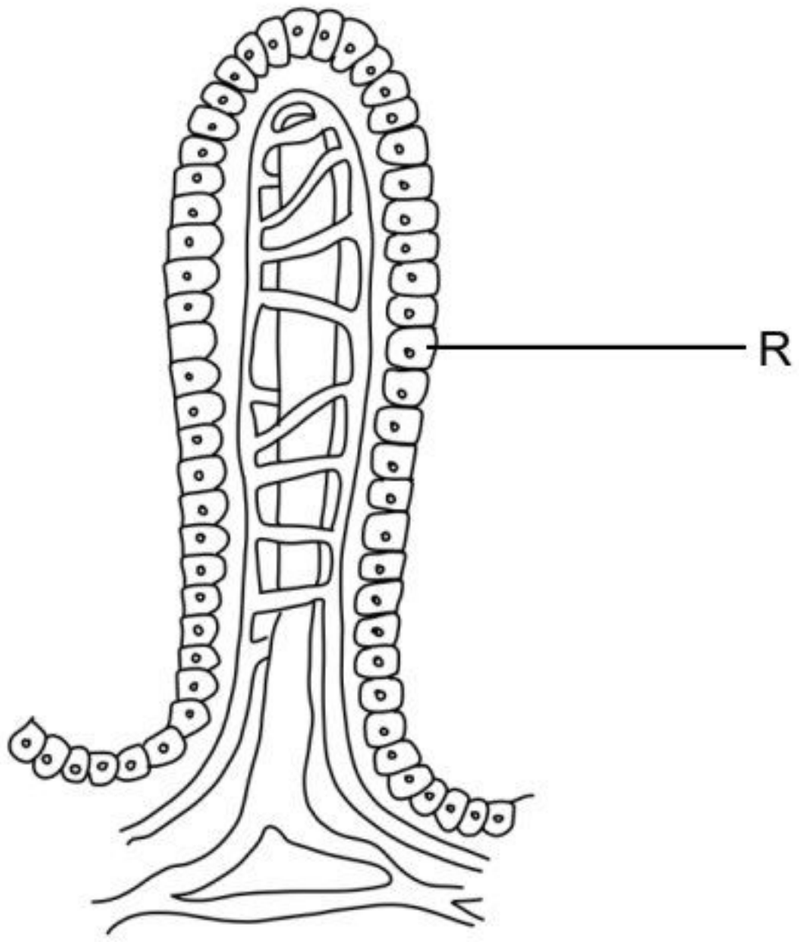
Bahagian A
Section A
[60 markah / *60 marks*]

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

1 Rajah 1.1 menunjukkan struktur vilus dalam organ pencernaan manusia.
Diagram 1.1 *shows the villus structure in human digestive organs.*



Rajah 1.1
Diagram 1.1

a) (i) Namakan sel R.
Name the cell R.

.....

[1 markah / *1 mark*]

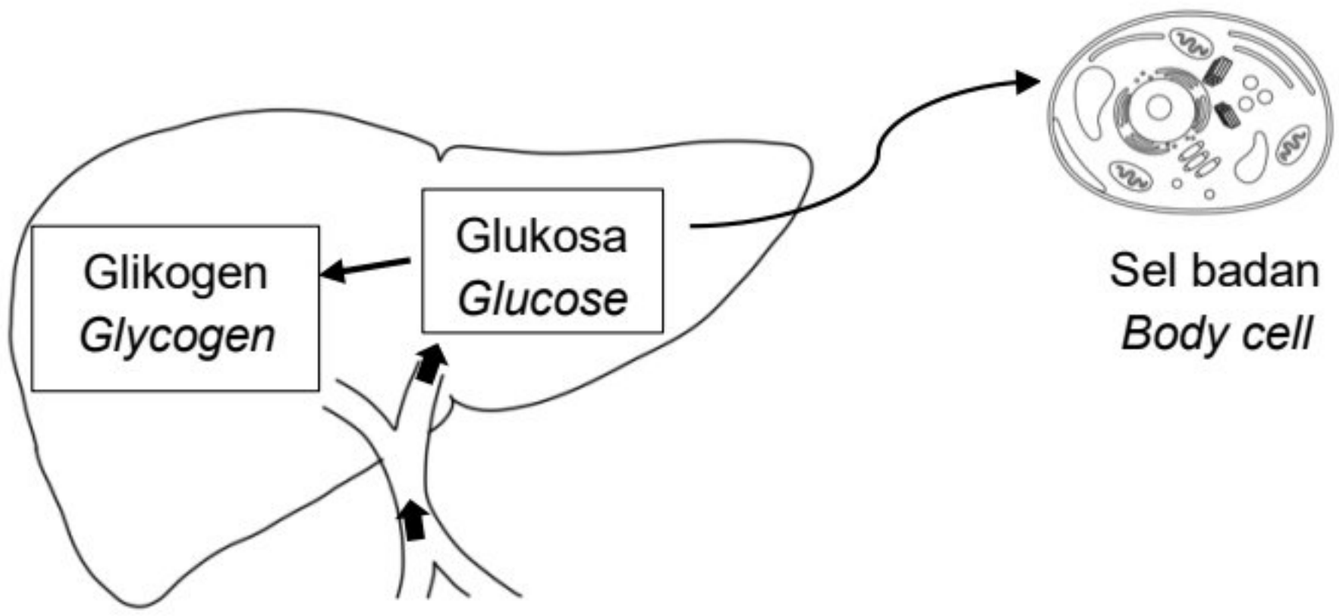
(ii) Nyatakan **dua** ciri yang terdapat pada vilus untuk kecekapan penyerapan nutrien.
*State **two** characteristics found in the villi for efficient nutrient absorption.*

1. .....

2. .....

[2 markah / *2 marks*]

b) Rajah 1.2 menunjukkan organ yang terlibat dalam asimilasi makanan tercerna.
Diagram 1.2 *shows the organ that involved in assimilation of digested food.*



Rajah 1.2
Diagram 1.2

Berdasarkan Rajah 1.2, terangkan proses asimilasi yang berlaku dalam organ tersebut.
Based on Diagram 1.2, explain the assimilation process that occurs in the organ.

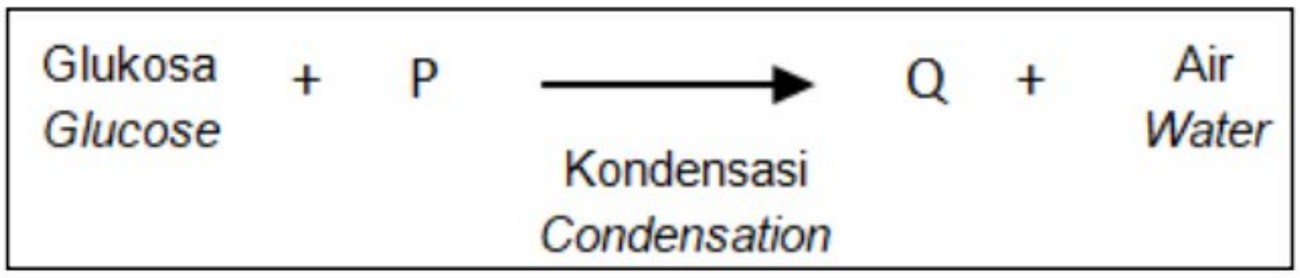
.....

.....

.....

[3 markah / *3 marks*]

2. Rajah 2.1 menunjukkan persamaan bagi pembentukan Q dalam tebu.
Diagram 2.1 shows the equation for the formation of Q in sugar cane.



Rajah 2.1
Diagram 2.1

a) Namakan:
Name:

P : .....

Q : .....

[2 markah/ *2 marks*]

b) Seorang murid telah menjalankan ujian Benedict ke atas sampel Q.
Terangkan pemerhatian eksperimen.
A student carries out Benedict test on sample Q.
Explain the experimental observation.

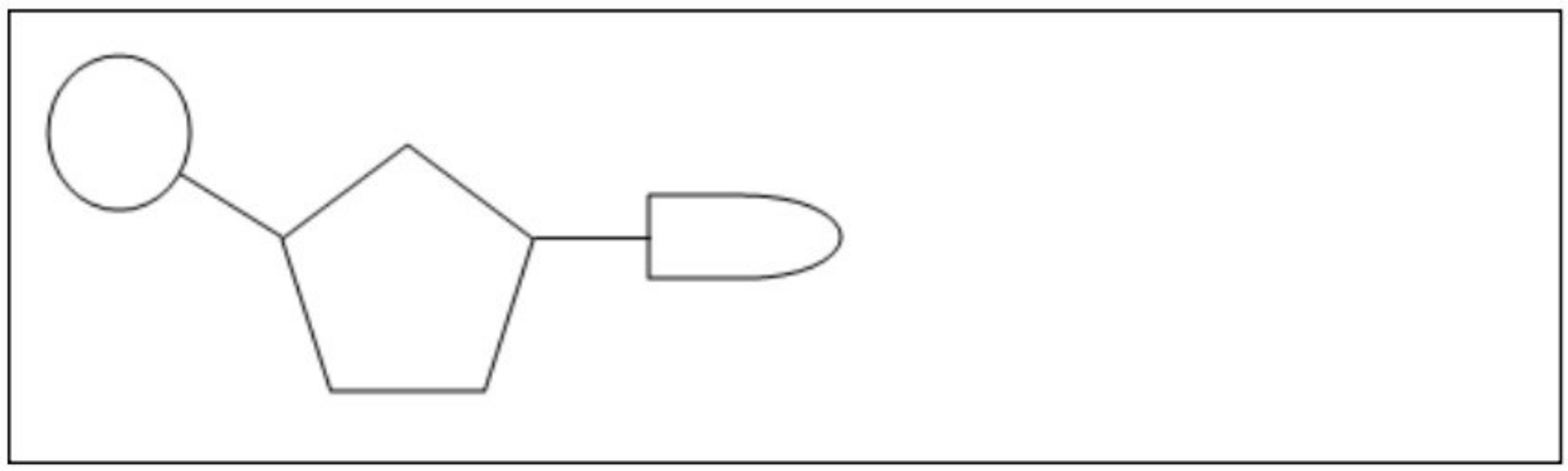
.....

.....

.....

[2 markah/ *2 marks*]

c) Rajah 2.2 menunjukkan satu unit nukleotida.
Diagram 2.2 shows one nucleotide unit.



Rajah 2.2
Diagram 2.2

(i) Dalam ruang yang disediakan, lengkapkan pasangan struktur nukleotida tersebut.
In the space provided, complete the pair of the nucleotide structure.

[1 markah/ *1 mark*]

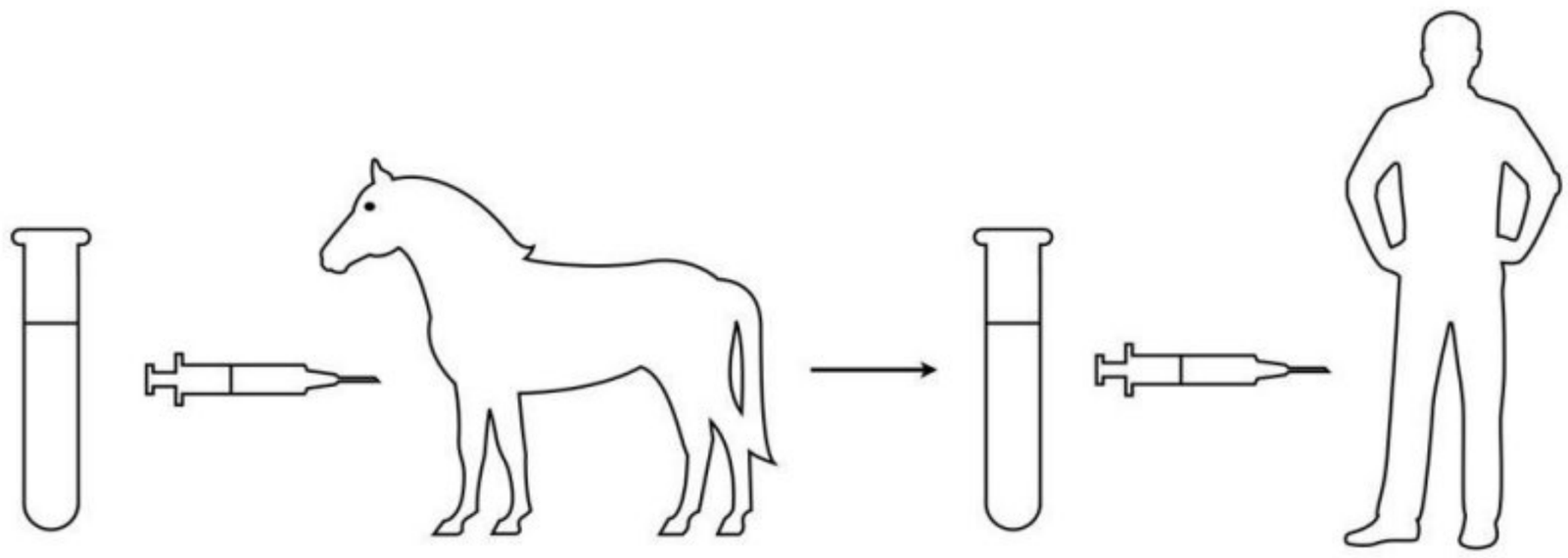
(ii) Nyatakan **satu** perbezaan bes bernitrogen yang terdapat pada DNA dan RNA.
*State **one** difference between the nitrogenous bases in DNA and RNA.*

.....

.....

[1 markah/ 1 *mark*]

3. Rajah 3.1 menunjukkan kaedah penghasilan bahan M yang diekstrak daripada darah kuda.
Diagram 3.1 shows the method of producing substance M extracted from horse blood.



Ampaian toksoid tetanus *Tetanus toxoid suspension*	Kuda yang diimunkan *Immunised horse*	Bahan M diasingkan daripada serum kuda dan ditulenkan *Substance M is isolated from horse serum and purified*	Bahan M disuntik kepada individu yang telah dijangkiti tetanus *Substance M is injected into individuals who have been infected with tetanus*

Rajah 3.1
Diagram 3.1

a) (i) Namakan bahan M.
Name substance M.

.....
[1 markah/ *1 mark*]

(ii) Nyatakan jenis keimunan yang diperoleh oleh individu tersebut.
State the type of immunity acquired by the individual.

.....
[1 markah/ 1 *mark*]

b) Jadual 1 menunjukkan imunisasi bahan N kepada bayi mengikut tempoh yang telah ditetapkan.
Table 1 shows immunization of babies with substance N according to the prescribed period.

Bahan N *Substance N*	Umur (Bulan) *Age (Month)*									
	Lahir *Born*	1	2	3	5	6	9	12	18	21
DTaP (Diphtheria, Tetanus, Pertussis)			Dos 1 *Dose 1*	Dos 2 *Dose 2*	Dos 3 *Dose 3*				Dos penggalak *Booster dose*	

Jadual 1
Table 1

Berdasarkan Jadual 1, terangkan fungsi bahan N dalam memberi perlindungan dan pencegahan terhadap jangkitan tetanus.
Based on Table 1, explain the function of substance N in providing protection and prevention against tetanus infection.

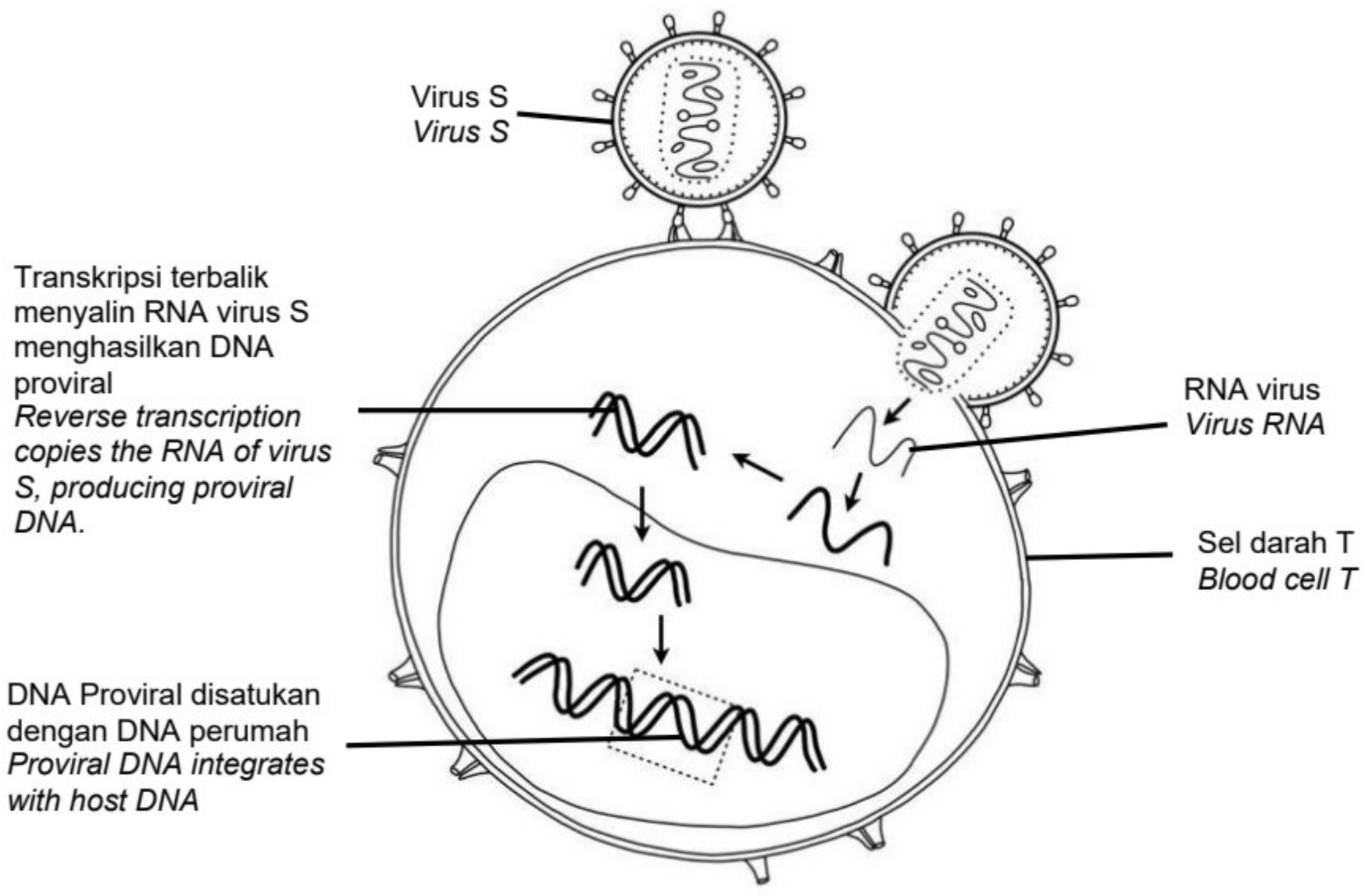
.....

.....

.....

[3 markah/ 3 *marks*]

c) Rajah 3.2 menunjukkan tindakan virus S yang menyerang sel darah T dan menyebabkan AIDS.
Diagram 3.2 shows the action of virus S that attacks blood cell T and causes AIDS.



Rajah 3.2
Diagram 3.2

Berdasarkan Rajah 3.2, terangkan kesan jangkitan virus S terhadap kesihatan seseorang.
Based on Diagram 3.2, explain the effects of infection of virus S on a person's health.

.....

.....

.....

[2 markah/ 2 *marks*]

4. Jadual 2 menunjukkan hierarki taksonomi bagi Harimau Malaya.
Table 2 shows the taxonomy hierarchy of Malayan Tiger.

Hierarki ***Hierarchy***	**Takson** ***Taxon***
Alam *Kingdom*	*Y*
Filum *Phylum*	*Chordata*
Kelas *Class*	*Mammalia*
Order *Order*	*Carnivora*
Famili *Family*	*Felidae*
X	*Panthera*
Spesies *Species*	*tigris*

Jadual 2
Table 2

a) (i) Berdasarkan Jadual 2, namakan:
Based on Table 2, name:

X: .....

Y: .....

[2 markah/ *2 marks*]

(ii) Nyatakan nama saintifik bagi Harimau Malaya.
State the scientific name of the Malayan tiger.

.....

[1 markah/ *1 mark*]

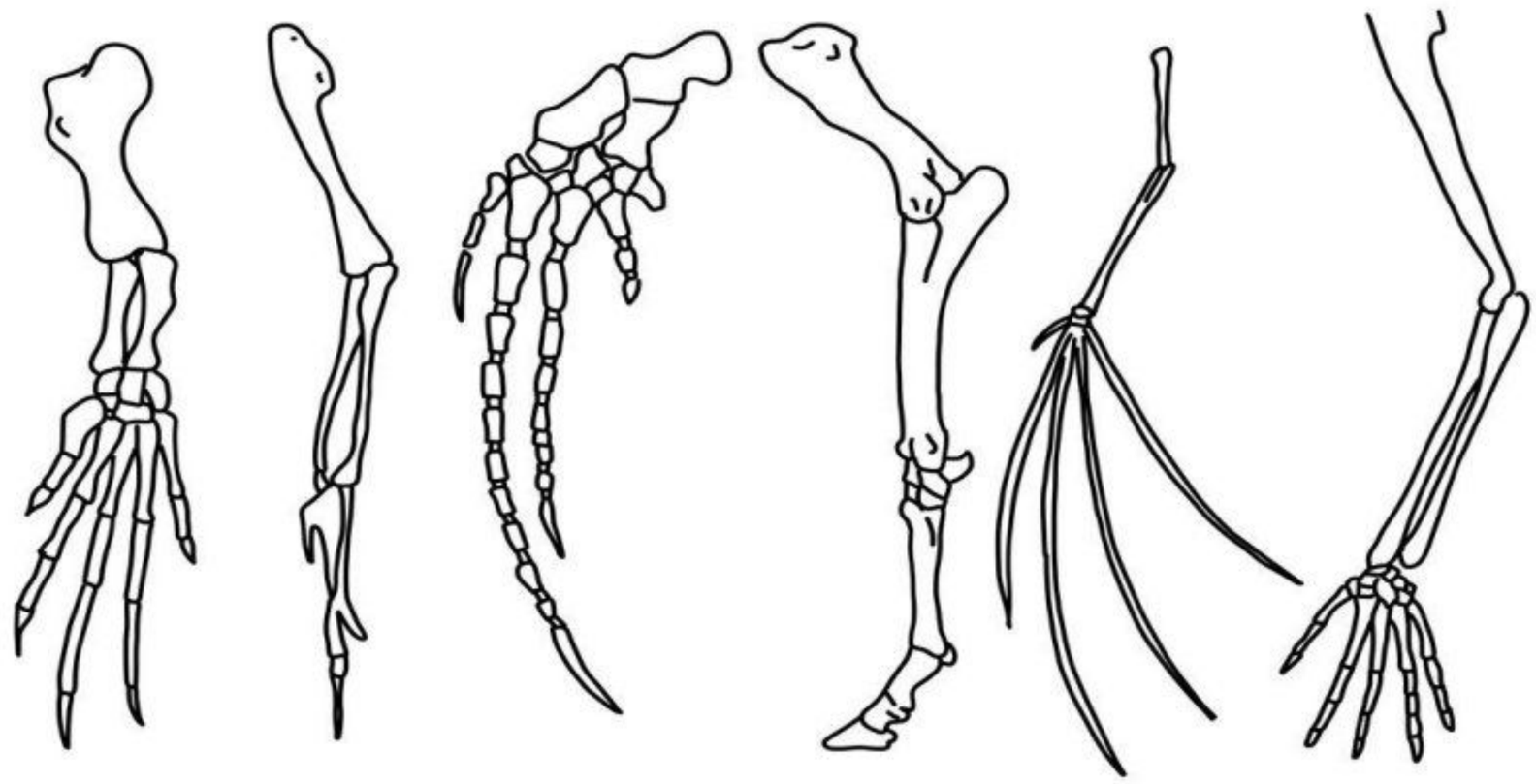
(iii) Berdasarkan jawapan anda di 1(a)(ii), terangkan sistem tatanama binomial yang digunakan.
Based on your answer in 1(a)(ii), explain the binomial nomenclature system used.

.....

.....

[2 markah/ *2 marks*]

b) Rajah 4 menunjukkan anggota hadapan bagi organisma yang berbeza.
Diagram 4 shows limbs of different organisms.



Rajah 4
Diagram 4

(i) Berdasarkan Rajah 4, apakah struktur yang digunakan dalam pengelasan filogeni tersebut.
Based on Diagram 4, what is the structure used in the phylogenetic classification.

.....

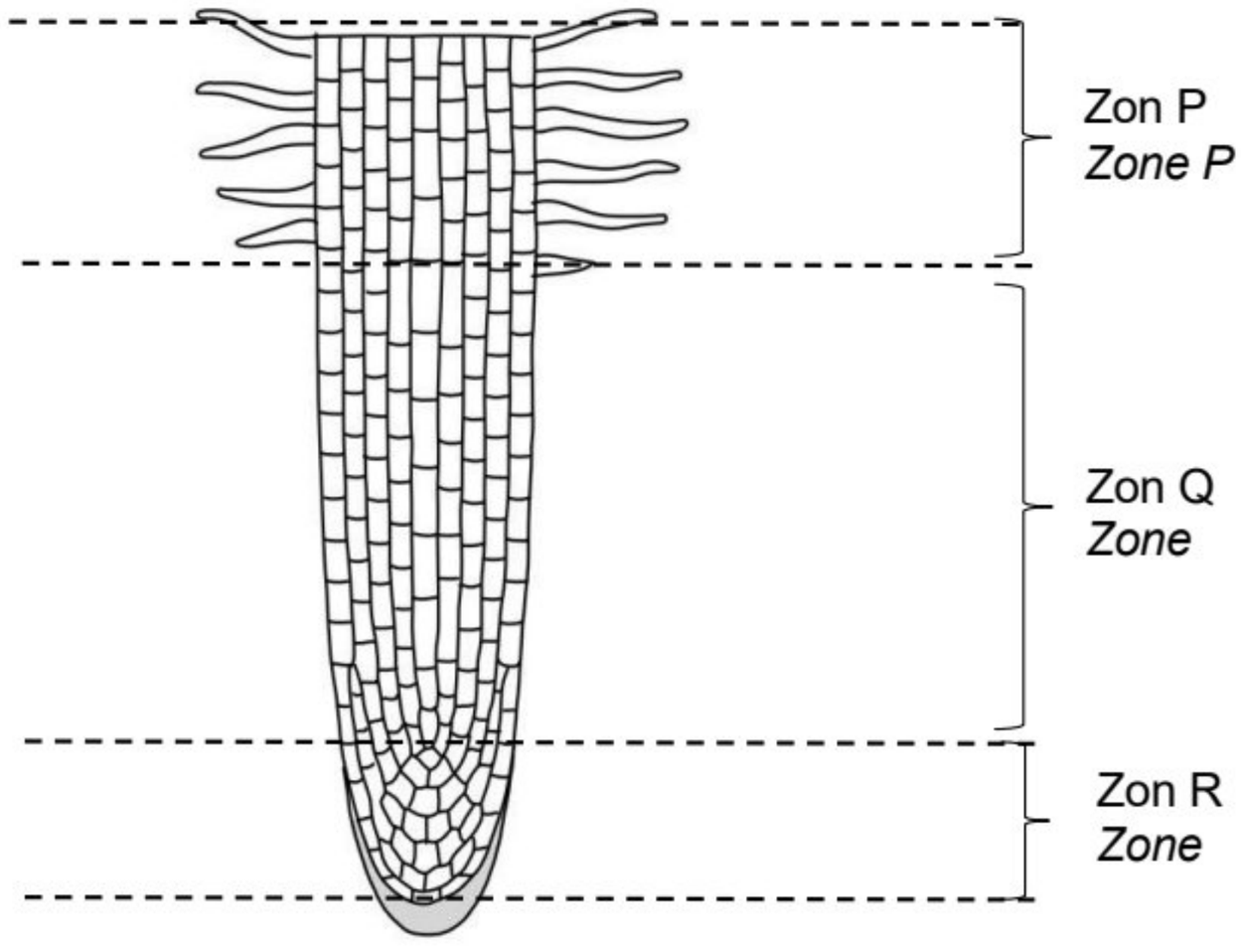
[1 markah/*1 mark*]

(ii) Nyatakan tujuan pengelasan filogeni dalam mengelaskan organisma.
State the purpose of phylogenetic classification in classifying organism.

.....

[1 markah/*1 mark*]

5. Rajah 5.1 menunjukkan keratan membujur hujung akar tumbuhan eudikot.
Diagram 5.1 shows a longitudinal section of the tip of a eudicot plant root.



Rajah 5.1
Diagram 5.1

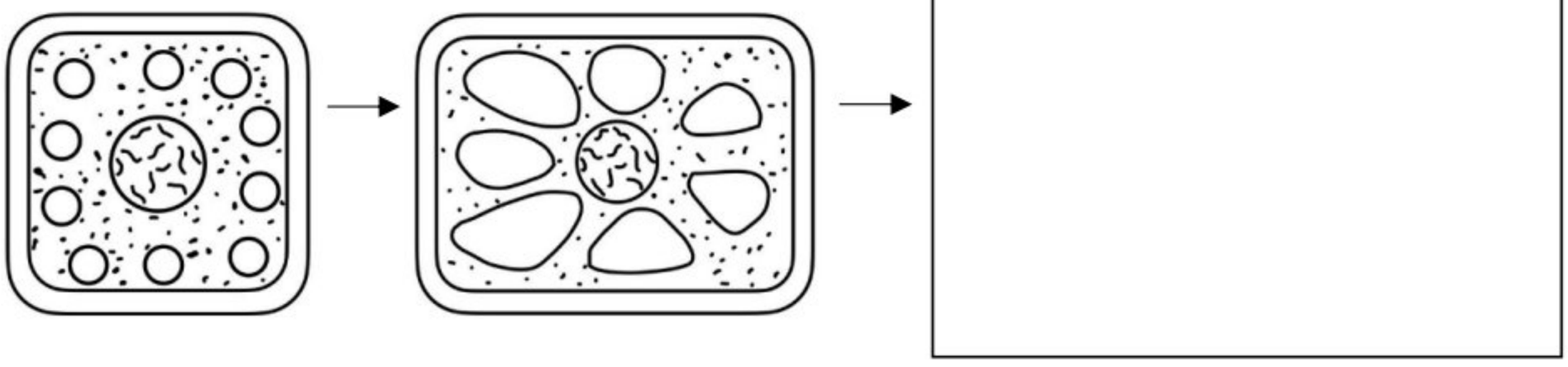
(a) (i) Namakan:
Name:

Zon P: .....
Zone P

Zon R: .....
Zone R

[2 markah/ *2 marks*]

(ii) Rajah 5.2 menunjukkan perkembangan sel dalam zon Q.
Diagram 5.2 shows cell development in zone Q.



Rajah 5.2
Diagram 5.2

Lengkapkan Rajah 5.2 dengan melukis pembentukan vakuol akibat resapan air secara osmosis pada ruangan yang disediakan.
Complete Diagram 5.2 by drawing the formation of a central vacuole due to the diffusion of water by osmosis in the space provided.

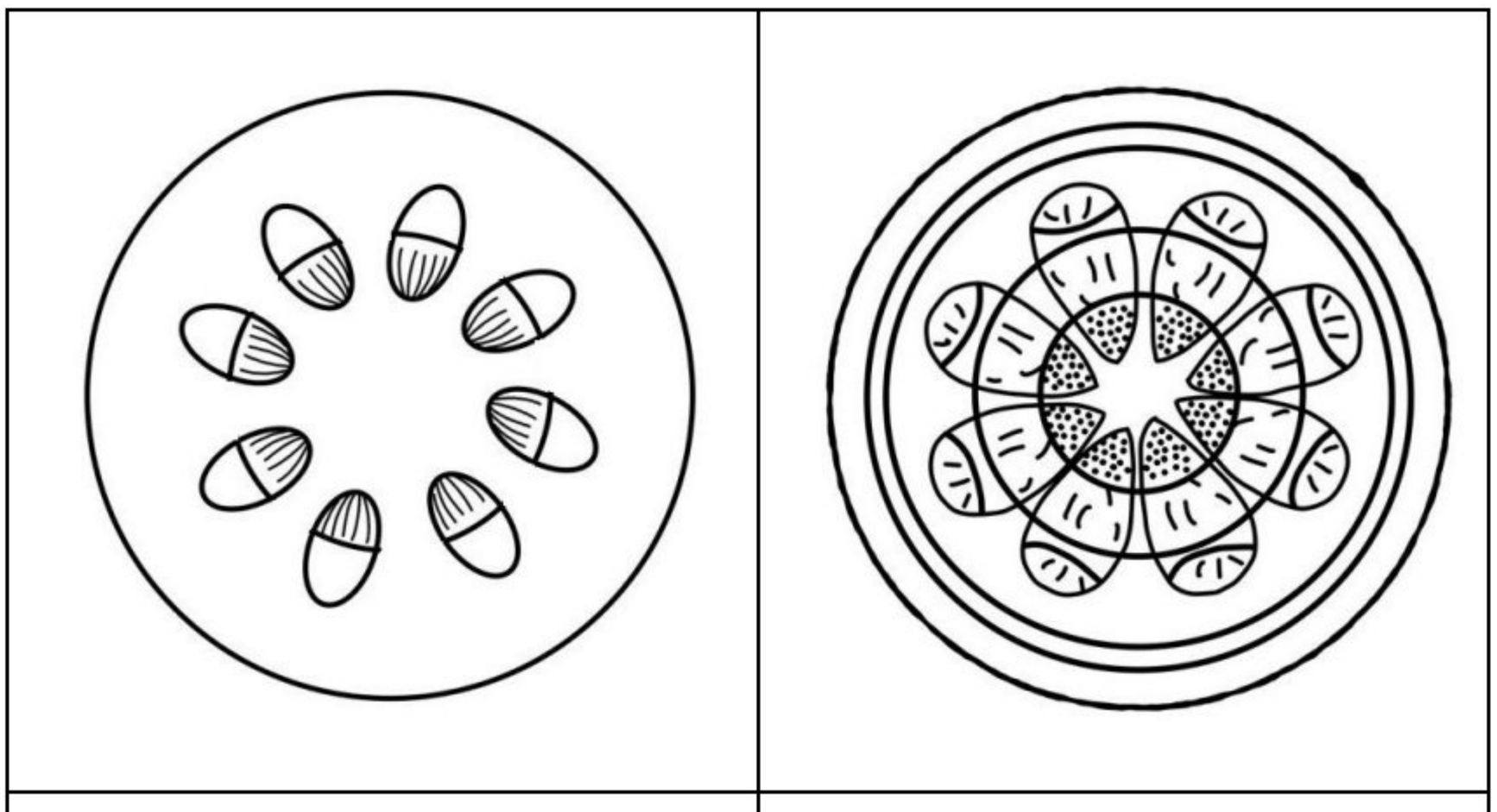
[1 markah/ *1 mark*]

(iii) Namakan proses dalam Rajah 5.2.
Name the process in Diagram 5.2.

.....

[1 markah/ *1 mark*]

(b) Rajah 5.3 menunjukkan keratan rentas batang tumbuhan yang menjalani pertumbuhan yang berbeza.
Diagram 5.3 shows a cross-section of plant stem that undergoes different type of growth.



Pokok A *Plant A*	Pokok B *Plant B*

Rajah 5.3
Diagram 5.3

i) Berdasarkan Rajah 5.3, bezakan jenis pertumbuhan berdasarkan kriteria dalam Jadual 3.
Based on Diagram 5.3, differentiate the type of growth based on the criteria in Table 3.

Pokok A *Plant A*	Kriteria *Criteria*	Pokok B *Plant B*
	Tisu meristem yang terlibat *Meristem tissue involved*	
	Kesan pertumbuhan *Effect of growth*	

Jadual 3
Table 3

[2 markah/ *2 marks*]

ii) Pokok B dapat hidup lebih lama berbanding Pokok A.
Terangkan kelebihan jenis pertumbuhan yang dialami oleh Pokok B yang boleh meningkatkan jangka hayatnya.
Plant B can live longer than Plant A.
Explain the advantages of the type of growth experienced by plant B that can increase its lifespan.

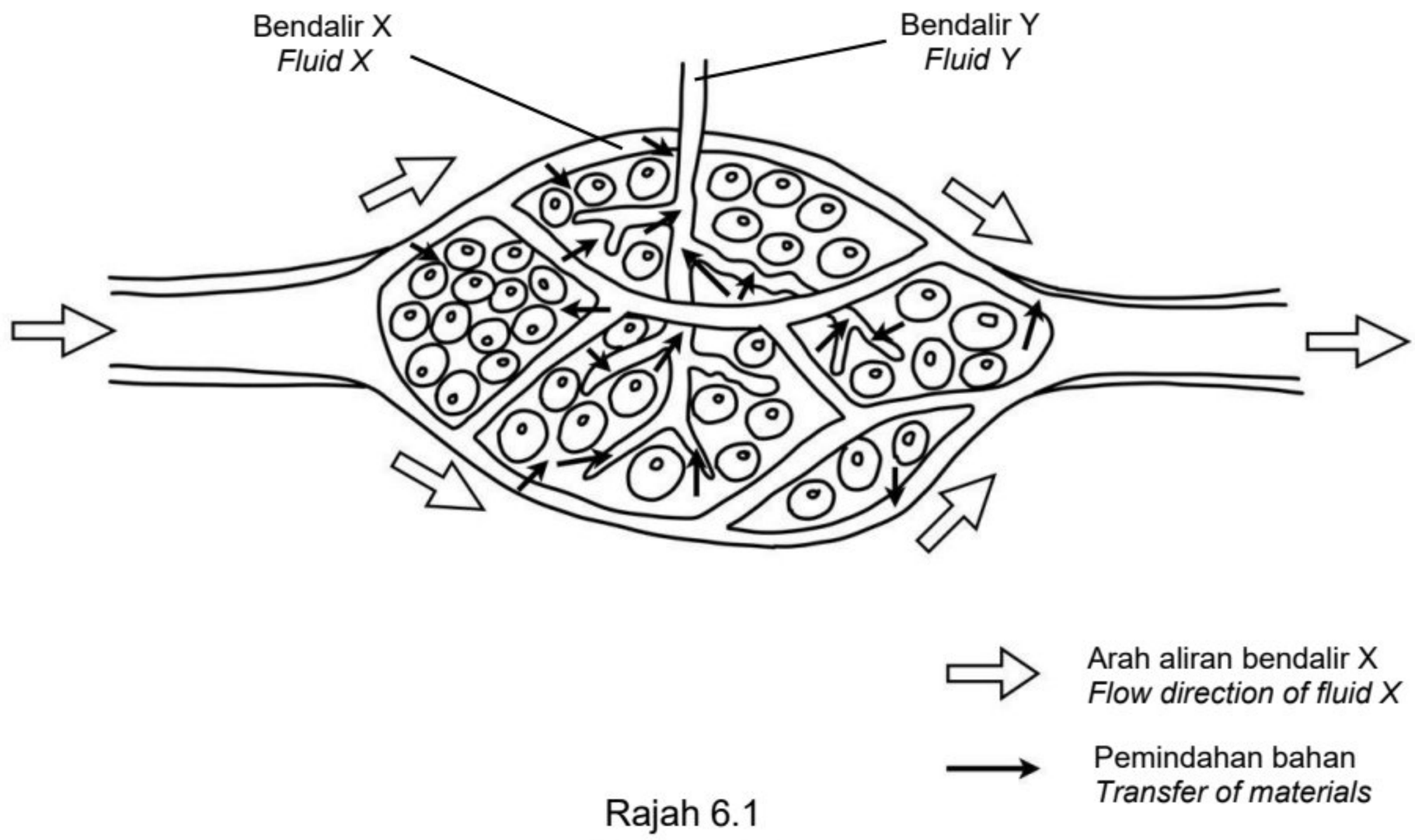
.....

.....

.....

[2 markah/ 2 *marks*]

6. Rajah 6.1 menunjukkan sebahagian sistem peredaran darah dan sistem limfa pada manusia.
Diagram 6.1 shows the parts of the blood circulatory system and lymphatic system in human.



Rajah 6.1
Diagram 6.1

a) (i) Namakan:
Name:

Bendalir X: .....
Fluid X

Bendalir Y: .....
Fluid Y

[2 markah/ *2 marks*]

(ii) Labelkan bendalir tisu pada Rajah 6.1.
Label tissue fluid in Diagram 6.1.

[1 markah/ *1 mark*]

(iii) Banding bezakan bendalir X dan bendalir Y.
Compare and contrast fluid X and fluid Y.

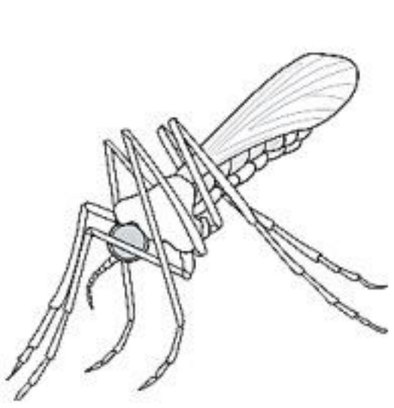
.....

.....

.....

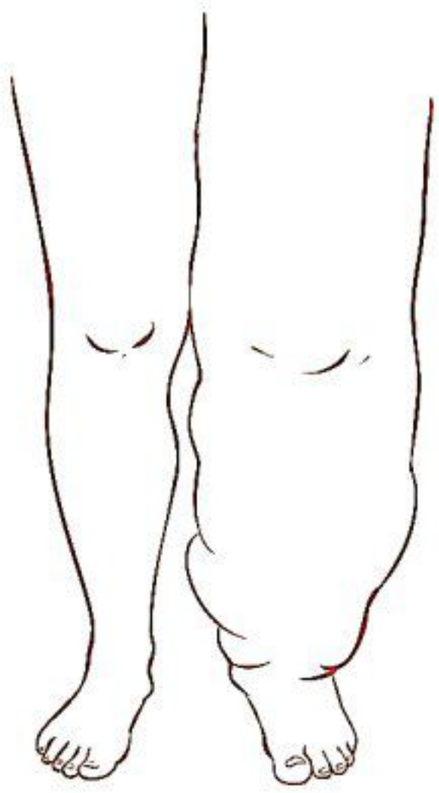
[2 markah/ *2 marks*]

b) Rajah 6.2 menunjukkan sejenis cacing yang dipindahkan oleh nyamuk kepada manusia. Nyamuk tersebut adalah vektor kepada penyakit M.
Diagram 6.2 shows a type of worm which is transmitted by mosquitoes to human. The mosquito is the vector of disease M.



Nyamuk memindahkan larva cacing semasa menggigit manusia
Mosquito transmits worm larvae while biting human

Larva cacing membiak dalam salur limfa
Worm larvae reproduce in lymphatic vessels



Penyakit M
Disease M

Rajah 6.2
Diagram 6.2

Cadangkan langkah-langkah untuk mengelakkan penyakit M.
Suggest ways to prevent disease M.

.....

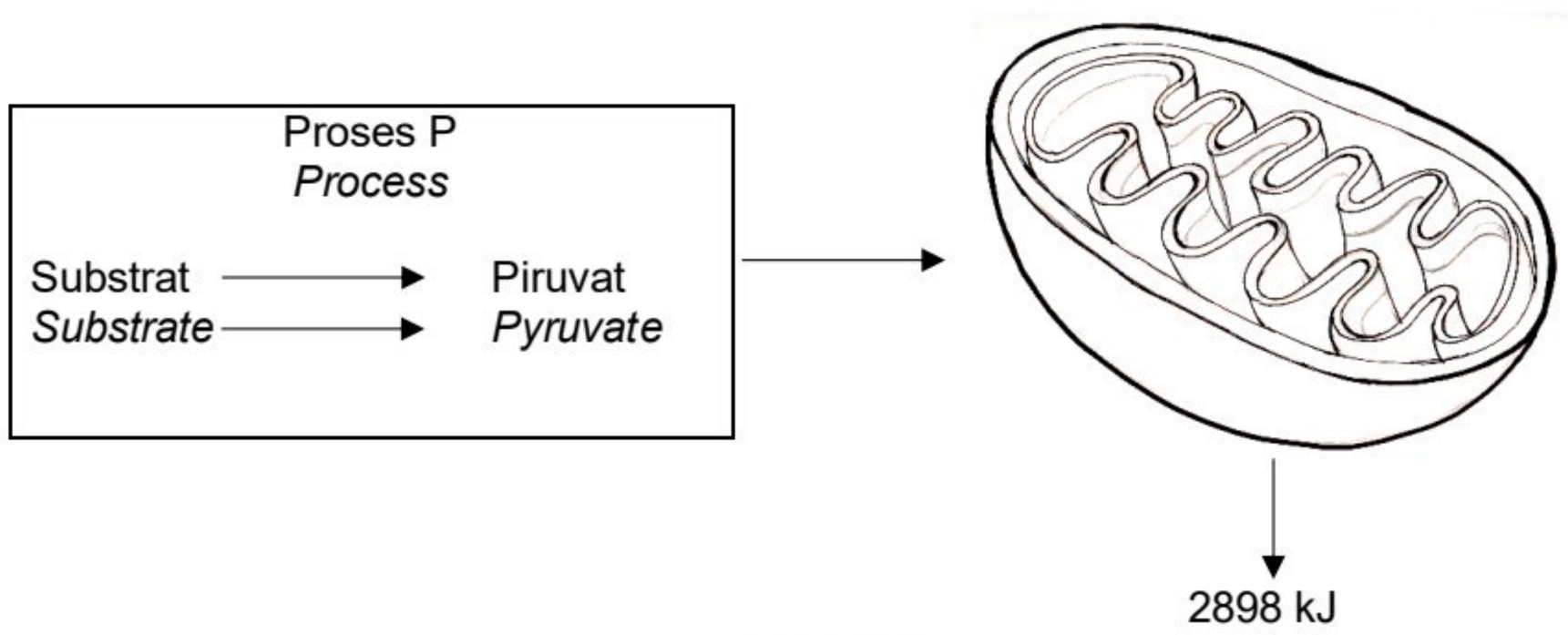
.....

.....

.....

[3 markah/ 3 *marks*]

7. Rajah 7.1 menunjukkan proses respirasi aerob yang berlaku dalam sel haiwan.
Diagram 7.1 shows the process of aerobic respiration that occurs in animal cells.



Rajah 7.1
Diagram 7.1

a) (i) Namakan proses P.
Name process P.

.....

[1 markah/ *1 mark*]

(ii) Namakan substrat utama dalam proses P.
Name the main substrate in process P?

.....

[1 markah/ *1 mark*]

b) Tuliskan persamaan perkataan bagi respirasi aerob yang berlaku dalam sel tersebut.
Write the word equation for aerobic respiration that occurs in the cell.

.....

[1 markah/ *1 mark*]

c) Seorang atlet pecut 100-meter bernafas dengan cepat dalam tempoh beberapa minit selepas menamatkan lariannya.
Terangkan mengapa.
A 100-meter sprinter breathes rapidly for several minutes after finishing his race.
Explain why.

.....

.....

.....

[3 markah/ 3 *marks*]

d) Rajah 7.2 menunjukkan sejenis bahan yang diambil oleh seorang atlet semasa latihan kecergasan yang melibatkan aktiviti lasak.
Diagram 7.2 shows a type of substance taken by an athlete during fitness training involving vigorous activities.

Rajah 7.2
Diagram 7.2

Berdasarkan Rajah 7.2, wajarkan pengambilan bahan tersebut semasa latihan kecergasan.
Based on Diagram 7.2, justify the intake of these substances during fitness training.

.....

.....

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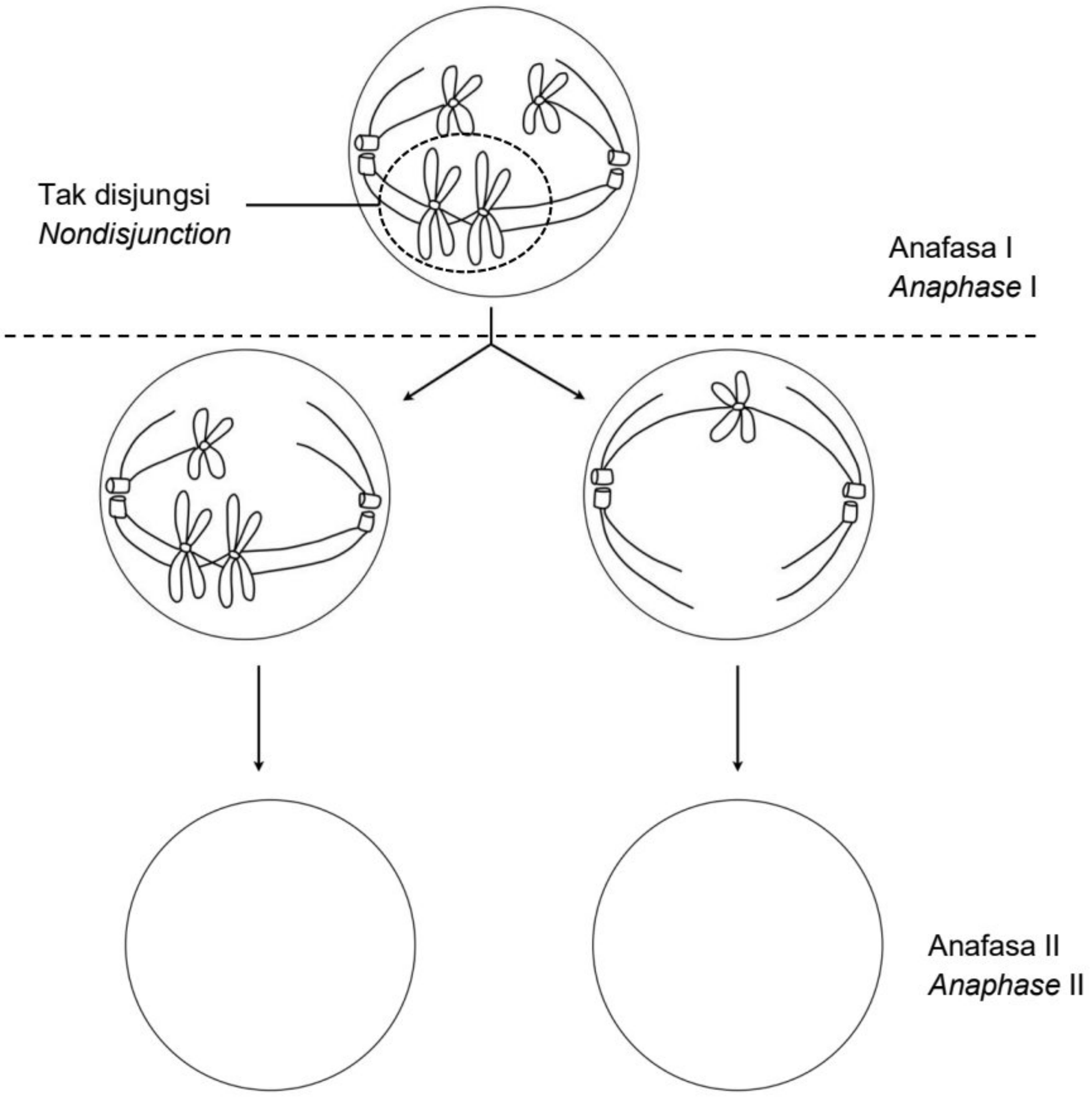
.....

[3 markah/ 3 *marks*]

8 Rajah 8.1 menunjukkan tak disjungsi pada kromosom homolog dalam salah satu peringkat semasa Meiosis I.
Diagram 8.1 *shows nondisjunction of homologous chromosomes in one of the stages during Meiosis I.*

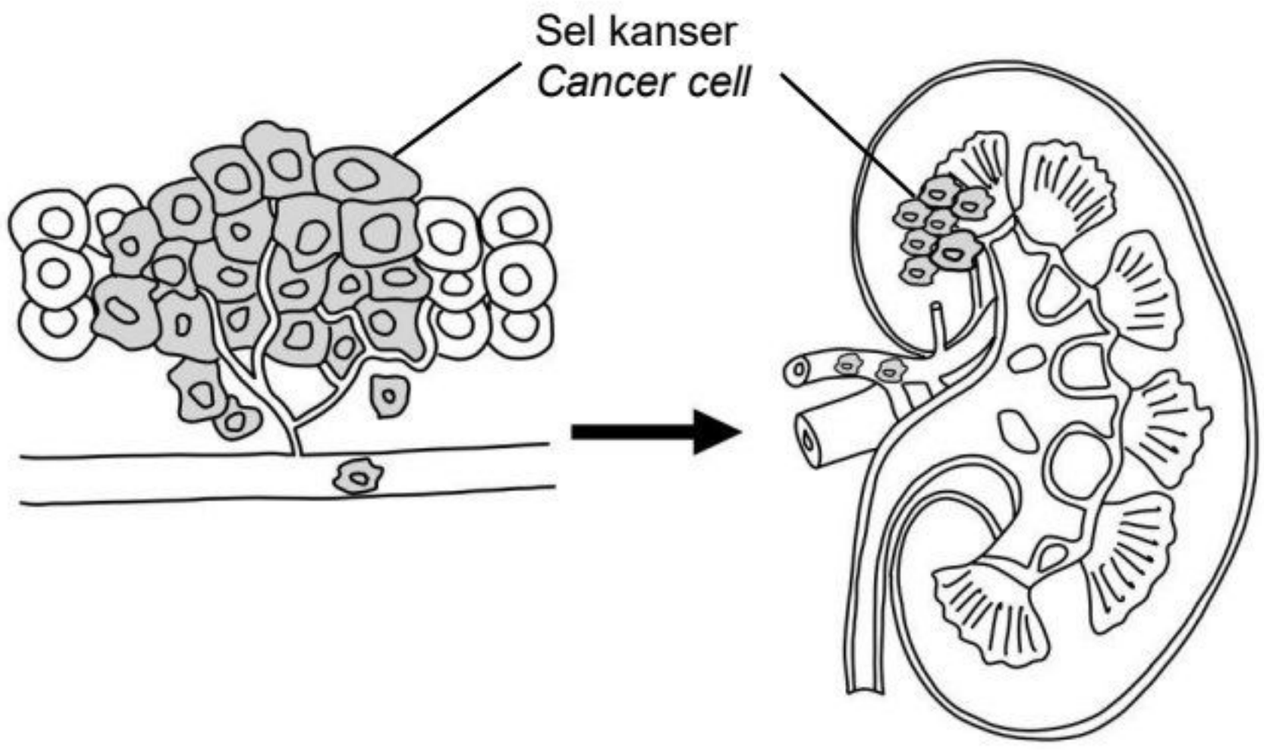


Rajah 8.1
Diagram 8.1

a) Lengkapkan Rajah 8.1 untuk menunjukkan kesan tak disjungsi semasa anafasa II.
Complete Diagram 8.1 *to show the effect of nondisjunction during anafasa II.*

[2 markah / 2 *marks*]

b) Rajah 8.2 menunjukkan sejenis tumor yang merebak kepada tisu dan organ lain dalam badan.
Diagram 8.2 shows a type of tumour that has spread to other tissues and organs in the body.



Rajah 8.2
Diagram 8.2

Cadangkan satu cara yang boleh digunakan untuk merawat tumor tersebut. Terangkan.
Suggest a method that can be used to treat the tumour.
Explain.

.....

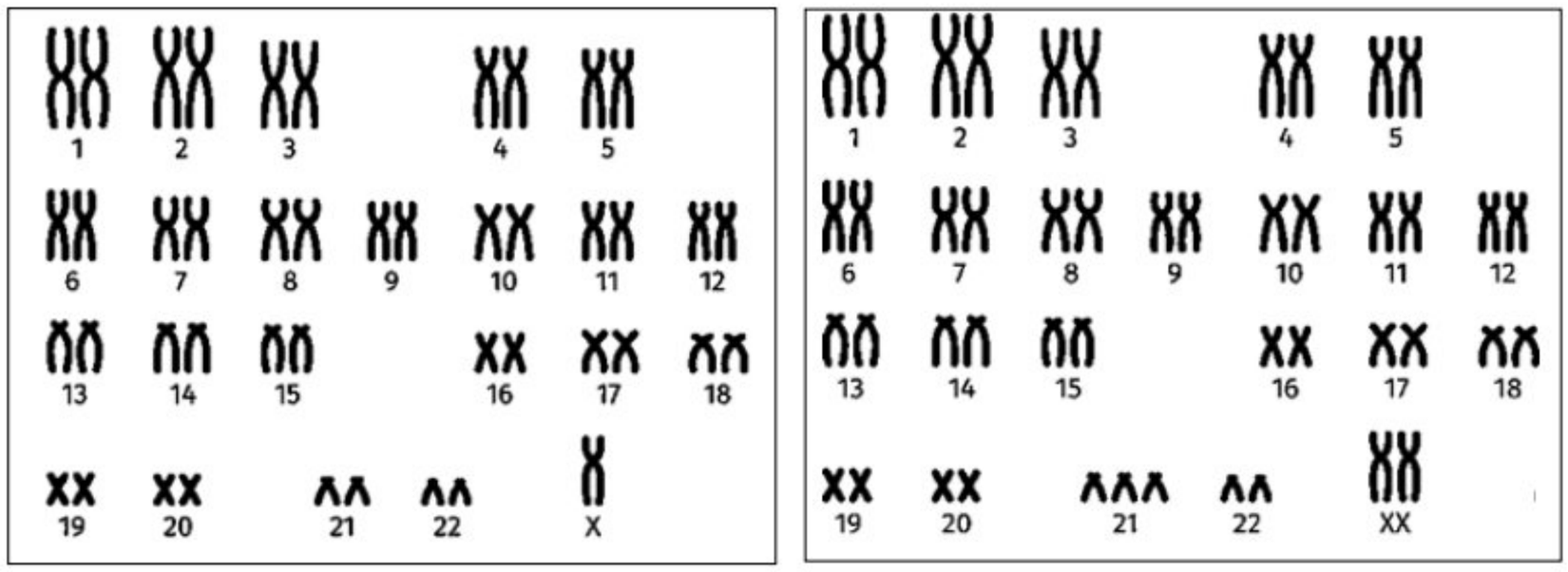
.....

.....

.....

[3 markah / *3 marks*]

c) Rajah 8.3 menunjukkan kariotip dua individu yang mempunyai penyakit genetik.
Diagram 8.3 *shows the karyotypes of two individuals who have a genetic disease.*



Individu A
Individual A

Individu B
Individu B

Rajah 8.3
Diagram 8.3

Lengkapkan Jadual 4 untuk menunjukkan perbezaan mutasi bagi kedua-dua individu tersebut.
Complete Table 4 to show the differences of mutations for both individuals.

Aspek *Aspect*	Individu A *Individual A*	Individu B *Individual B*
Nama penyakit *Name of disease*		
Jenis sel terlibat *Type of cell involved*		

Jadual 4
Table 4

[2 markah / 2 *marks*]

d) Penyataan di bawah menunjukkan petikan keratan akhbar.
Statement below shows an article from a newspaper.

Nasib Mangsa Agen Oren

Agen Oren ialah campuran bahan kimia kuat yang digunakan oleh tentera AS semasa Perang Vietnam untuk menghapuskan tentera Vietnam Utara dan Viet Cong, serta tanaman yang mungkin digunakan untuk memberi makan kepada mereka. Ia kemudiannya didedahkan telah menyebabkan masalah kesihatan yang serius termasuk tumor, kecacatan kelahiran, ruam, gejala psikologi dan kanser dalam kalangan askar AS yang pulang dan keluarga mereka serta dalam kalangan penduduk Vietnam.

Sinar Harian, 15 Mac 2014

The Fate of Agent Orange Victims

Agent Orange was a powerful chemical mixture used by the US military during the Vietnam War to eliminate for North Vietnamese and Viet Cong troops, as well as crops that might have been used to feed them. It was later revealed to cause serious health problems including tumors, birth defects, rashes, psychological symptoms, and cancer among returning US soldiers and their families, as well as among the Vietnamese population.

Sinar Harian, 15th March 2014

Wajarkan larangan ke atas penggunaan senjata kimia dalam peperangan.
Justify the prohibiton on the use of chemical weapons in warfare.

.....

.....

.....

[2 markah / *2 marks*]

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 salmon terubah suai genetik dan salmon normal. Gen pertumbuhan ikan salmon Chinook dimasukkan ke dalam genom ikan salmon Atlantik bagi menghasilkan ikan salmon terubah suai genetik.
Diagram 9.1 shows a genetically modified salmon and normal salmon. Chinook salmon growth genes were inserted into the Atlantic salmon genome to produce genetically modified salmon.

Ikan salmon terubah suai genetik *Genetically modified salmon*		
Usia: 18 bulan *Age: 18 months*	Panjang: 61 cm *Length: 61 cm*	Berat: 3 kg *Weight 3 kg*

Ikan salmon normal *Normal salmon*		
Usia: 18 bulan *Age: 18 months*	Panjang: 33 cm *Length: 33 cm*	Berat: 1.3 kg *Weight 1.3 kg*

Rajah 9.1
Diagram 9.1

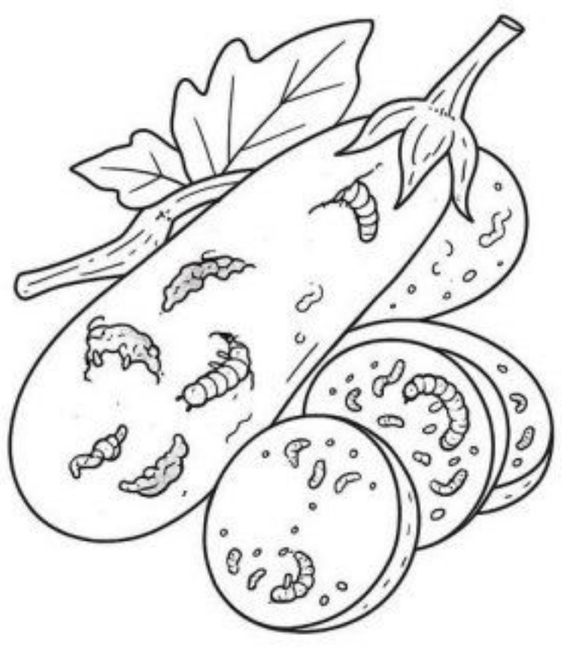
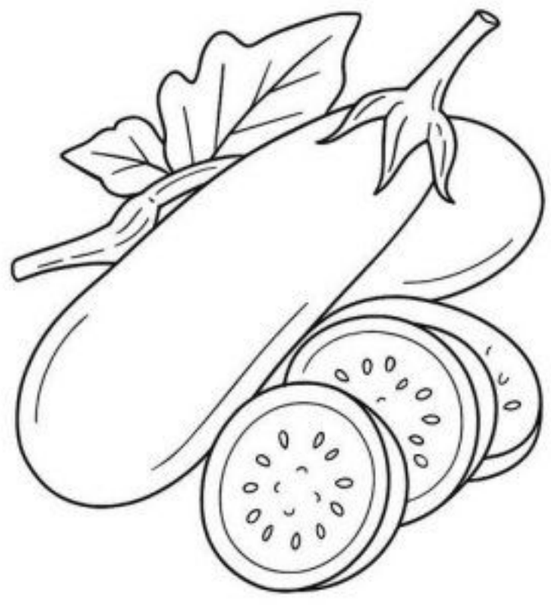
a) i) Definisikan organisma terubah suai genetik.
Define genetically modified organism.

[2 markah/ 2 *marks*]

ii) Bincangkan kebaikan salmon terubah suai genetik dalam bidang penternakan ikan.
Discuss the benefits of genetically modified salmon in fish farming.

[5 markah/ *5 marks*]

b) Rajah 9.2 menunjukkan dua keadaan yang berbeza untuk terung yang diusahakan secara komersial oleh seorang petani.
Diagram 9.2 shows two different conditions for eggplant grown commercially by a farmer.

Keadaan 1 ***Condition 1***	**Keadaan 2** ***Condition 2***
	
Terung biasa daripada penanaman biji benih terung semula jadi *Normal eggplants from the cultivation of natural eggplant seeds*	Terung Bt daripada penanaman biji benih organisma terubah suai genetik (GMO) *Bt eggplants from cultivation of Genetically Modified Organism (GMO) seeds*

Rajah 9.2
Diagram 9.2

Petani tersebut telah mengaplikasikan teknik penghasilan biji benih terung Bt menggunakan sejenis bakteria tanah.
The farmer has applied the technique of producing Bt eggplant seeds using a type of soil bacteria.

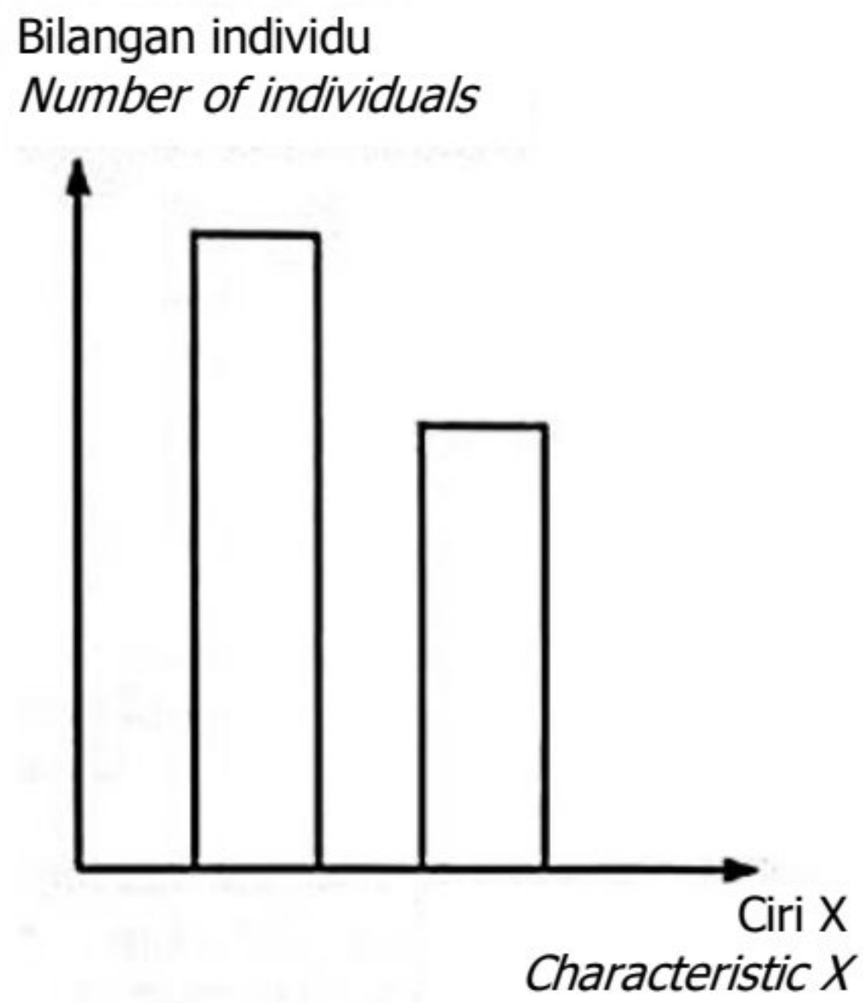
(i) Huraikan teknik bagi menghasilkan biji benih terung Bt.
Describe the technique to produce Bt eggplant seeds.

[3 markah/ 3 *marks*]

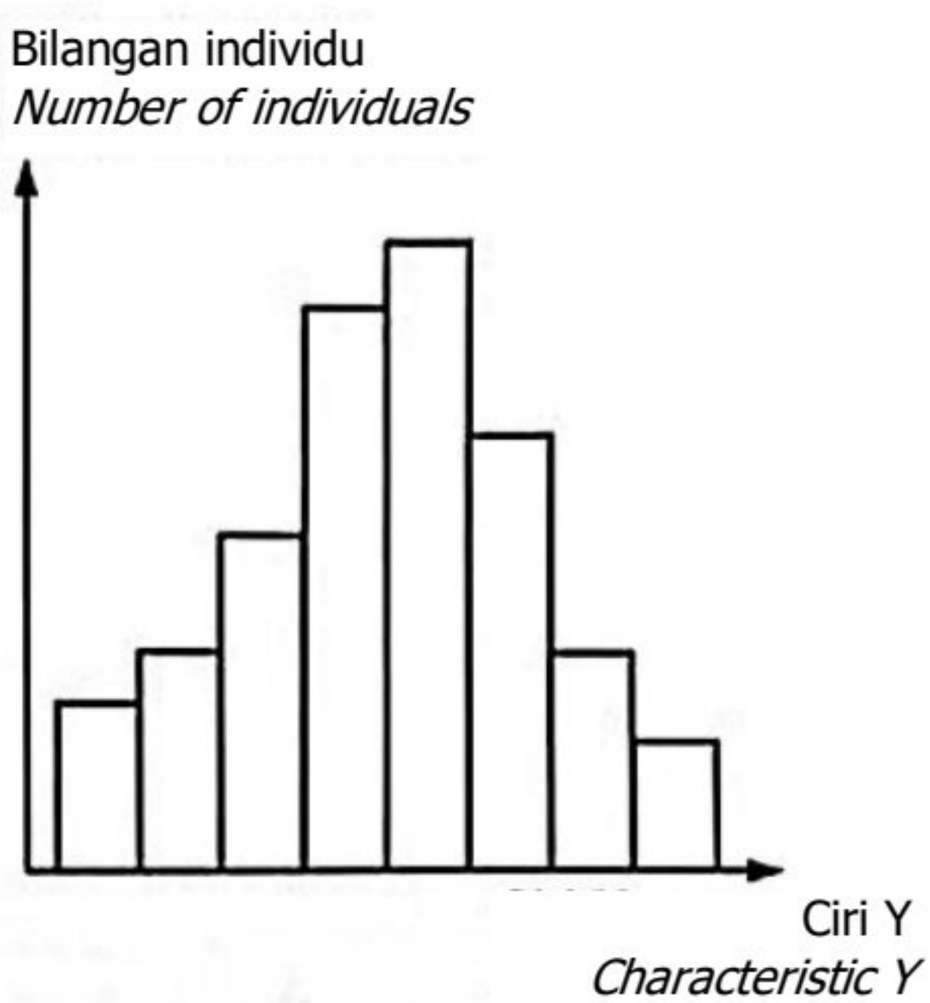
(ii) Bincangkan kebaikan penggunaan biji benih terung Bt.
Discuss the advantages of using Bt eggplant seeds.

[3 markah/ 3 *marks*]

c) Rajah 9.3 (a) dan Rajah 9.3 (b) menunjukkan graf bagi dua jenis variasi yang berbeza.
Diagram 9.3 (a) and Diagram 9.3 (b) shows graphs for two different types of variation.



Rajah 9.3 (a)
Diagram 9.3 (a)

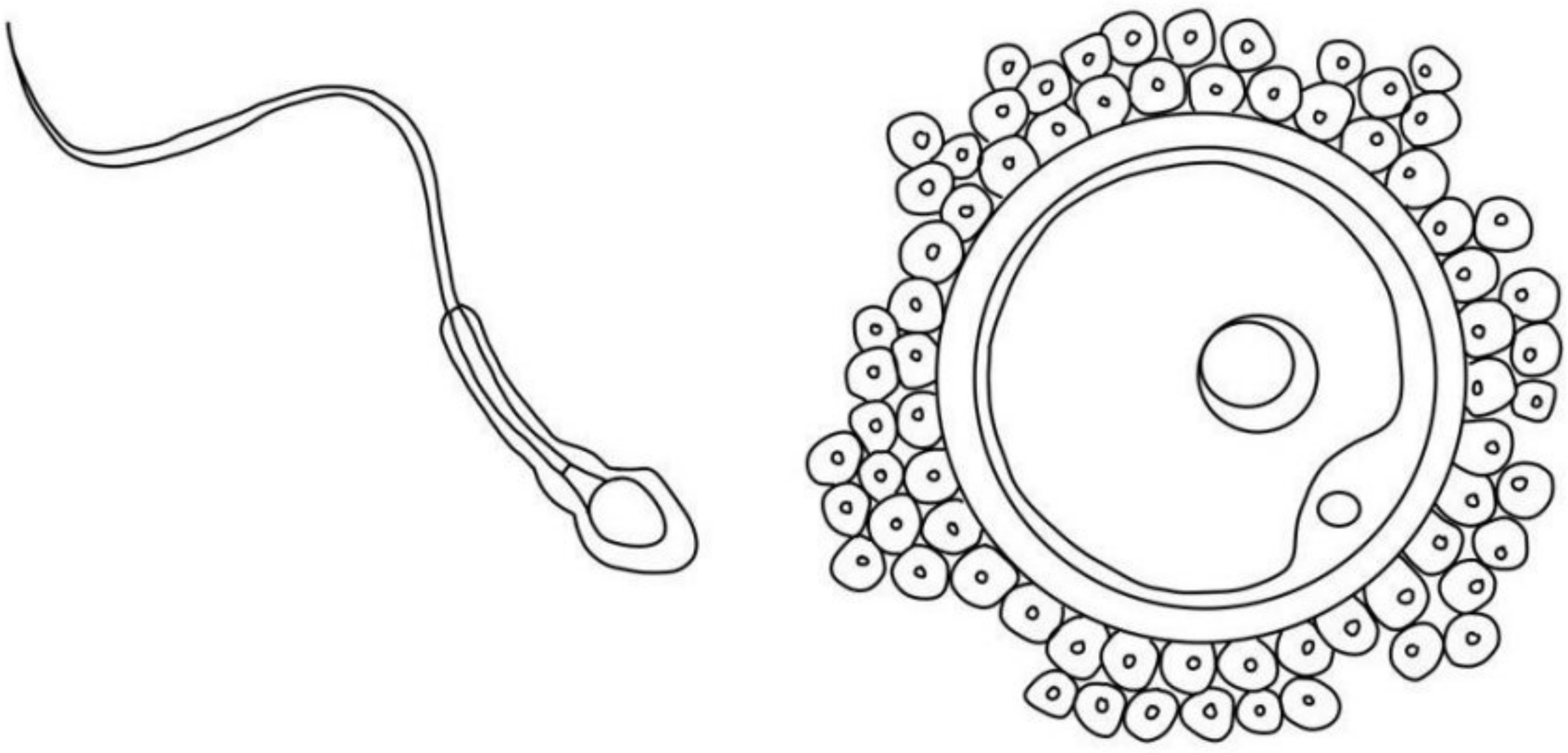


Rajah 9.3 (b)
Diagram 9.3 (b)

Banding bezakan jenis variasi pada Rajah 9.3 (a) dan Rajah 9.3 (b).
Compare and contrast the type of variation in Diagram 9.3 (a) and Diagram 9.3 (b).

[7 markah/ 7 *marks*]

10. Rajah 10.1 menunjukkan dua sel yang terlibat dalam proses pembiakan manusia.
Diagram 10.1 shows two cells involved in human reproduction process.



Sel A
Cell A

Sel B
Cell B

Rajah 10.1
Diagram 10.1

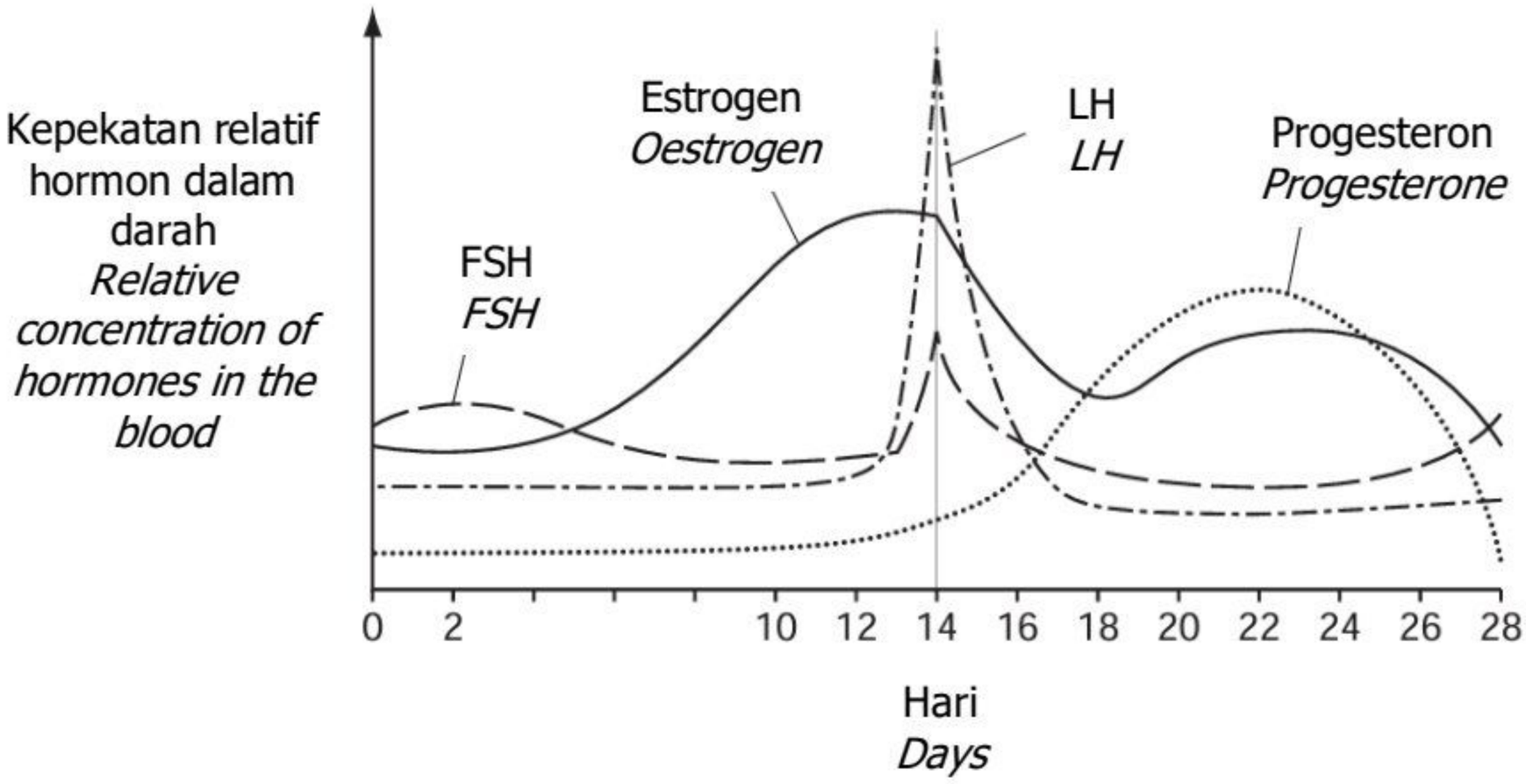
a) i) Terangkan struktur bagi kedua-dua sel tersebut.
Explain the structure for both cells.

[3 markah/ 3 *marks*]

ii) Banding dan bezakan proses penghasilan kedua-dua sel tersebut.
Compare and contrast the production processes for both cells.

[6 markah/ 6 *marks*]

(b) Rajah 10.2 menunjukkan perubahan kepekatan hormon dalam darah semasa satu kitar haid.
Diagram 10.2 shows changes in hormone concentrations in the blood during one menstrual cycle.



Rajah 10.2
Diagram 10.2

(i) Terangkan bagaimana perubahan aras hormon yang dirembeskan semasa kitar haid mengawal perkembangan folikel dalam ovari dan perubahan ketebalan dinding endometrium.
Explain how the changes in hormonal level secreted during the menstrual cycle controls the follicles development in ovaries and changes in the thickness of the endometrial wall.

[7 markah/ *7 marks*]

(ii) Rajah 10.3 menunjukkan sejenis hormon yang mempunyai peranan yang sama seperti hormon peluteinan.
Diagram 10.3 shows a type of hormone that that has a similar role as the luteinising hormone.

Rajah 10.3
Diagram 10.3

Seorang wanita tidak boleh hamil disebabkan kegagalan dalam pengovulan. Doktor telah memberikan suntikan hormon seperti Rajah 10.3 kepada wanita tersebut. Wanita itu telah hamil setelah rawatan hormon tersebut.
A woman cannot get pregnant due to failure in ovulation. The doctor gave the woman a hormone injection as shown in Diagram 10.3. The woman became pregnant after the hormone treatment.

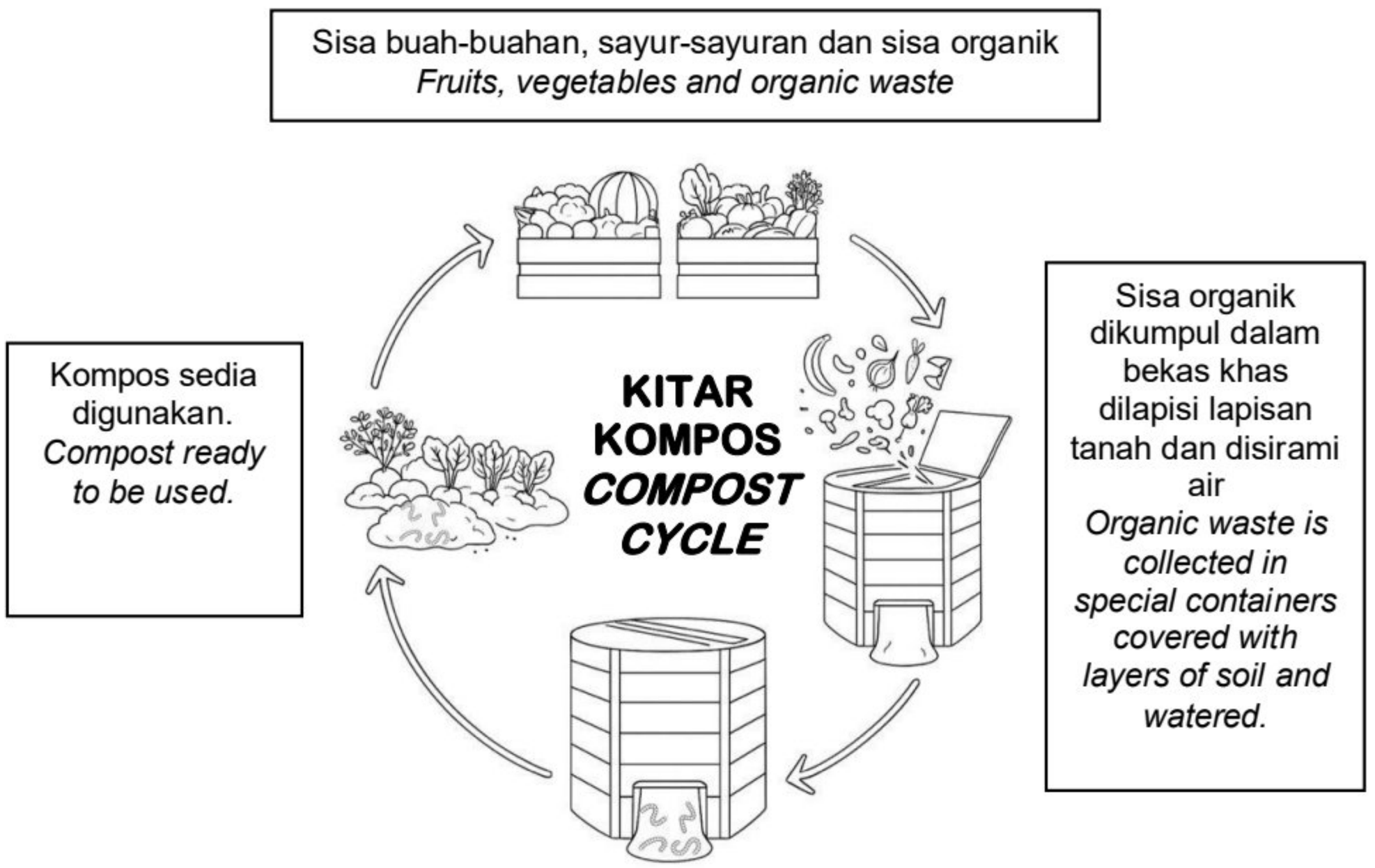
Berdasarkan pernyataan di atas, terangkan bagaimana suntikan hormon tersebut membolehkan proses kehamilan.
Based on the above statement, explain how the injections of the hormone enable the process of pregnancy.

[4 markah/ 4 *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 amalan berkonsep teknologi hijau yang dipraktikkan oleh seorang petani.
Diagram 11.1 shows green technology concept practices practiced by a farmer.



Rajah 11.1
Diagram 11.1

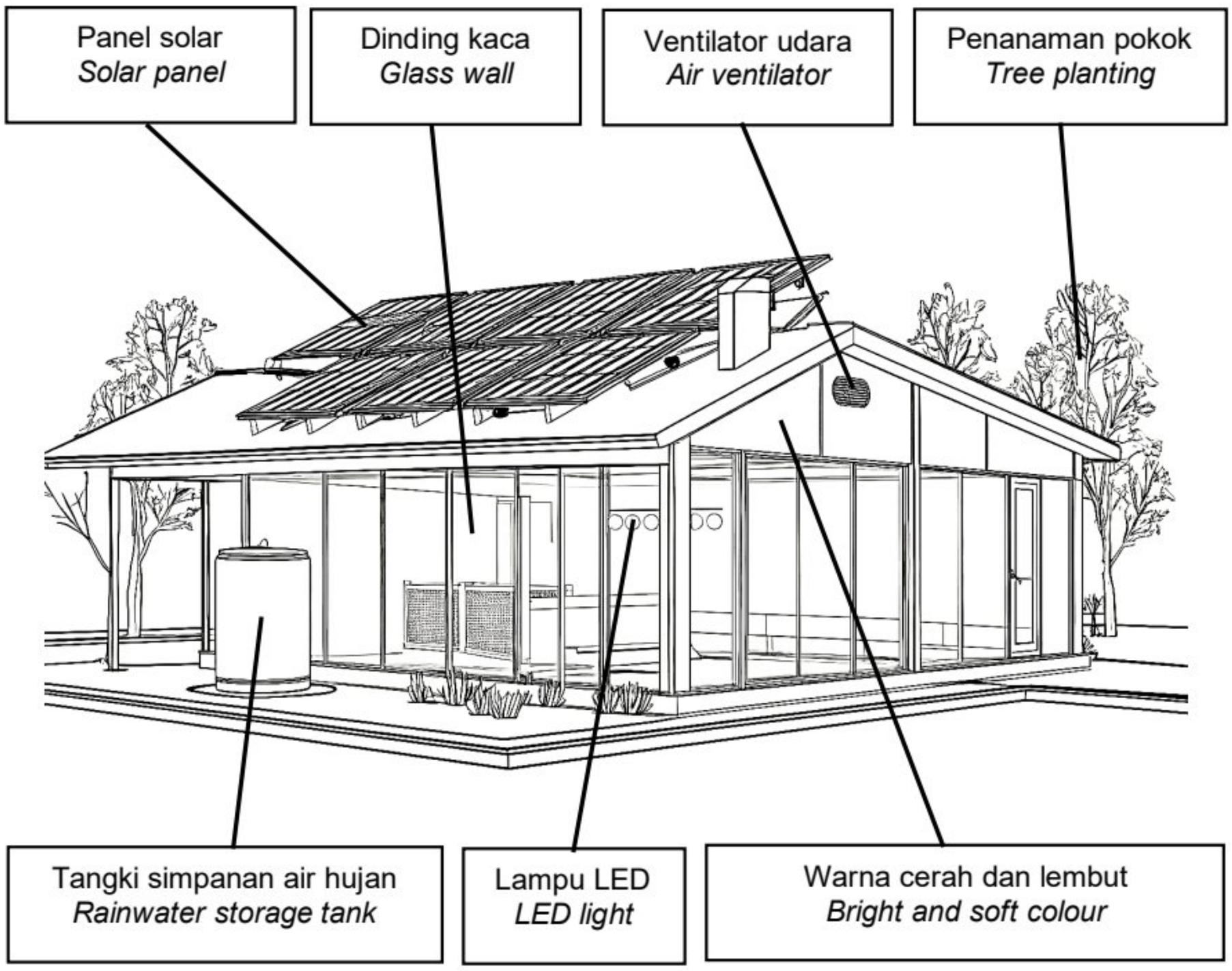
a) i) Definisikan teknologi hijau.
Define green technology.

[2 markah/ 2 *marks*]

ii) Berdasarkan Rajah 11.1, bincangkan kebaikan amalan yang dipraktikkan oleh petani tersebut.
Bases on Diagram 11.1, discuss the benefits of the practices practiced by the farmer.

[6 markah/ 6 *marks*]

b) Rajah 11.2 menunjukkan rekaan sebuah rumah moden yang menitikberatkan penggunaan sumber semula jadi seperti air, tenaga dan bahan dengan cekap.
Diagram 11.2 shows the design of a modern house that emphasizes on the efficient use of natural resources such as water, energy and materials.

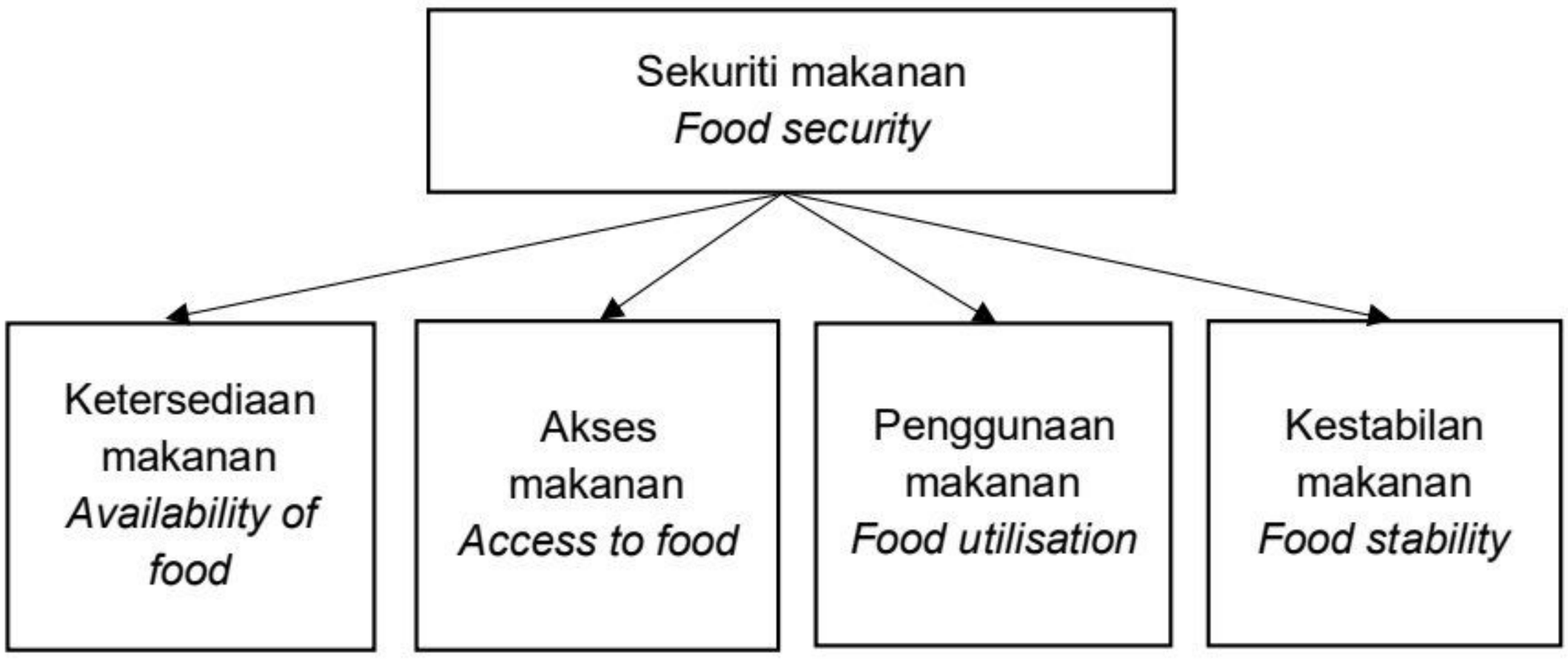


Rajah 11.2
Diagram 11.2

Berdasarkan Rajah 11.2, wajarkan ciri-ciri yang terdapat pada rekaan rumah tersebut untuk memenuhi kehendak Indeks Bangunan Hijau.
Based on Diagram 11.2, justify the characteristics found in the house design to meet the requirements of the Green Building Index.

[8 markah/ 8 *marks*]

c) Rajah 11.3 menunjukkan empat komponen penting dalam sekuriti makanan.
Diagram 11.3 shows four importance component of food security.



Rajah 11.3
Diagram 11.3

Berdasarkan komponen dalam Rajah 11.3, cadangkan peranan yang boleh dimainkan oleh pengusaha kantin di sekolah anda untuk memenuhi tanggungjawab dalam menjayakan sekuriti makanan.
Based on component in Diagram 11.3, suggest the role that can be played by canteen operators in your school to fulfill their responsibilities in achieving food security.

[4 markah/ 4 *marks*]