

NAMA : ..... TINGKATAN : .....

SULIT

4551/2

Biologi

KERTAS 2

2 ½ jam

**PEPERIKSAAN MPP1  
SPM 2021**

**BIOLOGI**  
Kertas 2

Dua jam tiga puluh minit

**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

1. **Kertas soalan ini mengandungi tiga bahagian :Bahagian A, Bahagian B dan Bahagian C.**
2. *Jawab semua soalan dalam Bahagian A. Jawapan kepada Bahagian A hendaklah ditulis dalam ruang jawapanyang disediakan*
3. *Jawab satu soalan dari Bahagian B dan satu soalan wajib dari Bahagian C. Jawapan kepada Bahagian B dan Bahagian C hendaklah ditulis dalam helatan tambahan. Anda diminta menjawab dengan lebih terperinci untuk Bahagian B dan C. Jawapan mestilah jelas dan logik. Dalam jawapan anda, persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda boleh digunakan.*
4. *Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.*
5. *Markah yang diperuntukkan bagi setiap soalan atau ceraiian soalan ditunjukkan dalam kurungan.*
6. *Sekiranya anda hendak membatalkan sesuatu jawapan, buat garisan di atas jawapan itu.*
7. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram. Walau bagaimanapun, langkah mengira perlu ditunjukkan*
8. *Masa yang dicadangkan untuk menjawab Bahagian A ialah 90 minit, Bahagian B dan C 60 minit.*
9. *Semua kertas jawapan hendaklah diserahkan di akhir peperiksaan.*

Kod Pemeriksa			
Bahagian	Soalan	Markah Penuh	Markah
A	1	6	
	2	7	
	3	7	
	4	7	
	5	8	
	6	8	
	7	8	
	8	9	
B	9	20	
	10	20	
C	11	20	
<b>Jumlah</b>			

**Kertas soalan ini mengandungi 21 halaman bercetak.**

For  
Examiner's  
Use

**BAHAGIAN A**

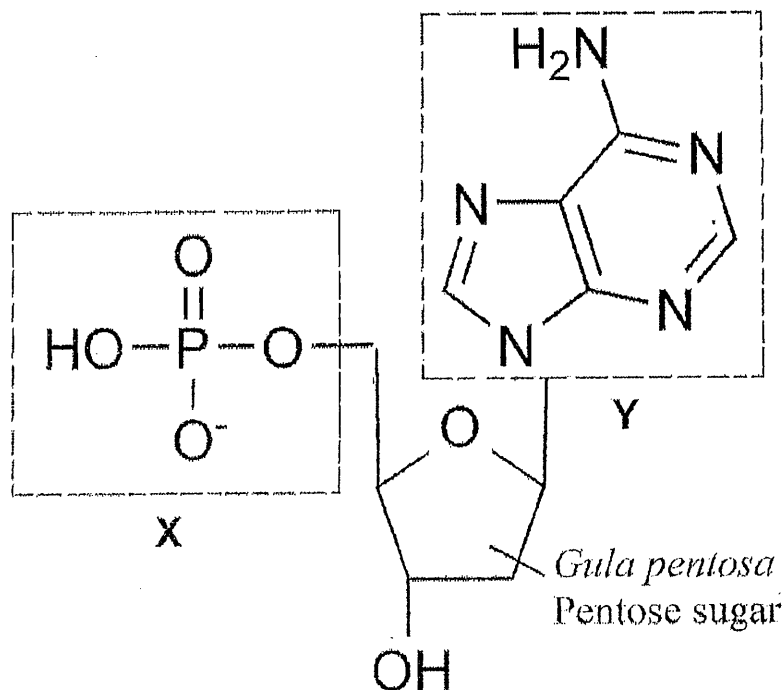
**SECTION A**

[60 markah]

Jawab *semua* soalan dalam bahagian ini

Answer *all* the questions

1. Rajah 1.1 menunjukkan unit asas bagi asid nukleik  
Diagram 1.1 shows basic unit of nucleic acid



Rajah 1.1 / Diagram 1.1

Berdasarkan Rajah 1.1:  
Based on Diagram 1.1:

1(a)

	1
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- (a) Namakan bahagian berlabel X dan Y  
Name parts labelled X and Y

X: ..... Y: .....

[1 markah / mark]

1(b)

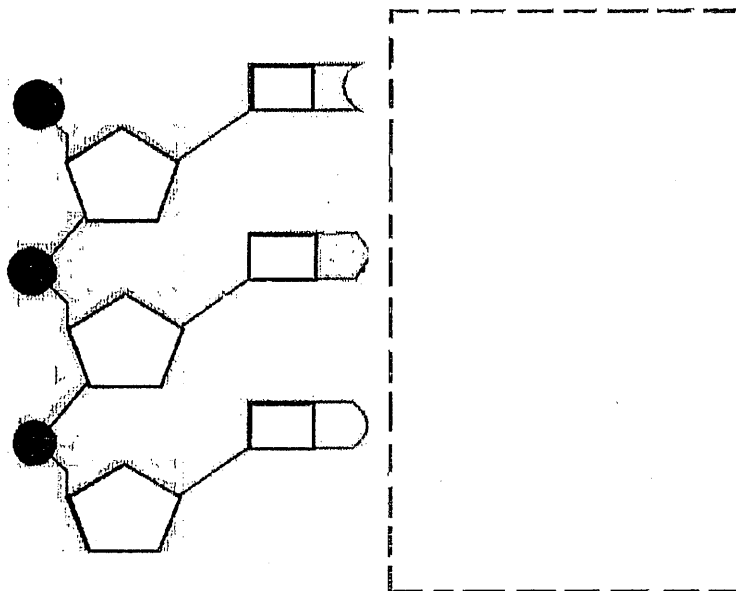
	1
--	---

- (b) Nyatakan dua jenis Y yang berpasangan dalam struktur DNA  
State two types of Y which paired in DNA structure.

.....

[1 markah / mark]

- (c) Rajah 1.2 menunjukkan sebahagian struktur DNA  
 Diagram 1.2 shows part of DNA structure



Rajah 1.2 / Diagram 1.2

- (i) Lengkapkan Rajah 1.2 bagi menunjukkan molekul DNA yang lengkap  
 Complete Diagram 1.2 to show a complete DNA molecule

[2 markah / marks]

- (ii) State two differences between the structure of DNA and RNA  
 Nyatakan dua perbezaan di antara struktur DNA dan RNA

1. ....

.....

2. ....

.....

[2 markah / marks]

For  
 Examiner's  
 Use

1(c)(i)

	2
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1(c)(ii)

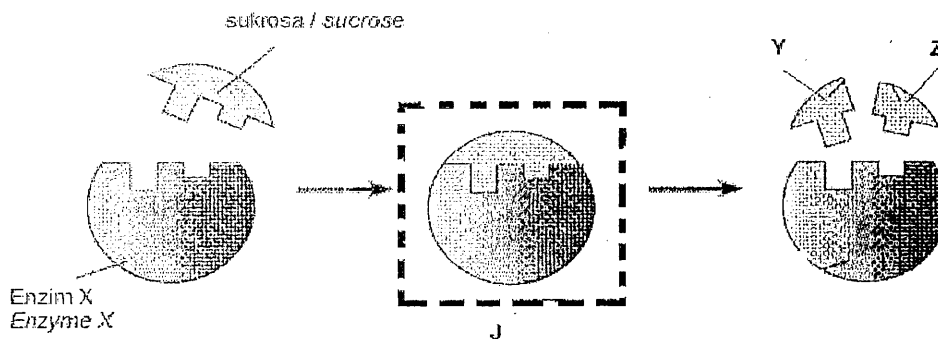
	2
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Total

	6
--	---

For  
Examiner's  
Use

2. Rajah 2 menunjukkan tindak balas enzim X ke atas sukrosa.  
Diagram 2 shows a reaction of enzyme X on sucrose.



Rajah 2 / Diagram 2

Berdasarkan Rajah 2:  
Based on Diagram 2:

2(a)

	1
--	---

(a) Namakan enzim X.  
Name the enzyme X.

.....  
[1 markah / mark]

2(b)

	2
--	---

(b) Nyatakan hasil tindakbalas tersebut.  
State the products of the reaction.

Y: .....

Z: .....

[2 markah / marks]

2(c)(i)

	1
--	---

(c)(i) Nyatakan satu ciri bagi enzim X.  
State one characteristic of enzyme X.

.....  
[1 markah / mark]

(ii) Terangkan tindakan enzim X ke atas sukrosa.  
Explain the reaction of enzyme X on sucrose.

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

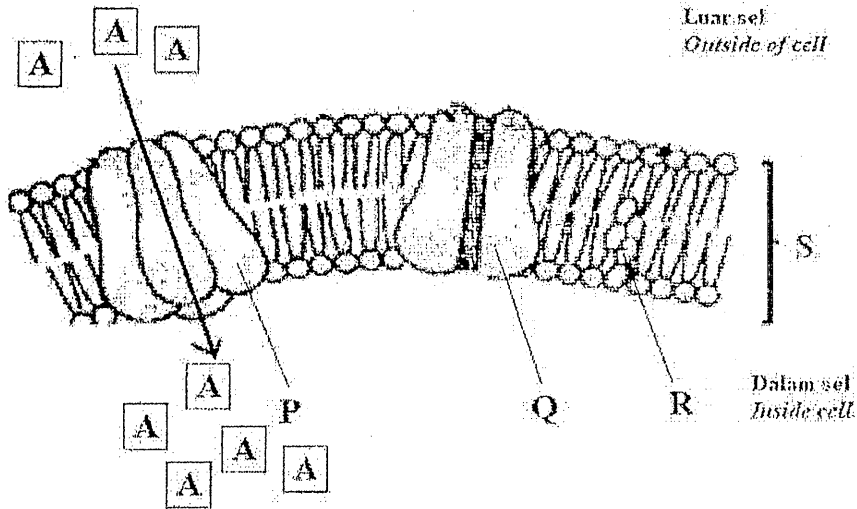
[3 markah / marks]

Total

	7
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3. Rajah 3 menunjukkan struktur membran plasma sel  
 Diagram 3 shows the structure of the cell plasma membrane

For  
 Examiner's  
 Use



Rajah 3 / Rajah 3

Berdasarkan Rajah 3:  
 Based on Diagram 3:

(a) (i) Namakan P dan Q  
 Name P and Q

P: ..... Q: .....  
 [2 markah / marks]

(ii) Nyatakan kepentingan fungsi R kepada membran plasma.  
 State the role of R to the plasma membrane.

.....  
 [1 markah / mark]

(b)(i) Terangkan bagaimana molekul A merentasi membran plasma berlaku  
 Explain how does the movement of molecule A across plasma membrane occurs.

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

(ii) Nyatakan satu ciri molekul A supaya dapat diangkut masuk ke dalam sel seperti soalan b(i)  
 State one characteristic of molecule A so that it can be transported into the cell as in question b (i)

.....  
 [1 markah / marks]

3(a)(i)

2
---

3(a)(ii)

1
---

3(b)(i)

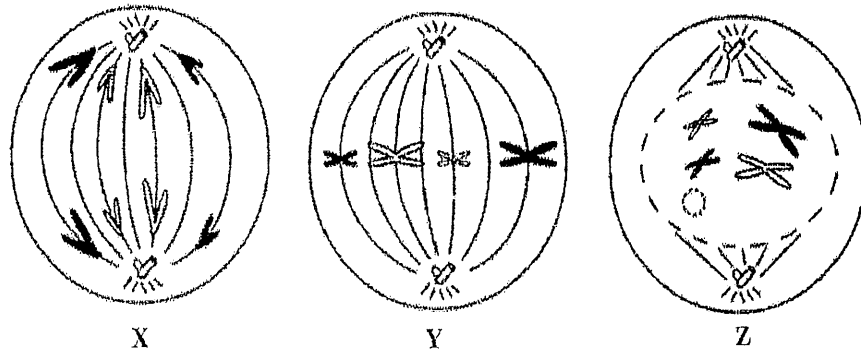
3
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3(b)(ii)

3
---

For  
Examiner's  
Use

4. Rajah 4.1 menunjukkan tiga peringkat mitosis, X, Y dan Z dalam sel haiwan  
Diagram 4.1 shows three stages of mitosis, X, Y and Z in an animal cell.



Rajah 4.1 /  
Diagram 4.1

(a)  
Susun  
peringkat X,

Y dan Z mengikut turutan yang betul.

Arrange the stages X, Y and Z in the correct order.

4(a)

1
---

.....  
[1 markah / mark]

(b) Nyatakan perlakuan kromosom pada peringkat berikut:  
State the chromosome behaviour at the following stages:

Peringkat X / Stage X: .....

.....

Peringkat Y / Stage Y: .....

.....

[2 markah / marks]

(c) Terangkan aplikasi proses di atas dalam teknik pengkulturan menggunakan sel stem daripada haiwan.  
Explain the application of the above process in the tissue culture technique using stem cells of animal..

.....

.....

.....

[2 markah / marks]

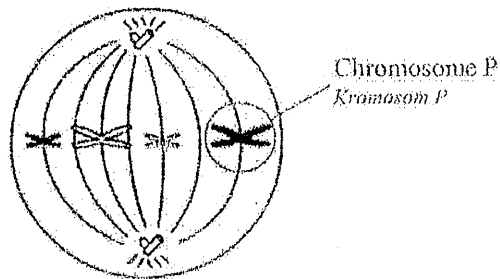
4(c)

2
---

(d) Rajah 4.2 menunjukkan suatu sel pada peringkat Y. Kromosom P tidak berpisah pada peringkat seterusnya.

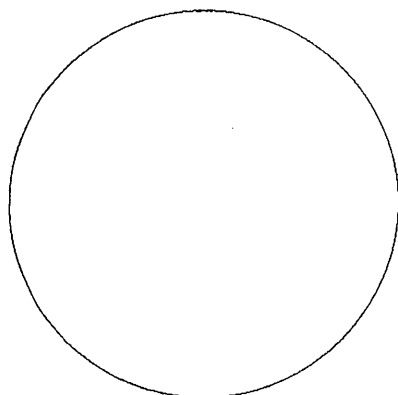
For  
Examiner's  
Use

Diagram 4.2 shows a cell at stage Y. Chromosome P is not separated in the next stage

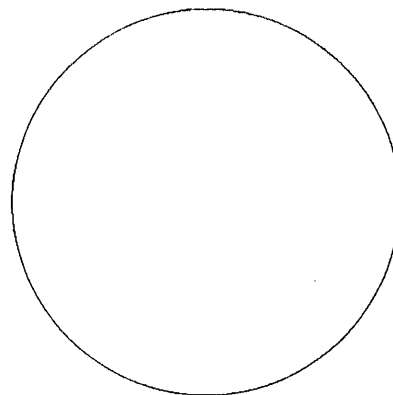


Rajah 4.2 / Diagram 4.2

Lengkapkan rajah-rajah berikut bagi kedua-dua sel anak yang akan terbentuk pada peringkat seterusnya.  
 Complete the following diagrams for the two daughter cells which will be formed in the stages.



Sel anak 1  
 Daughter cell 1

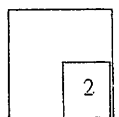


Sel anak 2  
 Daughter cell 2

[2 markah / marks]

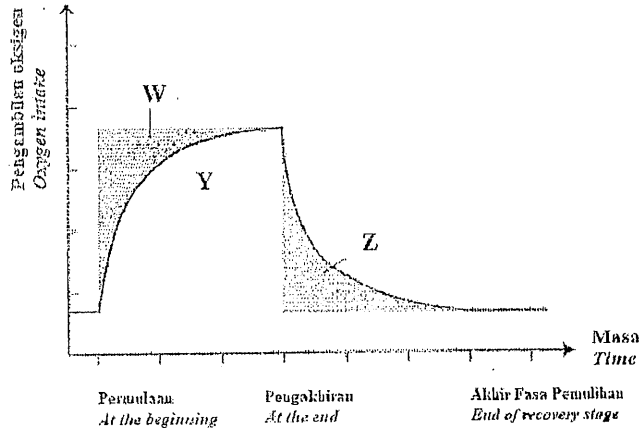
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4(d)



For  
Examiner's  
Use

5. Rajah 5.1 menunjukkan penggunaan oksigen semasa aktiviti cergas  
Diagram 5.1 shows oxygen consumption during vigorous activity



Rajah 5.1 / Diagram 5.1

Berdasarkan Rajah 5.1:  
Based on Diagram 5.1:

5(a)(i)

1

(a)(i) Apakah yang berlaku di kawasan yang diwakili oleh W?  
What happen at the area represented W?

[1 markah / mark]

5(a)(ii)

2

(ii) Mengapakah proses W berlaku semasa aktiviti cergas? Terangkan  
Why process W occurs during vigorous activity. Explain.

[2 markah / marks]

5(a)(iii)

2

(iii) Terangkan apakah yang berlaku di Z?  
Explain what happen in area Z?

[2 markah / marks]

5(b)

3

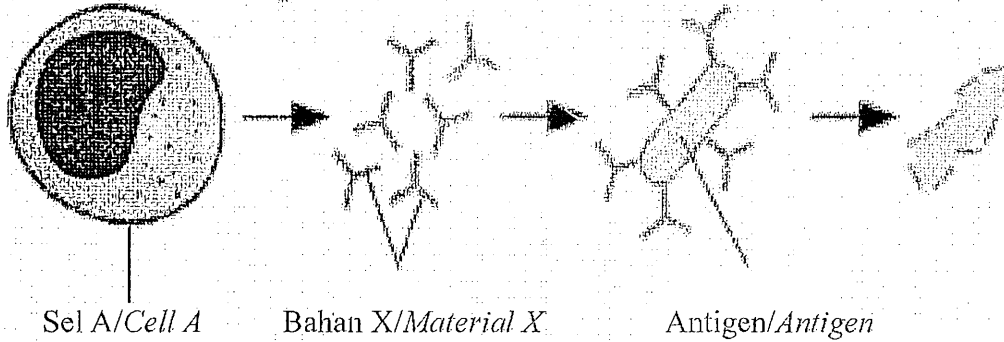
(b) Terangkan perbezaan antara kawasan W dan kawasan Y  
Explain the differences between area W and area Y

[3 markah / marks]



For  
Examiner's  
Use

6. Diagram 6.1 menunjukkan sejenis sel darah putih yang penting dalam mekanisme pertahanan badan yang berlaku dalam nodus limfa.  
Diagram 6.1 shows a type of white blood cell which is important in the body defence mechanism that occur in the lymph node



Rajah 6.1 / Diagram 6.1

Berdasarkan Rajah 6.1:  
Based on Diagram 6.1:

- (a) Namakan struktur berlabel A dan X:  
Name the structures labelled A and X

Sel A / Cell A : .....

Bahan X / Material X : .....

[2 markah / marks]

6(a)

	2
--	---

- (b) Nyatakan jenis pertahanan di atas yang ditunjukkan  
State the type of the body defence shown

.....

[1 markah / mark]

6(b)

	1
--	---

- (c) (i) Huraikan mekanisme tindakan antibodi untuk memusnahkan antigen.  
Describe the mechanism of action used by antibodies to destroy antigens.

.....

.....

[2 markah / marks]

6(c)(i)

	2
--	---

- (ii) Seorang doktor mencadangkan seorang pesakit mengambil antibiotik.  
Mengapa?

A doctor suggested an antibiotic for a patient. Explain why?

.....

.....

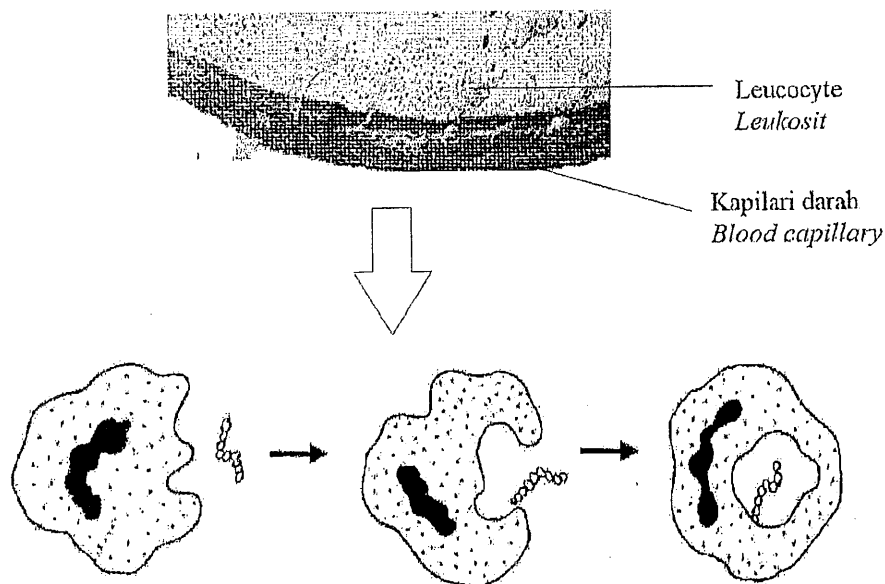
[1 markah / mark]

6(c)(ii)

	1
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For  
Examiner's  
Use

- (d) Diagram 6.2 menunjukkan sel leukosit memasuki bendalir tisu melalui liang dinding kapilari darah dan menunjukkan satu lagi mekanisme pertahanan badan.  
Diagram 6.2 shows leucocyte cells enter the tissue fluid through the pores of the blood capillaries and show another body defence mechanism.



Rajah 6.2 / Diagram 6.2

Berdasarkan rajah, terangkan jenis dan mekanisme pertahanan badan yang ditunjukkan.

Based on the diagram, explain the type and mechanism of body defence shown.

.....

.....

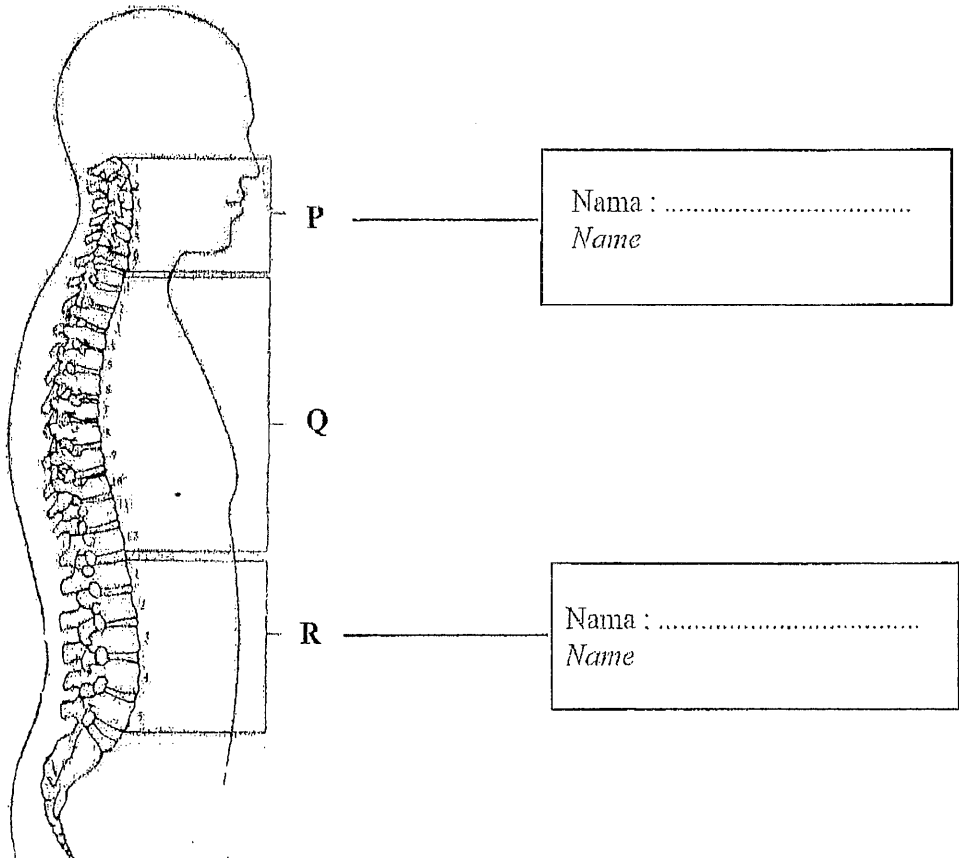
.....

[2 markah / marks]

6(d)

<table border="1"> <tr> <td style="width: 20px; height: 20px; text-align: center;">2</td> </tr> </table>	2
2	

7. Rajah 7 menunjukkan turus vertebra manusia  
*Diagram 7 shows the vertebral column of human.*



Rajah 7 / Diagram 7

Berdasarkan Rajah 7:  
*Based on Diagram 7:*

- (a)(i) Namakan vertebra pada bahagian P dan R.  
*Name the vertebrae in area p and R.*

[2 markah / marks]

7(a)(i)

2
---

For  
Examiner's  
Use

(ii) Nyatakan dua perbezaan struktur antara vertebra di kawasan P dan bahagian R.  
*State two differences in the structure between the vertebrae in area P and area R.*

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

7(a)(ii)

2
---

[2 markah / marks]

(b)(i) Khairul telah mengalami kemalangan dan menyebabkan 4 tulang rusuknya patah. Ramalkan kesan tulang rusuk yang patah ke atas proses pernafasan beliau.  
*Khairul involved in an accident and 4 of his ribs were broken. Predict the effect of the broken ribs on his breathing process.*

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

[2 markah / marks]

7(b)(i)

2
---

(ii) Berdasarkan pengetahuan biologi anda, cadangkan contoh makanan yang sesuai diambil oleh Khairul untuk membantu proses penyembuhan tulang rusuk beliau. Terangkan cadangan anda.  
*Based on your Biological knowledge, suggest a suitable food need to be taken by Khairul to help him in curing back his broken ribs. Explain your suggestion.*

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

[2 markah / marks]

7(b)(ii)

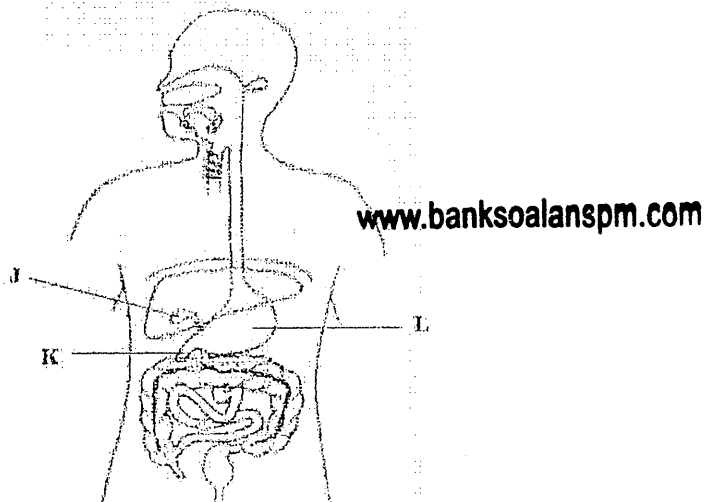
2
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Total

8
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- 8. Rajah 8 menunjukkan sistem pencernaan manusia.  
Diagram 8 shows human digestive system.

For  
Examiner's  
Use



Rajah 8 / Diagram 8

Berdasarkan Rajah 8:  
Based on Diagram 8:

- (a)(i) Namakan organ J  
Name organ J

8(a)(i)

1
---

[1 markah / marks]

- (ii) Terangkan kesan pembuangan organ J terhadap pencernaan lipid.  
Explain the effect removal of organ J in lipid digestion.

8(a)(ii)

2
---

[2 markah / marks]

- (b) Terangkan perbezaan dalam pencernaan protein yang berlaku dalam K dan L.  
Explain the difference in the digestion of protein that occur in K and L.

8(b)

2
---

[2 markah / marks]

For  
Examiner's  
Use

(c) Terangkan mengapa seorang ibu mengandung dinasihatkan oleh doktor untuk meminum susu?  
*Explain why does a pregnant mother is adviced by a doktor to consume milk?*

8(e)

2
---

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

[2 markah / marks]

(d)

Pembedahan bariatrik semakin menjadi pilihan dalam kalangan pesakit obesiti kerana dilihat sebagai salah satu kaedah penurunan berat badan terbaik dan berkesan.

*Bariatric Surgery has become obese patient's choice as one of the best and most effective weight loss methods.*

Berdasarkan pernyataan di atas, ramalkan kesan sampingan jangka pendek dan jangka panjang pembedahan bariatrik terhadap kesihatan individu.

*Based on the above statement, predict the short term and long term side effects of the surgery on the individual's health.*

8(d)

2
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.....  
.....  
.....

[2 marks]

Total

9
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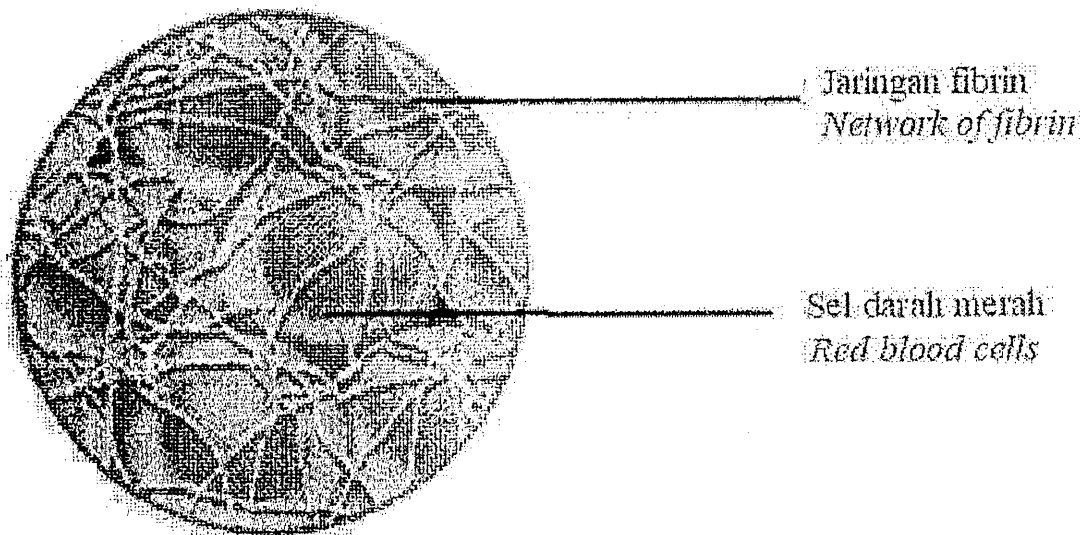
**BAHAGIAN B****SECTION B**

[40 markah]

*Jawab satu soalan sahaja daripada bahagian ini*Answer **only one** question from this section

9.(a) Rajah 9.1 menunjukkan mikrograf elektron keadaan sel darah merah yang menyebabkan darah membeku apabila seseorang itu luka.

*Diagram 9.1 shows an electron micrograph of the condition of red blood cells that causes blood clot when a person is injured.*



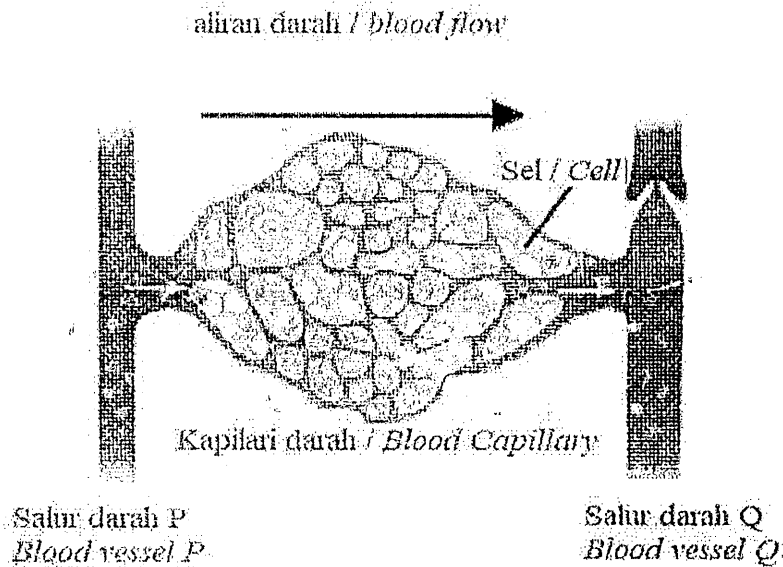
Rajah 9.1 / Diagram 9.1

Berdasarkan Rajah 9.1 huraikan mekanisme pembekuan darah dan kepentingannya.  
*Based on Diagram 9.1 describe the mechanism of blood clotting and its necessity.*

[6 markah / marks]

- (b) Rajah 9.2 menunjukkan sebahagian daripada sistem peredaran darah dalam badan manusia.

*Diagram 9.2 shows a part of the blood circulatory system in the human body.*



Rajah 9.2 / Diagram 9.2

Salur darah <i>Blood vessel</i>	Isipadu <i>Volume /cm<sup>3</sup></i>	Tekanan <i>Pressure/kPa</i>
P	100	13.3
Q	300	0.3

Jadual 1 / Table 1

Berdasarkan Rajah 9.2 dan Jadual 1, terangkan bagaimanakah struktur salur darah P mempengaruhi kadar aliran darah di dalamnya

*Based on Diagram 9.2 and Table 1, explain how the structure of blood vessels P affects the rate of blood flow in it.*

[4 markah/ marks]

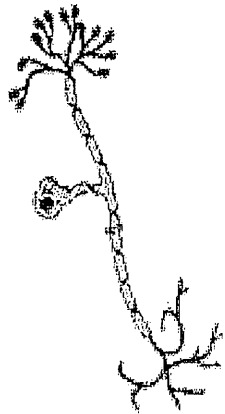
- (c) Ahmad mempunyai Rhesus positif berkahwin dengan Aisyah Rhesus negatif. Anak pertama mereka yang mempunyai Rhesus positif hidup tetapi anak kedua mereka yang juga Rhesus positif meninggal dunia semasa dalam kandungan. Jelaskan mengapa.

*Ahmad has a positive Rhesus married to Aisyah with negative Rhesus. Their first child with positive Rhesus is alive but their second child who also has positive Rhesus died during pregnancy. Explain why.*

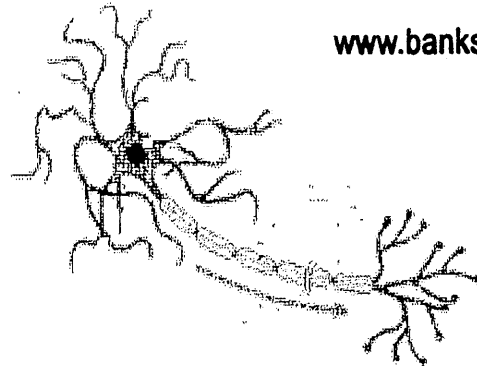
[10 markah/ marks]



10.(a) Rajah 10.1 menunjukkan dua jenis neuron.  
*Diagram 10:1 shows two types of neurons.*



Neuron P  
*Neurone P*



Neuron R  
*Neurone R*

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Rajah 10.1 / *Diagram 10.1*

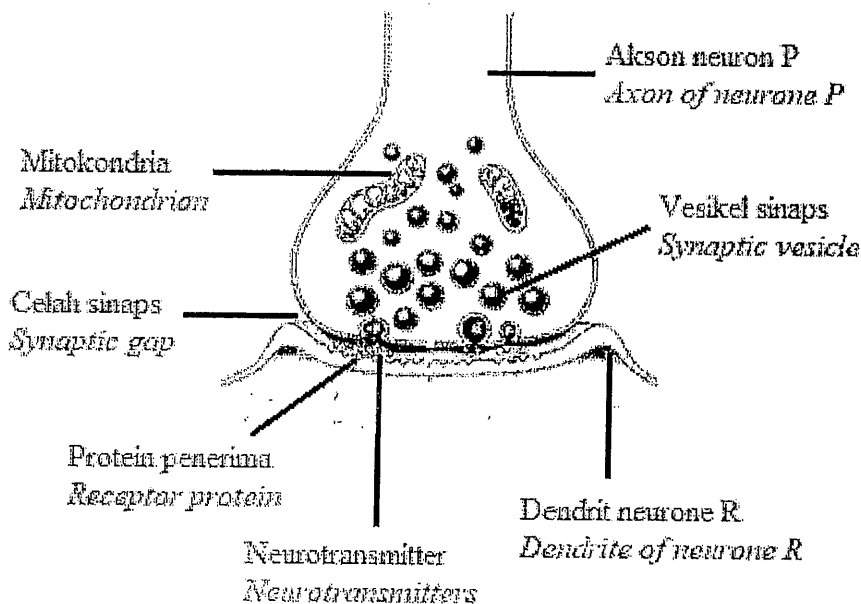
Namakan jenis neuron P dan R dan nyatakan fungsi .  
*Name types of neurone P and R and state their function .*

[4 markah / marks]

- (b) Encik X mengalami masalah obesiti tahap tiga. Beliau dinasihati untuk menjalani satu pembedahan pintasan perut untuk mengurangkan masalah obesitinya. Sebelum pembedahan dijalankan, beliau telah disuntik dengan sejenis dadah yang dapat mengurangkan rasa sakit.

*Mr X suffered a stage three obesity. He is advised to undergo a gastric bypass surgery to reduce his obesity problem. Before the surgery, he is injected a type of drug in order to reduce pain.*

Rajah 10.2 menunjukkan proses pemindahan impuls saraf  
*Diagram 10.2 shows transmission of nerve impulse process.*



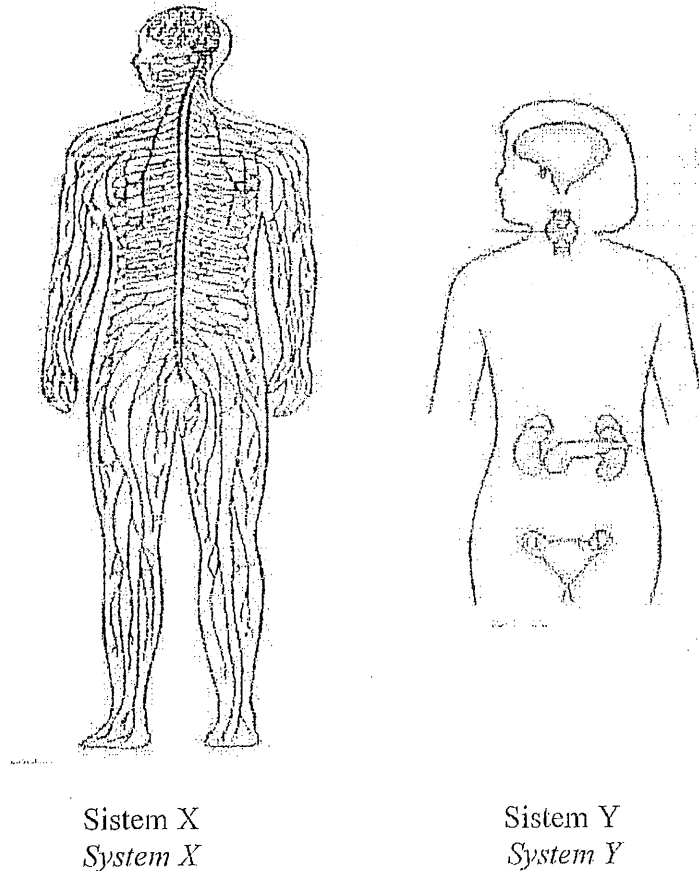
Rajah 10.2 / Diagram 10.2

Berdasarkan Rajah 10.2, terangkan bagaimana suntikan dadah itu mengganggu proses pemindahan impuls saraf dari neuron P ke neuron R yang seterusnya dapat mengurangkan kesakitan yang dirasakan oleh Encik X.

*Based on Diagram 10.2, explain how the injection of the drug affects the transmission of a nerve impulse from neurone P to neurone R which then could decrease the pain felt by Mr X.*

[6 markah / marks]

- (c) Rajah 10.3 menunjukkan dua sistem yang memainkan peranan dalam mengekalkan homeostasis. Kedua-dua sistem ini sentiasa bekerjasama  
*Diagram 10.3 shows two systems that play importance roles in maintaining homeostasis. Both systems often work together.*



Rajah 10.3 / Diagram 10.3

Terangkan perbandingan diantara sistem X dan sistem Y.  
*Explain the comparison between system X and system Y.*

[10 markah / marks]

- 11(a)(i) Tindak balas metabolisme sel manusia sangat sensitif dengan perubahan suhu. Terangkan kepentingan mengekalkan suhu badan manusia pada 37°C.

*The metabolism reactions of human cells is very sensitive to temperature changes. Explain the importance of maintaining human body temperature at 37°C.*

[3 markah / marks]

- (ii) Rajah 11.1 menunjukkan dua situasi pekerjaan yang berbeza.  
*Diagram 11.1 shows two different working situation.*

Rajah 11.2 menunjukkan kedudukan hipotalamus pada otak.  
*Diagram 11.2 shows the location of hypothalamus at brain.*

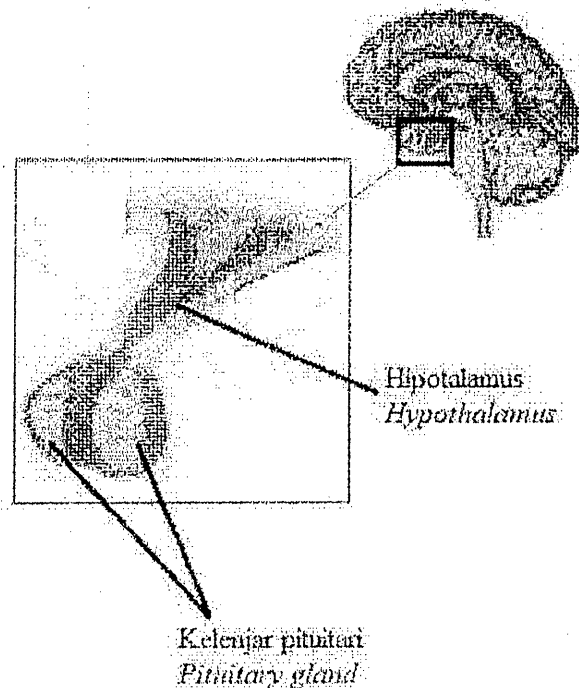
Se Jin bekerja di dalam sebuah bilik sejuk beku untuk pembekuan letupan pada suhu kurang daripada - 15°C selama 6 jam setiap hari

*Se Jin works in a frozen room for freezing explosions at temperatures less than - 15°C for 6 hours every day*

Seung Ho bekerja di dalam sebuah kilang pengeluaran besi keluli dimana peleburan besi keluli melibatkan suhu melebihi 1370°C selama 6 jam setiap hari

*Seung Ho works in a steel casting factory where smelting of steel involves temperatures above 1370°C for 6 hours every day*

Rajah 11.1 / Diagram 11.1



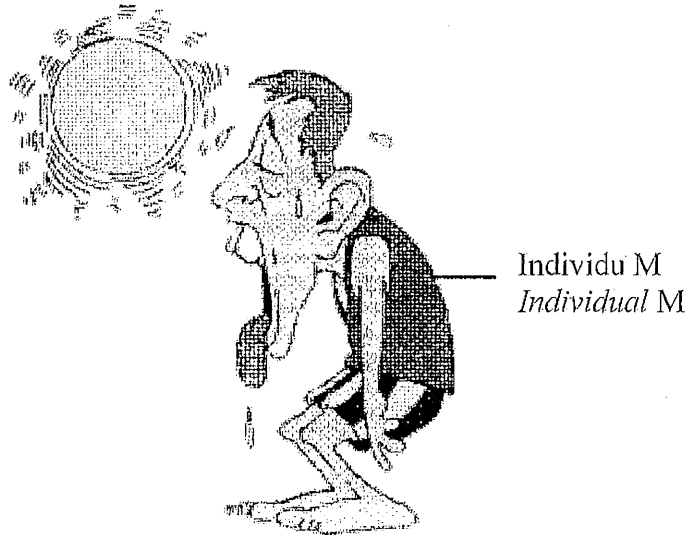
Rajah 11.2 / Diagram 11.2

Bincangkan bagaimana hypothalamus dalam Rajah 11.2 membantu dalam pengawalan suhu badan Se Jin dan Seung Ho melalui kaedah fizikal.

*Discuss how the hypothalamus in Diagram 11.2 able to regulated of Se Jin and Seung Ho's body temperature through physical methods.*

[6 markah / marks]

- (b) (i) Rajah 11.3 menunjukkan seseorang semasa panas terik.  
*Diagram 11.3 shows a man during scorching hot*



Rajah 11.3 / Diagram 11.3

Terangkan bagaimana situasi ini mempengaruhi isipadu penghasilan air kencing oleh ginjal individu M.

*Explain how this situation affects the volume of urine production by individual M kidneys.*

[7 markah / marks]

- (ii) Ginjal kanan individu M telah mengalami kerosakan manakala ginjal kirinya masih normal. Doktor menasihati beliau supaya mengamalkan gaya hidup sihat dan tidak perlu menjalani hemodialisis. Bincangkan apakah amalan gaya hidup sihat yang perlu diamalkan oleh individu M supaya dapat menjalani kehidupan harian yang normal.

*Individual M's right kidney was damage while his left kidney was still normal. The doctor advised him to practice a healthy lifestyle and no need to undergo hemodialysis.*

*Discuss what healthy lifestyle practices need to be practiced by individual M in order to lead a normal daily life.*

[4 markah / marks]

**SOALAN TAMAT / END OF THE QUESTIONS**

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