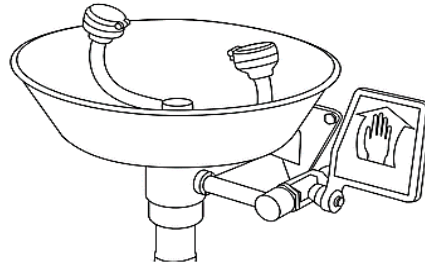


Jawab **semua** soalan.
Answer **all** questions.
(40 markah/ marks)

- 1 Rajah 1 menunjukkan satu peralatan perlindungan diri di dalam makmal.
Diagram 1 shows a personal protective equipment in the laboratory.

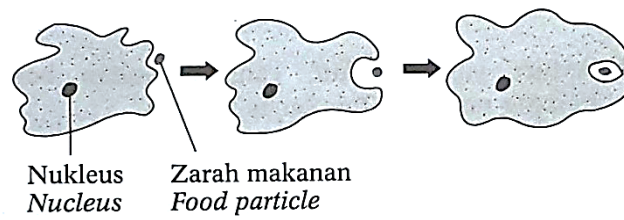


Rajah 1
Diagram 1

Apakah fungsi peralatan perlindungan diri tersebut?
What is the function of the personal protective equipment?

- A** Untuk membilas bahagian badan yang terkena bahan kimia
To rinse body parts affected by chemicals
- B** Untuk membilas dan mencuci mata yang terkena bahan kimia
To rinse and wash eyes exposed to chemicals
- C** Untuk mengelakkan kontaminasi semasa aktiviti berkaitan mikrobiologi dijalankan
To avoid contamination during microbiology related activities
- D** Untuk menjalankan eksperimen yang menggunakan bahan yang mudah meruap, mudah terbakar, mengakis dan berbau
To carry out experiments that use volatile, flammable, corrosive and smelly substances

- 2 Rajah 2 menunjukkan satu proses hidup yang dijalankan oleh *Amoeba* sp.
 Diagram 2 show a living process carried out by *Amoeba* sp.



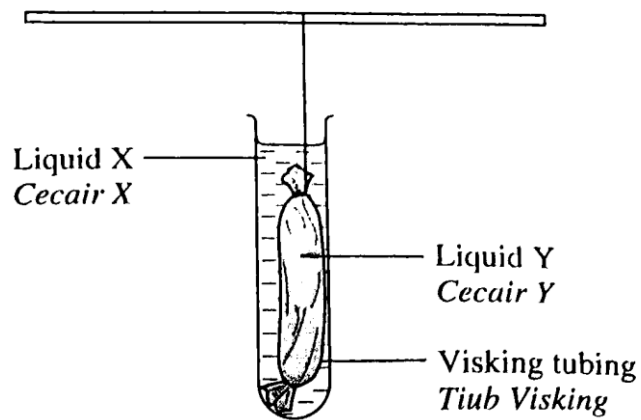
Rajah 2
 Diagram 2

Apakah proses tersebut?
 What is the process?

- A** Hidrolisis
Hydrolysis
- B** Respirasi
Respiration
- C** Fagositosis
Phagocytosis
- D** Sintesis
Synthesis
- 3 Antara yang berikut, urutan yang manakah betul untuk organisasi bagi suatu organisma?
 Which of the following order is correct for the organisation of an organism?

- | | | | | | | | |
|----------|-------------------------|---|-----------------------|---|-------------------------|---|-------------------------|
| A | Sel
<i>Cell</i> | → | Tisu
<i>Tissue</i> | → | Organ
<i>Organ</i> | → | Sistem
<i>System</i> |
| B | Sistem
<i>System</i> | → | Tisu
<i>Tissue</i> | → | Organ
<i>Organ</i> | → | Sel
<i>Cell</i> |
| C | Sel
<i>Cell</i> | → | Organ
<i>Organ</i> | → | Sistem
<i>System</i> | → | Tisu
<i>Tissue</i> |
| D | Sistem
<i>System</i> | → | Organ
<i>Organ</i> | → | Tisu
<i>Tissue</i> | → | Sel
<i>Cell</i> |

- 4 Rajah 3 menunjukkan suatu susunan radas.
Diagram 3 shows an apparatus set up.



Rajah 3
Diagram 3

Selepas beberapa jam, tiub Visking mengembang.
 Antara yang berikut, yang manakah mungkin mewakili cecair X dan Y?
After a few hours, the Visking tube expanded.
Which of the following are most probably represent liquid X and Y?

	Cecair X Liquid X	Cecair Y Liquid Y
I	Larutan sukrosa 10% 10% sucrose solution	Larutan sukrosa 20% 20% sucrose solution
II	Larutan sukrosa 30% 30% sucrose solution	Air suling Distilled water
III	Air suling Distilled water	Larutan sukrosa 10% 10% sucrose solution
IV	Larutan sukrosa 30% 30% sucrose solution	Larutan sukrosa 20% 20% sucrose solution

- A** I dan II
 I and II
B I dan III
 I and III
C II dan IV
 II and IV
D III dan IV
 III and IV

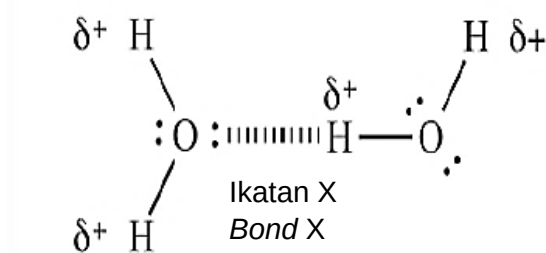
- 5 Antara yang berikut, yang manakah menerangkan kelayuan pada tumbuhan akibat penggunaan baja yang berlebihan?

Which of the following explains wilting in plants due to the excessive use of fertilisers?

- A Terlalu banyak baja meningkatkan kepekatan air tanah
Too much fertiliser increases the concentration of the soil water
- B Terlalu banyak baja mengurangkan kepekatan air tanah
Too much fertiliser decreases the concentration of the soil water
- C Air tanah yang hipotonik menyebabkan molekul air meresap keluar dari sap sel tumbuhan
The hypotonic soil water causes water molecules diffuse out from the plant cell sap
- D Sap sel tumbuhan menjadi hipertonik berbanding air tanah
The plant cell sap becomes hypertonic compared to the soil water

- 6 Rajah 4 menunjukkan dua molekul air yang terikat pada ikatan X.

Diagram 4 shows two water molecules that are bonded to bond X.



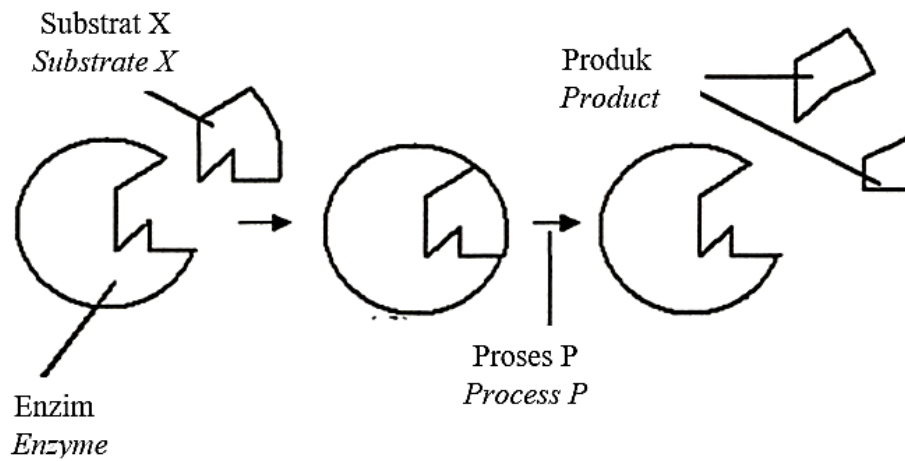
Rajah 4
Diagram 4

Apakah ikatan X?

What is bond X?

- A Ikatan ionik
Ionic bond
- B Ikatan hidrogen
Hydrogen bond
- C Ikatan dubel
Dobel bond
- D Ikatan kovalen
Covalent bond

- 7 Rajah 5 menunjukkan satu tindakbalas enzim yang dijalani oleh satu molekul disakarida.
Diagram 5 shows an enzyme reaction undergone by a disaccharide molecule.

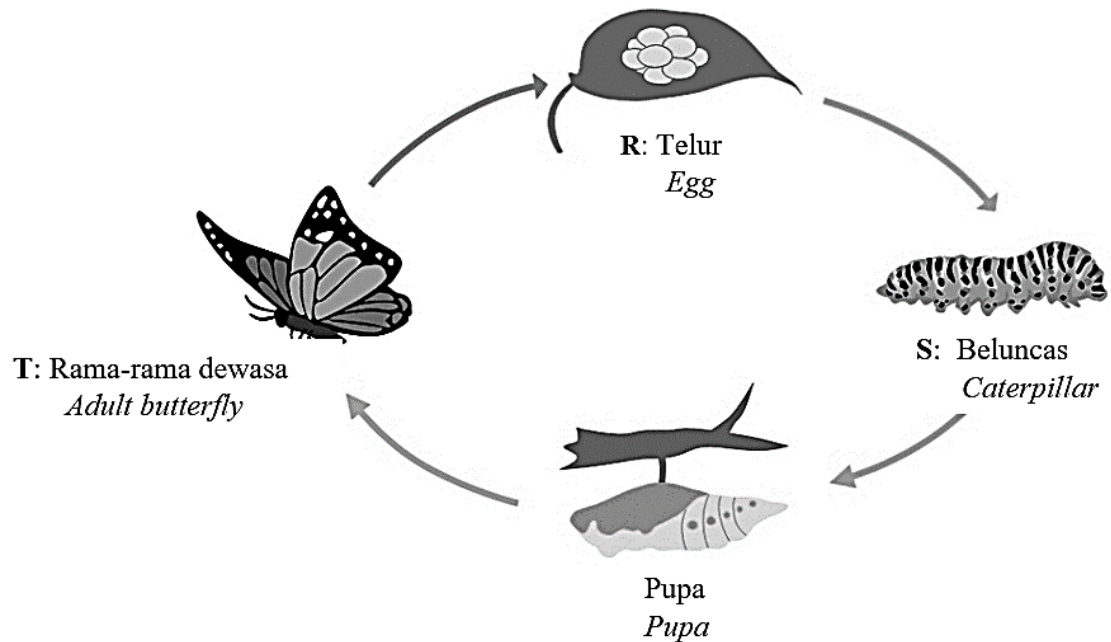


Rajah 5
 Diagram 5

Apakah substrat X, proses P dan jenis metabolisme yang terlibat?
 What is substrate X, process P and the type of metabolism involved?

	Substrat X <i>Substrate X</i>	Proses P <i>Process P</i>	Jenis metabolisme <i>Type of metabolism</i>
A	Laktosa <i>Lactose</i>	Hidrolisis <i>Hydrolysis</i>	Katabolisme <i>Catabolism</i>
B	Fruktosa <i>Fructose</i>	Kondensasi <i>Condensation</i>	Anabolisme <i>Anabolism</i>
C	Glukosa <i>Glucose</i>	Kondensasi <i>Condensation</i>	Katabolisme <i>Catabolism</i>

- 8 Rajah 6 menunjukkan kitar hidup seekor rama-rama.
Diagram 6 shows the life cycle of a butterfly.

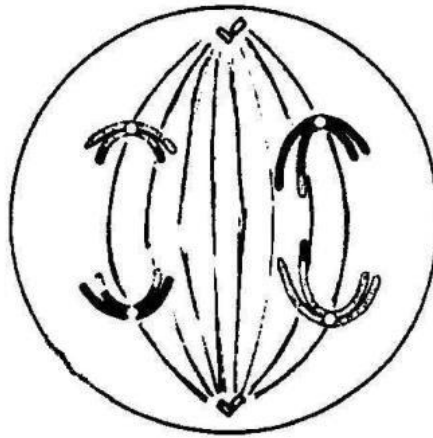


Rajah 6
Diagram 6

Berapakah nombor kromosom bagi R, S dan T?
What is the chromosomal number for R, S and T?

	R	S	T
A	Diploid <i>Diploid</i>	Diploid <i>Diploid</i>	Haploid <i>Haploid</i>
B	Diploid <i>Diploid</i>	Haploid <i>Haploid</i>	Haploid <i>Haploid</i>
C	Haploid <i>Haploid</i>	Diploid <i>Diploid</i>	Diploid <i>Diploid</i>
D	Haploid <i>Haploid</i>	Haploid <i>Haploid</i>	Diploid <i>Diploid</i>

- 9 Rajah 7 menunjukkan satu fasa dalam pembahagian sel.
Diagram 7 shows a phase in a cell division.



Rajah 7
Diagram 7

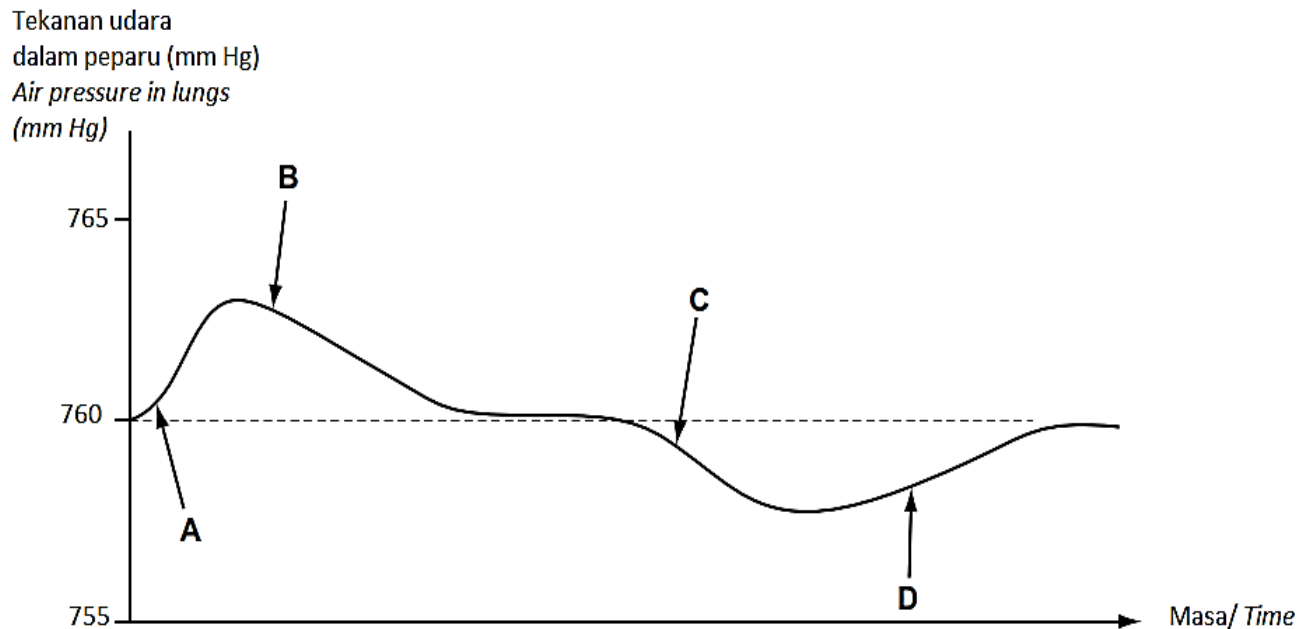
Antara yang berikut, yang manakah betul tentang sel itu?
Which of following is correct about the cell?

- A Sel berada pada peringkat anafasa II
Cell is at anaphase II stage
- B Kromatid kembar berpisah dan bergerak ke kutub bertentangan
Sister chromatids separate and move to opposite pole
- C Sel tersebut ialah sel tumbuhan
The cell is a plant cell
- D Bilangan kromosom dalam sel anak selepas pembahagian ialah 2
Chromosomal number in the daughter cell after division is 2

- 10 Aktiviti yang manakah menyebabkan kepekatan asid laktik yang tinggi dalam otot?
Which activity causes high concentrations of lactic acid in muscles?

- A Menonton televisyen
Watching television
- B Larian pecut 100m
100m sprint run
- C Senaman memanaskan badan
Warm-up exercises
- D Mengayuh basikal
Cycling

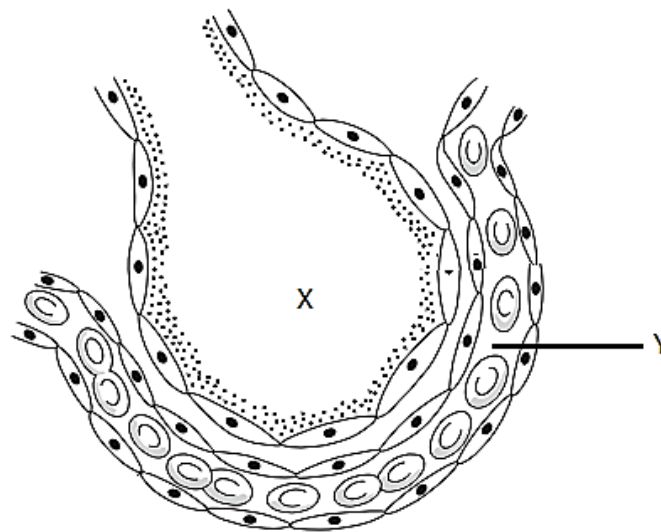
- 11** Rajah 8 menunjukkan perubahan dalam tekanan udara dalam paru-paru semasa satu kitar pernafasan yang lengkap. Tekanan atmosfera ialah 760 mm Hg.
Diagram 8 shows changes in the air pressure in the lungs during a complete breathing cycle. Atmospheric pressure is 760 mm Hg.



Rajah 8
Diagram 8

Antara A, B, C dan D, yang manakah menunjukkan masa tulang rusuk mula-mula diturunkan?
Which of the following points A, B, C or D shows the time when the ribs are initially lowered?

- 12 Rajah 9 menunjukkan keratan membujur struktur respirasi manusia.
Diagram 9 shows a longitudinal section of human respiratory structure.

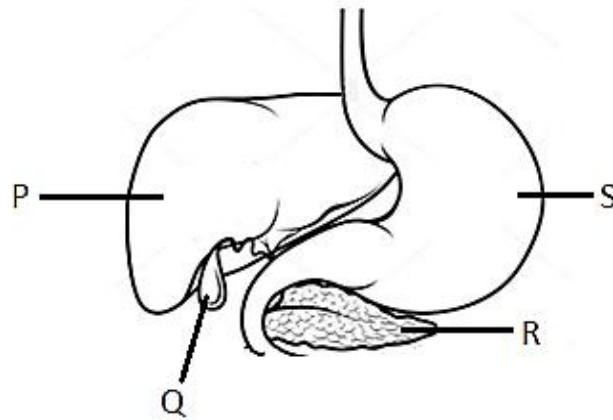


Rajah 9
 Diagram 9

Antara keadaan berikut, yang manakah menghasilkan resapan oksigen dari X ke Y dengan maksimum?
Which of the following situation causes maximum diffusion of oxygen from X to Y?

	X	Y
A	Tekanan separa oksigen tinggi. <i>High partial pressure of oxygen.</i>	Tekanan separa karbon dioksida rendah. <i>Low partial pressure of carbon dioxide.</i>
B	Tekanan separa karbon dioksida rendah. <i>Low partial pressure of carbon dioxide.</i>	Tekanan separa oksigen tinggi. <i>High partial pressure of oxygen.</i>
C	Tekanan separa oksigen tinggi. <i>High partial pressure of oxygen.</i>	Tekanan separa karbon dioksida tinggi. <i>High partial pressure of carbon dioxide.</i>

- 13** Rajah 10 menunjukkan sebahagian daripada salur pencernaan manusia.
Diagram 10 shows part of the human alimentary canal.

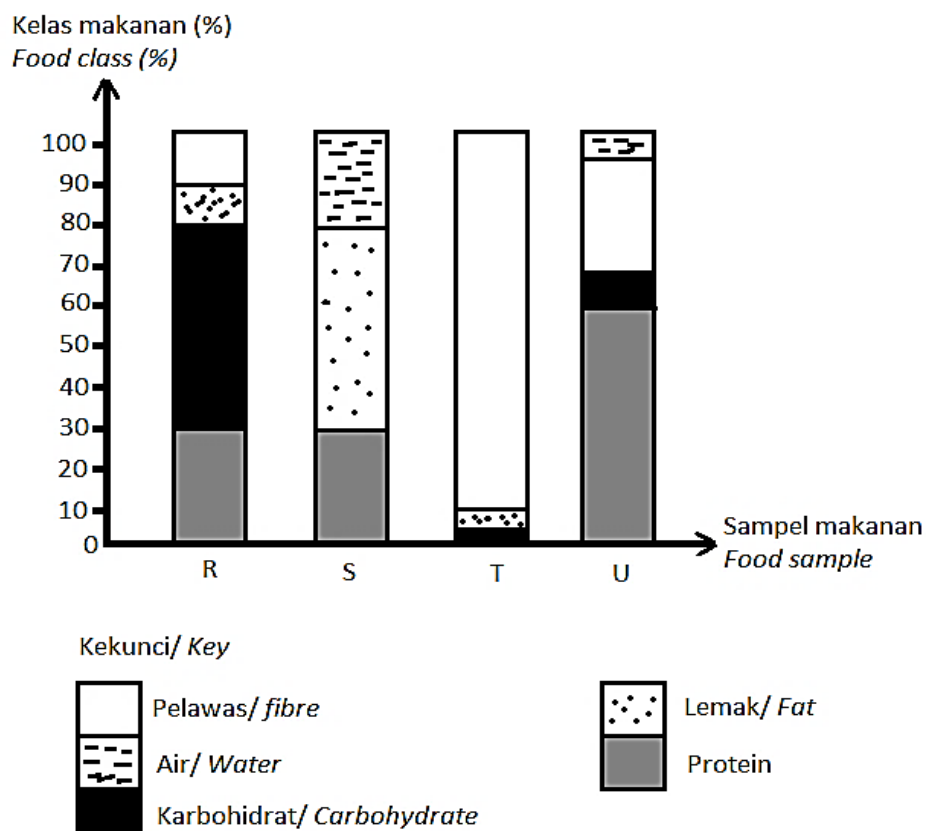


Rajah 10
Diagram 10

Antara yang berikut, yang manakah terlibat dalam pencernaan nasi?
Which of the following is involved in digestion of rice?

- A** P
- B** Q
- C** R
- D** S

- 14 Carta bar menunjukkan peratusan kelas makanan dalam empat sampel makanan.
The bar chart shows percentage of classes of food in four food samples.



Antara yang berikut, sampel makanan yang manakah sesuai untuk seorang individu yang mengalami kecederaan tisu?

Which of the following food sample is suitable for an individual who has tissue injury?

- A R
- B S
- C T
- D U

- 15 Antara yang berikut, yang manakah laluan yang terpendek yang dilalui oleh darah yang mengalir dari kaki ke lengan badan manusia?
Which of the following is the shortest route taken by blood flowing from the leg to the arm in the human body?

- A Leg Kaki → Heart Jantung → Lungs Peparu → Heart Jantung → Arm Lengan
- B Leg Kaki → Heart Jantung → Lungs Peparu → Liver Hati → Arm Lengan
- C Leg Kaki → Liver Hati → Heart Jantung → Lungs Peparu → Arm Lengan
- D Leg Kaki → Liver Hati → Lungs Peparu → Heart Jantung → Arm Lengan

- 16 Rajah 11 menunjukkan isyarat peringatan yang diberikan pada jam digital Encik A.
Diagram 11 shows the warning signal given on Mr. A's digital clock.



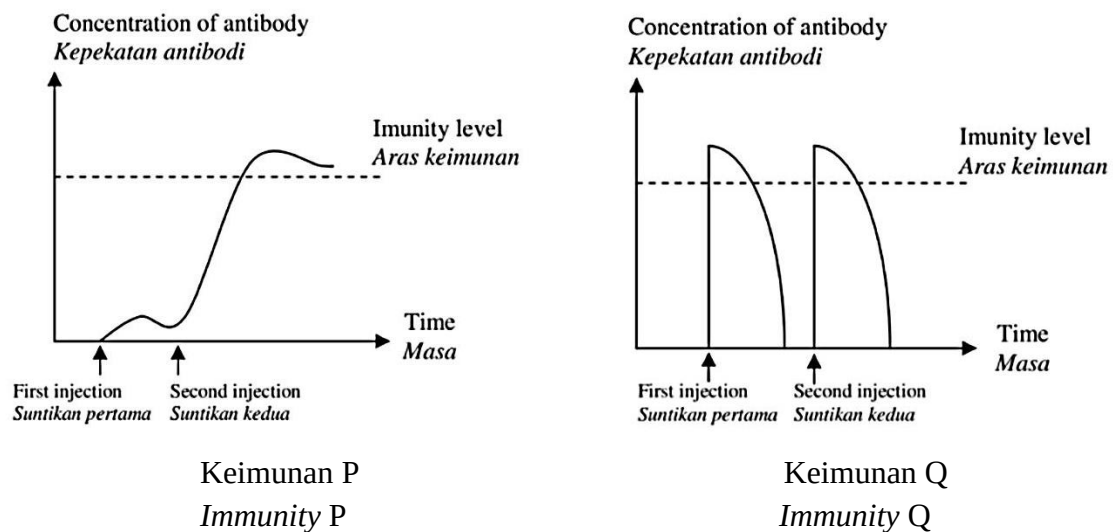
Rajah 11
Diagram 11

Tabiat duduk terlalu lama boleh mengakibatkan risiko trombosis.
Antara yang berikut, yang manakah betul mengenai masalah kesihatan tersebut?
The habit of sitting for too long can result in the risk of thrombosis.
Which of the following is correct about the health problem?

- A Ia menghalang darah membeku.
It prevents blood from clotting.
- B Ia diakibatkan oleh darah beku yang tersekat di dalam salur darah yang terlalu kecil.
It is caused by blood clots stuck in very small blood vessels.
- C Ia disebabkan pengaliran darah yang terlalu perlahan sehingga menyebabkan faktor pembeku berkumpul.
It is due to blood flow that is too slow causing clotting factors to accumulate.
- D Ia disebabkan oleh kekurangan faktor pembeku tertentu dalam darah.
It is caused by the lack of certain clotting factors in the blood.

17 Rajah 12 menunjukkan graf dua jenis keimunan.

Diagram 12 shows the graphs of two types of immunity.



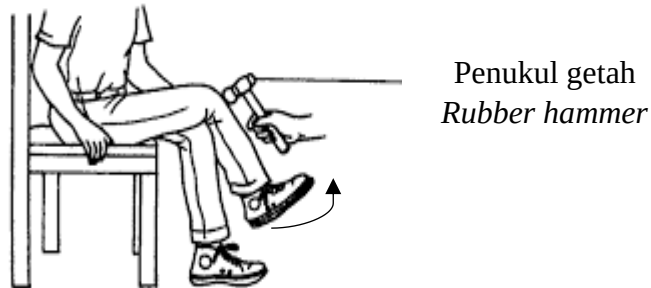
Rajah 12
Diagram 12

Antara berikut yang manakah betul tentang P dan Q?

Which of the following is correct for P and Q?

	Keimunan P Immunity P	Keimunan Q Immunity Q
A	Diperoleh melalui suntikan antiserum <i>Obtained by injection of antiserum</i>	Diperoleh melalui suntikan vaksin <i>Acquired through vaccination</i>
B	Bertujuan memberi rawatan atau perlindungan serta merta <i>Intended to provide immediate treatment or protection</i>	Bertujuan untuk memberi pencegahan daripada jangkitan <i>Aims to prevent infection</i>
C	Keimunan kekal untuk tempoh masa yang lama <i>Immunity lasts for a long period of time</i>	Keimunan bersifat sementara dan tidak kekal lama <i>Immunity is temporary and does not last long</i>
D	Dos penggalak diberikan sekiranya aras antibodi jatuh di bawah aras keimunan <i>A booster dose is given if the antibody level falls below the immune level</i>	Dos penggalak perlu diberikan bagi meningkatkan aras antibodi melepasi aras keimunan <i>A booster dose should be given to increase the antibody level beyond the immune level</i>

- 18** Rajah 13 menunjukkan satu gerak balas yang dilakukan oleh seorang murid.
Diagram 13 shows a response done by a student.



Rajah 13
Diagram 13

Antara yang berikut, yang manakah merupakan ciri gerak balas tersebut?
Which of the following is the characteristic of the response?

- A** Dikawal oleh korteks serebrum
Controlled by the cerebral cortex
- B** Melibatkan gerak balas otot licin dan kelenjar
Involves smooth muscle and glandular responses
- C** Menggunakan laluan saraf yang melibatkan hanya dua neuron
Using a neural pathway involving only two neurons
- D** Gerak balas yang berlaku disedari dan mengikut kehendak kita
The response that occurs is conscious and according to our will

- 19** Puan M membuat ujian darah secara sendiri ke atas anaknya menggunakan glukometer selepas dia mengadu kerap buang air kencing, sentiasa berasa haus dan rasa kebas pada tapak kaki. Ujian dijalankan dua jam selepas anaknya mengambil sarapan pagi.
Mrs. M did a self-blood test on her son using a glucometer after he complained of frequent urination, constant thirst and numbness in the soles of his feet. The test was conducted two hours after his son had breakfast.

Rajah 14.1 menunjukkan bacaan glukometer anaknya manakala Rajah 14.2 menunjukkan julat bacaan glukosa di dalam darah.

Diagram 14.1 shows his son's glucometer reading while Diagram 14.2 shows the range of glucose readings in the blood.



Rajah 14.1

Diagram 14.1

Masa ujian	Normal	Prediabetes	Diabetes
Rambang	< 11.1 mmol/L < 200 mg/dL	-	≥ 11.1 mmol/L ≥ 200 mg/dL
Berpuasa	< 5.5 mmol/L < 100 mg/dL	5.5 - 6.9 mmol/L 100 - 125 mg/dL	≥ 7.0 mmol/L ≥ 126 mg/dL
Selepas 2 jam makan	< 7.8 mmol/L < 140 mg/dL	7.8 - 11.0 mmol/L 140 - 199 mg/dL	≥ 11.1 mmol/L ≥ 200 mg/dL

Rajah 14.2

Diagram 14.2

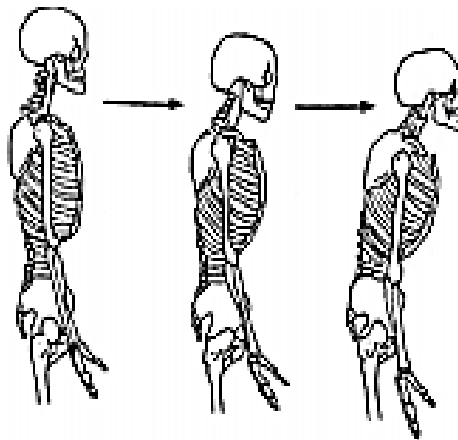
Berdasarkan bacaan yang diperoleh, apakah langkah-langkah yang sesuai diamalkan oleh anak Puan M?

Based on the readings obtained, what are the appropriate steps to be practiced by Mrs. M's son?

- I Mengurangkan pengambilan nasi dan roti putih
Reduce the intake of rice and white bread
- II Mengamalkan gaya hidup sihat dan selalu bersenam
Practice a healthy lifestyle and exercise regularly
- III Meningkatkan pengambilan bijirin sarapan pada awal pagi
Increase the intake of breakfast cereals at early morning
- IV Mengambil jus buah yang tidak ditambah gula sebagai minuman
Consume unsweetened fruit juice as a drink

- A** I dan II
I and II
- B** I dan III
I and III
- C** II dan IV
II and IV
- D** III dan IV
III and IV

- 20** Antara yang berikut, yang manakah betul mengenai pengawalan suhu badan oleh efektor apabila suhu badan jatuh di bawah julat normal?
Which of the following is correct about the regulation of body temperature by effectors when the body temperature drops below the normal range?
- A** Kelenjar peluh dirangsang untuk mengeluarkan lebih banyak peluh.
Sweat glands are stimulated to produce more sweat.
 - B** Otot erektor mengendur dan bulu roma akan condong ke permukaan kulit.
The erector muscles relax and the hairs will lean towards the surface of the skin.
 - C** Lebih banyak hormon tiroksina dirembeskan untuk meningkatkan kadar metabolisme.
More thyroxine is secreted to increase metabolic rate.
 - D** Arteriol di dalam kulit mengalami pemvasodilatan supaya lebih banyak darah mengalir ke permukaan kulit.
Arterioles in the skin undergo vasodilation so that more blood flows to the surface of the skin.
- 21** Rajah 15 menunjukkan perubahan postur pada rangka seorang perempuan yang meningkat usia disebabkan oleh kekurangan hormon dan nutrien tertentu.
Diagram 15 shows skeleton posture change of an aging woman due to lack of certain hormone and nutrients.

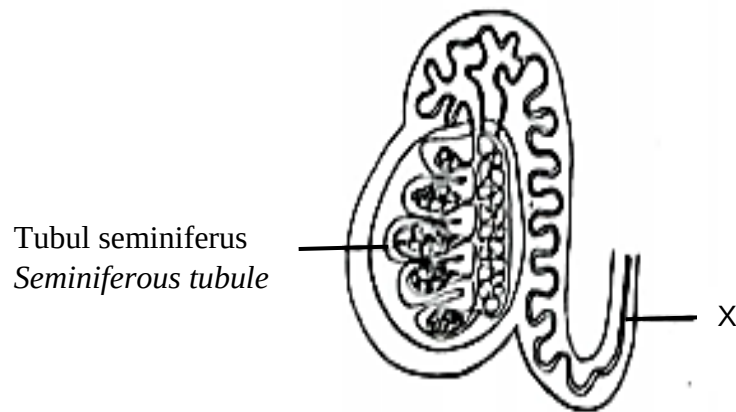


Rajah 15
 Diagram 15

Apakah hormon dan nutrien tersebut?
What are those hormone and nutrient?

- A** Progesteron dan ferum
Progesterone and iron
- B** Progesteron dan kalsium
Progesterone and calcium
- C** Estrogen dan ferum
Oestrogen and iron
- D** Estrogen dan kalsium
Oestrogen and calcium

- 22 Rajah 16 menunjukkan keratan membujur testis.
Diagram 16 shows a longitudinal section of the testis.

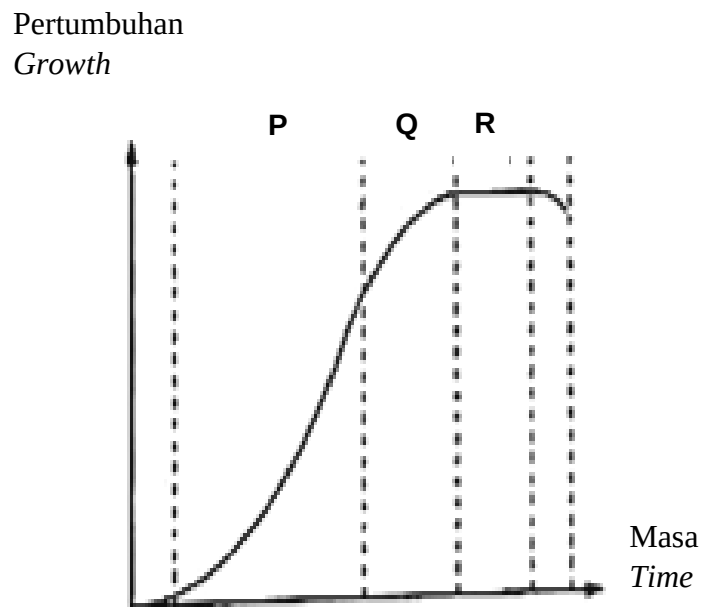


Rajah 16
Diagram 16

Apakah akan berlaku jika struktur X dipotong dan diikat?
What will happen if structure X is cut and tied?

- A** Spermatogenesis direncat
Spermatogenesis is inhibited
- B** Tiada testosteron dihasilkan
No testosterone is produced
- C** Sperma tidak dibebaskan
Sperm are not released
- D** Ciri-ciri seks sekunder lelaki itu berubah
The male's secondary sex characteristics change

- 23 Rajah 17 menunjukkan lengkung sigmoid bagi pertumbuhan suatu organisma.
Diagram 17 shows the sigmoid curve for the growth of an organism.

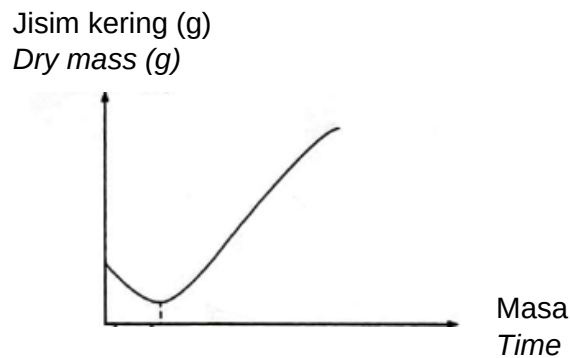


Rajah 17
Diagram 17

Apakah kadar pertumbuhan di bahagian P, Q dan R?
What are the growth rates in parts P, Q and R?

	P	Q	R
A	Perlahan <i>Slow</i>	Cepat <i>Fast</i>	Sifar <i>Zero</i>
B	Cepat <i>Fast</i>	Sifar <i>Zero</i>	Perlahan <i>Slow</i>
C	Sifar <i>Zero</i>	Perlahan <i>Slow</i>	Cepat <i>Fast</i>
D	Cepat <i>Fast</i>	Perlahan <i>Slow</i>	Sifar <i>Zero</i>

- 24 Rajah 18 menunjukkan lengkung pertumbuhan sejenis tumbuhan.
Diagram 18 shows the growth curve of a type of plant.



Rajah 18
Diagram 18

Antara berikut, yang manakah adalah jenis dan contoh tumbuhan tersebut?
Which of the following are the type and example of the plant?

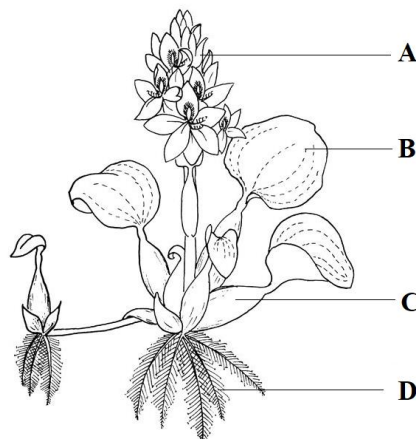
- A Tumbuhan saka contohnya pokok durian
Perennial plants such as durian tree
 - B Tumbuhan semusim contohnya pokok padi
Annual plants such as paddy plant
 - C Tumbuhan dwimusim contohnya kubis
Biennial plant such as cabbage
- 25 Sebuah kilang simen dibina berhampiran kebun limau pekebun X. Selepas sebulan kilang tersebut beroperasi, pekebun X mendapati pokok-pokok ditanamnya layu. Pernyataan yang manakah menerangkan keadaan pokok limau tersebut?

A cement factory was built near a lime orchard of farmer X. After a month of operation, farmer X found the trees he planted wilted.

Which of the following statement explains the condition of the lime trees?

- A kadar respirasi berkurang, kadar pertumbuhan kekal sama
the respiration rate decreases, the growth rate remains the same
- B kadar transpirasi dan kadar fotosintesis berkurang
the transpiration rate and the photosynthesis rate decreases
- C kadar fotosintesis berkurang, kadar respirasi kekal sama
the photosynthesis rate decreases, the respiration rate remains the same
- D kadar pertumbuhan berkurang, kadar transpirasi bertambah
the growth rate decreases, the transpiration rate increases

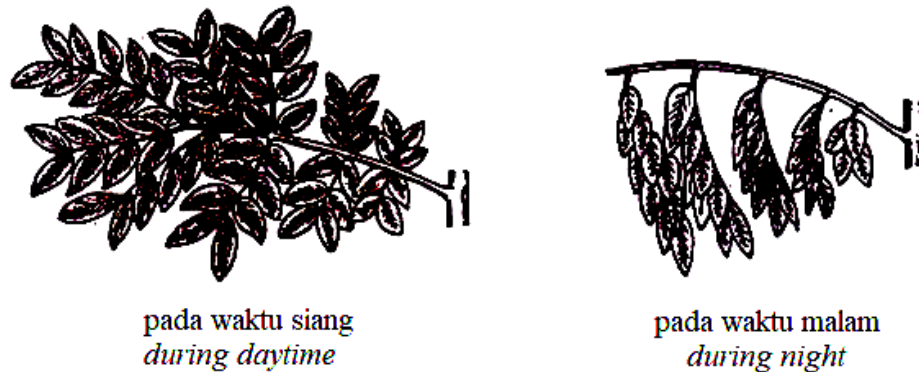
- 26 Antara yang berikut, pernyataan yang manakah betul tentang titik pampasan?
Which of the following statement is correct about compensation point?
- A Nilai keamatan cahaya apabila kadar respirasi bersamaan dengan kadar fotosintesis
Light intensity value when the rate of respiration equals the rate of photosynthesis
 - B Lebih banyak karbon dioksida diserap pada titik pampasan
More carbon dioxide is absorbed at the compensation point
 - C Peningkatan keamatan cahaya selepas titik pampasan menyebabkan kurang kanji disimpan
An increase in light intensity beyond the compensation point causes less starch is stored
 - D Peningkatan keamatan cahaya selepas titik pampasan menyebabkan kadar respirasi bertambah
An increase in light intensity beyond the compensation point causes the rate of respiration to increase
- 27 Antara yang berikut, komponen larutan kultur Knop yang manakah membekalkan nutrien penting dalam sintesis protein tumbuhan?
Which of the following component of Knop's culture solution provides essential nutrients in plant protein synthesis?
- A Magnesium sulfat
Magnesium sulphate
 - B Kalsium nitrat
Calcium nitrate
 - C Ferum (III) fosfat
Ferric phosphate
 - D Air suling
Distilled water
- 28 Rajah 19 menunjukkan sejenis hidrofit yang biasa dijumpai di dalam ekosistem kolam.
Diagram 19 shows a type of hydrophyte commonly found in a pond ecosystem.



Rajah 19
Diagram 19

Antara A, B, C dan D, yang manakah terlibat dalam fitoremediasi?
Which of the following parts A, B, C or D is involved in phytoremediation?

- 29 Rajah 20 menunjukkan keadaan daun tumbuhan legum pada waktu siang dan pada waktu malam.
Diagram 20 shows the condition of the leaves of leguminous plants during the day and at night.



Rajah 20
Diagram 20

Apakah jenis gerak balas tersebut?
What is the type of the response?

- A Fotonasti
Photonasty
- B Niktinasti
Nictinasty
- C Seismonasti
Seismonasty
- D Tigmonasti
Tigmonasty

- 30 Penggunaan racun serangga secara meluas di ladang kelapa sawit telah menyebabkan pengeluaran hasil tanaman kelapa sawit berkurang.
The widespread use of insecticides in oil palm plantations has caused the production of oil palm crops to decrease.

Pernyataan yang manakah menerangkan keadaan tersebut?
Which of the following statement explains the condition?

- A Populasi kumbang kepala sawit yang menjadi agen pendebungaan bertambah
The population of the oil palm beetles which is the pollination agent increases
- B Kurang debunga dipindahkan oleh kumbang kelapa sawit ke atas stigma
Less pollen is transferred by oil palm beetles on the stigma
- C Racun serangga menghalang rembesan larutan sukrosa di atas permukaan stigma
The insecticide inhibits the secretion of sucrose solution on the surface of the stigma
- D Racun serangga menghalang pembentukan tiub debunga
Insecticides prevent the formation of pollen tubes

31 Rajah 21 menunjukkan sejenis tumbuhan.

Diagram 21 shows a type of plant.



Rajah 21
Diagram 21

Apakah keadaan habitatnya?

What is the condition of its habitat?

- A** berair dan lembap
watery and moist
- B** gurun dan kering
dessert and dry
- C** berkepekatan garam yang tinggi dan kurang oksigen
high salt concentration and less oxygen
- D** tidak terlalu kering dan lembap
not too dry and wet

- 32 Pernyataan di bawah menunjukkan peranan salah satu mikroorganisma dalam kitar nitrogen.

Statement below shows the role of one of the microorganisms in the nitrogen cycle.

Mikroorganisma T bertindak untuk mengurai bahan buangan haiwan.
Microorganism T act to break down animal waste materials.

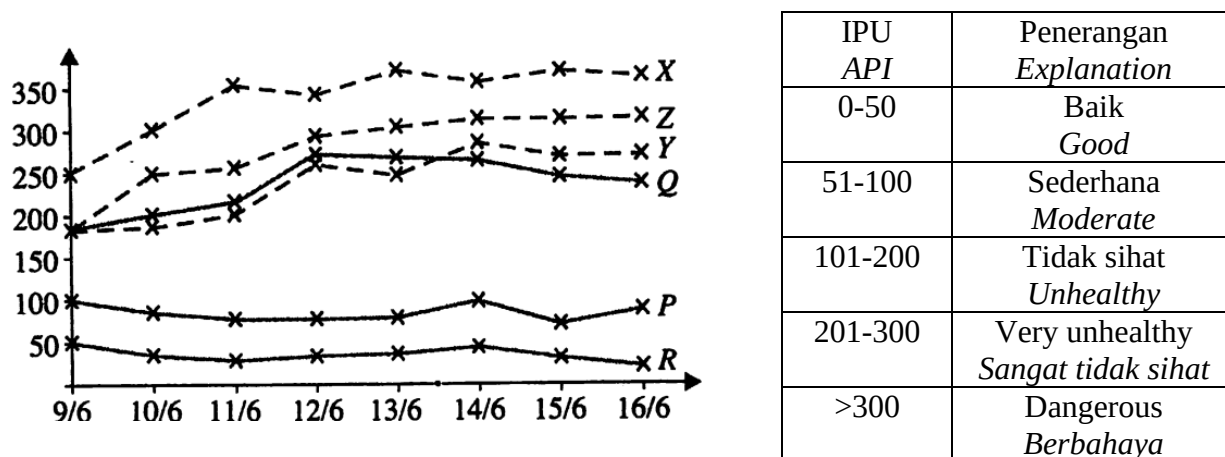
Antara yang berikut, yang manakah merupakan kesan jangka pendek sekiranya tiada mikroorganisma T?

Which of the following is a short-term effect in the absence of microorganism T?

- A** Nitrogen daripada atmosfera tidak dapat ditukar kepada ion ammonium
Nitrogen from the atmosphere cannot be converted to ammonium ions
- B** Sebatian protein di dalam tisu badan haiwan yang mati tidak dapat diurai melalui proses ammonifikasi
Protein compound in body tissues of dead animals cannot be decomposed through the ammonification process.
- C** Ion ammonium tidak dapat ditukar kepada ion nitrit melalui proses nitrifikasi
Ammonium ions cannot be converted to nitrite ions through the nitrification process
- D** Proses pendennitritan tidak dapat berlaku
The denitrification process cannot occur
- 33 Antara yang berikut, yang manakah merupakan nutrisi autotrof?
Which of the following is an autotrophic nutrition?
- A** Saprotrof
Saprotrophic
- B** Holozoik
Holozoic
- C** Kemoautotrof
Chemoautotrophic
- D** Parasit
Parasitic
- 34 Seorang saintis ingin menentukan taburan spesis pokok meranti (*Shorea* sp.) di Taman Negara.
Antara yang berikut, kaedah yang manakah paling sesuai digunakan?
A scientist wants to determine the distribution of meranti tree species (Shorea sp.) in Taman Negara.
Which of the following method is the most suitable to use?
- A** Pengiraan satu persatu
Direct counting
- B** Menggunakan kuadrat 50m x 50m
Using quadrat 50m x 50m
- C** Menggunakan kuadrat 1m x 1m
Using quadrat 1m x 1m
- D** Menggunakan kuadrat 10cm x 10cm
Using quadrat 10cm x 10cm

- 35 Rajah 22 menunjukkan Indeks Pencemaran Udara (IPU) untuk bandar P, Q, R di negeri A dan bandar X, Y dan Z di negeri B.

Diagram 22 shows the Air Pollution Index (API) for cities P, Q and R in state A and cities X, Y and Z in state B.



Rajah 22
Diagram 22

Berdasarkan maklumat daripada graf, pernyataan manakah adalah betul?

Based on the information from the graph, which statement is correct?

- A Bandar-bandar di negeri B mempunyai tahap pencemaran udara lebih rendah berbanding bandar-bandar di negeri A.
Cities in state B have lower levels of air pollution than cities in state A.
- B Bandar R mempunyai tahap pencemaran udara paling tinggi.
City R has the highest level of air pollution.
- C Pelbagai kempen telah dijalankan di bandar Q bagi mengurangkan tahap pencemaran udara.
Various campaigns have been carried out in city Q to reduce the level of air pollution
- D Aktiviti pembakaran terbuka adalah terkawal di bandar X.
Open burning activities are controlled in city X.

36 Jadual 1 menunjukkan istilah-istilah yang berkaitan dengan pengurusan ekosistem.

Table 1 shows the terms that are related to ecosystem management.

Istilah Term	Penerangan Explanation
K	Usaha-usaha membaik pulih sumber-sumber alam sekitar <i>Efforts to restore environmental resources</i>
L	Usaha-usaha melindungi komponen-komponen dalam suatu ekosistem <i>Efforts to protect the components of an ecosystem</i>

Jadual 1

Table 1

Apakah **K** dan **L**?

*What are **K** and **L**?*

	K	L
A	Pemulihan ekosistem <i>Ecosystem restoration</i>	Pemeliharaan ekosistem <i>Ecosystem preservation</i>
B	Pemuliharaan ekosistem <i>Ecosystem conservation</i>	Pemulihan ekosistem <i>Ecosystem restoration</i>
C	Pemulihan ekosistem <i>Ecosystem restoration</i>	Pemuliharaan ekosistem <i>Ecosystem conservation</i>
D	Pemuliharaan ekosistem <i>Ecosystem conservation</i>	Pemeliharaan ekosistem <i>Ecosystem preservation</i>

37 Jadual 2 menunjukkan keputusan bagi tiga kacukan monohibrid yang dilakukan oleh Mendel antara pokok-pokok kacang pis, *Pisum sativum*.

Table 2 shows the results for three monohybrid crosses that were carried out by Mendel between pea plants, Pisum sativum.

Ciri <i>Characteristics</i>	Trait <i>Traits</i>	
	Dominan <i>Dominant</i>	Resesif <i>Recessive</i>
Bentuk biji benih <i>Seed shape</i>	Y bulat <i>Y round</i>	1850 berkedut <i>1850 constricted</i>
Kedudukan bunga <i>Flower position</i>	651 aksial <i>651 axial</i>	207 terminal <i>207 terminal</i>
Warna pod <i>Pod colour</i>	428 hijau <i>428 green</i>	Z kuning <i>Z yellow</i>

Jadual 2
Table 2

Hitung dan tentukan nilai yang sesuai bagi **Y** dan **Z**.

Calculate and determine the suitable values for Y and Z.

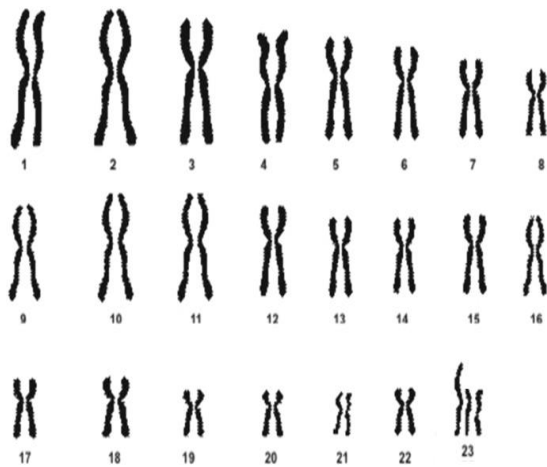
	Y	Z
A	5474	101
B	5474	152
C	7289	101
D	7289	152

38 Antara yang berikut, pasangan penyakit genetik yang manakah disebabkan oleh gen terangkai seks?
Which of the following pair of genetic diseases is caused by sex-linked genes?

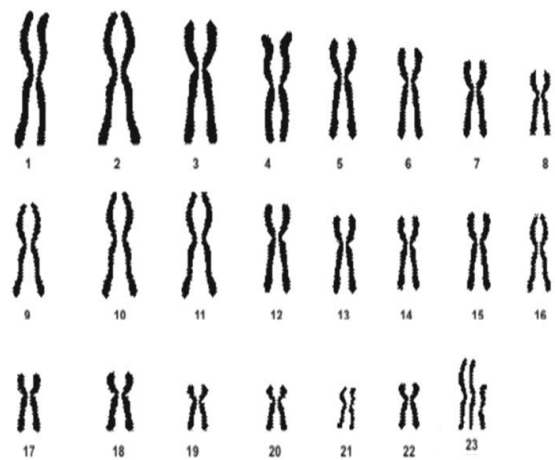
- A** Albinisme dan anemia sel sabit
Albinism and sickle cell anaemia
- B** Talasemia dan sistik fibrosis
Thalassemia and cystic fibrosis
- C** Hemofilia dan buta warna
Haemophilia and colour blindness
- D** Sindrom Turner dan sindrom Cri du chat
Turner syndrome and Cri du chat syndrome

39 Rajah 23(a) dan Rajah 23(b) menunjukkan kariotip bagi dua individu yang mempunyai penyakit genetik.

Diagram 23(a) and Diagram 23(b) show the karyotypes of two individuals with genetic diseases.



Rajah 23(a)
Diagram 23(a)



Rajah 23(b)
Diagram 23(b)

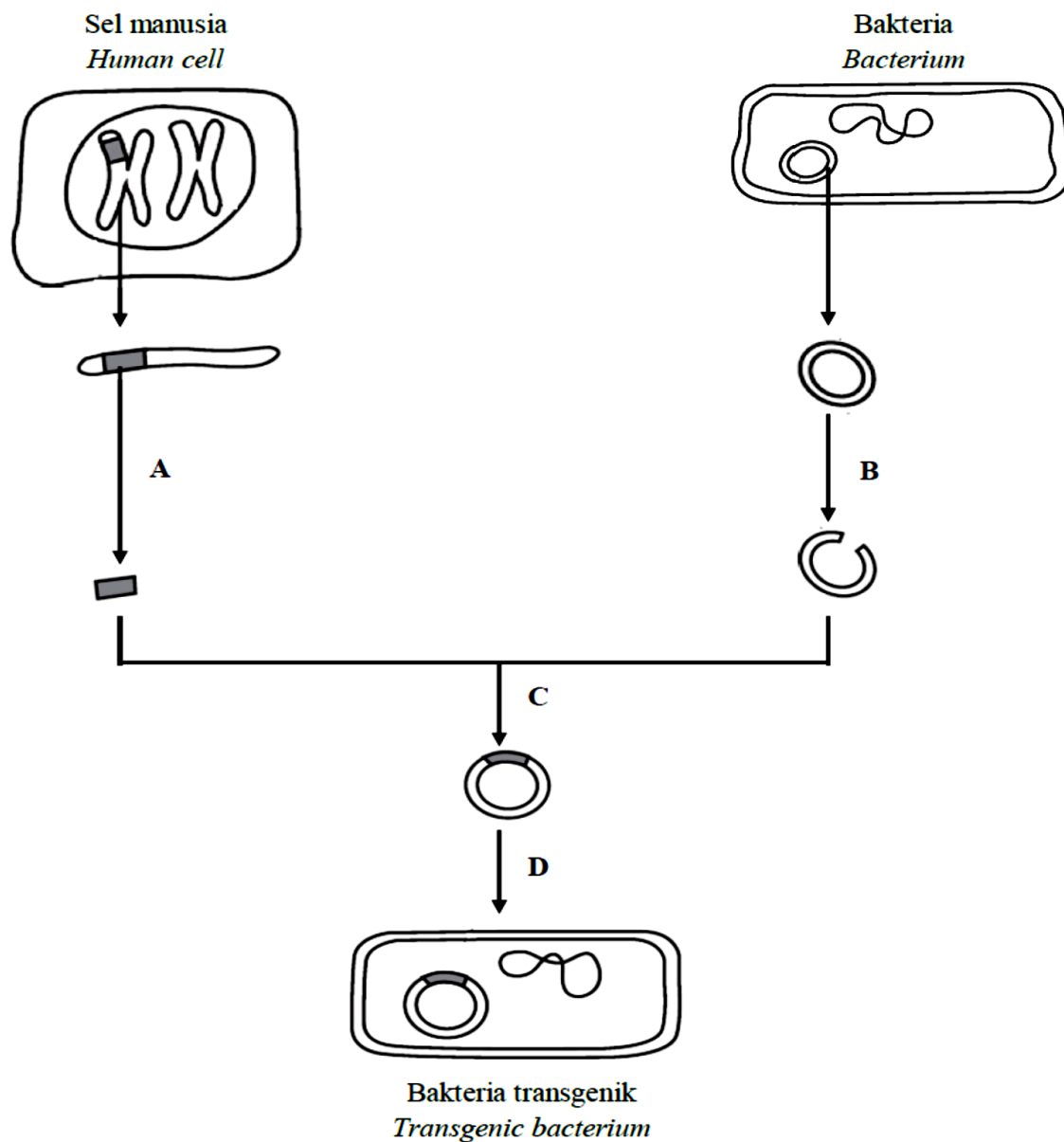
Apakah persamaan antara kedua-dua penyakit genetik tersebut?

What are the similarities between both genetic diseases?

- I Keabnormalan dalam kromosom seks
Abnormalities in sex chromosomes
- II Berlaku akibat tak disjungsi
Occurs due to nondisjunction
- III Individual adalah mandul
Individuals are sterile
- IV Disebabkan oleh mutasi gen
Caused by gene mutation

- A** I dan II
I and II
- B** I dan III
I and III
- C** II dan IV
II and IV
- D** III dan IV
III and IV

- 40 Rajah 24 menunjukkan beberapa langkah yang terlibat dalam teknik kejuruteraan genetik.
Diagram 24 shows some of the steps that are involved in genetic engineering technique.



Rajah 24
Diagram 24

Antara langkah A, B, C dan D, yang manakah melibatkan penggunaan enzim DNA ligase?
Which of the steps A, B, C or D, that involves the use of DNA ligase enzyme?

KERTAS PEPERIKSAAN TAMAT
END OF QUESTION PAPER