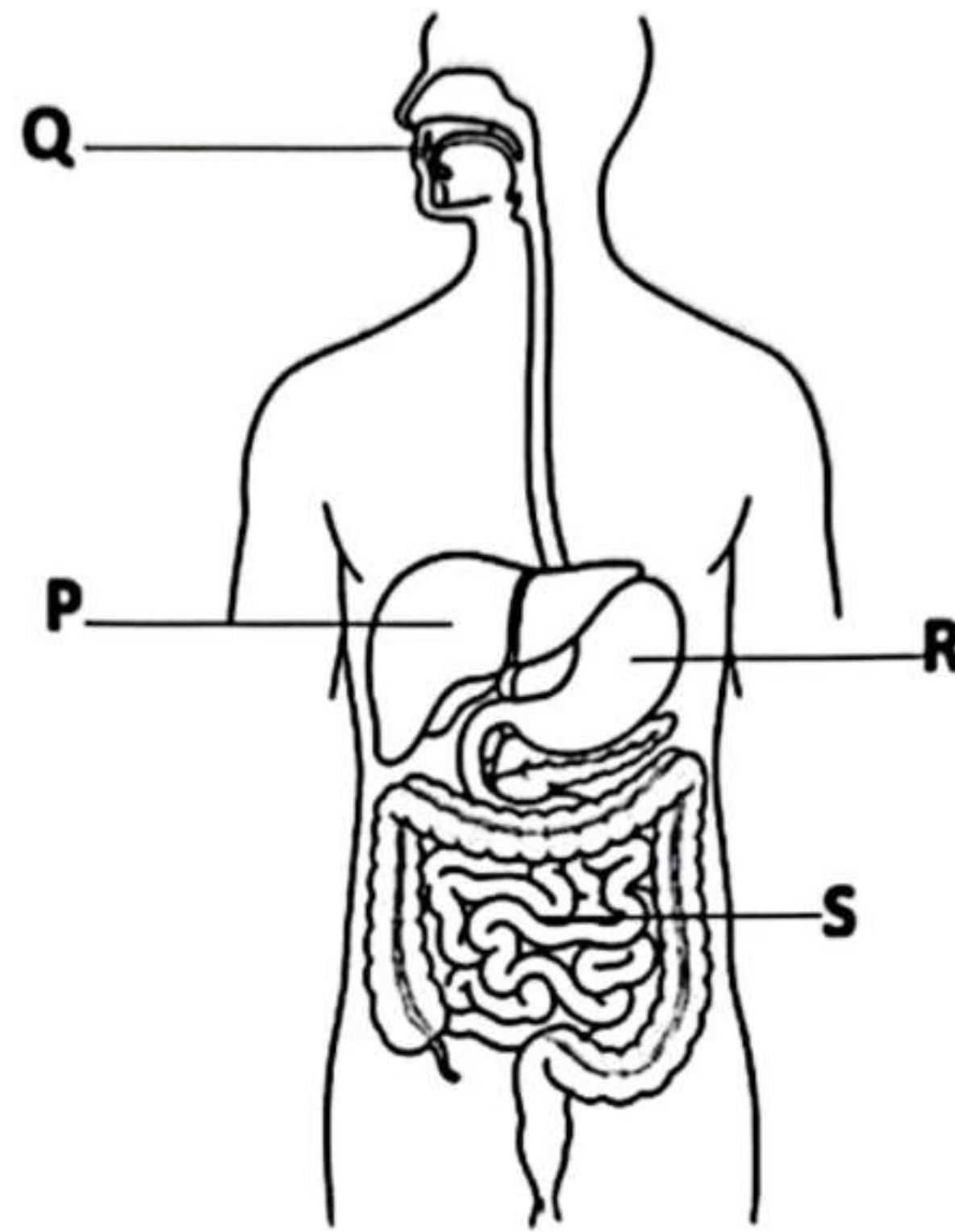
Based on the information given explain

- apakah punca kegagalan projek Encik X
what is the cause of the failure of Mr. X's project
- bagaimanakan beliau boleh mengatasi masalah tersebut
how can he overcome the problem

[4 markah]

[4 marks]

- 10 (a) Rajah 10.1 menunjukkan sistem pencernaan dalam manusia.
Diagram 10.1 shows the human digestive system.



Rajah 10.1
Diagram 10.1

- (i) Terangkan satu fungsi organ P.
Explain one function of organ P.

[2 markah]
[2 marks]

- (ii) Banding bezakan proses pencernaan yang berlaku di Q dan R.
Compare and contrast the digestive processes that occur in Q and R.

[10 markah]
[10 marks]

- (iii) Seorang pesakit menjalani pembedahan untuk membuang sebahagian besar organ S akibat komplikasi kanser.
A patient underwent surgery to remove a large portion of organ S due to complications of cancer.

Huraikan bagaimana pembuangan sebahagian organ S mempengaruhi proses penyerapan nutrient.

Describe how the removal of organ S affects the process of nutrient absorption.

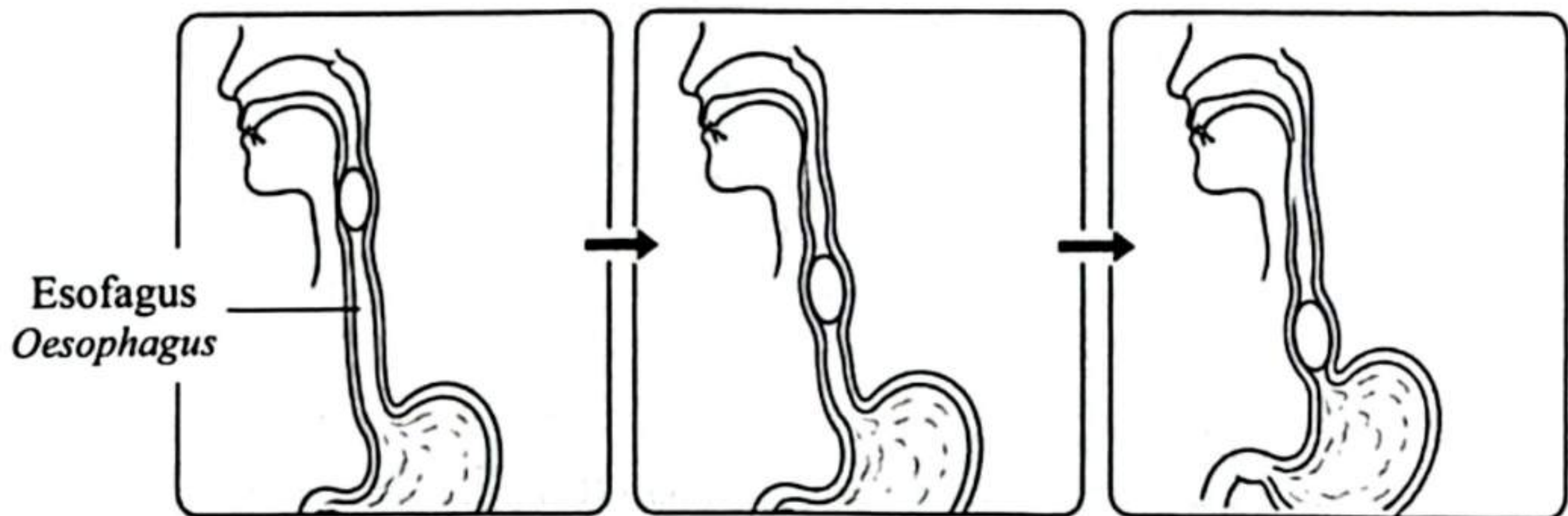
[4 markah]
[4 marks]

- (b) Otak dan sistem saraf mengawal tindakan otot licin di dinding esofagus dalam proses peristalsis.

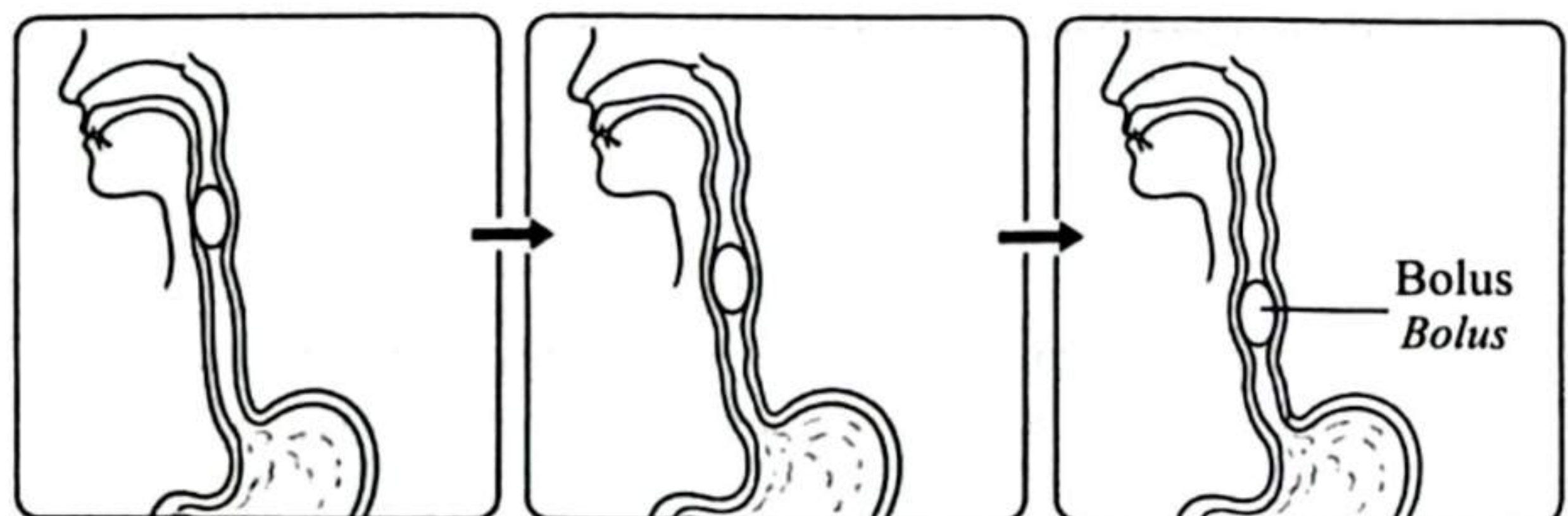
The brain and nervous system control the action of the smooth muscles in the oesophageal wall in the process of peristalsis.

Rajah 11.2 menunjukkan proses peristalsis yang berlaku di sepanjang esofagus dua orang individu. Rajah 11.2(a) adalah individu normal dan 11.2(b) merupakan pesakit strok.

Diagram 11.2 shows the process of peristalsis occurring along the oesophagus of two individuals. Diagram 11.2(a) is a normal individual and 11.2(b) is a stroke patient.



Rajah 10.2 (a)
Diagram 10.2 (a)



Rajah 11.2 (b)
Diagram 11.2 (b)

Berdasarkan Rajah 11.2 (b), terangkan bagaimana strok boleh mempengaruhi proses peristalsis di sepanjang esofagus yang mengakibatkan pesakit sukar menelan makanan.

Based on Diagram 11.2 (b) explain how stroke can affect the peristalsis process along the esophagus, resulting in patients having difficulty swallowing food.

[4 markah]
[4 marks]

Bahagian C
[20 markah]
Soalan ini mesti dijawab.

- 11 (a) Pernyataan di bawah menerangkan tentang langkah yang dijalankan oleh kerajaan Malaysia.

The statement below explains the steps taken by the Malaysian government.

Malaysia giat melaksanakan pelbagai inisiatif Teknologi Hijau merentasi pelbagai sektor untuk mencapai status negara rendah karbon.

Malaysia is actively implementing various Green Technology initiatives across various sectors to achieve low-carbon country status.

Definisikan Teknologi Hijau.

Define Green Technology.

[3 markah]

[3 marks]

- (b) Satu kawasan tasik terbiar akan dimajukan sebagai taman rekreasi. Sebagai pemaju yang bertanggungjawab, cadangkan langkah-langkah pemuliharaan dan pemulihan ekosistem di kawasan tersebut.

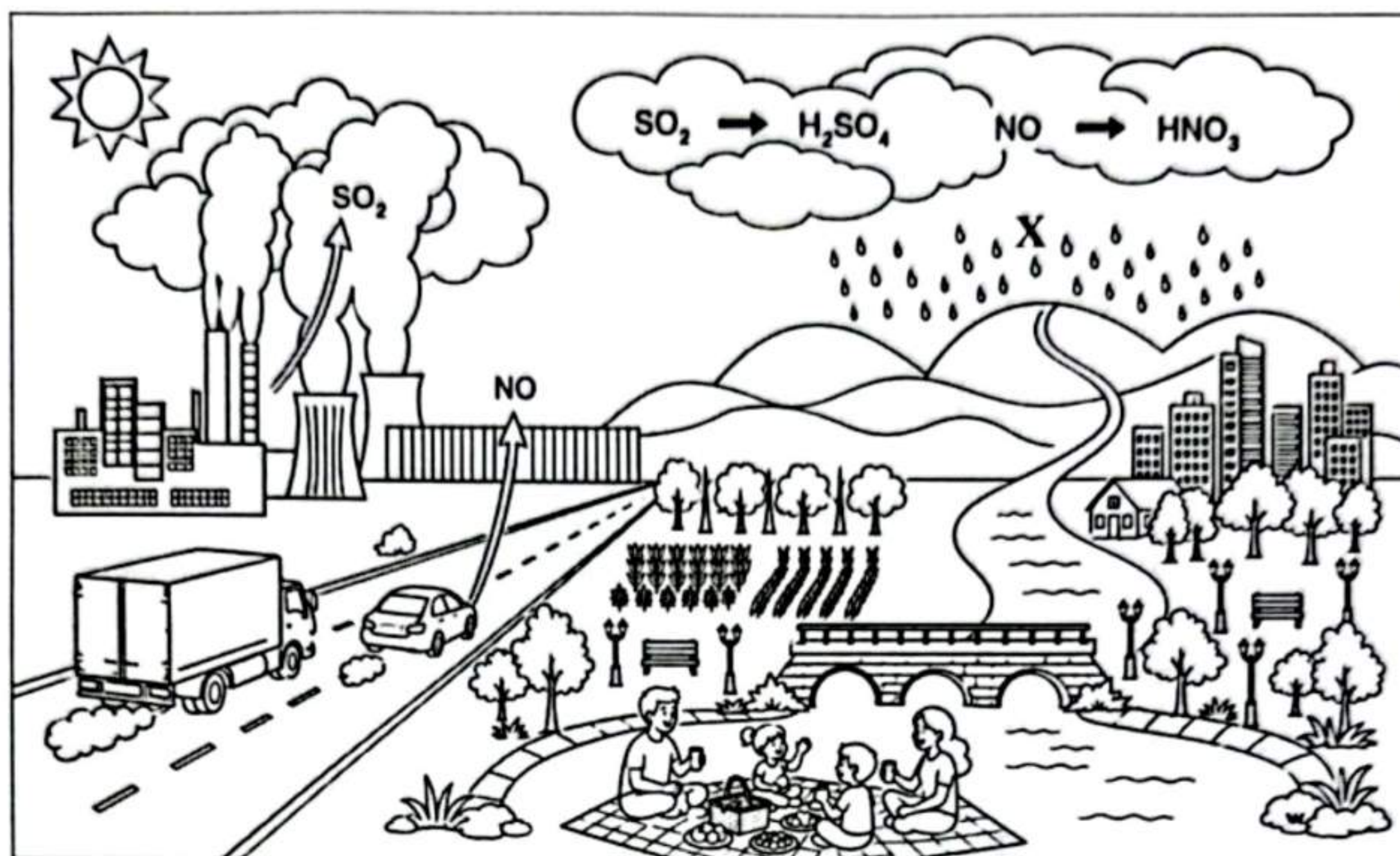
An abandoned lake area to be developed as a recreational park.

As a responsible developer, suggest steps on the conservation and restoration of the ecosystem in that area.

[4 markah]

[4 marks]

- (c) Rajah 11.2 menunjukkan pembentukan X di satu kawasan.
 Diagram 11.2 shows the formation of X in an area.



Rajah 11.2
 Diagram 11.2

Terangkan bagaimana kawasan perindustrian dan kenderaan menyumbang kepada :

Explain how industrial area and vehicles contributes to :

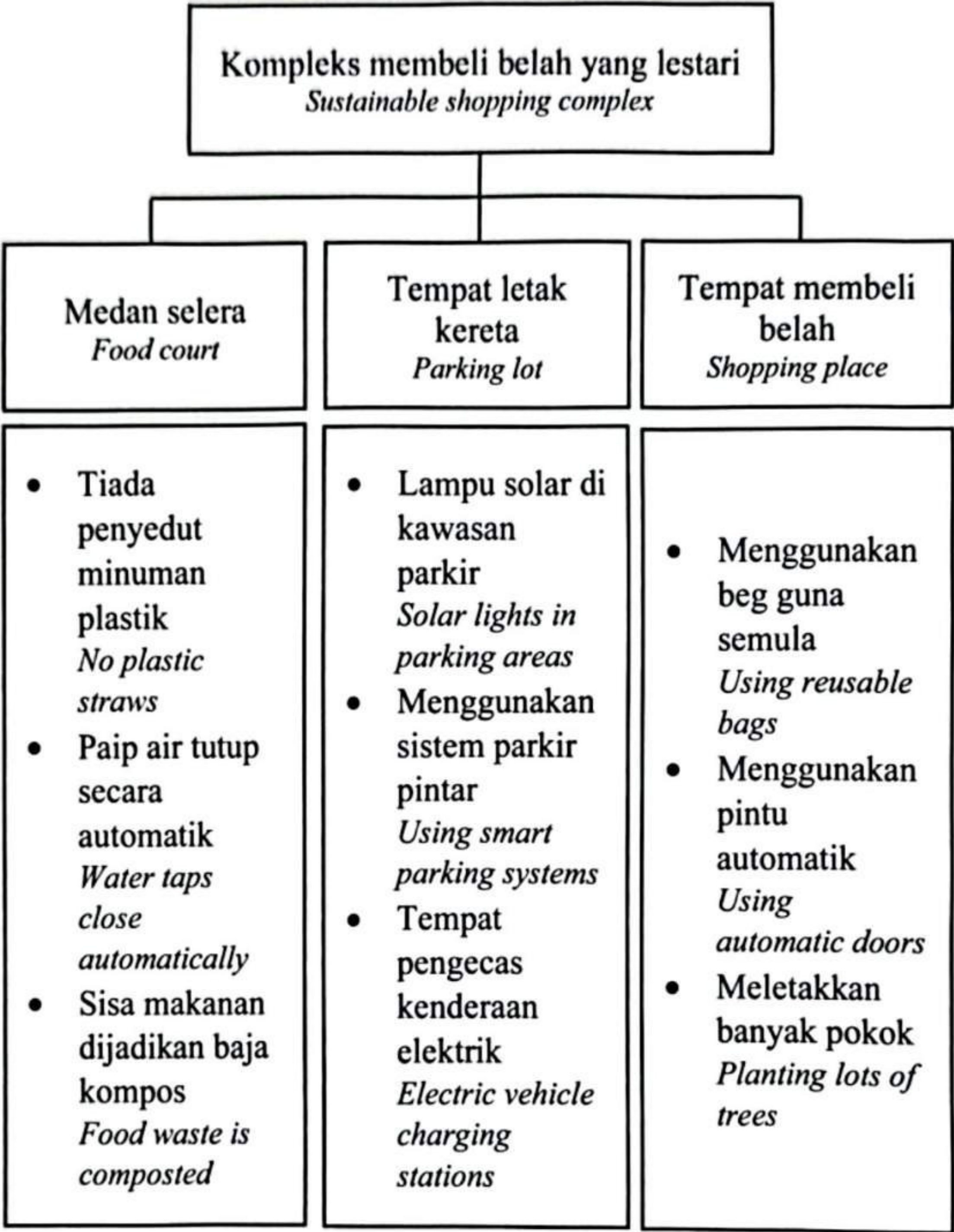
- pembentukan X
the formation of X
- kesan X terhadap ekosistem
the effects of X to the ecosystem

[7 markah]

[7 marks]



- (d) Rajah 11.3 menunjukkan antara inisiatif yang diambil oleh pihak pengurusan di sebuah kompleks membeli belah.
Diagram 11.3 shows some of the initiatives taken by management at a shopping complex.



Rajah 11.3
Diagram 11.3

Wajarkan langkah-langkah yang diambil oleh pihak pengurusan kompleks membeli belah tersebut sebagai menyokong kelestarian alam.
Justify the steps taken by the shopping complex management in supporting environmental sustainability.

[6 markah]
[6 marks]

KERTAS SOALAN TAMAT
END OF QUESTION PAPER