

Section A/ Bahagian A

[60 marks/ markah]

Answer **all** questions in this section.

Jawab **semua** soalan dalam bahagian ini.

1. Diagram 1.1 shows the structure of a plant cell as seen under an electron microscope.
Rajah 1.1 menunjukkan struktur satu sel tumbuhan yang dilihat di bawah mikroskop elektron.

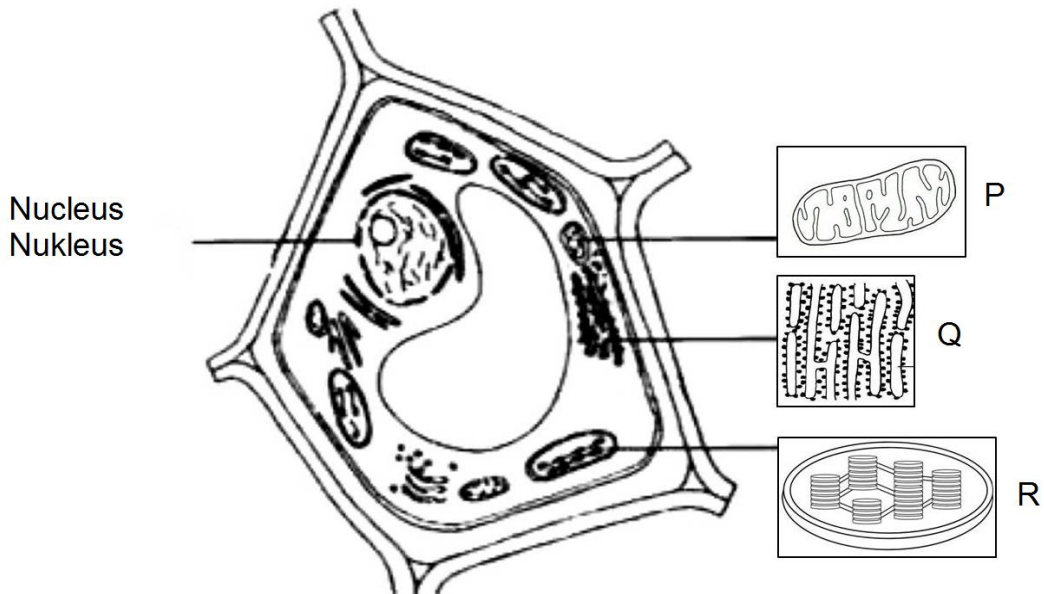


Diagram 1.1/ *Rajah 1.1*

- (a) (i) Name structures P, Q and R.

Namakan struktur P, Q dan R.

P :
 Q :
 R :

[3 marks/ markah]

- (ii) Explain the function of organelle R in the plant cell.

Terangkan fungsi organel R dalam sel tumbuhan.

.....

[2 marks/ markah]

- (iii) The ribosomes in Q synthesize proteins to form a hormone. If the ribosome in the meristematic cell is less, explain the effect to the plant growth.

Ribosome dalam Q mensintesis protein untuk membina hormon. Sekiranya ribosom di dalam sel meristem berkurang, terangkan kesan terhadap pertumbuhan pokok tersebut.

.....

[2 marks/ markah]

- (b) Diagram 1.2 shows a cell P that undergoes a process of mitosis at stage X.

Rajah 1.2 menunjukkan sel P yang sedang mengalami proses mitosis pada peringkat X.

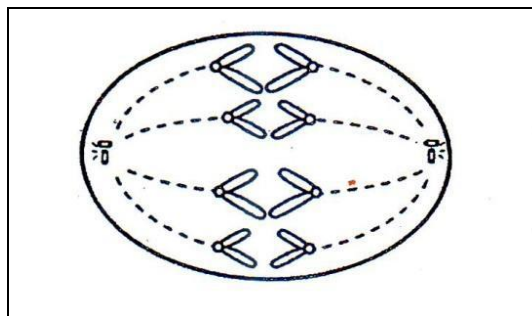


Diagram 1.2/ Rajah 1.2

- (i) Name stage X.
 Namakan peringkat X.

.....

[1 marks/ markah]

- (ii) State the chromosomal behaviour at stage X
 Nyatakan perlakuan kromosom di peringkat X.

.....

[1 marks/ markah]

- (c) Cloning technique is the process of producing clones or organisms that are identical to the parent organism through asexual reproduction.

Cloning technique has been applied in the modern orchid industry widely in the world including in Malaysia. Diagram 1.3 below shows the results of orchid cultivation carried out on a large scale in Malaysia.

Teknik pengklonan ialah proses penghasilan klon atau organisma yang seiras dengan organisma induk melalui pembiakan aseks.

Teknik pengklonan ini telah diaplikasikan dalam industri orkid moden secara meluas di dunia termasuklah di Malaysia. Rajah 1.3 di bawah menunjukkan hasil penanaman bunga orkid yang dijalankan secara besar-besaran di Malaysia.



Diagram 1.3/ Rajah 1.3

- (i) What is the type of cell division are involved in the orchid cloning process?
Apakah jenis pembahagian sel yang terlibat dalam proses pengklonan bunga orkid?

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[1 marks/ markah]

- (ii) Explain the purpose of cloning applied large scale in orchid cultivation in Malaysia.
Terangkan tujuan pengklonan diaplikasikan secara besar-besaran dalam penanaman orkid di Malaysia.

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.....
[2 marks/ markah]

- 2 (a) Diagram 2.1 shows two individuals P and Q in two different situations. P is in a vigorous activity while Q is at rest. Process R and S occur in a human muscle cell.

Rajah 2.1 menunjukkan dua individu P dan Q dalam dua situasi yang berbeza. P sedang melakukan satu aktiviti cergas manakala Q berada dalam keadaan rehat. Proses R dan S berlaku dalam satu sel otot manusia.

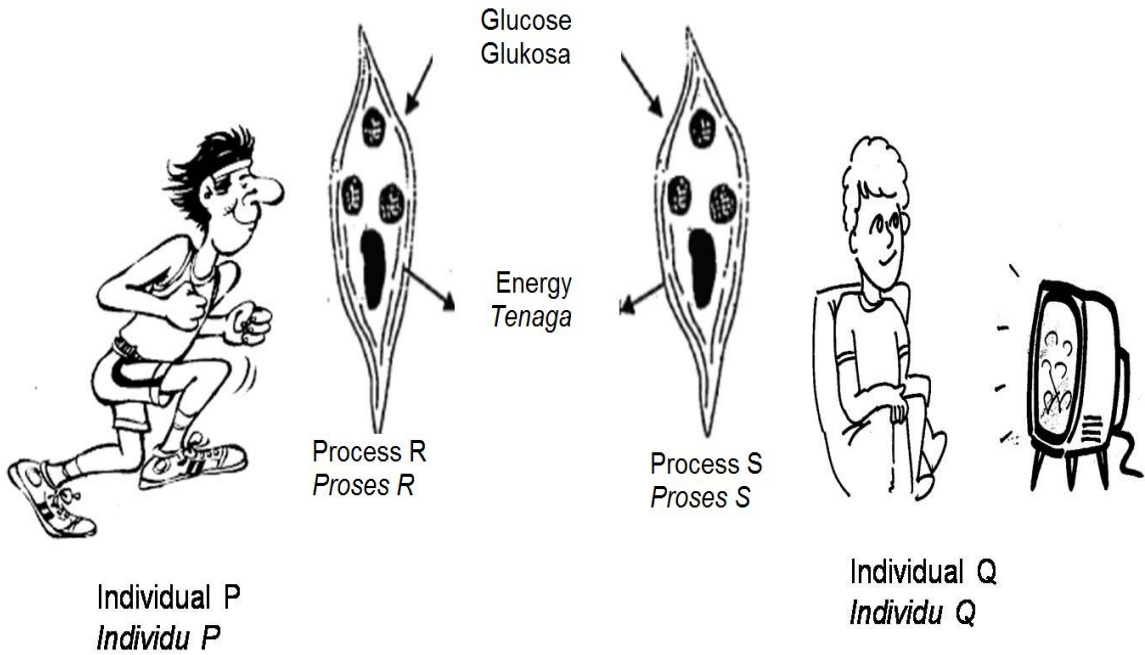


Diagram 2.1/ Rajah 2.1

- (i) Based on Diagram 2.1, name the process R and S:
Berdasarkan Rajah 2.1, namakan proses R dan S:

Process R / Proses R:

Process S / Proses S:

[2 marks/ markah]

- (ii) Write the words equation of process S.

Tuliskan persamaan perkataan bagi proses S.

.....

[2 marks/ markah]

- (iii) State **two** differences between process R and process S.

*Nyatakan **dua** perbezaan antara proses R dan S.*

.....

[2 marks/ *markah*]

- (b) Diagram 2.2 shows the gaseous exchange in the alveolus.

Rajah 2.2 menunjukkan pertukaran gas di alveolus.

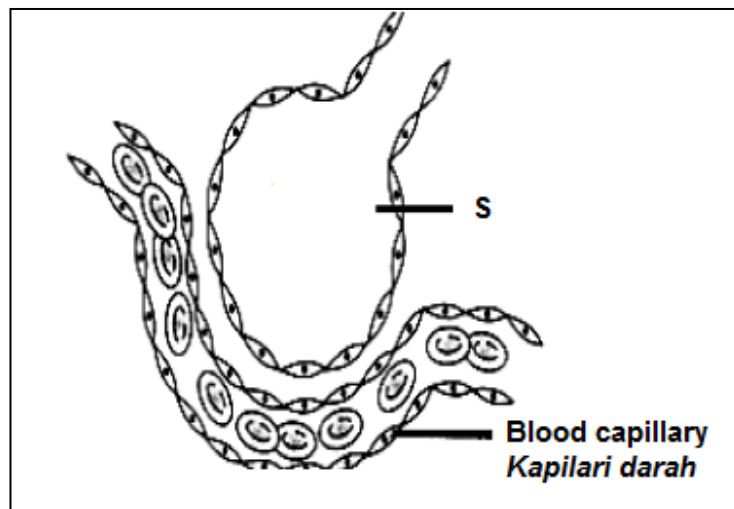


Diagram 2.2/ *Rajah 2.2*

- (i) Name the process occur between alveolus and blood capillary.

Namakan proses yang berlaku di antara alveolus dan kapilari darah.

.....

[1 marks/ *markah*]

- (ii) **Draw and label** an arrow on the Diagram 2.2 to show the direction of oxygen and carbon dioxide movement during the gas exchange process.

***Lukis dan label** anak panah pada Rajah 2.2 untuk menunjukkan arah pergerakan oksigen dan karbon dioksida semasa proses pertukaran gas.*

[2 marks/ *markah*]

(iii) Give **three** characteristics of S structure which allows the gas to pass through it efficiently

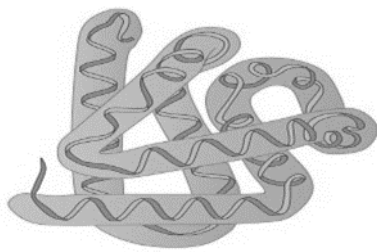
*Berikan **tiga** ciri struktur S yang membolehkan gas melaluinya dengan cekap.*

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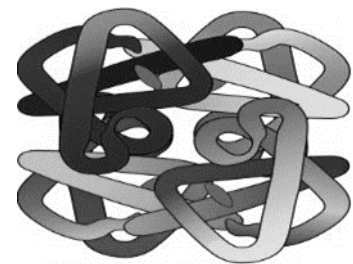
[3 marks/ markah]

3 Diagram 3.1 shows two structures of protein.

Rajah 3.1 menunjukkan dua struktur protein



A



B

Diagram 3.1/ *Rajah 3.1*

Based on the diagram above, label the correct protein structure in Table 3.1.

Berdasarkan rajah diatas, labelkan struktur protein yang betul pada Jadual 3.1.

Name of protein structure <i>Nama struktur protein</i>	Alphabet <i>Huruf</i>
Tertiary <i>Tertier</i>	
Quaternary <i>Kuartener</i>	

Table 3.1/*Jadual 3.1*

[2 marks / markah]

- (ii) Match the protein to its correct structure in Diagram 3.2

Padankan protein dengan strukturnya yang betul dalam Rajah 3.2

Protein <i>Protein</i>	Protein structure <i>Struktur protein</i>
Haemoglobin <i>Hemoglobin</i>	Secondary <i>Sekunder</i>
Amylase <i>Amilase</i>	Tertiary <i>Tertier</i>
Hair keratin <i>Keratin rambut</i>	Quaternary <i>Kuartener</i>

Diagram 3.2/ *Rajah 3.2*

[3 marks / *markah*]

- (b) (i) Diagram 3.3 shows two shirts, P and Q that were stained with blood. The shirts were washed with enzymatic washing powder at different temperature.

Rajah 3.3 menunjukkan dua kemeja, P dan Q yang telah dikotori oleh darah. Kemeja-kemeja tersebut telah dicuci menggunakan serbuk pencuci berenzim pada suhu yang berbeza.

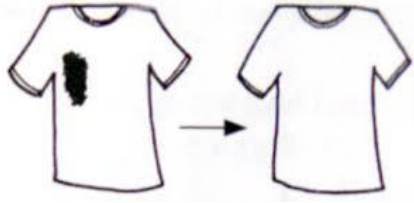
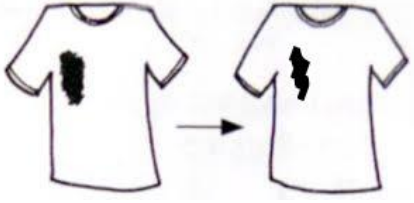
Shirt P <i>Kemeja P</i>	Shirt Q <i>Kemeja Q</i>
	
Temperature <i>Suhu</i>	Temperature <i>Suhu</i>
35°C	70°C

Diagram 3.3/ *Rajah 3.3*

- (b) (i) Why does the stain remains on shirt Q?

Explain what happen to the structure of enzyme in that situation.

Mengapakah masih terdapat kotoran pada kemeja Q?

Terangkan apa yang berlaku kepada struktur enzim dalam situasi tersebut.

.....
.....

[2 marks/ markah]

- (ii) In the past, people make cheese by keeping the milk in a pouch made from camel's stomach. Explain how the enzyme in the pouch causes the milk to become cheese.

Pada zaman dahulu, manusia membuat keju dengan menyimpan susu didalam kantung yang diperbuat daripada perut unta. Terangkan bagaimana enzim di dalam kantung itu menyebabkan susu bertukar menjadi keju?

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.....
.....

[2 marks/ markah]

- (c) (i) Diagram 3.4 shows two types of food in different classes of protein.

Rajah 3.4 menunjukkan dua jenis makanan dalam kelas protein yang berbeza.



Green Peas
Kacang hijau



Fried Chicken
Ayam Goreng

Diagram 3.4/ Rajah 3.4

- (c) (i) State the class of protein for each food. Explain.
Nyatakan kelas protein bagi setiap makanan tersebut. Terangkan.

.....
.....

[2 marks / markah]

- (ii) In ileum protein will be digested into amino acid. Write the equation for the reaction.

Di dalam ileum, protein akan dicernakan kepada asid amino. Tuliskan persamaan untuk tindak balas itu.

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[1 mark/ markah]

- 4 Diagram 4.1 shows the structure of the human brain consisting of X, Y and Z
Rajah 4.1 menunjukkan struktur otak manusia yang terdiri daripada X, Y dan Z

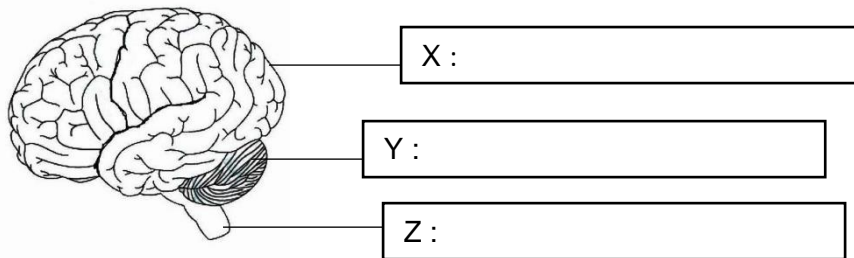


Diagram 4.1/Rajah 4.1

- (a) (i) Name X, Y and Z
Namakan X, Y dan Z

[3 marks/markah]

- (ii) X is the largest part of the brain. Tick (/) in the space below to explain the function of X.

X merupakan bahagian otak yang paling besar. Tandakan(/) pada ruangan di bawah bagi menerangkan fungsi X.

Coordination of all controlled activities <i>Koordinasi semua aktiviti terkawal</i>	
Intelligence <i>Kecerdasan</i>	
Coordination of all uncontrolled activities <i>Koordinasi semua aktiviti tidak terkawal</i>	
Control Reflex Action <i>Mengawal Tindakan Refleks</i>	
Integrate information and stimuli <i>Mengintegrasikan maklumat dan rangsangan</i>	

[3 marks/ markah]

- (iii) The hypothalamus is located in the middle part of the brain. This part is a very important part. State two functions of the hypothalamus.

Hipotalamus terletak di bahagian tengah otak. Bahagian ini merupakan bahagian yang sangat penting. Nyatakan dua fungsi hipotalamus.

.....
.....

[2 marks/ markah]

- (iv) Mr. John has had an accident. The doctor found that Mr. John suffered serious injuries involving part Y. State what the effect of the damage was on Mr. John.

Encik John telah mengalami kemalangan. Doktor telah mendapati Encik John mengalami kecederaan serius yang melibatkan bahagian Y. Nyatakan apakah kesan kerosakan tersebut pada Encik John.

.....

[1 mark/ markah]

- (b) There are two types of diseases associated with the nervous system. Give three differences of Alzheimer's disease and Parkinson's disease.

Terdapat dua jenis penyakit yang berkaitan dengan sistem saraf. Berikan tiga perbezaan penyakit Alzheimer dan penyakit Parkinson.

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[3 marks/ markah]

- 5 Diagram 5.1 shows a type of variation found in human.

Rajah 5.1 menunjukkan satu jenis variasi yang terdapat pada manusia.

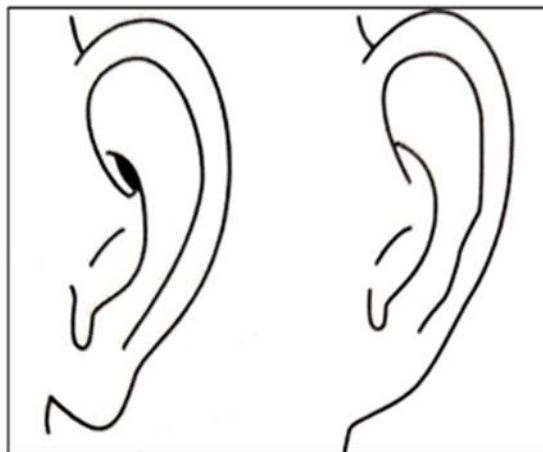


Diagram 5.1/ Rajah 5.1

- (a) (i) Name the type of variation in diagram 5.1

Namakan jenis variasi pada rajah 5.1.

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[1 mark/ markah]

- (ii) What is the factor that causes variation named in 5 (a) (i).

Apakah faktor yang menyebabkan variasi yang dinamakan di 5 (a) (i).

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[1 mark/ markah]

- (b) State **three** differences between continuous variation and discontinuous variation.

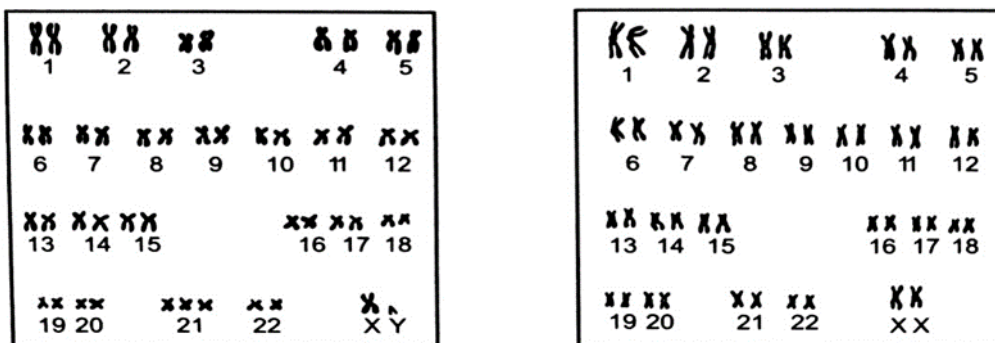
Nyatakan tiga perbezaan antara variasi selanjar dan variasi tak selanjar.

Continuous variation <i>Variasi selanjar</i>	Discontinuous variation <i>Variasi tak selanjar</i>

[3 marks/ markah]

- (c) Diagram 5.2 shows the karyotypes of individual P and individual Q.

Rajah 5.2 menunjukkan kariotip bagi individu P dan individu Q.



Individual P/ Individu P

Individual Q/ Individu Q

Diagram 5.2/ Rajah 5.2

- (i) State one difference between the karyotypes of individual P and Q.

Nyatakan satu perbezaan antara kariotip P dan Q.

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[1 mark/ markah]

- (ii) The karyotypes of individual P is abnormal. Explain how the abnormality occurred.

Kariotip individu P adalah tidak normal. Terangkan bagaimana keadaan ini berlaku.

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.....

[3 marks/ markah]

- (d) A patient has been diagnosed with sickle cell anemia. As a doctor, what advice can you give to the patient.

Seorang pesakit telah disahkan menghidap anemia sel sabit. Sebagai seorang doktor, terangkan apakah nasihat yang boleh anda berikan kepada pesakit tersebut.

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.....
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[3 marks/ markah]

Section B / Bahagian B

[40 marks/ markah]

Answer any two questions from this section.

Jawab mana-mana dua soalan daripada bahagian ini

- 6 (a) Diagram 6.1 shows the movement of water that occurs in plants. J is a xylem that acts to transport water.

Rajah 6.1 menunjukkan pergerakan air yang berlaku dalam tumbuhan. J ialah salur xilem yang berfungsi mengangkut air.

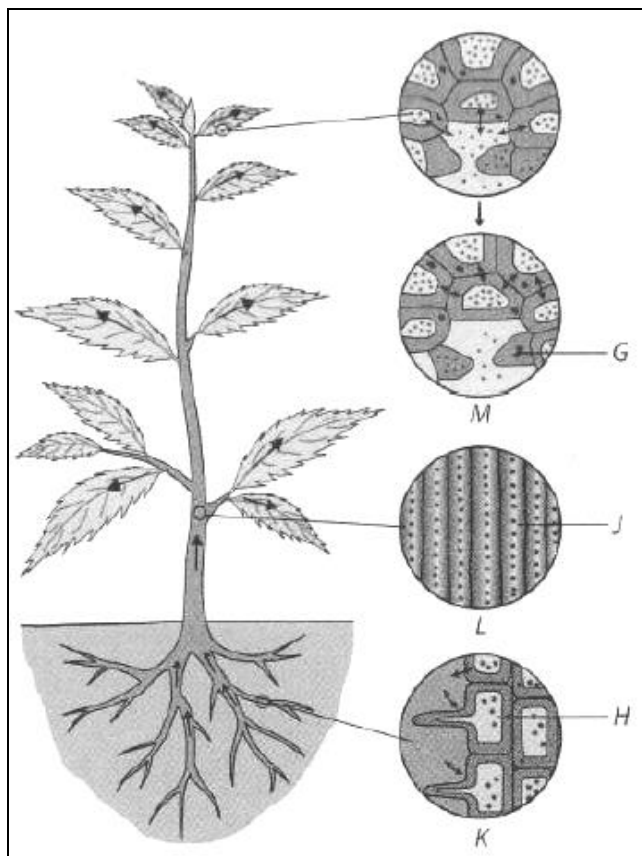


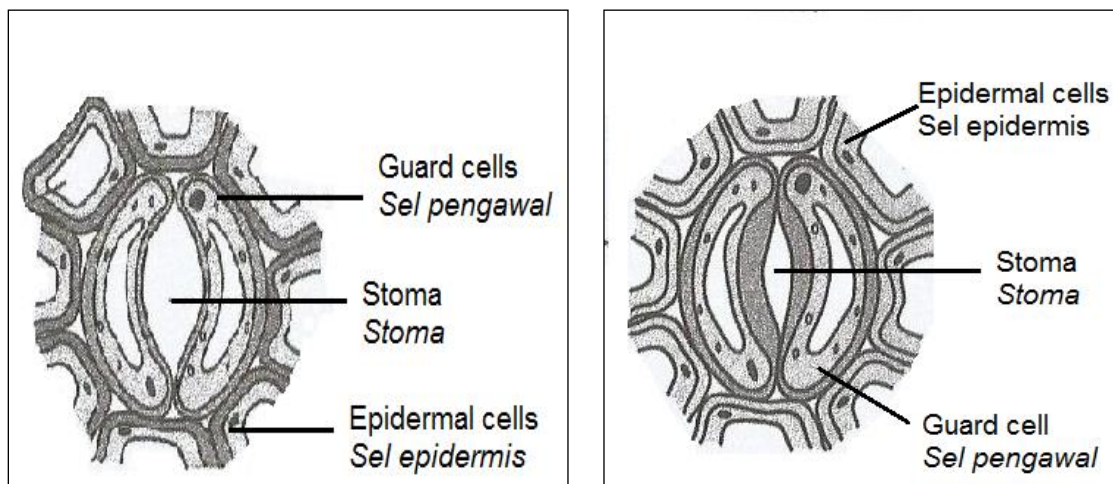
Diagram 6.1/ Rajah 6.1

State the adaptation of xylem to carry out the process effectively.

Nyatakan penyesuaian xilem bagi menjalankan proses ini dengan berkesan.

[4 marks/ markah]

- (b) Diagram 6.2 (a) and 6.2(b) shows stoma condition at different times.
Rajah 6.2 (a) dan 6.2(b) menunjukkan keadaan stoma pada waktu yang berbeza.

Diagram 6.2 (a)/ *Rajah 6.2 (a)*Diagram 6.2 (b)/ *Rajah 6.2 (b)*

Explain the different condition of the stomata in each diagram.

Terangkan perbezaan keadaan stoma pada setiap rajah.

[6 marks/ markah]

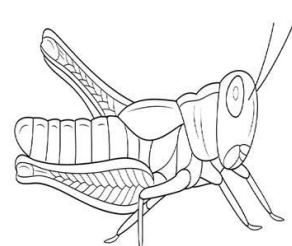
- (c) Plants are adapted with specific characteristics to maintain their support in their respective habitat. Discuss how certain plants are adapted to maintain their support in water and on land.

Tumbuhan disesuaikan dengan ciri-ciri tertentu untuk memperolehi sokongan dalam habitat masing-masing. Bincangkan bagaimana tumbuhan tertentu beradaptasi untuk mendapat sokongan dalam air dan di atas darat.

[10 marks/ markah]

- 7 (a) (i) Diagram 7.1 shows the two types of organism.

Rajah 7.1 menunjukkan dua jenis organisma.

Organism M/ *Organisma M*Organism N/ *Organisma N*Diagram 7.1/ *Rajah 7.1*

Based on Diagram 7.1, name and explain the characteristics of skeletal system of organism M and organism N.

Berdasarkan rajah 7.1, namakan dan terangkan ciri-ciri sistem rangka organisma M dan organisma N.

[5 marks/markah]

- (ii) Explain how the skeletal system of an organism M is adapted for its movement.

Terangkan bagaimana sistem rangka organisma M itu disesuaikan untuk melakukan pergerakan.

[5 marks/markah]

- (b) Diagram 7.2(a) and 7.2(b) shows the two types of diseases in skeletal system of human

Rajah 7.2(a) dan 7.2(b) menunjukkan dua jenis penyakit sistem rangka pada manusia.



Diagram 7. 2(a)/ *Rajah 7.2(a)*



Diagram 7.2(b)/ *Rajah 7.2(b)*

Based on diagram 7.2(a) and 7.2(b), explain the characteristics between the two diseases.

Berdasarkan rajah 7.2(a) dan 7.2(b) di atas, terangkan ciri-ciri kedua-dua penyakit tersebut.

[10 marks/ markah]

- 8 Diagram 8.1 shows a type of microorganism that can cause fever, dry cough and fatigue in an individual.

Rajah 8.1 menunjukkan sejenis mikroorganisma yang boleh menyebabkan demam, batuk kering, sesak nafas dan keletihan pada seseorang individu.

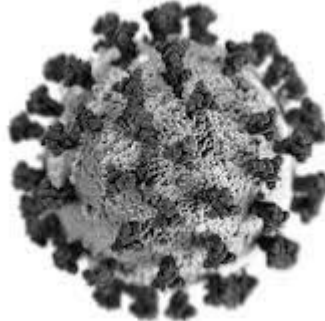


Diagram 8.1/ Rajah 8.1

- (a) (i) Name the type of microorganism and list its characteristics.
Namakan jenis mikroorganisma tersebut dan senaraikan ciri-cirinya.
[4 marks/ markah]
- (ii) There are many methods of controlling pathogen.
Explain how pathogen control methods are performed.
Terdapat banyak cara dalam kaedah pengawalan patogen.
Terangkan bagaimana kaedah pengawalan patogen dilakukan.
[8 marks/ markah]
- (b) Ecosystem undergoes changes in their structure and function as time passes. This process will take some time to complete one cycle of the process.
Ekosistem mengalami perubahan dari segi struktur dan fungsinya. Proses ini akan mengambil masa yang agak lama untuk melengkapkan satu kitaran proses tersebut.



Diagram 8.2/ Rajah 8.2

The diagram 8.2 shows an area of bare ground.

Rajah 8.2 menunjukkan satu kawasan tanah lapang.

Explain what happened to the area after a few years of abandonment?

Terangkan apakah yang berlaku kepada kawasan tersebut selepas beberapa tahun ditinggalkan?

[8 marks/markah]

9. a) A man with type AB blood is married to a woman with type O blood. They have two biological children and one adopted child. Alif has type A blood, Azam has type B blood, and Amin has type O blood. Identify the the adopted child. Explain it by using a schematic diagram.

Seorang lelaki dengan darah jenis AB berkahwin dengan seorang wanita berdarah jenis O. Mereka mempunyai dua orang anak kandung dan seorang anak angkat. Alif mempunyai darah jenis A, Azam mempunyai darah jenis B dan Amin mempunyai darah jenis O. Kenalpasti anak angkat tersebut. Terangkan hal itu dengan menggunakan gambarajah skema.

[10 marks/ markah]

- b) The increasing demand for salmon has encouraged biotechnological scientists to start the research on genetically engineered salmon. Salmon is now the first genetically modified (GMO) fish to be approved for human consumption. Diagram 9.1 below shows the difference between normal salmon and genetically modified salmon at 18 months.

Permintaan yang semakin meningkat terhadap ikan salmon telah menarik minat saintis bioteknologi untuk memulakan kajian kejuruteraan genetik ikan salmon. Kini ikan salmon merupakan ikan terubahsuai genetik (GMO) pertama yang diperakui selamat untuk dimakan.

Rajah 9.1 di bawah menunjukkan perbezaan di antara ikan salmon biasa dan ikan salmon terubahsuai genetic yang berusia 18 bulan.

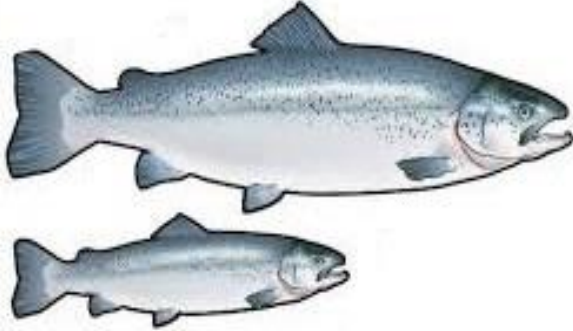
Salmon/ Ikan salmon	Data/ Data
	GMO Salmon / <i>Ikan salmon GMO</i> Length / <i>Panjang</i> : 61 cm Weight / <i>Berat</i> : 3.3 kg
	Normal / <i>Biasa</i> Length / <i>Panjang</i> : 33 cm Weight / <i>Berat</i> : 1.3 kg

Diagram 9.1/ *Rajah 9.1*

Based on your biological knowledge, discuss the advantages and disadvantages of Genetically Modified Organism (GMO) for salmon.

Berdasarkan pengetahuan biologi anda, bincangkan kebaikan dan keburukan organisma terubahsuai genetik (GMO) bagi salmon.

[10 marks/ *markah*]

**END OF QUESTION PAPER
KERTAS SOALAN TAMAT**