

10 (a)

Seorang tukang kayu telah terpijak paku yang berkarat dan mengandungi bakteria. Bahagian tersebut mengalami keradangan dan menyebabkannya menjadi merah dan berasa sakit.
A carpenter has stepped on a nail that is rusty and contains bacteria. The part becomes inflamed and causes it to become red and painful.

- (i) Terangkan bagaimana gerak balas keradangan ini dapat memusnahkan dan meneutralkan tindakan berbahaya bakteria dan toksin pada peringkat awal jangkitan.
Explain how this inflammatory response can destroy and neutralize harmful microorganisms and toxins in the early stages of infection.

[6 markah] [6 marks]

- P1 Tisu yang rosak membebaskan histamin
Damaged tissue releases histamine
- P2 Histamin merangsang gerak balas keradangan dengan serta merta
Histamine stimulates an immediate inflammatory response
- P3 Histamin menyebabkan pengembangan kapilari darah
Histamine causes the blood capillaries to expand
- P4 Bagi membolehkan aliran darah yang lebih banyak ke kawasan jangkitan
To enable more blood to flow to the infected area
- P5 Histamin meningkatkan ketelapan kapilari darah terhadap sel fagosit
Histamine increases the permeability of blood capillaries to phagocyte cells
- P6 Sel fagosit / Faktor pembeku berkumpul di kawasan jangkitan
Phagocyte cells / Clotting factors accumulate in the infected area
- P7 Mekanisme pembekuan darah dicituskan
Blood clotting mechanism is triggered
- P8 Sel fagosit menjalankan fagositosis
Phagocyte cells carry out phagocytosis

- (ii) Gerak balas keradangan adalah barisan pertahanan kedua. Nyatakan dua contoh lain barisan pertahanan kedua.
The inflammatory response is the second line of defense. Name two other second lines of defense.

[2 markah] [2 marks]

- P1 Demam / Fever
- P2 Fagositosis / Phagocytosis

(b)

Kaedah 1
Method 1

Individu disuntik dengan bahan X untuk memberi keimunan terhadap penyakit tibi di masa hadapan.
The individual is injected with substance X to give him immunity against the tuberculosis disease in the future.

Kaedah 2
Method 2

Individu disuntik dengan bahan Y selepas dipatuk ular.
Individuals are injected with substance Y after being bitten by a snake.

- (i) Nyatakan nama bahan X dan bahan Y.
State the name of substance X and Y.

[2 markah] [2 marks]

- (ii) Bandingkan keimunan yang diperoleh oleh individu tersebut melalui dua kaedah ini.
~~Compare the immunities obtained by the individual through these two methods.~~

X : Vaksin / Vaccine

Y : Antiserum / Antitoksin // Antiserum / Antitoxin [10 markah] [10 marks]

Persamaan / Similarities

- S1 Kedua-duanya melindungi badan daripada jangkitan
Both protect the body from infectious diseases
- S2 Kedua-duanya melibatkan antibodi / *Both involves antibodies*
- S3 Kedua-duanya melibatkan antigen / *Both involves antigens*
- S4 Kedua-duanya adalah keimunan buatan / *Both are artificial immunity*

Perbezaan / Differences

- D1 Kaedah 1 keimunan aktif buatan, kaedah 2 keimunan pasif buatan
Method 1 artificial active immunity, method 2 artificial passive immunity
- D2 Kaedah 1 melibatkan vaksin yang mengandungi patogen mati/lemah/tak virulen,
kaedah 2 melibatkan antiserum yang mengandungi antibodi yang spesifik
Method 1 involves vaccine contains suspension of weakened/dead/non-virulent pathogen, method 2 involves antiserum contains specific antibodies
- D3 Kaedah 1 untuk prevention, kaedah 2 untuk treatment/ immediate protection
Method 1 for prevention, method 2 for treatment/ immediate protection
- D4 Kaedah 1 tidak memberikan perlindungan serta-merta,
kaedah 2 memberikan perlindungan serta-merta
Method 1 does not give immediate protection, method 2 gives immediate protection
- D5 Kaedah 1 keimunan kekal untuk tempoh masa yang lama,
kaedah 2 keimunan sementara / tidak kekal lama
Method 1 immunity lasts for a long period of time, method 2 immunity is temporary
- D6 Kaedah 1 suntikan vaksin diberi sebelum dijangkiti penyakit,
kaedah 2 suntikan antiserum boleh diberi sebelum dan selepas dijangkiti penyakit
Method 1 vaccine injection is given before being infected, method 2 antiserum injection can be given before and after infection
- D7 Kaedah 1 antibodi dihasilkan oleh sel limfosit, kaedah 2 antibodi diperoleh dari antiserum
Method 1 antibody is produced by lymphocytes cells, method 2 antibody is obtained from antiserum

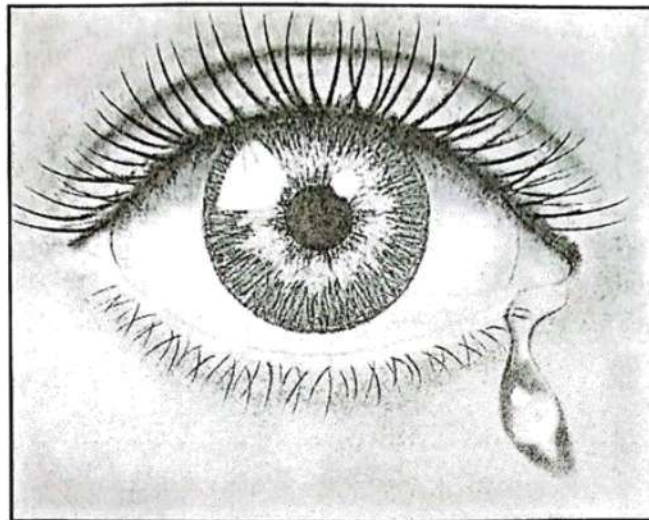
BAHAGIAN B
SECTION B

[20 markah / marks]

Jawab **SATU** soalan sahaja daripada bahagian ini

Answer only ONE question from this section.

- 9 (a) Rajah 9.1 menunjukkan satu mekanisme apabila mata dimasuki habuk.
Diagram 9.1 shows a mechanism when dust enters the eye.



Rajah 9.1
Diagram 9.1

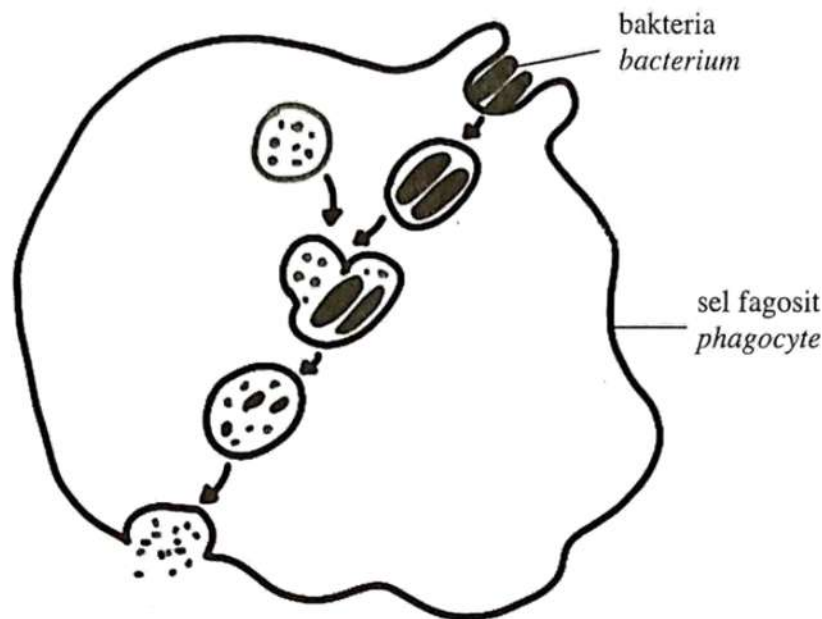
Terangkan mekanisme dalam Rajah 9.1 untuk menghalang patogen daripada memasuki badan.

Explain the mechanism in Diagram 9.1 to avoid pathogens from entering the body.

[2 markah/marks]

- P1 Mekanisme barisan pertahanan pertama
First line of defense
- P2 Kelenjar air mata merembeskan air mata
Tear gland secretes tears
- P3 Air mata mengandungi lisozim / protein antimikrob
Tear contains lysozyme / antimicrobial protein
- P4 memusnahkan / mengurai patogen / bakteria
destroys / dissolve pathogen / bacteria

- (b) Rajah 9.2 menunjukkan sejenis pertahanan badan manusia.
Diagram 9.2 shows a type of defense of the human body.



Rajah 9.2
Diagram 9.2

Seorang surirumah terpijak kaca yang mengandungi bakteria ketika membersihkan dapur dan mengakibatkan jangkitan berlaku.
 Terangkan kesan mekanisme pertahanan badan dalam Rajah 9.2 yang bertindak ke atas bakteria tersebut.

A housewife stepped on glass containing bacteria while cleaning the kitchen and caused an infection.

Explain the effects of the body's defence mechanism in Diagram 9.2 that act on the bacteria.

- P1 Mekanisme barisan pertahanan kedua
Second line of defense [8 markah/marks]
- P2 Sel fagosit ialah sel darah putih / leukosit / neutrofil
The phagocyte cell is white blood cell / leucocytes / neutrophil
- P3 Sel fagosit menelan / memusnahkan bakteria
Phagocyte cell swallows / destroys bacteria
- P4 secara fagositosis / by phagocytosis
- P5 Sel fagosit mengunjurkan pseudopodium / mengepung bakteria
Phagocyte cell extends its pseudopodium / envelops bacteria
- P6 Pengingesan bakteria membentuk fagosom
Bacterial ingestion forms phagosome
- P7 Fagosom bergabung dengan lisosom membentuk fagolisosom
Phagosome combines with lysosome to form phagolysosome
- P8 Lisosom membebaskan lisozim ke dalam fagosom
Lysosome secretes lysozyme into phagosome
- P9 Lisozim memusnahkan bakteria dalam fagosom
Lysozyme destroys bacteria in phagosome
- P10 Fagosit menyingkirkan sisa bakteria yang tercerna daripada sel
Phagocyte expels the remains of digested bacteria from the cell

(c) Rajah 9.3 menunjukkan dua kaedah bagaimana bayi mendapat keimmunan.
 Diagram 9.3 shows two methods on how the baby obtain immunity.



Kaedah 1 / Method 1

Jadual Immunisasi Kebangsaan bagi Kanak-kanak
 National Immunization Schedule for Children

VAKSIN	Umur (Bulan)										Umur (Tahun)		
	Lahir	1	2	3	5	6	9	12	18	21	7	13	15
BCG													
Hepatitis B													
Difteria-Tetanus- Pertussis – Polio – Hepatitis B - Haemophilus influenzae type b (DTaP-IPV-HepB-Hib)			Dos 1	Dos 2	Dos 3				Dos panggilan (booster)				
Measles (Sabah sahaja)													
Measles – Mumps – Rubella (MMR)													
Japanese Encephallitis (JE) (Sarawak sahaja)													
Measles-Rubella (MR)													
Difteria – Tetanus (DT)													
Human Papilloma Virus (HPV)												2 dos	
Tetanus (ATT)													

Kaedah 2 / Method 2

Rajah 9.3
 Diagram 9.3

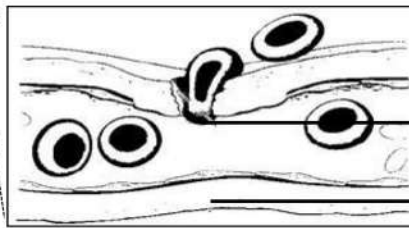
Bandingkan keimmunan yang diperoleh oleh bayi melalui dua kaedah ini.
 Compare the immunities obtained by the baby through these two methods.

[10 markah / marks]

	(Susu ibu)	(Suntikan vaksin)
	Kaedah 1 / Method 1	Kaedah 2 / Method 2
	Persamaan	
S1	Kedua-dua kaedah memerlukan / memperolehi antibodi <i>Both methods need / obtain antibody</i>	
S2	Kedua-dua kaedah menggunakan antibodi melawan penyakit / patogen <i>Both methods use antibody to fight diseases / pathogen</i>	
	Perbezaan	
D1	Keimunan pasif semulajadi <i>Passive natural immunity</i>	Keimunan aktif buatan <i>Active artificial immunity</i>
D2	Antibodi dihasilkan oleh ibu <i>Antibody produced by mother</i>	Antibodi dihasilkan oleh badan sendiri <i>Antibody is produced by body cells / lymphocytes</i>
D3	Keimunan diperolehi melalui susu ibu <i>Immunity is acquired through breast milk</i>	Keimunan diperolehi melalui suntikan vaksin <i>Immunity is acquired through vaccine injection</i>
D4	Keimunan sementara / tempoh pendek <i>Short period of immunity</i>	Keimunan kekal / tempoh lama <i>Long lasting immunity</i>
D5	Susu ibu mengandungi antibodi <i>Breast milk contains antibody</i>	Vaksin mengandungi patogen lemah / mati <i>Vaccine contains weaken / dead pathogen</i>
D6	Bekalan antibodi berterusan sepanjang penyusuan <i>Continuous antibody supply as long as breastfeeding</i>	Dos penggalak diperlukan untuk mengekalkan aras antibodi / mengikut keperluan <i>Booster dose is given to maintain the antibody level / if required</i>
D7	Tidak menyebabkan alergi <i>Does not cause allergy / side effects</i>	Boleh menyebabkan alergi <i>Can cause allergy / side effects</i>

- 9 (a) Rajah 9.1 menunjukkan seorang kanak-kanak tercedera dan berdarah.

Diagram 9.1 shows a child injured and bleeding.



Sel darah merah mengalir keluar
Red blood cells flow out
Kawasan terluka
Injured area
Salur darah
Blood vessel

Rajah 9.1 / *Diagram 9.1*

- (i) Terangkan mekanisme badan yang dapat menghentikan pendarahan.

Explain the body's mechanism to stop the bleeding.

[5 markah/marks]

- P1 **Platlet bergumpal pada luka membentuk plak / menutup luka sementara**
Platelets clump together in the wound to form a plaque / cover wound temporarily
- P2 **Faktor pembeku menjadi aktif dan membentuk trombokinase**
Clotting factors become active and form trombokinase
- P3 **Trombokinase merangsang protrombin menjadi trombin**
Trombokinase catalyst the conversion of prothrombin to thrombin
- P4 **dengan kehadiran ion kalsium dan vitamin K / in the presence of calcium ion and vitamin K**
- P5 **Trombin menukarkan fibrinogen kepada fibrin / Thrombin converts fibrinogen to fibrin**
- P6 **Fibrin membentuk jaringan pada kulit / Fibrin forms a network in the wound**
- P7 **Sel-sel darah merah terperangkap bersama platlet dalam jaringan fibrin membentuk darah beku / menutup luka**
Red blood cells trapped together with platelets in fibrin network to form blood clot / close the wound

- (ii) Bahagian jari yang terluka menjadi bengkak, kemerahan dan sakit selepas dijahit. Terangkan mekanisma pertahanan badan terhadap bakteria yang telah masuk melalui luka tersebut.

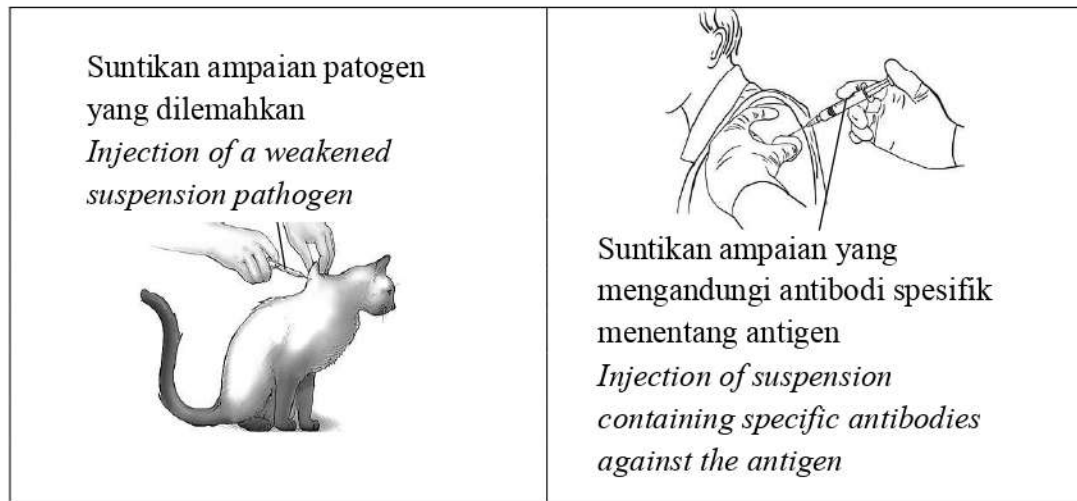
The injured part of the finger becomes swollen, red and painful after being stitched. Explain the body's defense mechanism against bacteria that have entered through the wound.

[5 markah/marks]

- P1 **Tisu yang rosak membebaskan histamin**
Damaged tissue releases histamine
- P2 **Histamin merangsang gerak balas keradangan dengan serta merta**
Histamine stimulates an immediate inflammatory response
- P3 **Histamin menyebabkan pengembangan kapilari darah**
Histamine causes the blood capillaries to expand
- P4 **Bagi membolehkan aliran darah yang lebih banyak ke kawasan jangkitan**
To enable more blood to flow to the infected area
- P5 **Histamin meningkatkan ketelapan kapilari darah terhadap sel fagosit**
Histamine increases the permeability of blood capillaries to phagocyte cells
- P6 **Sel fagosit / Faktor pembeku berkumpul di kawasan jangkitan**
Phagocyte cells / Clotting factors accumulate in the infected area
- P7 **Mekanisme pembekuan darah dicituskan**
Blood clotting mechanism is triggered
- P8 **Sel fagosit menjalankan fagositosis**
Phagocyte cells carry out phagocytosis

- (b) Rajah 9.2 dan Rajah 9.3 menunjukkan dua suntikan yang berbeza kepada dua organisma.

Diagrams 9.2 and 9.3 show two different injections into two organisms.



Rajah 9.2 / Diagram 9.2

Rajah 9.3 / Diagram 9.3

Berdasarkan pengetahuan biologi anda, nyatakan perbezaan antara keimunan yang diperoleh oleh dua organisma ini.

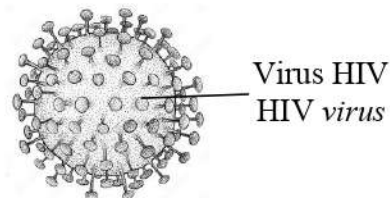
Based on your biological knowledge, state the differences between the immunity acquired by these two organisms.

[6 markah / marks]

	Rajah 9.2 / Diagram 9.2	Rajah 9.3 / Diagram 9.3
D1	Keimunan aktif buatan <i>Active artificial immunity</i>	Keimunan pasif buatan <i>Passive artificial immunity</i>
D2	Antibodi dihasilkan oleh badan sendiri <i>Antibody is produced by body cells / lymphocytes</i>	Antibodi diperolehi daripada antiserum <i>Antibodies are obtained from antiserum</i>
D3	Keimunan diperolehi melalui suntikan vaksin <i>Immunity is acquired through vaccine injection</i>	Keimunan diperolehi melalui suntikan antiserum <i>Immunity is acquired through antiserum injection</i>
D4	Untuk pencegahan / <i>For prevention</i>	Untuk rawatan / <i>For treatment</i>
D5	Tidak memberikan perlindungan serta merta <i>Does not give immediate protection</i>	Memberikan perlindungan serta merta <i>Gives immediate protection</i>
D6	Suntikan diberi sebelum dijangkiti penyakit <i>Injection is given before being infected</i>	Suntikan diberi selepas dijangkiti penyakit <i>Injection is given after being infected</i>
D7	Keimunan kekal / tempoh lama <i>Long lasting immunity</i>	Keimunan tidak kekal / sementara <i>Short period immunity / temporarily</i>
D8	Dos penggalak diperlukan untuk mengekalkan aras antibodi / mengikut keperluan <i>Booster dose is given to maintain the antibody level / if required</i>	Dos penggalak diperlukan untuk mengekalkan aras antibodi / mengikut keperluan <i>Booster dose is given to maintain the antibody level / if required</i>

- (c) Rajah 9.4 menunjukkan virus HIV yang menyebabkan Sindrom Kurang Daya Tahan Penyakit (AIDS).

Diagram 9.4 shows the HIV virus which causes Acquired Immunodeficiency Syndrome (AIDS).



Rajah 9.4 / Diagram 9.4

Terangkan langkah-langkah pencegahan penularan penyakit AIDS.

Explain the measures to prevent the spread of AIDS.

[4 markah/marks]

- P1 Menjauhi hubungan seks yang tidak dilindungi / dengan individu yang mungkin dijangkiti / Mengamalkan hubungan seks selamat dengan memakai kondom
Avoid unprotected sexual relations / with an infected individual / Practice safe sex by using condoms
- P2 Tidak berkongsi jarum suntikan yang tercemar / dijangkiti untuk menyuntik dadah / dakwat tatu // Gunakan jarum baru / steril
Do not share contaminated / infected needles to inject drugs / tattoo ink // Use new / sterile needles
- P3 Tidak menerima darah / organ daripada individu tercemar dengan virus HIV
Do not receive blood / organ from infected individual
- P4 Ibu mengambil anti-virus semasa mengandung untuk mengelakkan jangkitan kepada janin
Pregnant mothers take anti-viral to avoid infection to the fetus
- P5 Menjalankan kempen kesedaran tentang penularan penyakit AIDS
Conduct awareness to prevent the spread of AIDS campaign

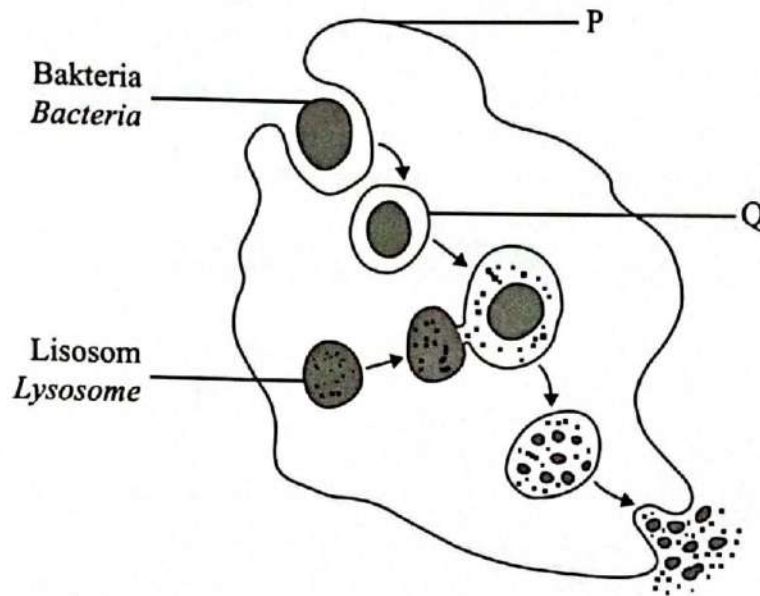
Bahagian A
Section A

[60 markah]
[60 marks]

Jawab semua soalan dalam bahagian ini.
Answer all questions in this section.

- 1 Rajah 1 menunjukkan satu mekanisme barisan pertahanan kedua yang melibatkan sel leukosit.

Diagram 1 shows a second line of defence mechanism that involve the leucocyte.



Rajah 1
Diagram 1

- (a) (i) Namakan P dan Q.

Name P and Q.

P : Pseudopodium / Pseudopodium

Q : Fagosom / Vakuol makanan
Phagosome / Food vacuole[2 markah]
[2 marks]

1(a)(i)

	2
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- (ii) Nyatakan peranan bahan yang terdapat di dalam lisosom.

State the role of the substance found in the lysosome.

Mencernakan/memusnahkan bakteria

Digests / Destroys bacteria

[1 markah]
[1 mark]

1(a)(ii)

	1
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- (iii) Namakan proses yang dilakukan oleh sel leukosit dalam mekanisme pertahanan badan tersebut.

Name the process carried out by the leucocyte in the body defence mechanism.

Fagositosis / Phagocytosis

[1 markah]
[1 mark]

1(a)(iii)

	1
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- (b) Tisu yang rosak membebaskan histamin yang merangsang gerak balas keradangan.

Nyatakan **dua** fungsi histamin.*Damaged tissue releases histamine which stimulates an inflammatory response.**State two functions of histamine.*

1. Menyebabkan pengembangan kapilari darah
Causes blood capillaries to expand
2. Meningkatkan ketelapan kapilari darah terhadap sel fagosit
Increase the permeability of blood capillaries against phagocyte cells

[2 markah]
[2 marks]

1(b)

	2
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Total
AI

	6
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