

BAHAGIAN A

[60 markah]

Jawab semua soalan.

1. (a) Seorang murid menjalankan eksperimen bagi menentukan kesan nisbah makronutrien terhadap pertumbuhan anak benih jagung dengan menggunakan larutan Knop. Jadual 1 menunjukkan pemerhatian yang direkodkan oleh murid tersebut selepas empat minggu. *A student carried out an experiment to determine the effects of macronutrient ratios on the growth of corn seedling using the Knop's solution. Table 1 shows the observation recorded by the student after four weeks.*

Botol kultur <i>Culture bottle</i>	Kekurangan nutrien <i>Nutrient deficiency</i>	Pemerhatian <i>Observations</i>
A	Tiada <i>None</i>	Anak benih tumbuh dengan sihat <i>Seedling grows healthily</i>
B	Semua <i>All</i>	Anak benih tidak tumbuh dan mati <i>Seedling cannot grow and die</i>
C	X	• Daun menjadi kuning <i>Leaves turn yellow</i> • Pertumbuhan terbantut <i>Stunted growth</i>
D	Fosforus <i>Phosphorus</i>	
E	Y	• Sisi daun menjadi kuning <i>Edge of leaves turn yellow</i> • Pertumbuhan terbantut dan mati <i>Stunted growth and die</i>

Jadual 1

Table 1

- (i) Kenal pasti nutrien X dan Y.

Identify nutrient X and Y.

X:

Y:

[2 markah]

[2 marks]

- (ii) Lengkapkan pemerhatian bagi pertumbuhan anak benih dalam botol kultur D dalam Jadual 1.

Complete the observation for the growth of the seedling in culture bottle D in Table 1.

[1 markah]

[1 mark]

- (b) Rajah 1 menunjukkan sejenis tumbuhan yang ditanam oleh seorang tukang kebun di taman mini sekolah.

Diagram 1 shows a type of plant planted by a gardener at school's mini garden.



Rajah 1

Diagram 1

- (i) Nyatakan jenis tumbuhan tersebut berdasarkan penyesuaian nutrisinya. Terangkan.

State the type of plant based on its nutritional adaptation. Explain.

.....

[2 markah]

[2 marks]

- (ii) Sebuah ladang penternakan ayam baru dibina berdekatan dengan kawasan sekolah tersebut yang mengakibatkan populasi lalat bertambah. Nyatakan **satu** kesan kehadiran lalat terhadap pertumbuhan tumbuhan tersebut.

*A new chicken farm has been built near the school area which result increasing fly population. State **one** effect of the presence of flies on the growth of the plant.*

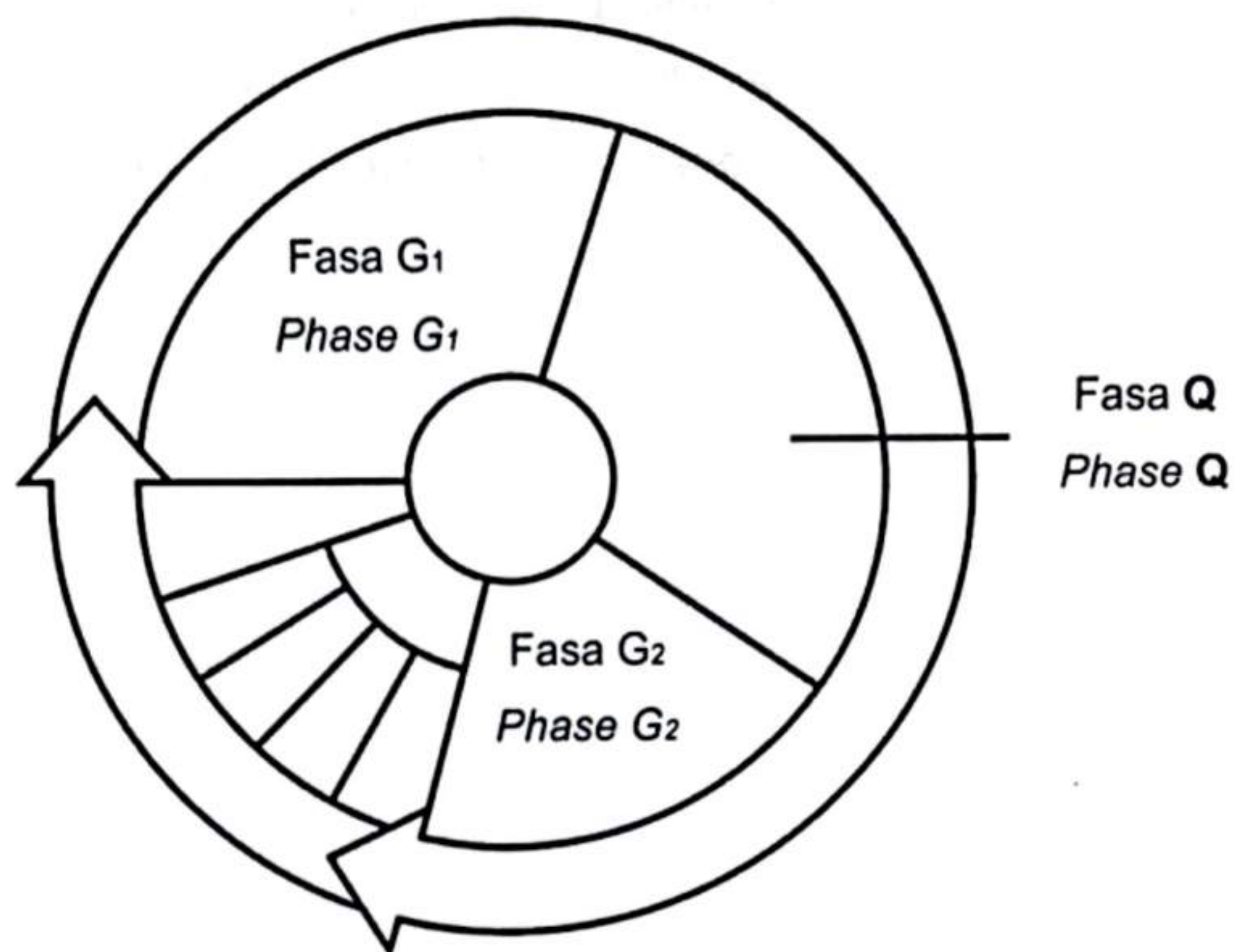
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[1 markah]

[1 mark]

2. Rajah 2 menunjukkan kitar sel suatu organisma.

Diagram 2 shows a cell cycle of an organism.



Rajah 2
Diagram 2

- (a) (i) Labelkan fasa sitokinesis pada Rajah 2.
Label the cytokinesis phase in Diagram 2.

[1 markah]
[1 mark]

- (ii) Berdasarkan Rajah 2, namakan Fasa Q.
Based on Diagram 2, name the Phase Q.

.....

[1 markah]
[1 mark]

- (iii) Huraikan apakah yang berlaku pada Fasa Q.
Describe what happens during Phase Q.

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.....
.....

[2 markah]
[2 marks]

- (b) Seorang peladang mahu menghasilkan pokok pisang yang banyak dalam masa singkat untuk tujuan komersial dengan menggunakan tisu akar sebagai eksplan. Nyatakan teknik dan terangkan mengapa tisu akar digunakan.

A farmer wants to produce many banana trees in a short time for commercial purposes by using root tissue as explants. State the technique and explain why root tissue is used.

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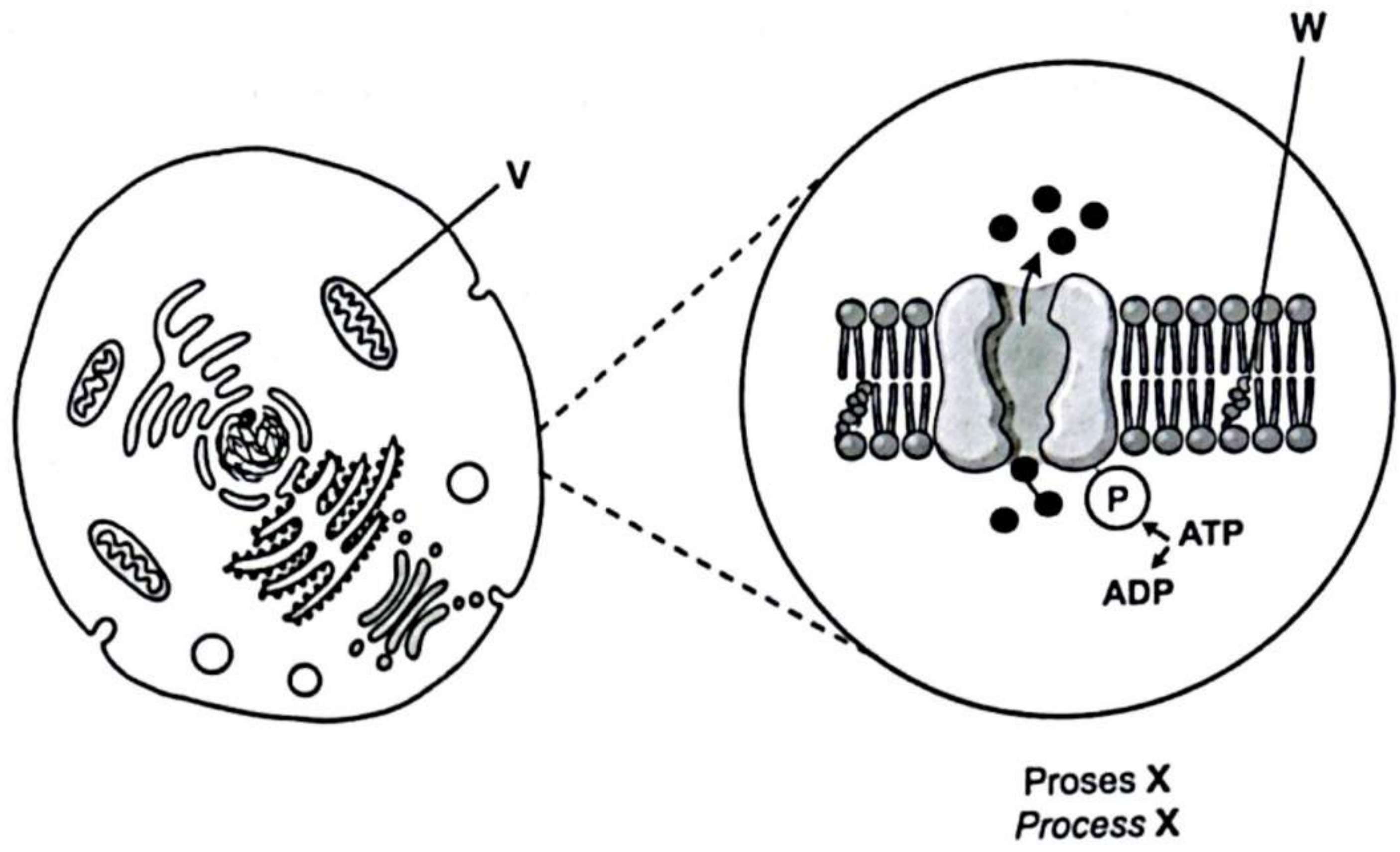
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[2 markah]

[2 marks]



3. Rajah 3 menunjukkan satu sel haiwan.
Diagram 3 shows an animal cell.



Rajah 3
Diagram 3

(a) Berdasarkan Rajah 3, nyatakan nama bagi:

Based on Diagram 3, state the name of:

- (i) komponen sel V :
component cells V
- (ii) proses X :
process X

[2 markah]
[2 marks]

(b) Terangkan bagaimana proses X terlibat dalam pengangkutan asid amino di tubul renal.
Explain how process X is involved in the transport of amino acids in the renal tubules.

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.....
.....

[2 markah]
[2 marks]

- (c) Nyatakan kesan ke atas membran plasma dari segi ketelapan ion sekiranya **W** tiada.
*State the effect on the plasma membrane in terms of ion permeability if **W** is absent.*

.....

[1 markah]

[1 mark]

- (d) Seorang kanak-kanak mengalami cirit-birit dan muntah-muntah akibat daripada keracunan makanan. Doktor menasihatkan ibu bapa kanak-kanak tersebut supaya memberikan larutan garam penghidratan oral (ORS) secara kerap dan bukannya air kosong sahaja. Terangkan mengapa rawatan ORS tersebut penting untuk pemulihan kanak-kanak itu.
A child suffers from diarrhoea and vomiting due to food poisoning. The doctor advises the child's parents to give oral rehydration salt (ORS) solution regularly instead of just plain water.

Explain why the ORS treatment is important for the child's recovery.

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.....

.....

[2 markah]

[2 marks]

4. Jadual 2 menunjukkan fungsi-fungsi untuk dua jenis hormon yang dirembeskan oleh kelenjar endokrin yang sama.

Table 2 shows the functions for two types of hormones secreted by the same endocrine gland.

Hormon <i>Hormone</i>	Fungsi <i>Function</i>
G	Merangsang pengecutan otot uterus semasa kelahiran anak <i>Stimulates the contraction of uterine muscles during birth</i>
H	Merangsang penyerapan air oleh ginjal <i>Stimulates water absorption by the kidneys</i>

Jadual 2

Table 2

- (a) (i) Kenal pasti hormon **G** dan hormon **H**.

*Identify hormone **G** and hormone **H**.*

Hormon **G** :.....

*Hormone **G***

Hormon **H** :.....

*Hormone **H***

[2 markah]

[2 marks]

- (ii) Nyatakan nama kelenjar endokrin yang merembeskan hormon-hormon tersebut.

State the name of endocrine gland that secretes the hormones.

.....

[1 markah]

[1 mark]

- (b) Rajah 4 menunjukkan dua jenis tindakan yang dilakukan oleh dua orang murid.
Diagram 4 shows two types of action carried out by two pupils.



Murid R
Pupil R



Murid S
Pupil S

Rajah 4
Diagram 4

Bezakan tindakan yang dilakukan oleh murid R dan murid S.
Differentiate the actions taken by pupil R and pupil S.

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.....

.....

[2 markah]
[2 marks]

- (c) Seorang wanita sering berasa gementar, cepat berpeluh, tidak tahan panas, kerap buang air besar dan mengalami penurunan berat badan yang mendadak walaupun mempunyai selera makan yang tinggi. Selain itu kadar denyutan jantung juga cepat dan pernafasannya sering tercungap-cungap walaupun tidak melakukan aktiviti cergas. Doktor mengesahkan wanita tersebut mengalami masalah kesihatan yang berkaitan dengan ketidakseimbangan hormon yang dirembeskan oleh salah satu kelenjar endokrinnya. Terangkan bagaimana keadaan ini berlaku.

A woman often feels nervous, sweats easily, heat intolerance, has frequent bowel movements, and experiences sudden weight loss despite having a high appetite. In addition, her heart rate is also fast, and she is often short of breath even without performing vigorous activities. The doctor confirmed that the woman is experiencing health problem related to a hormonal imbalance secreted by one of her endocrine glands.

Explain how this situation happened.

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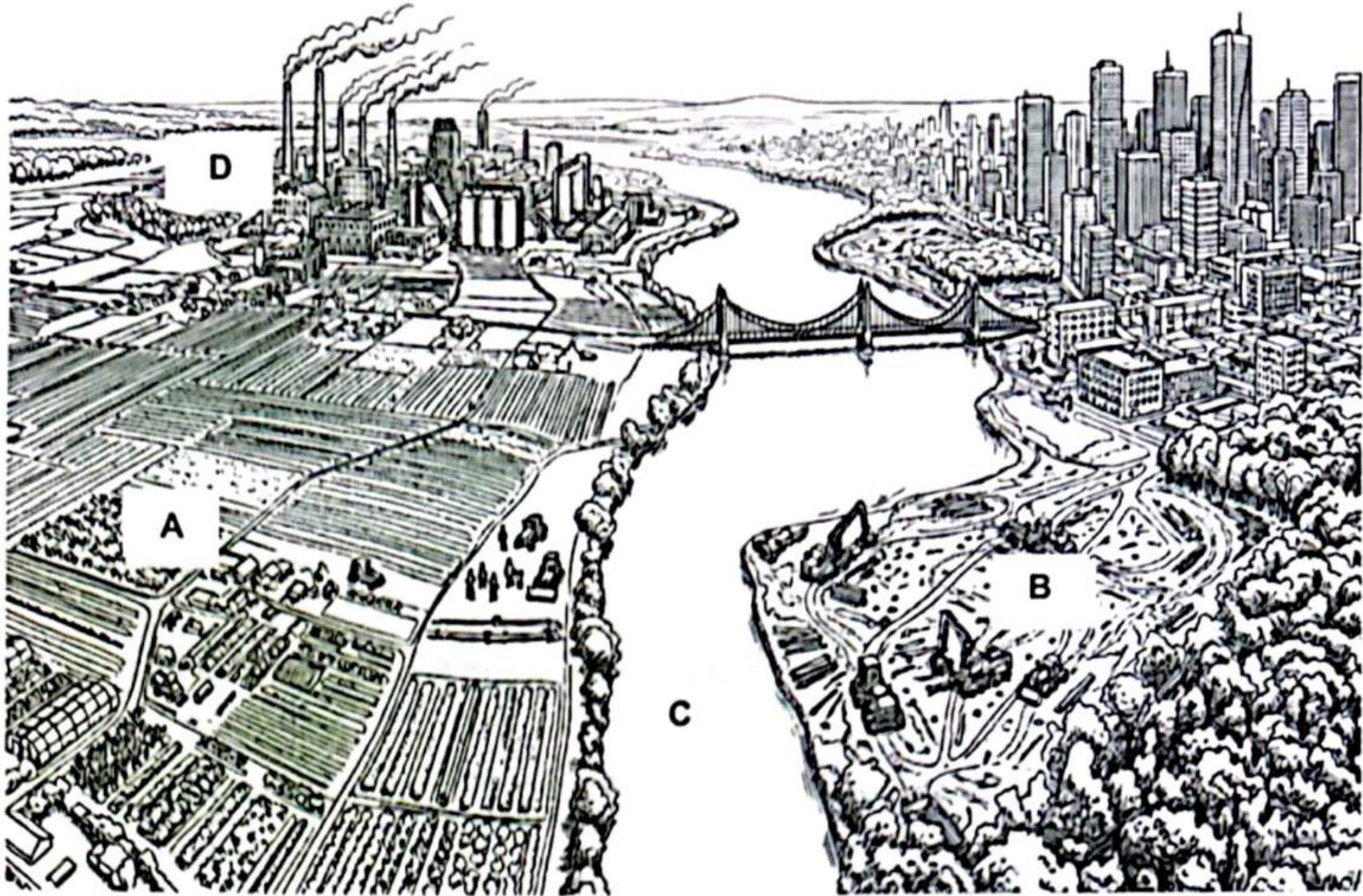
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[2 markah]
[2 marks]

5. Rajah 5 menunjukkan pelbagai aktiviti manusia di beberapa kawasan.

Diagram 5 shows various human activities in several areas.



Rajah 5

Diagram 5

- (a) Berdasarkan Rajah 5, nyatakan jenis aktiviti manusia yang dijalankan di kawasan B.

Based on Diagram 5, state the type of human activities carried out in area B.

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[1 markah]

[1 mark]

- (b) Terangkan kesan aktiviti yang dijalankan di kawasan A terhadap tahap keperluan oksigen biokimia (BOD) di sungai C.

Explain the impact of activities carried out in area A on the level of biochemical oxygen demand (BOD) in river C.

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.....

.....

[2 markah]

[2 marks]

- (c) Nyatakan perbezaan antara aktiviti di kawasan **A** dan kawasan **D** berdasarkan kriteria berikut:

*State the differences between activities in area **A** and area **D** based on the following criteria:*

Kawasan A <i>Area A</i>	Kriteria <i>Criteria</i>	Kawasan D <i>Area D</i>
	Jenis pencemaran <i>Type of pollution</i>	
	Bahan pencemar <i>Pollutant</i>	

[2 markah]

[2 marks]

- (d) Huraikan bagaimana pembebasan asap dari kilang **D** boleh mengurangkan hasil tuaian di kawasan **A**.

*Describe how the release of smoke from factory **D** can reduce crop yields at area **A**.*

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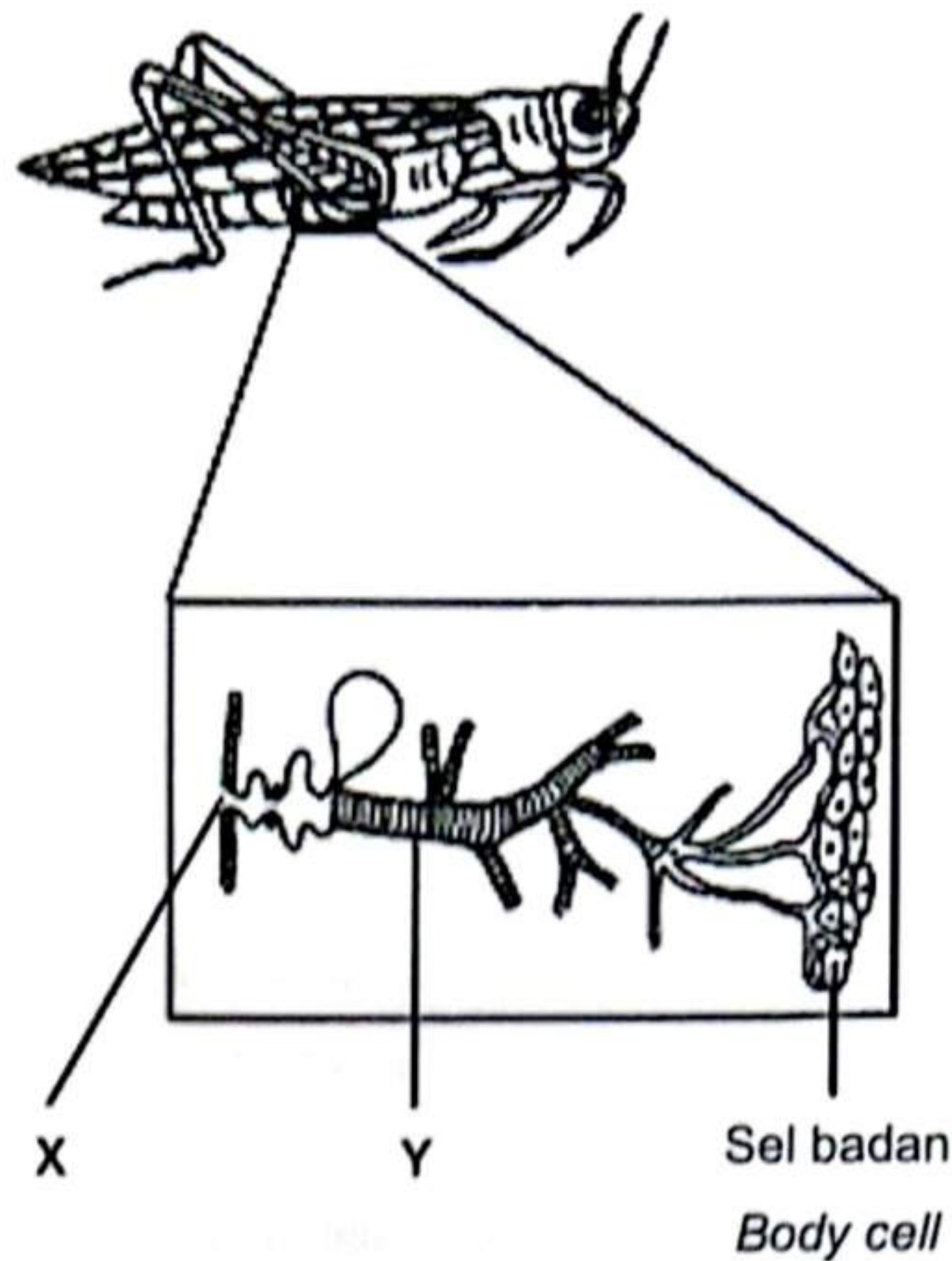
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[3 markah]

[3 marks]

6. Rajah 6.1 menunjukkan struktur respirasi seekor belalang.
Diagram 6.1 shows the respiratory structure of a grasshopper.



Rajah 6.1
Diagram 6.1

- (a) (i) Nyatakan nama bagi struktur X dan Y.

State the name of structure X and Y.

X :

Y :

[2 markah]

[2 marks]

- (ii) Nyatakan penyesuaian pada struktur respirasi belalang yang dapat meningkatkan jumlah luas permukaan untuk pertukaran gas.

State the adaptation in the respiratory structure of the grasshopper that would increase the total surface area for gaseous exchange.

.....
.....

[1 markah]

[1 mark]

- (b) Rajah 6.2 menunjukkan keadaan bronkiol individu sihat dan pesakit asma.
Diagram 6.2 shows the condition of the bronchioles of healthy individual and asthmatic patients.



Sihat
Healthy



Dinding bronkiol bengkak dan menebal
Bronchiole walls become swollen and thick

Rajah 6.2
Diagram 6.2

Terangkan bagaimana penggunaan alat sedut membantu seseorang pesakit asma bernafas.
Explain how the usage of an inhaler helps the asthmatic patient to breathe.

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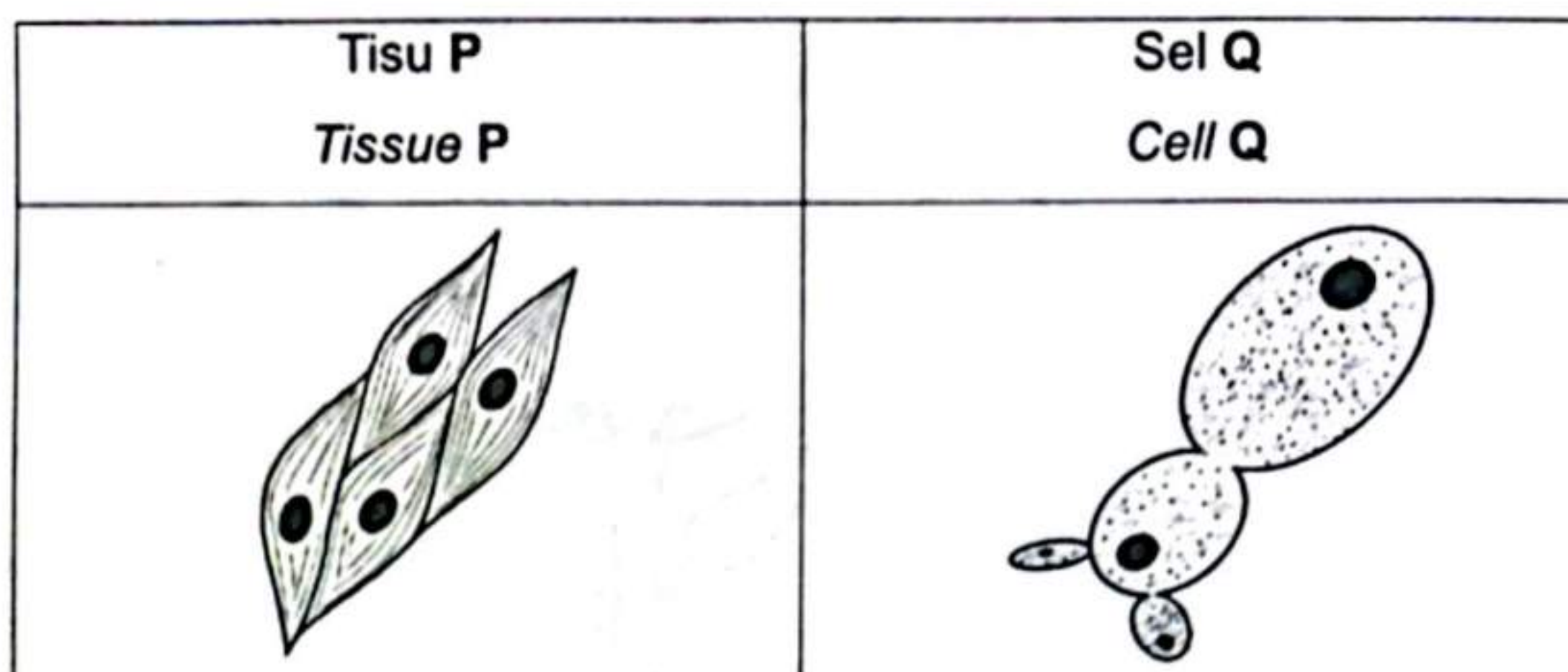
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[3 markah]
[3 marks]



- (c) Rajah 6.3 menunjukkan tisu P dan sel Q. Tisu P terdapat dalam organisma multisel manakala sel Q ialah organisma unisel.

Diagram 6.3 shows tissue P and cell Q. Tissue P is found in a multicellular organism while cell Q is a unicellular organism.



Rajah 6.3
Diagram 6.3

Nyatakan dua perbezaan ke atas tindak balas biokimia yang berlaku antara tisu P dan sel Q tanpa kehadiran gas oksigen berdasarkan aspek berikut:

State two differences on the biochemical reaction occurring between tissue P and cell Q in the absence of gas oxygen based on following aspects:

- Jenis tindak balas biokimia
Type of biochemical reaction
- Jumlah tenaga yang dihasilkan
Amount of energy produced

.....

.....

.....

[2 markah]

[2 marks]

<https://t.me/cikgufazliebiosensei>

7. Rajah 7.1 menunjukkan struktur bunga lili.
Diagram 7.1 shows the structure of lily flower.



Rajah 7.1

Diagram 7.1

- (a) (i) Dalam Rajah 7.1, labelkan stamen dan karpel.
In Diagram 7.1, label the stamen and carpel.

[2 markah]

[2 marks]

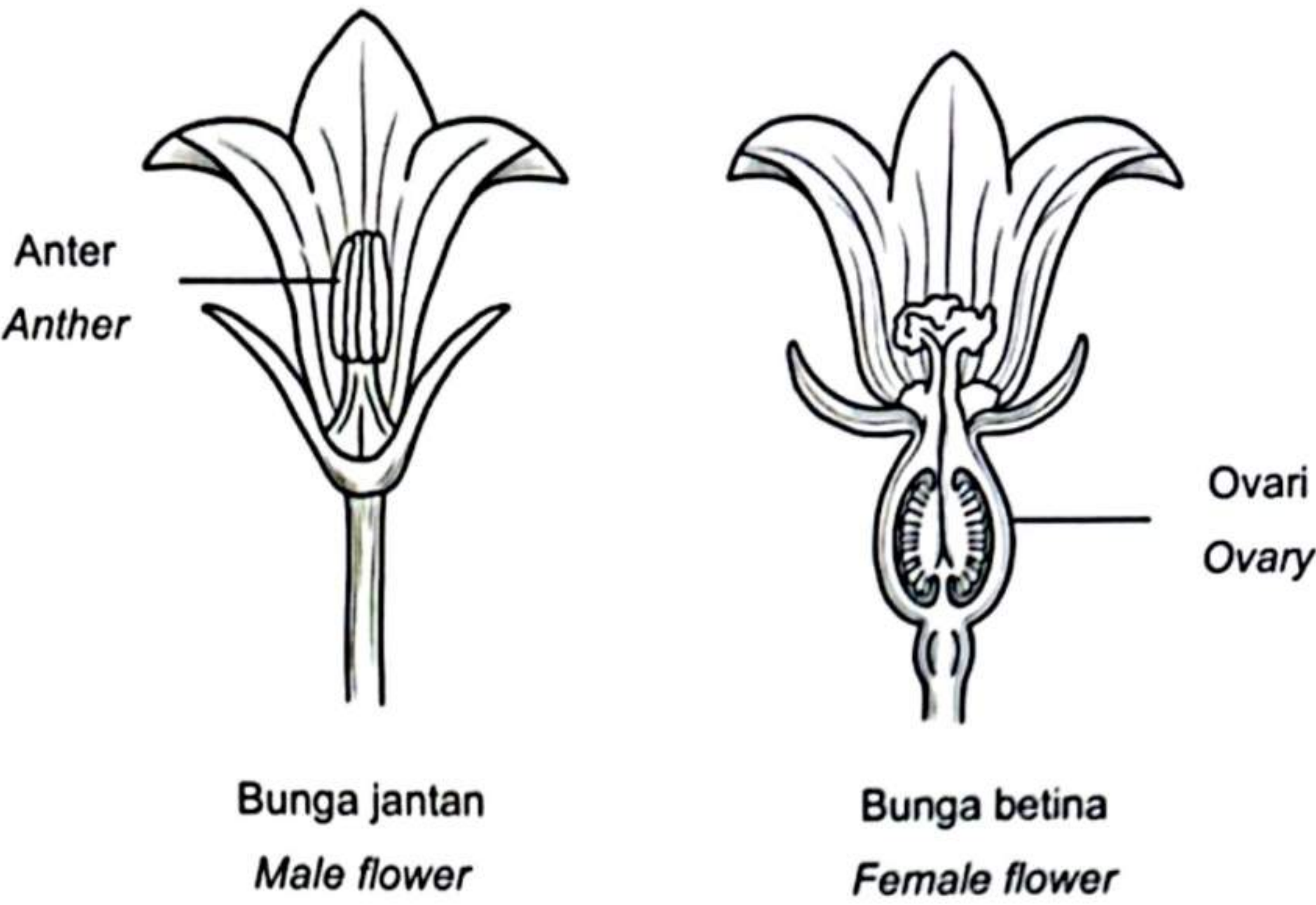
- (ii) Bunga lili adalah hermafrodit. Terangkan.
The lilies flowers are hermaphrodite. Explain.

.....

[1 markah]

[1 mark]

- (b) Rajah 7.2 menunjukkan dua jenis bunga pada satu pokok labu. Pada tahun ini, seorang petani mendapati bilangan bunga jantan melebihi bunga betina di kebunnya berbanding tahun lalu.
- Diagram 7.2 shows two types of flower on a pumpkin plant.*
- This year, a farmer found that the number of male flowers is more than female flowers in his garden compared to last year.*



Rajah 7.2
Diagram 7.2

- (i) Ramalkan penghasilan buah labu di kebun petani tersebut pada tahun semasa. Terangkan.
- Predict the production of pumpkin in the farmer's farm in current year.*
- Explain.*

.....

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.....

.....

[3 markah]
[3 marks]

- (ii) Selain daripada kaedah partenokarpi, cadangkan kaedah yang dapat dilakukan oleh petani tersebut untuk memaksimumkan penghasilan buah labu di kebunnya.
Other than parthenocarpy method, suggest a method that can be taken by the farmer to maximize the production of pumpkin in his farm.

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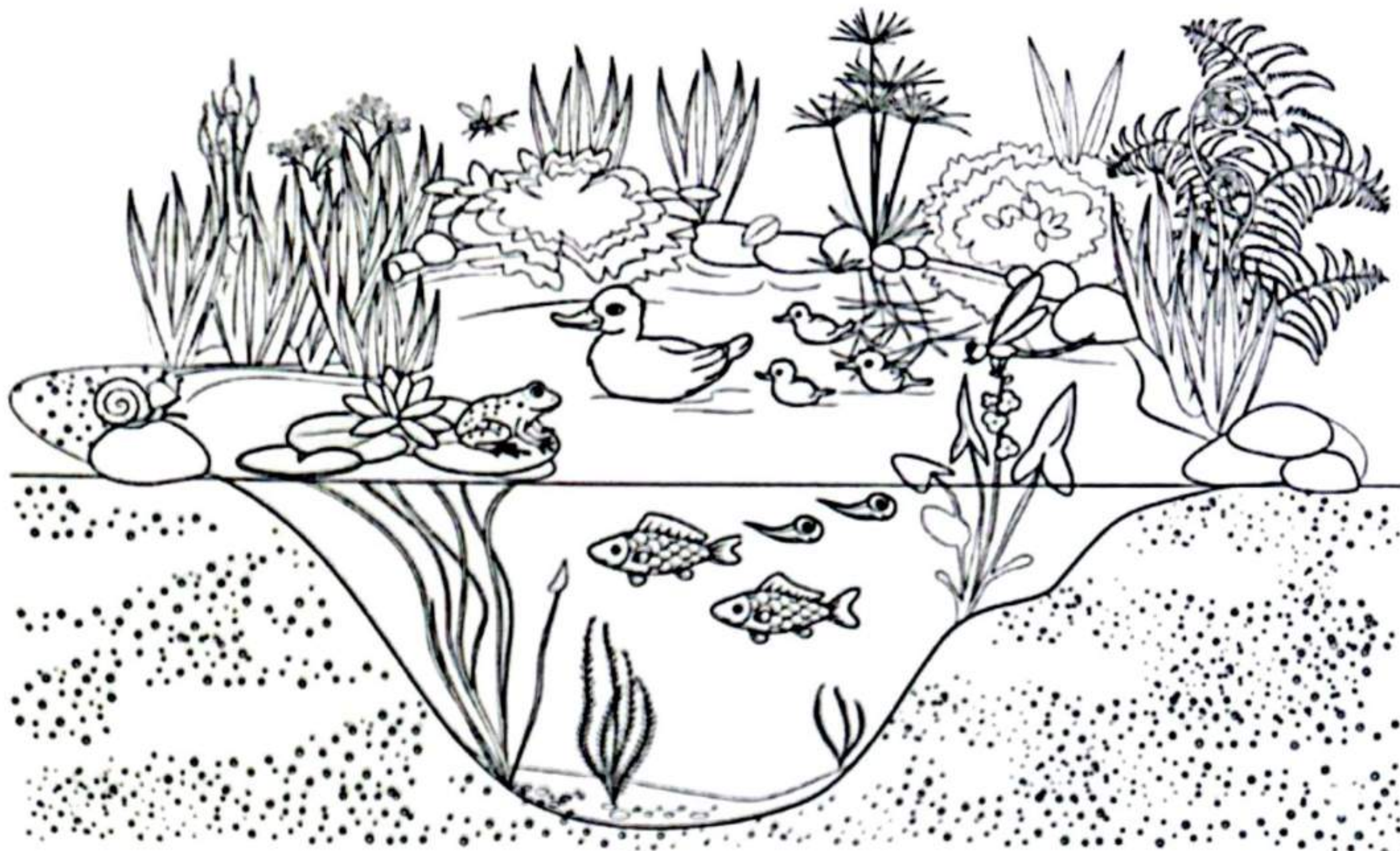
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[3 markah]
[3 marks]

8. Rajah 8.1 menunjukkan satu ekosistem kolam.

Diagram 8.1 shows a pond ecosystem.



Rajah 8.1

Diagram 8.1

(a) Berdasarkan Rajah 8.1, bina satu piramid tenaga.

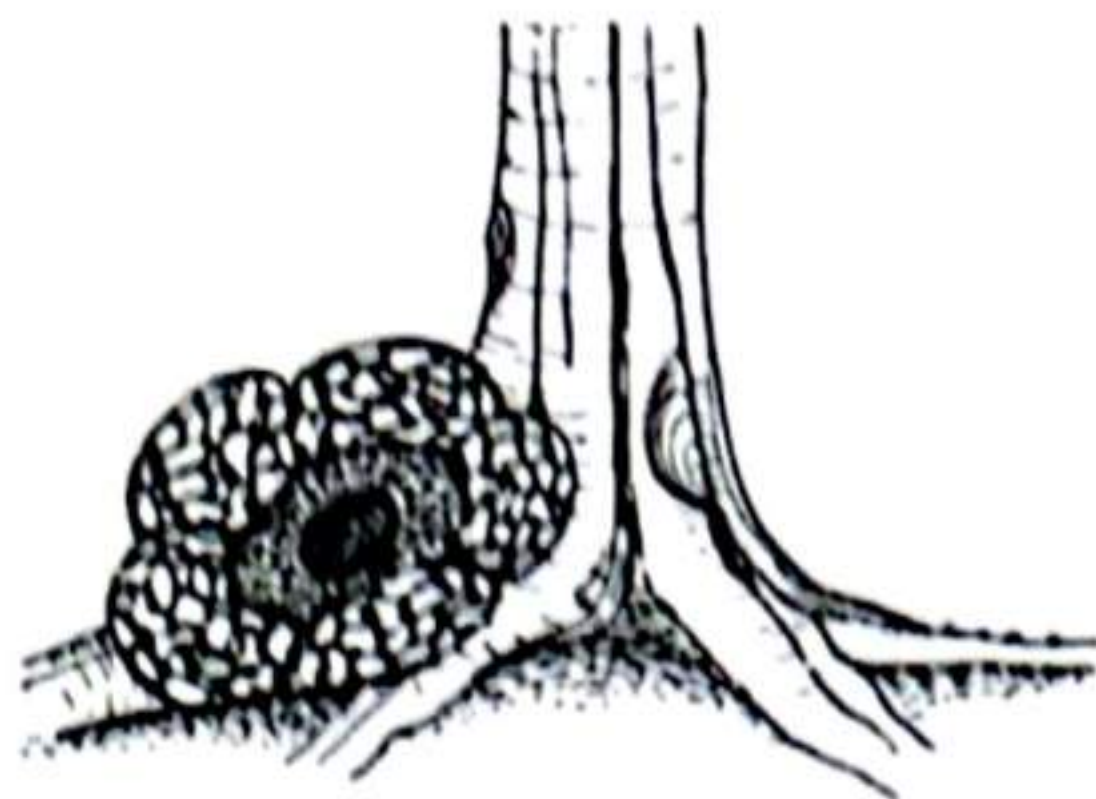
Based on Diagram 8.1, construct an energy pyramid.

[3 markah]

[3 marks]

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- (b) (i) Rajah 8.2 (a) dan 8.2 (b) menunjukkan jenis interaksi yang berlaku antara organisma.
Diagrams 8.2 (a) and 8.2 (b) show interaction that occurs in the organism.



Rajah 8.2 (a)
Diagram 8.2 (a)



Rajah 8.2 (b)
Diagram 8.2 (b)

Bezakan jenis interaksi berdasarkan Rajah 8.2 (a) dan Rajah 8.2 (b).
Differentiate the types of interaction based on Diagram 8.2 (a) and Diagram 8.2 (b).

Rajah 8.2 (a) <i>Diagram 8.2 (a)</i>	Rajah 8.2 (b) <i>Diagram 8.2 (b)</i>

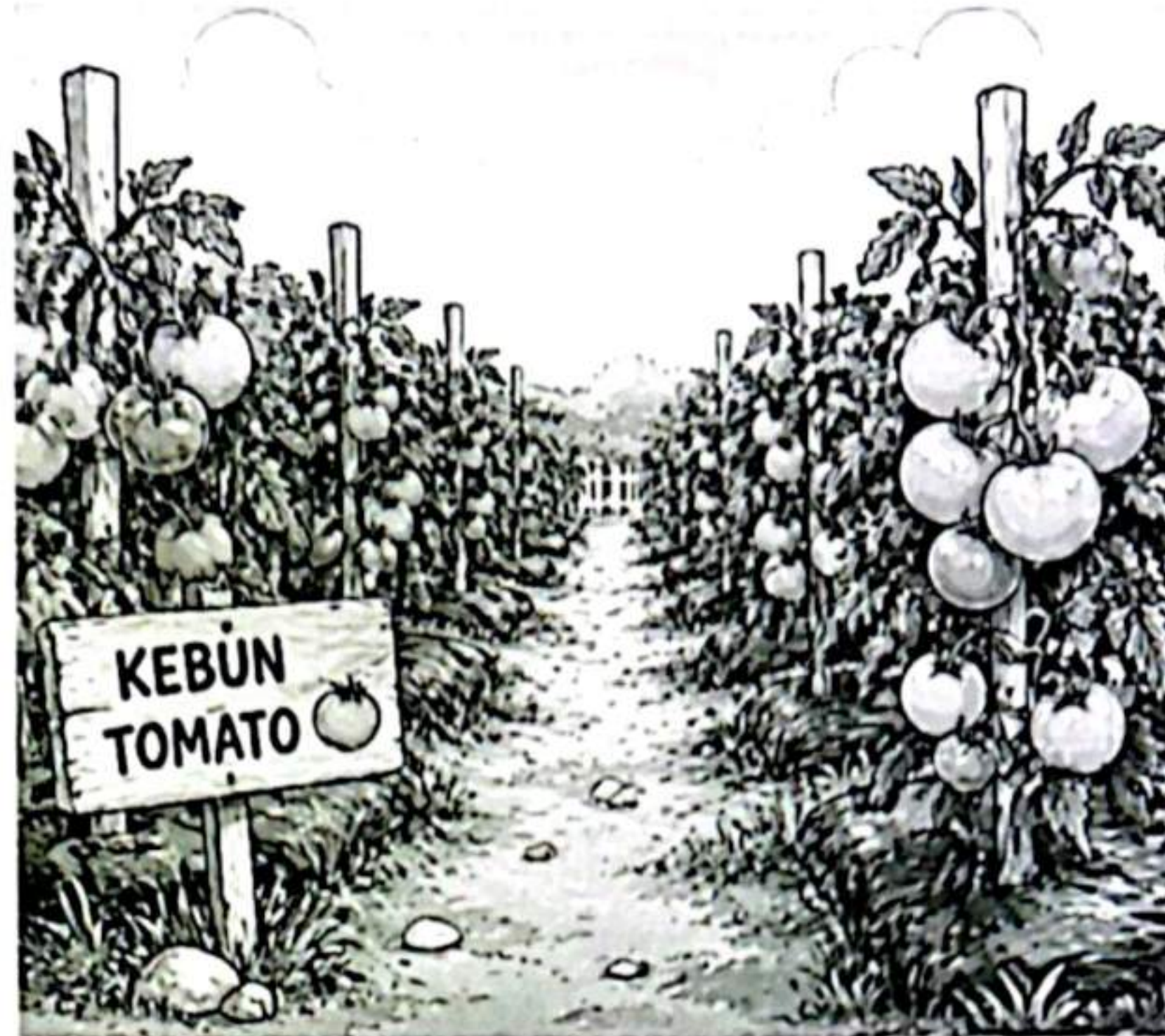
[3 markah]
[3 marks]

- (ii) Nyatakan **satu** persamaan bagi interaksi dalam Rajah 8.2 (a) dan Rajah 8.2 (b).
*State **one** similarity for the interaction in Diagram 8.2 (a) and Diagram 8.2 (b).*
-
-

[1 markah]
[1 mark]

- (c) Rajah 8.3 (a) menunjukkan kebun tomato kepunyaan Encik X. Setelah menuai hasil tomato, pokok tomato akan mati dan Encik X akan membersihkan kebunnya sehingga bersih seperti Rajah 8.3 (b).

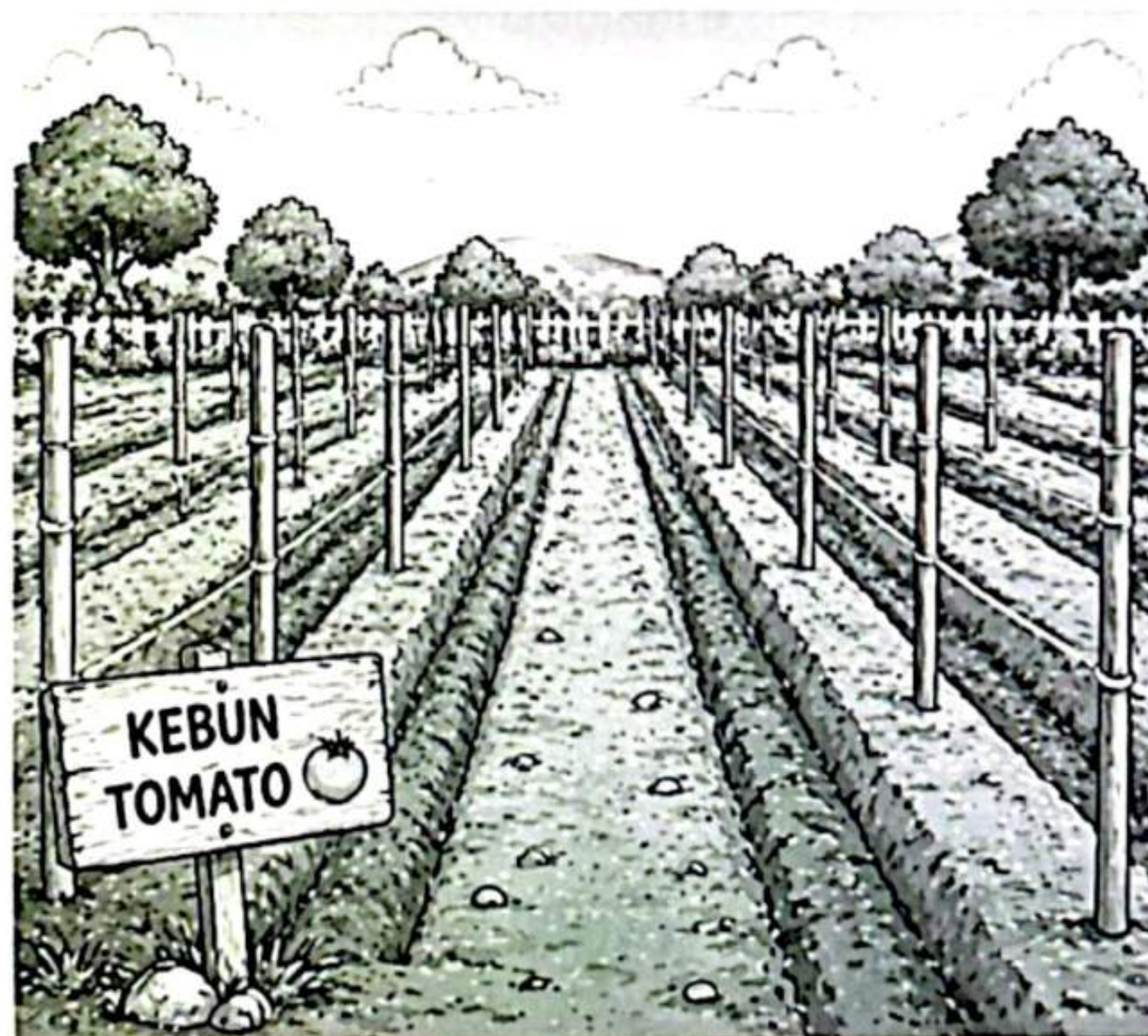
Diagram 8.3 (a) shows the tomato garden belonging to Mr. X. After harvesting the tomatoes, the tomato plants will die, and Mr. X will clean his garden until it is clean as shown in Diagram 8.3 (b).



Rajah 8.3 (a)

Diagram 8.3 (a)

Setelah kebun dibersihkan
After the garden is cleaned



Rajah 8.3 (b)

Diagram 8.3 (b)

- (ii) Sel parietal di dalam organ **K** merembeskan bahan **P**. Terangkan kepentingan bahan **P** bagi proses pencernaan di dalam organ **K**.

[2 markah]

The parietal cells in organ K secrete substance P. Explain the importance of substance P for the digestion process in organ K.

[2 marks]

- (b) Encik Q makan ayam goreng ketika makan tengah hari. Terangkan proses asimilasi yang berlaku di dalam hati dan sel badan Encik Q apabila makanan tersebut dicernakan dengan lengkap.

[8 markah]

Mr. Q eats fried chicken for lunch. Explain the assimilation processes that occur in liver and body cells of Mr. Q once the food has been completely digested.

[8 marks]

10. Rajah 10.1 menunjukkan fenotip warna bulu bagi arnab, P dan Q.
Diagram 10.1 shows fur colour phenotype of rabbits, P and Q.

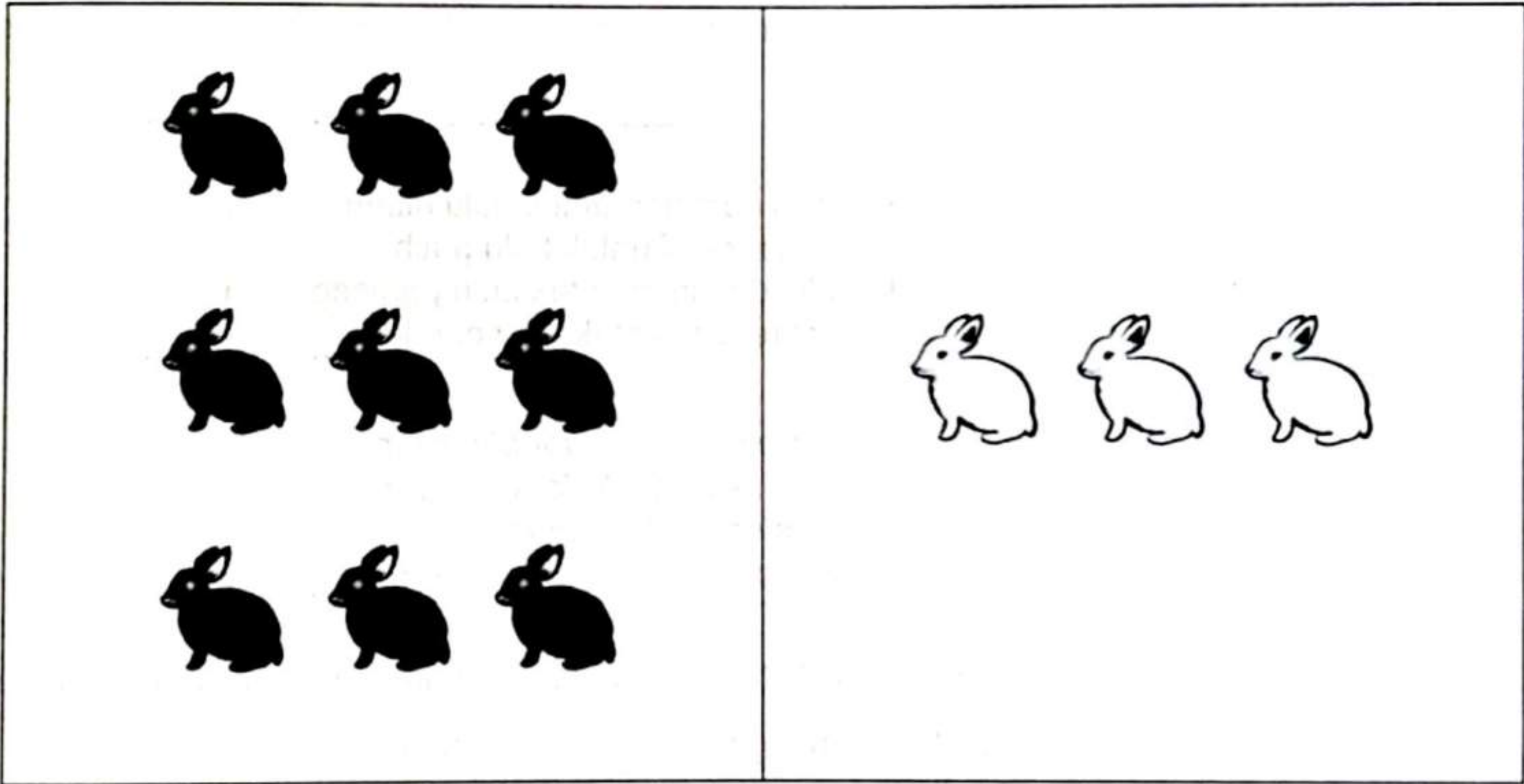


Rajah 10.1
Diagram 10.1

Seorang penternak mengacukkan dua ekor arnab yang mempunyai bulu hitam. Penternak tersebut menjangkakan semua anak arnab akan mempunyai bulu hitam seperti induknya. Selepas beberapa minggu, anak arnab yang dihasilkan menunjukkan bilangan seperti dalam Rajah 10.2.

A breeder crosses two rabbits with black fur. The breeder expects all offspring to have black fur like the parents.

After several weeks, the offspring produced are as shown in Diagram 10.2.



Rajah 10.2
Diagram 10.2

- (a) (i) Nyatakan jenis alel bagi kedua-dua induk dan nisbah fenotip warna bulu anak anab.

[2 markah]

State the type of allele for both parents and the phenotypic ratio of the offspring's fur colour.

[2 marks]

- (ii) Dengan menggunakan kata kunci H untuk alel dominan dan h untuk alel resesif, lukis rajah skema kacukan untuk menunjukkan bagaimana hasil kacukan tersebut diperoleh.

[4 markah]

By using the keyword H for the dominant allele and h for the recessive allele, draw a schematic diagram to show how the result of the cross is obtained.

[4 marks]

- (b) Seorang penternak ingin menghasilkan anab berbulu hitam dan pendek secara konsisten untuk pasaran.

Beliau mengacukkan dua ekor anab berbulu hitam dan panjang. Kedua-dua induk adalah heterozigot bagi kedua-dua ciri tersebut.

A breeder aims to consistently produce rabbits with black and short fur for the market.

He bred two rabbits with black and long fur. Both parents were heterozygous for both traits.

Kekunci:

H = alel dominan untuk bulu hitam

h = alel resesif untuk bulu putih

L = alel dominan untuk bulu panjang

l = alel resesif untuk bulu pendek

Key:

H = dominant allele for black fur

h = recessive allele for white fur

L = dominant allele for long fur

l = recessive allele for short fur

Berdasarkan pernyataan diatas, terangkan bagaimana anab berbulu hitam dan pendek diperolehi tanpa menggunakan gambar rajah skema pewarisan.

[4 markah]

Based on the statement above, explains how black and short fur rabbits were obtained without using schematic diagram.

[4 marks]

- (c) Banding bezakan pewarisan dalam soalan 10 (a)(ii) dengan pewarisan dalam soalan 10 (b).

[10 markah]

Compare and contrast the inheritance in question 10 (a)(ii) with the inheritance in question 10 (b).

[10 marks]

BAHAGIAN C

[20 markah]

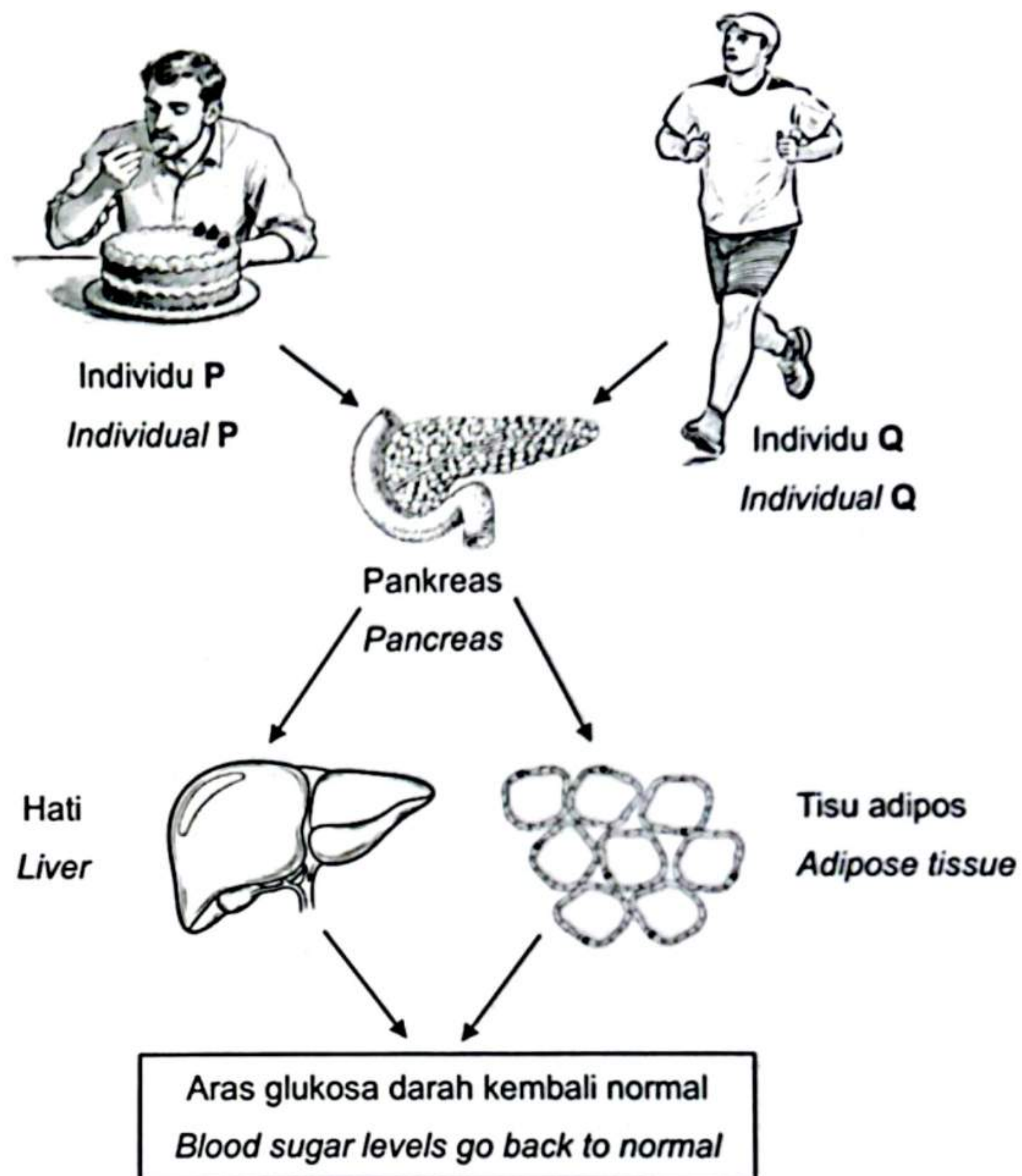
Soalan ini mesti dijawab.

11. (a) Pankreas ialah kelenjar yang bertanggungjawab untuk mengekalkan aras glukosa darah dalam julat normal 75 – 110 mg / 100 ml.

Rajah 11 menunjukkan pengawalan aras glukosa darah dalam individu P dan individu Q.

The pancreas is responsible for maintaining blood glucose levels within the normal range of 75 – 110 mg / 100 ml.

Diagram 11 shows the regulation of blood sugar levels in individual P and individual Q.



Rajah 11

Diagram 11

- (i) Berdasarkan Rajah 11, huraikan mekanisme kawal atur glukosa darah dalam individu P dan individu Q.

[7 markah]

Based on Diagram 11, describe the mechanism of blood glucose regulation in individual P and individual Q.

[7 marks]

- (ii) Doktor mendapati individu P menghidap kanser pankreas yang menyebabkan pankreas terpaksa dibuang. Terangkan nasihat yang boleh diberikan kepada pesakit untuk membantunya menangani masalah kawal atur glukosa darah yang disebabkan oleh pembuangan pankreas.

[3 markah]

Doctor found that individual P suffered pancreas cancer that requires the pancreas to be removed. Explain the advice can be given to the patient to help him deal with the blood glucose regulation problems caused by the removal of his pancreas.

[3 marks]

- (b) Seorang individu mengalami kerosakan pada kedua-dua ginjal. Bahan kumuh tidak dapat disingkirkan daripada badan menyebabkan tekanan osmosis darah tidak dapat dikawal atur.

Huraikan rawatan yang sesuai untuk individu tersebut agar dia dapat menjalani kehidupan harian tanpa masalah.

[4 markah]

An individual suffered damage to both kidneys. Waste products cannot be removed from the body causing the osmotic pressure of the blood cannot be regulated.

Describe the appropriate treatment for the individual so that he can carry out his daily life without problems.

[4 marks]

- (c) Pernafasan ialah proses luar kawal yang dikawal oleh pusat kawalan respirasi di dalam medula oblongata. Wajarkan mengapa kadar pernafasan seorang pelajar meningkat semasa acara larian 400 meter.

[6 markah]

Breathing is an involuntary process that is controlled by the respiratory control center in the medulla oblongata. Justify why a student's breathing rate increases during the 400 meters running event.

[6 marks]