

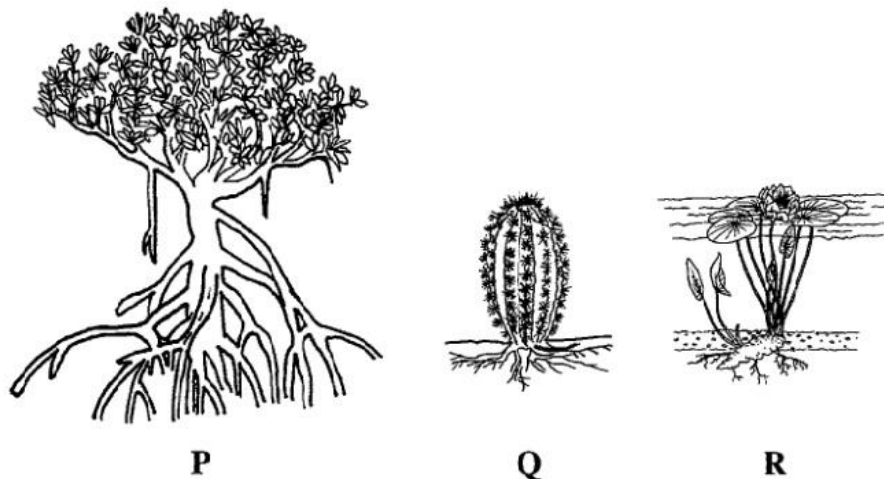
Bahagian A

[60 markah]

Jawab **semua** soalan.

- 1** Tumbuhan boleh dikelaskan berdasarkan habitatnya. Rajah 1 menunjukkan tiga contoh tumbuhan iaitu **P**, **Q** dan **R**.

*Plants can be classified according to their habitat. Diagram 1 shows three examples of plants which are **P**, **Q** and **R**.*



Rajah 1
Diagram 1

- (a) Berdasarkan Rajah 1, nyatakan satu contoh habitat untuk tumbuhan **P**.
*Based on Diagram 1, state one example of habitat for plant **P**.*

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

- (b) Kelas bagi tumbuhan **P** berdasarkan habitatnya ialah halofit.
Nyatakan kelas bagi tumbuhan **Q** dan tumbuhan **R** berdasarkan habitatnya.
*Class for plant **P** based on their habitat is halophyte.*
*State the class of plant **Q** and **R** based on their habitat.*

Q:

R:

[2 markah]
[2 marks]

- (c) Tumbuhan memerlukan air untuk pertumbuhan dan metabolisme. Tumbuhan **Q** banyak dijumpai di gurun.
 Terangkan bagaimana tumbuhan **Q** beradaptasi untuk mendapatkan air di kawasan tersebut.
Plants need water for growth and metabolism. Plant Q is found mainly in the desert.
Explain how plant Q is adapted to obtain water in the area.

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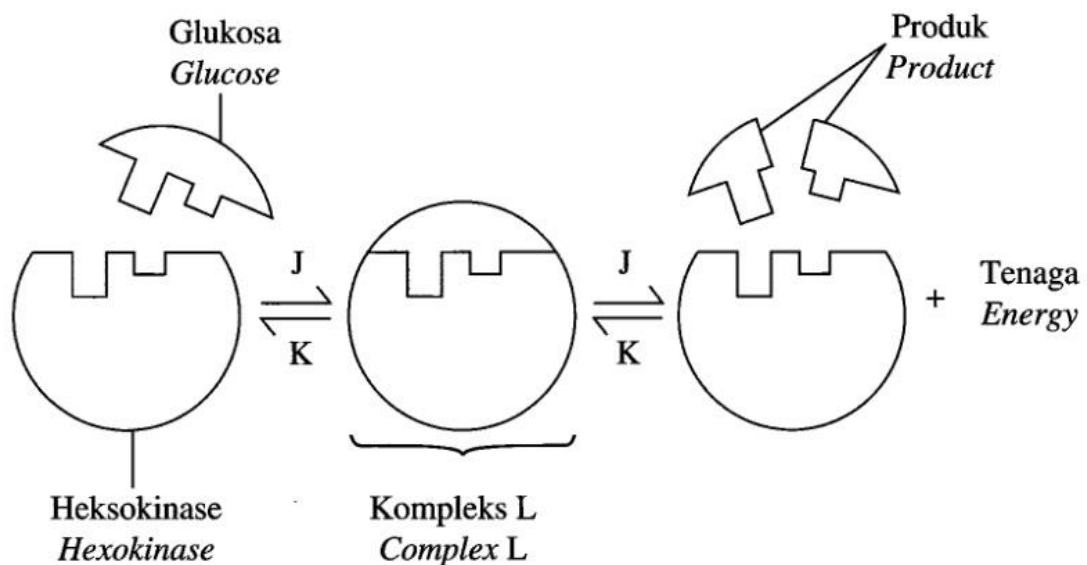
[2 markah]
 [2 marks]

- (d) Tumbuhan **R** mempunyai daun yang lebar dan tisu aerenkima yang banyak.
 Nyatakan peranan adaptasi ini kepada tumbuhan tersebut.
Plant R has broad leaves and a lot of aerenchyma tissues.
State the role of this adaptation to the plant.

.....

[1 markah]
 [1 mark]

- 2 Rajah 2 menunjukkan metabolisme **J** dan **K** dalam sel yang dimangkin oleh enzim.
Diagram 2 shows metabolisme J and K in a cell that are catalysed by an enzyme.



Rajah 2
 Diagram 2

- (a) (i) Nyatakan nama bagi kompleks **L**.
State the name of complex L.

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

- (ii) Nyatakan jenis enzim heksokinase
State the type of hexokinase enzyme.

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

- (b) Berdasarkan Rajah 2, nyatakan jenis metabolisme **J** dan **K**.
Based on Diagram 2, state the types of metabolism **J** and **K**.

J:

K:

[2 markah]
[2 marks]

- (c) Pernyataan berikut adalah tentang sifat umum enzim.
The following statement is about the general characteristic of enzyme.

Merkuri ialah logam berat paling toksik yang merencat fungsi enzim. <i>Mercury is the most toxic heavy metal which inhibits the function of enzyme.</i>
--

Terangkan kesan merkuri ke atas aktiviti enzim heksokinase.
Explain the effects of mercury on the activity of hexokinase enzyme.

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

[2 markah]
[2 marks]

- 3 Rajah 3.1 menunjukkan tumbuhan **M** di habitatnya.
Diagram 3.1 shows plant M in its habitat.



Rajah 3.1
 Diagram 3.1

- (a) Nyatakan organ pada tumbuhan M yang terlibat dalam pengambilan air dan garam mineral.
State the organ of plant M that is involved in the uptake of water and mineral salts.

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

- (b) (i) Nyatakan penyesuaian nutrisi bagi tumbuhan M.
State the nutritional adaptation of plant M.

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

- (ii) Terangkan jawapan anda di 3(b)(i).
Expalin your answer in 3(b)(i).

.....

[2 markah]
 [2 marks]

- (c) Seorang pekebun telah memindahkan tumbuhan M ke tapak semaian. Rajah 3.2 menunjukkan sejenis baja yang digunakan oleh pekebun tersebut.
A farmer transferred plant M to the nursery. Diagram 3.2 shows a type of fertiliser used by the farmer.



Rajah 3.2
Diagram 3.2

Berdasarkan Rajah 3.2, terangkan kesan makronutrien dalam baja tersebut terhadap pertumbuhan tumbuhan M.

Based on Diagram 3.2, explain the effects of the macronutrients in the fertiliser to the growth of plant M.

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.....

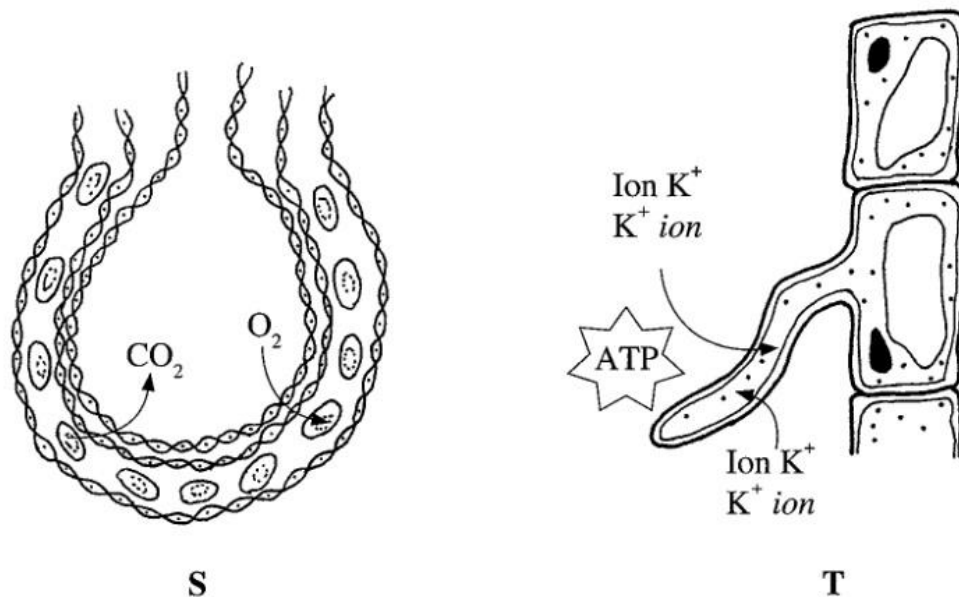
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[3 markah]
[3 marks]

- 4 Rajah 4.1 menunjukkan dua jenis pergerakan bahan merentas membrane plasma.
 Diagram 4.1 shows two types of movements of substances across the plasma membrane.



Rajah 4.1
 Diagram 4.1

- (a) (i) Nyatakan jenis pergerakan bahan dalam Rajah 4.1.
 State the type of movement of substances in Diagram 4.1.

S :

T :

[2 markah]
 [2 marks]

- (ii) Nyatakan **satu** ciri bahan yang dapat merentasi membrane plasma pada S.
 State **one** characteristic of the substances which can move across the plasma membrane in S.

.....

[1 markah]
 [1 mark]

- (b) Berikan **dua** perbezaan antara proses S dengan proses T.
 Give **two** differences between process S and T.

.....

.....

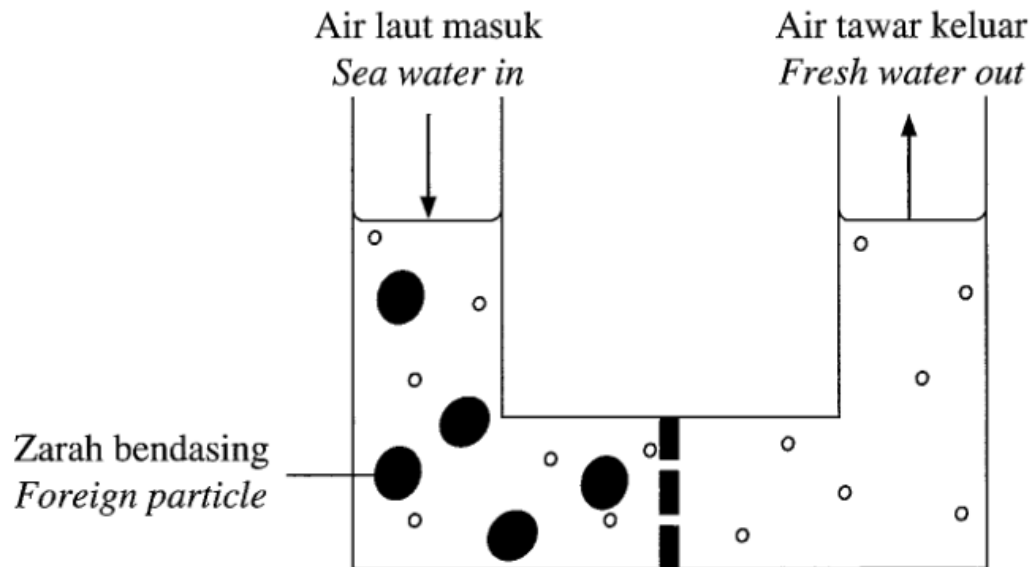
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[2 markah]
 [2 marks]

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- (c) Kebanyakan negara Timur Tengah menggunakan proses penyahgaraman bagi menapatkan bekalan air tawar daripada air laut. Rajah 4.2 menunjukkan konsep asas proses yang terlibat.

Most of the Middle East countries use desalination process to obtain fresh water supply from the sea water. Diagram 4.2 shows the basic concept of the process involved.



Rajah 4.2
Diagram 4.2

Berdasarkan Rajah 4.2, terangkan proses tersebut.
Based on Diagram 4.2, explain the process.

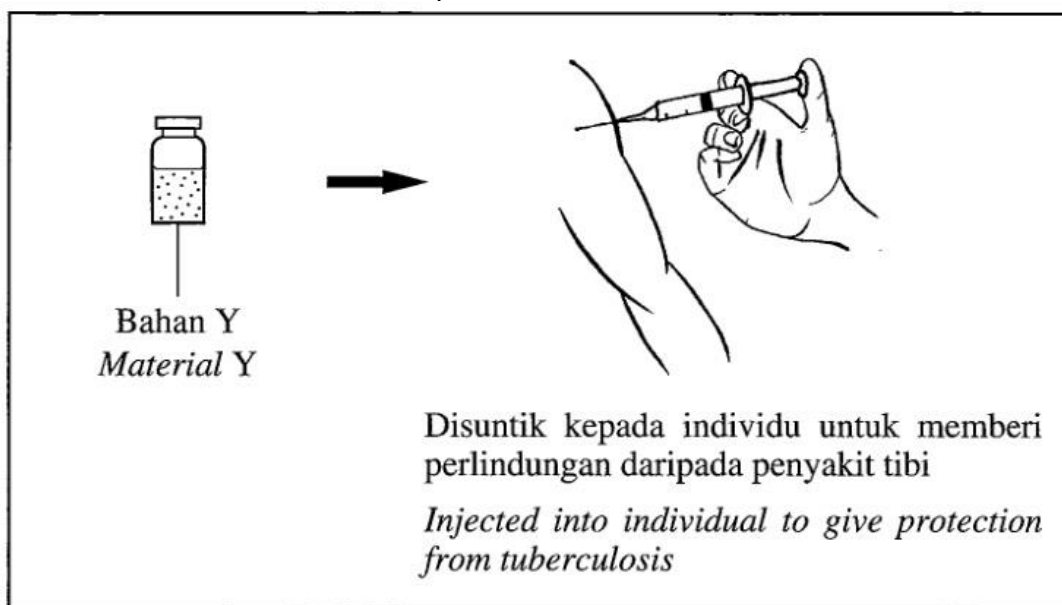
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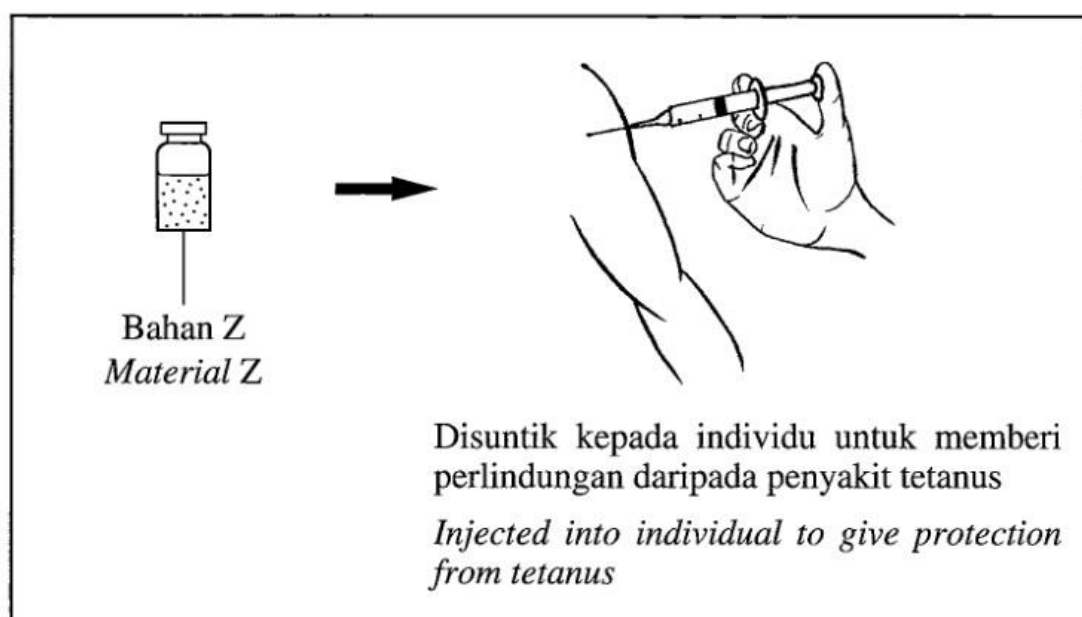
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[2 markah]
[2 marks]

- 5 Rajah 5.1 menunjukkan seorang individu disuntik dengan bahan Y. Rajah 5.2 menunjukkan seorang individu disuntik dengan bahan Z yang diekstrak daripada darah kuda.
Diagram 5.1 shows an individual is injected with material Y. Diagram 5.2 shows an individual is injected with material Z that is extracted from horse blood.



Rajah 5.1
Diagram 5.1



Rajah 5.2
Diagram 5.2

- (a) (i) Nyatakan jenis keimunan yang diperoleh oleh individu dalam Rajah 5.1 dan Rajah 5.2.
State the type of immunity obtained by individual 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) Bezakan antara bahan Y dengan Z. Tulis jawapan anda dalam ruang yang disediakan.
Differentiate between material Y and Z. Write your answer in the space provided.

Bahan Y <i>Material Y</i>	Bahan Z <i>Material Z</i>

[2 markah]
 [2 marks]

- (b) Rajah 5.3 menunjukkan poster tentang Kempen Kesedaran Penyusuan Susu Ibu.
Diagram 5.3 shows a poster about Breastfeeding Awareness Campaign.

SOKONG PENYUSUAN IBU KE ARAH KESEJAHTERAAN SEJAGAT <i>SUPPORT BREASTFEEDING TOWARDS THE UNIVERSAL WELL BEING</i> Susu ibu menyelamatkan nyawa anak dan memberikan perkembangan yang sihat dari segi keimunan <i>Breast milk saves baby's life and gives a healthy development in term of immunity</i>



Rajah 5.3
Diagram 5.3

- (i) Terangkan kebaikan susu ibu dari aspek keimunan.
Explain the advantages of breast milk in term of immunity.

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.....

[3 markah]
[3 marks]

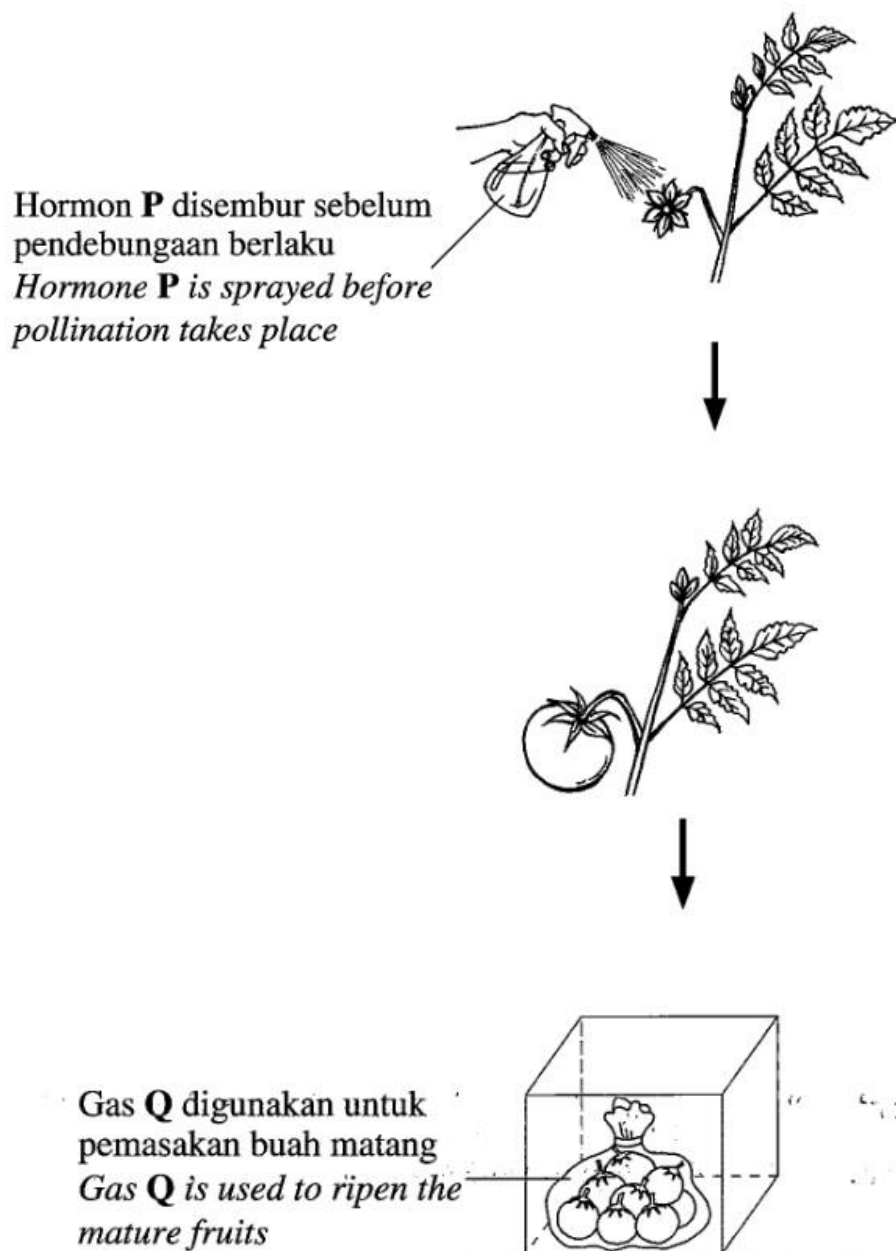
- (ii) Cadangkan satu cara lain bagaimana keimunan seperti di 5(b)(i) dapat diperoleh.
Suggest another way on how immunity in 5(b)(i) can be obtained.

.....

[1 markah]
[1 mark]

- 6 Rajah 6.1 menunjukkan penghasilan buah tomato untuk tujuan komersial dengan menggunakan fitohormon.

Diagram 6.1 shows production of tomatoes for commercial purpose by using phytohormone.



Rajah 6.1
Diagram 6.1

- (a) Nyatakan nama hormon **P** dan gas **Q**.
*State the name of hormone **P** and gas **Q**.*

P :

Q :

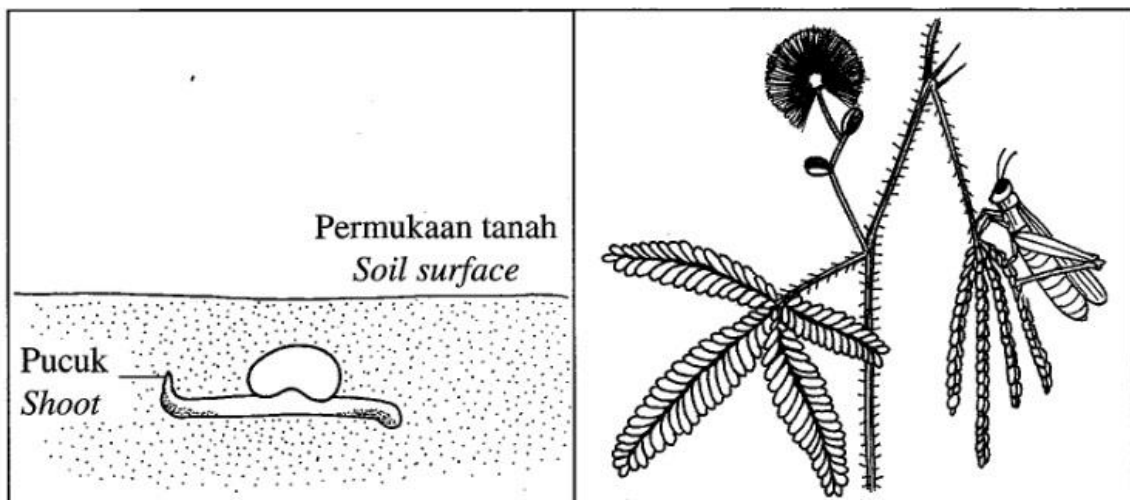
[2 markah]
 [2 marks]

- (b) Nyatakan peranan hormon **P** yang disembur pada bunga.
*State the role of hormone **P** that is sprayed onto the flower.*

.....

[1 markah]
 [1 mark]

- (c) Rajah 6.2(a) dan Rajah 6.2(b) menunjukkan dua jenis gerak balas pada tumbuhan.
Diagram 6.2(a) and Diagram 6.2(b) show two types of responses in plants.



Rajah 6.2(a)
 Diagram 6.2(a)

Rajah 6.2(b)
 Diagram 6.2(b)

- (i) Bagaimanakah pucuk dapat bergerak balas seperti yang ditunjukkan dalam Rajah 6.2(a)?
How does the shoot respond as shown in Diagram 6.2(a)?

.....

[3 markah]

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[3 marks]

- (ii) Apakah perbezaan antara gerak balas pada Rajah 6.2(a) dengan Rajah 6.2(b)?
What are the differences between the responses in Diagram 6.2(a) and Diagram 6.2(b)?

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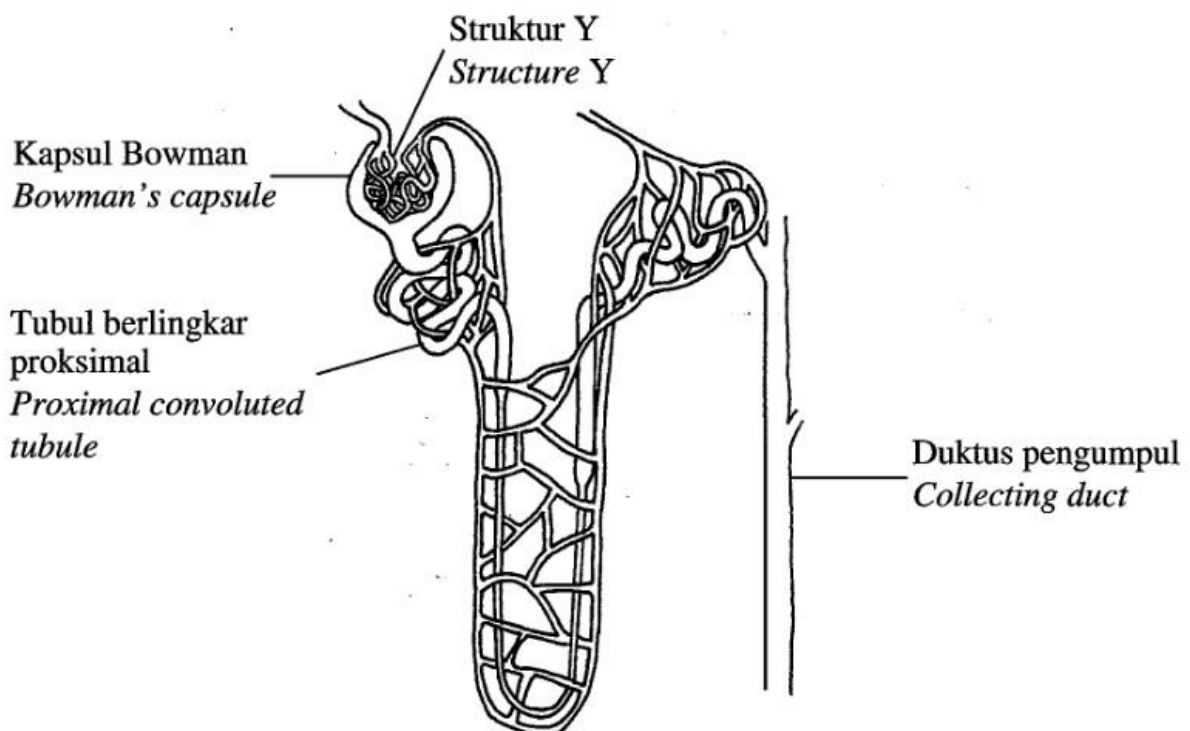
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[2 markah]

[2 marks]

- 7 Rajah 7.1 menunjukkan struktur nefron dalam ginjal manusia.
Diagram 7.1 shows the structure of a nephron in human kidney.



Rajah 7.1
Diagram 7.1

- (a) (i) Nyatakan **dua** bahan yang tidak dapat meresap merentasi dinding struktur Y ke dalam rongga kapsul Bowman.
*State **two** substances that cannot diffuse through the wall of structure Y into the cavity of Bowman's capsule.*

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

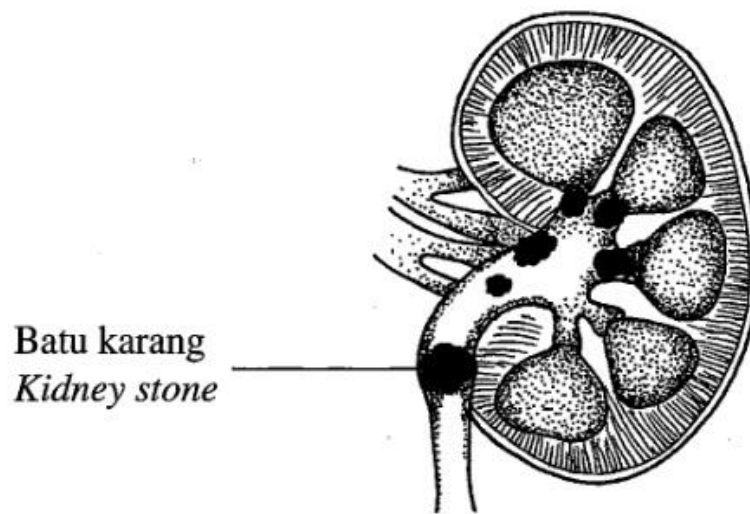
- (ii) Berdasarkan jawapan anda di 7(a)(i), berikan **satu** alasan.
*Based on your answer in 7(a)(i), give **one** reason.*

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

- (b) Encik X telah menghidap penyakit diabetes mellitus selama 15 tahun. Penyakit ini akan menyebabkan kerosakan pada struktur Y dalam Rajah 7.1.
Huraikan kesan kerosakan pada struktur Y terhadap sistem urinarinya.
Mr. X was diagnosed with diabetes mellitus for 15 years. This disease will cause damage to structure Y in Diagram 7.1.
Describe the effects of damage to structure Y on his urinary system.

.....
.....
.....
.....
.....
[3 markah]
[3 marks]

- (c) Rajah 7.2 menunjukkan keratin rentas ginjal seorang pesakit.
Diagram 7.2 shows a cross-section of a kidney of a patient.



Rajah 7.2
Diagram 7.2

Doktor telah menasihati pesakit itu agar:

Doctor has advised the patient to:

- Minum banyak air setiap hari
Drink a lot of water daily
- Kurangkan pengambilan daging merah
Reduce intake of red meat

Terangkan kebaikan nasihat tersebut.

Explain the benefits of the advices.

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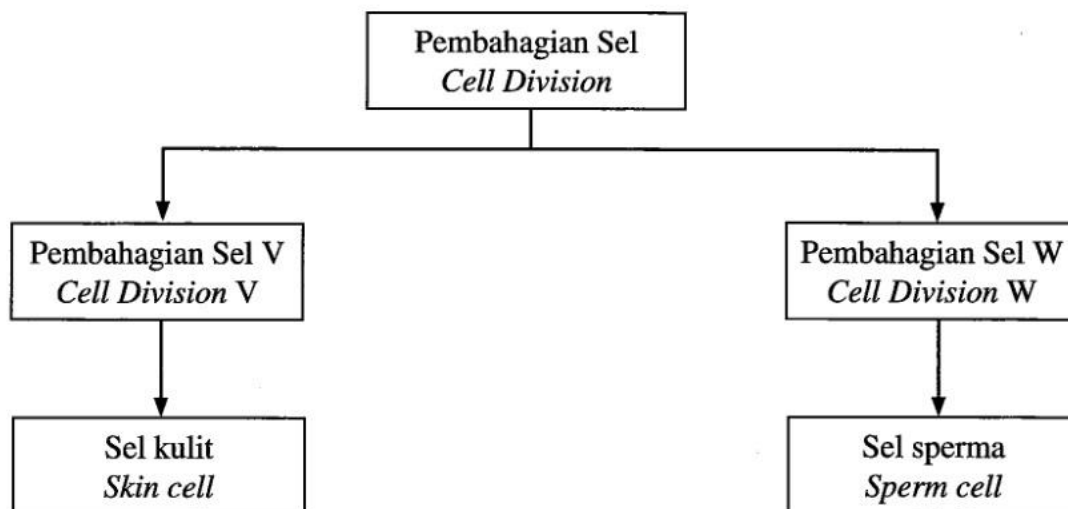
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[3 markah]
[3 marks]

- 8 (a) Rajah 8.1 menunjukkan dua jenis pembahagian sel yang berlaku dalam manusia.
 Diagram 8.1 shows two types of cell divisions that occur in human.



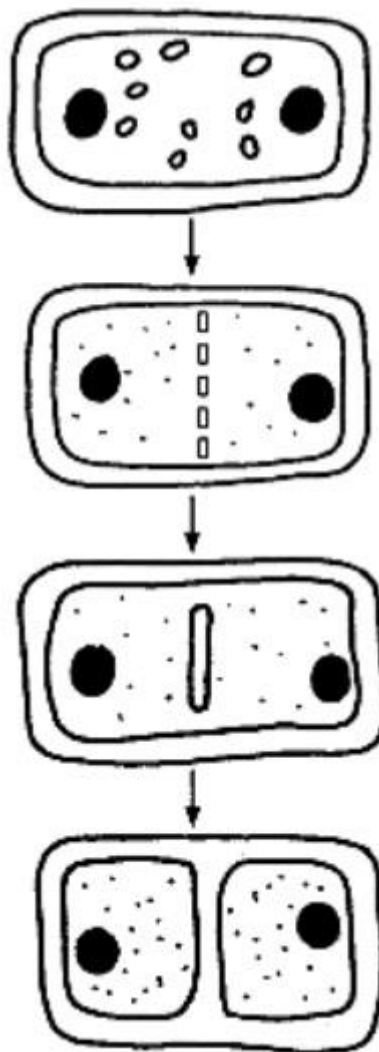
Rajah 8.1
 Diagram 8.1

- (i) Lengkapkan jadual untuk menunjukkan perbezaan bagi jenis pembahagian sel.
 Complete the table to show the differences between the types of cell divisions.

Aspek Aspect	Pembahagian sel V Cell division V	Pembahagian sel W Cell division W
Jenis pembahagian Type of division		
Bilangan kromosom dalam sel anak Chromosome number in daughter cell		

[2 markah]
 [2 marks]

- (a) (ii) Rajah 8.2 menunjukkan proses sitokinesis yang berlaku dalam suatu sel.
Diagram 8.2 shows cytokinesis process that takes place in a cell.



Rajah 8.2
Diagram 8.2

Berdasarkan Rajah 8.2, huraikan proses yang berlaku dalam sel tersebut.
Based on Diagram 8.2, describe the process that occurs in the cell.

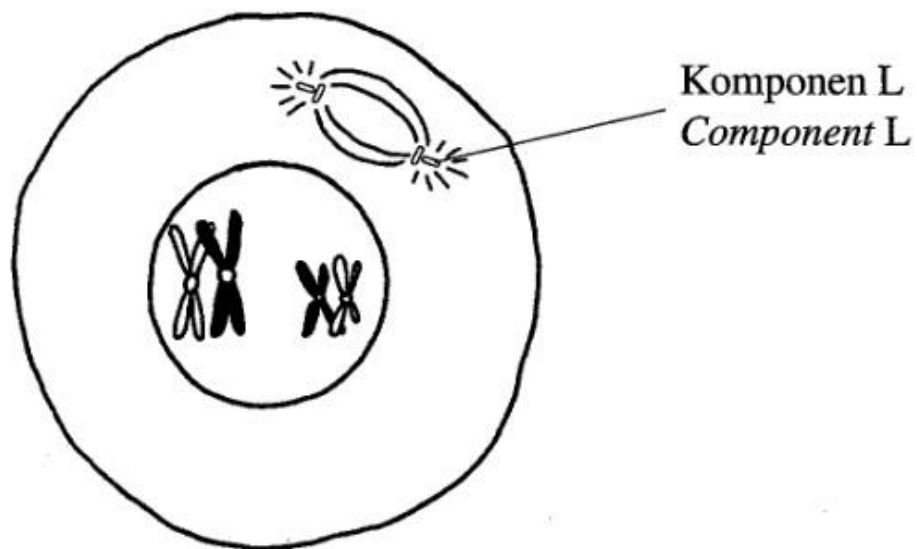
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.....

.....

[2 markah]
[2 marks]

- (b) Rajah 8.3 menunjukkan peringkat profasa I dalam suatu sel yang sedang membahagi.
Diagram 8.3 shows prophase I stage in a dividing cell.



Rajah 8.3
Diagram 8.3

Sel itu telah terdedah kepada sinaran gamma dan menyebabkan komponen L gagal berfungsi.

Terangkan kesannya.

The cell was exposed to gamma rays and caused the component L failed to function.

Explain the effects.

.....

.....

.....

.....

.....

[3 markah]
[3 marks]

- (c) Pertambahan penduduk yang pesat akan meningkatkan permintaan bekalan makanan. Bagi sesetengah negara, permintaan terhadap daging sangat kritikal kerana daging merupakan sumber utama protein.

Berdasarkan aplikasi pembahagian sel, terangkan teknik yang digunakan untuk menghasilkan daging dengan banyak dalam masa yang singkat.

The rapid increase in the population increases a greater demand on food supply. In some countries, the demand for meat is very critical because meat is the main source of protein. Based on cell division application, explain technique used to produce meat in a short period of time.

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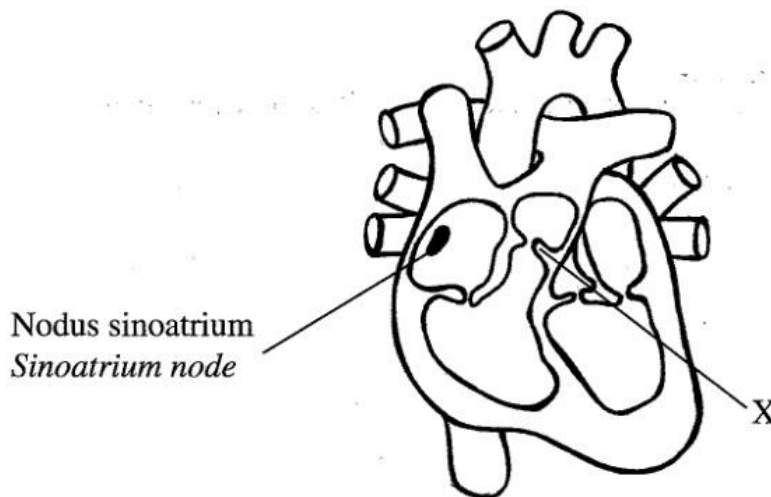
[2 markah]
[2 marks]

Bahagian B

[20 markah]

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

- 9 Rajah 9.1 menunjukkan keratan membujur jantung manusia.
Diagram 9.1 shows a longitudinal section of a human's heart.

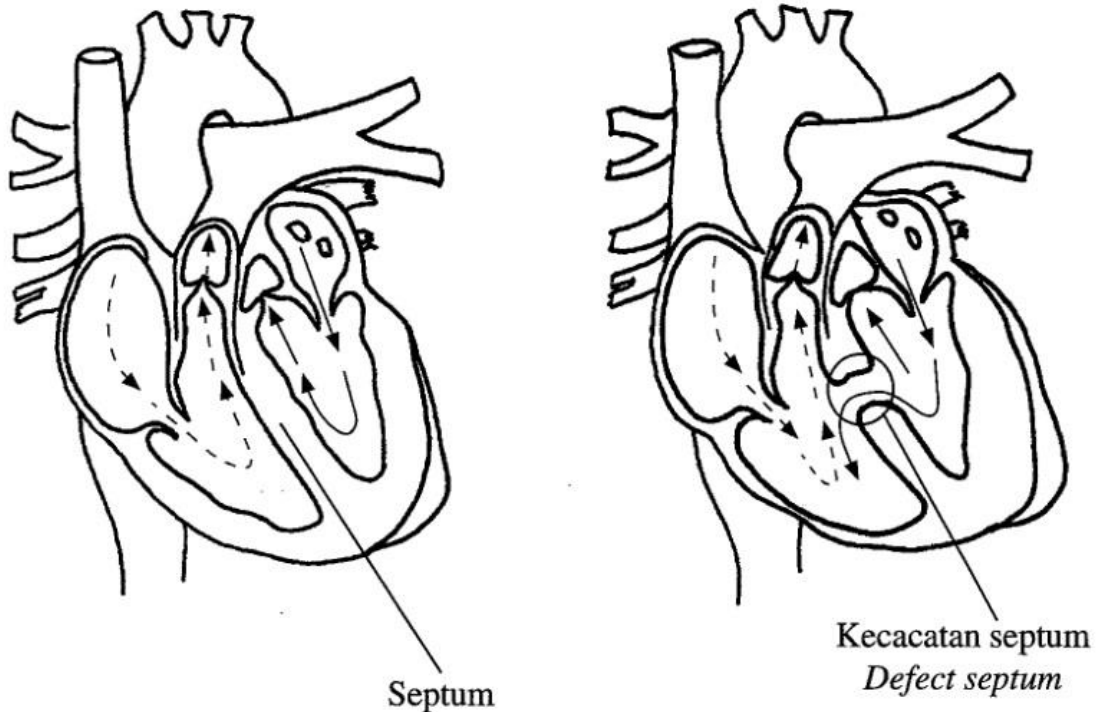


Rajah 9.1
Diagram 9.1

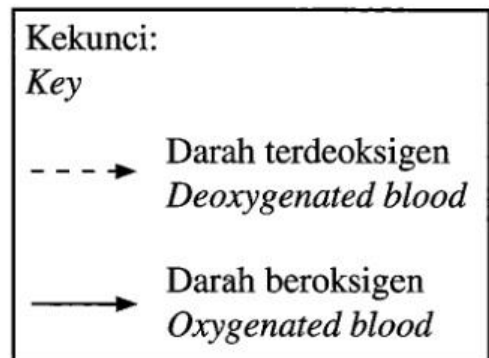
- (a) (i) Apakah struktur X dan peranannya? [2 markah]
What is structure X and its role? [2 marks]
- (ii) Bagi pesakit yang mengalami kegagalan nodus sinoatrium, doktor akan memasukkan 'Meditronic Micra' pada jantung tanpa menjalani pembedahan. [3 markah]
Terangkan bagaimana alat tersebut berfungsi. [3 marks]
For patients with sinoatrium nodes failure, doctor will insert 'Meditronic Micra' to the heart by not undergoing surgery. Explain how this device works.

- (b) Rajah 9.2(a) menunjukkan keratan membujur jantung normal seorang kanak-kanak. Rajah 9.2(b) menunjukkan keratan membujur jantung seorang kanak-kanak mengalami kecacatan pada septum ventrikel.

Diagram 9.2(a) shows a longitudinal section of a normal heart of a child. Diagram 9.2(b) shows a longitudinal section of a child's heart with defect at the septum of a ventricle.



Rajah 9.2(a)
Diagram 9.2(a)

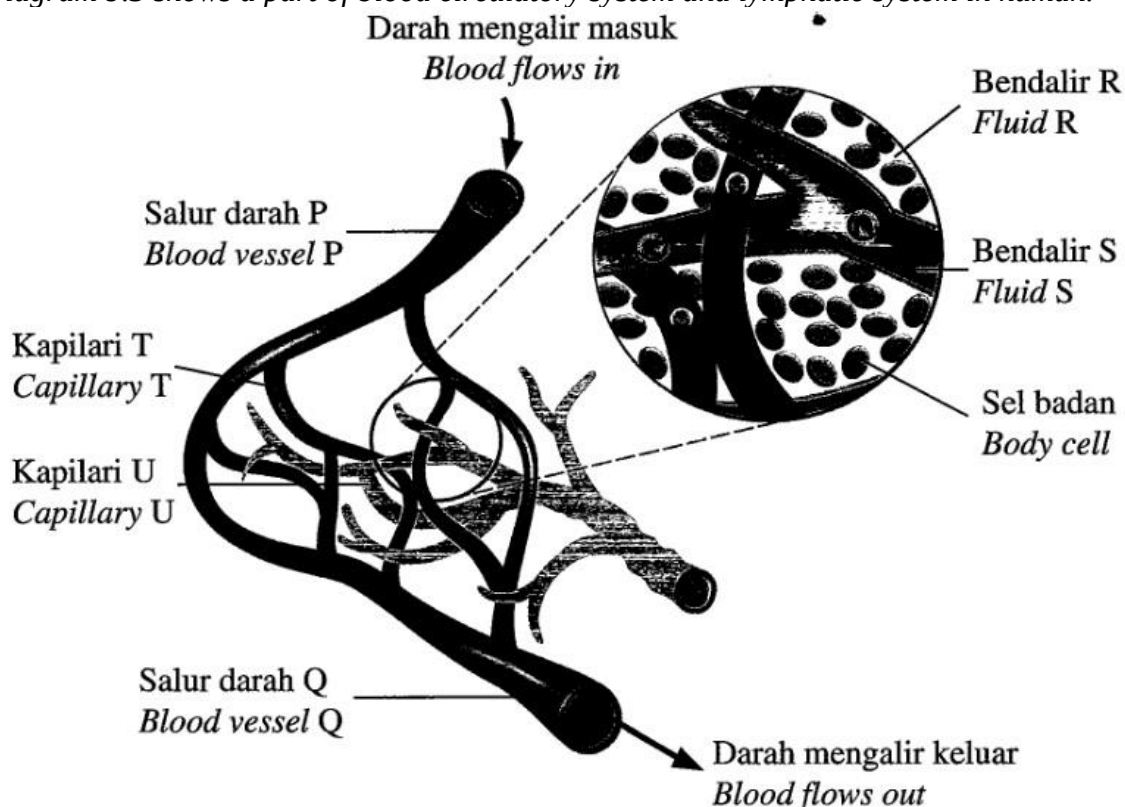


Berdasarkan Rajah 9.2(b), terangkan bagaimana kecacatan septum mempengaruhi sistem peredaran darah kanak-kanak itu. [5 markah]

Based on Diagram 9.2(b), explain how septum defect affects the blood circulatory system of the child. [5 marks]

- (c) Rajah 9.3 menunjukkan sebahagian daripada sistem peredaran darah dan sistem limfa dalam manusia.

Diagram 9.3 shows a part of blood circulatory system and lymphatic system in human.



Rajah 9.3
Diagram 9.3

Berdasarkan Rajah 9.3, bezakan antara
Based on Diagram 9.3, differentiate between :

- Salur darah P dengan salur Q
Blood vessel P and blood vessel Q
- Bendalir R dengan bendalir S
Fluid R and fluid S
- Kapilari T dengan kapilari U
Capillary T and capillary U

[10 markah]
[10 marks]

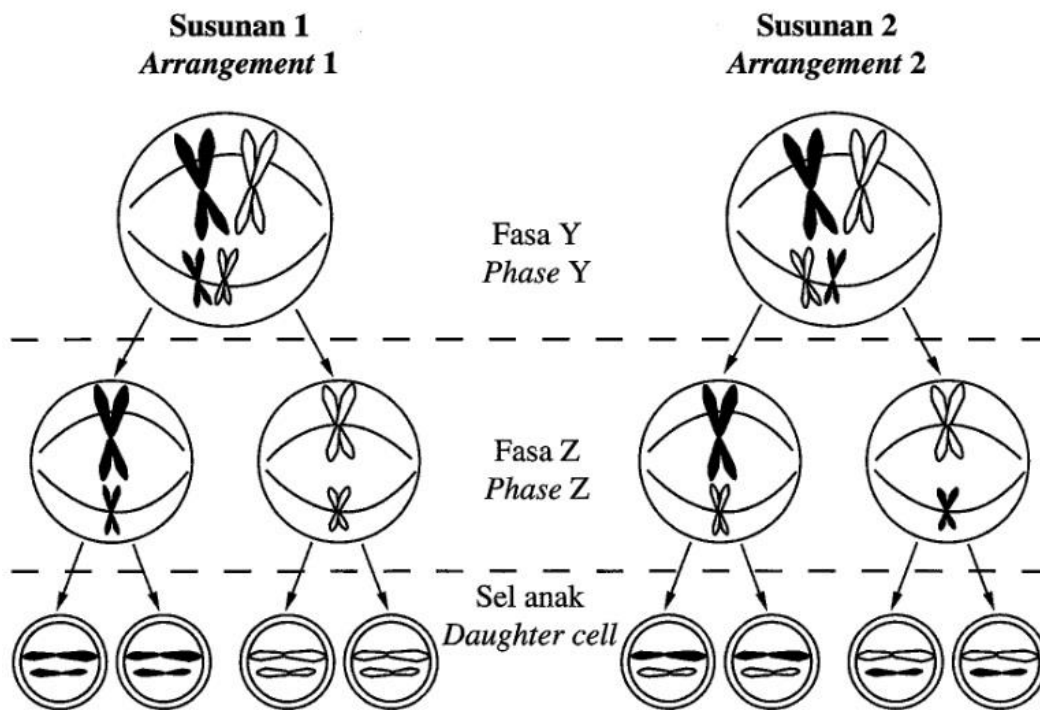
- 10 (a) Rajah 10.1 menunjukkan pewarisan jenis rambut dalam satu keluarga.
Diagram 10.1 shows the inheritance of hair type in a family.



Rajah 10.1
Diagram 10.1

- (i) Terangkan jenis variasi berdasarkan ciri yang ditunjukkan dalam Rajah 10.1.
[2 markah]
Explain the type of variation based on the characteristics show in Diagram 10.1
[2 marks]

- (a) (ii) Rajah 10.2 menunjukkan dua susunan kromosom pada satah khatulistiwa semasa meiosis.
Diagram 10.2 shows two chromosome arrangements at the equatorial plate during meiosis.

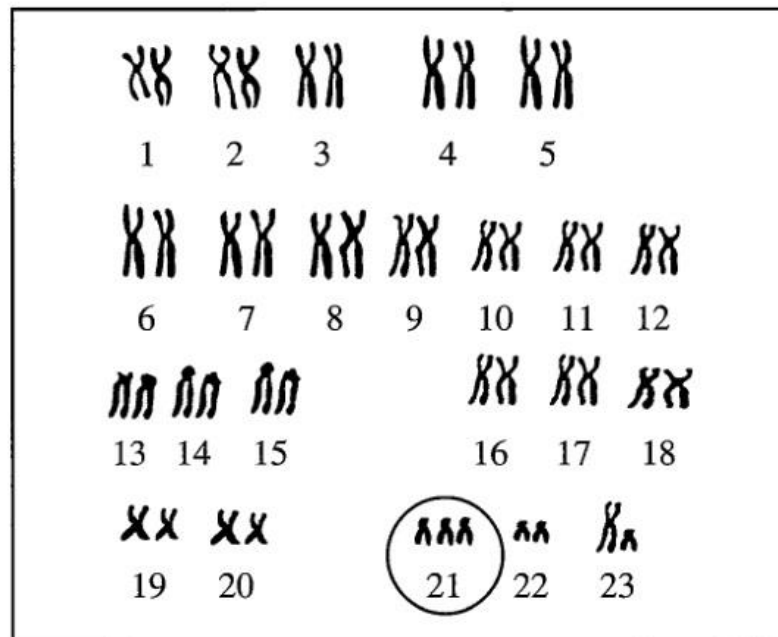


Rajah 10.2
 Diagram 10.2

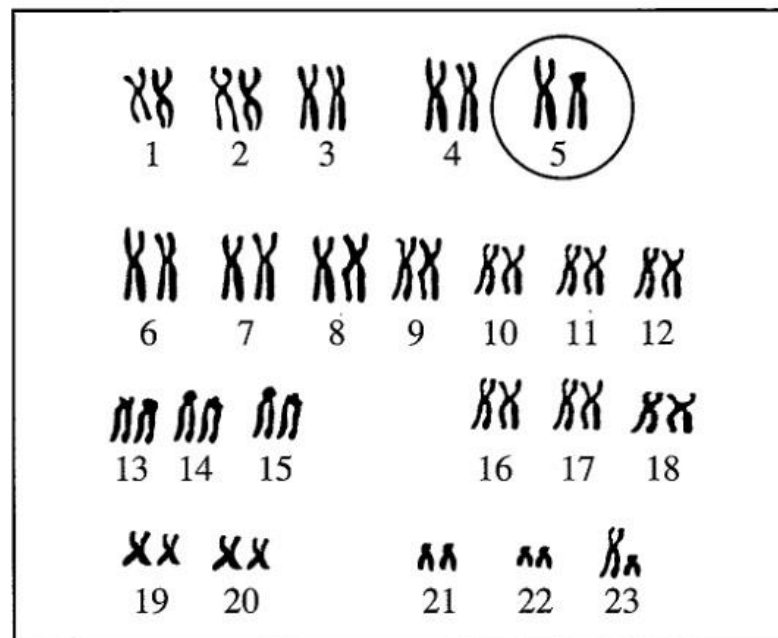
Huraikan perlakuan kromosom semasa fasa Y dan fasa Z yang menyebabkan variasi pada sel anak. [5 markah]

Describe chromosomal behaviour during phase Y and phase Z that cause variation on the daughter cells. [5 marks]

- (b) Rajah 10.3(a) dan Rajah 10.3(b) menunjukkan kariotip bagi dua individu yang mempunyai penyakit genetik.
Diagram 10.3(a) and Diagram 10.3(b) show the karyotypes of two individuals with genetic diseases.



Rajah 10.3(a)
Diagram 10.3(a)

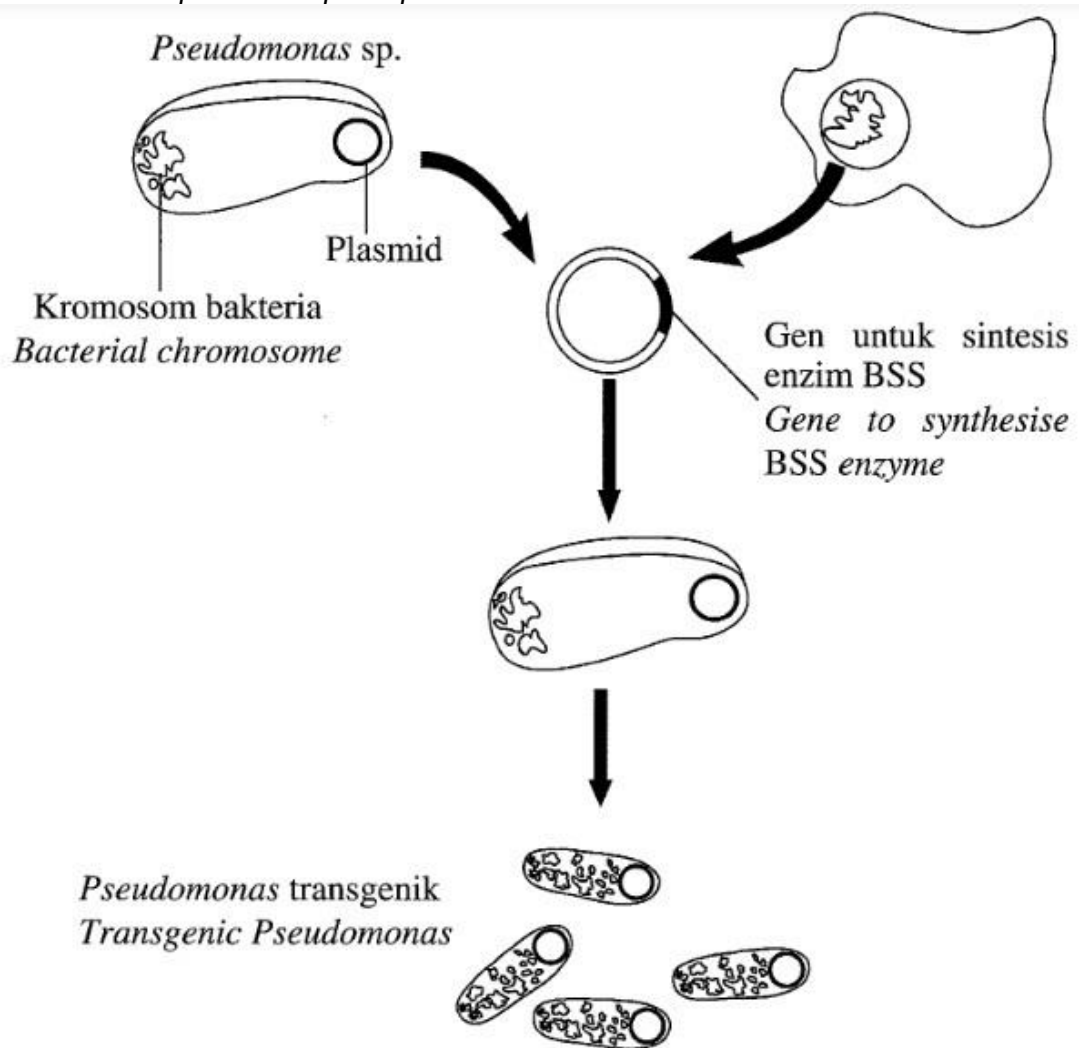


Rajah 10.3(b)
Diagram 10.3(b)

Banding dan bezakan kedua-dua penyakit genetik tersebut.
Compare and contrast those two genetic diseases.

[5 markah]
 [5 marks]

- (c) Rajah 10.4 menunjukkan langkah-langkah dalam teknik kejuruteraan genetik untuk menghasilkan *Pseudomonas* transgenik. *Pseudomonas* transgenik merupakan satu contoh organisma terubah suai genetik (GMO) yang boleh mensintesis enzim benylsuccinil sintase (BSS) yang digunakan untuk merawat tumpahan minyak di laut. Diagram 10.4 shows parts of steps in genetic engineering technique to produce transgenic *Pseudomonas*. Transgenic *Pseudomonas* is one of the example of Genetically Modified Organism (GMO) which can synthesise enzyme benzy succinate synthase (BSS) that is used to treat oil spills on surface of the ocean.



Rajah 10.4
Diagram 10.4

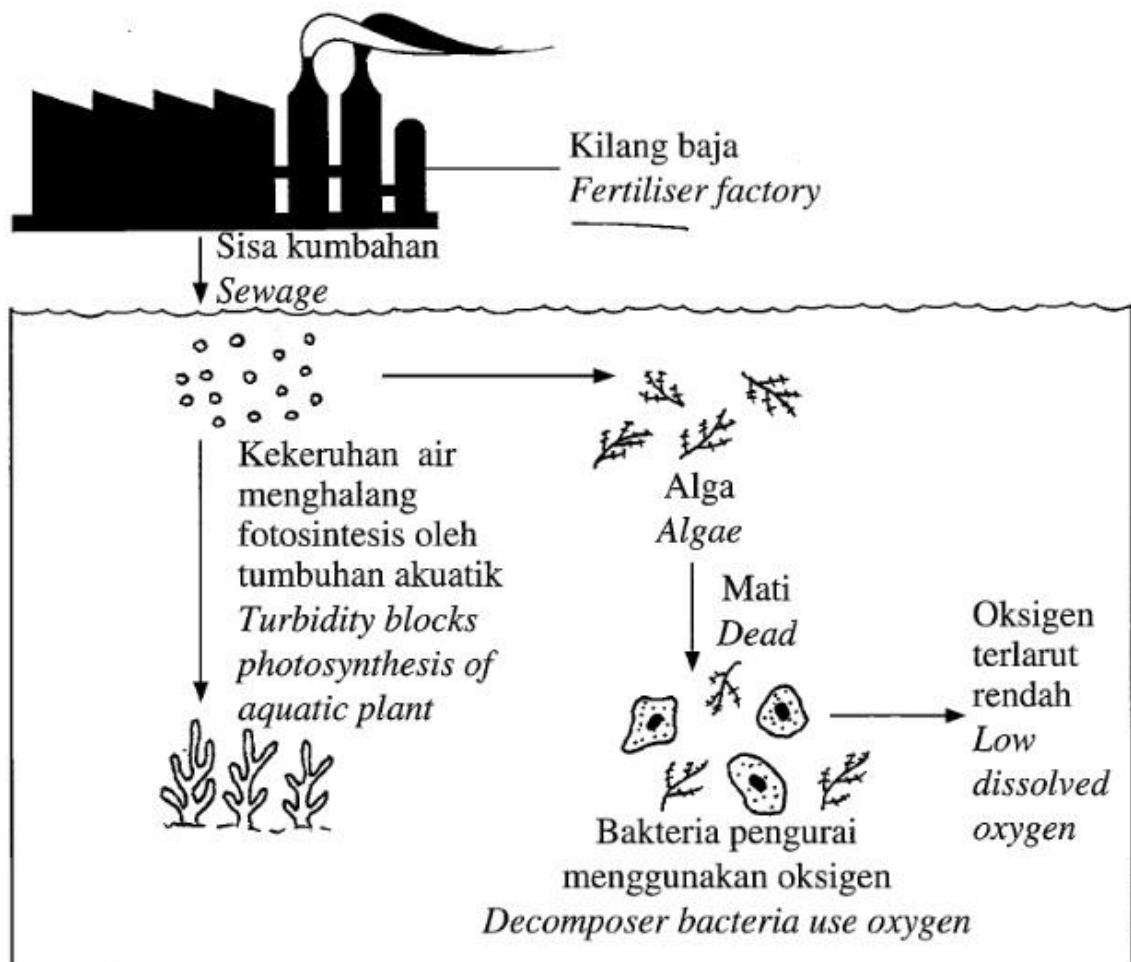
Huraikan teknik kejuruteraan genetik dalam penghasilan *Pseudomonas* transgenik bagi merawat tumpahan minyak di permukaan laut. [8 markah]
Describe genetic engineering technique in producing transgenic *Pseudomonas* to treat oil spills on the surface of the ocean. [8 marks]

Bahagian C

[20 markah]

Soalan ini mesti dijawab.

- 11 (a) Penyahhutan ialah penebangan pokok hutan secara besar-besaran. Pokok besar dijual sebagai kayu balak manakala pokok yang tidak bernilai dibakar. Keadaan ini menjadikan sesetengah tempat menjadi panas dan kering. Terangkan bagaimana penyahhutan menyebabkan pemanasan global. [3 markah]
Deforestation is logging of forest tree massively. Big trees are made into timber while trees with no values are burnt. This situation causes a certain place to be hot and dry. Explain how deforestation causes global warming. [3 marks]
- (b) Rajah 11.1 menunjukkan keadaan sungai yang mengalami proses W. Diagram 11.1 shows the condition of the river that undergoes process W.



Proses W
Process W

Rajah 11.1
Diagram 11.1

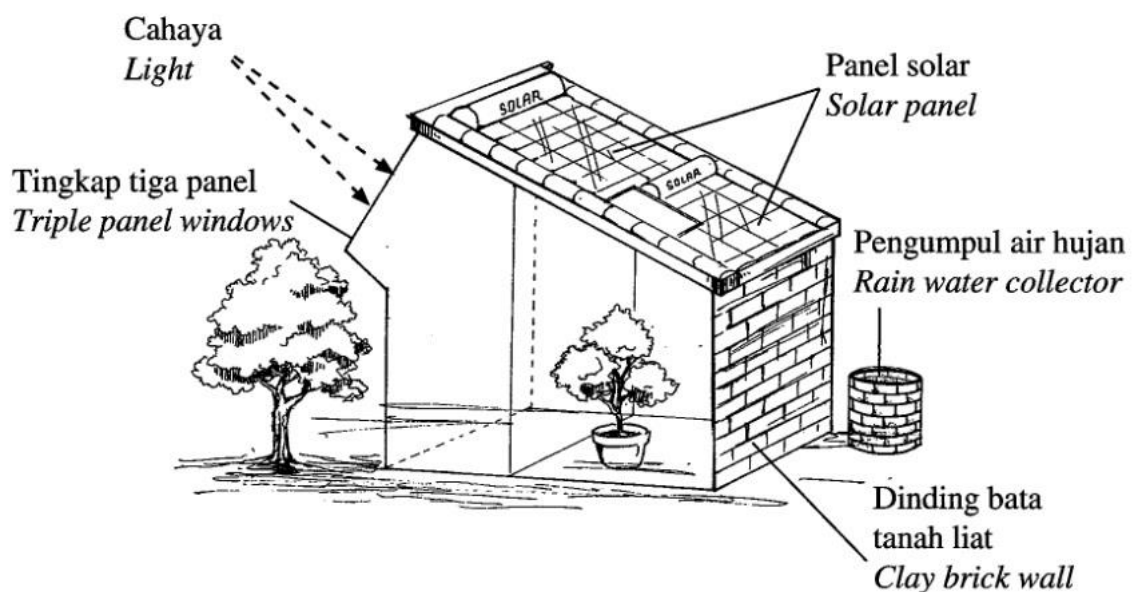
Pengurusan kilang merancang untuk menggunakan sistem biofiltrasi bagi merawat sisa kumbahan sebelum dilepaskan ke sungai. Biofiltrasi ialah teknologi yang menggunakan bacteria untuk menguraikan bahan-bahan pencemar bagi menghasilkan air yang bersih dan tidak berbau.

Berdasarkan Rajah 11.1, bincangkan kesan penggunaan teknologi biofiltrasi terhadap proses **W** di sungai tersebut. [7 markah]

The management of a factory plans to use biofiltration system in order to treat sewage before releasing it into the river. Biofiltration is a technology that uses bacteria to breakdown pollutants in order to produce clean and odourless water.

*Based on Diagram 11.1, discuss the effects of using biofiltration technology to the process **W** in the river.* [7 marks]

- (c) Rajah 11.2 menunjukkan konsep bangunan hijau.
Diagram 11.2 shows a green building concept.



Rajah 11.2
Diagram 11.2

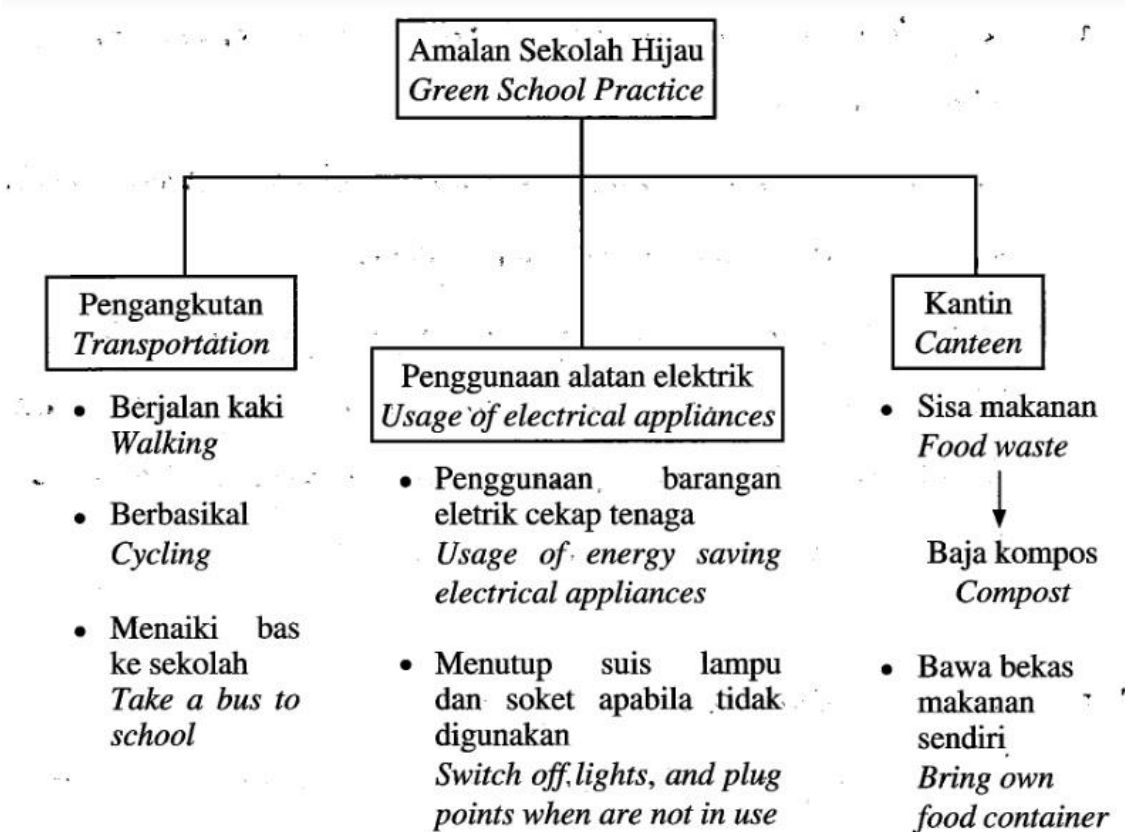
Konsep, reka bentuk dan operasi bangunan hijau ini dapat mengurangkan impak negatif dan menimbulkan impak positif kepada iklim dan persekitaran, memelihara sumber semula jadi serta kualiti hidup.

Concept, design and operation of the green building can reduce the negative impacts and give positive impacts to the climate and nature, preservation of natural resources and quality of life.

Berdasarkan Rajah 11.2 dan pernyataan tersebut, cadangkan aspek yang perlu dipertimbangkan oleh arkitek untuk membina rumah yang berkonsepkan bangunan hijau. [4 markah]

Based on Diagram 11.2 and the statement, suggest the aspects that need to be considered by architect in building houses with green building concept. [4 marks]

- (d) Rajah 11.3 menunjukkan maklumat tentang Amalan Teknologi Hijau di sekolah.
Diagram 11.3 shows information of Green Technologies Practices in school.



Rajah 11.3
Diagram 11.3

Berdasarkan Rajah 11.3, wajarkan bagaimana amalan teknologi hijau dapat menyumbang kepada kelestarian alam sekitar. [6 markah]

Based on Diagram 11.3, justify how the practices of green technologies can contribute to sustain the environment. [6 marks]

KERTAS PEPERIKSAAN TAMAT