

4551 / 2  
**BIOLOGI**  
 Kertas 2  
 NOV 2021  
 2 ½ jam

Nama		
Tingkatan		No Angka Giliran
	Logo sekolah	
(NAMA SEKOLAH)		

**UJIAN DIAGNOSTIK BIOLOGI SPM 2021**  
**TINGKATAN LIMA**  
 Dua jam tiga puluh minit

**Arahan :**

1. Tulis nama dan tingkatan anda pada ruangan yang disediakan di atas.
2. Kertas soalan ini adalah dalam dwibahasa.
3. Soalan dalam Bahasa Melayu mendahului soalan dalam Bahasa Inggeris.
4. Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam Bahasa Melayu atau Bahasa Inggeris.
5. Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini

<i>Untuk Kegunaan Pemeriksa</i>		
<i>Bahagian</i>	<i>Soalan</i>	<i>Markah diperolehi</i>
A	1	
	2	
	3	
	4	
	5	
	6	
	7	
	8	
B	9	
	10	
C	11	
<b>Jumlah</b>		

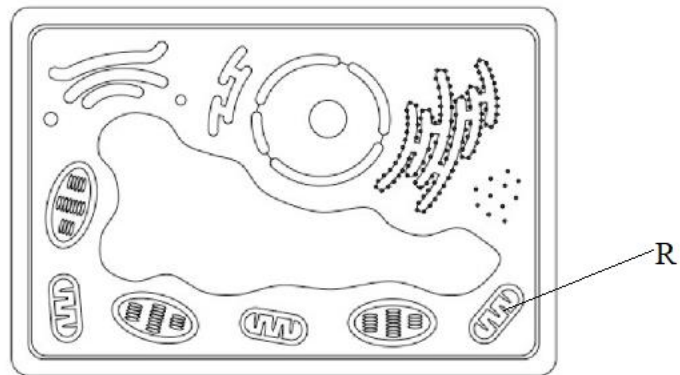
*Kertas soalan ini mengandungi 31 halaman bercetak termasuk muka surat hadapan*

**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-struktur yang terdapat di dalam satu sel tumbuhan.  
*Diagram 1.1 shows structures that are found in a plant cell.*



Rajah 1.1/Diagram 1.1

- (a) (i) Namakan struktur R.

*Name structure R.*

.....

[1 markah/1 mark]

- (ii) Terangkan **satu** adaptasi struktur R untuk menjalankan fungsinya dengan lebih cekap.

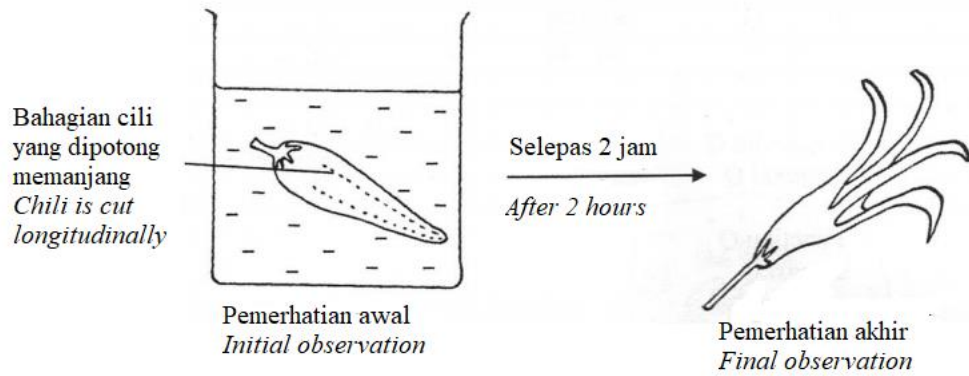
*Explain **one** adaptation of structure R to perform its function more efficiently.*

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

[2 markah /2 marks]

(b) Rajah 1.2 menunjukkan keadaan cili selepas direndam di dalam air paip.

*Diagram 1.2 shows the condition of chilly after being immersed in tap water.*



Rajah 1.2/ *Diagram 1.2*

Berdasarkan Rajah 1.2, terangkan pemerhatian akhir.

*Based on Diagram 1.2, explain the final observation.*

.....

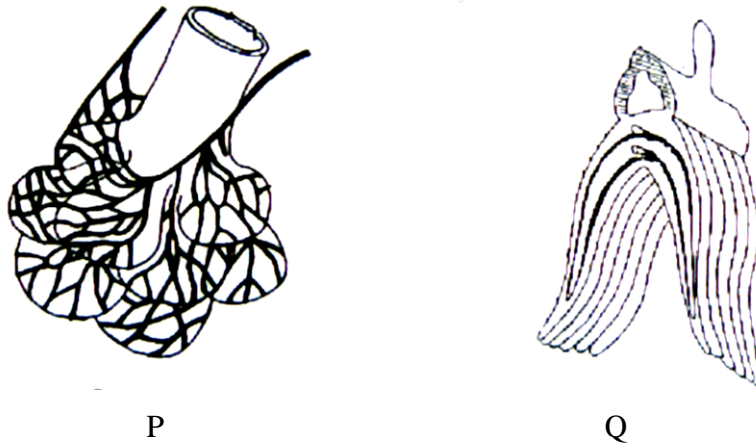
.....

.....

[3 markah /3 marks]

2. Rajah 2.1 menunjukkan struktur respirasi dalam manusia dan ikan.

*Diagram 2.1 shows respiratory structure in human and fish.*



Rajah 2.1/ *Diagram 2.1*

(a) Namakan struktur P dan Q.

*Name structures P and Q.*

P: .....

Q: .....

[2 markah/2 marks]

(b) Terangkan **satu** ciri yang sama pada struktur P dan Q untuk meningkatkan kecekapan proses pertukaran gas.

*Explain **one** similar characteristic in structures P and Q to increase efficiency for gaseous exchange process.*

*Ciri/ Characteristic: .....*

*Penerangan/ Explanation: .....*

.....

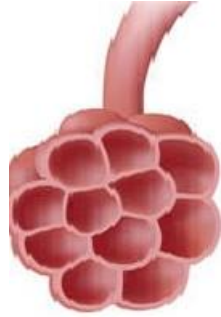
[2 markah/2 marks]

(c) Rajah 2.2(a) menunjukkan alveolus individu yang sihat

*Diagram 2.2(a) shows alveoli of a healthy individual*

Rajah 2.2(b) menunjukkan alveolus individu yang menghidap emfisema.

*Diagram 2.2(b) shows alveoli of an individual with emphysema.*



Rajah 2.2(a)/Diagram 2.2(a)



Rajah 2.2(b)/Diagram 2.2(b)

Emfisema adalah sejenis penyakit paru.

*Emphysema is a type of lung disease.*

Terangkan kesan penyakit tersebut kepada kesihatan individu itu.

*Explain the effects of the disease to the health of the individual.*

.....  
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.....


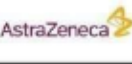



[2 markah/ 2 marks]

3. Rajah 3 menunjukkan jadual dos vaksin Covid-19 di Malaysia. Dos kedua diberi mengikut jangkamasa yang telah ditetapkan dan bergantung kepada jenis vaksin.

*Diagram 3 shows the Covid-19 dosage schedule in Malaysia. Second dosage are given according to the time frame and depends on the types of the vaccine.*

**JADUAL DOS VAKSIN COVID-19 DI MALAYSIA**

**COVID-19 VACCINE DOSAGE SCHEDULE IN MALAYSIA**

VAKSIN VACCINE					
JUMLAH DOS TOTAL DOSAGE	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>
Selang hari antara dos 1 dan 2 Day interval between dosage 1 and 2	<b>21</b>	<b>28</b>	<b>14</b>	<b>0</b>	<b>21</b>

Rajah 3/ Diagram 3

- (a) Apakah maksud vaksin?

*What is the meaning of vaccine?*

.....

[1 mark/1 markah]

- (b) (i) Kenal pasti jenis keimunan yang diberikan kepada seseorang yang mendapat suntikan Vaksin Covid-19.

*Identify the type of immunisation given to a person who receives injection of Covid-19 vaccine.*

.....

[1 mark/1 markah]

- (ii) Nyatakan tempoh immuniti bagi (b)(i).

*State the immunity period of (b)(i)*

.....

[1 mark/1 markah]

(c) (i) Namakan sel yang menghasilkan antibodi di dalam badan.

*Name the cells that produce antibodies in the body.*

.....

[1 markah/1 mark]

(ii) Berdasarkan Rajah 3, terangkan mengapa dos pertama dan dos kedua diperlukan mengikut jangkamasa yang ditetapkan.

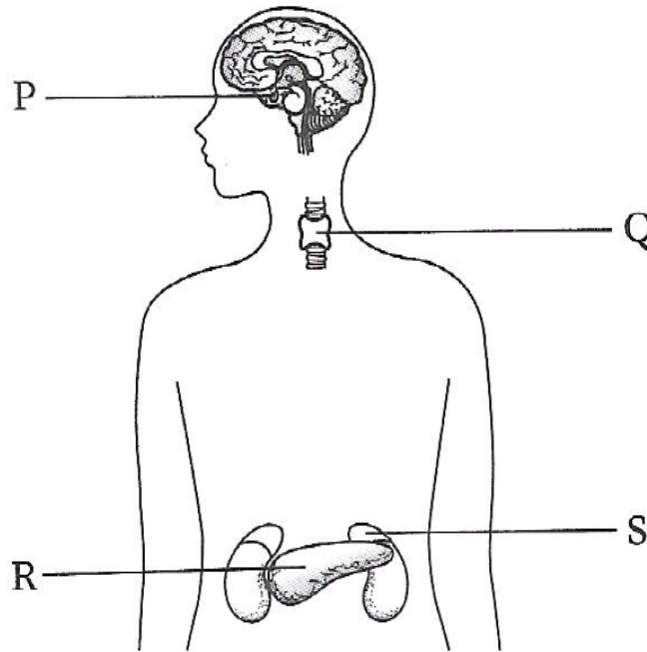
*Based on Diagram 3, explain why first and second dose are required depends on the schedule given.*

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

[3 markah/ 3 marks]

4. Rajah 4.1 menunjukkan sistem endokrin manusia.

*Diagram 4.1 shows human endocrine system.*



Rajah 4.1/Diagram 4.1

- (a) Namakan hormon yang dihasilkan di Q dan S.

*Name the hormones produced in Q and S*

Q: .....

S: .....

[2 markah/ 2 marks]

- (b) Encik Ahmad dikenalpasti telah menghidapi diabetes selepas mengadu yang dia kerap kencing, kerap dahaga dan selalu lapar. Selain daripada itu, dia turut mengalami kekurangan berat badan. Menurut beliau dia memang mengambil ubat kencing manis setiap hari. Satu hari Encik Ahmad dikejarkan ke hospital dan doktor mengesahkan beliau sedang mengalami hipoglisemia kerana telah mengambil ubat melebihi dos yang telah ditetapkan.

*Mr. Ahmad was diagnosed with diabetes after complaining that he urinated frequently, always thirsty and hungry. Apart from that, he was losing weight too. According to him,*



*he did take diabetes medicine every day. One day Mr. Ahmad was rushed to the hospital and the doctor had confirmed that he was suffering from hypoglycemia for taking excessive medicine from the prescribed dose.*

Terangkan mengapa pengambilan ubat kencing manis yang berlebihan telah menyebabkan hipoglisemia dan bagaimana ubat tersebut bertindak mengawal atur aras glukosa dalam darah.

*Explain why excessive intake of diabetes medication has caused hypoglycemia and how the medicine reacted in controlling the glucose levels in blood.*

.....

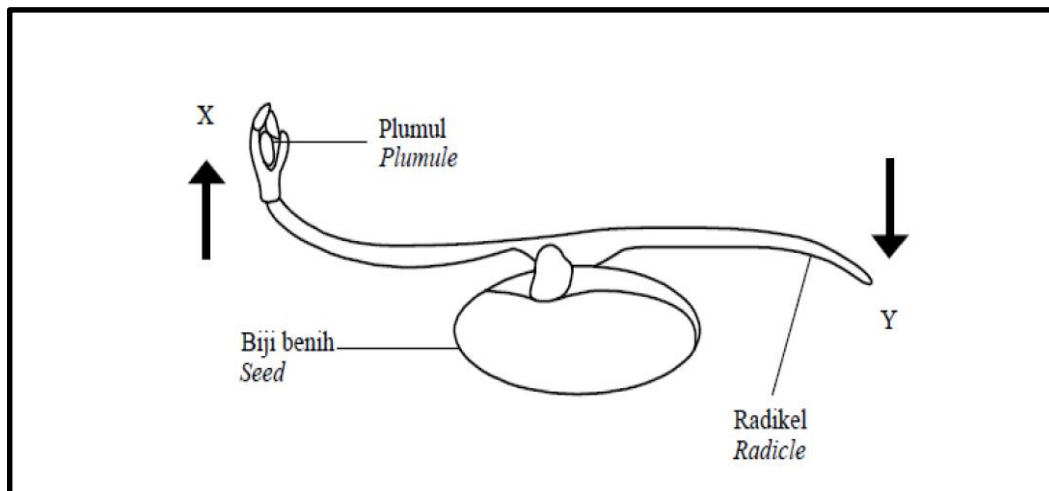
.....

.....

[2 markah/ 2 marks]

- (c) Rajah 4.2 di bawah menunjukkan arah pertumbuhan plumul dan radikel biji benih yang diletakkan secara mendatar semasa percambahan di dalam sebuah kotak.

*Diagram 4.2 below shows the direction of growth of the plumule and radicle of a seedling which is placed in a horizontal position during germination in a box.*



Kotak  
box

Rajah 4.2/ Diagram 4.2

Terangkan mengapa radikel tumbuh ke arah Y

*Explain why the radicle grows towards direction Y.*

.....

.....

.....

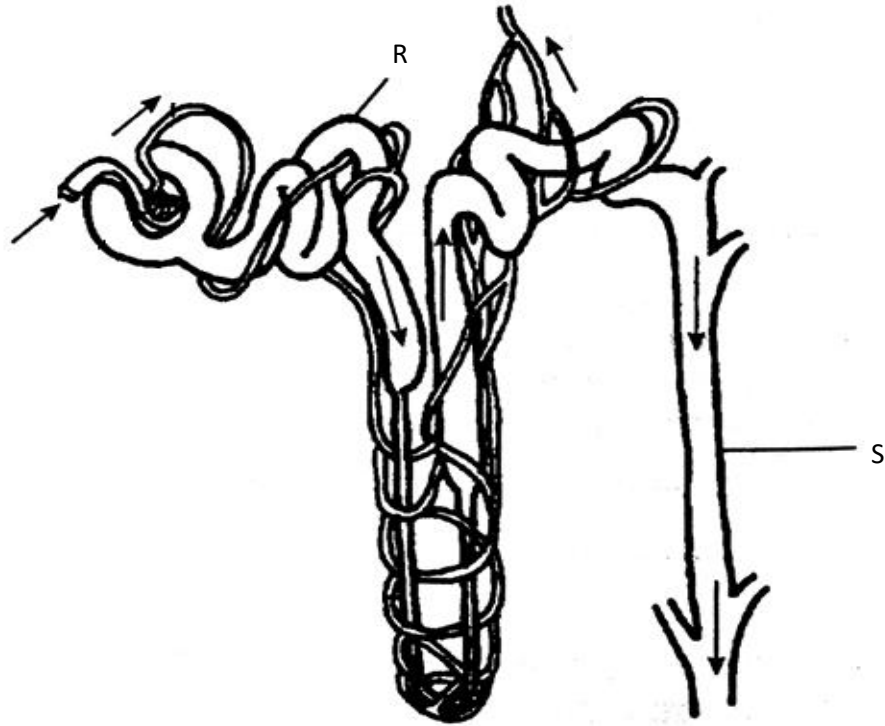
.....

.....

[3 markah/ 3 marks]

5. Rajah 5 menunjukkan struktur satu nefron dan salur darah dalam ginjal.

*Diagram 5 shows the structure of a nephrone with the blood vessels in the kidney.*



Rajah 5/ Diagram 5

(a) Label R dan S.

*Label R and S.*

R: .....

S: .....

[2 markah/ 2 marks]

(b) Jadual 5 menunjukkan sebahagian kandungan hasil turasan dalam R dan S.

*Table 5 shows some of the contents of the filter results in R and S.*

Kandungan hasil turasan <i>Filtrate content</i>	Kepekatan kandungan hasil turasan (%) <i>Concentration of filtrate content (%)</i>	
	R	S
Glukosa <i>Glucose</i>	0.1	0
Asid amino <i>Amino acid</i>	8.0	0

Jadual 5/ Table 5

Terangkan **satu** perbezaan kandungan dalam R dan S.

*Explain **one** difference between the content in R and in S.*

.....

.....

.....

[2 markah/ 2 marks]

(c) Tikus kangaroo yang hidup di gurun mempunyai liku Henle yang panjang.

Terangkan kesannya ke atas penghasilan air kencing yang terbentuk di S.

*Kangaroo rats that live in the desert have very long loops of Henle.*

*Explain its effect on the production of urine formed in S.*

.....

.....

.....

[2 markah/ 2 marks]

(d) Cadangkan dua cara untuk mengekalkan kesihatan ginjal.

*Suggest two ways to maintain the healthy kidneys.*

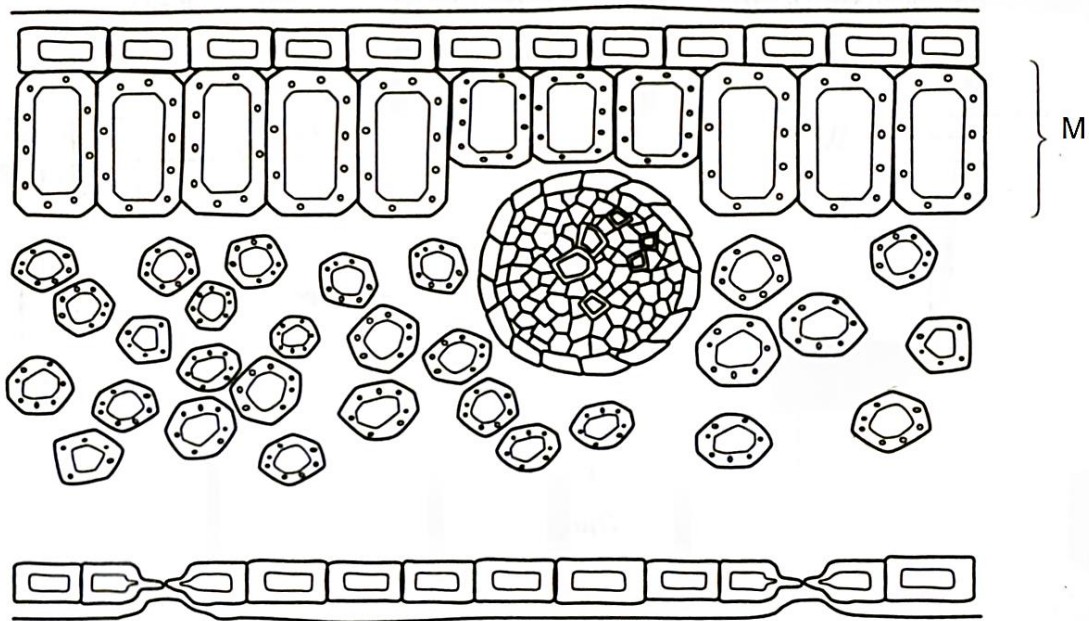
1.....

2.....

[2 markah/ 2 marks]

6. Rajah 6.1 menunjukkan keratan rentas bagi daun

*Diagram 6.1 shows the cross section of a leaf.*



Rajah 6.1/ *Diagram 6.1*

(a) (i) Namakan sel M

*Name cells M*

.....

[1 markah / 1 mark]

(ii) Terangkan penyesuaian struktur M untuk proses fotosintesis

*Explain the adaptation of structure M for photosynthesis process.*

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

[2 markah / 2 marks]

(b) Jabatan Meteorologi Malaysia (MetMalaysia) meramalkan cuaca mendung di seluruh negara akan berlaku selama 14 hari berturut-turut.

Terangkan kesan cuaca mendung terhadap pengeluaran hasil pertanian pada waktu tersebut.

*The Malaysian Meteorological Department (MetMalaysia) predicts cloudy weather across the country for 14 consecutive days. Explain the effect of cloudy weather on agricultural production at that time.*

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

[3 markah / 3 marks]

- (c) Encik Abu petani moden menjalankan aktiviti pertanian berdekatan dengan perindustrian. Encik Abu membuat saliran di kebunnya sebagai sumber air untuk menyiram tanamannya. Cadang dan terangkan satu cara yang boleh En Abu lakukan untuk memastikan sumber air tersebut bebas dari sisa kimia yang dibebaskan dari sektor perindustrian.

*Mr. Abu is a modern farmer engaged in agricultural activities close to industrial.*

*Mr. Abu makes drainage in his garden as a source of water to water his crops.*

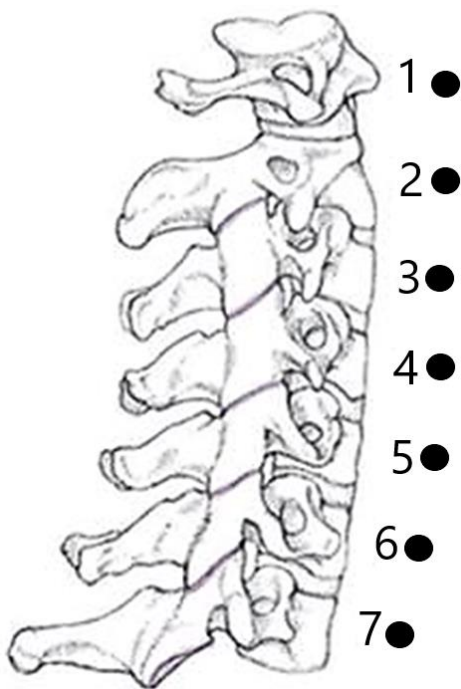
*Suggest and explain one way that Mr. Abu can do to ensure that the water source is free from chemical waste released from the industrial sector.*

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

[2 markah / 2 marks]

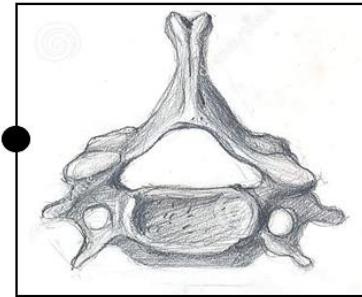
7. Rajah 7.1 menunjukkan tujuh vertebra serviks di turus vertebra manusia. Rajah 7.2 adalah tiga vertebra serviks R, S dan T.

*Diagram 7.1 shows seven cervical vertebrae in the human vertebral column. Diagram 7.2 is the three cervical vertebrae R, S and T.*

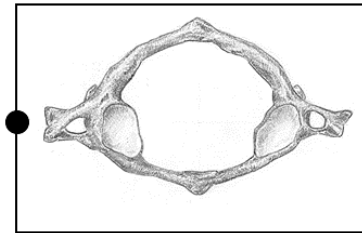


Rajah 7.1

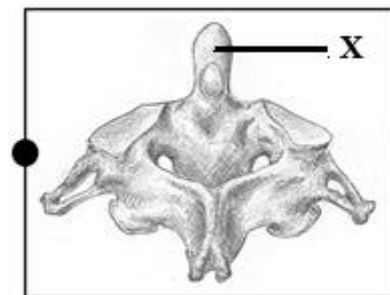
*Diagram 7.1*



R



S



T

Rajah 7.2/ *Diagram 7.2*



(a) Lukis anak panah (  $\longrightarrow$  ) untuk memadankan vertebra serviks R, S dan T kepada urutan kedudukannya yang betul di di Rajah 7.1

*Draw an arrow (  $\longrightarrow$  ) to match the cervical vertebrae R, S and T to the correct order of position in Diagram 7.1*

[3 markah/3 marks]

(b) Vertebra serviks T di Rajah 7.2 mempunyai struktur X. Terangkan fungsi struktur X.

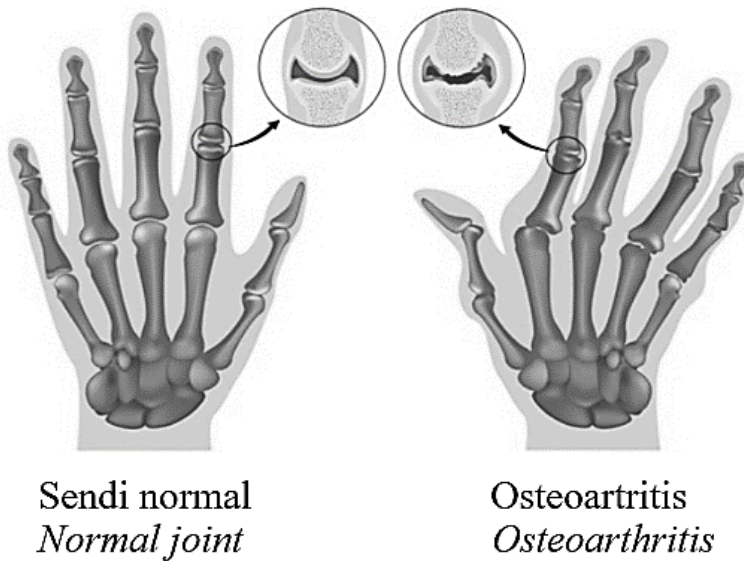
*The cervical vertebra T in Diagram 7.2 has an X structure. Explain the function of structure X.*

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

[2 markah/2 marks]

(c) Rajah 7.3 menunjukkan sendi yang normal dan osteoarthritis.

*Diagram 7.3 shows a normal joint and osteoarthritis.*



Rajah 7.3/ Diagram 7.3

Nyatakan punca osteoarthritis.

*State the cause of osteoarthritis.*

.....

[1 markah/1 mark]

(d) (i) Apakah gejala penyakit ini dan kesannya kepada pergerakan?

*What are the symptoms of this disease and its effect on movement?*

.....

.....

[2 markah/2 marks]

(ii) Cadangkan satu kaedah rawatan penyakit osteoarthritis.

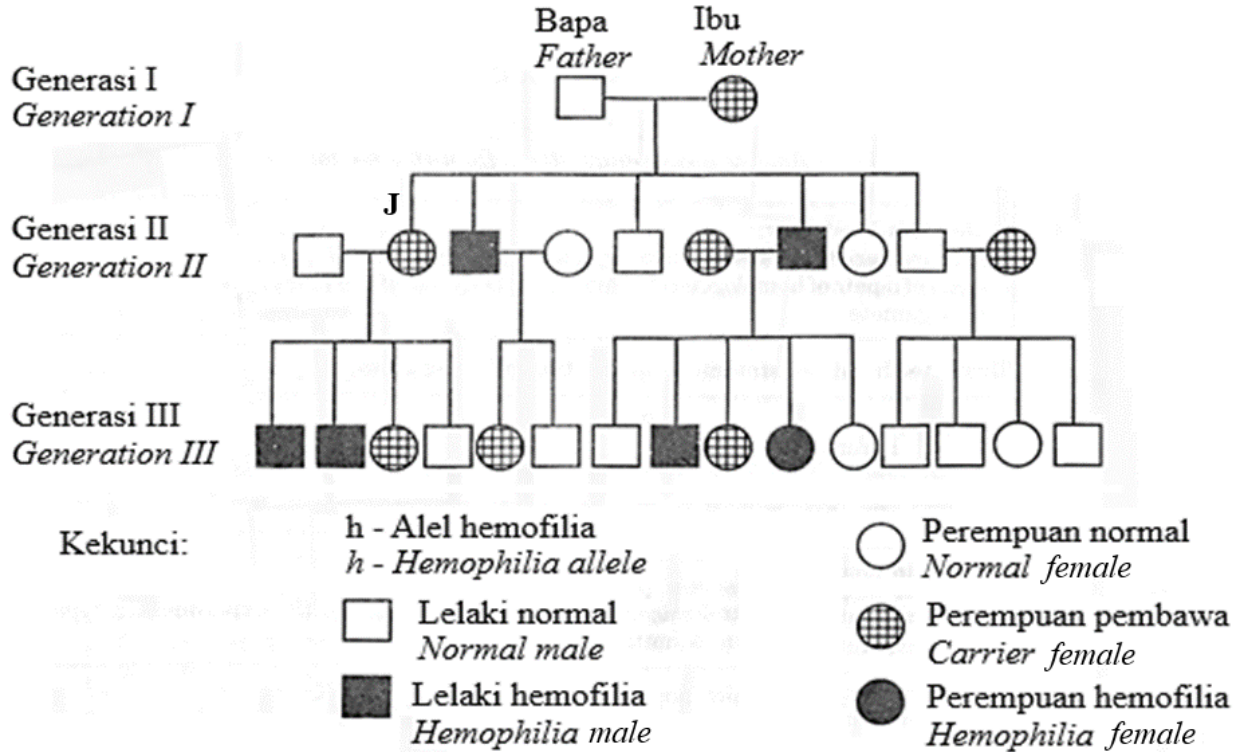
*Suggest a method of treatment for osteoarthritis.*

.....

[1 markah/1 mark]

8. Rajah 8.1 menunjukkan pedigri pewarisan penyakit genetik hemofilia dari Generasi I hingga Generasi III.

*Diagram 8.1 shows the inherited pedigree of the genetic disease hemophilia from Generation I to Generation III.*



Rajah 8.1/ Diagram 8.1

(a)(i) Berdasarkan Rajah 8.1, nyatakan genotip bapa dan ibu.

*Based on Diagram 8.1, state the genotypes of father and mother.*

Genotip ibu : .....

*Mother genotype:*

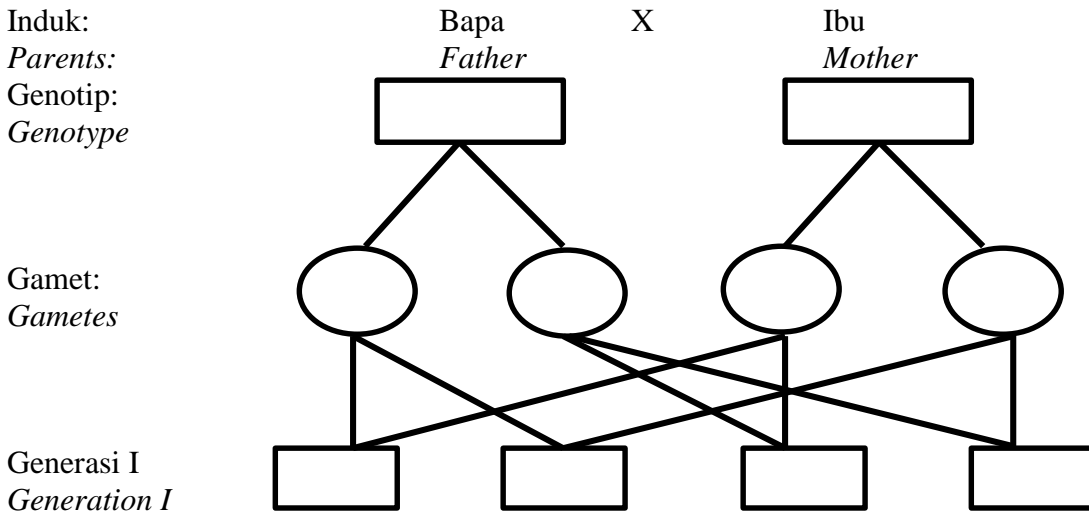
Genotip bapa : .....

*Father genotype:*

[2 markah/2 marks]

(ii) Generasi II pasangan ini iaitu J telah berkahwin dengan seorang lelaki. Berdasarkan Rajah 8.1 didapati anak-anak mereka mewarisi penyakit hemofilia. Lengkapkan rajah skema di Rajah 8.2 untuk menunjukkan pewarisan penyakit tersebut.

*Generation II of this couple, J was married to a man. Based on Diagram 8.1 it is found that their children inherited hemophilia. Complete the schematic diagram in Figure 8.2 to show the inheritance of the disease.*



Rajah 8.2/Diagram 8.2

[3 markah/3 marks]

(b) Pesakit hemophilia akan menghadapi masalah sekiranya berlaku kecederaan. Darahnya tidak boleh membeku kerana tiada factor pembeku di dalam darah pesakit ini. Cadangkan satu teknologi genetik yang dapat membantu pesakit ini.

*Hemophilia patients will face problems in case of injury. His blood could not clot because there was no clotting factor in this patient's blood. Suggest a genetic technology that can help this patient.*

.....

[1 markah/1 mark]

(c) (i) Nyatakan jenis variasi yang di tunjukkan oleh Rajah 8.1.

*State the type of variation shown by Diagram 8.1.*

.....

[1 markah/1 mark]

(ii) Jelaskan punca jenis variasi yang anda nyatakan di (c)(i)

*Explain the cause of the type of variation you stated in (c)(i).*

.....

.....

.....

[2 markah/ 2 marks]

## Bahagian B

### Section B

[20 markah]

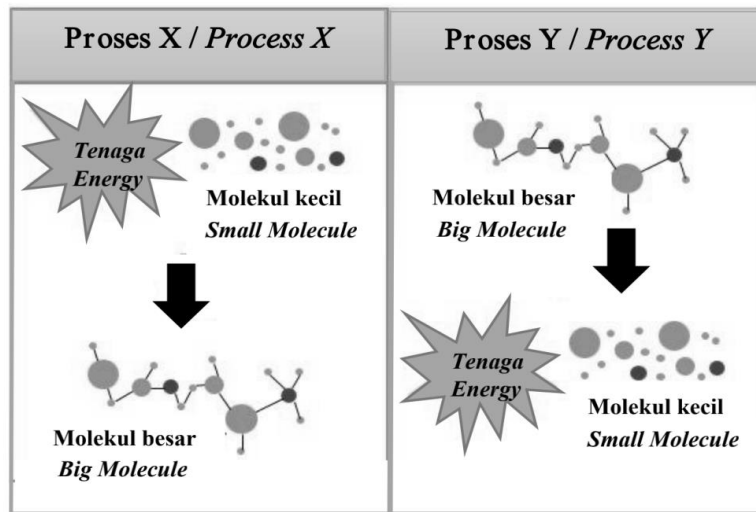
[20 marks]

Jawab mana-mana **satu** soalan daripada bahagian ini.

*Answer only **one** question from this section.*

9. (a) Rajah 9.1 di bawah menunjukkan dua jenis metabolisme.

*Diagram 9.1 below shows two types of metabolism.*

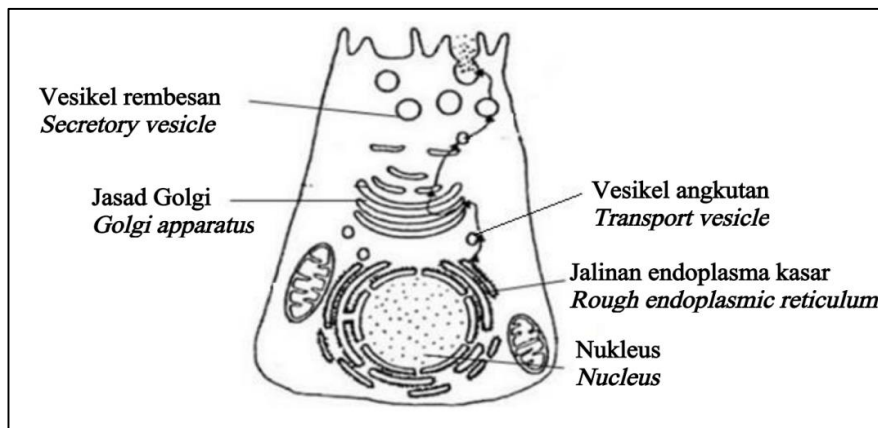


Rajah 9.1 / *Diagram 9.1*

(i) Berdasarkan Rajah 9.1, terangkan tentang proses X dan proses Y.

*Based on Diagram 9.1, explain about process X and process Y.*

[4 markah/ 4 marks]



Rajah 9.2/ *Diagram 9.2*

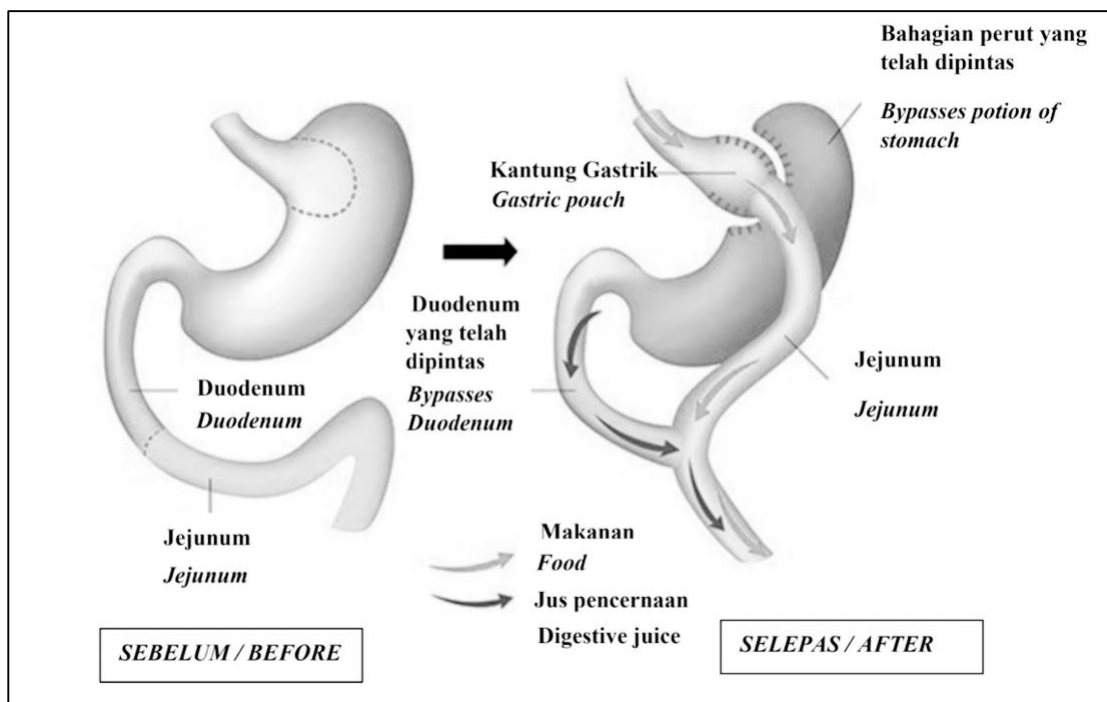
- (ii) Kehadiran enzyme sangat penting dalam proses metabolisme. Berdasarkan Rajah 9.2, huraikan bagaimana penghasilan enzim luar sel.

*The presence of enzymes is very important in the metabolic process. Based on Diagram 9.2, describe how extracellular enzymes are produced.*

[6 markah/ 6 marks]

- (b) Aminah berusia 35 tahun dan mengalami obesiti. Beliau mempunyai ketinggian 159cm dan berat badannya kini telah mencecah 140kg. Dia juga mengalami sakit lutut yang kronik serta masalah pergerakan dalam melakukan pekerjaannya sebagai pembantu makmal sekolah akibat berat badan berlebihan. Disebabkan masalah obesiti ini, Aminah ingin membuat kaedah pembedahan seperti yang ditunjukkan di dalam Rajah 9.3 di bawah.

*Aminah is 35 years old and obese. Her height is 159cm and her weight has now reached 140kg. She also suffers from chronic knee pain as well as movement problems in doing her job as a school laboratory assistant due to being overweight. Due to this obesity problem, Aminah wants to have a surgical procedure as shown in Diagram 9.3 below.*



Rajah 9.3 / Diagram 9.3

Sebagai seorang pelajar biologi, wajarkan tindakan Aminah dan huraikan kesan yang akan dialaminya.

*As a biology student, justify Aminah's actions and describe the effects she will have.*

[6 markah/ 6 marks]

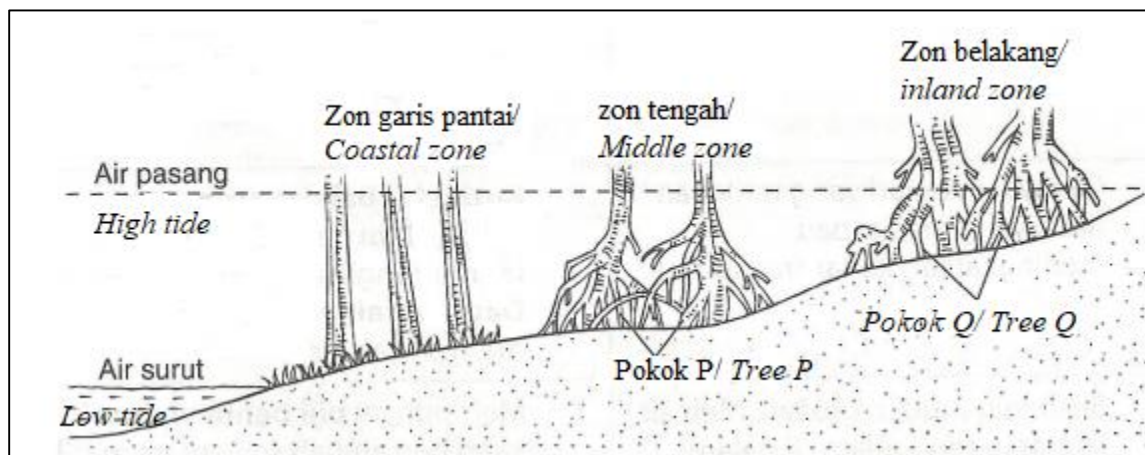
- (c) Sekiranya Aminah tidak menjalankan kaedah pembedahan di atas, cadangkan pelan pemakanan yang sihat baginya.

*If Aminah is not having surgical procedure above, suggest a healthy eating plan for her.*

[4 markah/ 4 marks]

10. (a) Suatu ekosistem seperti hutan paya bakau yang ditunjukkan pada rajah 10.1 boleh berubah akibat fenomena alam semula jadi dan aktiviti manusia selepas satu jangka masa yang panjang. Ini melibatkan proses pengkolonian dan sesaran.

*An ecosystem such as mangrove swamp as shown in diagram 10.1 can change due to natural phenomena and human activities after a long period of time. These involve colonization and succession.*



Rajah 10.1 / Diagram 10.1

- (i) Terangkan bagaimana pokok P yang berada di zon tengah disesarkan dan dikoloni oleh pokok Q di kawasan paya bakau.

*Explain how tree P at Middle Zone replaced and colonised by tree Q in mangrove area.*

[5 markah/5 marks]



(ii) Hari Bakau Sedunia disambut pada 26 Julai setiap tahun bertujuan untuk meningkatkan kesedaran umum mengenai kepentingan ekosistem hutan ini kepada kelestarian alam sekitar. Rajah 10.2 menunjukkan poster sempena hari bakau yang meminta masyarakat di peringkat antarabangsa menghargai bakau.

*World Mangrove Day is celebrated on July 26 each year with the aim of raising public awareness on the importance of forest ecosystems to environmental sustainability. Diagram 10.2 shows a poster in conjunction with mangrove day requesting the international community to appreciate mangroves.*



Rajah 10.2 / Diagram 10.2

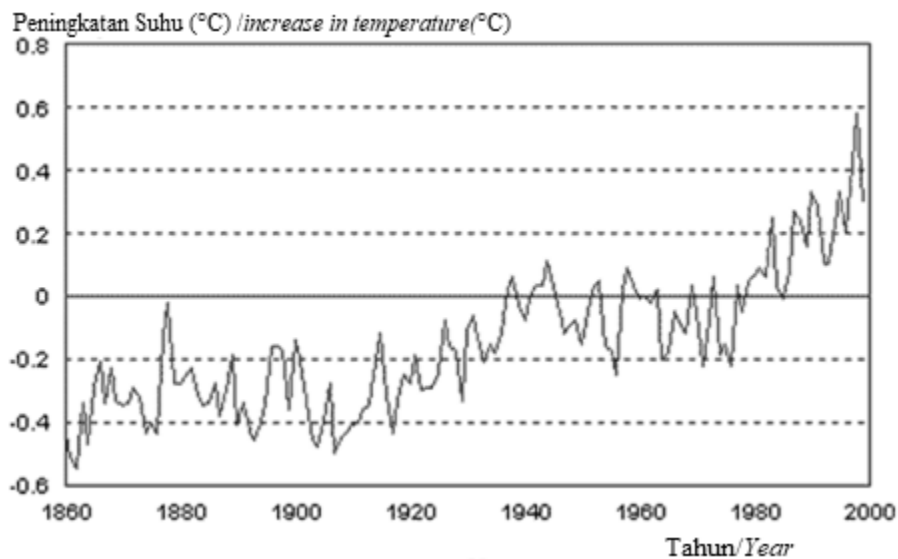
Apakah kepentingan memelihara hutan paya bakau?

*What are the importances to preserve the mangrove swamp?*

[5 markah/5 marks]

- (b)(i) Ancaman alam sekitar adalah berpunca daripada aktiviti manusia terhadap ekosistem dan memberi kesan negatif kepada kehidupan. Fenomena pemanasan global adalah akibat dari bertambahnya pembebasan gas rumah hijau ke atmosfera. Rajah 10.3 menunjukkan peningkatan suhu yang dialami oleh bumi sehingga tahun 2000.

*Environmental threats are caused by human activities in the ecosystem and result in negative impacts on life. The phenomenon of global warming is the result of increased emissions of greenhouse gases into the atmosphere. Diagram 10.3 shows the increase in temperature of the earth until the year 2000.*



Rajah 10.3/ Diagram 10.3

Berdasarkan pernyataan di atas, terangkan bagaimana kesan rumah hijau berlaku.

*Based on the above statement, explain how greenhouse effect occur.*

[5 markah/5 marks]

(ii) Bangunan hijau merupakan satu konsep pembinaan yang bercirikan teknologi mesra alam semula jadi. Rajah 10.3 ialah dua contoh bangunan hijau yang terdapat di Malaysia.

*Green building is a building concept which has the characteristics of nature-friendly technology. Diagram 10.3 are two examples of green buildings found in Malaysia.*



Masjid Cyber Jaya  
*Cyber Jaya Mosque*



Bangunan Suruhanjaya Tenaga  
*Energy Commission's Building*

Rajah 10.3 / *Diagram 10.3*

Terangkan apa yang melayakkan sesuatu bangunan diiktiraf sebagai bangunan hijau.

*Explain what qualifies a building to be recognized as a green building.*

[5 markah/5 marks]

**Section C/ Bahagian C**

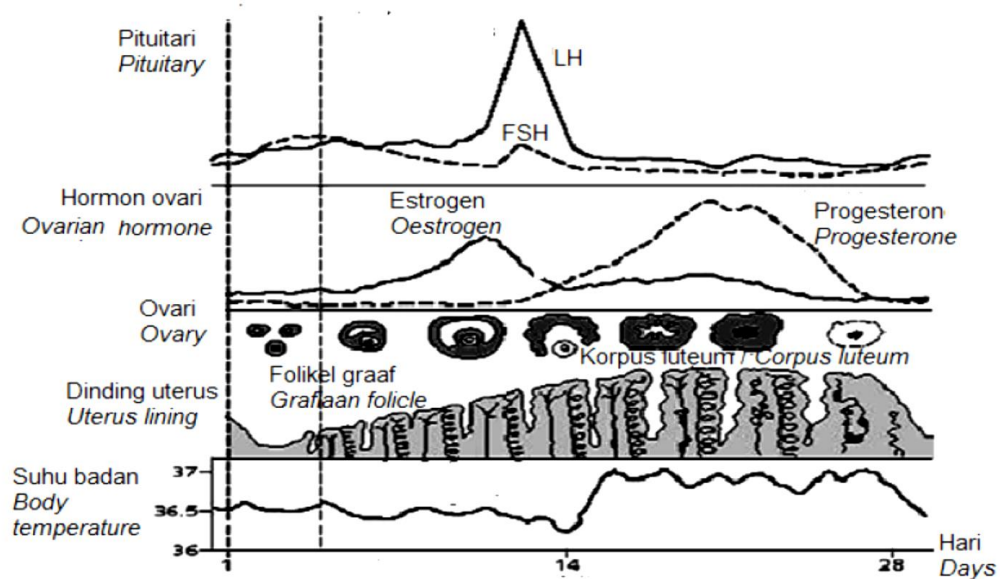
**[20 marks/20 markah]**

Answer the question in this section.

*Jawab soalan dalam bahagian ini*

11. Rajah 11.1 menunjukkan graf perubahan kepekatan hormon dan perubahan perkembangan folikel untuk seorang wanita yang mempunyai kitar haid yang normal.

*Diagram 11.1 shows a graph of hormone concentration changes and changes follicle development for a woman who has a menstrual cycle normal.*



Rajah 11.1/ Diagram 11.1

(a)(i) Berdasarkan Rajah 11.1, terangkan kesan kecederaan serius kelenjar pituitari terhadap tahap kesuburan seseorang wanita?

*Based on Diagram 11.1, explain the effects of serious injury of pituitary gland on the fertility level of a woman?*

[6 markah / 6 marks]

(ii) Kitar haid terhenti merupakan petanda awal fasa awal kehamilan wanita.

Cadangkan satu kaedah yang lebih tepat untuk mengetahui bahawa seseorang wanita tersebut telah hamil. Terangkan kaedah tersebut.





*The menstruation cycle stops is an early sign of the early phase of a woman's pregnancy. Suggest one accurate method to know that the woman was pregnant. Explain the method.*

[4 markah / 4 marks]

(b) Seorang suri rumah telah menanam 2 biji anak benih pokok betik di kawasan rumahnya.

Rajah 11.2 menunjukkan keadaan pokok betik ketika berusia 5 bulan dan 7 bulan.

*A housewife has planted 2 papaya seedlings in her home area. Diagram 11.2 shows the condition of papaya trees when they were 5 months and 7 months old.*

<p><b>Pokok betik A</b> <i>Papaya tree A</i></p>	<p><b>Pokok betik B</b> <i>Papaya tree B</i></p>
 <p><b>Usia: 5 bulan</b> <i>Age: 5 months</i></p>	 <p><b>Usia: 5 bulan</b> <i>Age: 5 months</i></p>
 <p><b>Usia : 7 bulan</b> <i>Age: 7 months</i></p>	 <p><b>Usia : 7 bulan</b> <i>Age: 7 months</i></p>

Rajah 11.2/ *Diagram 11.2*

Terangkan perbezaan dari segi struktur bunga, proses persenyawaan dan perkembangan biji benih dan buah antara pokok betik A dan pokok betik B.

*Explain the differences in terms of flower structure, fertilization process and seed and fruit development between papaya tree A and papaya tree B.*

[6 markah / 6 marks]

**Bank biji benih ditubuh**

SERDANG: Kementerian Pertanian dan Industri Asas Tani akan mewujudkan bank biji benih pada Rancangan Malaysia Kesembilan (RMK-9) selaras usaha meningkatkan industri pertanian negara.

*Seed banks are formed*

*SERDANG: The Ministry of Agriculture and Agro-based Industry will establish a seed bank in the Ninth Malaysia Plan (9MP) in line with efforts to improve the country's agricultural industry.*

- (c) Keratan akhbar di atas melaporkan usaha kerajaan dalam meningkatkan industri pertanian negara. Cadangkan satu kaedah penyimpanan biji benih di bank biji benih dan terangkan kepentingan kewujudan bank biji benih tersebut?

*The newspaper clipping above reports on the government's efforts in improving the industry state agriculture. Suggest a method of storing seeds in seed banks and explain the importance of the existence of such seed bank?*

[ 4 markah / 4 marks]

**-END OF QUESTION-**