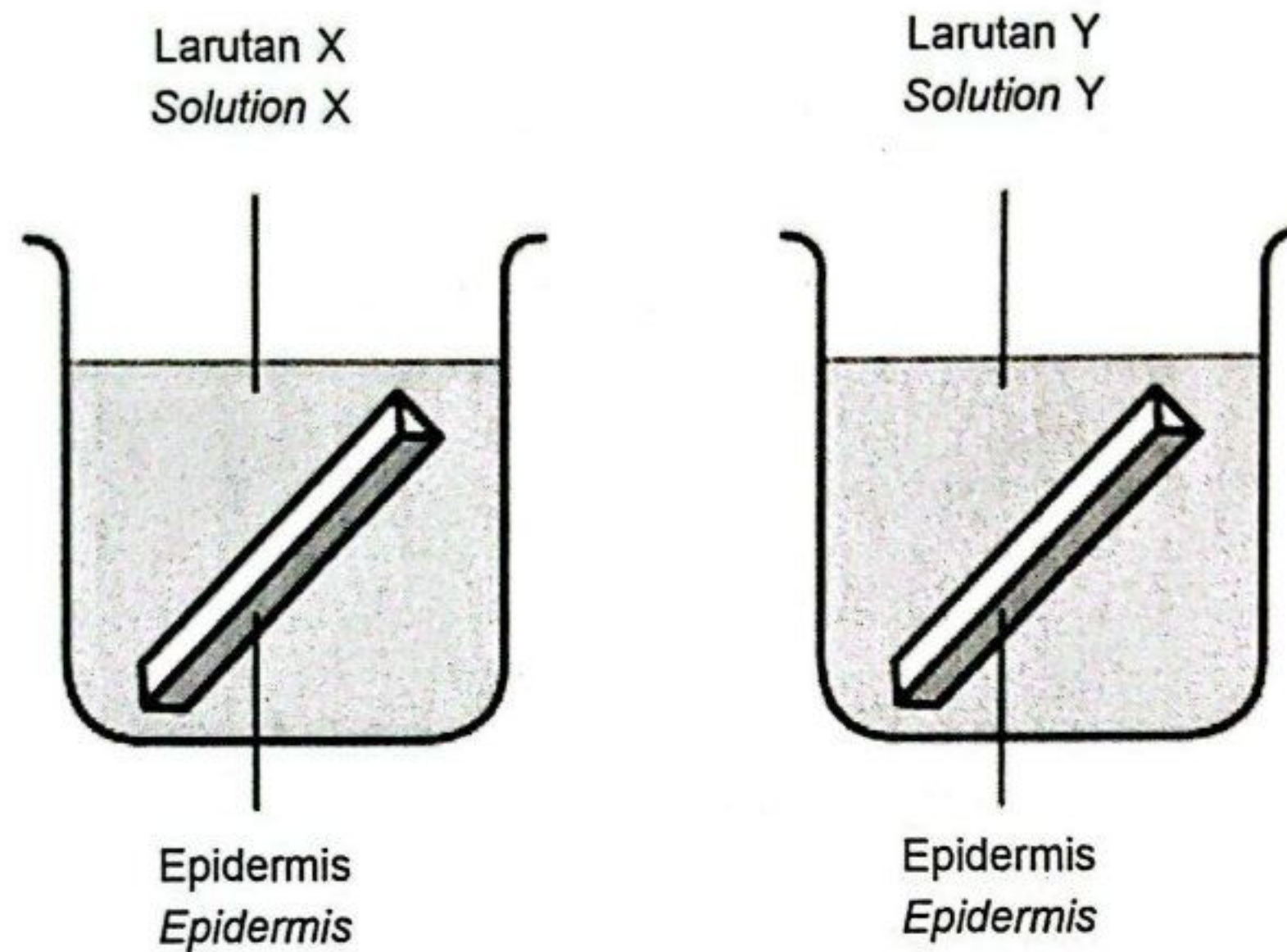


Bahagian A
Section A
[60 markah / 60 marks]

Jawab semua soalan dalam bahagian ini.
Answer all questions in this section.

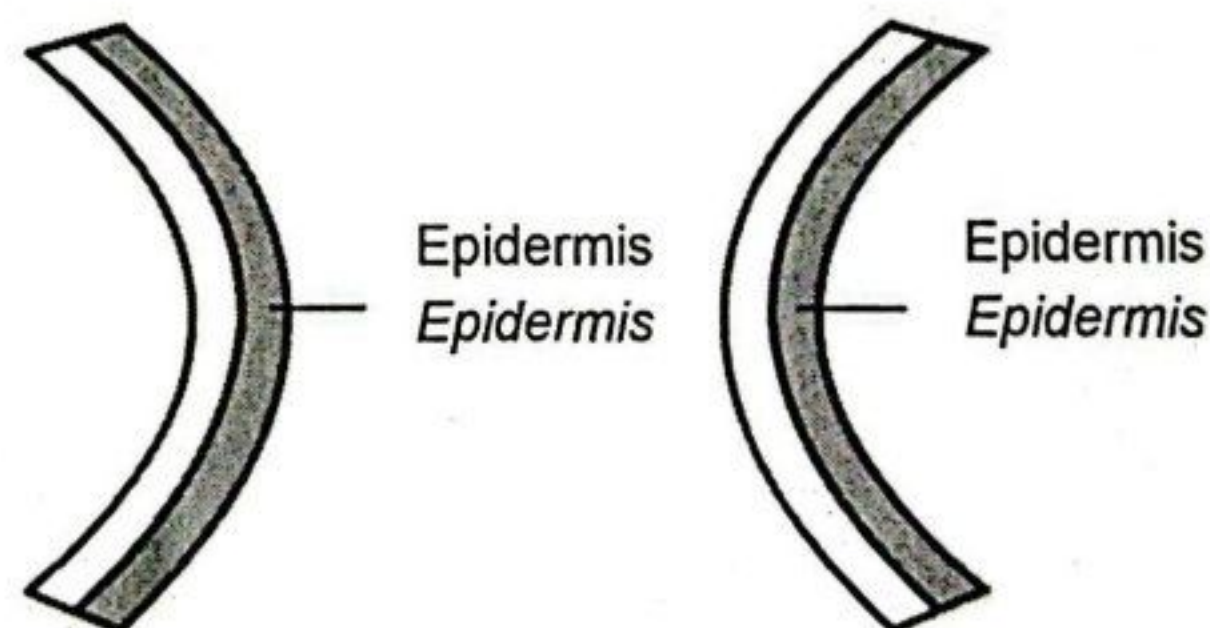
- 1 Rajah 1.1 menunjukkan batang sawi yang dipotong kepada dua jalur yang sama saiz dan masing-masing diletakkan ke dalam larutan X dan larutan Y.
Diagram 1.1 shows a green mustard stem is cut into two equal strips and placed in solution X and solution Y respectively.



Rajah 1.1
Diagram 1.1

Rajah 1.2 menunjukkan keputusan yang diperoleh daripada eksperimen tersebut selepas 15 minit.

Diagram 1.2 shows the results obtained from this experiment after 15 minutes.



Jalur yang direndam dalam larutan X
Strip immersed in solution X

Jalur yang direndam dalam larutan Y
Strip immersed in solution Y

Rajah 1.2
Diagram 1.2

- a) Berdasarkan Rajah 1.2, nyatakan jenis larutan X dan larutan Y.
Based on Diagram 1.2, state the type of solution X and solution Y.

Larutan X:

Solution X:

Larutan Y:

Solution Y:

[2 markah / 2 marks]

- b) Terangkan keadaan jalur yang direndam dalam larutan X.
Explain the condition of the strip immersed in solution X.

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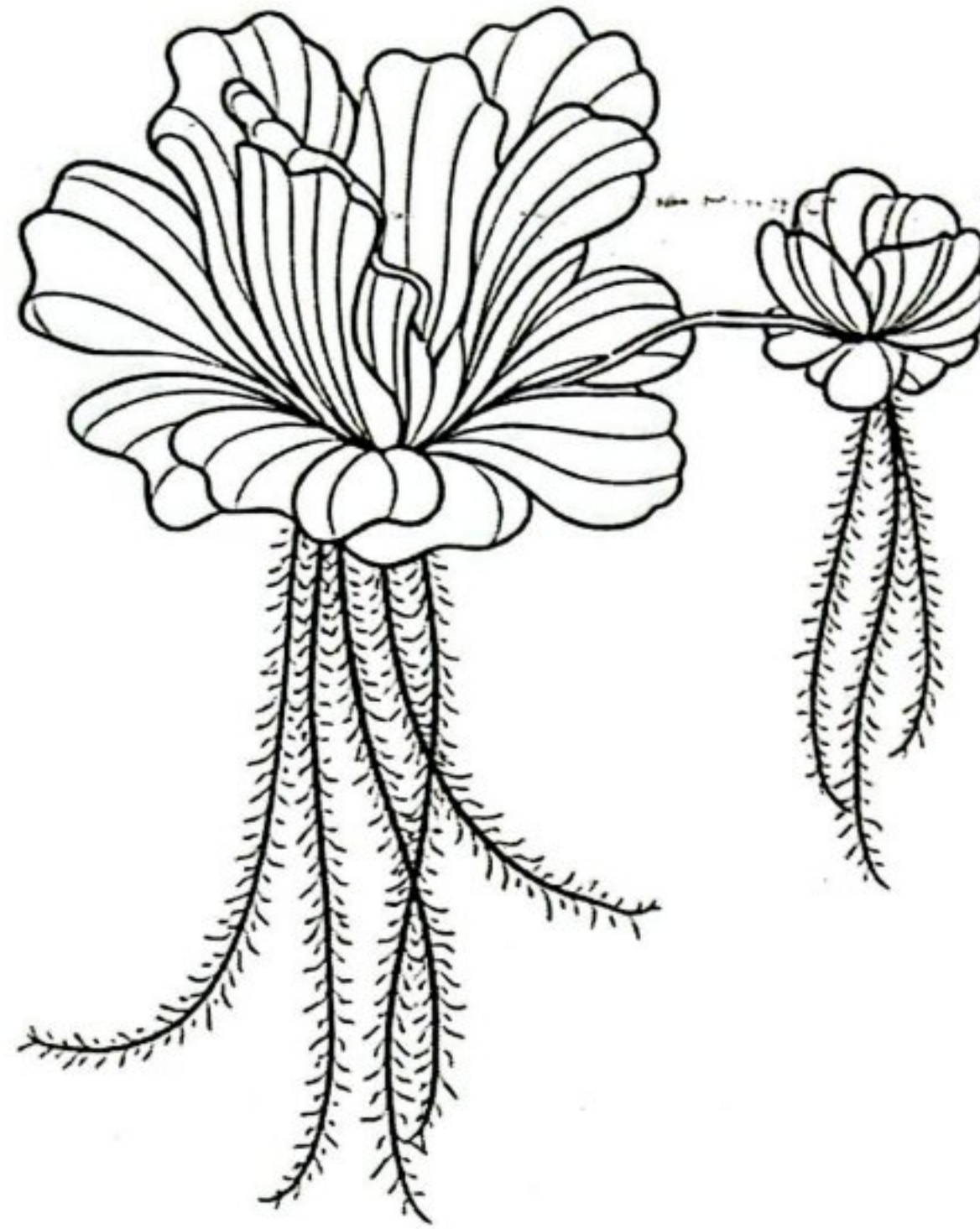
[2 markah / 2 marks]

- c) Seorang pemain badminton dinasihatkan meminum minuman isotonik semasa pertandingan.
Berikan dua sebab.
A badminton player is advised to drink an isotonic drink during a tournament.
*Give **two** reasons.*

1.
.....
2.
.....

[2 markah / 2 marks]

2. Rajah 2 menunjukkan sejenis tumbuhan yang hidup di kawasan air tawar.
Diagram 2 shows a type of plant that lives in freshwater areas.



Rajah 2
Diagram 2

- (a) (i) Kenal pasti jenis tumbuhan ini berdasarkan habitatnya.
Identify the type of this plant based on its habitat.

.....

[1 markah/ 1 mark]

- (ii) Namakan tisu yang membantu tumbuhan tersebut terapung di permukaan air.
Name the tissue that helps the plant float on the surface of the water.

.....

[1 markah/ 1 mark]

- (iii) Terangkan **satu** ciri penyesuaian yang terdapat pada akar tumbuhan tersebut untuk hidup di habitatnya.
Explain one adaptive feature found in the roots of the plant to survive in its habitat.

Penyesuaian:

Adaptive:

.....
.....

Penerangan:

Explanation:

.....
.....

[2 markah/ 2 marks]

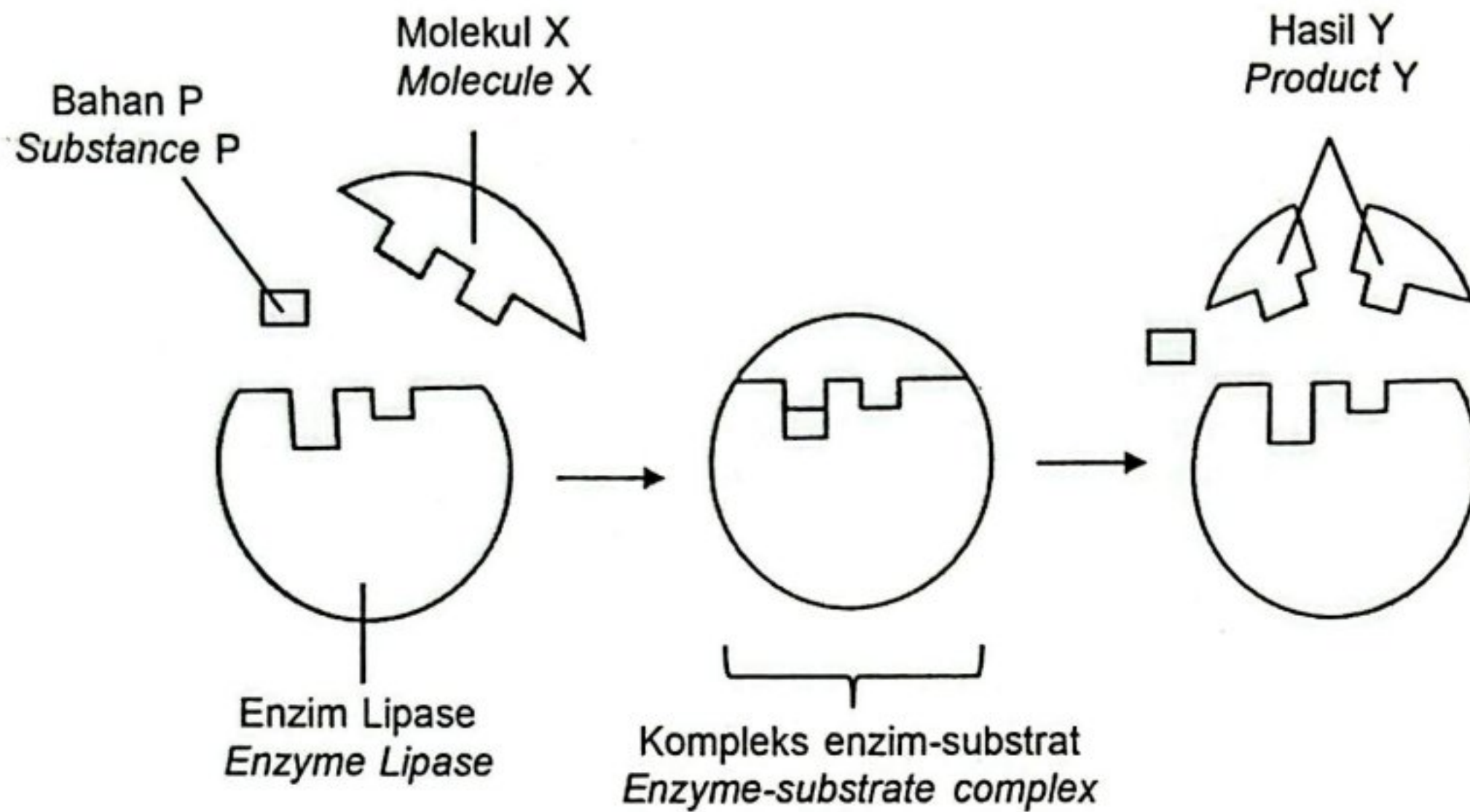
- (b) Sebuah syarikat kumbahan ingin menggunakan tumbuhan dalam Rajah 2 untuk merawat air yang tercemar.
Cadangkan satu kaedah untuk menyelesaikan masalah tersebut. Terangkan
A sewage company wants to use the plant in Diagram 2 to treat polluted water. Suggest a method to solve the problem. Explain.

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

[2 markah/ 2 marks]

- 3 Rajah 3.1 menunjukkan tindakan molekul X ke atas enzim lipase dengan kehadiran bahan P.

Diagram 3.1 shows the action of molecule X on enzyme lipase in the presence of substance P.



Rajah 3.1
Diagram 3.1

- (a) (i) Berdasarkan Rajah 3.1, nyatakan nama bagi bahan P dan hasil Y.
Based on Diagram 3.1, state the name of the substance P and the product Y.

Bahan P:
Substance P

Hasil Y:
Product Y

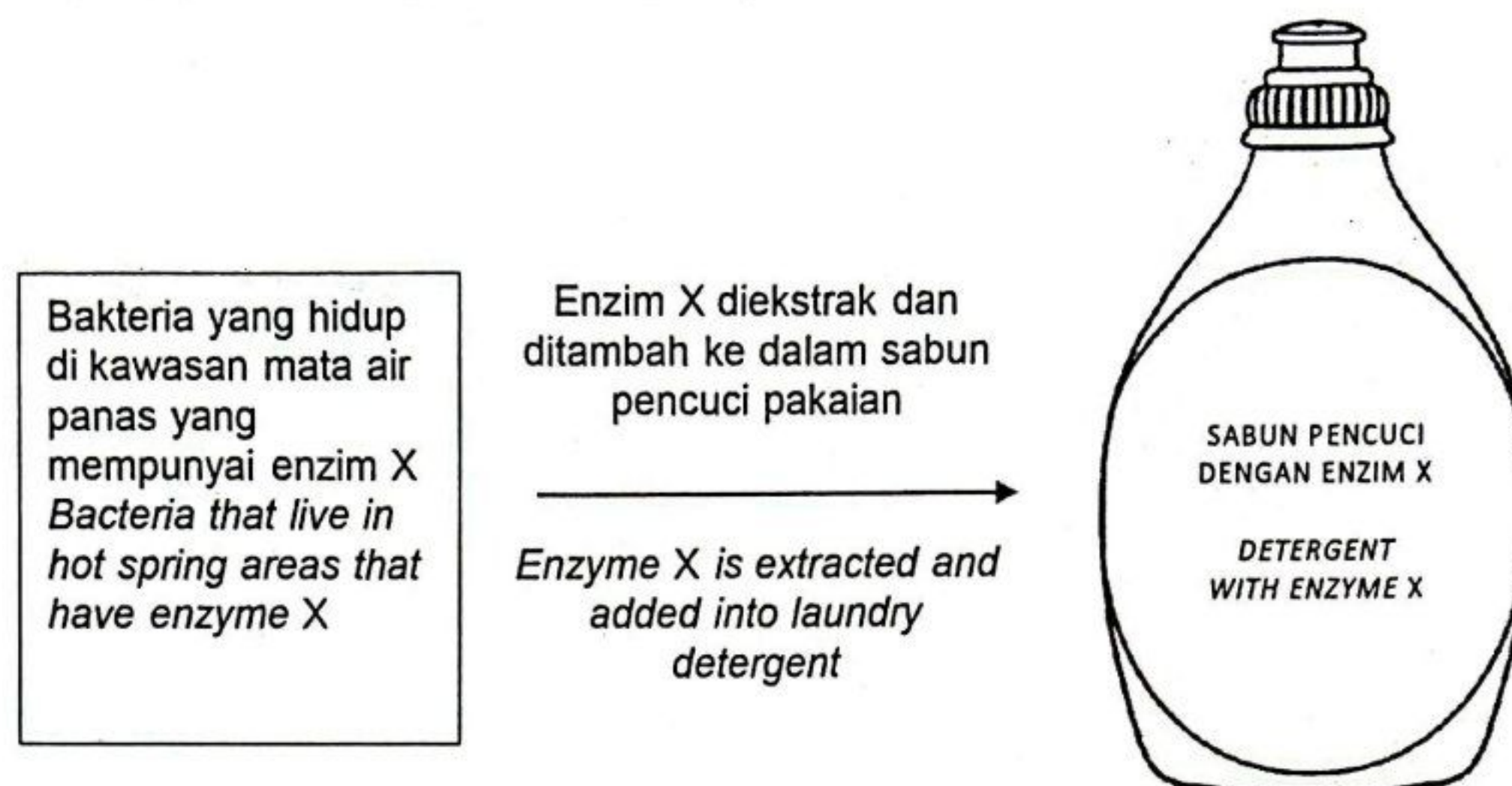
[2 markah/ 2 marks]

- (ii) Terangkan bagaimana kehadiran bahan P mempengaruhi kadar tindak balas enzim lipase terhadap molekul X.
Explain how the presence of substance P affects the rate of reaction of lipase enzyme with molecule X.

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

[2 markah/ 2 marks]

- (b) Rajah 3.2 menunjukkan sejenis sabun pencuci pakaian.
Diagram 3.2 shows a type of laundry soap.



Rajah 3.2
Diagram 3.2

Terangkan kelebihan penggunaan sabun pencuci pakaian tersebut.
Explain the advantages of using that laundry detergent.

.....

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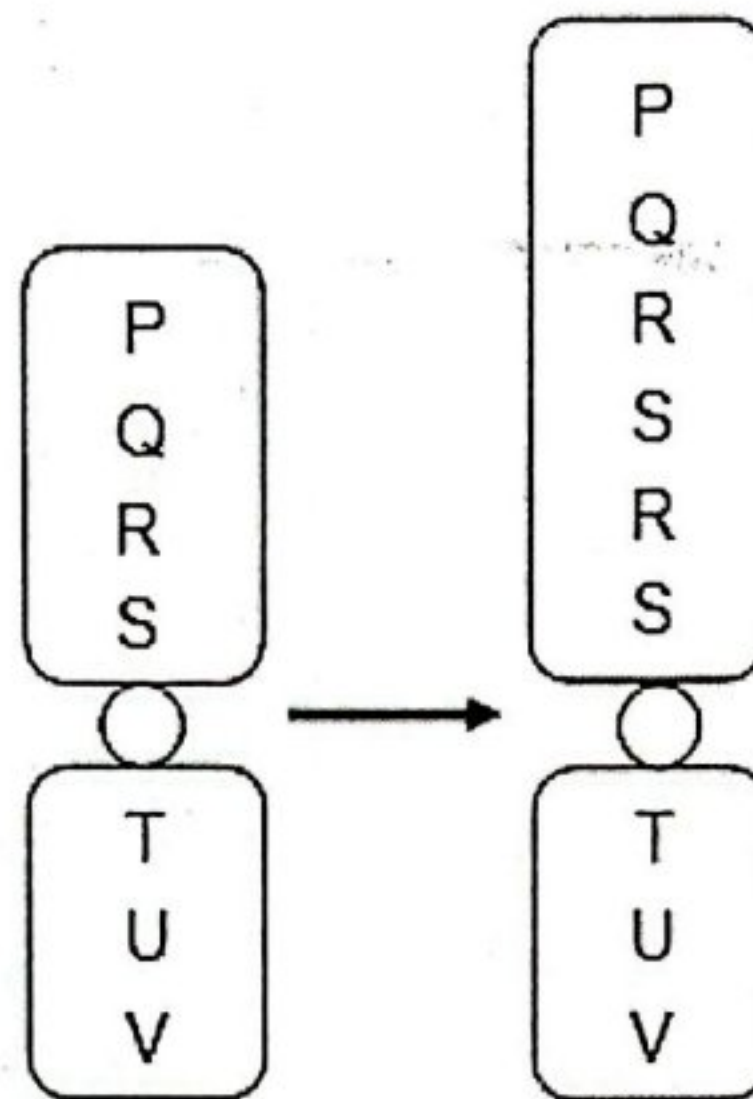
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[3 markah/ 3 marks]

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4. Rajah 4.1 menunjukkan aberasi kromosom yang berlaku pada manusia.
 Diagram 4.1 shows chromosomal aberrations that occur in humans.



Rajah 4.1
 Diagram 4.1

- a) Berdasarkan Rajah 4.1,
 Based on Diagram 4.1,

- (i) namakan jenis mutasi.
 name the type of mutation.

.....

[1 markah/ 1 mark]

- (ii) kenal pasti jenis perubahan struktur kromosom tersebut.
 identify the type of change in the structure of the chromosome.

.....

[1 markah/ 1 mark]

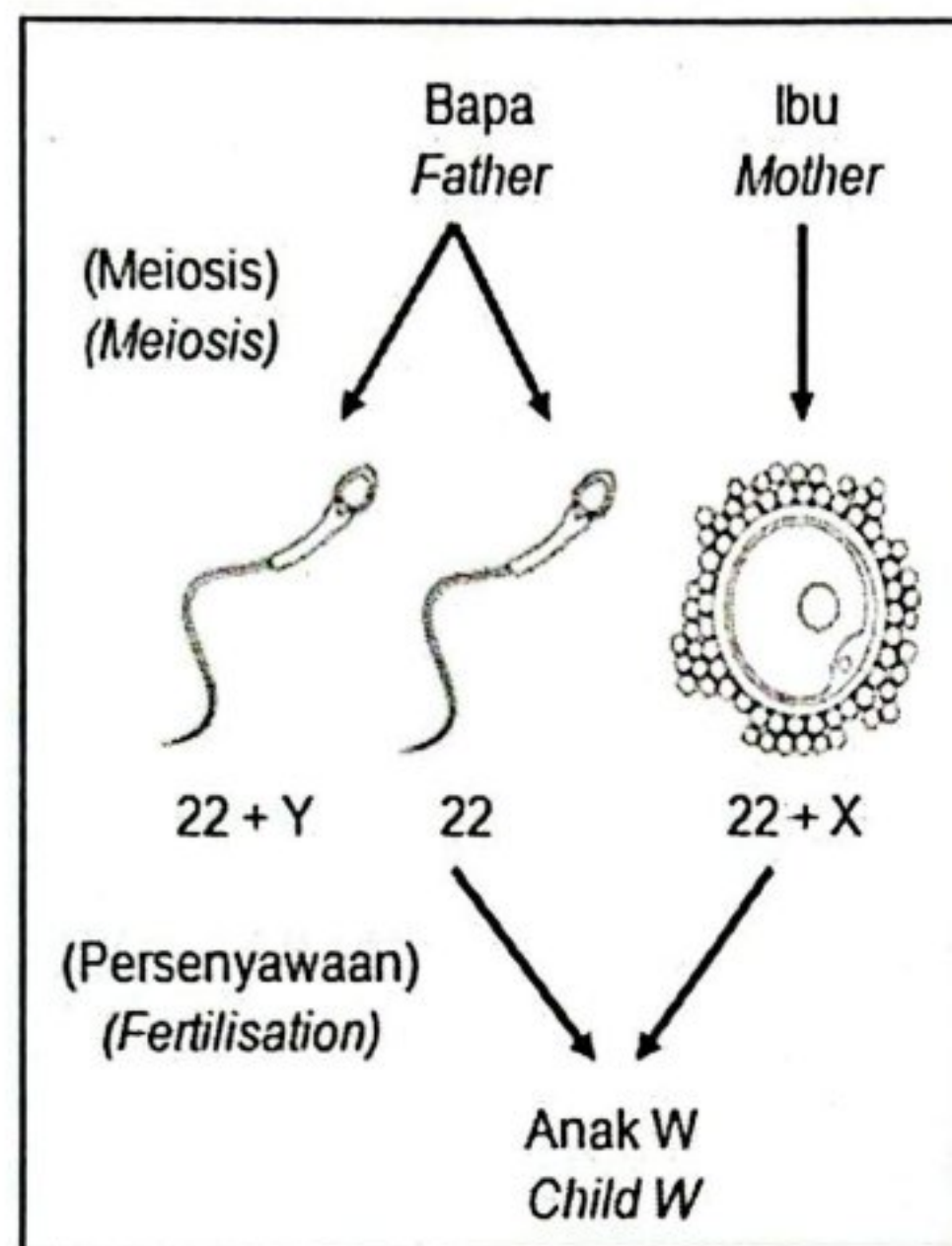
- (iii) namakan **satu** contoh agen kimia yang menjadi punca kepada mutasi.
 name **one** example of a chemical agent that causes mutation.

.....

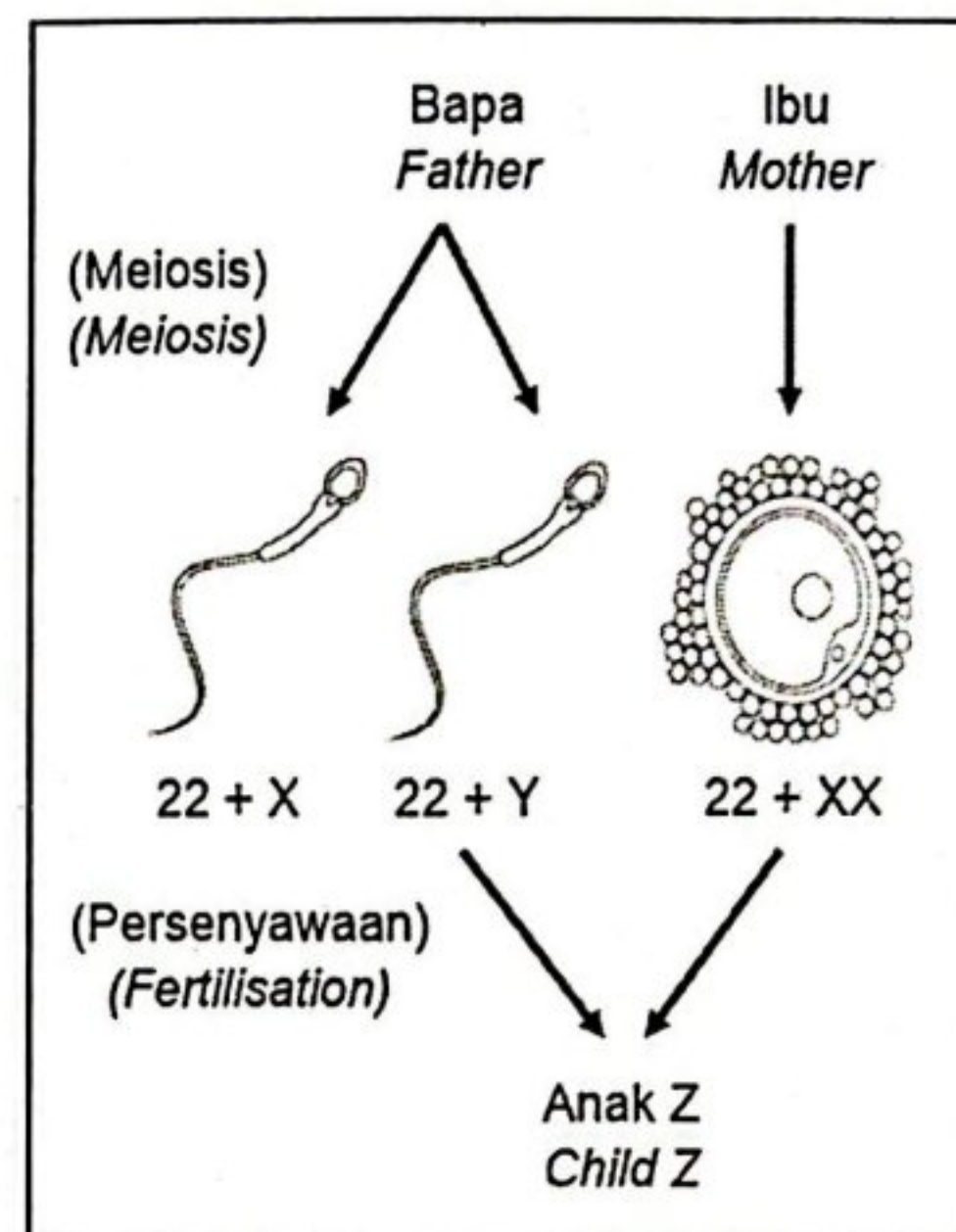
[1 markah/ 1 mark]

- b) Rajah 4.2 (a) dan Rajah 4.2 (b) menunjukkan keabnormalan yang berlaku semasa proses meiosis.

Diagram 4.2 (a) and Diagram 4.2 (b) show abnormalities that occur during the meiosis process.



Rajah 4.2 (a)
Diagram 4.2 (a)



Rajah 4.2 (b)
Diagram 4.2 (b)

- (i) Berdasarkan Rajah 4.2 (a), terangkan bagaimana keabnormalan tersebut boleh berlaku pada Anak W.

Based on Diagram 4.2 (a), explain how the abnormality can occur in Child W.

.....

.....

.....

.....

[2 markah/ 2 marks]

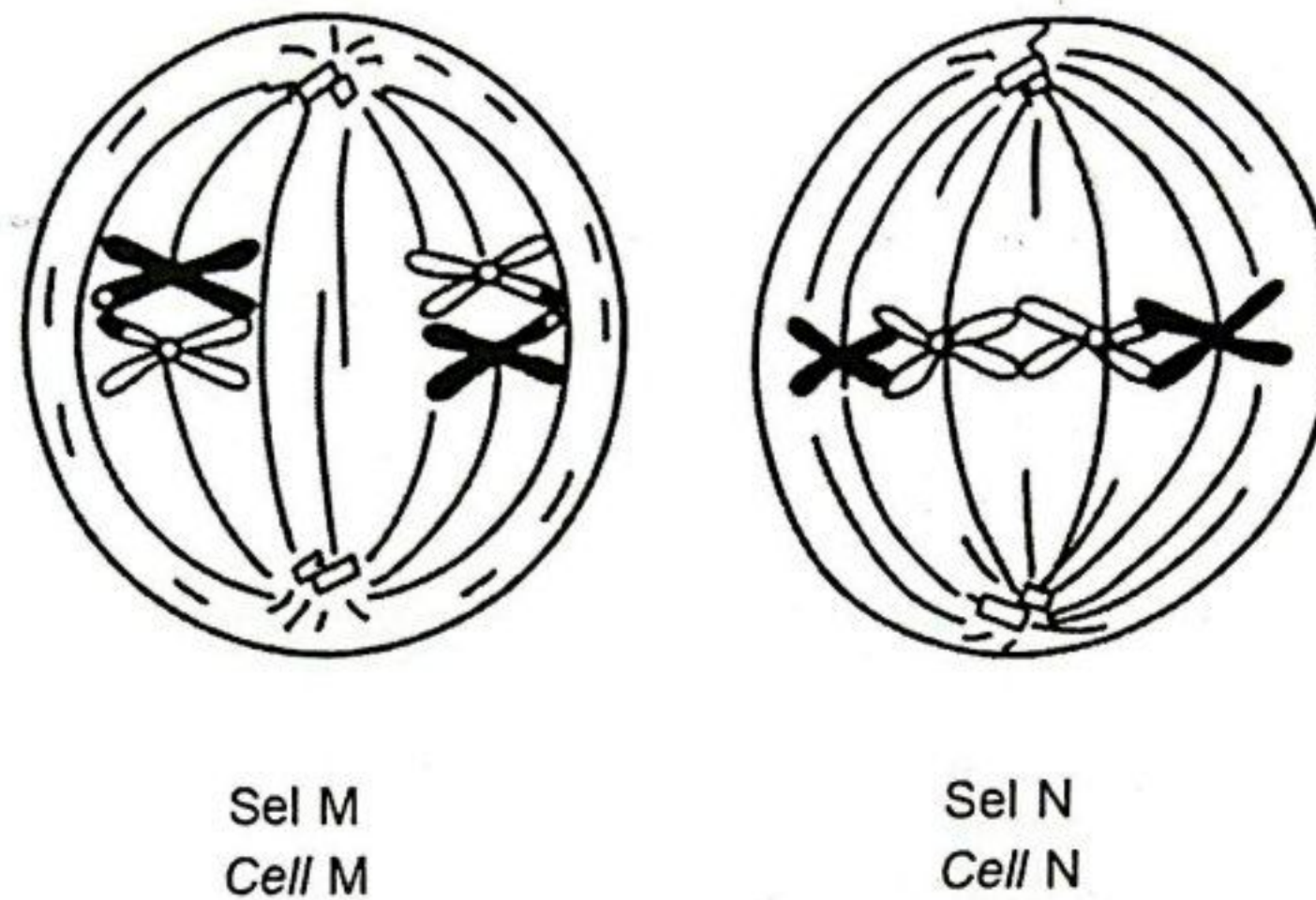
- (ii) Lengkapkan jadual untuk menunjukkan perbezaan bagi jenis penyakit yang dihadapi oleh Anak W dan Anak Z.
Complete the table to show the difference in the type of illness suffered by Child W and Child Z.

	Anak W <i>Child W</i>	Anak Z <i>Child Z</i>
Penyakit <i>Disease</i>		
Ciri fizikal yang ditunjukkan <i>Physical characteristics shown</i>		

[2 markah/ 2 marks]

5. Rajah 5.1 menunjukkan Sel M dan Sel N yang menjalani dua jenis pembahagian sel yang berbeza.

Diagram 5.1 shows Cell M and Cell N that undergo two different types of cell division.



Rajah 5.1
Diagram 5.1

- a) i) Kenal pasti peringkat pembahagian sel bagi:

Identify the stage of cell division for:

Sel M:

Cell M:

Sel N:

Cell N:

[2 markah / 2 marks]

- ii) Nyatakan kepentingan pembahagian sel M kepada kemandirian spesies organisma.

State the importance of cell division M to the survival of an organism's species.

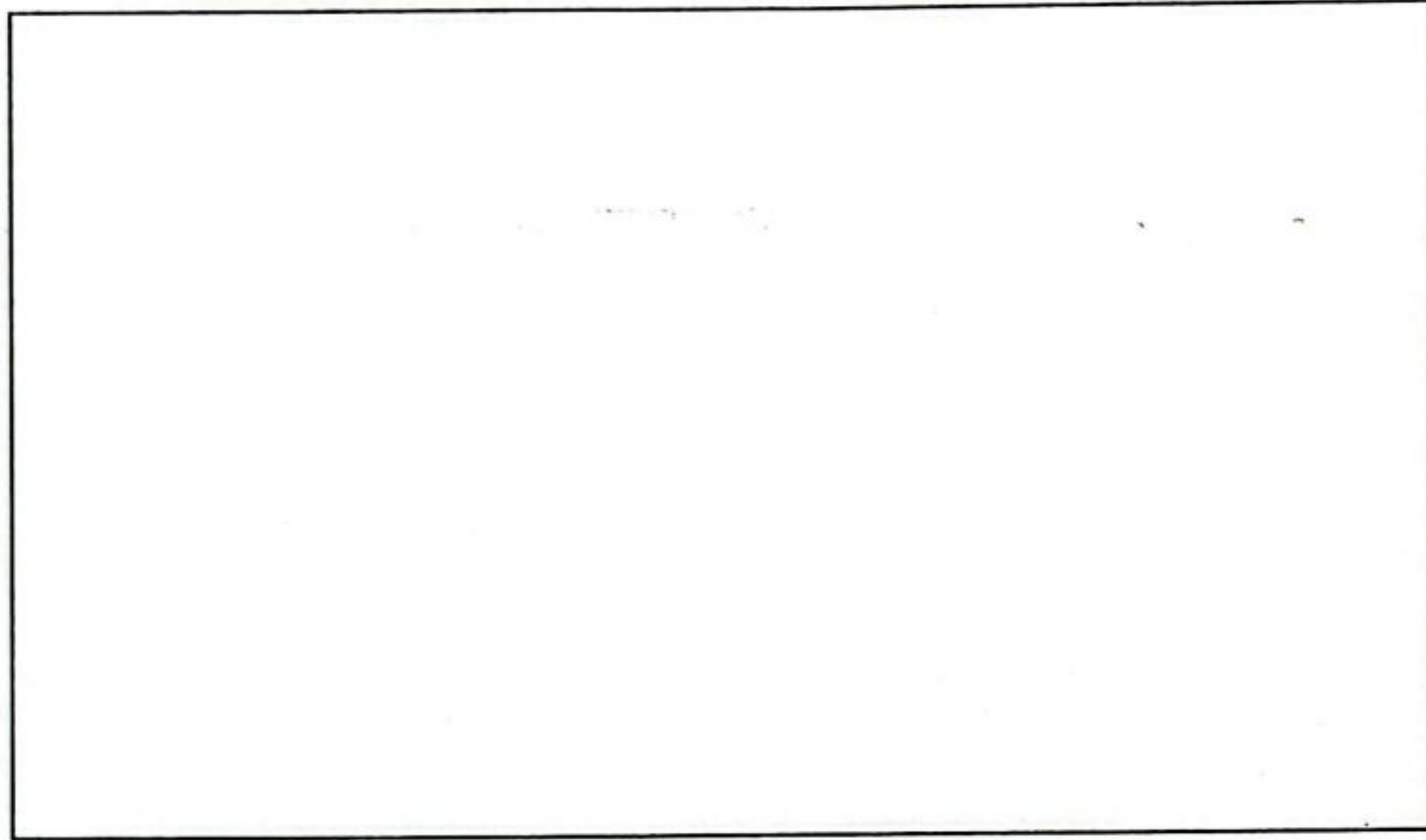
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[1 markah / 1 mark]

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- b) Lukiskan peringkat pembahagian sel selepas peringkat yang ditunjukkan dalam Rajah 5.1 bagi sel M.
Draw the stages of cell division after the stage shown in Diagram 5.1 for cell M.



[1 markah / 1 mark]

- c) Nyatakan perbezaan sel M dan Sel N mengikut aspek berikut:
State the differences between Cell M and Cell N according to the following aspects:

Aspek Aspect	Sel M Cell M	Sel N Cell N
Perlakuan kromosom Chromosome behaviour		
Bilangan kromosom sel anak yang terhasil Number of chromosomes in the resulting daughter cells		

[2 markah / 2 marks]

- d) Rajah 5.2 menunjukkan kempen yang dijalankan oleh Kementerian Kesihatan.
Diagram 5.2 shows a campaign carried out by Ministry of Health.

PENYIMPANAN DARAH TALI PUSAT SELEPAS KELAHIRAN ANUGERAH TERINDAH UNTUK MASA HADAPAN BAYI ANDA  Lindungi masa hadapan si manja anda dengan penyimpanan sel stem yang berharga. Suatu prosedur yang selamat, mudah dan pantas selepas kelahiran. MULA PERLINDUNGAN HARI INI. DAFTAR SEBELUM KELAHIRAN MUDAH. SELAMAT. BERMAKNA	CORD BLOOD STORAGE AFTER BIRTH A MOST BEAUTIFUL GIFT FOR YOUR BABY'S FUTURE  Protect your little one's future with precious stem cell storage. A procedure that is safe, easy and swift after childbirth. START PROTECTION TODAY. ENROL BEFORE BIRTH EASY. SAFE. MEANINGFUL
--	---

Rajah 5.2
Diagram 5.2

Sepasang suami isteri ingin menyimpan darah tali pusat anaknya.
Wajarkan kepentingan tindakan tersebut.
*A married couple wants to store their child umbilical cord blood.
Justify the importance of the action.*

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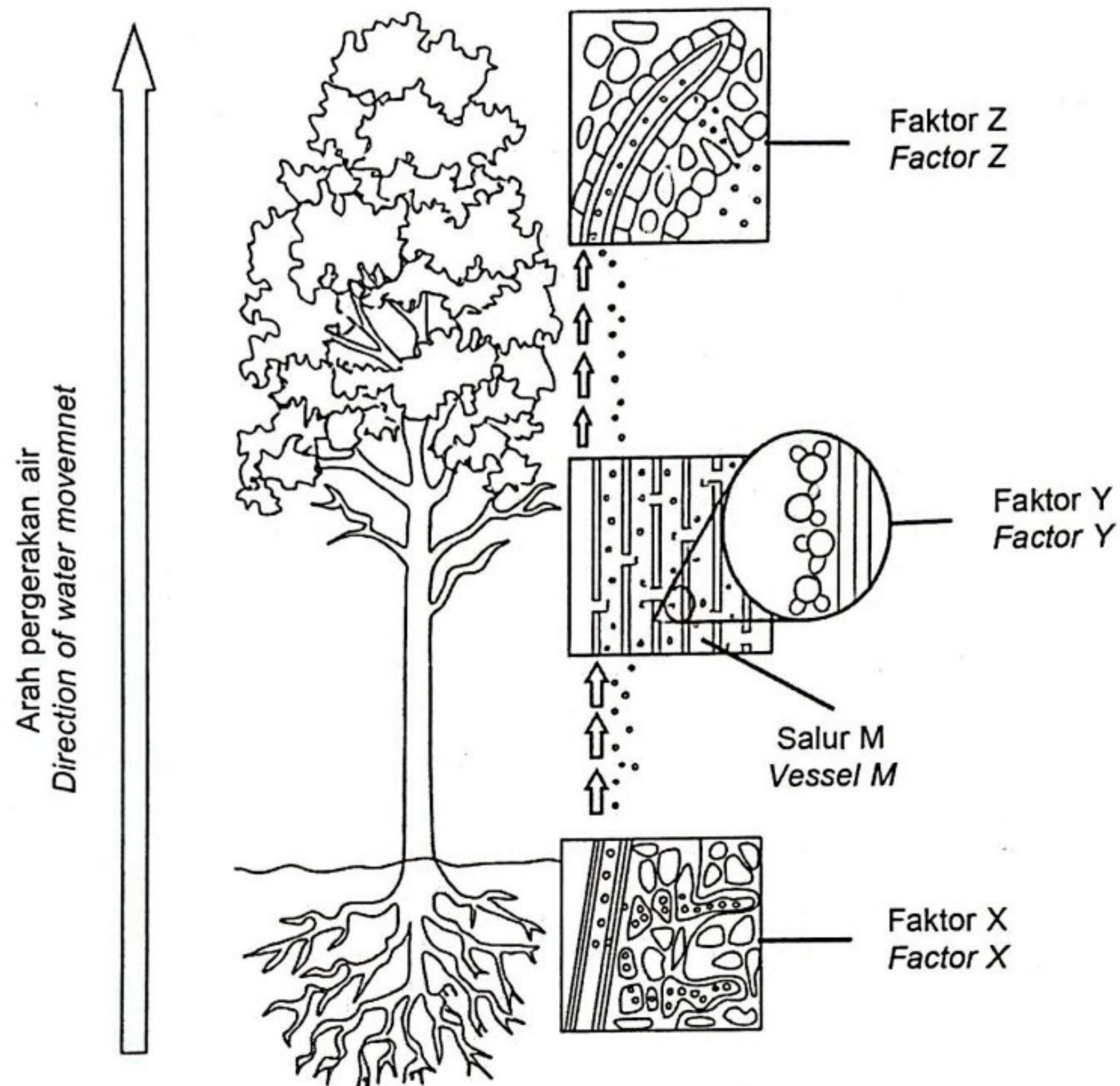
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[2 markah / 2 marks]

6. Rajah 6.1 menunjukkan faktor-faktor yang membantu pergerakan air dan garam mineral pada sebatang pokok Tualang.
Diagram 6.1 shows the factors that help the movement of water and mineral salts in a Tualang tree.



Rajah 6.1
Diagram 6.1

- a) Berdasarkan Rajah 6.1, nyatakan:
Based on Diagram 6.1, state:

Faktor X:
Factor X

Faktor Y:
Factor Y

[2 markah / 2 marks]

- b) Faktor Y membantu pergerakan air ke bahagian daun bagi tumbuhan yang tinggi melalui daya tarikan yang berterusan di sepanjang salur M.
Namakan daya pada salur M yang membantu faktor Y untuk menjalankan fungsi tersebut.

Factor Y helps the movement of water to the leaves of tall plants through a constant pulling force along vessel M.

Name the force on vessel M that helps factor Y to carry out the function.

.....

[1 markah / 1 marks]

- c) Salur M telah dijangkiti sejenis kulat yang menyebabkannya rosak.
Terangkan kesan kerosakan yang berlaku dalam salur M terhadap proses translokasi.

Vessel M has been infected with a type of fungus that caused it to become damaged.

Explain the effect of the damage that occur in vessel M on the translocation process.

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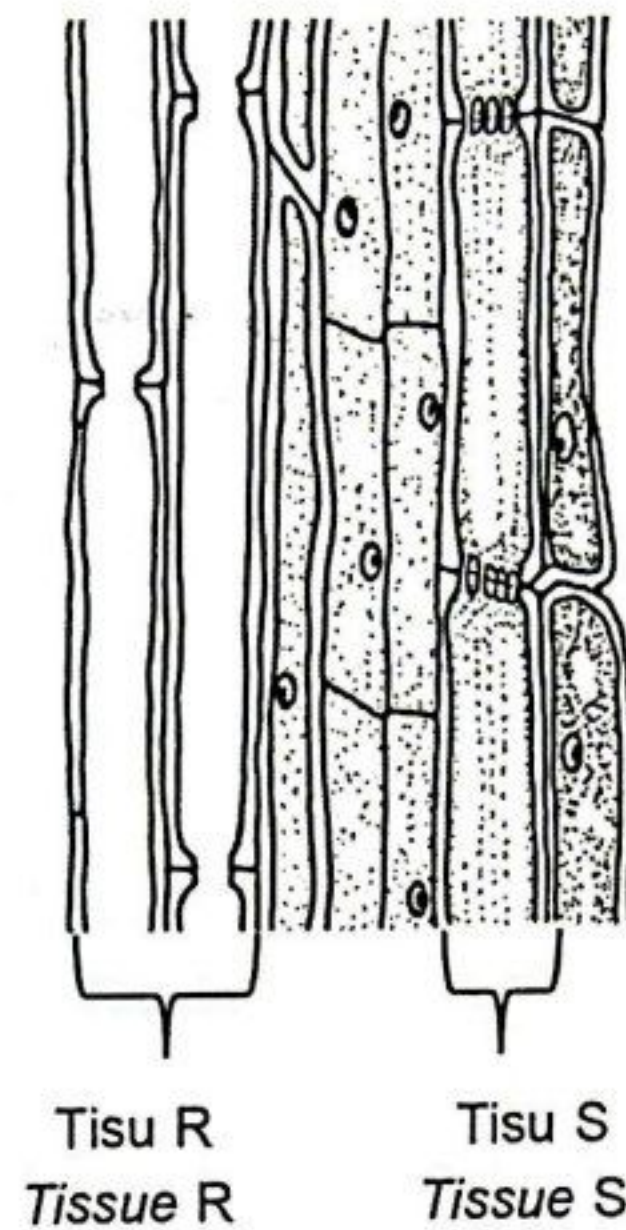
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[3 markah/ 3 marks]

- d) Rajah 6.2 menunjukkan dua jenis tisu yang terlibat dalam sistem pengangkutan tumbuhan.

Diagram 6.2 shows two types of tissues involved in plant's transport system.



Rajah 6.2
Diagram 6.2

Bezakan struktur tisu R dan tisu S.

Differentiate the structure of tissue R and tissue S.

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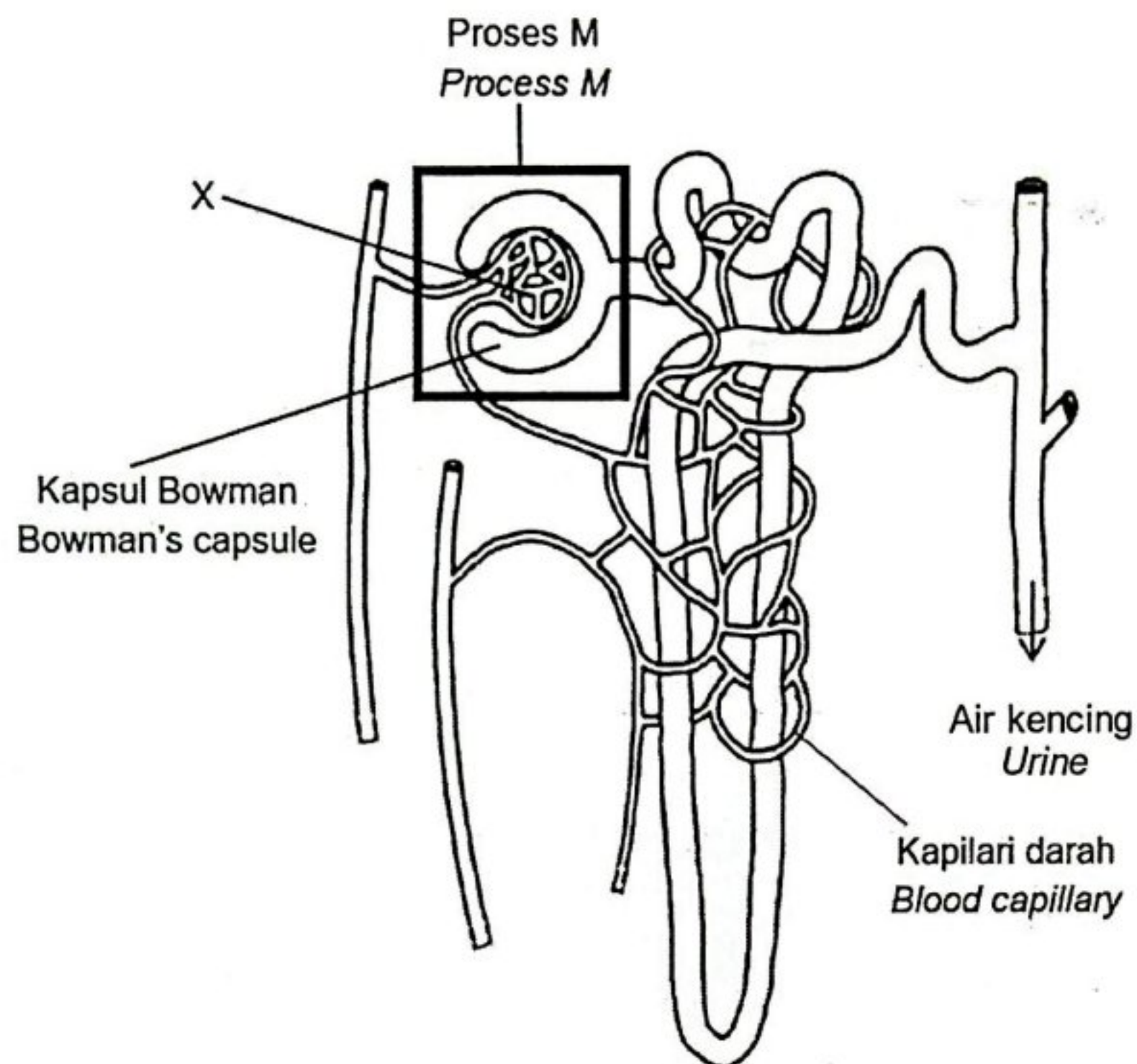
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[2 markah/ 2 marks]

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7. Rajah 7.1 menunjukkan struktur satu nefron dalam ginjal manusia yang terlibat dalam pembentukan air kencing.

Diagram 7.1 shows the structure of a nephron in the human kidney involved in the formation of urine.



Rajah 7.1
Diagram 7.1

- a) (i) Berdasarkan Rajah 7.1, nyatakan **satu** komponen darah yang tidak dapat merentasi struktur X.
*Based on Diagram 7.1, state **one** blood component that cannot pass through structure X.*

.....

[1 markah / 1 mark]

- (ii) Terangkan proses M yang berlaku di antara struktur X dan kapsul Bowman.
Explain process M that occurs between structure X and Bowman's capsule.

.....

.....

.....

[2 markah / 2 marks]

- b) Seorang pesakit telah menjalani ujian air kencing. Keputusannya adalah seperti berikut:

A patient undergo a urine test. The results were as follows:

Bahan Substance	Keputusan Result
Glukosa Glucose	Dikesan Trace

Berdasarkan keputusan di atas,
Based on the results above,

Terangkan keputusan ujian air kencing pesakit tersebut.
Explain the patient's urine test results.

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.....

[3 markah / 3 marks]

- c) Encik Y telah mengalami kemalangan yang menyebabkan kedua-dua ginjalnya tidak berfungsi. Doktor pakar menyarankan penggunaan ginjal biotiruan. Wajarkan saranan doktor tersebut.

Mr. Y had an accident that caused both of his kidneys to stop working. The specialist doctor recommended the use of a bioartificial kidney. Justify the doctor's recommendation.

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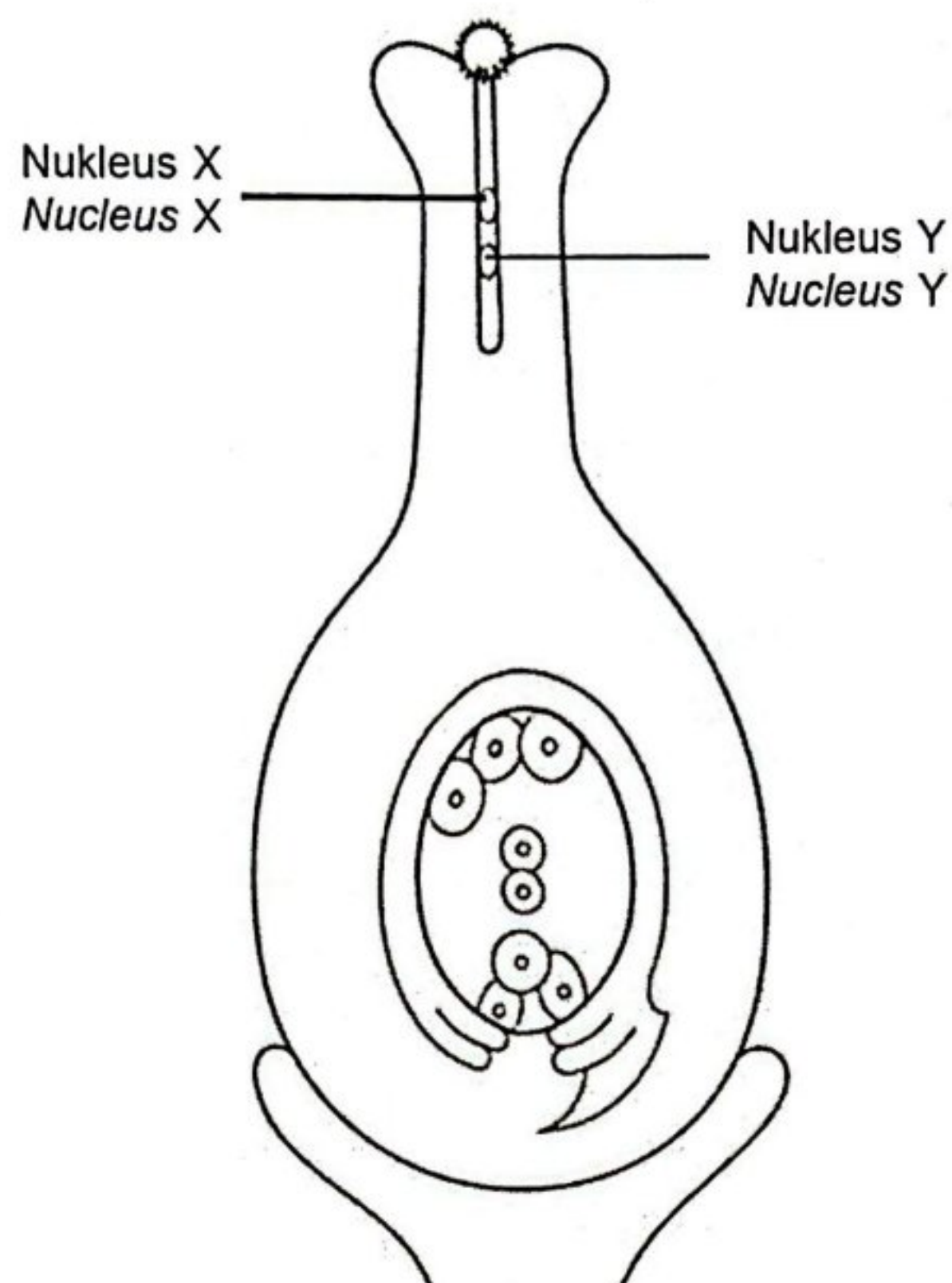
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[3 markah / 3 marks]

8. Rajah 8.1 menunjukkan organ pembiakan betina sejenis tumbuhan.
Diagram 8.1 shows the female reproductive organ of a plant.



Rajah 8.1
Diagram 8.1

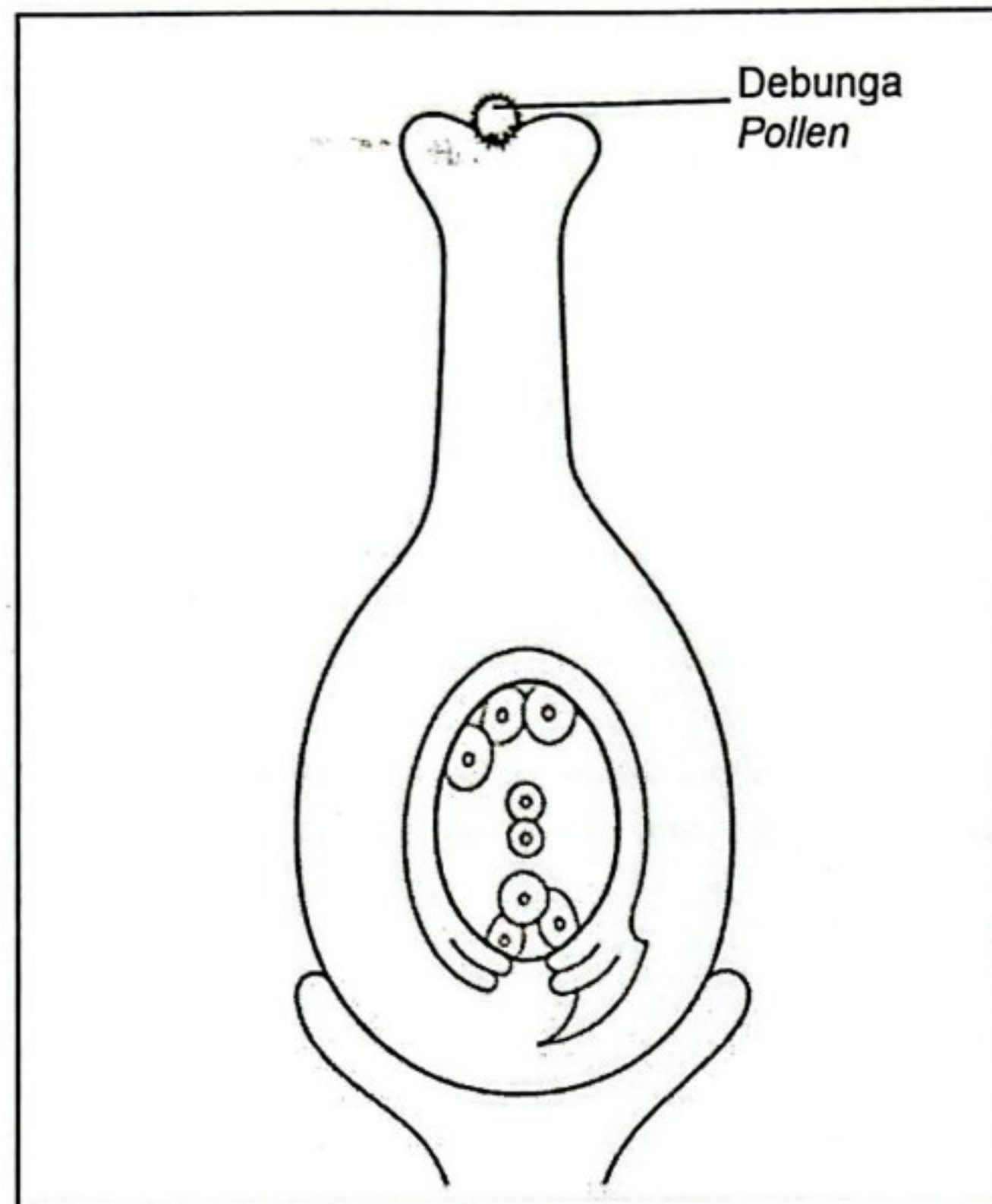
- a) Nyatakan fungsi:
State the function:

Nukleus X :
Nucleus X :

Nukleus Y :
Nucleus Y :

[2 markah/ 2 marks]

- b) Lengkapkan Rajah 8.2 dengan melukis pembentukan tiub debunga yang menembusi ovul melalui mikropil dan pembentukan gamet jantan.
Complete Diagram 8.2 by drawing the formation of the pollen tube that penetrate the ovule through the micropyle and the formation of the male gamete.



Rajah 8.2
 Diagram 8.2

[2 markah/ 2 marks]

- c) Nyatakan **satu** perbezaan fungsi bagi dua gamet jantan dalam persenyawaan ganda dua.
*State **one** difference in the function of two male gametes in double fertilization.*

.....

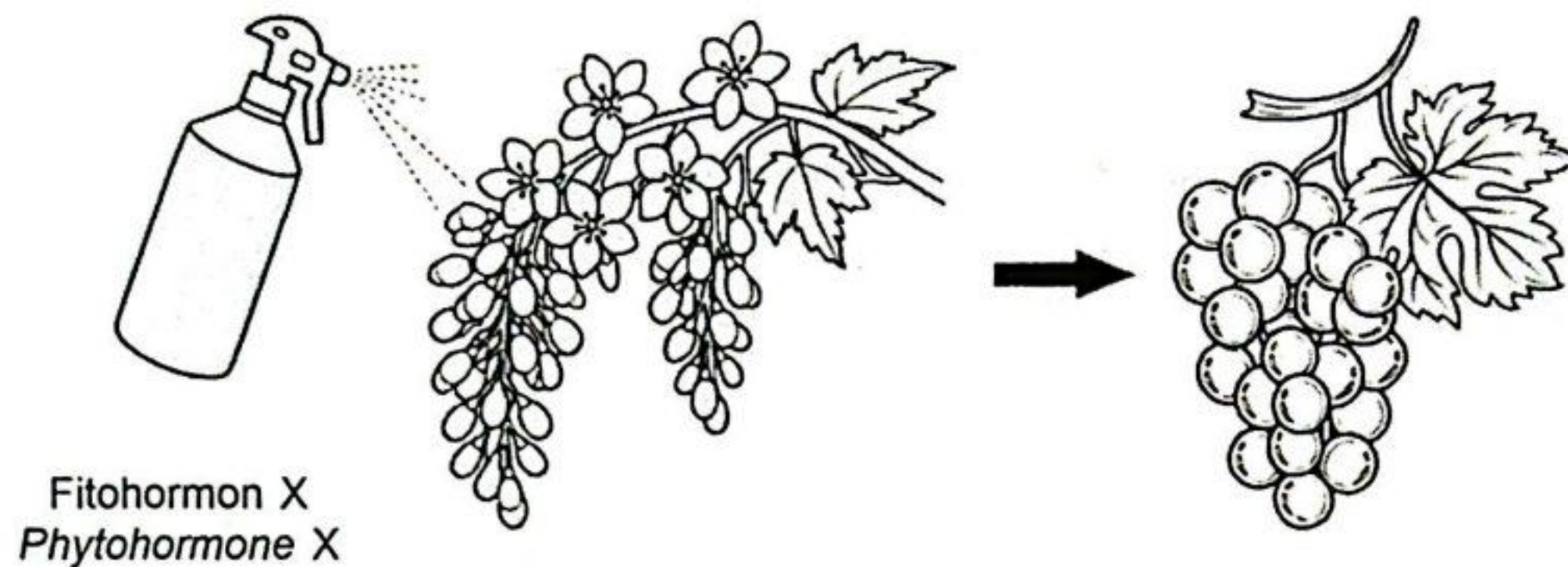
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[1 markah/ 1 mark]

- d) Rajah 8.3 menunjukkan satu teknik penghasilan buah anggur tanpa melibatkan proses persenyawaan.

Diagram 8.3 shows a grape production technique without involving the fertilization process.



Rajah 8.3
Diagram 8.3

Berikan **satu** kebaikan dan **satu** keburukan teknik ini kepada pengguna.

*Give **one** advantage and **one** disadvantage of this technique to the user.*

.....

.....

.....

.....

[2 markah/ 2 marks]

- e) Pisang dari Filipina akan dibungkus secara vakum sebelum dieksport ke Malaysia. Wajarkan.

Bananas from the Philippines will be vacuum packed before being exported to Malaysia. Justify.

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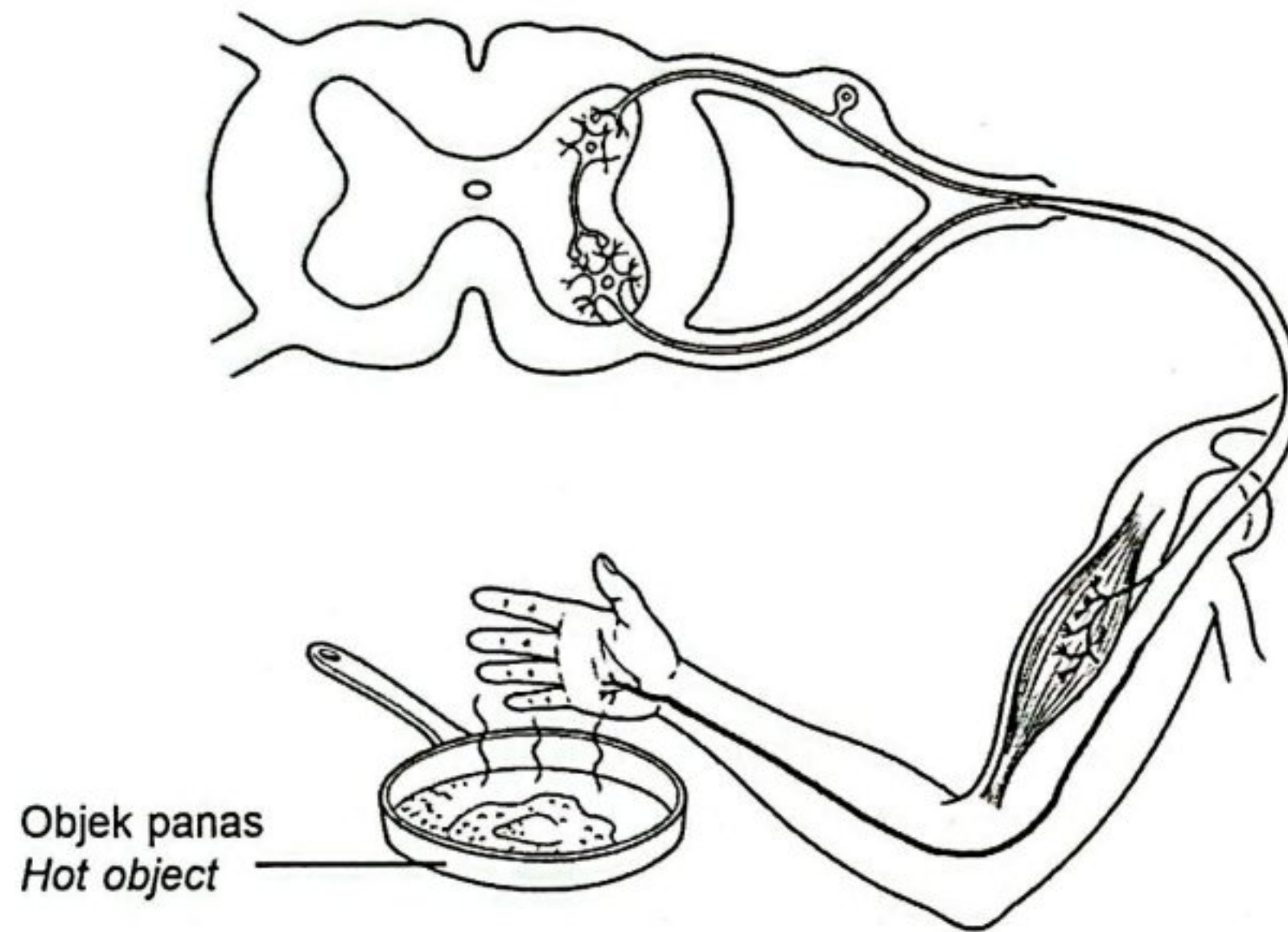
[2 markah/ 2 marks]

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Bahagian B
Section B
[20 markah / 20 marks]

Jawab mana-mana **satu** soalan dalam bahagian.
*Answer any **one** question in this section.*

- 9 Rajah 9.1 menunjukkan gerak balas yang berlaku apabila tangan tersentuh objek panas.
Diagram 9.1 shows a response when a hand touches a hot object.



Rajah 9.1
Diagram 9.1

- (a) (i) Terangkan kepentingan gerak balas tersebut terhadap manusia.
Explain the importance of this response to humans.

[3 markah/ 3 marks]

- (ii) Huraikan lintasan impuls saraf yang menyebabkan gerak balas dalam Rajah 9.1.
Describe the impulse transmission pathway which cause the respond in Diagram 9.1.

[5 markah/ 5 marks]

- (b) Rajah 9.2 menunjukkan seorang wanita sedang membaca buku.
Diagram 9.2 shows a woman reading a book.

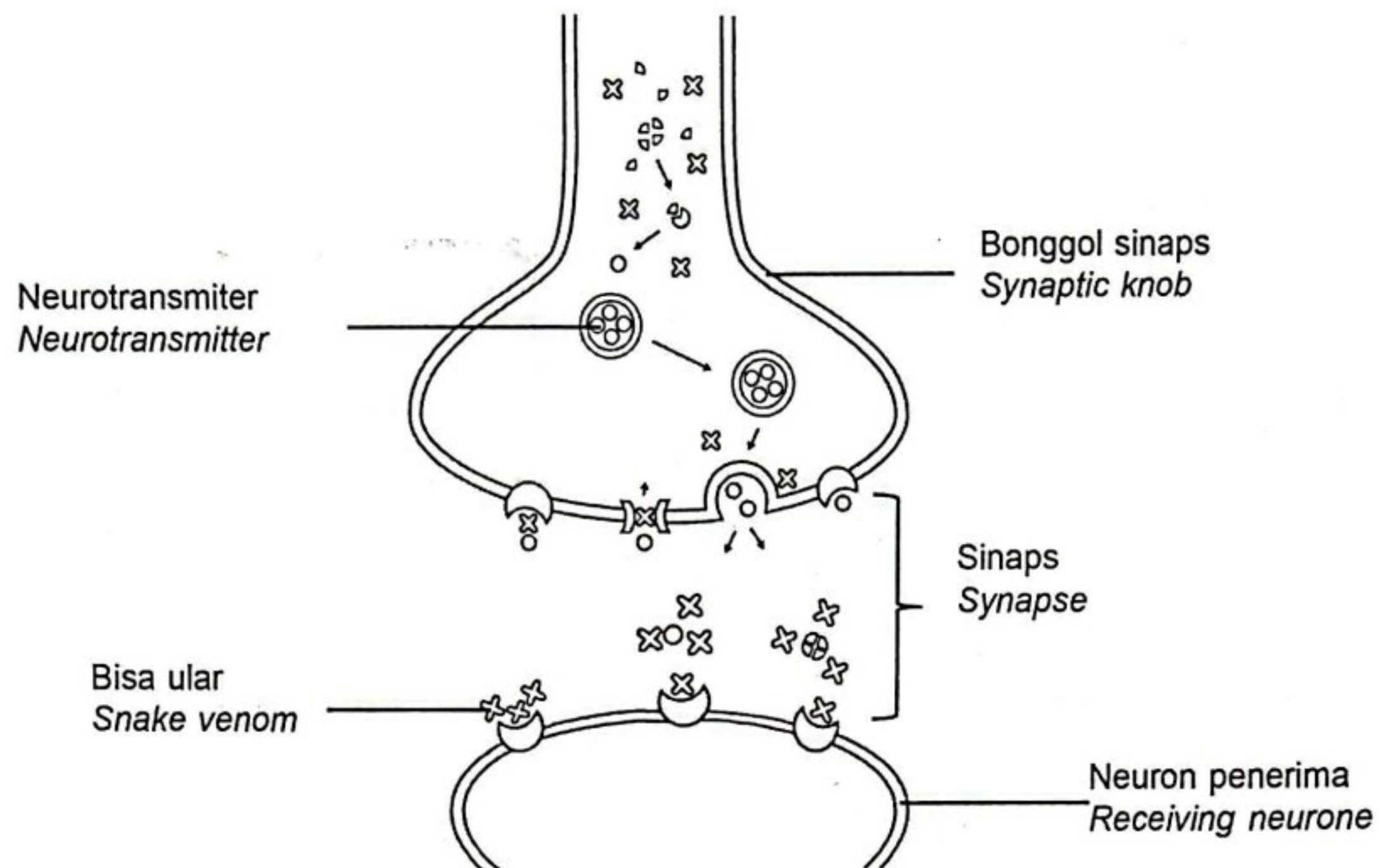


Rajah 9.2
Diagram 9.2

Bandingkan gerak balas pada Rajah 9.1 dan Rajah 9.2.
Compare the response between Diagram 9.1 and Diagram 9.2.

[5 markah/ 5 marks]

- (c) Seorang lelaki telah dipatuk oleh seekor ular berbisa.
A man was bitten by a venomous snake.



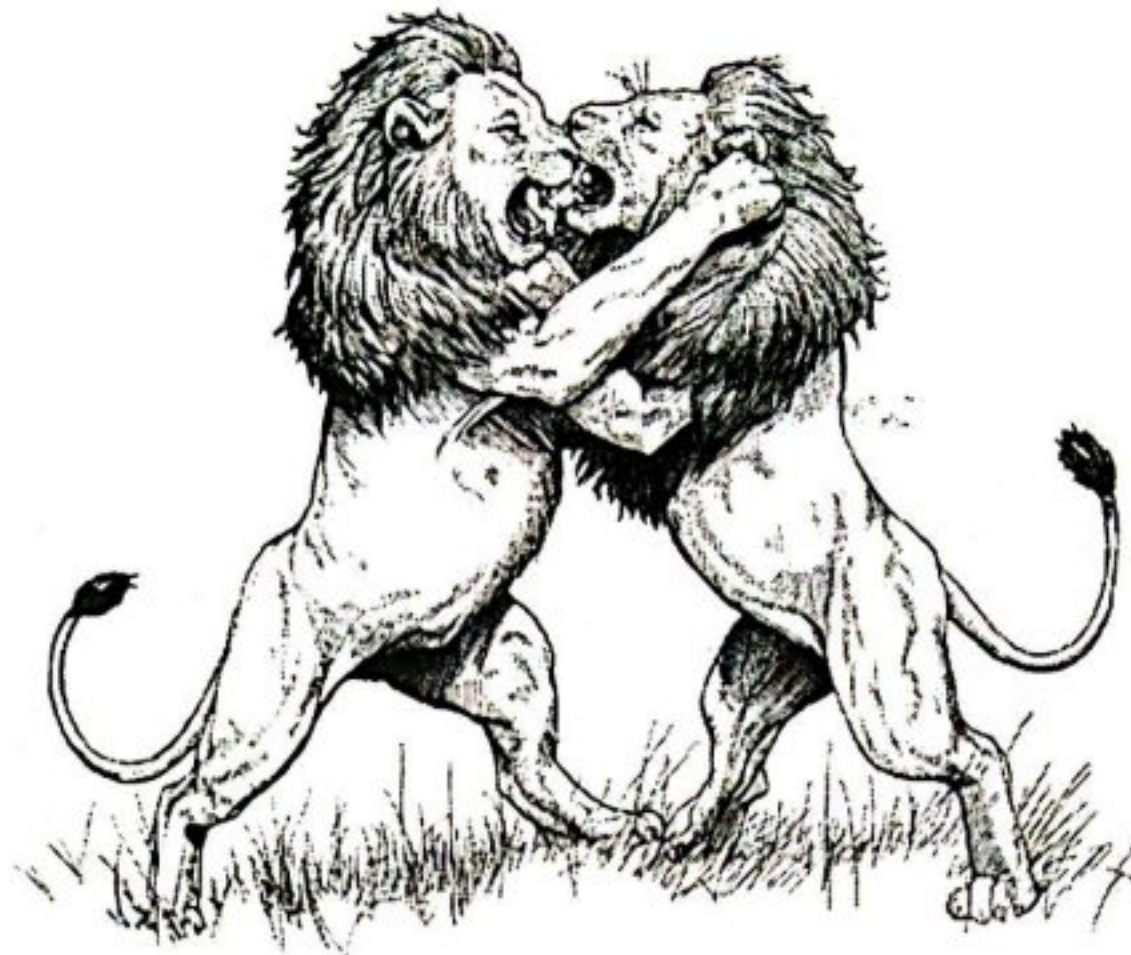
Rajah 9.3
Diagram 9.3

Menggunakan maklumat dalam Rajah 9.3, terangkan bagaimana bisa ular itu boleh mengakibatkan kelumpuhan pada lelaki tersebut.

Using the information in Figure 9.3, explain how the snake's venom could have caused paralysis in the man.

[7 markah/ 7 marks]

10. Rajah 10.1 menunjukkan interaksi antara komponen biosis dalam suatu ekosistem.
Diagram 10.1 shows the interactions between biotic components in an ecosystem.



Rajah 10.1
Diagram 10.1

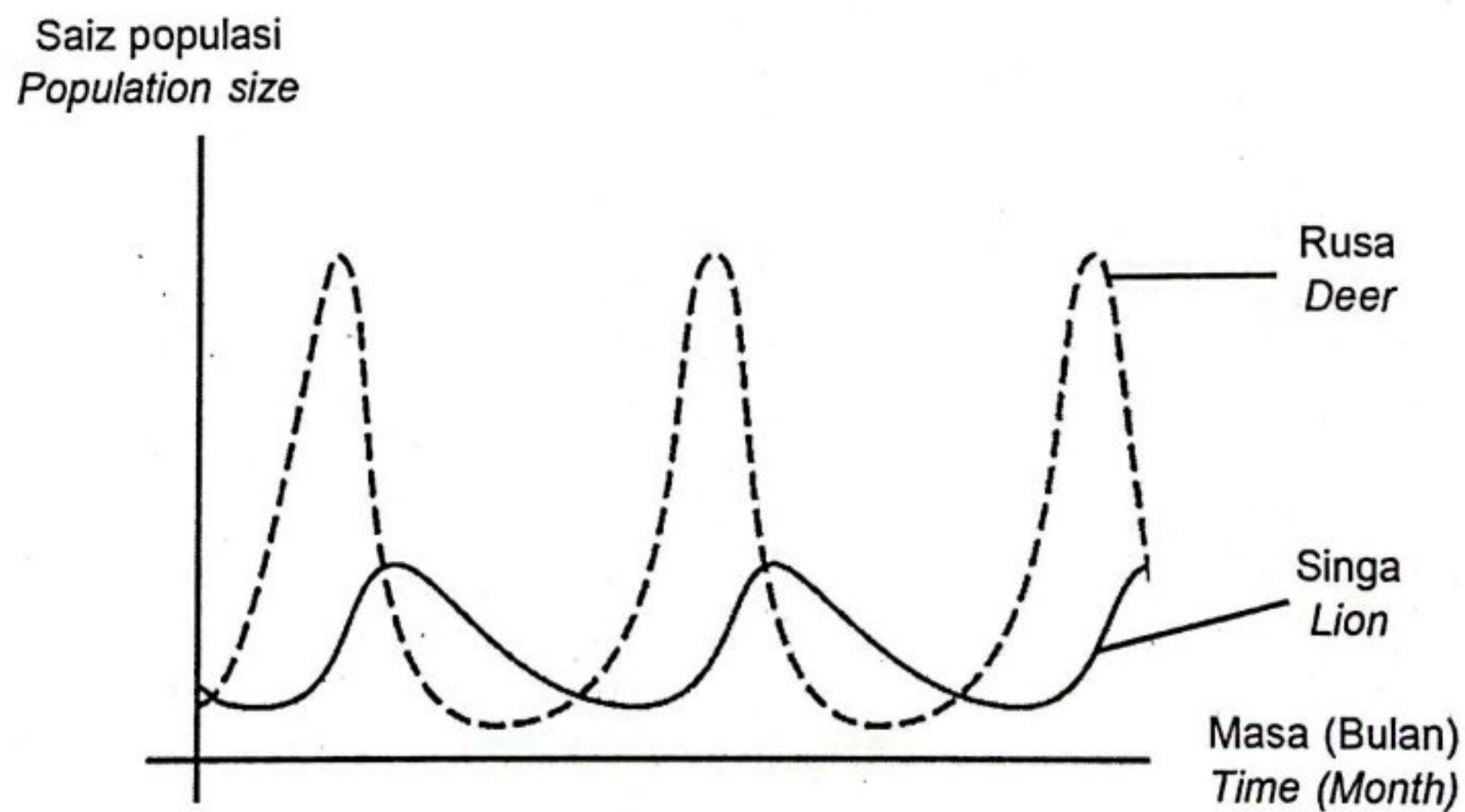
- a) i) Terangkan jenis interaksi yang ditunjukkan dalam Rajah 10.1.

Explain the type of interaction shown in Diagram 10.1.

[2 markah/ 2 marks]

- ii) Rajah 10.2 menunjukkan hubungan antara populasi singa dan populasi rusa yang terdapat di satu habitat yang sama.

Diagram 10.2 shows the relationship between lion populations and deer populations found in the same habitat.



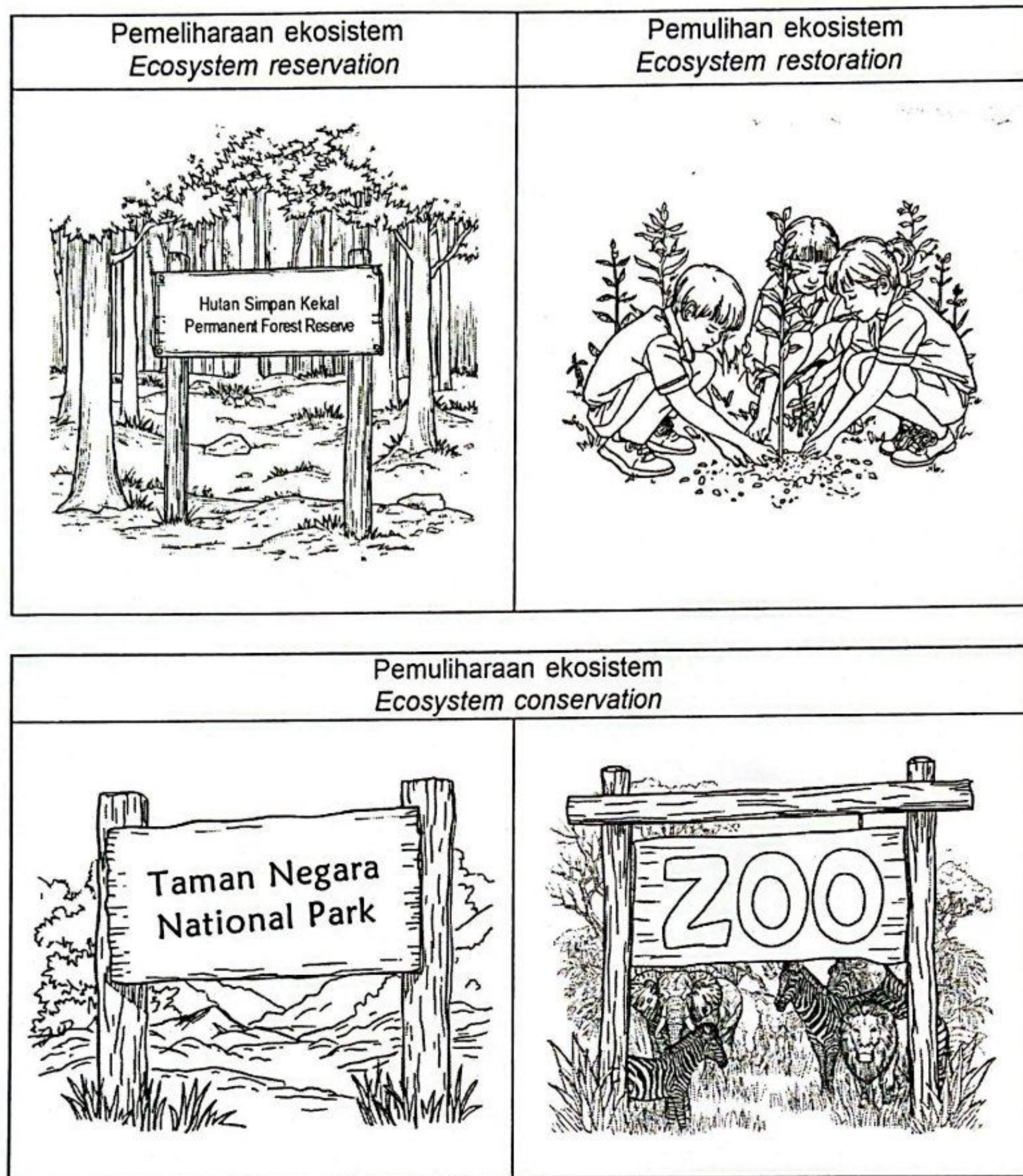
Rajah 10.2
Diagram 10.2

Berdasarkan Rajah 10.2, huraikan hubungan antara singa dan rusa.

Based on Diagram 10.2, describe the relationship between lion and deer.

[4 markah/ 4 marks]

- b) Rajah 10.3 menunjukkan langkah-langkah dalam menguruskan pembangunan mampan untuk memelihara kelestarian alam sekitar.
Diagram 10.3 shows steps in managing sustainable development to preserve environmental sustainability.



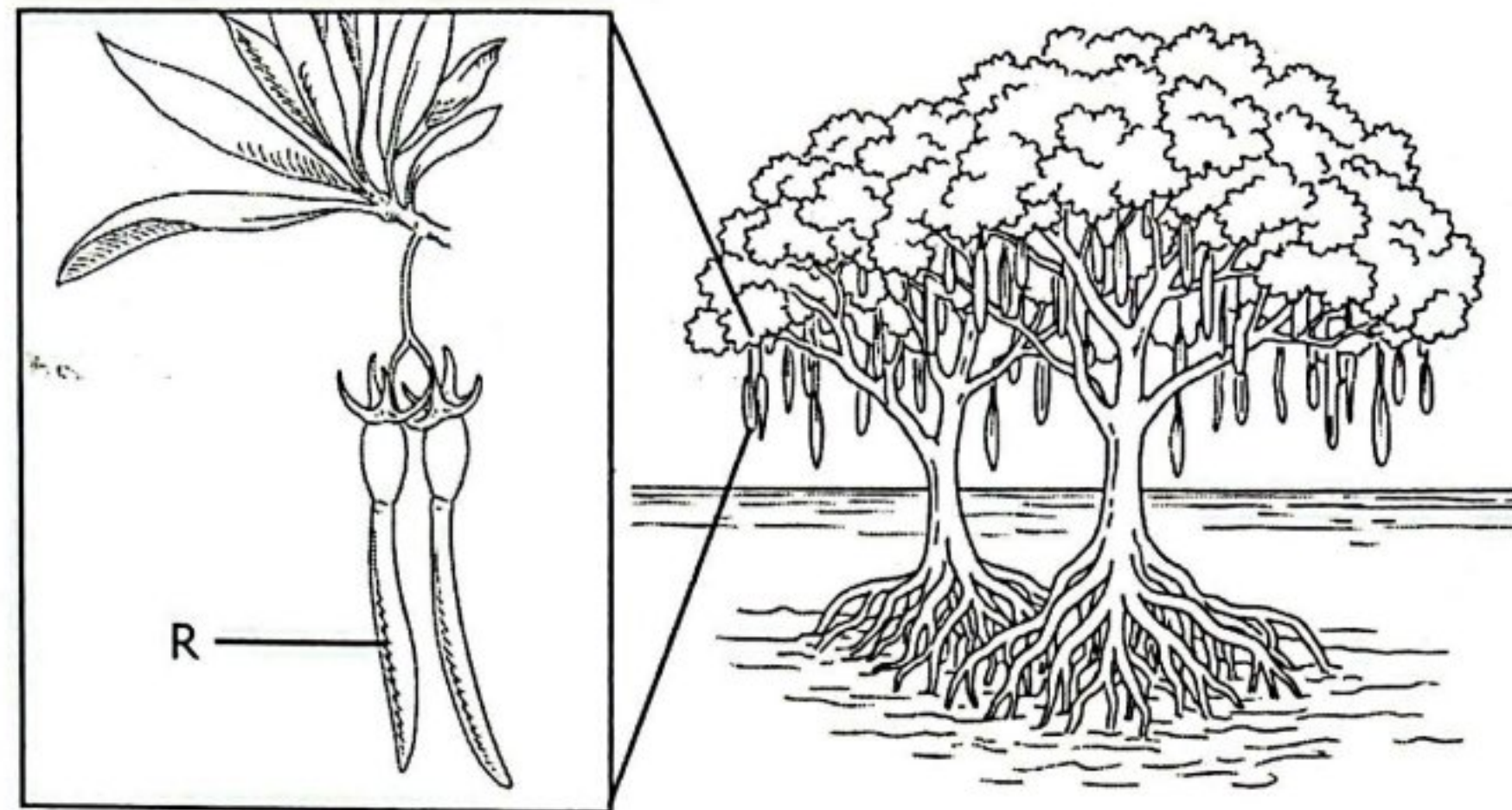
Rajah 10.3
 Diagram 10.3

Berdasarkan Rajah 10.3, wajarkan sumbangan langkah-langkah pemeliharaan, pemuliharaan dan pemulihan ekosistem dalam memelihara kelestarian alam sekitar.
Based on Diagram 10.3, justify the contribution of reservation, conservation and restoration of ecosystem measures in preserving environmental sustainability.

[6 markah/ 6 marks]

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- c) Rajah 10.4 menunjukkan tumbuhan halofit di paya bakau.
Diagram 10.4 shows halophyte plant in mangrove swamps.

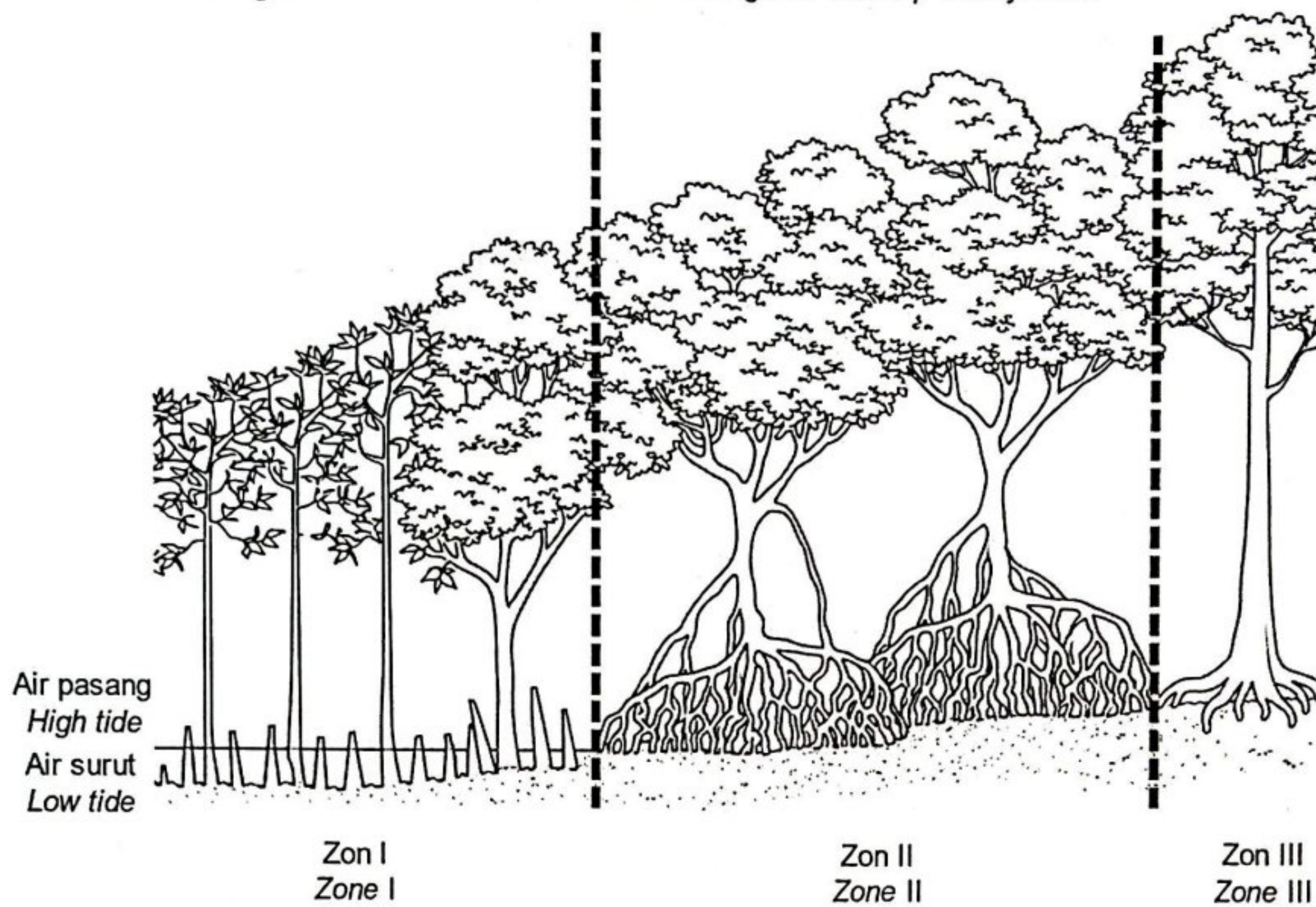


Rajah 10.4
Diagram 10.4

- i) Berdasarkan Rajah 10.4, terangkan penyesuaian struktur R.
Based on Diagram 10.4, explain the adaptations of structure R.

[3 markah/ 3 marks]

- ii) Rajah 10.5 menunjukkan zon dalam satu ekosistem paya bakau.
Diagram 10.5 shows zones in the mangrove swamp ecosystem.



Rajah 10.5
Diagram 10.5

Berdasarkan Rajah 10.5, banding beza struktur akar yang terdapat pada zon I dan zon II.

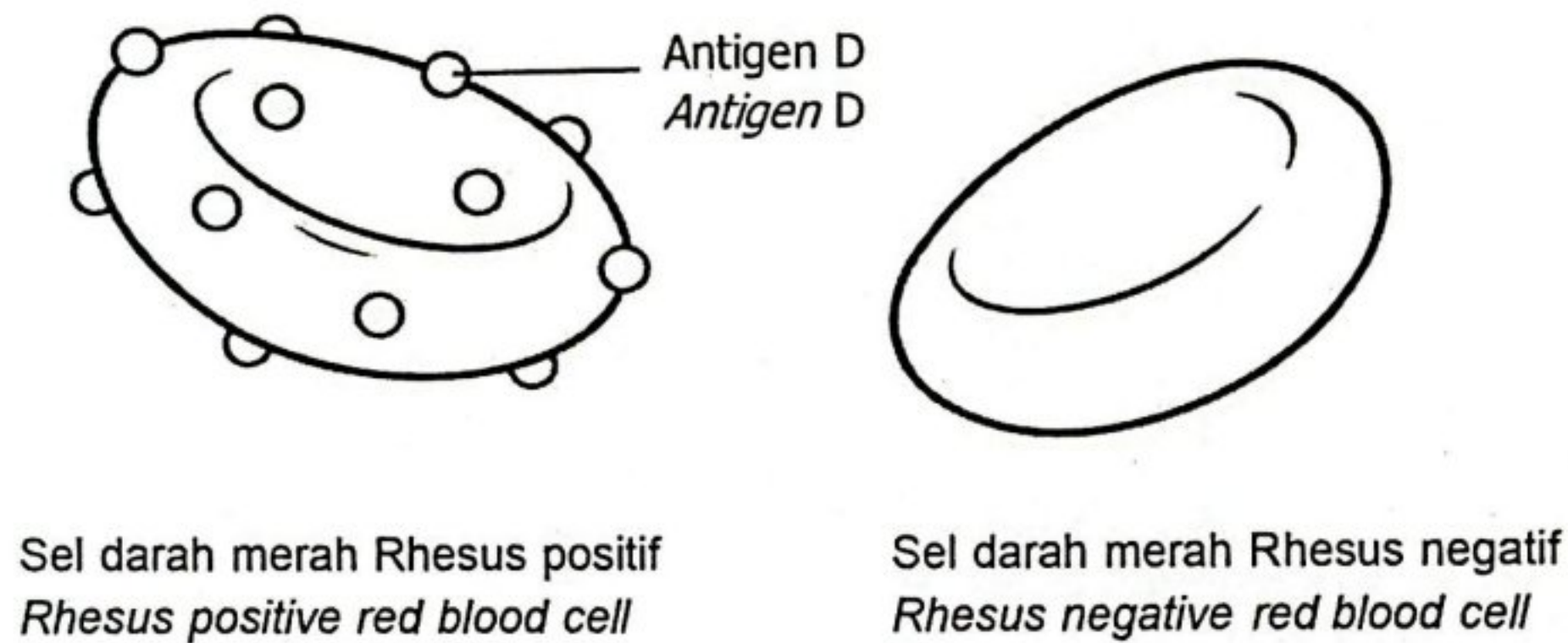
Based on Diagram 10.5, compare the root structures found in zone I and zone II.

[5 markah/ 5 marks]

Bahagian C
Section C
[20 markah / 20 marks]

Jawab semua soalan dalam bahagian ini.
Answer all question in this section.

11. Rajah 11.1 menunjukkan dua jenis sel darah merah.
Diagram 11.1 shows two types of red blood cell.



Rajah 11.1
Diagram 11.1

- a) Seorang lelaki heterozigot Rh-positif berkahwin dengan seorang perempuan Rh-negatif dan dikurniakan anak.
A man who is heterozygous Rh-positive marries a woman who is Rh-negative and has a child.

- i) Nyatakan genotip trait faktor Rhesus bagi lelaki dan perempuan tersebut.
State the genotype of the Rhesus factor trait for the male and female.

[2 markah/ 2 marks]

- ii) Dengan menggunakan rajah skema kacukan, apakah kebarangkalian anak mereka mempunyai darah Rh-positif?
By using the schematic diagram, what is the probability that their child will have Rh-positive blood?

[4 markah/ 4 marks]

- iii) Terangkan bagaimana pewarisan faktor Rhesus boleh menyebabkan kematian anak kedua sekiranya anak pertama mempunyai faktor Rhesus yang berlainan dengan ibunya.
Cadangkan **satu** cara untuk menyelamatkan anak kedua.
*Explain how inheritance of the Rhesus factor can cause the death of a second child if the first child has a different Rhesus factor from its mother.
Suggest **one** way to save the second child.*

[4 markah/ 4 marks]

b)

Albino merujuk kepada individu yang dilahirkan dengan keadaan genetik kekurangan atau ketiadaan pigmen melanin dalam kulit, rambut, dan mata. Individu ini sering dikenali melalui warna kulit sangat cerah, rambut putih kekuningan, mata yang kelihatan kemerahan atau biru pucat dan sensitif terhadap cahaya.

Albino refers to individuals born with a genetic condition of a lack or absence of melanin pigment in the skin, hair, and eyes. These individuals are often recognized by their very light skin colour, yellowish-white hair, eyes that appear reddish or pale blue and sensitive towards light.

Cadangkan cara-cara untuk mengurangkan gejala penyakit tersebut.
Suggest ways to reduce the symptoms of the disease.

[4 markah/ 4 marks]

- c) Rajah 11.2 menunjukkan notis yang dikeluarkan oleh sebuah sekolah berkaitan sejenis penyakit pewarisan.
Diagram 11.2 shows a notice issued by a school regarding a type of hereditary disease.

SARINGAN TALASEMIA
MURID TINGKATAN 4
KHAMIS- 21/05/2026- 8.30 PAGI- BILIK RAWATAN

THALASSEMIA SCREENING
FORM 4 STUDENTS
THURSDAY- 21/05/2026- 8.30 AM- TREATMENT ROOM

Rajah 11.2
Diagram 11.2

Wajarkan saringan talasemia yang bermula di tingkatan 4.
Justify the thalassemia screening starting in form 4.

[6 markah/ 6 marks]

<https://t.me/cikgufazliebiosensei>