



MODUL JAWAB UNTUK JAYA

SIJIL PELAJARAN MALAYSIA 2024

BIOLOGI

Kertas 2

2 Jam 30 Minit

4551/2

SET 1

BIOLOGI

KERTAS 2

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

- Kertas peperiksaan ini mengandungi **tiga** bahagian: **Bahagian A**, **Bahagian B** dan **Bahagian C**.
- Jawapan hendaklah ditulis pada ruang jawapan yang disediakan di dalam kertas peperiksaan ini.
- Kertas peperiksaan ini adalah dalam dwibahasa.
- Jawapan boleh ditulis dalam Bahasa Melayu atau Bahasa Inggeris.
- Rajah yang mengiringi soalan tidak mengikut skala kecuali dinyatakan.
- Kerja mengira anda mesti ditunjukkan.
- **Kertas peperiksaan ini hendaklah diserahkan kepada pengawas peperiksaan pada akhir peperiksaan.**

Untuk Kegunaan Pemeriksa			
Kod Pemeriksa			
Bahagian	Soalan	Markah Penuh	Markah Diperoleh
A	1	6	
	2	6	
	3	7	
	4	7	
	5	8	
	6	8	
	7	9	
	8	9	
Jumlah		60	
B	9	20	
	10	20	
Jumlah		20	
C	11	20	
Jumlah			/100

Kertas peperiksaan ini mengandungi 46 halaman bercetak.

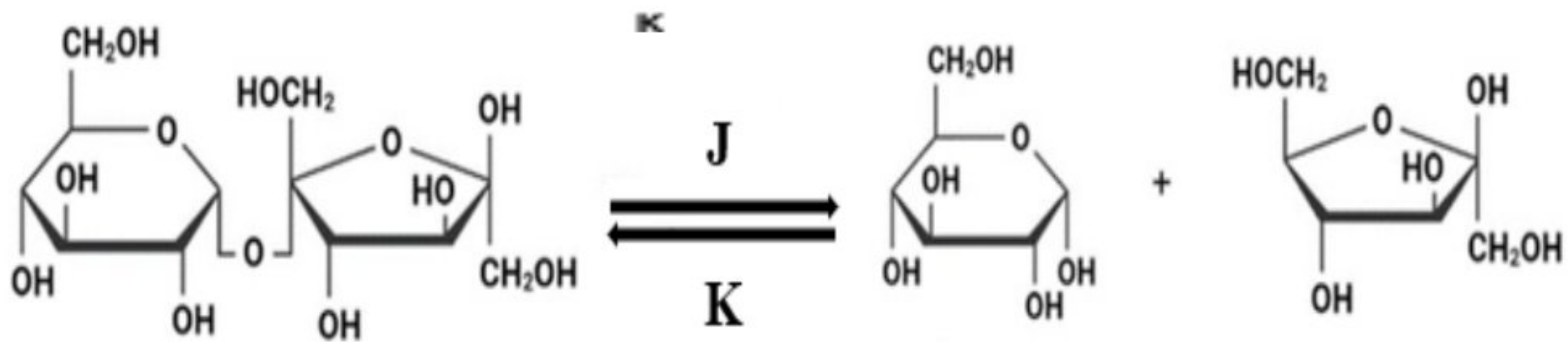
Bahagian A

[60 markah]

Jawab **semua** soalan.

1. Rajah 1 menunjukkan proses hidrolisis dan kondensasi sukrosa.

Diagram 1 shows the hydrolysis and condensation of sucrose.



Rajah 1
Diagram 1

- (a) (i) Namakan jenis metabolisme berlabel J dan K

Name type of metabolisms labelled J and K.

J :

K :

[2 markah]

[2 marks]

- (ii) Namakan satu hasil dari proses hidrolisis sukrosa.

Name one product from hydrolysis of sucrose.

.....

[1 markah]

[1 mark]

- (b) Huraikan proses yang berlaku di K.

Describe the process occur at K.

.....

.....

.....

[2 markah]

[2 marks]

- (c) Nyatakan **satu** keburukan jika mengambil makanan yang tinggi dengan sukrosa dalam jangka masa yang lama.

*State **one** disadvantage if consuming foods high in sucrose for a long period.*

.....

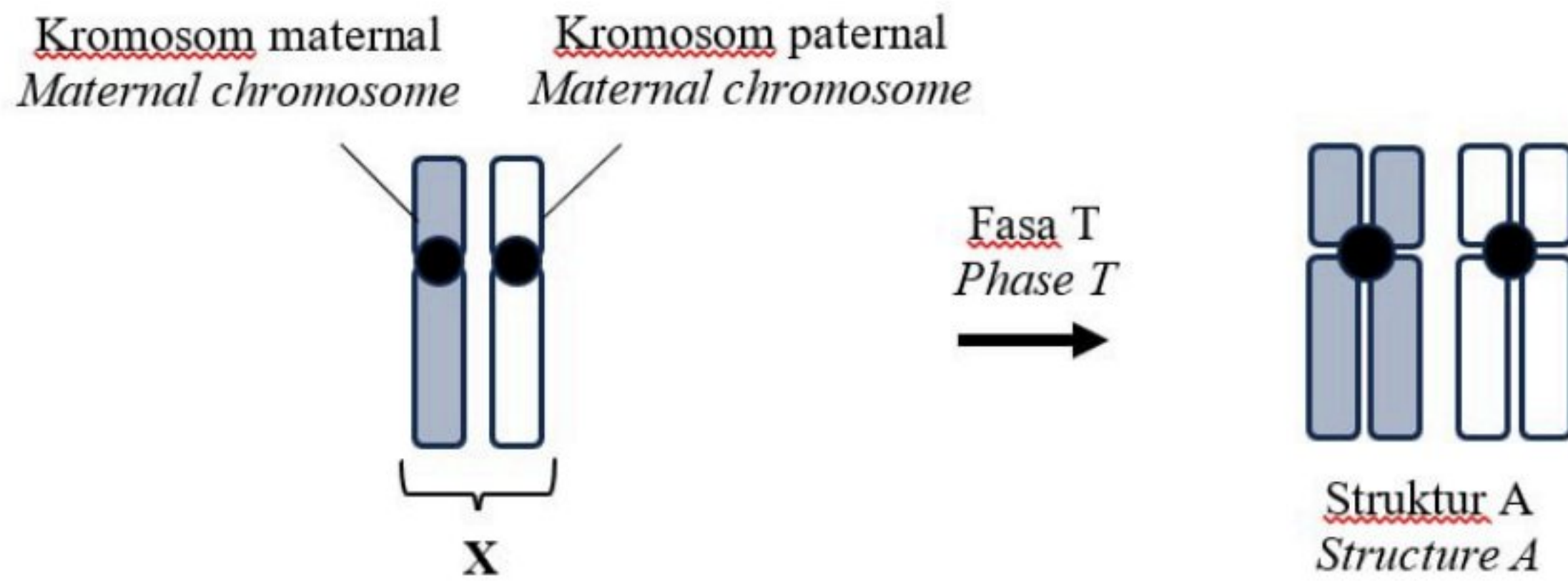
.....

[1 markah]

[1 mark]

2. Rajah 2 menunjukkan struktur X yang terdapat di dalam nukleus.

Diagram 2 shows structure X found in the nucleus.



Rajah 2
Diagram 2

- (a) Namakan struktur X.

Name structure X.

.....

[1 markah]

[1 mark]

- (b) (i) Apakah yang dimaksudkan dengan kromosom paternal?

What is paternal chromosome?

.....

[1 markah]

[1 mark]

- (ii) Fasa T adalah satu fasa dalam kitar sel. Pembentukan Struktur A berlaku semasa fasa T. Terangkan Fasa T.

Phase T is one phase in the cell cycle. The formation of Structure A occurs during Phase T. Explain Phase T.

.....

.....

.....

[2 markah]

[2 marks]

- (c) Kanser boleh di rawat sekiranya dikesan pada peringkat awal. Seorang pesakit kanser payu dara tahap dua telah di nasihatkan oleh doktor untuk menjalani pembedahan bagi membuang nodus limfa di bawah ketiaknya.

Wajarkan kenyataan ini.

Cancer can be treated if detected at an early stage. A stage two breast cancer patient was advised by the doctor to undergo surgery to remove the lymph nodes under her armpit. Justify this statement.

.....

.....

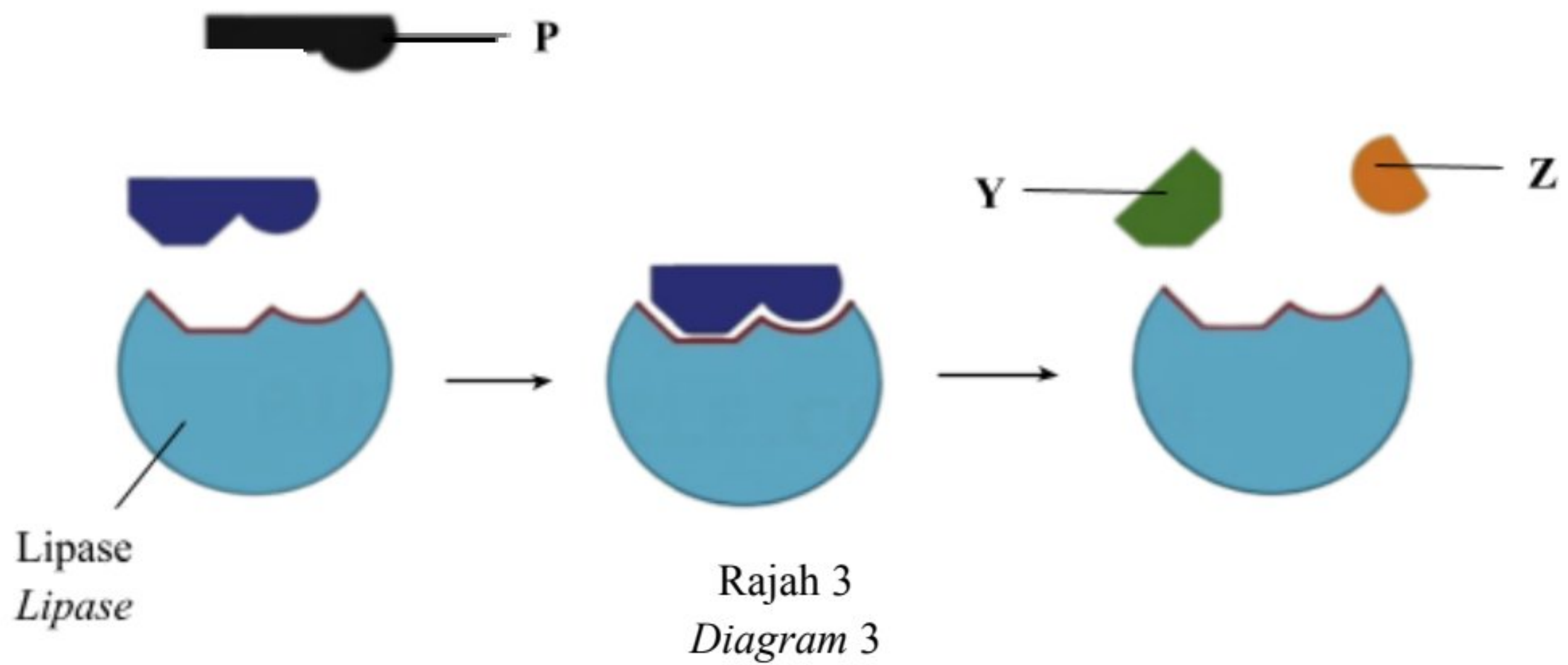
.....

[2 markah]

[2 marks]

3. Rajah 3 menunjukkan mekanisme tindak balas enzim lipase yang membantu dalam proses pencernaan.

Diagram 3 shows the mechanism of lipase enzyme reaction in digestion process.



- (a) Namakan Y dan Z.

Name Y and Z.

Y :

Z :

[2 markah]

[2 marks]

- (b) Berdasarkan Rajah 3, nyatakan **dua** ciri enzim lipase?

*Based on Diagram 3, state **two** characteristics of lipase enzyme?*

.....

[2 markah]

[2 marks]

- (c) **P** merupakan perencat yang mengganggu aktiviti enzim.

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Terangkan bagaimana perencat enzim tersebut dapat memperlahankan atau menghentikan aktiviti enzim.

P is an inhibitor that can affect enzyme activity.

Explain how the enzyme inhibitor can slow down or stop the enzyme activity.

.....

.....

.....

[3 markah]

[3 marks]

4. Rajah 4.1 menunjukkan poster Kementerian Kesihatan Malaysia mengenai penyakit Rabies.
Diagram 4.1 shows the Malaysian Ministry of Health poster on Rabies.



Rajah 4.1
 Diagram 4.1

- (a) (i) Namakan jenis suntikan yang diberikan oleh doktor sekiranya anda terkena penyakit Rabies. Terangkan jawapan anda.

Name the type of injection given by the doctor if you get Rabies. Explain your answer.

.....

.....

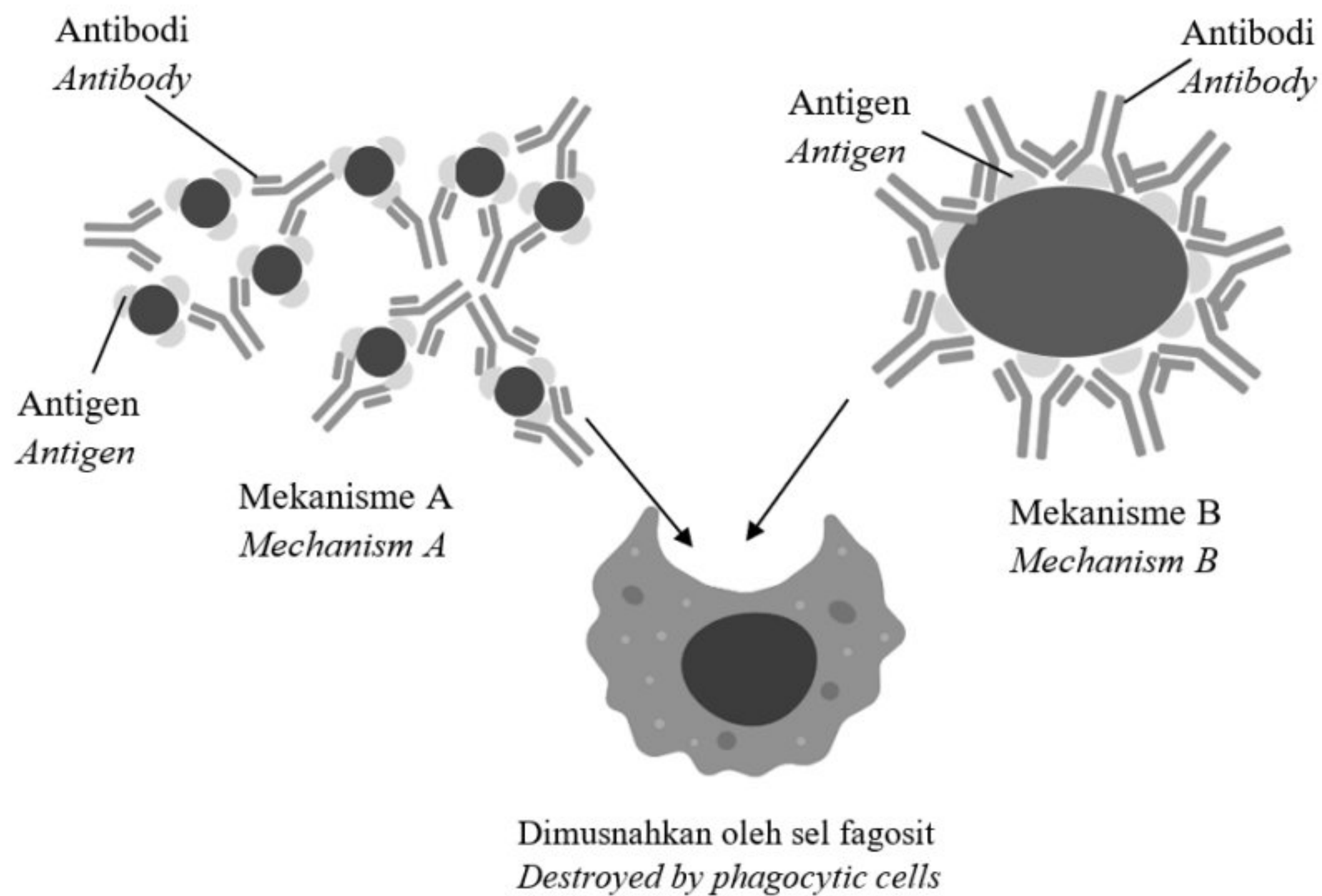
[2 markah]
 [2 marks]

- (ii) Nyatakan keimunan yang diperolehi seperti yang dinamakan di 4(a)(i).
State the type of immunity as mentioned in 4(a)(i).

[1 markah]

[1 mark]

- (b) Rajah 4.2 menunjukkan dua jenis mekanisme antigen yang dimusnahkan oleh antibodi.
Diagram 4.2 shows two types of antigen mechanisms that are destroyed by antibodies.



Rajah 4.2
 Diagram 4.2

Berdasarkan pengetahuan biologi anda, nyatakan perbezaan tindakan antibodi terhadap antigen dalam mekanisme A dan mekanisme B.

Based on your biological knowledge, state the differences in the action of antibodies against antigens in Mechanism A and Mechanism B.

.....

.....

.....

[2 markah]

[2 marks]

- (c) Individu X telah dijangkiti virus kurang daya tahan manusia (HIV) namun enggan mendapatkan rawatan. Huraikan bagaimana HIV dapat memusnahkan sistem keimunan Individu X.

Individual X has been infected with the Human Immunodeficiency Virus (HIV) but refused to seek treatment. Describe how HIV can destroy the immune system of Individual X.

.....

.....

.....

[2 markah]

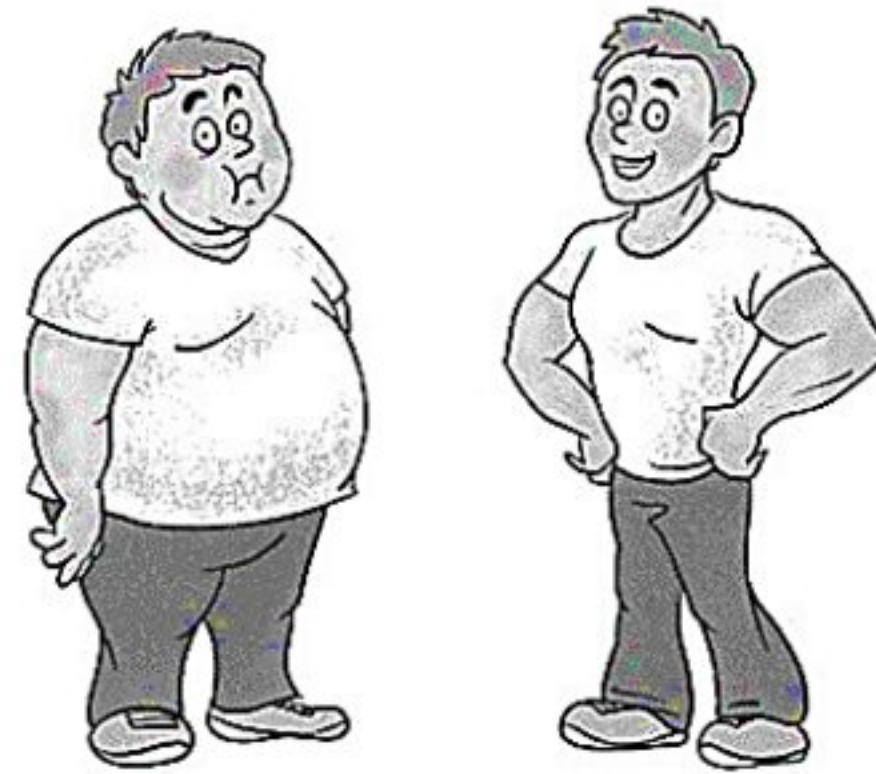
[2 marks]

5. Rajah 5.1 dan Rajah 5.2 menunjukkan variasi dalam organisma.

Diagram 5.1 and Diagram 5.2 show variations of organisms.



Rajah 5.1
Diagram 5.1



Rajah 5.2
Diagram 5.2

- (a) (i) Nyatakan jenis variasi pada Rajah 5.1 dan Rajah 5.2.

State type of variation in Diagram 5.1 and Diagram 5.2.

Rajah 5.1 :

Diagram 5.1

Rajah 5.2 :

Diagram 5.2

[2 markah]

[2 marks]

- (ii) Nyatakan **satu** faktor yang menyebabkan variasi di Rajah 5.2

*State **one** factor that can cause variation in Diagram 5.2*

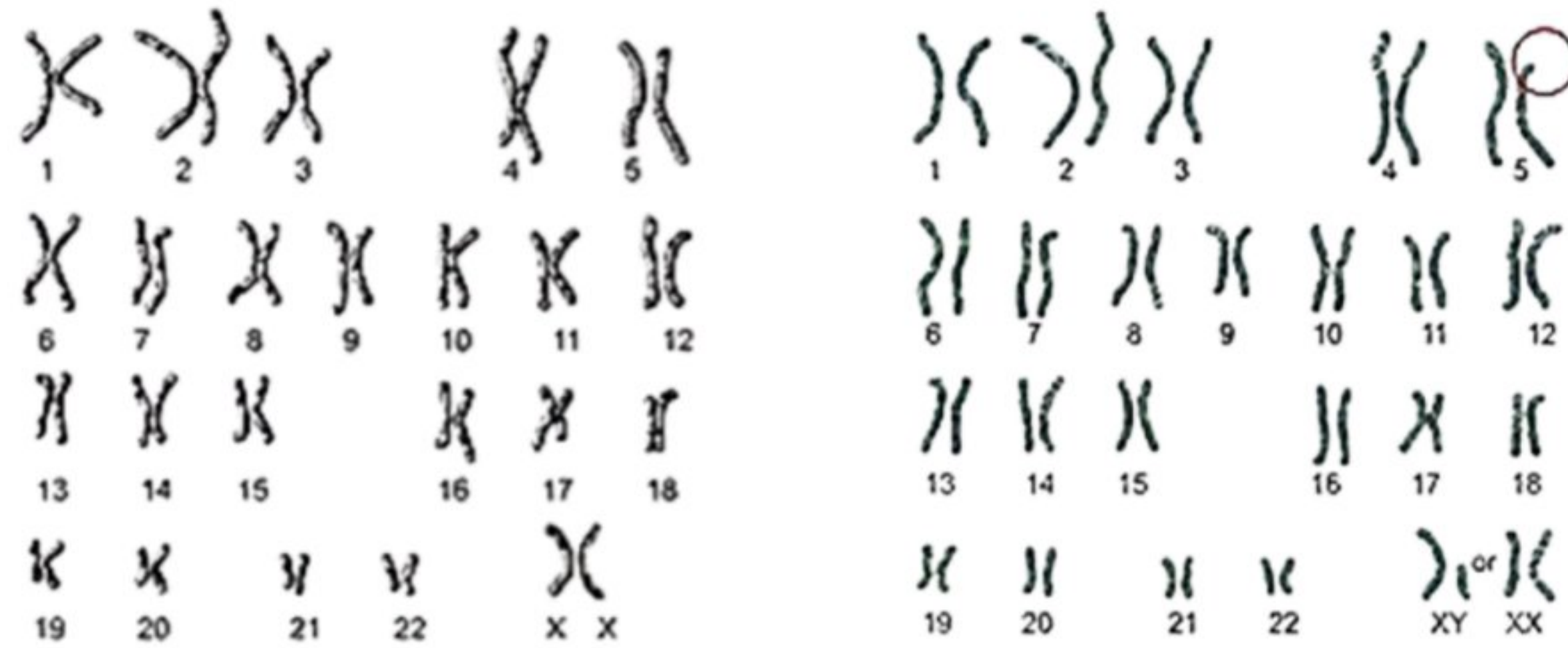
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[1 markah]

[1 mark]

- (b) Rajah 5.3 menunjukkan kariotip individu yang normal dan individu X, yang menghidap satu penyakit.

Diagram 5.3 shows a karyotype of a normal individual and individual X, which suffered a disease.



Individu normal

Individu X

Normal individual

Individual X

Rajah 5.3

Diagram 5.3

Terangkan bagaimana keabnormalan ini mempengaruhi ciri -ciri individu X.

Explain how this abnormality affects characteristics of individual X.

.....

.....

.....

.....

[3 markah]

[3 marks]

(c) Bezakan mutasi sel soma dengan mutasi sel gamet.

Differentiate the mutation of somatic cells with mutation of gamete cells.

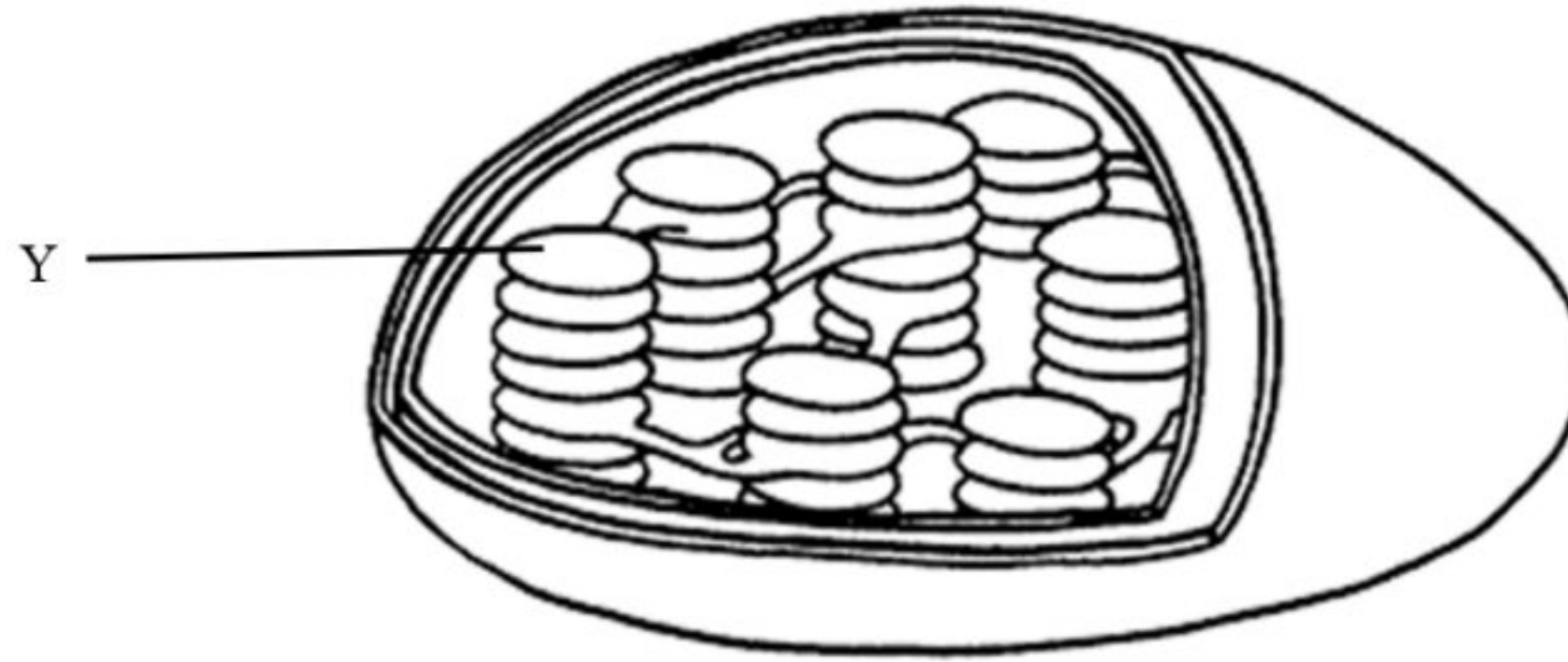
Mutasi sel soma <i>Mutation in somatic cells</i>	Mutasi sel gamet <i>Mutation in gametes</i>

[2 markah]

[2 marks]

6. Rajah 6.1 menunjukkan komponen yang terlibat dengan fotosintesis.

Diagram 6.1 shows the component involved in photosynthesis.



Rajah 6.1
Diagram 6.1

- (a) (i) Berdasarkan Rajah 6.1, namakan satu organ dalam tumbuhan di mana komponen ini boleh didapati dengan banyak.

Berikan satu sebab bagi jawapan anda

Based on Diagram 6.1, name an organ in a plant where the component is found in abundance.

Give a reason for your answer

Nama Organ :

.....

Name of the Organ

Sebab :

.....

Reason

[2 markah]

[2 marks]

- (ii) Berdasarkan Rajah 6.1, tuliskan persamaan perkataan yang menerangkan proses fotosintesis yang berlaku dalam komponen tersebut

Based on Diagram 6.1, write a word equation that explains the process of photosynthesis that occurs in that component

.....

[1 markah]

[1 mark]

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

Explain effects on light-independent reaction that occurs at part Y in the absence of light

.....

.....

.....

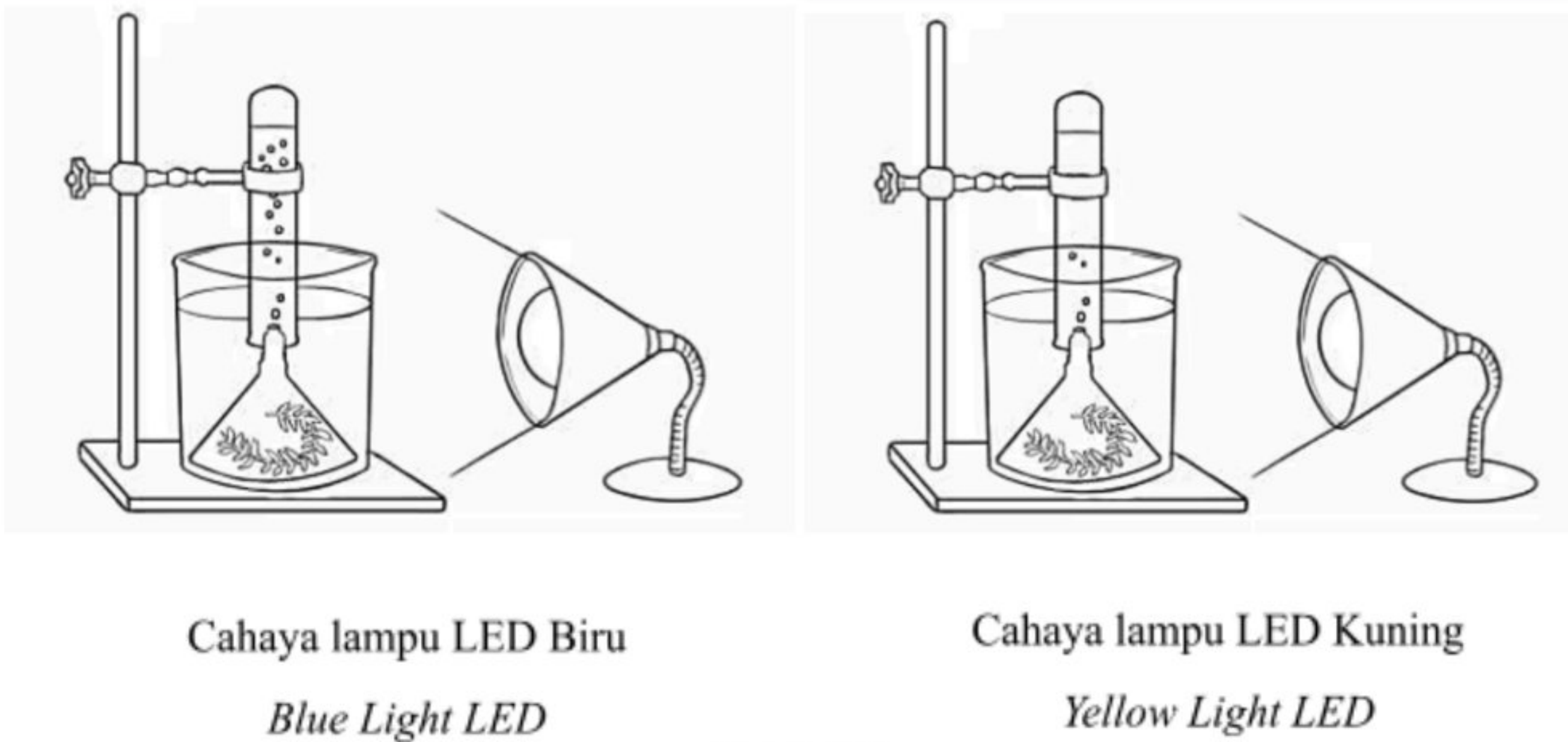
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[3 markah]

[3 marks]

- (c) Rajah 6.2 menunjukkan satu eksperimen untuk mengkaji kadar fotosintesis apabila menggunakan dua jenis cahaya lampu yang berbeza

Diagram 6.2 shows an experiment to determine the rate of photosynthesis by using two different types of light.



Rajah 6.2

Diagram 6.2

Berdasarkan Rajah 6.2, terangkan perbezaan yang dapat diperhatikan apabila menggunakan dua jenis cahaya yang berbeza.

Based on Diagram 6.2, explain the differences that can be observed when using two different types of light.

.....

.....

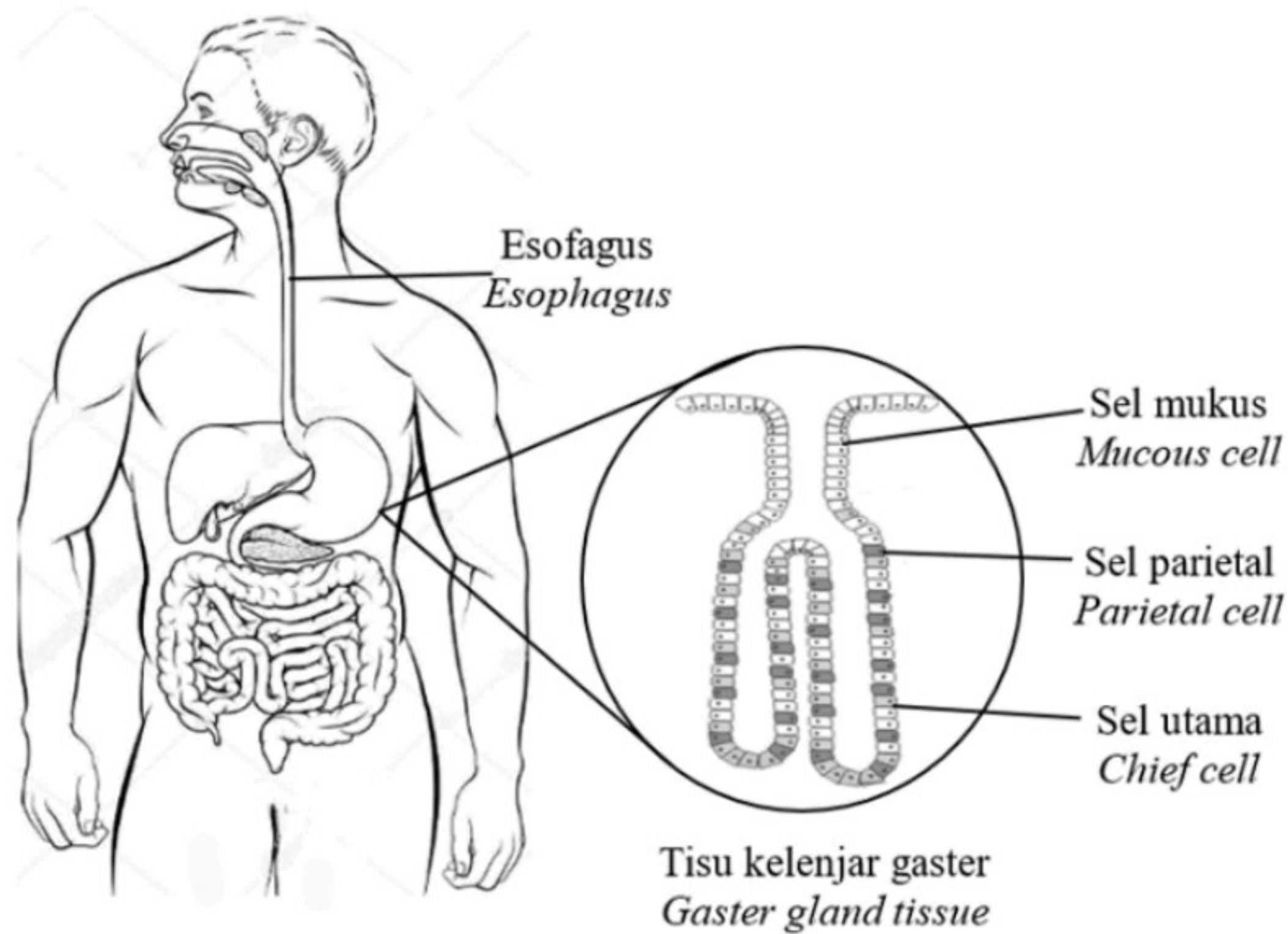
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[2 markah]

[2 marks]

7. Rajah 7.1 menunjukkan sistem pencernaan manusia.

Diagram 7.1 shows a human digestive system.



Rajah 7.1
Diagram 7.1

(a) (i) Nyatakan jenis pencernaan yang berlaku di esofagus.

State the type of digestion that occurs in the esophagus.

.....
[1 markah]

[1 mark]

(ii) Terangkan bagaimana jenis pencernaan yang dinyatakan dalam 7(a)(i) dapat meningkatkan kadar pencernaan makanan.

Explain how the type of digestion stated in 7(a)(i) can increase the rate of food digestion.

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

[2 markah]

[2 marks]

- (b) Seorang individu mengambil makanan yang mengandungi kandungan alkali yang tinggi. Terangkan bagaimana sel parietal berfungsi untuk menyediakan keadaan bagi mengoptimumkan proses pencernaan di perut.

An individual consumes food with high alkaline content. Explain how the parietal cells work to provide conditions to optimize the digestive process in the stomach.

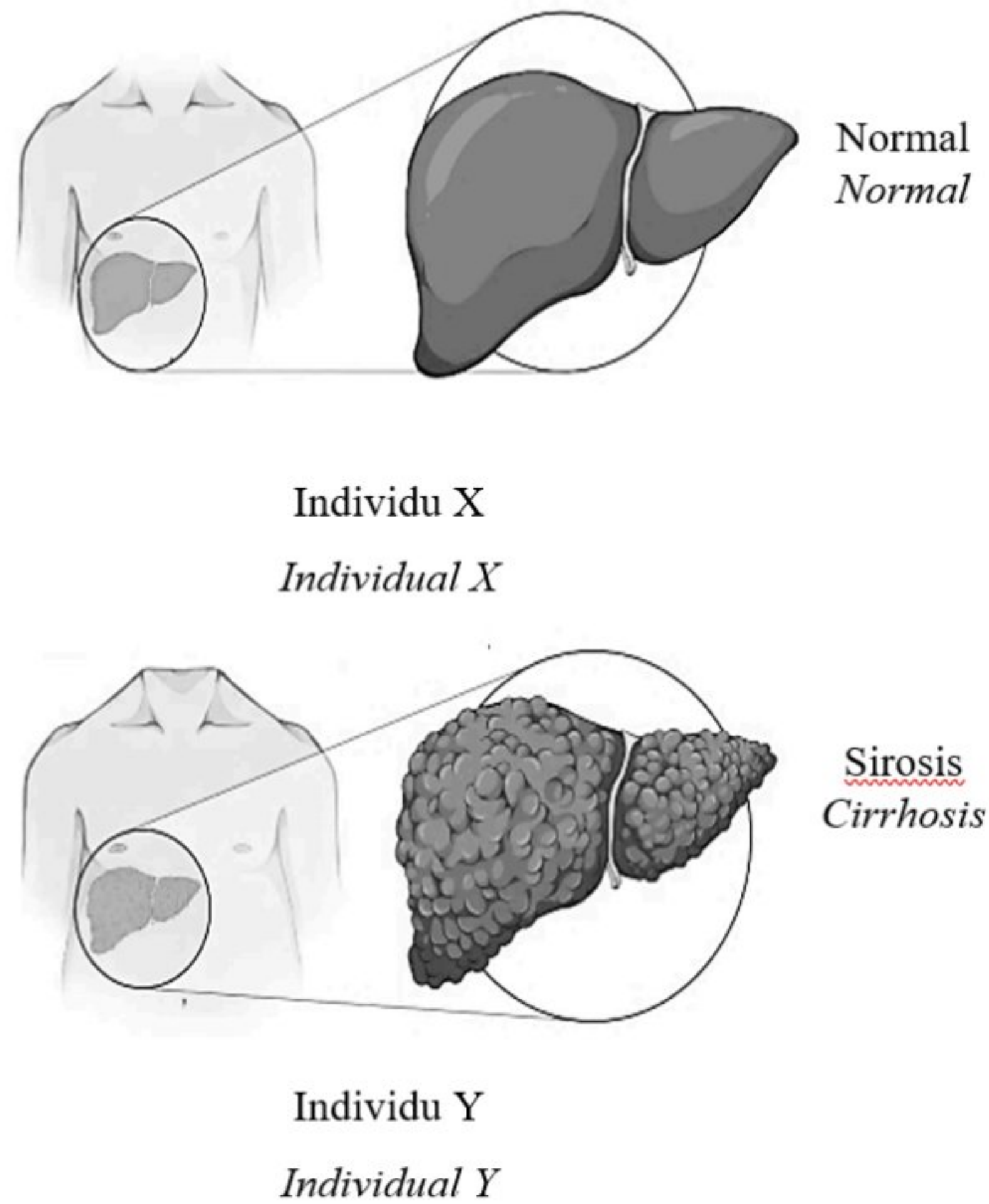
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[3 markah]

[3 marks]

(c) Rajah 7.2 menunjukkan keadaan hati Individu X dan Individu Y.

Diagram 7.2 shows the liver condition of Individual X and Individual Y.



Rajah 7.2
Diagram 7.2

Terangkan bagaimana keadaan hati individu Y memberi kesan terhadap pencernaan makanan.

Explain how the condition of individual Y liver affects the digestion of food.

.....

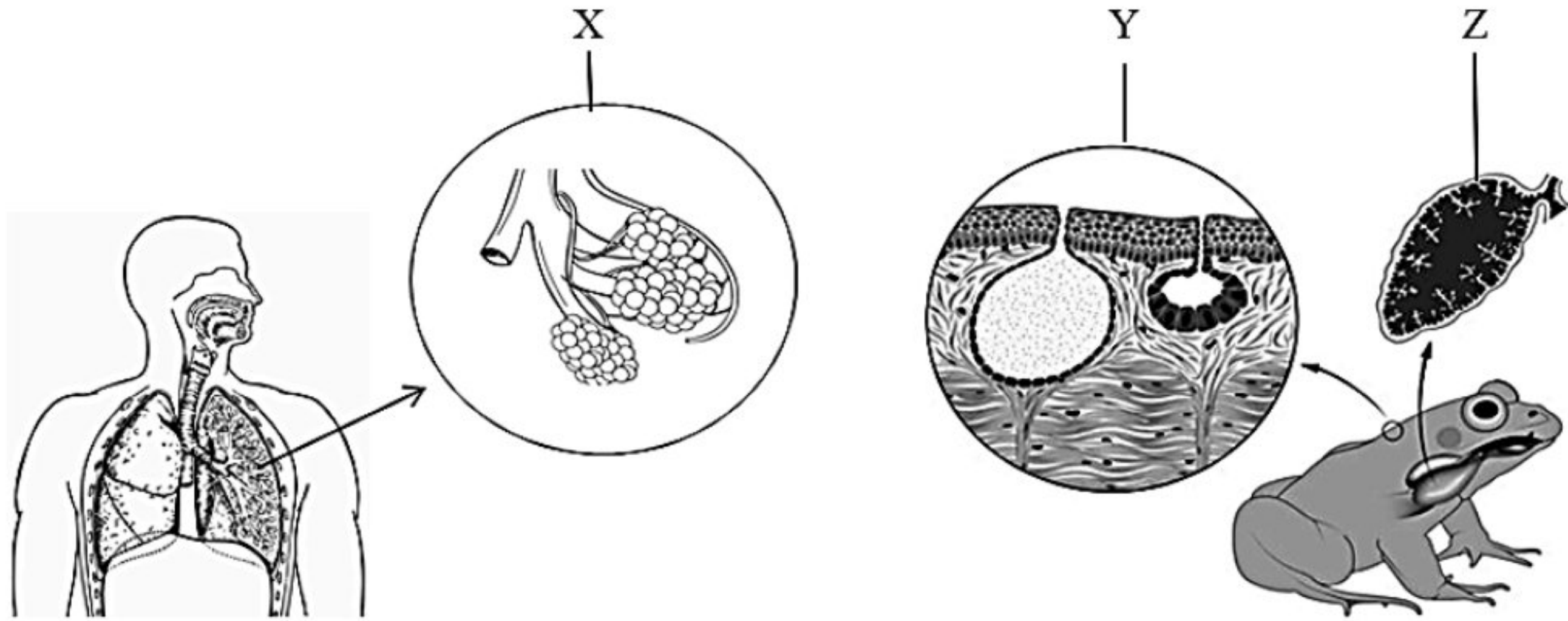
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[3 markah]
[3 marks]

8. X, Y dan Z dalam Rajah 8 menunjukkan struktur respirasi bagi manusia dan katak.
X, Y, and Z in Diagram 8 show the respiratory structure in a human and a frog.



Rajah 8
 Diagram 8

- (a) Berdasarkan Rajah 8, terangkan perbandingan antara struktur respirasi manusia dan katak supaya dapat berfungsi dengan cekap.

Based on diagram 8, explain the comparison between the respiratory structures of humans and frogs to function efficiently.

(i) **Persamaan**

Similarities:

.....

.....

.....

.....

[2 markah]

[2 marks]

(ii) **Perbezaan**

Differences:

[2 markah]
[2 marks]

Struktur respirasi manusia, X <i>Human respiratory structure, X</i>	Struktur respirasi katak, Y <i>Frog respiratory structure, Y</i>

- (b) Pencemaran udara menyebabkan kesukaran bernafas bagi manusia dan haiwan. Terangkan kesan ke atas respirasi seekor katak sekiranya katak tersebut hidup di kawasan sekitar kilang simen yang tercemar.

Air pollution makes breathing difficult for humans and animals.

Explain the effects on the respiration of a frog if the frog lives in a polluted cement factory.

.....

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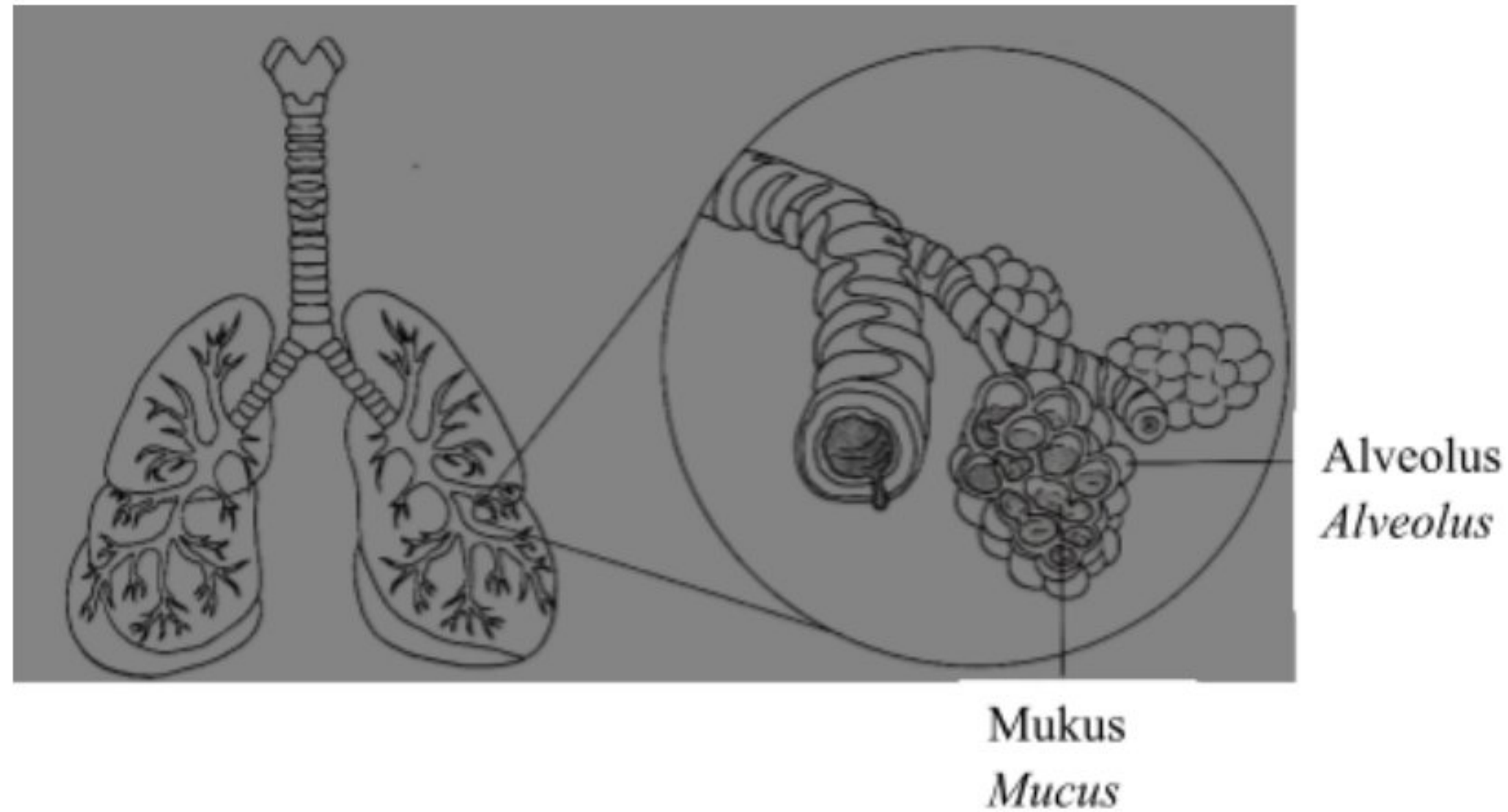
.....

[3 markah]
[3 marks]

- (c) COVID-19 merupakan penyakit berjangkit yang disebabkan oleh virus corona. Rajah 8.2 menunjukkan keadaan alveolus yang dijangkiti dengan virus korona.

COVID-19 is a contagious disease caused by the coronavirus.

Diagram 8.2 shows the condition of the alveolus that is infected with coronavirus.



Rajah 8.2

Diagram 8.2

Terangkan langkah pencegahan bagi jangkitan virus korona kepada sistem pernafasan manusia.

Explain the preventive steps of coronavirus infection to the human respiratory system.

.....

.....

.....

[2 markah]
[2 marks]

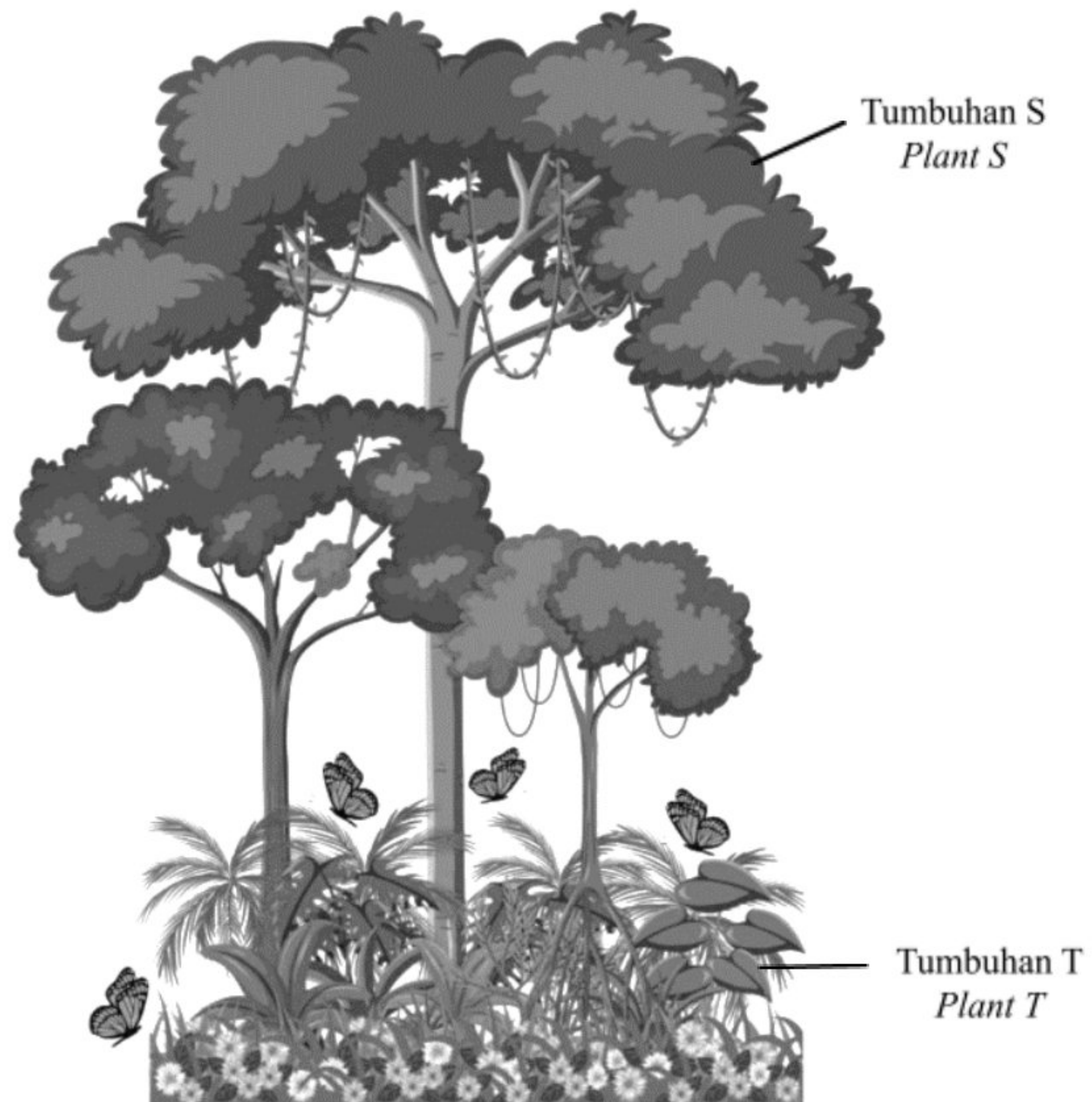
Bahagian B

[20 markah]

*Bahagian ini mengandungi **dua** soalan. Jawab **satu** soalan.*

9. Rajah 9.1 menunjukkan satu ekosistem hutan tropika yang terdapat di Malaysia.

Diagram 9.1 shows a tropical forest ecosystem found in Malaysia.



Rajah 9.1
Diagram 9.1

- (a) (i) Terangkan nic ekologi rama-rama dalam ekosistem di atas.
Explain the ecological niche of butterflies in the ecosystem above.

[2 markah]
[2 marks]

- (ii) Terangkan hubungan antara keamatan cahaya dengan pertumbuhan Tumbuhan S dan Tumbuhan T?

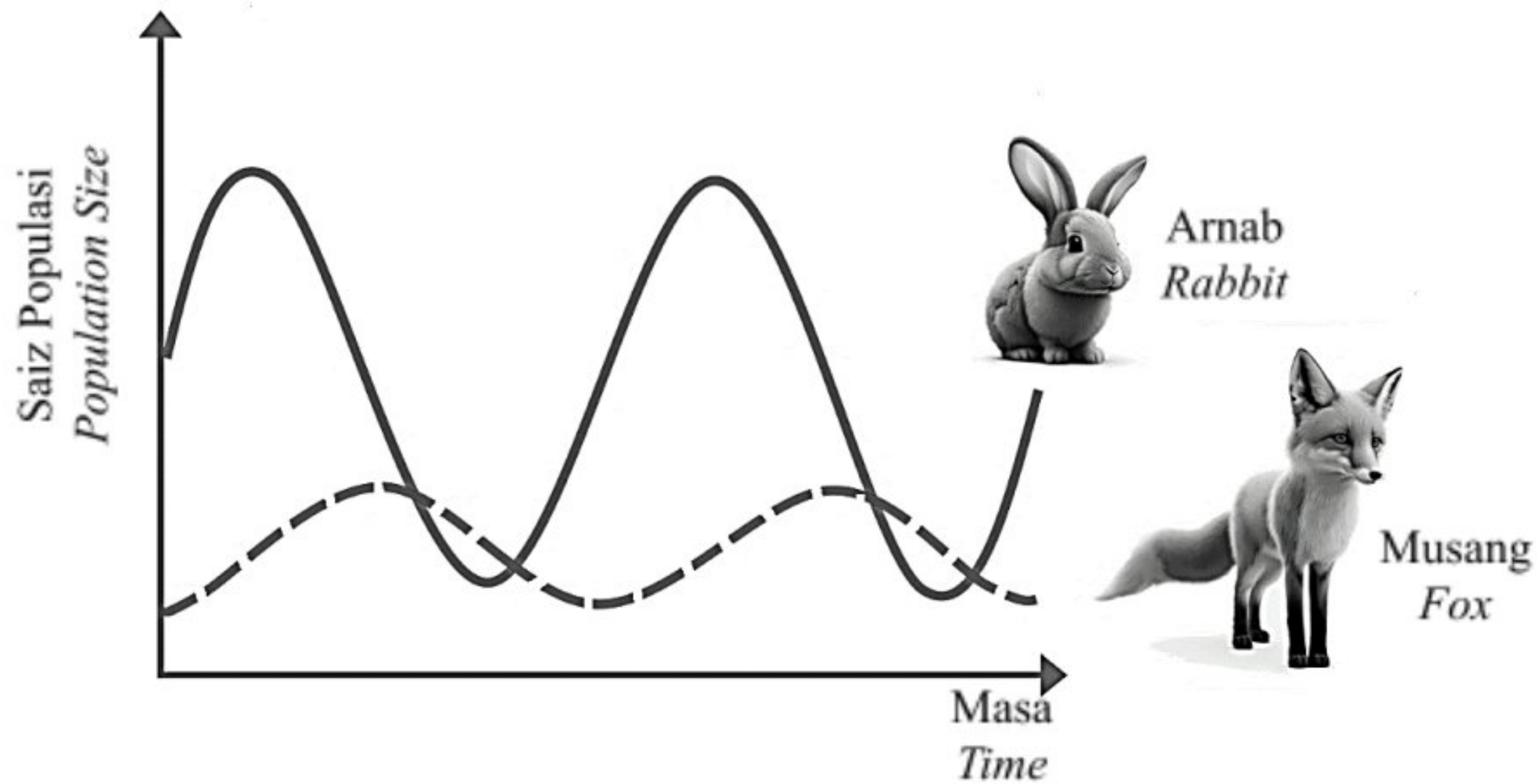
Explain the relationship between light intensity and the growth of Plant S and Plant T?

[6 markah]

[6 marks]

- (b) Graf 9.2 menunjukkan hubungan mangsa dan pemangsa di antara dua organisma.

Graph 9.2 shows the prey and predator relationship between two organisms.



Graf 9.2

Graph 9.2

Berdasarkan Graf 9.2, terangkan bagaimana interaksi antara arnab dan musang menggambarkan konsep keseimbangan dinamik dalam ekosistem.

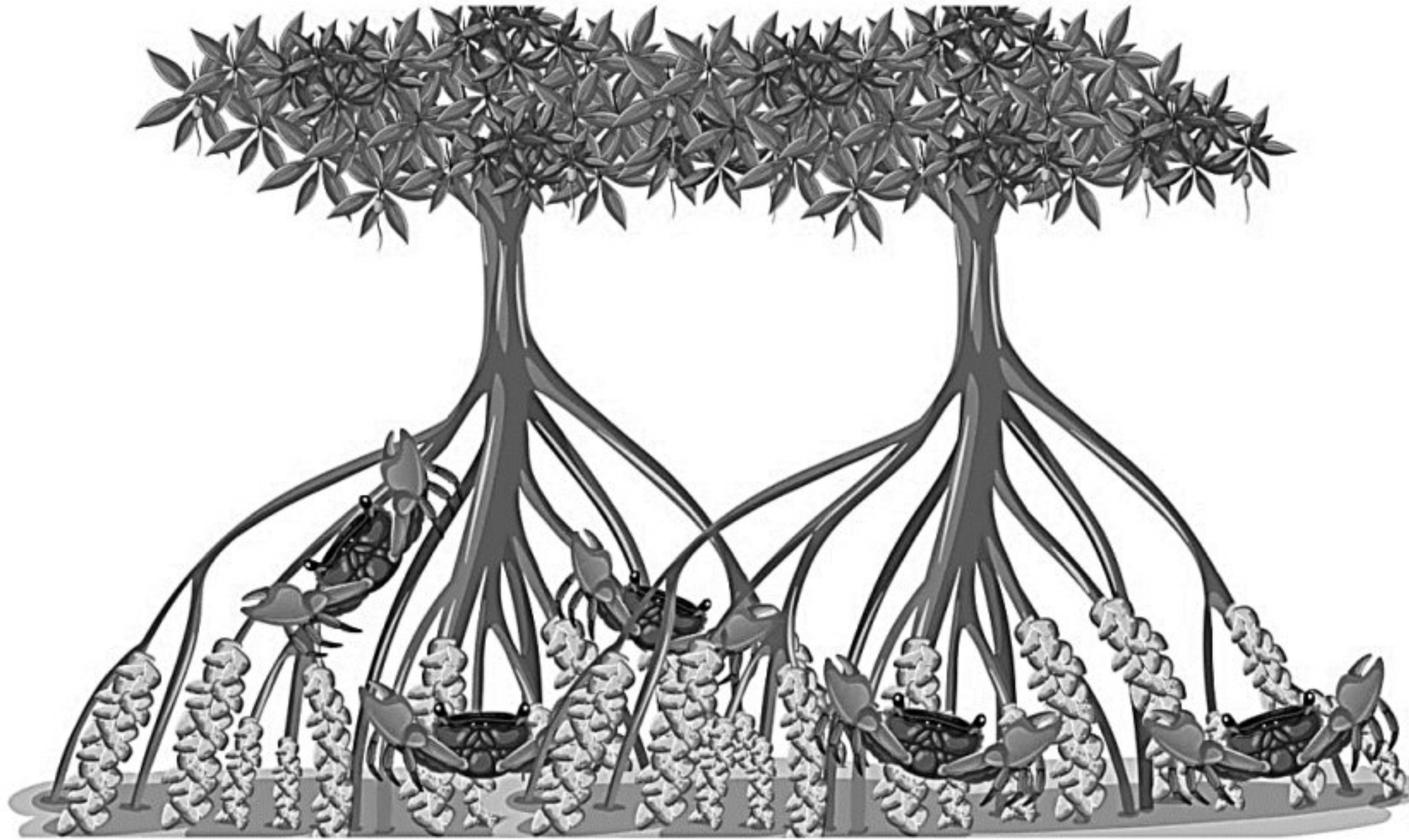
Based on Graph 9.2, explain how the interaction between the rabbit and the fox illustrates the concept of dynamic balance in an ecosystem.

[4 markah]

[4 marks]

- (c) Sekumpulan pelajar telah menjalankan kajian tindakan berkaitan populasi ketam di ekosistem paya bakau Sungai P. Jadual 9.3 menunjukkan data yang diperolehi dari kajian tersebut.

A group of students has conducted an action study related to the crab population in the River P mangrove swamp ecosystem. Table 9.3 shows the data obtained from the study.



Tarikh <i>Date</i>	Bilangan ketam yang di tangkap <i>Number of crabs captured</i>	Bilangan ketam bertanda yang di tangkap <i>Number of marked crabs captured</i>
01.06.2024	50	-
07.06.2024	60	12

Jadual 9.3
Table 9.3

- i. Berdasarkan data dalam Jadual 9.3, kira populasi ketam di Sungai P.
Based on the data in Table 9.3, calculate the crab population in Sungai P.

[3 markah]
[3 marks]

- ii. Satu tambak benteng telah dibina di hutan paya bakau Sungai P untuk pembangunan di kawasan tersebut. Terangkan bagaimana aktiviti tersebut menjejaskan ekonomi tradisional penduduk setempat.

An embankment has been built in the mangrove forest of River P for development in the area. Explain how these activities affect the traditional local economy.

[5 markah]

[5 marks]

[illegible]

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This image shows a full page of white paper with horizontal dotted lines. The lines are evenly spaced and run across the width of the page, providing a guide for handwriting or typing. There are no margins, text, or other markings on the page.

10. Rajah 10.1(a) menunjukkan pemerhatian ke atas pokok hiasan di dalam pasu.
Rajah 10.1(b) menunjukkan keadaan pokok hiasan tersebut setelah tidak di siram selama empat hari.

Diagram 10.1(a) shows the observation on a potted ornamental plant. Diagram 10.1(b) shows the condition on an ornamental plant after not being watered for four days.



Rajah10.1(a)
Diagram 10.1(a)



Rajah 10.1(b)
Diagram 10.1(b)

- (a) Berdasarkan rajah, terangkan apa yang telah berlaku kepada pokok hiasan itu pada hari keempat.

Based on the diagram, explain what had happened to the ornamental plant on the fourth day.

[4 markah]

[4 marks]

- (b) Terangkan bagaimana keadaan tumbuhan itu boleh bertukar semula dari keadaan seperti Rajah 10.1(b) kepada keadaan Rajah 10.1(a)

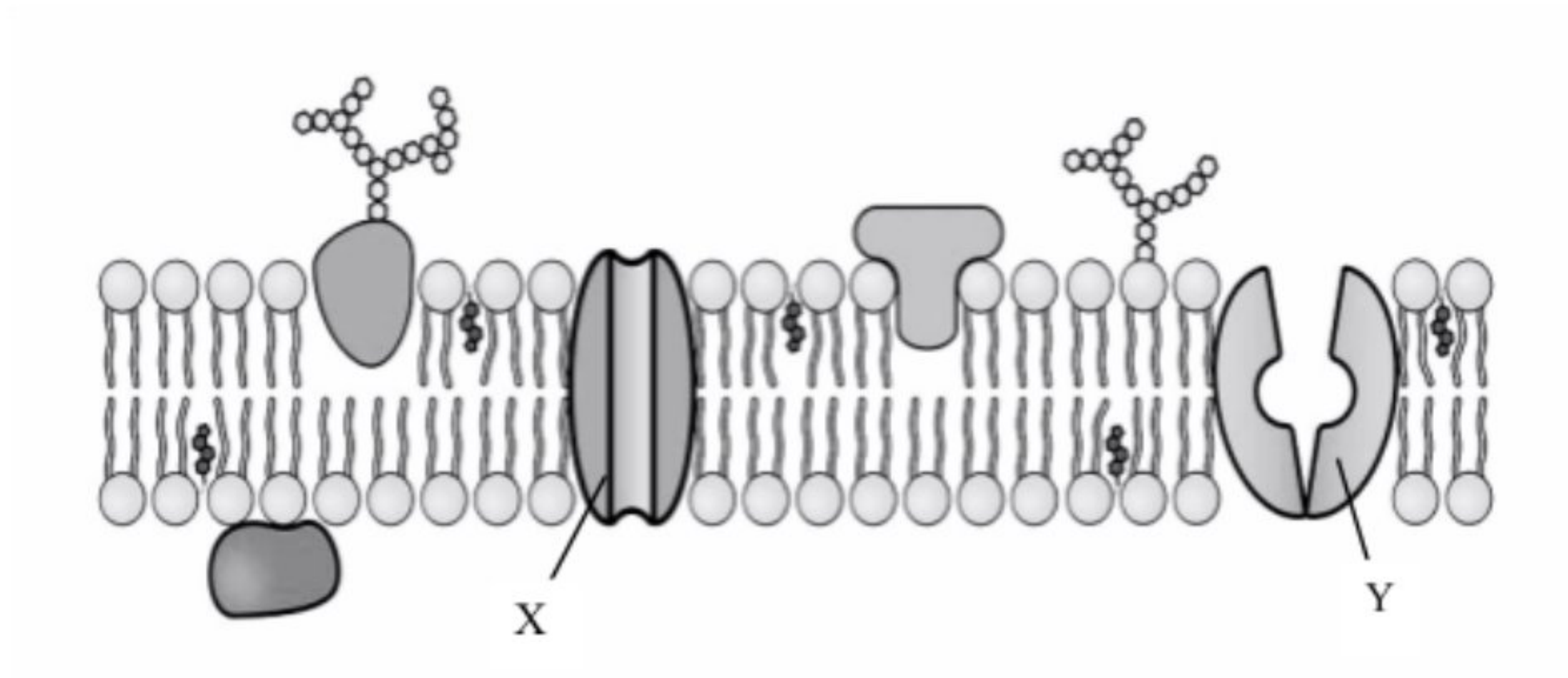
Explain how the condition of the plant can change from Diagram 10(a) back to Diagram 10(b) again.

[6 markah]

[6 marks]

- (c) Rajah 10.2 menunjukkan struktur membran plasma.

Diagram 10.2 shows a structure of plasma membrane.



Rajah10.2
Diagram 10.2

- (i) Berdasarkan Rajah 10.2, banding dan bezakan proses pergerakan bahan yang berlaku di struktur X dan Y.

Based on Diagram 10.2, compare and contrast the movement of substances that occur at structure X and Y.

[4 markah]

[4 marks]

- (ii) Bandingkan pengangkutan aktif dan pengangkutan pasif.

Compare active transport and passive transport.

[6 markah]

[6 marks]

[illegible]

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[illegible]

[illegible]

Bahagian C

[20 markah]

Soalan ini mesti dijawab

11. (a) Rajah 11.1 menunjukkan nisbah fenotip bagi generasi F_2 hasil perwaisan kacukan dihibrid yang dilakukan oleh Gregor Mendel.

Diagram 11.1 shows the phenotypic ratio produced in F_2 generation, as a result of the dihybrid cross performed by Gregor Mendel.



Rajah 11.1

Diagram 11.1

Dari hasil kacukan ini Mendel telah mengemukakan Hukum Mendel II.

Terangkan bagaimana Mendel membuat kesimpulan untuk menerangkan Hukum Mendel II bagi pembentukan nisbah fenotip generasi F_2 .

From the results of this hybrid, Mendel proposed Mendel's Law II.

Explain how Mendel concluded to explain Mendel's Second Law regarding the formation of the phenotypic ratio in the F_2 generation.

[3 markah]

[3 marks]

- (b) Rajah 11.2(a) menunjukkan satu program yang dijalankan oleh Kementerian Kesihatan Malaysia dengan kerjasama Kementerian Pendidikan Malaysia. Rajah 11.2(b) menunjukkan genotip tiga orang perempuan.

Diagram 11.2(a) shows a program conducted by the Malaysian Ministry of Health in collaboration with the Malaysian Ministry of Education. Diagram 11.2(b) shows the genotypes of three females.



Rajah 11.2 (a)

Diagram 11.2 (a)

Petunjuk :

R : alel dominan Normal

dominant allele Normal

r : alel resesif talasemia

recessive allele thalassemia



Cik B

RR



Cik C

Rr



Cik D

rr

Rajah 11.2 (b)

Diagram 11.2 (b)

- (i) Wajarkan kebaikan program yang ditunjukkan dalam Rajah 11.2(a)

Justify the benefits of the program shown in the Diagram 11.2 (a)

[6 markah]

[6 marks]

- (ii) Encik A telah menerima keputusan saringan talasemia yang menunjukkan beliau sebagai penghidap talasemia. Beliau ingin mendirikan rumahtangga. Berdasarkan Rajah 11.2 dan pengetahuan anda dalam pewarisan, cadangkan kepada Encik A calon isteri yang sesuai bagi memastikan anak-anak yang dilahirkan tidak menghidap talasemia. Terangkan cadangan anda.

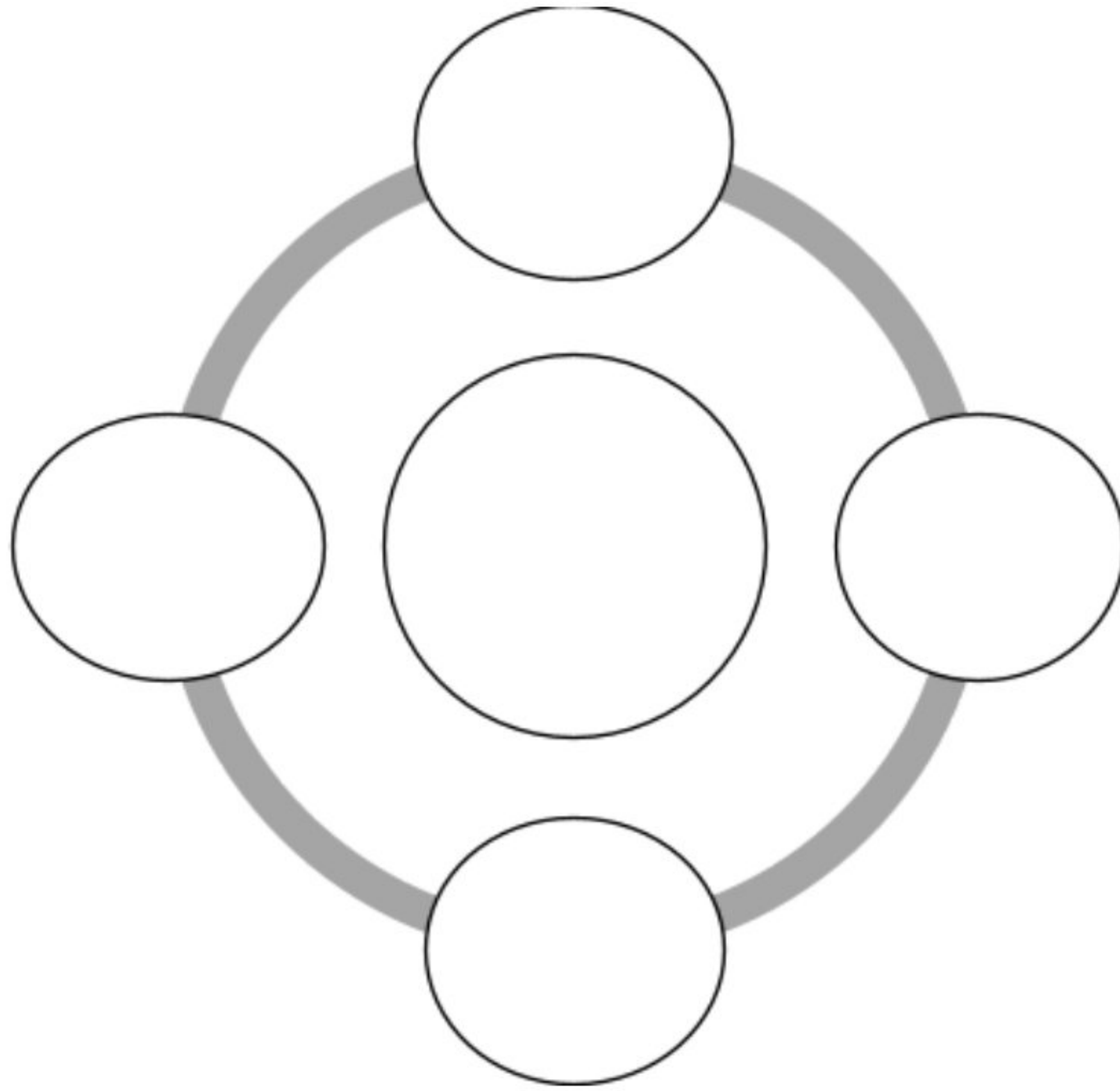
Mr. A has received a thalassemia screening result that shows he has thalassemia. He wants to start a family. Based on Diagram 11.2 and your knowledge of inheritance, suggest to Mr. A a suitable potential wife to ensure that the children born do not suffer from thalassemia. Explain your proposal.

[7 markah]

[7 marks]

(c) Rajah 11.3 menunjukkan beberapa pewarisan manusia.

Diagram 11.3 shows some human inheritance



Rajah 11.3
Diagram 11.3

Cadangkan kaedah yang boleh digunakan untuk menyiasat Pewarisan ciri manusia .

Suggest method that can be used to investigate the inheritance of human characteristics.

[4 markah]

[4 marks]

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[illegible]

[illegible]

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