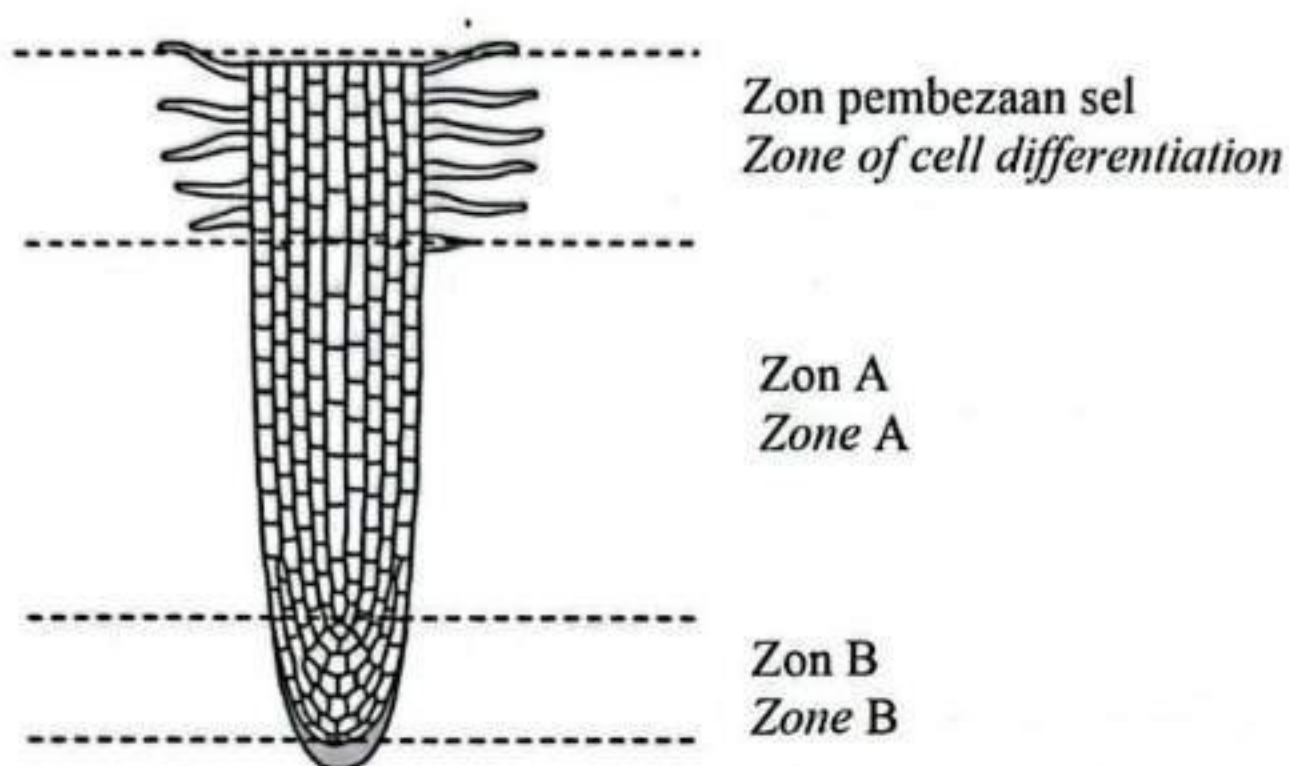


Bahagian A
[60 markah]
Jawab semua soalan

1. Rajah 1 menunjukkan pertumbuhan sel di hujung akar.

Diagram 1 shows cell growth at the tip of the root.



Rajah 1
 Diagram 1

- (a) (i) Namakan zon A dan zon B.

Name zone A and zone B.

Zon A :

Zone A

Zon B :

Zone B

[2 markah]
 [2 marks]

- (ii) Terangkan proses yang berlaku di zon A.

Explain the process that occur in the zone A.

.....

[2 markah]
 [2 marks]

- (b) Seorang petani mendapati tumbuhannya layu walaupun disirami air yang mencukupi. Beliau mendapati akar tumbuhan itu tidak dapat menyerap air dengan cekap. Terangkan satu kemungkinan masalah yang berlaku pada zon pembezaan sel dan kesannya terhadap penyerapan air oleh akar.

A farmer found that his plants were wilting despite being watered sufficiently. He found that the roots of the plants were not able to absorb water efficiently.

Explain one problem that occurs in the zone of cell differentiation and its effect on water absorption by the roots.

.....

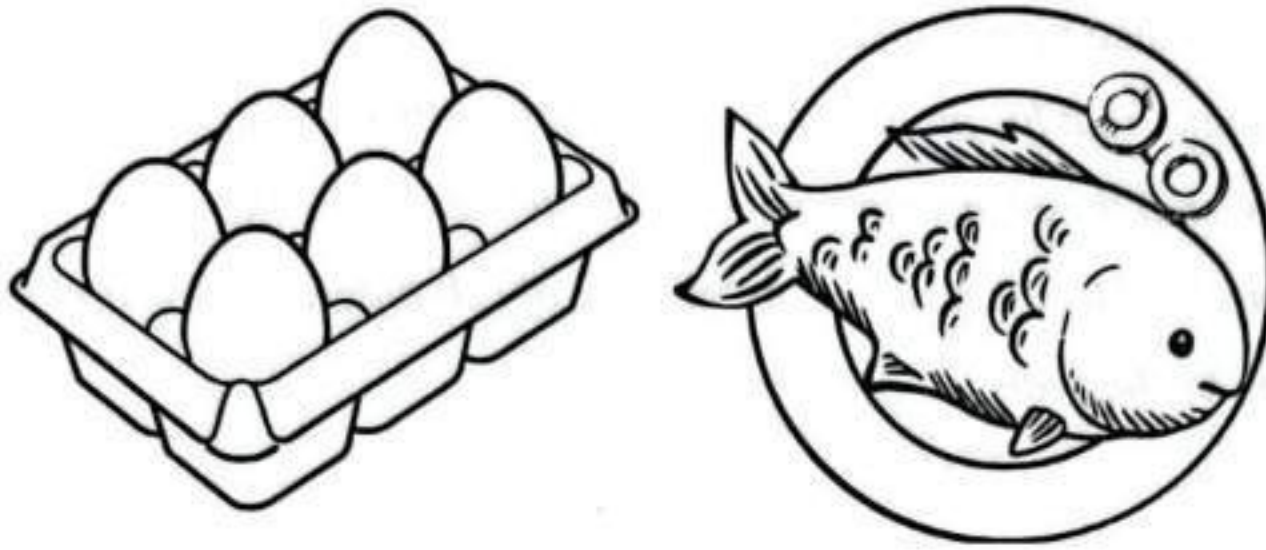
.....

.....

[2 markah]
[2 marks]

2. Rajah 2.1 menunjukkan dua contoh makanan bagi satu kelas makanan.

Diagram 2.1 shows two examples of food that belong to a type of food class.



Rajah 2.1
Diagram 2.1

- (a) (i) Namakan kelas makanan yang ditunjukkan dalam Rajah 2.1.

Name the food class shown in Diagram 2.1.

.....

[1 markah]

[1 mark]

- (ii) Nyatakan monomer bagi kelas makanan yang dinamakan dalam 2(a)(i).

State the monomer of the food class named in 2(a)(i).

.....

[1 markah]

[1 mark]

- (iii) Nyatakan **dua** kepentingan kelas makanan yang dinamakan dalam 2(a)(i).

State two importance of the food class named in 2(a)(i).

1.

2.

[2 markah]

[2 marks]

- (b) Rajah 2.2 menunjukkan atlet berbasikal memerlukan makanan tambahan sebagai sumber tenaga tambahan ketika berbasikal dalam jarak yang jauh.

Diagram 2.2 shows cycling athletes require supplementary food an extra source of energy when cycling over distances.



Rajah 2.2
Diagram 2.2

Terangkan keperluan pengambilan makanan tambahan kepada atlet tersebut.

Explain the necessity of the supplementary food intake to the athletes.

.....

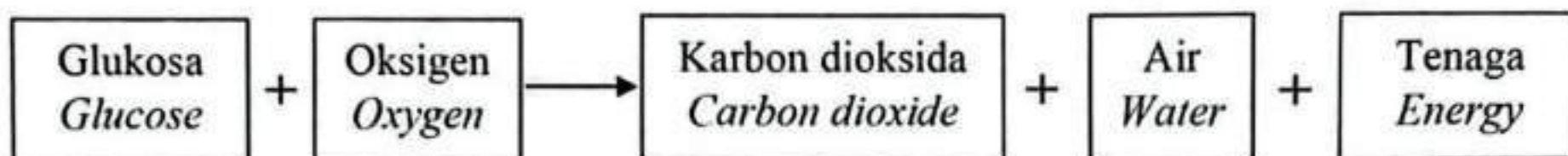
.....

.....

[2 markah]
[2 marks]

3. Rajah 3.1 menunjukkan suatu proses yang berlaku dalam satu sel.

Diagram 3.1 shows a process that occurs in a cell.



Rajah 3.1
Diagram 3.1

- (a) (i) Namakan proses yang berlaku dalam Rajah 3.1.

Name the process that occurs in Diagram 3.1.

.....

[1 markah]
[1 mark]

- (ii) Nyatakan tempat berlakunya proses yang dinamakan di 3(a)(i).

State the place where the process named in 3(a)(i) take place.

.....

[1 markah]
[1 mark]

- (b) (i) Rajah 3.2 menunjukkan seorang pelari pecut 100 m. Dalam situasi tersebut, dia berasa letih dan bernafas dengan cepat.

Diagram 3.2 shows a 100 m sprinter. In this situation, he feels tired and breathing rapidly.



Rajah 3.2
Diagram 3.2

Terangkan mengapa pelari tersebut tercungap-cungap.

Explain why the runner is gasping for breath.

.....

.....

.....

[2 markah]
[2 marks]

- (b) (ii) Nyatakan perbezaan proses respirasi yang berlaku dalam Rajah 3.1 dan Rajah 3.2.

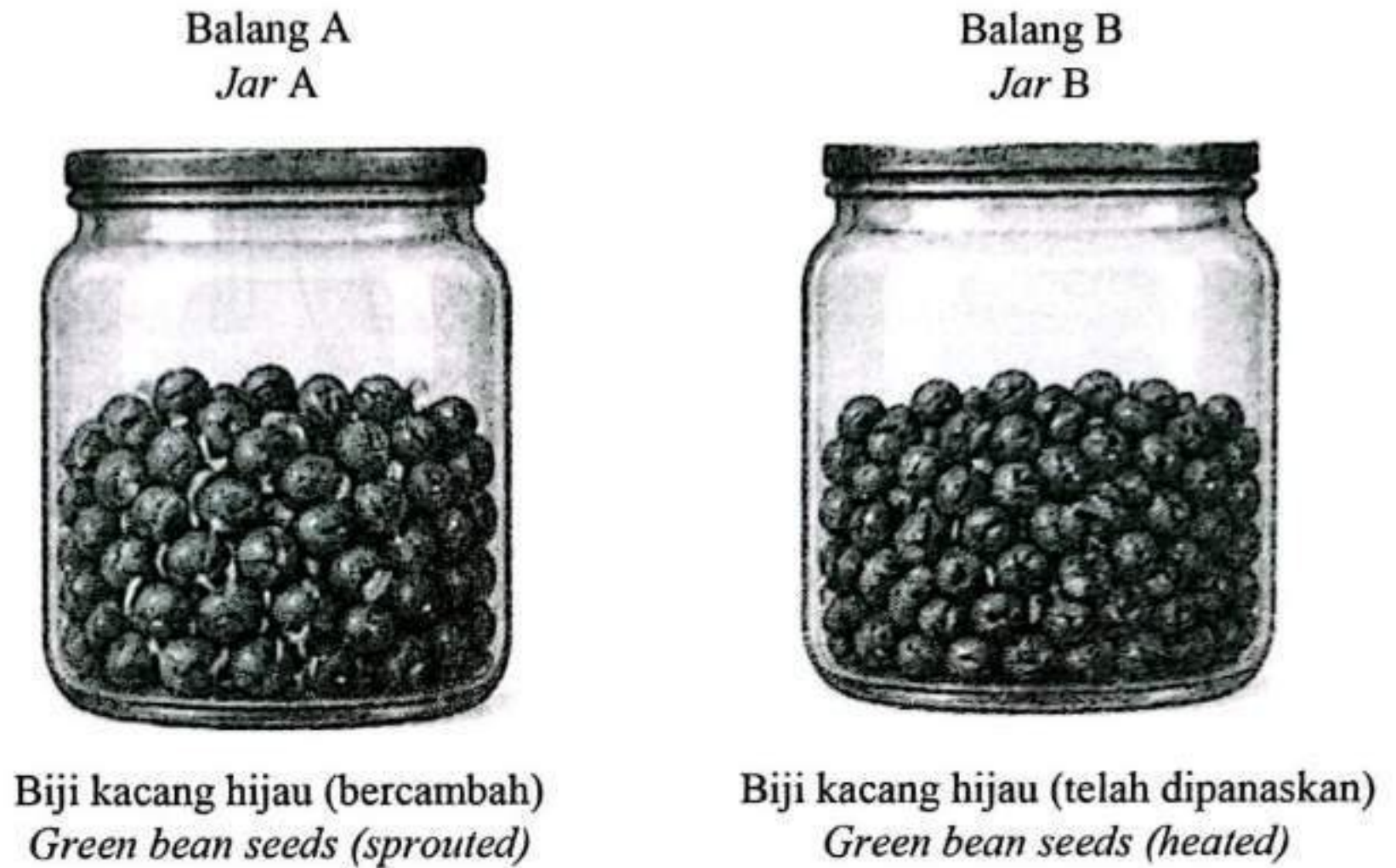
State the differences in the respiration process that occurs in Diagram 3.1 and Diagram 3.2.

Aspek <i>Aspect</i>	Rajah 3.1 <i>Diagram 3.1</i>	Rajah 3.2 <i>Diagram 3.2</i>
Pengoksidaan glukosa <i>Glucose oxidation</i>		
Jumlah tenaga yang dihasilkan <i>The amount of energy produced</i>		

[2 markah]
[2 marks]

- (c) Rajah 3.3 menunjukkan dua balang bertutup yang mengandungi kacang hijau yang dibiarkan pada suhu bilik.

Diagram 3.3 shows two closed jars containing green beans left at room temperature.



Rajah 3.3
Diagram 3.3

Selepas 24 jam, didapati bahagian luar balang A terasa panas berbanding balang B. Terangkan situasi tersebut.

After 24 hours, the external part of jar A is hot than jar B.

Explain the situation.

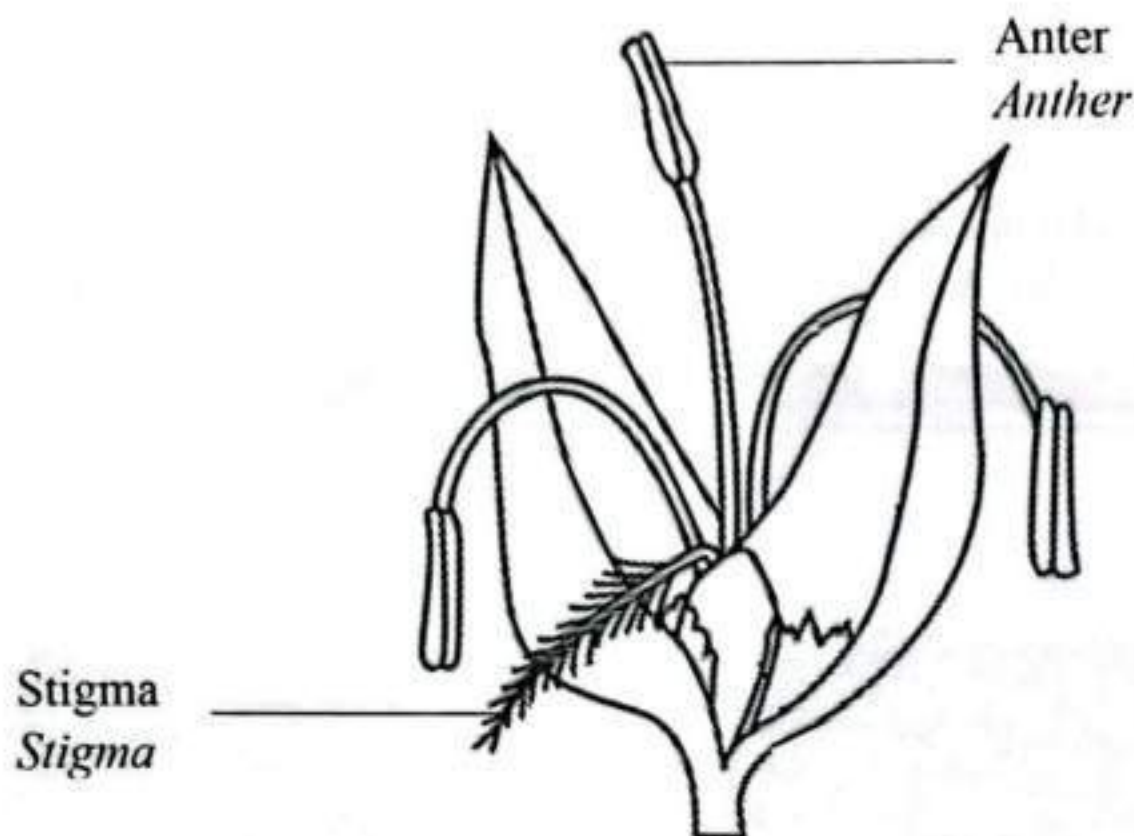
.....

.....

[1 markah]
[1 mark]



4. Rajah 4.1 menunjukkan struktur bunga yang didebungakan oleh agen pendebungaan.
Diagram 4.1 shows the structure of flower, which is pollinated by pollinating agent.



Rajah 4.1
 Diagram 4.1

(a) Berdasarkan Rajah 4.1

Based on Diagram 4.1

- (i) Nyatakan agen pendebungaan bagi bunga ini.

State pollination agent of this flower.

.....

[1 markah]
 [1 mark]

- (ii) Nyatakan **satu** ciri debunga yang dipindahkan oleh agen pendebungaan di 3(a)(i).

*State **one** characteristic of pollen grains that are transferred by the pollination agent in 3(a)(i).*

.....

[1 markah]
 [1 mark]

(b) Terangkan apa yang akan berlaku kepada debunga apabila dipindahkan ke stigma.

Explain what happens to the pollen grains when they are transferred to the stigma.

.....

.....

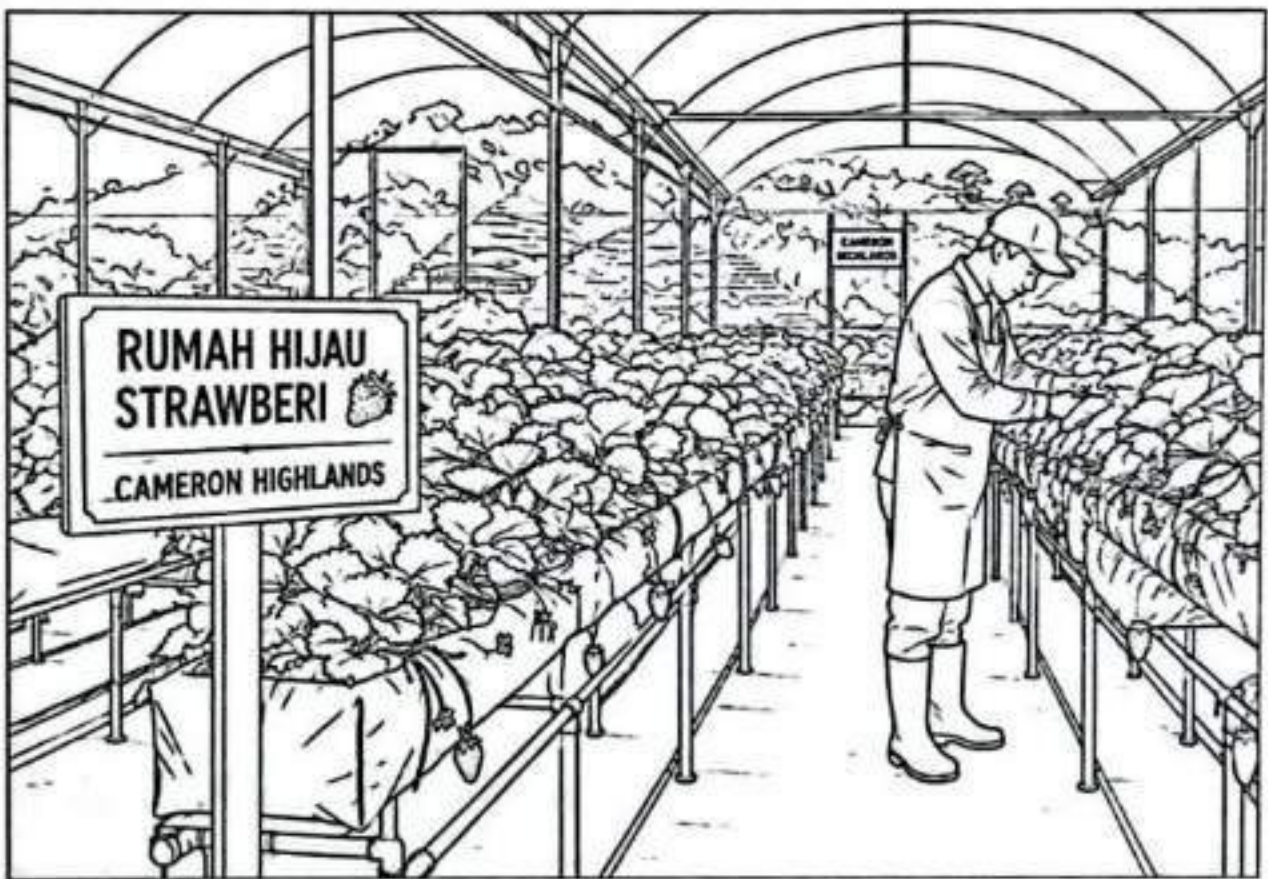
.....

[2 markah]
[2 marks]

(c) Encik K menanam pokok strawberi dalam rumah hijau miliknya di Cameron Highlands.

Beliau mendapati pendebungaan semulajadi kurang berlaku.

Mr. K planted strawberry plants in his greenhouse in Cameron Highlands. He found that natural pollination occurred less frequently.



Rajah 4.2
Diagram 4.2

Terangkan mengapa situasi ini berlaku.

Explain why this situation occurred.

.....

.....

.....

[2 markah]
[2 marks]

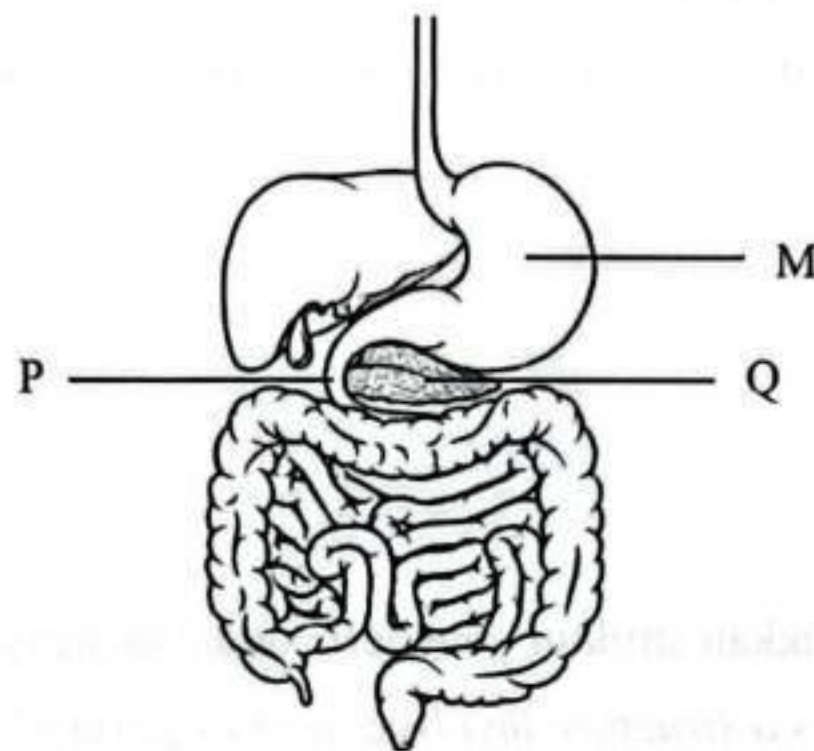
- (d) Bezakan organ pembiakan jantan dan organ pembiakan betina bunga.
Compare male reproductive organ and female reproductive organ of flower.

Organ pembiakan jantan bunga <i>Male reproductive organ</i>	Ciri <i>Characteristic</i>	Organ pembiakan betina bunga <i>Female reproductive organ</i>
	Struktur-struktur yang membentuknya <i>Structures which form</i>	

[1 markah]
[1 marks]

5. Rajah 5.1 menunjukkan salur pencernaan dalam manusia.

Diagram 5.1 shows the digestive canal in humans.



Rajah 5.1
Diagram 5.1

- (a) Namakan struktur P dan Q.

Name structures P and Q.

P :

Q :

[2 markah]
[2 marks]

- (b) Enzim di dalam P hanya berfungsi secara cekap dalam nilai pH 8 sehingga 15.

Terangkan bagaimana nilai pH tersebut dapat dikekalkan dalam P.

The enzyme in P are only effective in pH value of 8 until 15.

Explain how the pH value is maintained in P.

.....

[2 markah]
[2 marks]

- (c) Seorang murid didapati gemar mengambil buah limau dengan banyak setiap hari.
Terangkan kesan pengambilan buah limau terlalu banyak ke atas pencernaan kanji di P.
A pupil enjoys eating a lot of limes everyday.
Explain the effect of taking too much lime everyday to starch digestion in P.

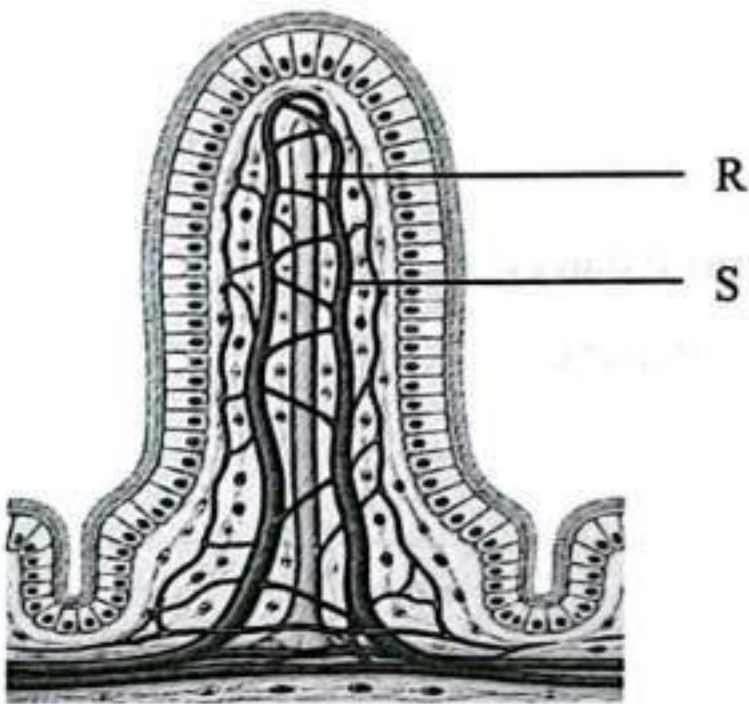
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.....

[2 markah]
[2 marks]

- (d) Rajah 5.2 menunjukkan struktur yang terlibat dalam penyerapan makanan tercerna.
Diagram 5.2 shows a structure involved in absorption of digested food.



Rajah 5.2
Diagram 5.2

Kenalpasti perbezaan di antara kedua-dua cara penyerapan tersebut.
Identify the differences between the two methods of absorption.

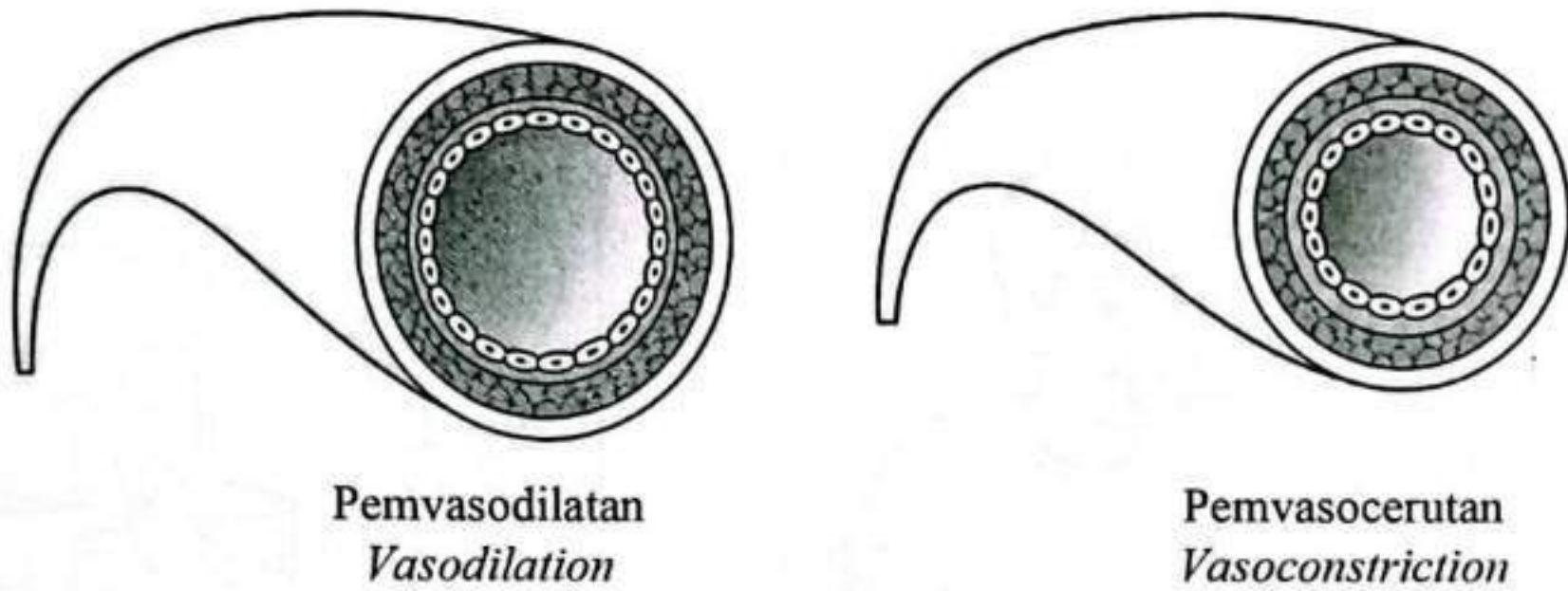
Struktur <i>Structure</i>	Makanan tercerna <i>Digested food</i>	Cara penyerapan <i>Methods of absorption</i>
R		
S		

[2 markah]
[2 marks]



6. (a) Rajah 6.1 menunjukkan dua keadaan salur darah arteri yang terlibat dalam mekanisme kawal atur tekanan darah bagi seorang individu.

Diagram 6.1 shows two arterial blood vessel conditions involved in the blood pressure regulation mechanism for an individual.



Rajah 6.1
Diagram 6.1

- (i) Nyatakan reseptor yang terlibat dalam mekanisme kawal atur tekanan darah.
State the receptor that is involved in blood pressure regulation mechanism.

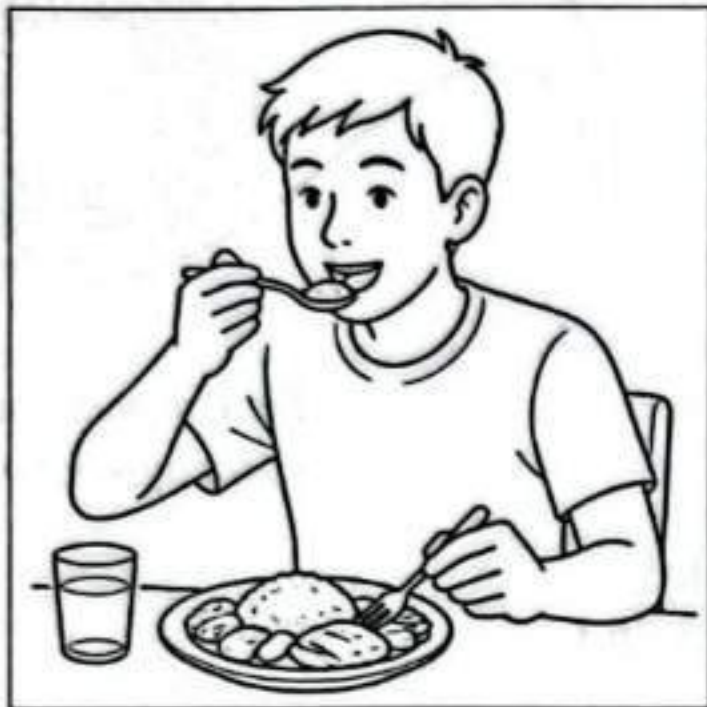
[1 markah]
[1 mark]

- (ii) Nyatakan fungsi reseptor tersebut.
State the function of the receptor.

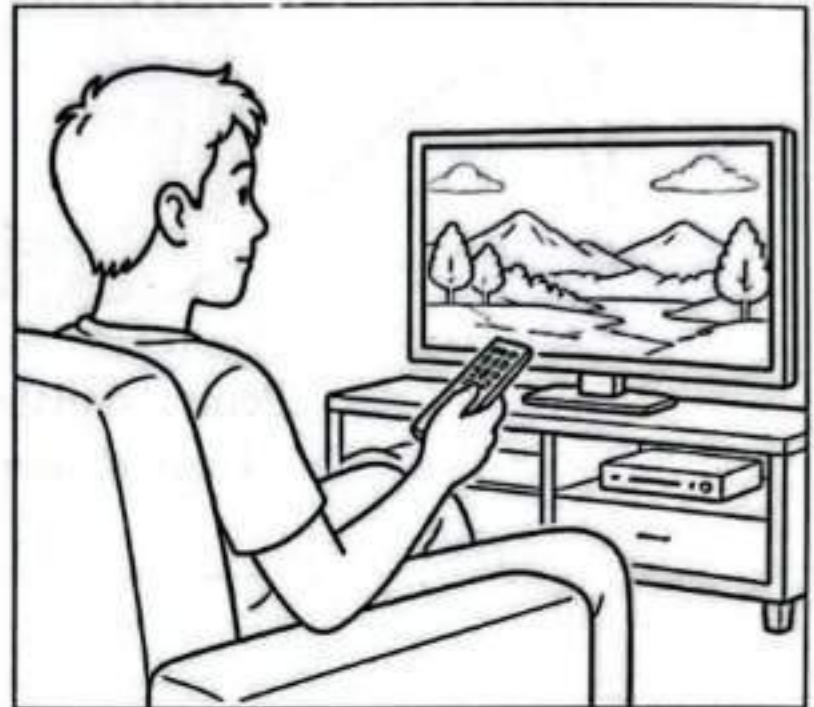
[1 markah]
[1 mark]

- (b) Rajah 6.2 menunjukkan dua individu menjalankan dua aktiviti yang berbeza. Aras gula dalam darah bagi individu P telah meningkat manakala aras gula dalam darah bagi individu Q menurun.

Diagram 6.2 shows two individuals doing two different activities. Individual P's blood sugar level has increased while individual Q's blood sugar level has decreased.



Individu P
Individual P



Individu Q
Individual Q

Rajah 6.2
Diagram 6.2

- (i) Nyatakan organ yang terlibat dalam mengekalkan aras gula dalam darah.

State the organ involved in maintaining blood sugar level.

.....

[1 markah]

[1 mark]

- (ii) Berdasarkan Rajah 6.2, bezakan tindakan pengawalaturan bagi individu P dan individu Q.
Based on Diagram 6.2, compare the osmoregulation for individual P and individual Q.

Individu P <i>Individual P</i>	Tindakan pengawalaturan <i>Osmoregulation action</i>	Individu Q <i>Individual Q</i>
	Sel yang dirangsang <i>Stimulated cells</i>	
	Hormon yang dirembeskan <i>Hormones that is secreted</i>	

[2 markah]
[2 marks]

- (iii) Seorang pesakit mengalami kegagalan organ di 6(b)(i) dan menyebabkan organ tersebut terpaksa dibuang melalui pembedahan.
Terangkan kesan yang akan dialami oleh pesakit tersebut untuk tempoh jangka masa panjang selepas pembedahan.
A patient experiences organ failure in 6(b)(i), and the organ has to be removed surgically.
Explain the long-term effects that the patient will experience after the surgery.

.....

.....

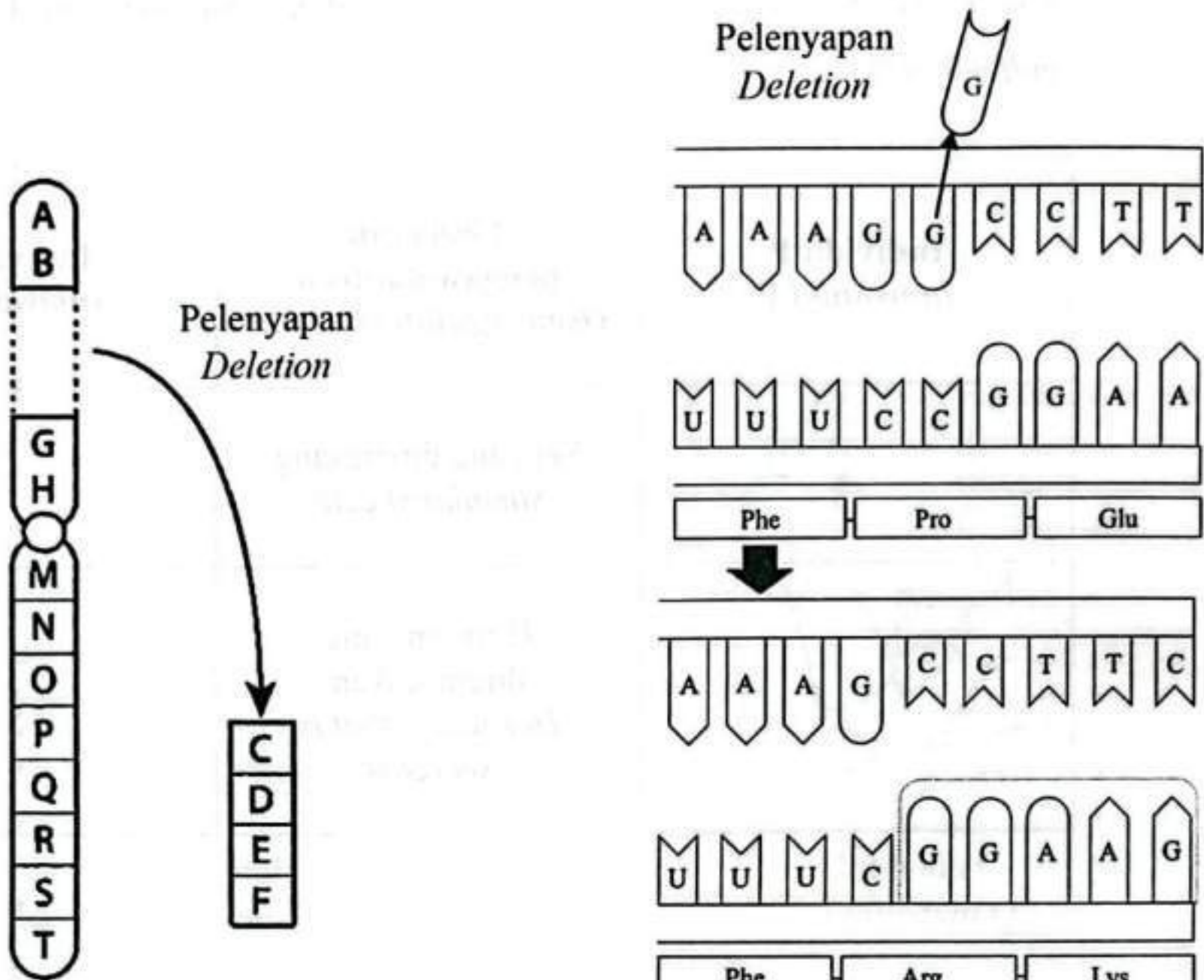
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.....

[3 markah]
[3 marks]

7. Rajah 7.1(a) dan Rajah 7.1(b) menunjukkan dua jenis mutasi.

Diagram 7.1(a) and Diagram 7.1(b) show two types of mutations.



Rajah 7.1(a)
Diagram 7.1(a)

Rajah 7.1(b)
Diagram 7.1(b)

(a)(i) Nyatakan jenis mutasi yang ditunjukkan dalam Rajah 7.1(a) dan Rajah 7.1(b).
State the type of mutation shown in Diagram 7.1(a) and Diagram 7.1(b).

Rajah 7.1(a) :
Diagram 7.1(a)
Rajah 7.1(b) :
Diagram 7.1(b)

[2 markah]
[2 marks]

(ii) Terangkan proses pelenyapan yang berlaku dalam Rajah 7.1(a) dan Rajah 7.1(b).
Explain the process of the deletion that occurs in Diagram 7.1(a) and Diagram 7.1(b).

.....

.....

[2 markah]
[2 marks]

(iii) Pengambilan makanan tertentu boleh menghasilkan bahan mutagen yang merosakkan DNA dan menyebabkan mutasi.
Cadangkan satu langkah untuk mengelakkan mutasi yang berpunca daripada makanan.

Consumption of certain foods can produce mutagens that damage DNA and cause mutations.

Suggest one step to prevent mutations caused by food.

.....

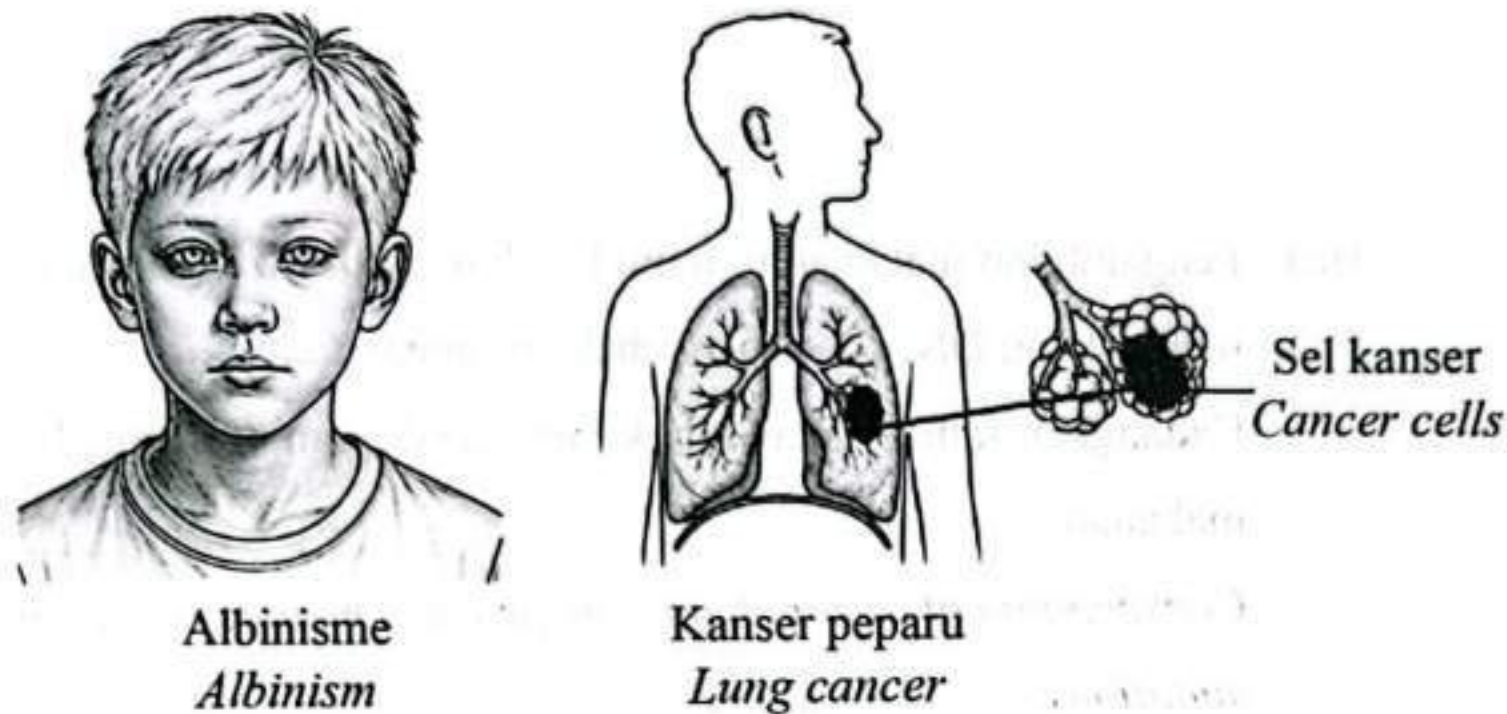
[1 markah]
[1 mark]

(Marking 2)
(Marking 1)



- (b) Rajah 7.2 menunjukkan dua jenis penyakit yang disebabkan oleh mutasi pada sel soma dan sel gamet.

Diagram 7.2 shows two types of diseases caused by mutations in somatic cells and gamete cells.



Rajah 7.2
Diagram 7.2

- (i) Nyatakan perbezaan antara mutasi sel soma dan mutasi sel gamet.
State the differences between somatic cells mutation and gamete cells mutations.

Mutasi sel soma <i>Somatic cells mutation</i>	Mutasi sel gamet <i>Gamete cells mutation</i>

[2 markah]
[2 marks]

(ii) Individu yang menghidap albinisme dinasihatkan oleh doktor untuk mengurangkan aktiviti luar pada waktu siang.

Wajarkan nasihat tersebut.

An individual with albinism is advised by a doctor to reduce outdoor activities during the day.

Justify the advice.

.....

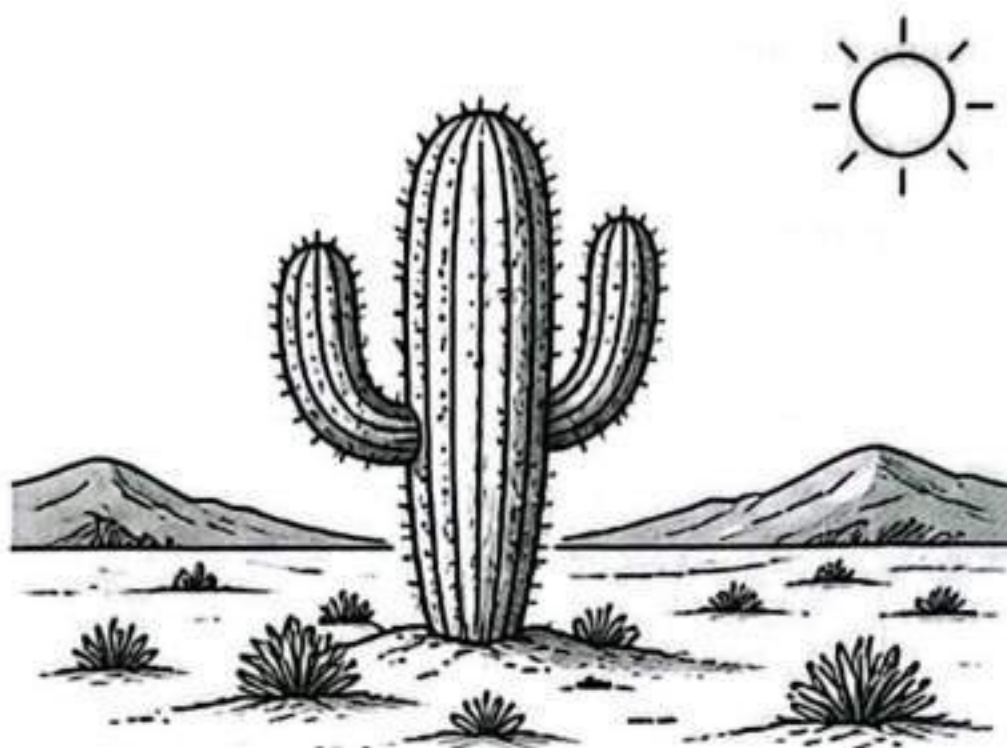
.....

.....

[2 markah]
[2 marks]

8. (a) Rajah 8.1 menunjukkan suatu tumbuhan yang hidup di kawasan padang pasir.

Diagram 8.1 shows a plant that lives in desert areas.



Rajah 8.1
Diagram 8.1

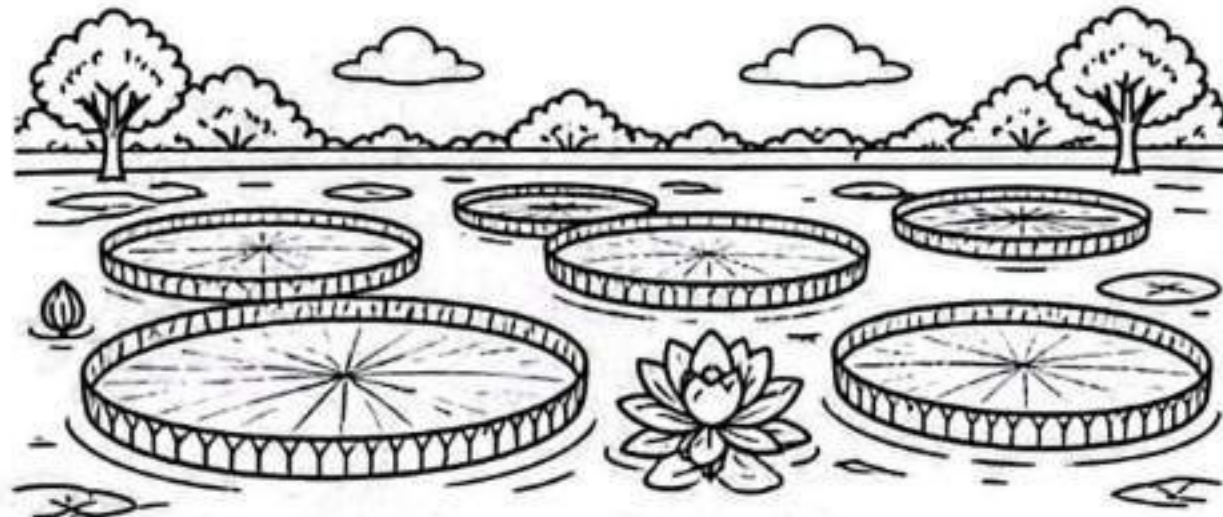
Berdasarkan Rajah 8.1, kelaskan tumbuhan tersebut berdasarkan habitatnya.

Based on Diagram 8.1, classify the plants based on their habitat.

[1 markah]
[1 mark]

- (b) Rajah 8.2 menunjukkan sejenis tumbuhan iaitu teratai, *Victoria* sp.

Diagram 8.2 shows a type of plant, water lily, Victoria sp.



Rajah 8.2
Diagram 8.2

Terangkan bagaimana penyesuaian tumbuhan tersebut yang membolehkannya hidup di tasik.

Explain how the plant adaptations allow it to live in lake.

.....

.....

.....

[2 markah]
[2 marks]

- (c) Rajah 8.3 menunjukkan pokok bakau yang hidup di kawasan paya bakau.

Diagram 8.3 shows mangrove trees that live in mangrove swamp areas.



Rajah 8.3
Diagram 8.3

Sekiranya pokok bakau tidak mempunyai akar seperti dalam Rajah 8.3, ramalkan kesan yang berlaku kepada tumbuhan tersebut.

If a mangrove tree does not have a roots as in Diagram 8.3, predict the effect that will occur to the plant.

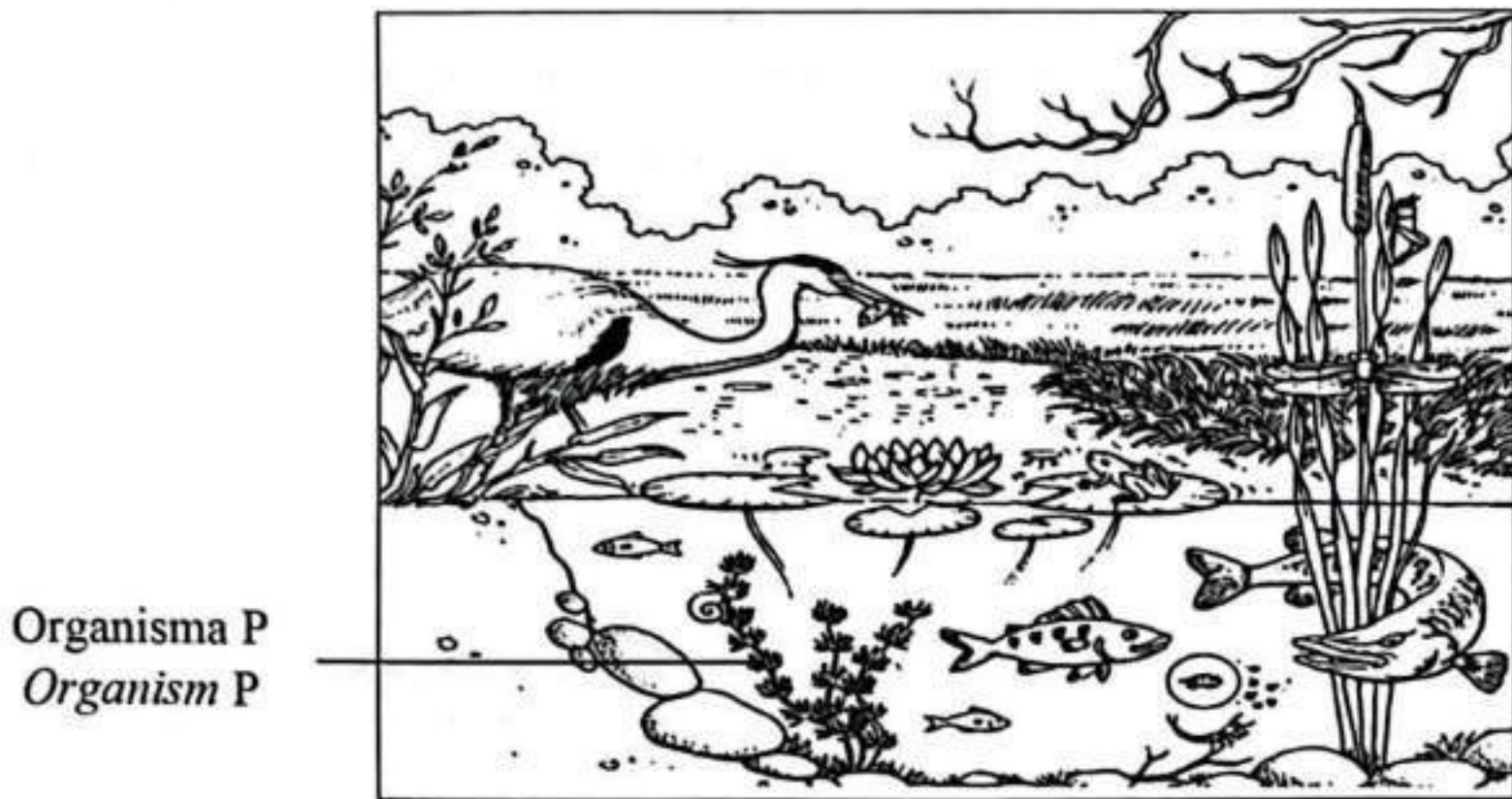
.....

.....

[1 markah]
[1 mark]

- (d) Rajah 8.4 menunjukkan sebuah ekosistem kolam.

Diagram 8.4 shows a pond ecosystem.



Rajah 8.4
Diagram 8.4

- (i) Berdasarkan Rajah 8.4, tentukan satu komponen biotik dan satu komponen abiotik yang terdapat dalam ekosistem kolam.

Based on Diagram 8.4, determine one biotic component and one abiotic component found in the pond ecosystem.

Komponen biotik:

Biotic component

Komponen abiotik:

Abiotic component

[2 markah]
[2 marks]

- (ii) Berdasarkan Rajah 8.4, bina satu rantai makanan yang terdapat dalam ekosistem kolam.

Based on Diagram 8.4, construct a food chain found in a pond ecosystem.

.....

[1 markah]
[1 mark]

(iii) Terangkan mengapa organisma P sangat penting dalam rantai makanan.

Explain why organism P are very important in the food chain.

.....

.....

.....

[2 markah]

[2 marks]

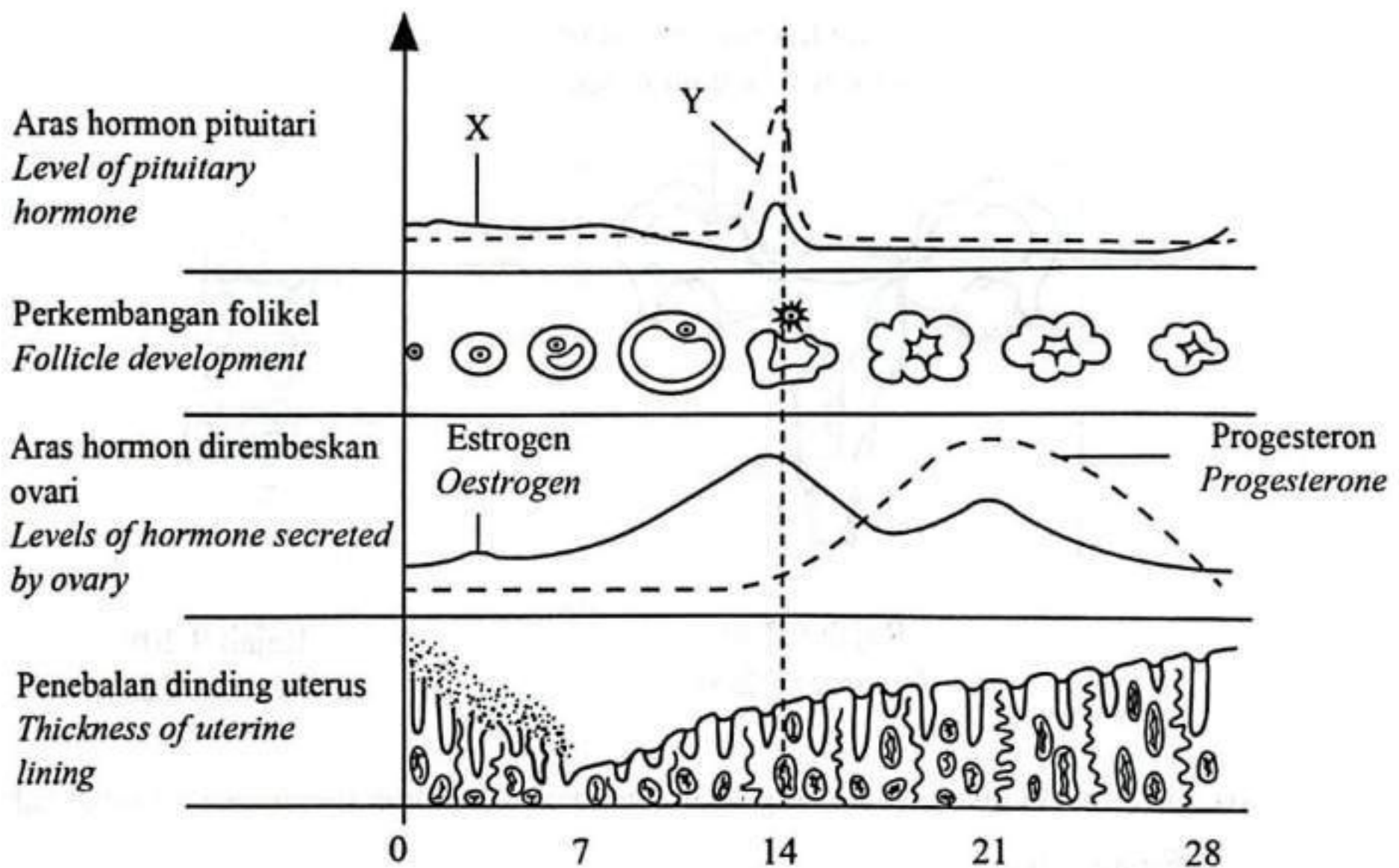
Bahagian B

[20 markah]

Bahagian ini mengandungi dua soalan. Jawab satu soalan.

9. (a) Rajah 9.1 menunjukkan satu kitar haid seorang wanita.

Diagram 9.1 shows a menstrual cycle of a woman.



Rajah 9.1
Diagram 9.1

- (i) Terangkan fungsi hormon X dan hormon Y dalam kitar haid.

Explain the function of hormone X and hormone Y in menstrual cycle.

[2 markah]

[2 marks]

- (ii) Berdasarkan Rajah 9.1, terangkan perubahan yang berlaku kepada aras hormon ovari dan penebalan dinding uterus sekiranya oosit sekunder disenyawakan.

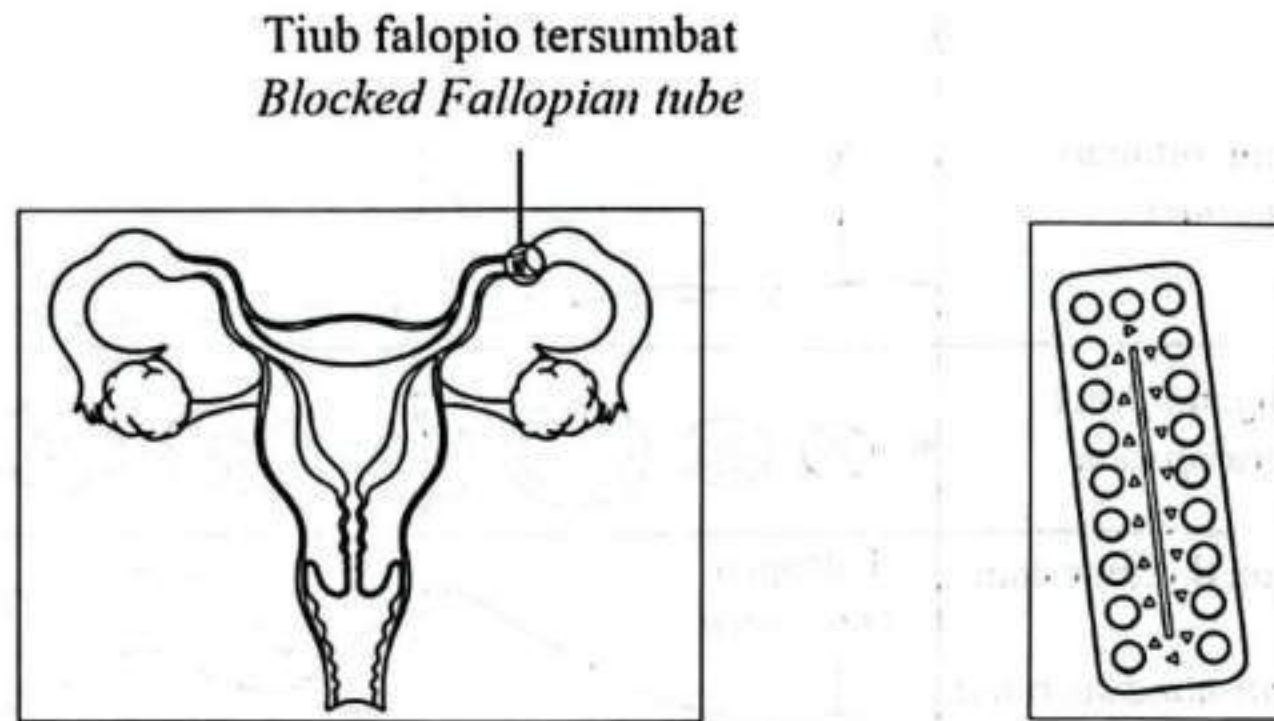
Based on Diagram 9.1, explain the changes that occur in ovarian hormone levels and thickening of the uterine wall if the secondary oocyte is fertilized.

[5 markah]

[5 marks]

- (b) Rajah 9.2(a) menunjukkan masalah kesihatan yang dialami oleh seorang wanita yang merancang untuk hamil manakala Rajah 9.2(b) menunjukkan pil perancang untuk mengelakkan kehamilan.

Diagram 9.2 shows the health problems experienced by a woman who is planning to get pregnant while Diagram 9.2(b) shows the contraceptive pill to prevent pregnancy.



Rajah 9.2(a)
Diagram 9.2(a)

Rajah 9.2(b)
Diagram 9.2(b)

- (i) Terangkan dua kaedah yang boleh dicadangkan untuk mengatasi masalah dalam Rajah 9.2(a).

Explain two methods can be proposed in order to overcome the problem in Diagram 9.2(a).

[4 markah]
[4 marks]

- (ii) Seorang wanita mengambil pil seperti yang ditunjukkan dalam Rajah 9.2(b) untuk mengelakkan kehamilan.

Terangkan bagaimana pil tersebut boleh mengelakkan kehamilan.

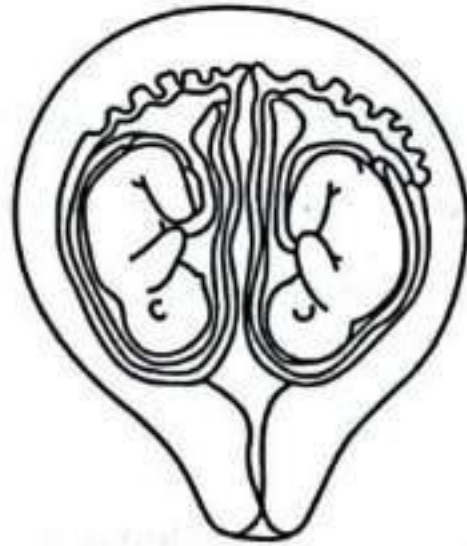
A woman takes the pills as shown in Diagram 9.2(b) to prevent pregnancy.

Explain how the pills can prevent pregnancy.

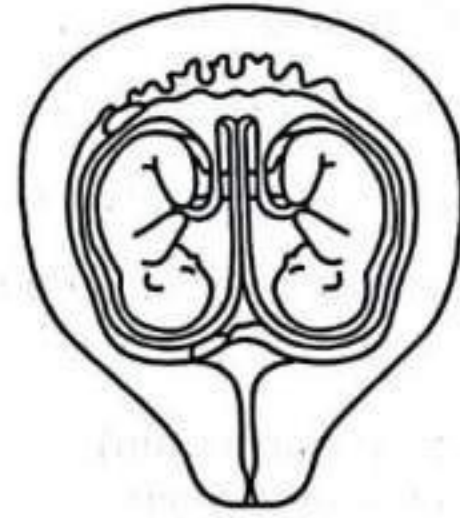
[2 markah]
[2 marks]

(c) Rajah 9.3 menunjukkan dua jenis kembar.

Diagram 9.3 shows two types of twins.



Kembar T
Twins T



Kembar U
Twins U

Rajah 9.3
Diagram 9.3

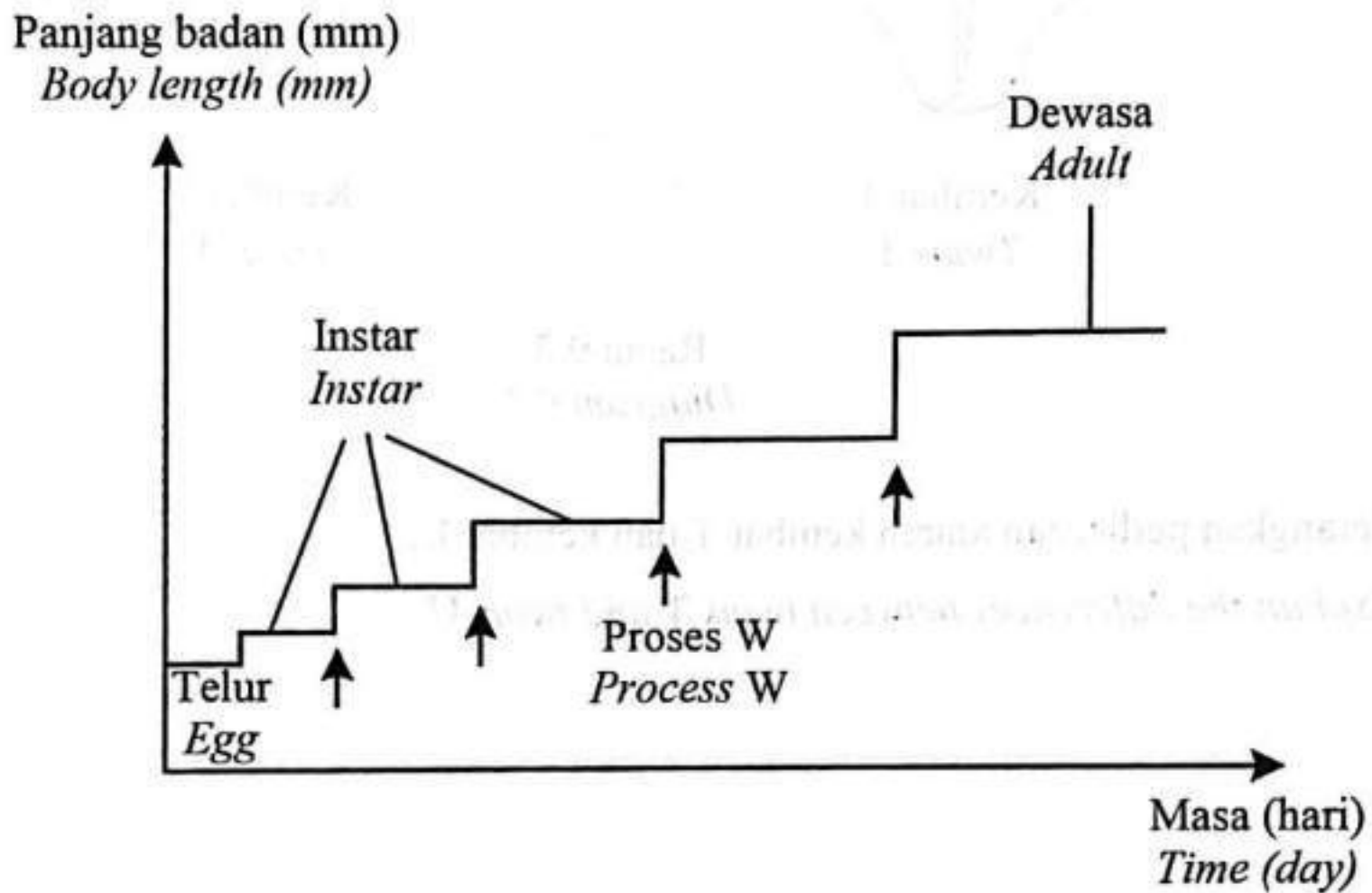
Terangkan perbezaan antara kembar T dan kembar U.

Explain the differences between twins T and twins U.

[4 markah]
[4 marks]

- (d) Rajah 9.4 menunjukkan lengkung pertumbuhan seekor belalang. Belalang merupakan serangga yang mempunyai rangka luar yang keras. Belalang menjalani proses W bagi membolehkan pertumbuhan dan perkembangan berlaku sehingga menjadi belalang dewasa.

Diagram 9.4 shows the growth curve of a grasshopper. Grasshoppers are insects that have a hard exoskeleton. Grasshoppers undergo the process W to allow growth and development to occur until they become adult grasshoppers.



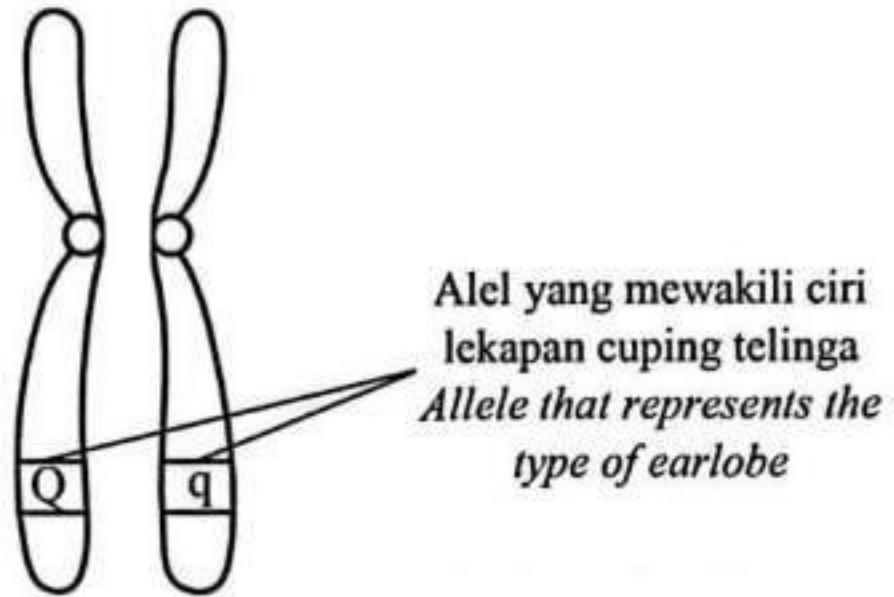
Rajah 9.4
Diagram 9.4

Berdasarkan Rajah 9.4, terangkan lengkung pertumbuhan belalang itu.
Based on Diagram 9.4, explain the growth curve of the grasshopper.

[3 markah]
[3 marks]

10. (a) Rajah 10.1 menunjukkan sepasang kromosom homolog. Alel Q merupakan alel dominan bagi ciri lekapan cuping telinga bebas manakala alel q ialah alel resesif bagi ciri lekapan cuping telinga melekap.

Diagram 10.1 shows a pair of homologous chromosomes. The Q allele is the dominant allele for the trait of free earlobe attachment while the q allele is the recessive allele for the trait of attached earlobe attachment.



Rajah 10.1
Diagram 10.1

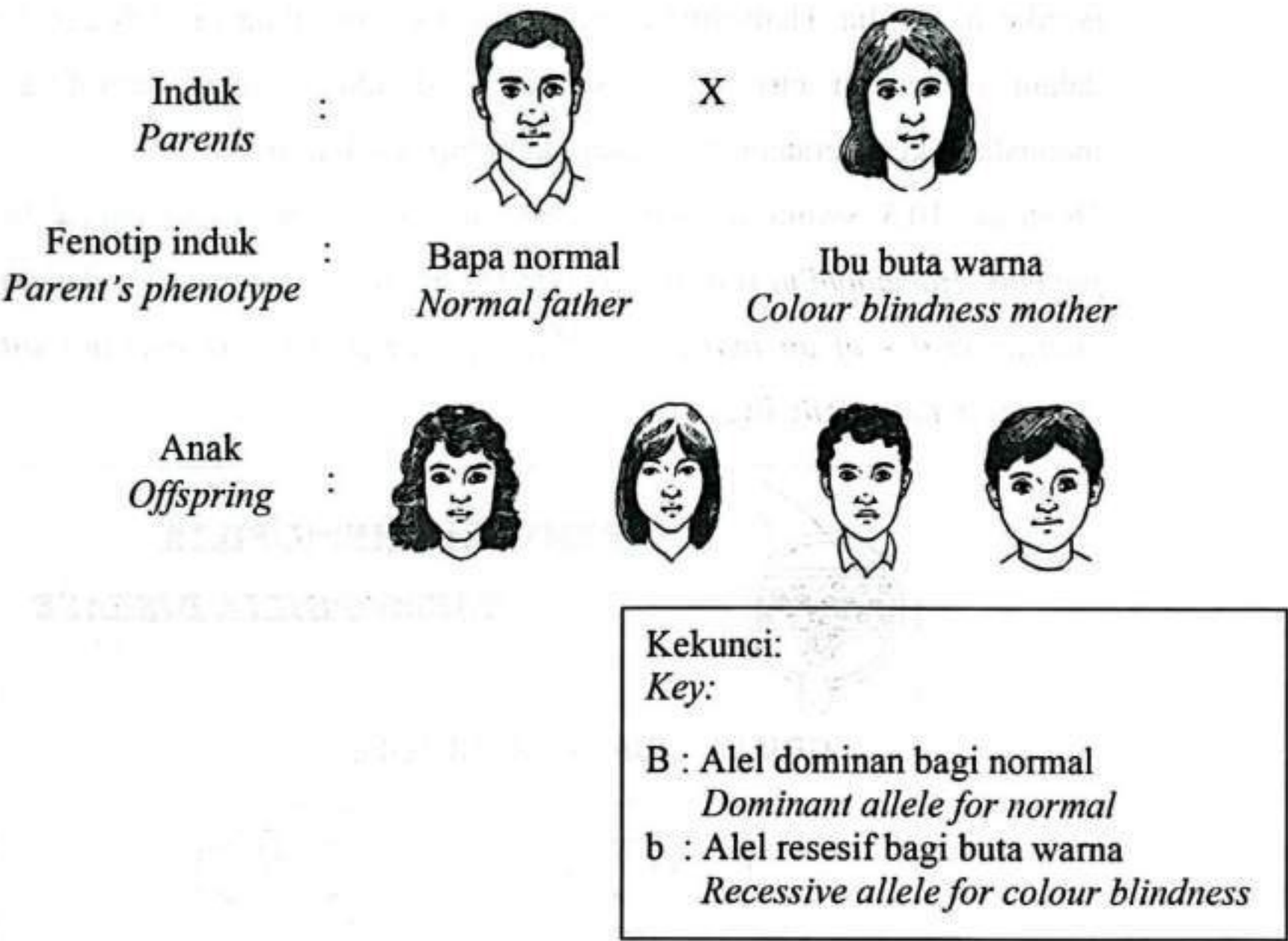
Berdasarkan Rajah 10.1, terangkan maksud bagi alel.

Based on Diagram 10.1, explain the meaning of allele.

[2 markah]
[2 marks]

(b) (i) Rajah 10.2 menunjukkan perwarisan buta warna yang berlaku dalam sebuah keluarga. Buta warna ialah keadaan yang menyebabkan seseorang itu tidak dapat membezakan warna merah dan hijau. Buta warna berlaku disebabkan alel resesif yang dibawa pada kromosom X.

Diagram 10.2 shows the inheritance of colour blindness that occurs in a family. Colour blindness is a condition that causes a person cannot differentiate colours such as red and green. Colour blindness occurs due to a recessive allele carried on the X chromosome.



Rajah 10.2
Diagram 10.2

Dengan menggunakan rajah skema, terangkan kebarangkalian anak-anak mewarisi buta warna.
Using a schematic diagram, explain the probability of children inheriting color blindness.

[8 markah]
[8 marks]

- (ii) Dengan menggunakan pengetahuan biologi anda, cadangkan satu kaedah yang boleh digunakan untuk mengenal pasti perwarisan buta warna dalam kalangan rakan kelas anda.

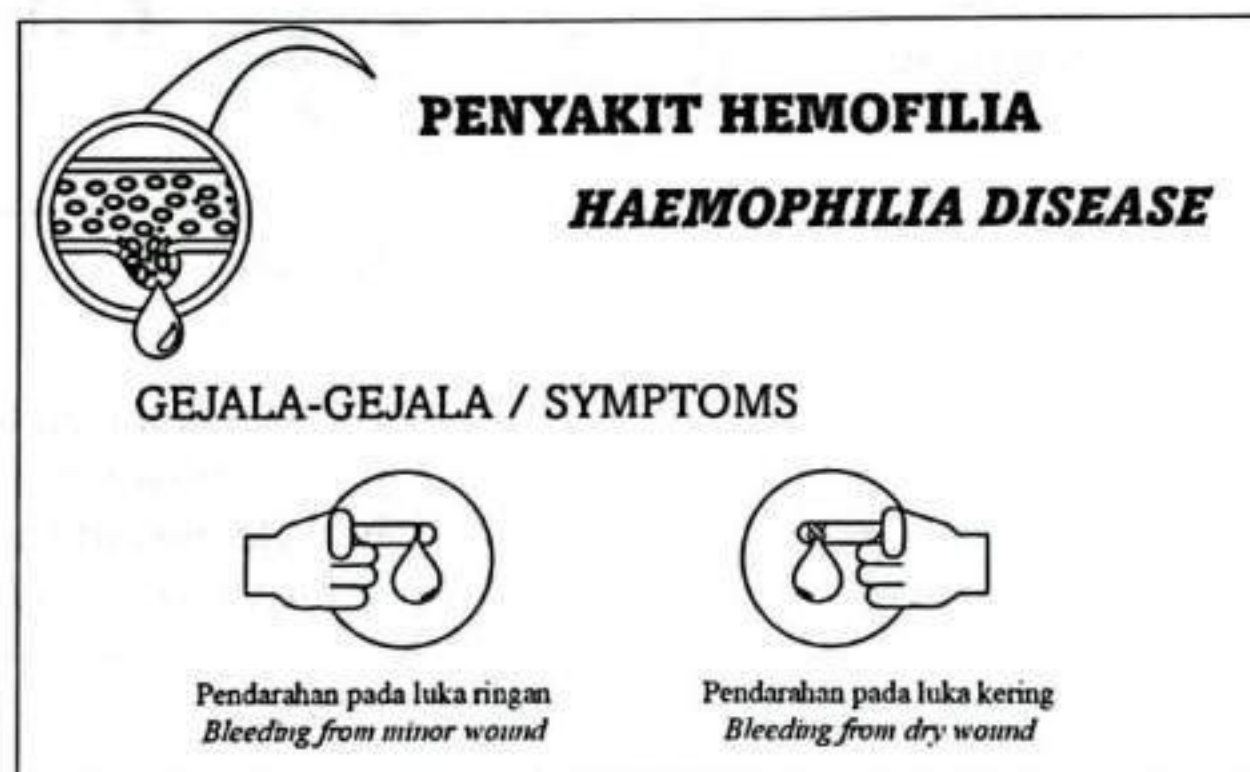
Using your biological knowledge, suggest one method which can identify colour blindness among friends in your class.

[2 markah]

[2 marks]

- (c) Rajah 10.3 menunjukkan sebuah poster mengenai gejala-gejala yang dialami oleh pesakit hemofilia. Hemofilia adalah penyakit yang dibawa oleh gen terangkai seks dalam penentuan ciri seks seseorang individu. Pesakit hemofilia tidak boleh mengalami kecederaan serius dalam kehidupan sehariannya.

Diagram 10.3 shows a poster about the symptoms experienced by hemophilia patients. Haemophilia is a disease carried by sex-linked genes in determining the sex characteristics of an individual. Haemophilia patients should not suffer seriously injuries in their daily lives.



Rajah 10.3
Diagram 10.3

Wajarkan mengapa pesakit hemofilia perlu meminimumkan kecederaan dalam kehidupan sehariannya.

Justify why haemophilia patients need to minimize injuries in their daily routine.

[2 markah]

[2 marks]

- (d) Rajah 10.4 menunjukkan keratan akhbar mengenai program saringan talasemia yang dilancarkan pada tahun 2016 oleh Kementerian Kesihatan Malaysia.

Diagram 10.4 shows newspaper clipping about the thalassemia screening program launched in 2016 by the Malaysian Ministry of Health.

Syor remaja 16 tahun jalani ujian saringan talasemia.

Kementerian Kesihatan disaran bekerjasama dengan Kementerian Pendidikan serta Persatuan ibu bapa dan guru (PIBG) untuk mewajibkan pelajar Tingkatan Empat menjalani ujian saringan talasemia.

Recommendation for 16-year-olds to undergo thalassemia screening tests.

The Ministry of Health is advised to collaborate with the Ministry of Education and the Parent-teacher Association (PIBG) to make it mandatory for Form Four students to undergo thalassemia screening tests.

Berita Harian, 14 November 2016

Rajah 10.4
Diagram 10.4

Terangkan bagaimana penyakit ini boleh diwarisi dan kesannya terhadap kesihatan seseorang.

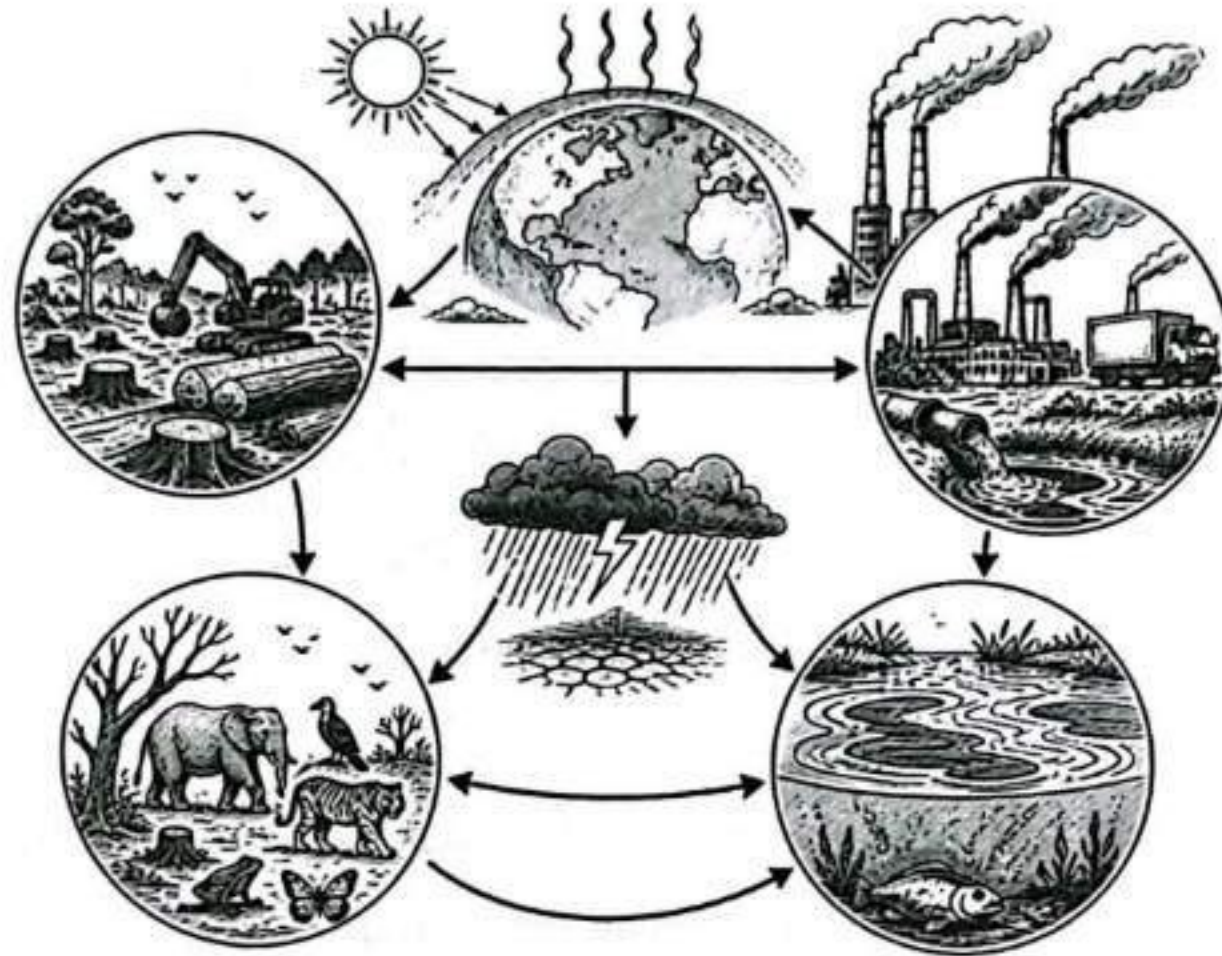
Explain how this disease can be inherited and the effect to person health.

[6 markah]
[6 marks]

Bahagian C
[20 markah]
Soalan ini mesti dijawab

11. (a) Rajah 11.1 menunjukkan ancaman yang boleh memberi kesan kepada kelestarian alam sekitar akibat aktiviti manusia.

Diagram 11.1 show threats that are able to effect on environmental sustainability due to human activities.



Rajah 11.1
 Diagram 11.1

- (i) Terangkan maksud kelestarian alam sekitar.

Explain the meaning of environmental sustainability.

[2 markah]
 [2 marks]

- (ii) Berdasarkan Rajah 11.1, bincangkan ancaman tersebut terhadap manusia dan alam sekitar.

Based on Diagram 11.1, discuss the threats to humans and environment.

[10 markah]
 [10 marks]

- (b) Rajah 11.2 menunjukkan satu amalan yang menyumbang kepada kelestarian alam.
Diagram 11.2 shows a practice that contributes to environmental sustainability.



Rajah 11.1
Diagram 11.1

Terangkan amalan lain yang boleh dilakukan untuk menyumbang kepada kelestarian alam bagi mengurangkan ancaman seperti Rajah 11.1.

Explain other practices that can be done to contribute environmental sustainability to reduce threats such as Diagram 11.1.

[5 markah]
 [5 marks]

- (c) Rajah 11.3 menunjukkan keadaan komuniti yang terjejas akibat peperangan.
Diagram 11.3 shows the condition of a community affected by war.



Rajah 11.3
Diagram 11.3

Pada pandangan anda, terangkan bagaimana peperangan boleh mengancam sekuriti makanan komuniti tersebut.

In your opinion, explain how war can threaten the food security of the community.

[3 markah]
 [3 marks]