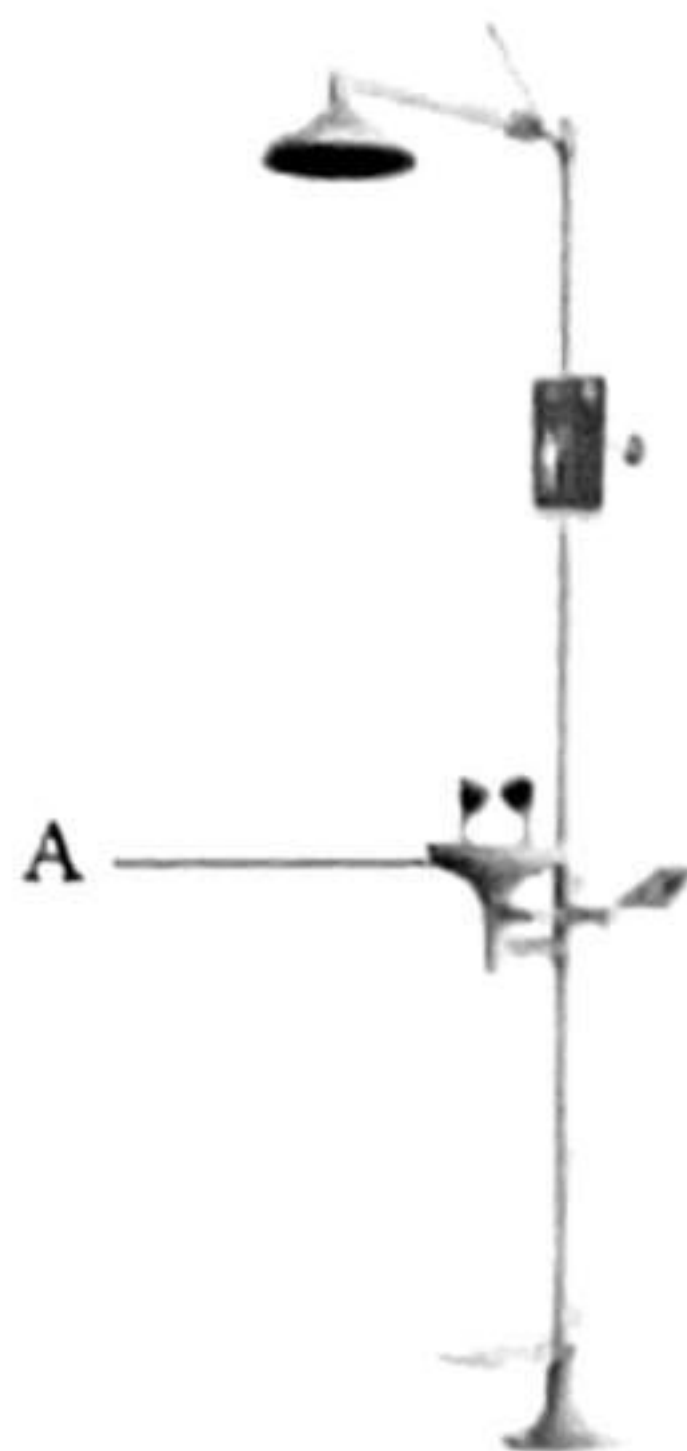


Jawab **semua** soalan.

Answer **all** questions.

1. Rajah 1 menunjukkan satu peralatan perlindungan diri yang terdapat di dalam makmal.

Diagram 1 shows a piece of personal protective equipment found in a laboratory.



Rajah 1

Diagram 1

Apakah nama bahagian yang berlabel A?

What is the name of the part labeled A?

A. Kebuk wasap

Fume hood

B. Stesen pencuci mata

Eyewash station

C. Stesen pancuran kecemasan

Emergency shower station

2. Rajah 2 menunjukkan satu langkah semasa menyediakan slaid sel bawang.

Diagram 2 shows a step in preparing onion cell slides.



Rajah 2

Diagram 2

Mengapakah penutup slaid kaca perlu diletakkan pada sudut 45° secara perlahan-lahan?

Why does the glass cover need to be placed at a 45° angle slowly?

- A. Untuk mengelakkan epidermis bawang berlipat.

To prevent the onion epidermis from folding.

- B. Untuk mengelakkan pembentukan gelembung udara di bawah penutup slaid kaca.

To prevent the formation of air bubbles under the glass slide cover.

- C. Untuk mengelakkan menarik titisan iodine supaya mewarnai keseluruhan epidermis bawang.

To avoid drawing iodine drops so that they color the entire onion epidermis.

3. Apakah kesan disfungsi mitokondrion?

What are the effects of mitochondrial dysfunction?

- I. Otot lemah

Weak muscles

- II. Terencat akal

Mental retardation

- III. Masalah penglihatan

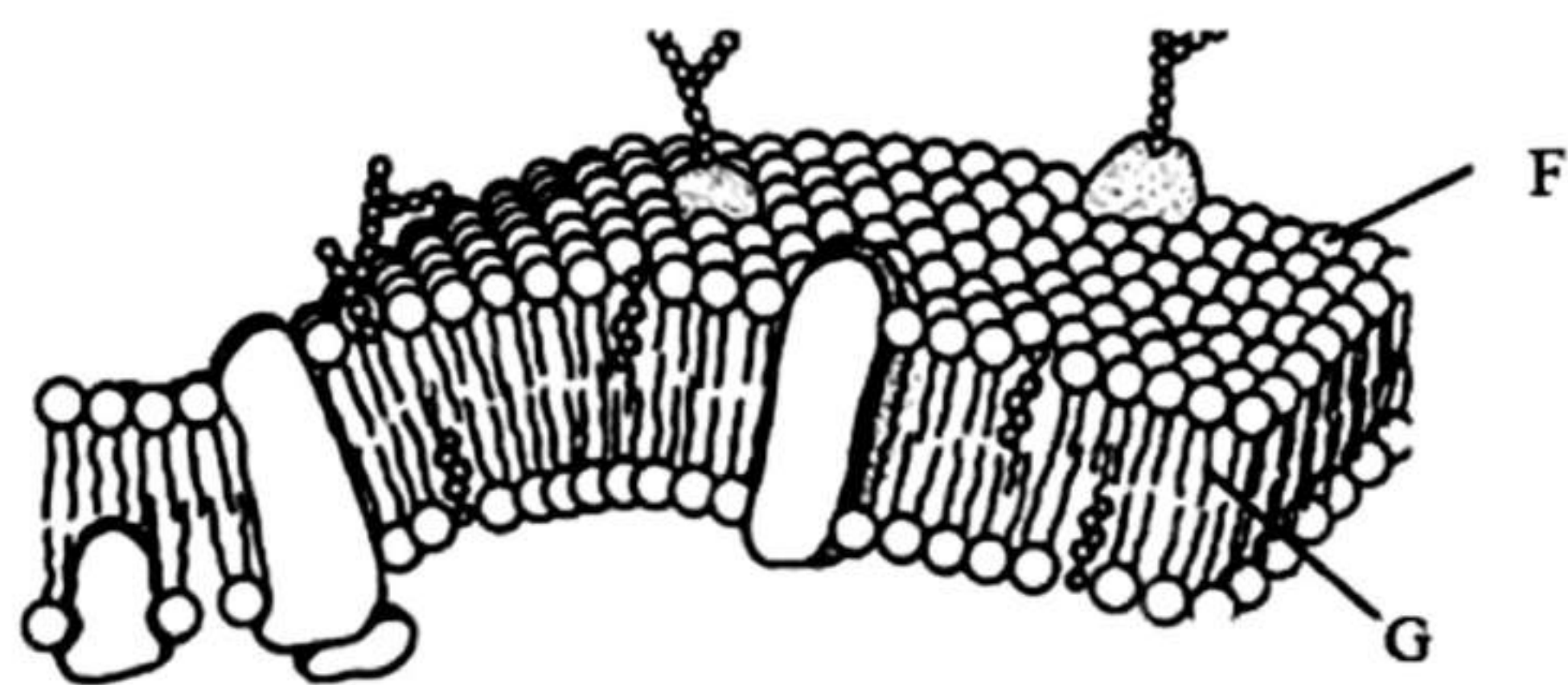
Vision problems

- IV. Pertumbuhan terbantut

Stunted growth

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

4. Rajah 3 menunjukkan dwilapisan fosfolipid.
Diagram 3 shows a phospholipid bilayer.



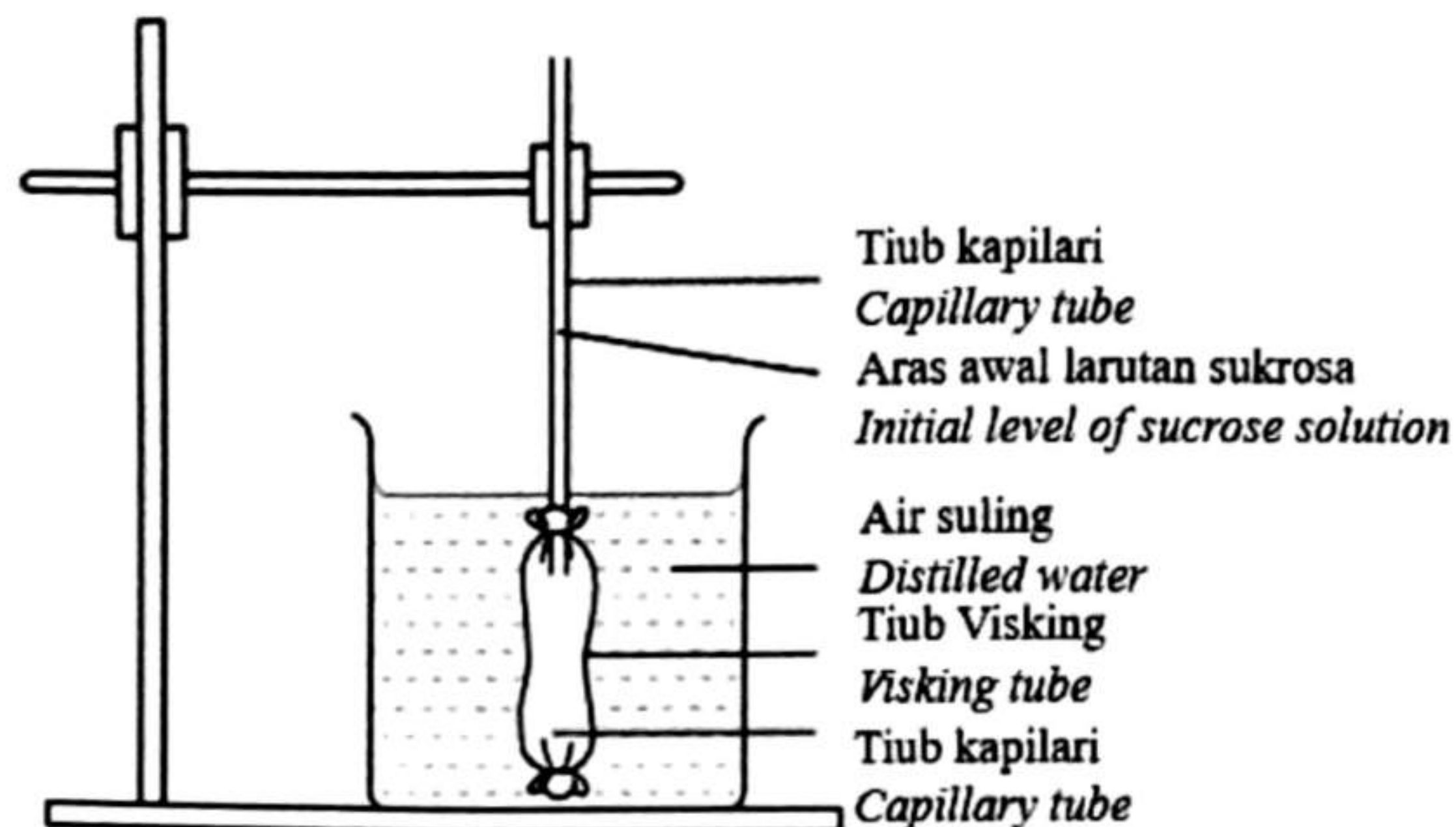
Rajah 3
Diagram 3

Padanan yang manakah benar tentang struktur F dan G?
Which match is correct about the structures of F and G?

	F	G
A.	Berkutub <i>Polarized</i>	Tidak berkutub <i>Non polarized</i>
B.	Tidak berkutub <i>Non polarized</i>	Berkutub <i>Polarized</i>
C.	Hidrofobik <i>Hydrophobic</i>	Hidrofilik <i>Hydrophilic</i>
D.	Tidak tertarik kepada air <i>Not attracted to water</i>	Tertarik kepada air <i>Attracted to water</i>

5. Rajah 4 menunjukkan susunan radas bagi eksperimen mengkaji pergerakan bahan melalui tiub Visking.

Diagram 4 shows the arrangement of the apparatus for an experiment studying the movement of matter through a Visking tube.



Rajah 4

Diagram 4

Selepas 5 minit, didapati aras akhir larutan sukrosa meningkat. Apakah yang akan diperhatikan sekiranya tiub Visking digantikan dengan plastik aiskrim?

After 5 minutes, it was found that the final level of the sucrose solution increased.

What would be observed if the Visking tube was replaced with ice cream plastic?

- A. Aras larutan sukrosa tidak berubah

The level of sucrose solution does not change

- B. Aras akhir larutan sukrosa meningkat

The final level of the sucrose solution increases

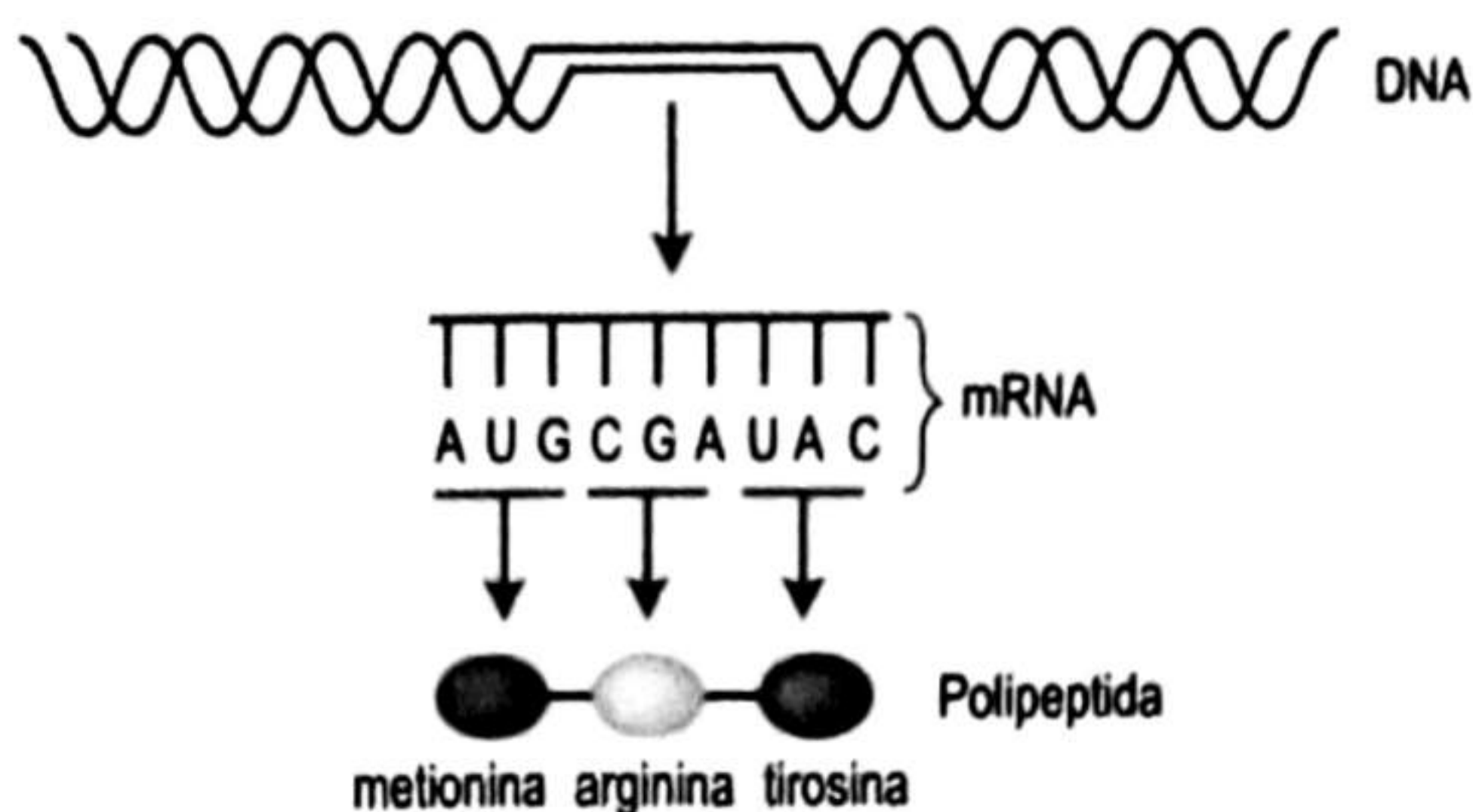
- C. Aras akhir larutan sukrosa menurun

The final level of sucrose solution decreases

- D. Aras akhir air suling di dalam bikar menurun

The final level of distilled water in the beaker decreases

6. Rajah 5 menunjukkan proses sintesis polipeptida yang membentuk protein.
Diagram 5 shows the process of polypeptide synthesis that forms proteins.



Rajah 5

Diagram 5

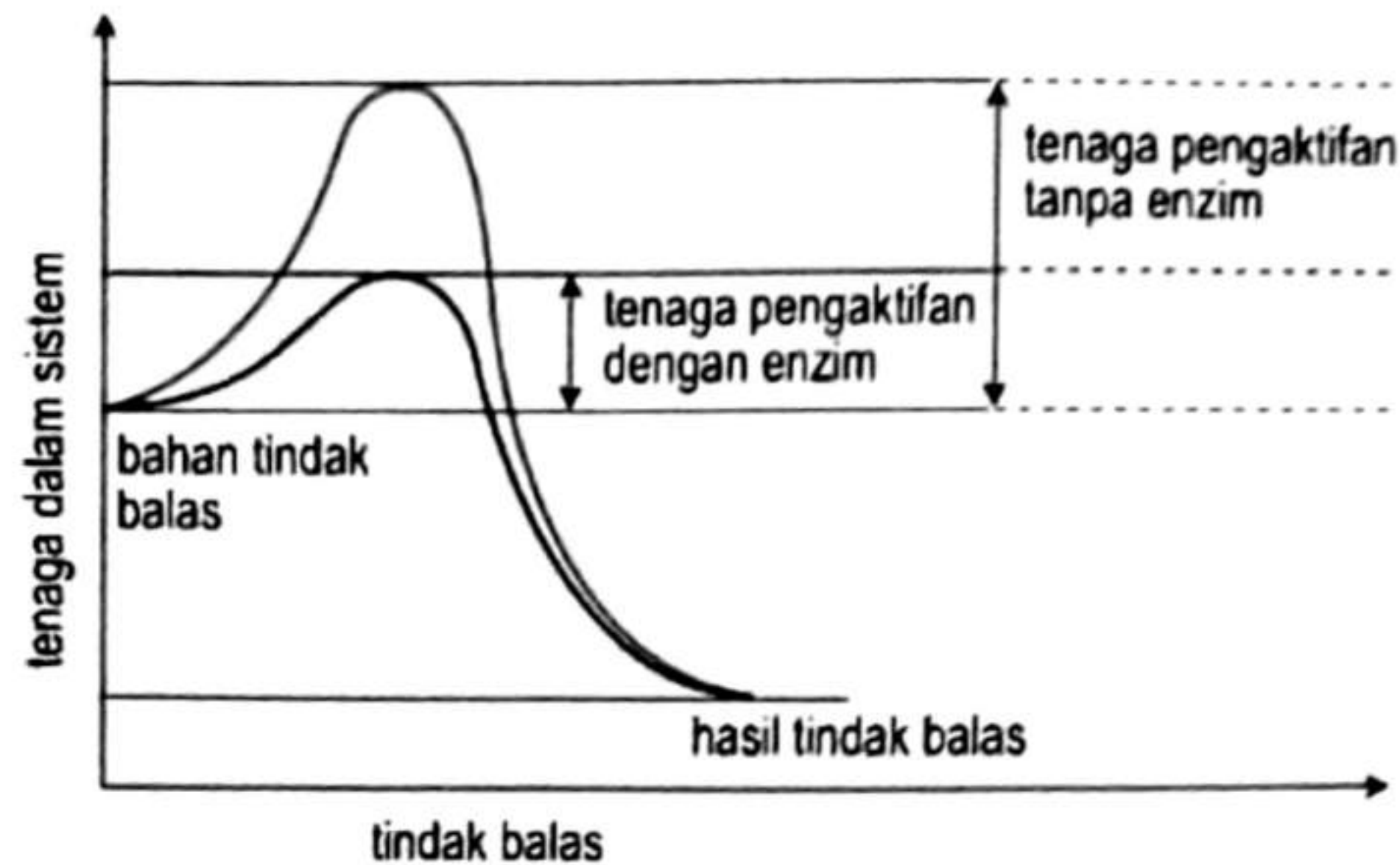
Berdasarkan Rajah 5, apakah kesan sekiranya DNA terurai?

Based on Diagram 5, what would be the effect if DNA breaks down?

- I. Kodon dibentuk
Codons are formed
 - II. Proses transkripsi tidak berlaku
Transcription does not occur
 - III. Proses translasi tidak berlaku
Translation does not occur
 - IV. Rantai polipeptida disintesis
Polypeptide chains are synthesized
- A. I dan II
I and II
 - B. II dan III
II and III
 - C. III dan IV
III and IV
 - D. I dan IV
I and IV

7. Rajah 6 menunjukkan graf perubahan tenaga bagi satu tindak balas metabolik dengan dan tanpa kehadiran enzim.

Diagram 6 shows a graph of energy change for a metabolic reaction with and without the presence of enzymes.



Rajah 6

Diagram 6

Seorang murid mendapati bahawa penghasilan produk meningkat dengan cepat apabila enzim ditambah walaupun suhu eksperimen malar.

Apakah penerangan terbaik bagi pemerhatian tersebut?

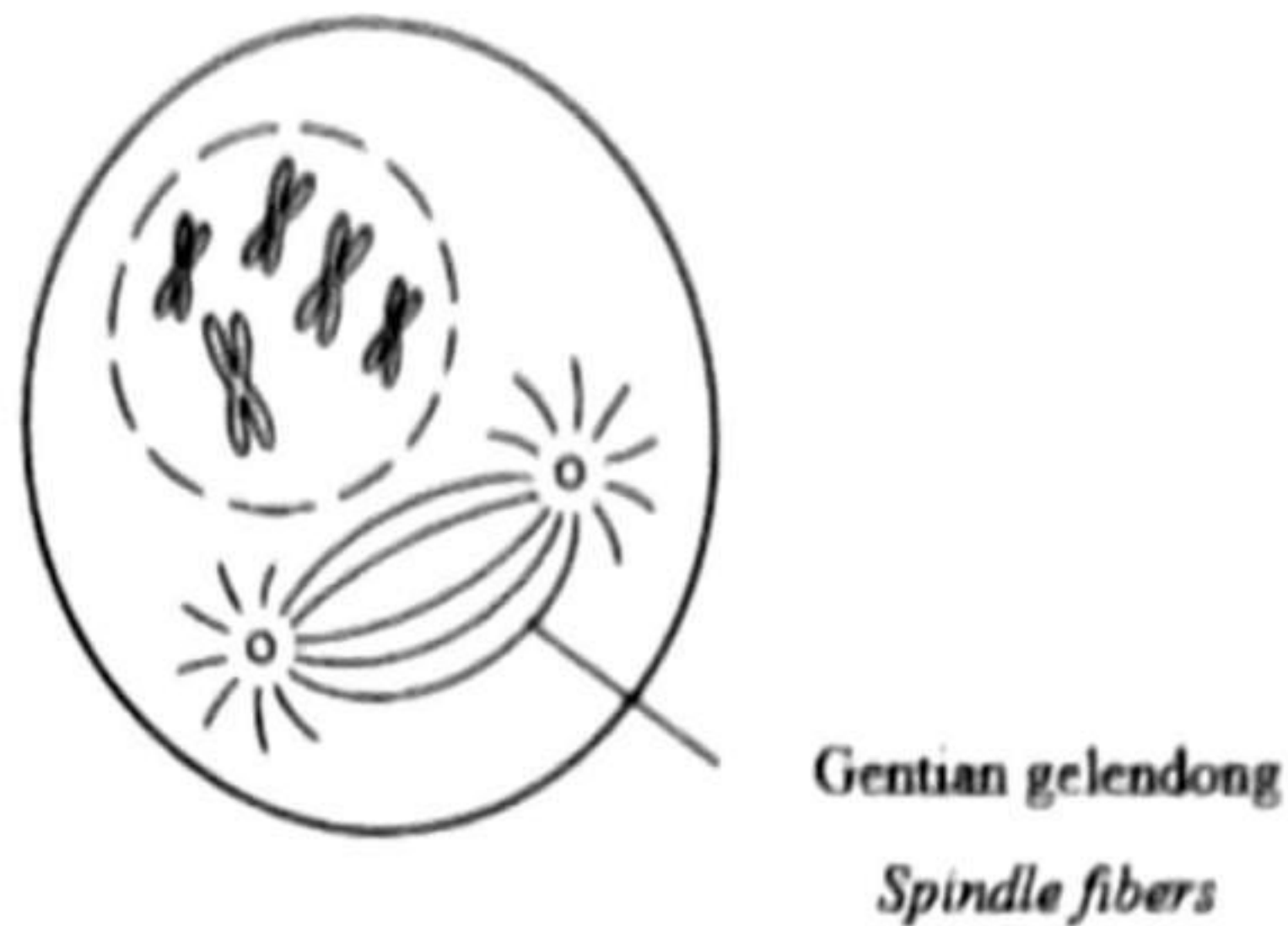
A student found that product production increased rapidly when enzymes were added even though the experimental temperature was constant.

What is the best explanation for this observation?

- A. Enzim meningkatkan tenaga kinetik molekul substrat
Enzymes increase the kinetic energy of the substrate molecule
- B. Enzim meningkatkan kandungan tenaga produk
Enzymes increase the energy content of the product
- C. Enzim menurunkan tenaga pengaktifan tindak balas
Enzymes decrease the activation energy of the reaction
- D. Enzim membekalkan tenaga haba kepada produk
Enzymes provide heat energy to the product

8. Rajah 7 menunjukkan satu fasa dalam proses mitosis.

Diagram 7 shows a phase in the mitosis process.



Rajah 7

Diagram 7

Apakah fungsi gentian gelendong?

What is the function of spindle fibers?

- A. Menghasilkan tenaga untuk pembahagian sel
Produce energy for cell division
- B. Mengawal pertukaran bahan merentasi membran plasma
Control the exchange of materials across the plasma membrane
- C. Membentuk membran nukleus semasa pembahagian sel
Form the nuclear membrane during cell division
- D. Menarik kromosom atau kromatid ke kutub bertentangan sel
Pull chromosomes or chromatids to opposite poles of the cell

9.

Seorang kanak-kanak telah dilahirkan dengan simptom seperti pertumbuhan terbantut, kerencatan mental, mata sepet dan lidah sedikit terjelir.

A child was born with symptoms such as stunted growth, mental retardation, small eyes and a slightly protruding tongue.

Berdasarkan pernyataan, manakah merupakan punca yang menyebabkan penyakit tersebut?

Based on the statement, which is the cause of the disease?

A. Gentian gelendong mengalami kecacatan

Spindle fibers are defective

B. Kromosom homolog gagal terpisah semasa metafasa I

Homologous chromosomes fail to separate during metaphase I

C. Kromatid kembar gagal terpisah semasa anafasa II

Sister chromatids fail to separate during anaphase II

D. Persenyawaan antara gamet yang mempunyai bilangan kromosom tidak normal iaitu 22+XX dengan 22+Y

Fertilization between gametes that have an abnormal number of chromosomes, namely 22+XX and 22+Y

10.

Respirasi sel ialah proses pengoksidaan molekul organik melalui beberapa peringkat bagi membebaskan tenaga.

Cellular respiration is the process of oxidizing organic molecules through several stages to release energy.

Berdasarkan pernyataan di atas, berapakah nilai tenaga yang dihasilkan semasa respirasi aerob?

Based on the statement above, what is the value of the energy produced during aerobic respiration?

A. 150 kJ

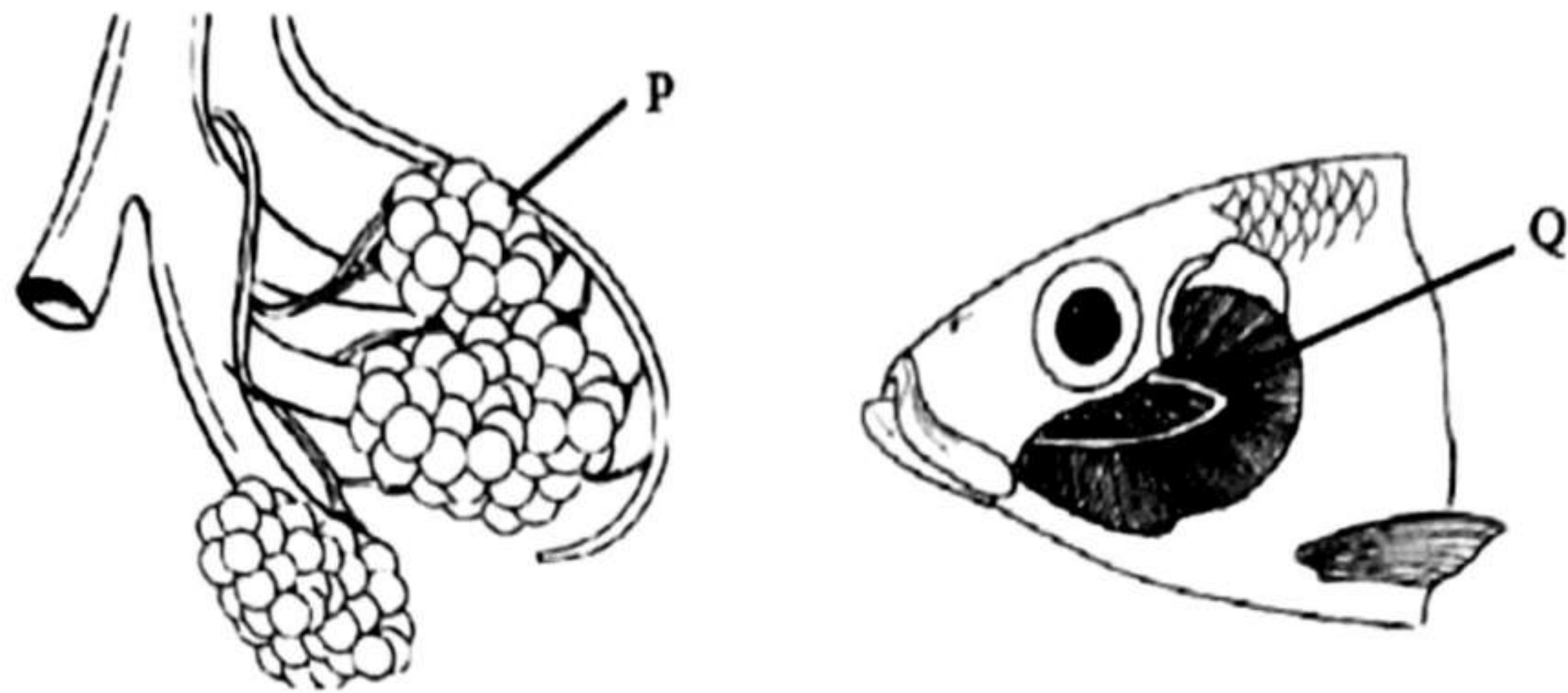
B. 210 kJ

C. 2898 kJ

D. 2989 kJ

11. Rajah 8 menunjukkan struktur respirasi bagi manusia dan ikan.

Diagram 8 shows respiratory structure of human and fish.



Rajah 8

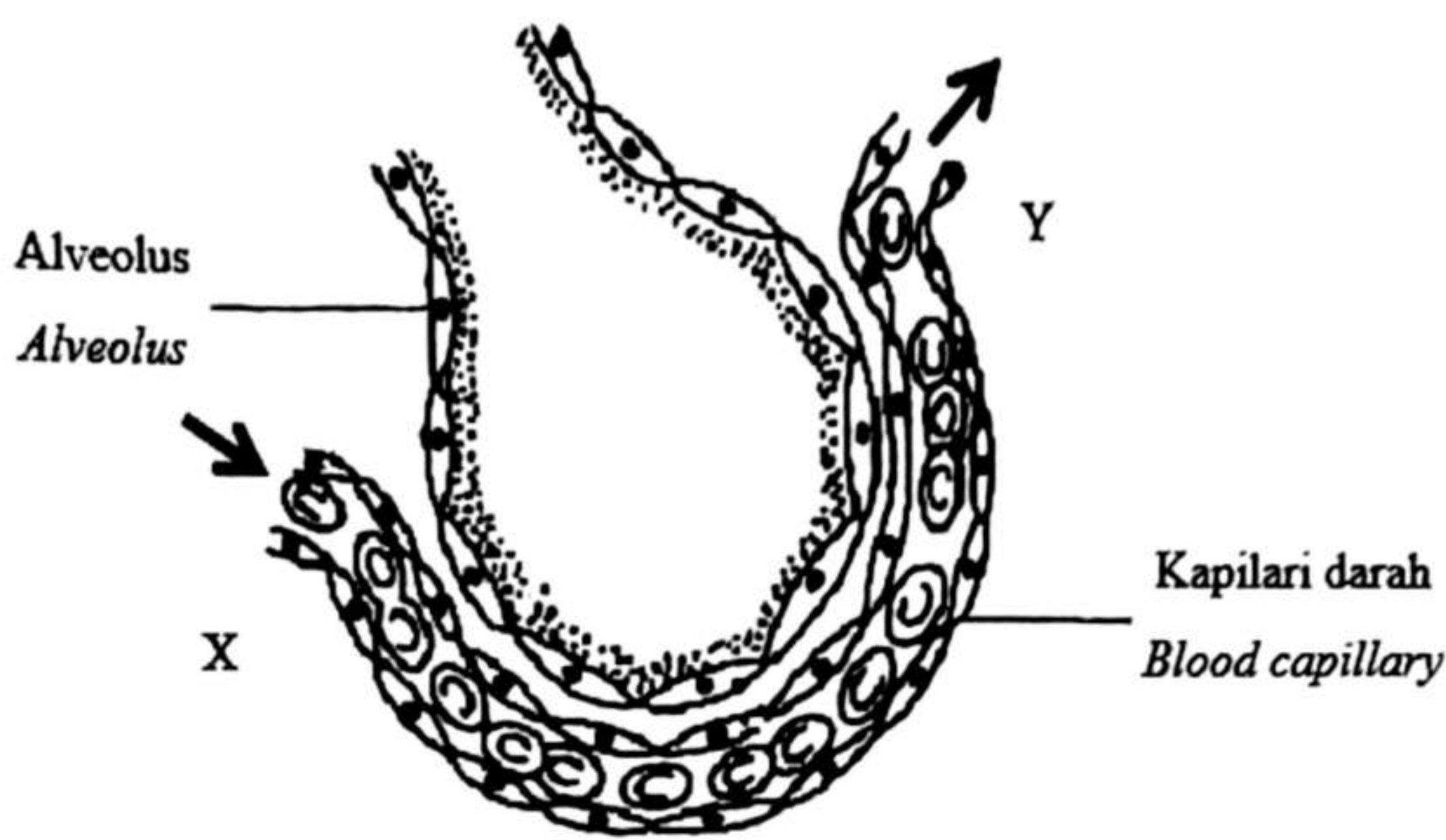
Diagram 8

Antara yang berikut, persamaan yang manakah betul tentang P dan Q?

Which of the following similarities about P and Q is correct

- A. Nipis untuk memastikan gas respirasi dapat melarut di dalamnya.
Thin to ensure the respiratory gases able to dissolve inside it.
- B. Sentiasa lembap untuk resapan gas berlaku dengan cepat
Always moist for diffusion of gases occurs quickly
- C. Dikelilingi kapilari darah untuk mempercepatkan pengangkutan gas respirasi
Surrounded by blood capillaries to speed up the transportation of respiratory gases
- D. Jumlah luas permukaan yang kecil untuk meningkatkan kecekapan pertukaran gas
Small total surface area to increase the efficiency of gases exchange.

12. Rajah 9 menunjukkan satu alveolus dan kapilari darah.
Diagram 9 shows an alveolus and blood capillary.



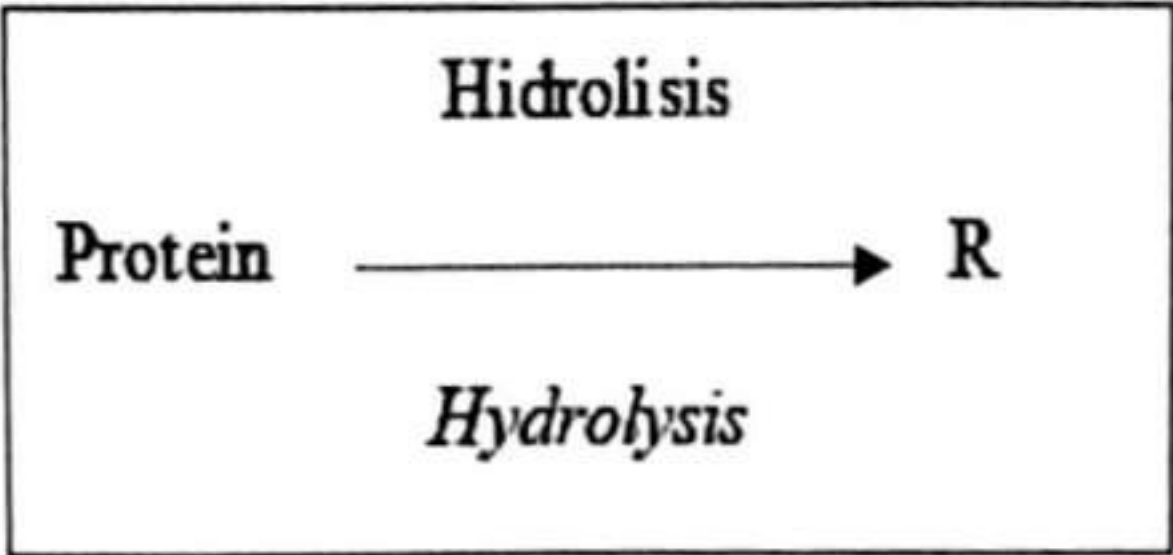
Rajah 9
Diagram 9

Antara yang berikut, padanan manakah yang betul mengenai tekanan separa oksigen di X dan Y?
Which of the following matches is correct oxygen partial pressure at X and Y?

	X	Y
A	Rendah <i>Low</i>	Rendah <i>Low</i>
B	Rendah <i>Low</i>	Tinggi <i>High</i>
C	Tinggi <i>High</i>	Rendah <i>Low</i>
D	Tinggi <i>High</i>	Tinggi <i>High</i>

13. Maklumat berikut menunjukkan suatu proses yang berlaku dalam organ Q dalam sistem pencernaan manusia.

The following information shows a process that occurs in Q in the human digestive system.

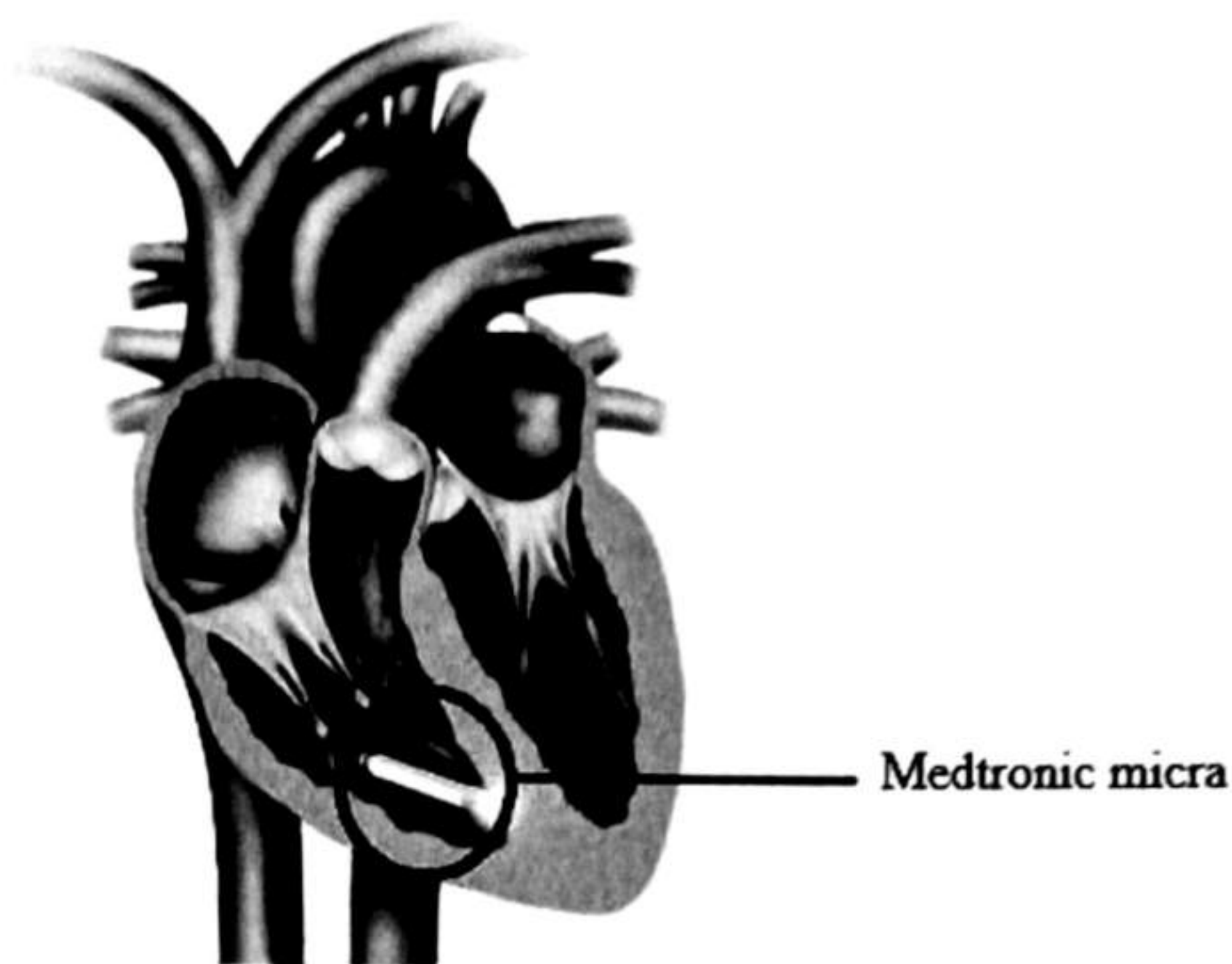


Organ Q
Organ Q

Apakah Q dan R?
What are Q and R?

	Q	R
A	Perut <i>Stomach</i>	Poliipeptida <i>Polypeptide</i>
B	Duodenum <i>Duodenum</i>	Peptida <i>Peptide</i>
C	Ileum <i>Ileum</i>	Poliipeptida <i>Polypeptide</i>

14. Rajah 10 menunjukkan perentak jantung *Medtronic micra* yang diletakkan dalam jantung.
Diagram 10 shows a Medtronic micra pacemaker which is placed in heart.



Rajah 10

Diagram 10

Apakah tujuan meletakkan *Medtronic micra* dalam jantung?

What is the purpose of placing Medtronic micra in heart?

- A. Untuk meningkatkan pengaliran darah ke jantung.

To increase blood flows to the heart.

- B. Untuk meningkatkan denyutan jantung

To increase heartbeat

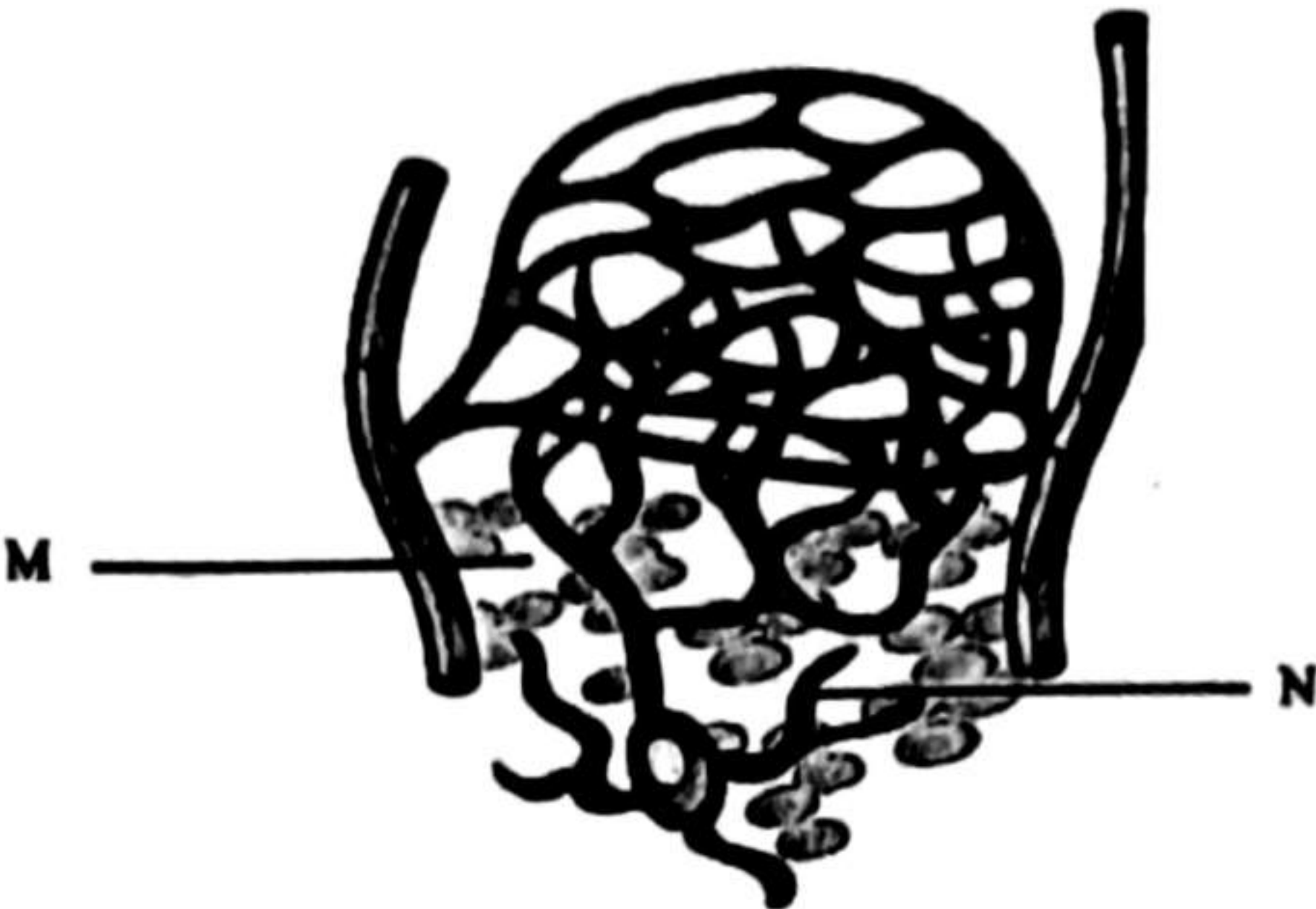
- C. Untuk menjana impuls elektrik di jantung

To initiate electrical impulse in heart

- D. Untuk meningkatkan pengecutan jantung

To increase the contraction of heart

15. Rajah 11 menunjukkan sebahagian daripada sistem peredaran darah dan sistem limfa.
Diagram 11 shows part of the blood circulatory system and lymphatic system.



Rajah 11
Diagram 11

Padanan yang manakah betul tentang bendalir M dan N?
Which match is correct about fluid M and N?

	M	N
A	Mengandungi eritrosit <i>Contain erythrocytes</i>	Tidak mengandungi eritrosit <i>Does not contain erythrocytes</i>
B	Tidak mengandungi protein plasma <i>Does not contain plasma protein</i>	Mengandungi protein plasma <i>Contains plasma protein</i>
C	Kandungan limfosit yang rendah <i>Low content of lymphocytes</i>	Kandungan limfosit yang tinggi <i>High content of lymphocytes</i>
D	Tidak mengandungi platlet <i>Does not contain platelets</i>	Mengandungi platlet <i>Contains platelets</i>

16. Rajah 12 menunjukkan sejenis keimunan yang diperoleh seorang bayi.
Diagram 12 show a type of immunity acquired by a baby.



Rajah 12

Diagram 12

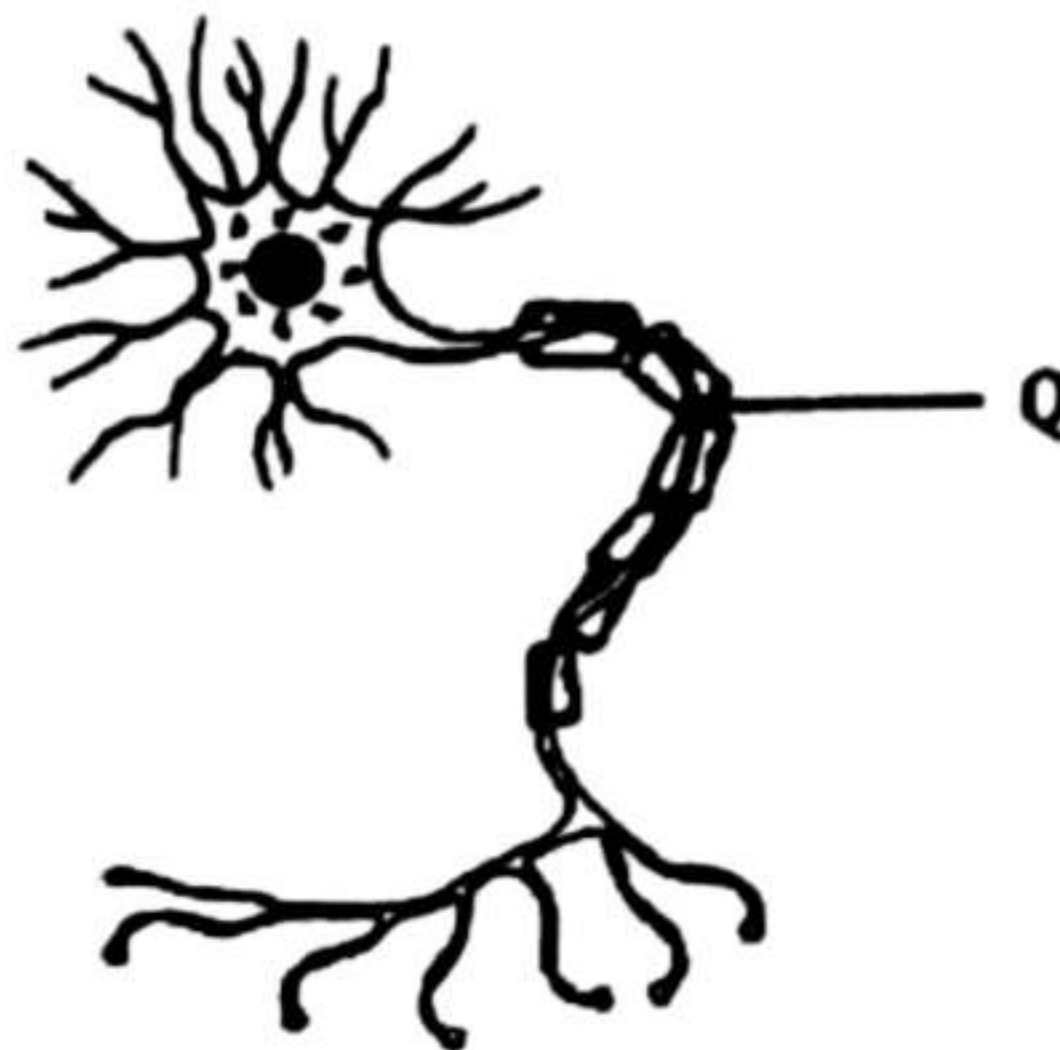
Apakah jenis keimunan tersebut?

What type of immunity is that?

- A. Keimunan aktif buatan
Artificial active immunity
- B. Keimunan pasif buatan
Artificial passive immunity
- C. Keimunan aktif semulajadi
Natural active immunity
- D. Keimunan pasif semulajadi
Natural passive immunity

17. Rajah 13 menunjukkan struktur satu neuron.

Diagram 13 shows the structure of a neurone.



Rajah 13

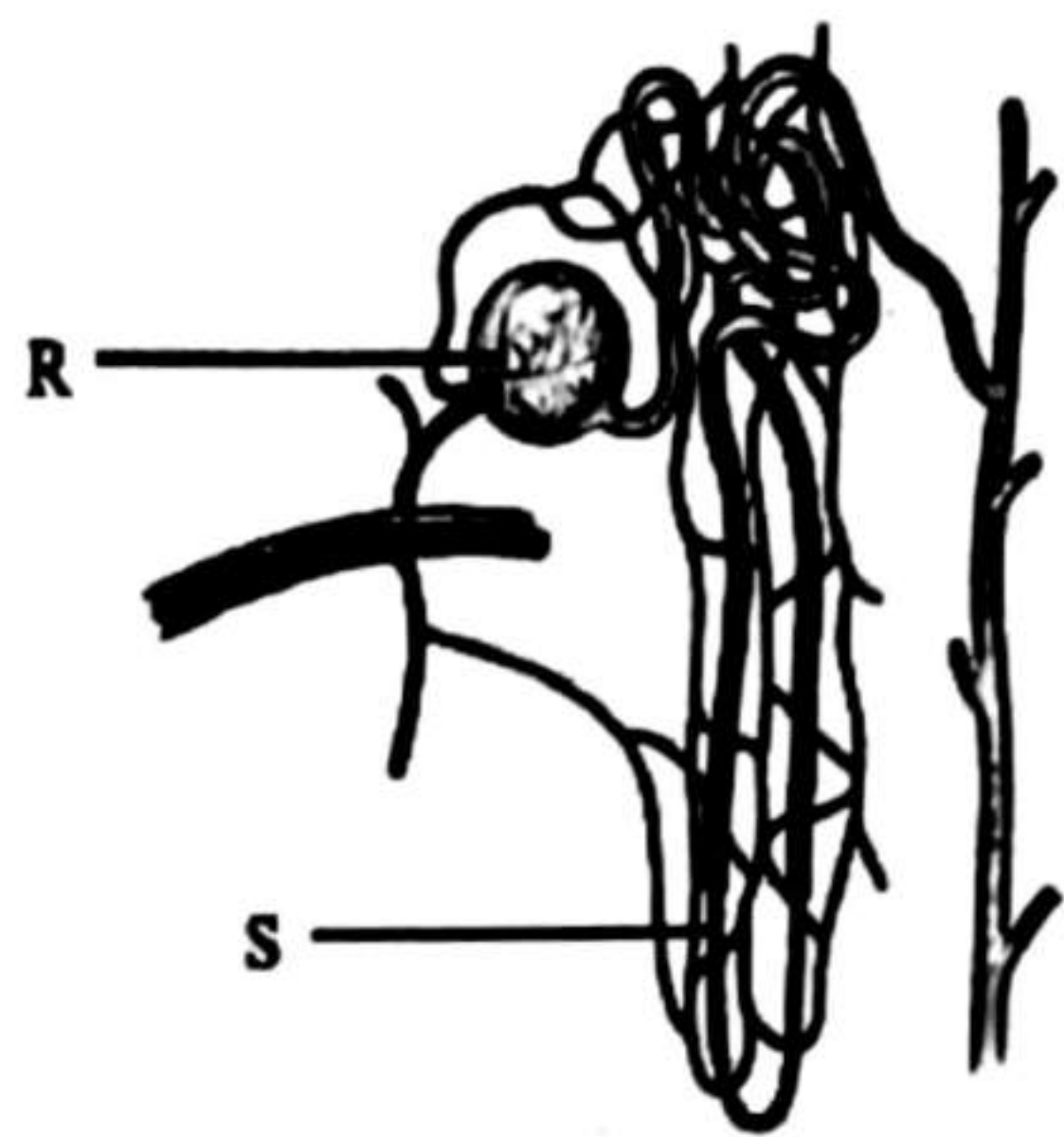
Diagram 13

Apakah fungsi bahagian Q?

What is the function of part Q?

- A. Sebagai pelindung kepada neuron
As protector to the neurone.
- B. Mempercepat pengaliran impuls saraf.
Accelerates the flow of nerve impulses
- C. Sebagai penebat impuls elektrik
As insulator for electrical impulses
- D. Membekalkan nutrien kepada akson
Provides nutrient to axon

18. Rajah 14 menunjukkan struktur nefron pada ginjal.
Diagram 14 show the structure of nephron in the kidney.



Rajah 14
Diagram 14

Padanan yang manakah betul bagi proses yang berlaku dalam R dan S?
Which match is correct for the process that takes place in R and S?

	R	S
A	Rembesan <i>Secretion</i>	Pembentukan air kencing <i>Urine formation</i>
B	Ultraturasan <i>Ultrafiltration</i>	Penyerapan semula <i>Reabsorption</i>
C	Penyerapan semula <i>Reabsorption</i>	Rembesan <i>Secretion</i>
D	Ultraturasan <i>Ultrafiltration</i>	Pembentukan air kencing <i>Urine formation</i>



19. Seorang individu berpuasa semasa menjalankan ujian darah.

Antara yang berikut, pernyataan manakah menerangkan mekanisme kawal atur aras gula dalam darahnya?

An individual is fasting when carrying out blood test.

Which of the following statements explains the mechanism in the regulation of blood sugar level?

- A. Sel alfa Langerhans dirangsang

Alpha Langerhans is stimulated

- B. Hormon insulin dirembeskan

Insulin hormone is secreted

- C. Glikogen disimpan dalam hati

Glycogen is stored in the liver

- D. Respirasi sel dalam otot meningkat

Cellular respiration in muscle increases

20. Rajah 15 menunjukkan turus vertebra manusia.

Diagram 15 shows a human vertebral column.



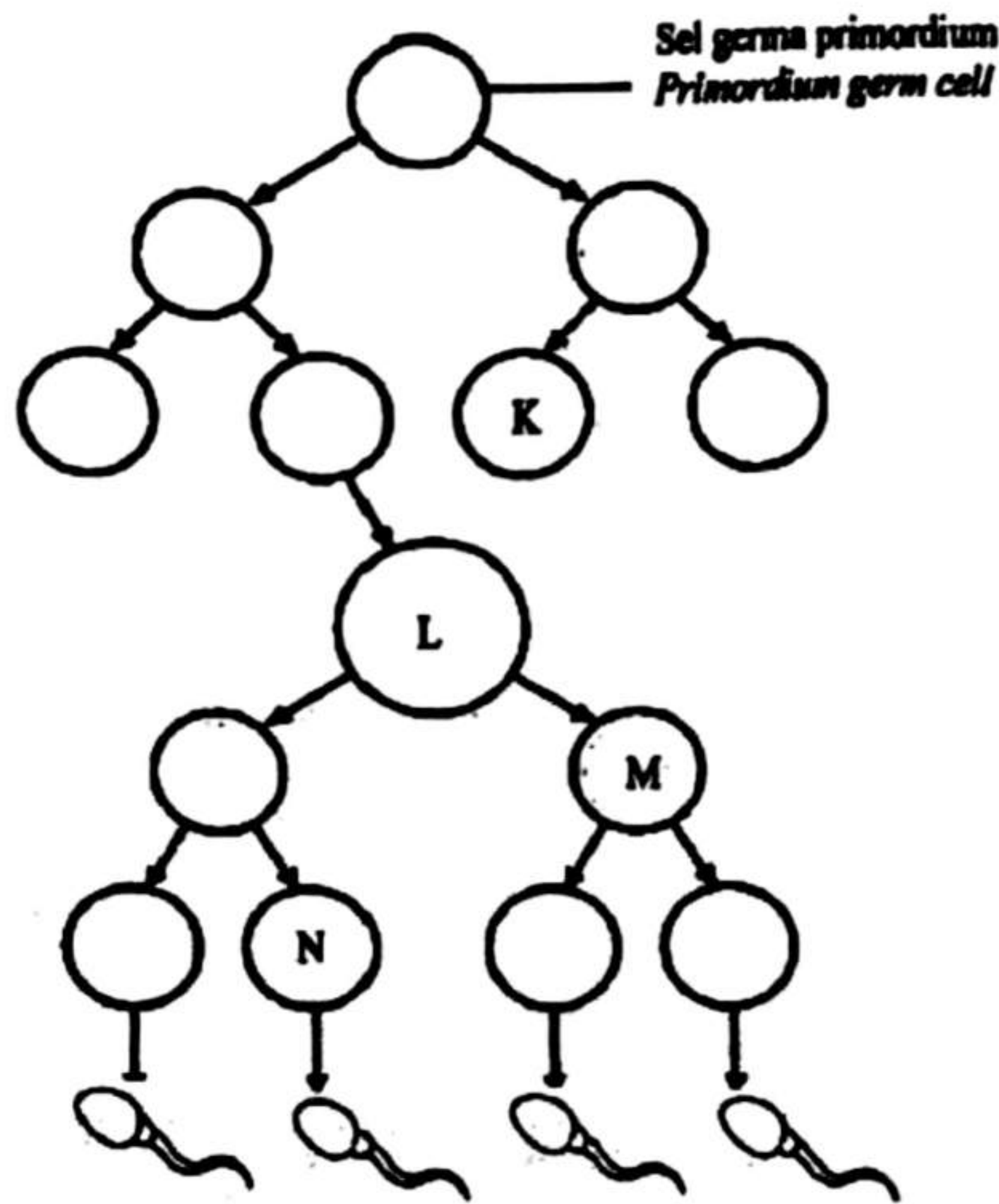
Rajah 15

Diagram 15

Antara yang berikut, yang manakah ialah fungsi bagi struktur P?
Which of the following is the function of structure P?

- A. Menyokong berat badan
Support body weight
- B. Menyokong leher
Support the neck
- C. Menyokong arteri vertebra
Support the vertebral artery
- D. Menyokong tulang rusuk
Support the ribs

21. Rajah 16 menunjukkan proses spermatogenesis.
Diagram 16 shows the spermatogenesis process.



Rajah 16
Diagram 16

Antara yang berikut, sel yang manakah haploid?

Which of the following is haploid?

A. K dan L

K and L

B. L dan M

L and M

C. M dan N

M and N

D. K dan N

K and N

22. Rajah 17 menunjukkan dua keadaan ovari X dan Y. Wanita Y sukar hamil berbanding wanita X.

Diagram 17 shows two conditions of ovary X and Y. Woman Y is difficult to get pregnant than woman X.



Wanita X

Woman X



Wanita Y

Woman Y

Rajah 17

Diagram 17

Antara berikut, hormon manakah dapat membantu wanita Y untuk hamil?

Which of the following hormones can help woman Y to get pregnant?

A. Hormon perangsang folikel

Follicle stimulating hormone

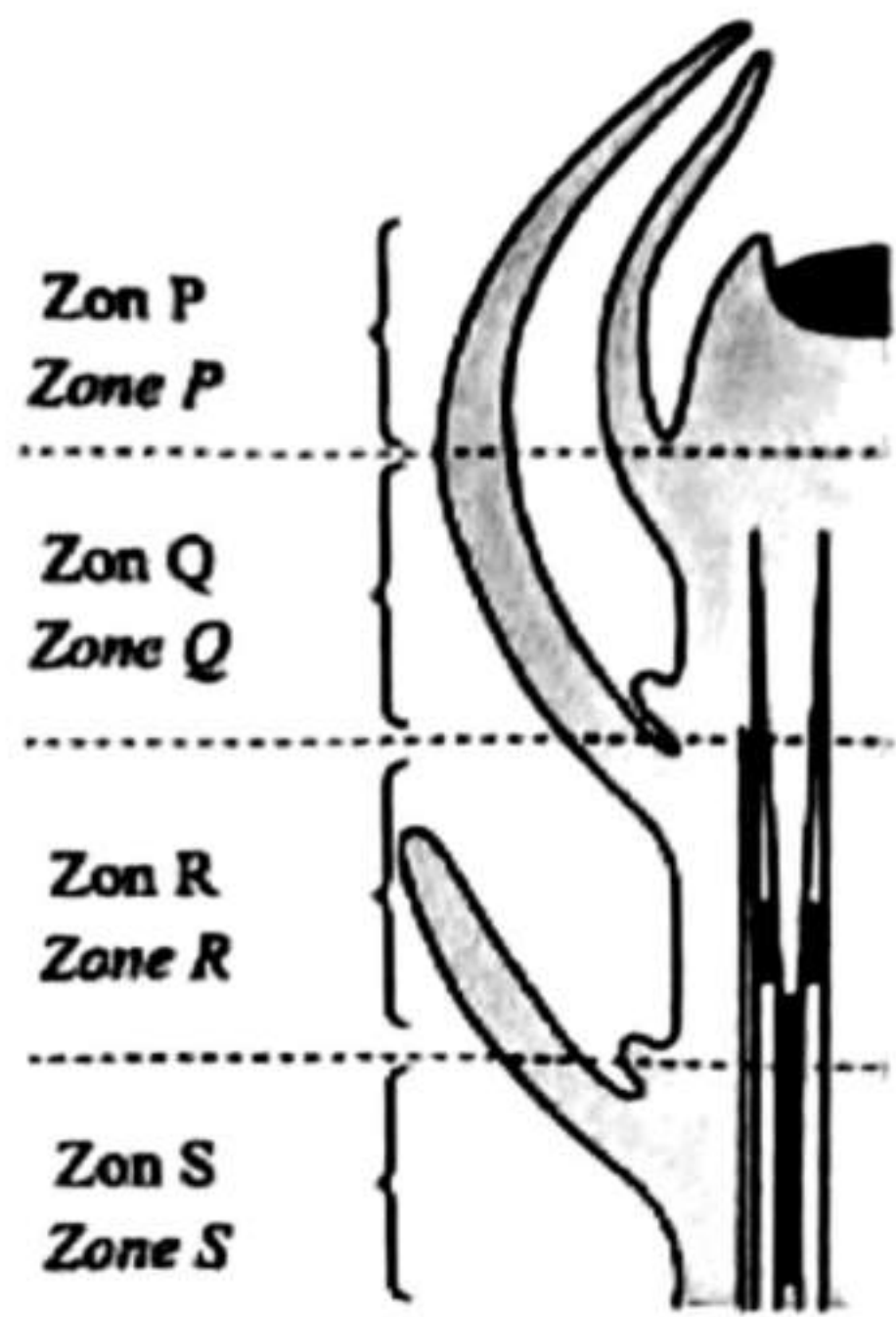
B. Hormon progesteron

Progesterone hormone

C. Hormon peluteinan

Luteinising hormone

23. Rajah 18 menunjukkan zon pertumbuhan sel pada hujung pucuk.
Diagram 18 shows the zone of cell growth at the shoot tip.



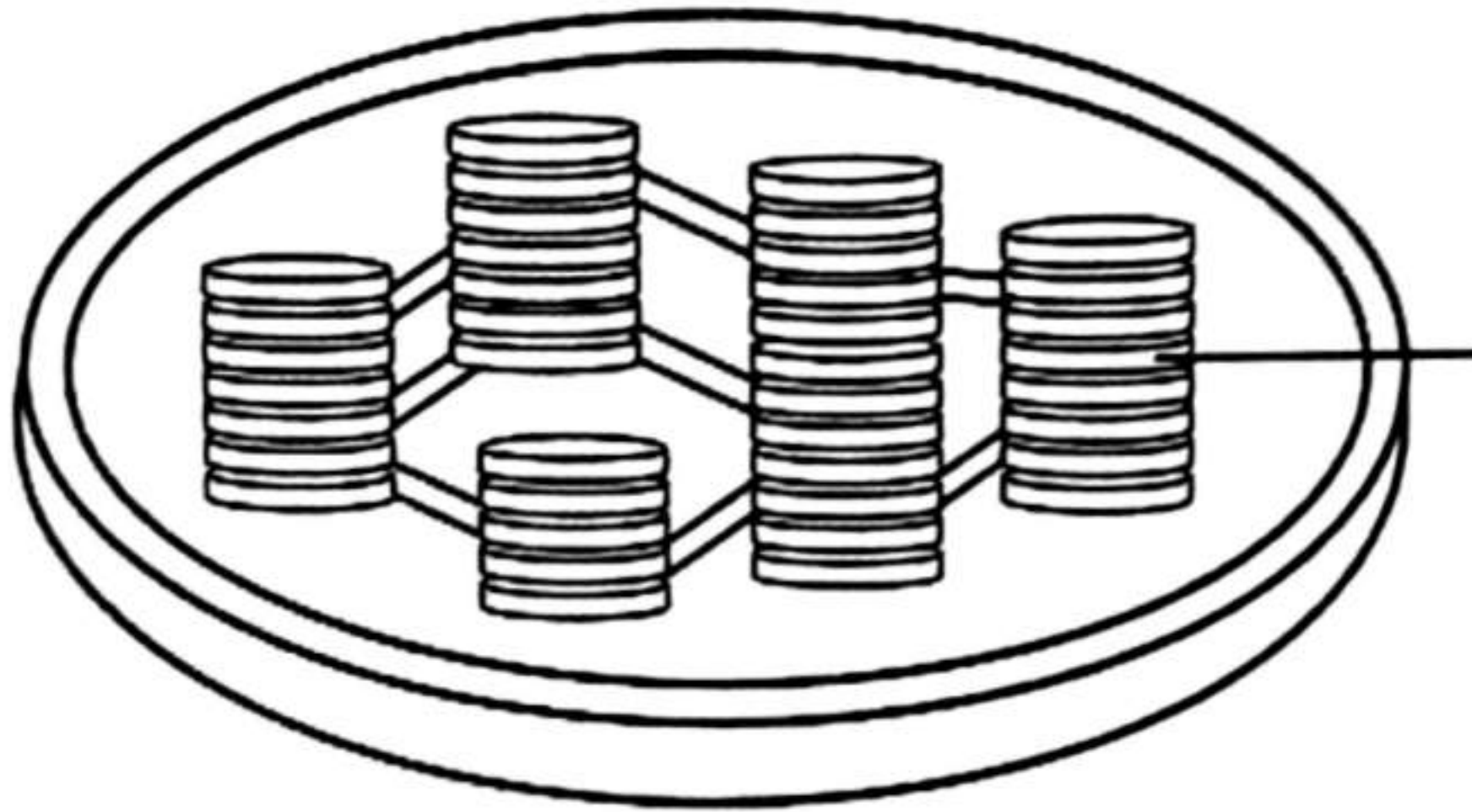
Rajah 18
Diagram 18

Zon yang manakah berlakunya pembezaan sel?
Which zone does the process of cell differentiation occur?

- A. Zon P
Zone P
- B. Zon Q
Zone Q
- C. Zon R
Zone R
- D. Zon S
Zone S

24. Rajah 19 menunjukkan struktur kloroplas.

Diagram 19 shows the structure of chloroplast.



Tindak balas Y

Reaction Y

Rajah 19

Diagram 19

Antara pernyataan berikut, yang manakah berlaku dalam tindak balas Y?

Which of the following occur in reaction Y?

- A. Penyerapan karbon dioksida
Absorption of carbon dioxide
- B. Ion hidroksida kehilangan elektron menghasilkan oksigen dan air
Hydroxide ion loses electron to produce oxygen and water
- C. Penurunan karbon dioksida untuk menghasilkan glukosa
Reduction of carbon dioxide to produce glucose
- D. Tenaga ATP digunakan
ATP energy is used

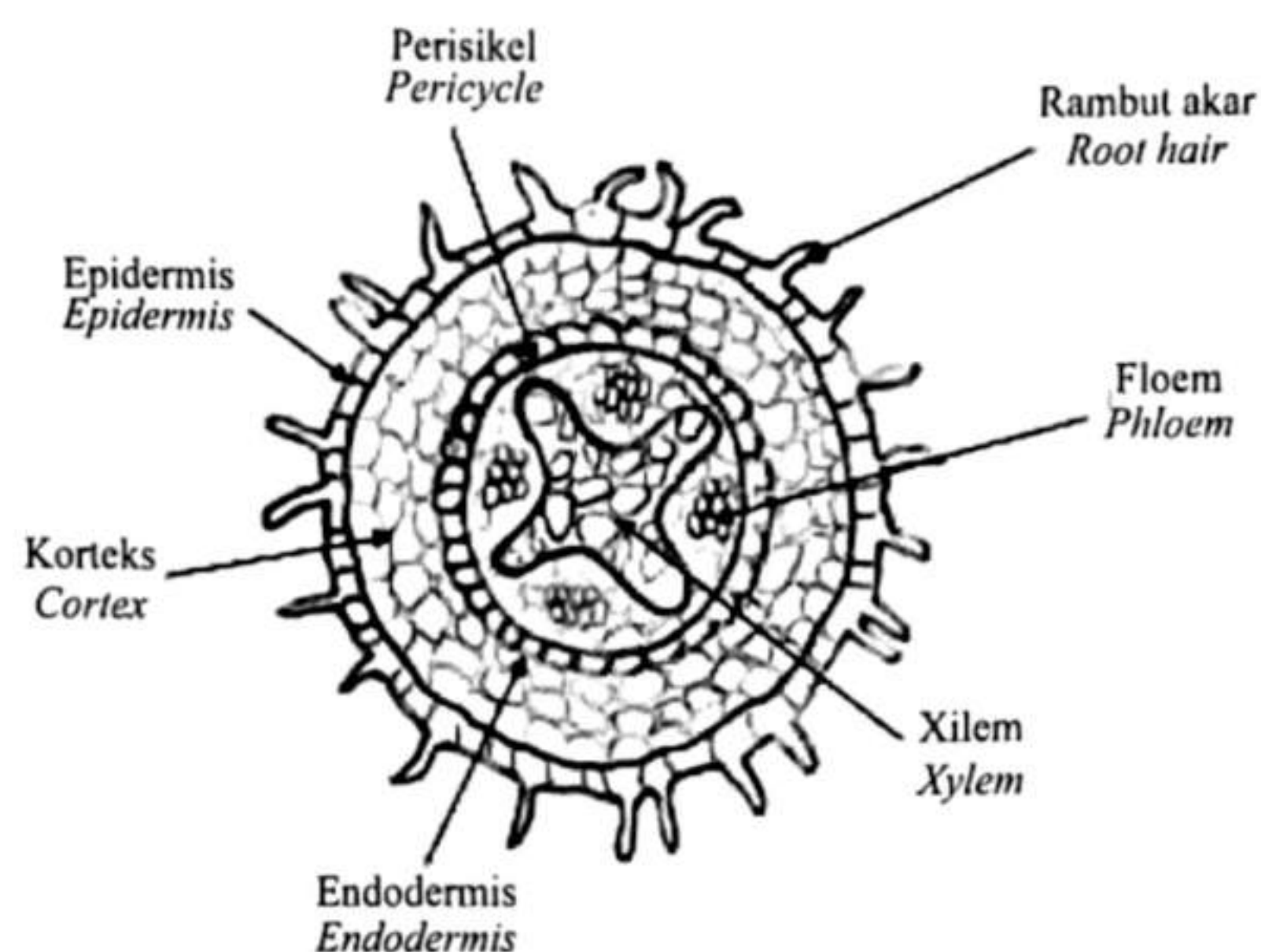
25. Nitrogen dan magnesium diperlukan untuk mensintesis satu komponen penting dalam tumbuhan. Apakah komponen itu?

Nitrogen and magnesium are needed to synthesise one important component in plant. What is the component?

- | | |
|-----------------------------------|---------------------------------------|
| A. Enzim
<i>Enzyme</i> | B. Protein
<i>Protein</i> |
| C. Klorofil
<i>Chlorophyll</i> | D. Karbohidrat
<i>Carbohydrate</i> |

26. Rajah 20 menunjukkan keratan rentas struktur dalam akar tumbuhan.

Diagram 20 shows a cross-section of the structure in a plant root.



Rajah 20

Diagram 20

Apakah adaptasi tisu epidermis akar untuk menjalankan fungsinya dalam penyerapan air dan garam mineral?

What is the adaptation of the root epidermal tissue to carry out its function in the absorption of water and mineral salts?

- I. Dinding sel yang tebal
Thick-walled cells
- II. Membran sel yang telap terhadap air
Cell membrane is permeable to water
- III. Sel-sel yang tersusun rapat
The cells are arranged tightly
- IV. Membentuk rambut akar yang tidak dilapisi kutikel
Form root hairs that are not coated with cuticle

- | | | | |
|----|-------------------------------|----|---------------------------------|
| A. | I dan II
<i>I and II</i> | B. | I dan III
<i>I and III</i> |
| C. | II dan IV
<i>II and IV</i> | D. | III dan IV
<i>III and IV</i> |

SULIT

27. Rajah 21 menunjukkan struktur salur xilem dalam tumbuhan.

Diagram 21 shows the structure of xylem vessels in plants.



Rajah 21

Diagram 21

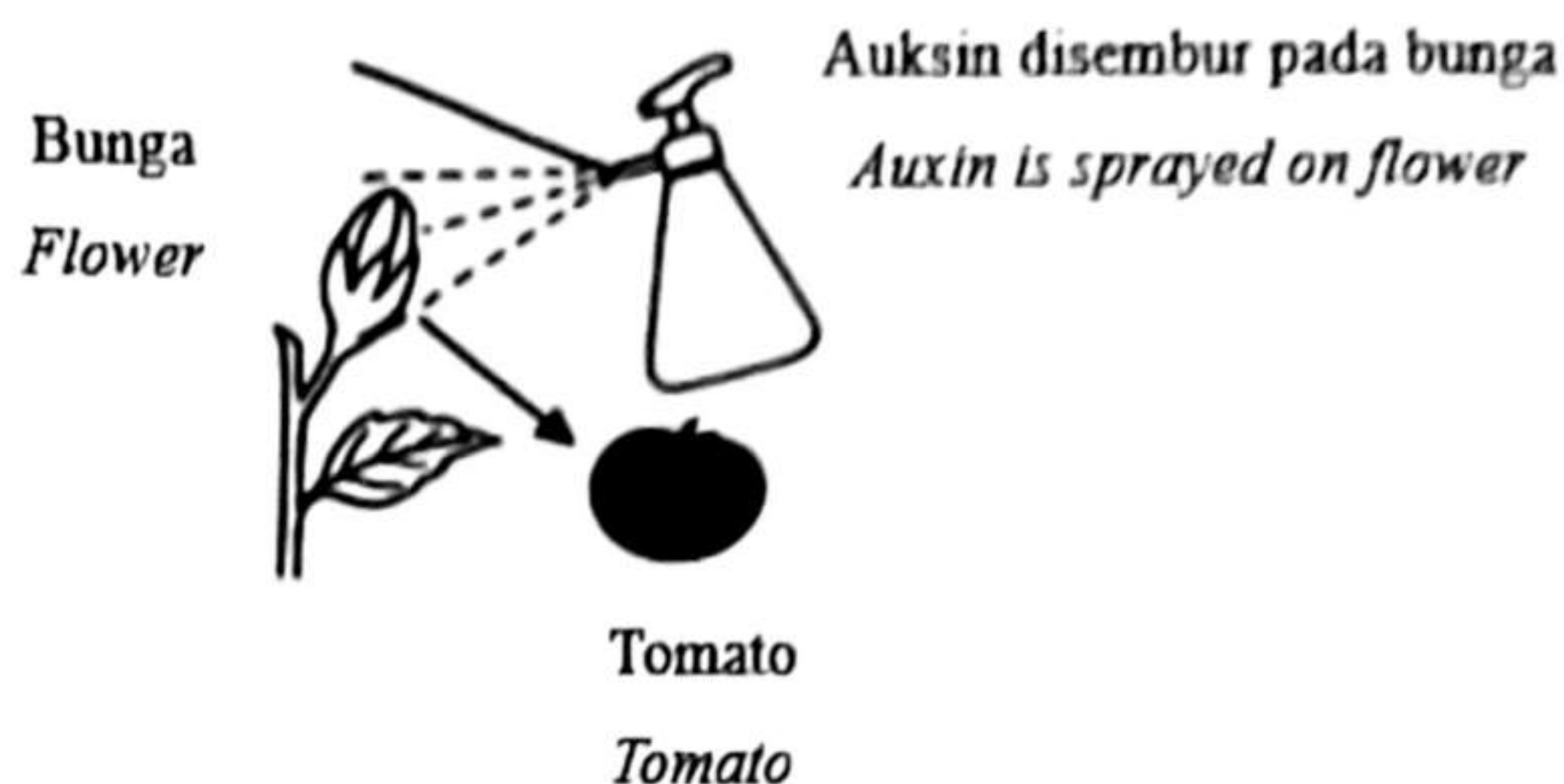
Salur xilem disesuaikan untuk mengangkut air dan mineral dari akar ke daun. Pernyataan yang manakah menerangkan penyesuaian salur xilem untuk fungsi tersebut?

Xylem vessel is adapted to transport water and mineral from the root to the leaves. Which statement correctly explains the adaptation of a xylem vessel for the function?

- A. Mempunyai mitokondrion yang banyak
Has abundant mitochondria
- B. Terdapat plat berliang di kedua-dua hujung
There are plates with pores at both ends
- C. Terdiri daripada sel mati yang tiada Sitoplasma
Consists of dead cells that do not have cytoplasm
- D. Tidak mempunyai nukleus, ribosom dan vakuol di dalam sitoplasma
Does not have nucleus, ribosome and vacuole in the cytoplasm

28. Rajah 22 menunjukkan satu kaedah dalam pengeluaran buah tomato dengan menggunakan hormon auksin.

Diagram 22 shows a method in the production of tomatoes using auxin.



Rajah 22

Diagram 22

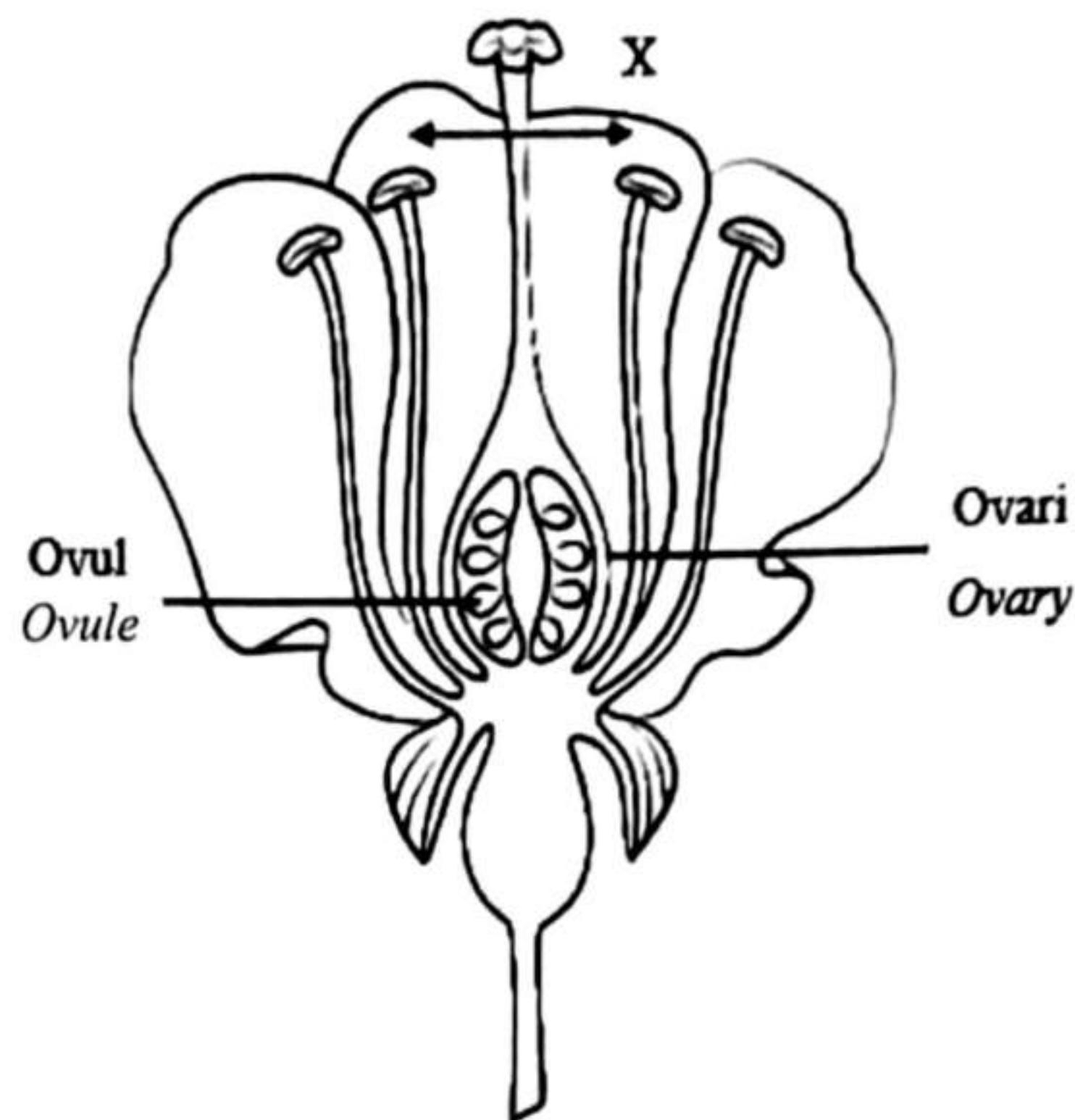
Bagaimanakah buah yang dihasilkan dengan kaedah ini berbeza daripada buah yang terhasil secara semulajadi?

How is the fruit produced by this method different from the fruit produced naturally?

- A. Buah adalah lebih manis
The fruit is sweeter
- B. Buah mengandungi lebih serabut
The fruit has more fiber
- C. Buah yang dihasilkan lebih besar
The fruit produced is bigger
- D. Buah tidak mempunyai biji benih
The fruit does not have seeds

29. Rajah 23 menunjukkan keratan memanjang sekuntum bunga.

Diagram 23 shows a longitudinal section of a flower.



Rajah 23

Diagram 23

Bunga itu dipotong pada X. Pernyataan manakah yang menerangkan mengapa ovari itu tidak berkembang menjadi buah.

The flower is cut at X. Which statement explains why the ovary does not develop into a fruit?

- A. Ovul tidak disenyawakan
The ovules are not fertilised
- B. Ovul tidak menerima nutrient
The ovules do not receive nutrient
- C. Ovul gagal mendapat oksigen daripada udara
The ovules fail to obtain oxygen from the air
- D. Ovul gagal menghasilkan pundi embrio
The ovules fail to produce embryo sacs.

30. Rajah 24 menunjukkan debunga yang melekat di atas stigma.

Diagram 24 shows pollen grains attached to the stigma.



Rajah 24

Diagram 24

Berapakah bilangan biji benih yang terhasil sekiranya semua debunga berjaya bercambah?

How many seeds will be produced if all the pollen grains successfully germinate?

- A. 1
 - B. 2
 - C. 3
 - D. 4
31. Rajah 25 menunjukkan sejenis tumbuhan tenggelam iaitu *Elodea sp.* Tumbuhan ini mempunyai daun yang nipis dan kecil.
- Diagram 25 shows a type of submerged plant, Elodea sp. This plant has thin and small leaves.*



Rajah 25

Diagram 25

Apakah kepentingan ciri tersebut?

What is the importance of these characteristics?

- A. Membantu tumbuhan tegak terapung di dalam air
Helps plants float upright in water
- B. Membantu tumbuhan menyerap cahaya matahari yang maksimum
Helps plants absorb maximum sunlight
- C. Meningkatkan kadar resapan air, garam mineral dan gas terlarut ke dalam tumbuhan
Increases the rate of water, mineral salts and dissolved gases permeation into plants
- D. Memerangkap gelembung udara bagi membolehkannya lebih stabil, ringan dan tegak di dalam air
Traps air bubbles to make them more stable, light and upright in water

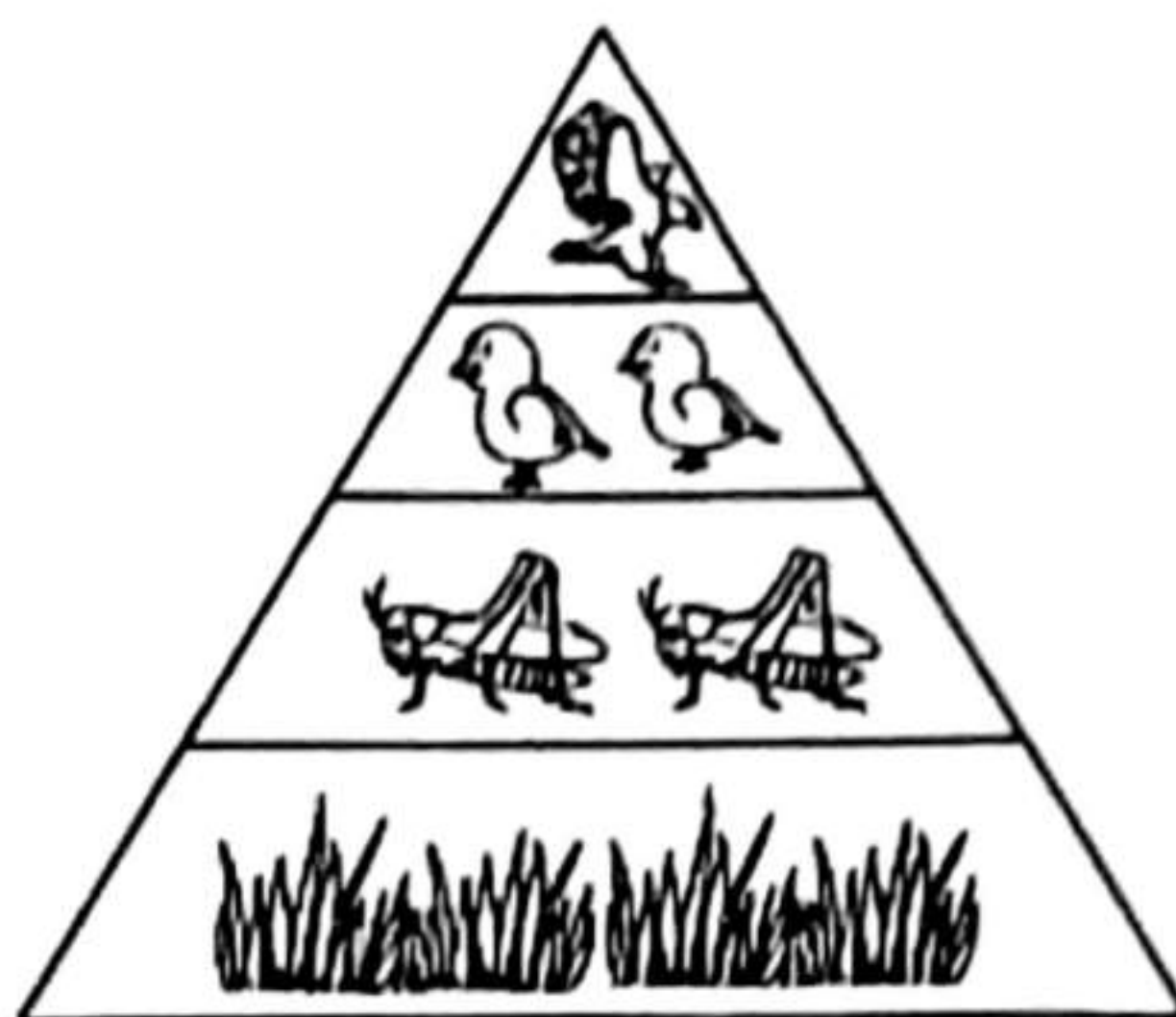
32. Apakah peranan utama bakteria *Nitrosomonas sp.* dan *Nitrobacter sp.* dalam kitar nitrogen?

What is the main role of Nitrosomonas sp. and Nitrobacter sp. in the nitrogen cycle?

- A. Menguraikan bahan organik kepada ammonia dan ammonium
Decompose organic matter into ammonia and ammonium
- B. Menukarkan ammonium kepada nitrat melalui proses nitrifikasi
Convert ammonium to nitrate through the process of nitrification
- C. Menukarkan nitrat kepada gas nitrogen melalui proses denitrifikasi
Convert nitrates into nitrogen gas through the process of denitrification
- D. Mengikat gas nitrogen dari atmosfera dan menukarkannya kepada ammonium
Fix nitrogen gas from the atmosphere and convert it to ammonium

33. Rajah 26 menunjukkan aliran tenaga dalam satu ekosistem.

Diagram 26 shows flow of energy in an ecosystem.



Rajah 26

Diagram 26

Antara yang berikut, pernyataan manakah yang betul mengenai piramid tenaga tersebut?

Which of the following statements is correct about the energy pyramid?

- A. Bilangan organisma berkurang menuruni piramid

The number of organisms decreases descending the pyramid

- B. Jumlah tenaga bertambah apabila pengguna primer makan pengeluar

Total energy increases when primary consumers eat producers

- C. 10% tenaga dipindahkan apabila pengguna tertier makan pengguna sekunder

10% of energy is transferred when tertiary consumers eat secondary consumers

- D. 90% tenaga dipindahkan apabila pengguna primer makan pengeluar

90% of energy is transferred when primary consumers eat producers

34. Kaji pernyataan berikut.

Study the following information.

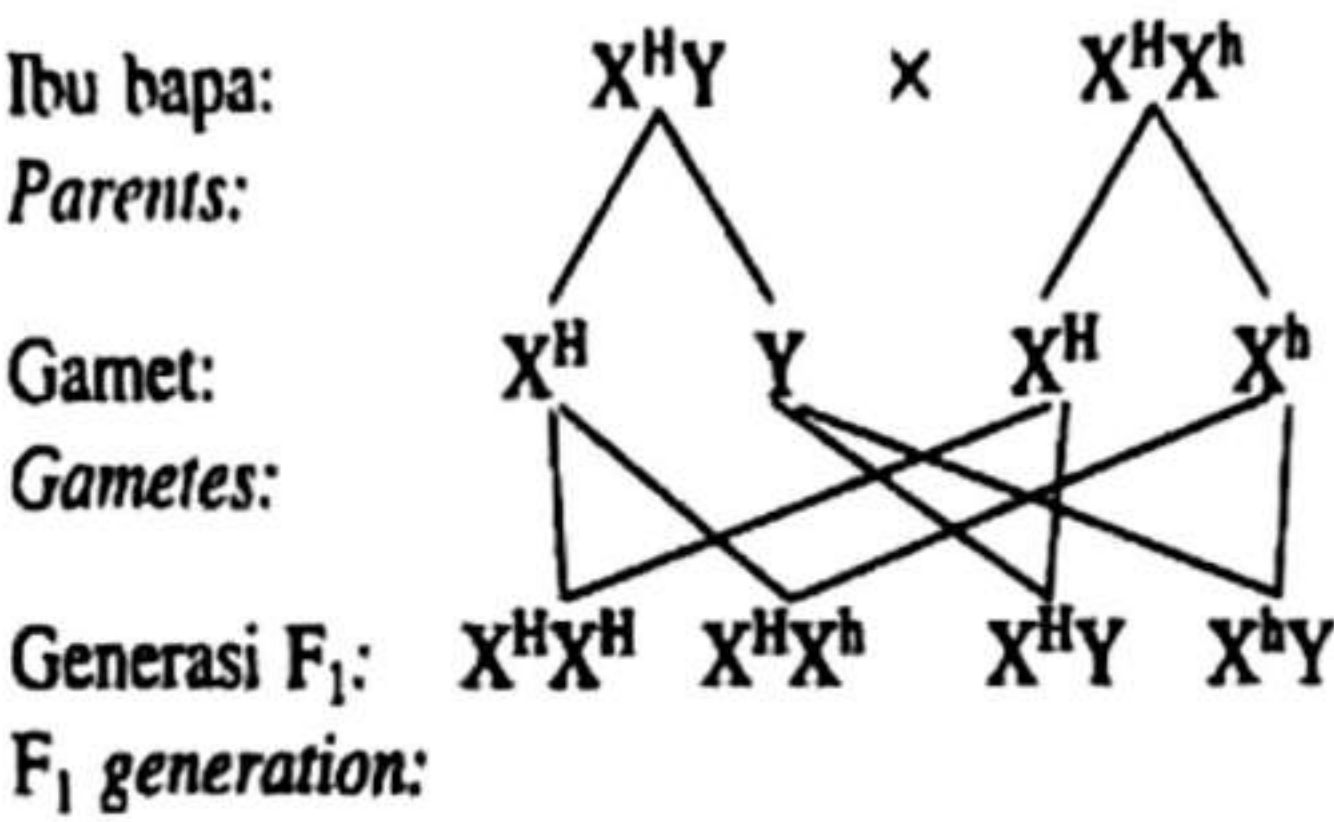
**Kesan rumah hijau disebabkan aktiviti manusia
yang menyebabkan peningkatan gas yang
memerangkap haba.**

*The greenhouse effect is caused by human activities
which cause an increase in gases that trap heat.*

Antara berikut yang manakah merupakan gas utama yang menyumbang kepada kesan di atas?
Which of the following is the main gas that contribute to the effect above?

- A. Gas klorofluorokarbon
Chlorofluorocarbon gas
- B. Gas nitrogen dioksida
Nitrogen dioxide gas
- C. Gas karbon monoksida
Carbon monoxide gas
- D. Gas karbon dioksida
Carbon dioxide gas

35. Rajah 27 menunjukkan pewarisan gen terangkai seks pada hemofilia.
Diagram 27 shows the inheritance of sex-linked gene in haemophilia.



Rajah 27

Diagram 27

Berapakah peratus kebarangkalian gen bagi penyakit ini diwarisi oleh anak dalam generasi F1?
What is the percentage probability that the gene for the disease is carried by the offspring in the F1 generation?

- A. 25%
- B. 50%
- C. 75%
- D. 100%

36. Pada manusia, individu yang mempunyai reseptor rasa terhadap larutan PTC (phenylthiocarbamide) adalah dorminan. Sekiranya, kedua-dua suami dan isteri adalah heterozigot, apakah kebarangkalian anak mereka tidak dapat merasa larutan PTC?
- In humans, individuals who have taste receptors for PTC (phenylthiocarbamide) solution are dominant. If both husband dan wife are heterozygous, what is the probability that their children will not be able to taste PTC solution?*
- A. 5%
 - B. 10%
 - C. 25%
 - D. 50%

37. Rajah 28 menunjukkan infografik tentang faktor yang menyebabkan variasi dalam tiga organisma.
- Diagram 28 shows an infographie of the factor that causes variation in three organisms.*



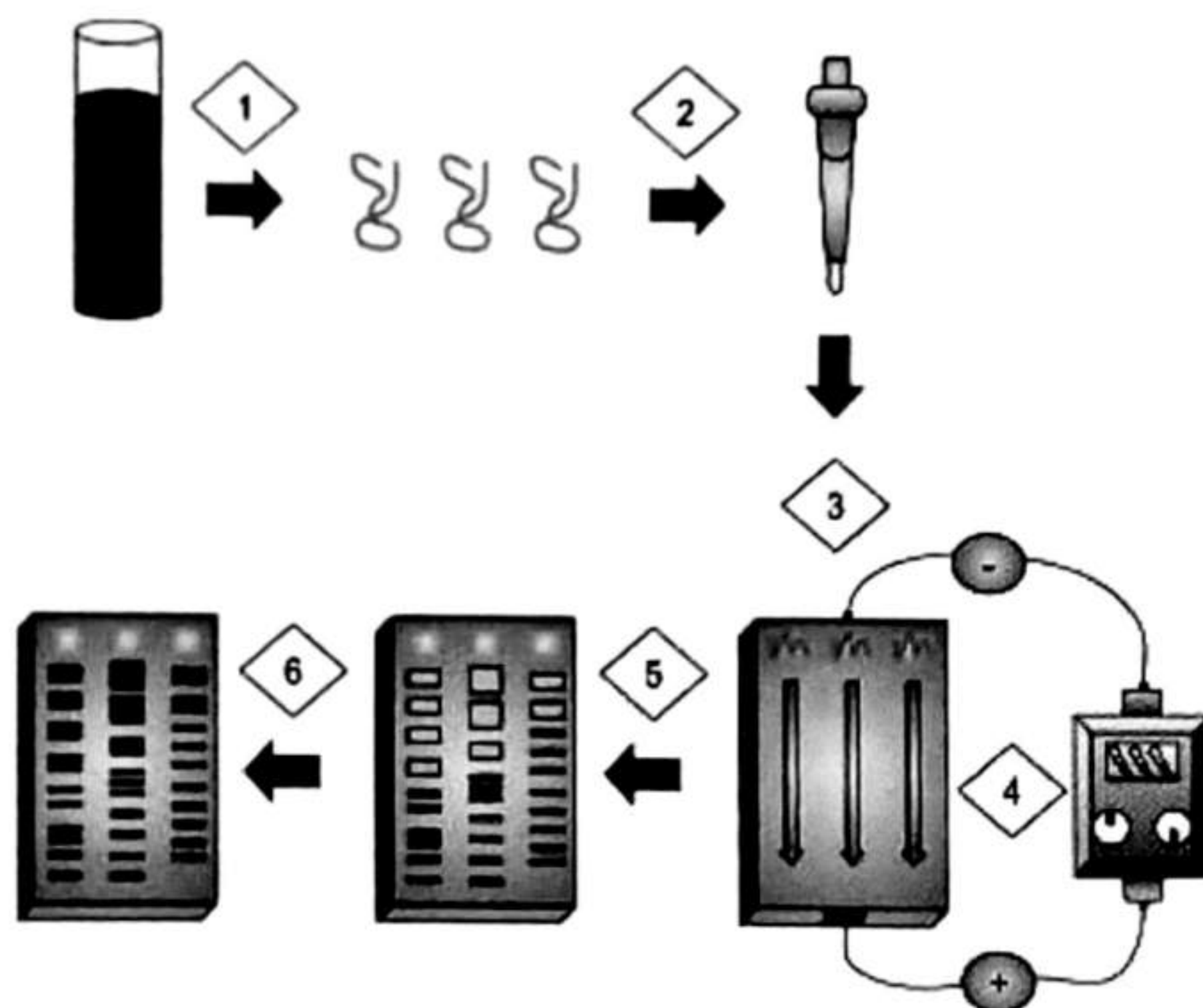
Rajah 28
Diagram 28

Apakah faktor X?
What is factor X?

- | | |
|--------------------|--------------------|
| A. pH | B. Suhu |
| <i>pH</i> | <i>Temperature</i> |
| C. Cahaya matahari | D. Angin |
| <i>Sunlight</i> | <i>Wind</i> |



38. Seorang pelajar mendapati bahawa dia mewarisi warna mata coklat daripada ibunya, manakala adik lelakinya mewarisi warna mata biru daripada ayahnya. Bagaimana variasi ini berlaku?
A student discovers that he inherited brown eye color from his mother, while his younger brother inherited blue eye color from his father. How does this variation occur?
- A. Kombinasi kromosom yang berbeza semasa persenyawaan
Different combinations of chromosomes during fertilization
- B. Kegagalan kromosom homolog atau kromatid kembar untuk berpisah dengan betul semasa proses meiosis
Failure of homologous chromosomes or twin chromatids to separate correctly during the process of meiosis
- C. Pindah silang pada Profasa I
Cross over in Prophase I
- D. Kombinasi alel yang berbeza semasa persenyawaan
Different combinations of alleles during fertilization.
39. Rajah 29 menunjukkan satu aplikasi bioteknologi yang digunakan untuk menyelesaikan masalah tertentu.
Diagram 29 shows an application of biotechnology that is used to solve a certain problem.



Rajah 29

Diagram 29

Antara yang berikut, masalah manakah yang boleh diatasi dengan menggunakan aplikasi tersebut?

Which of the following problems can be solved using the application?

A. Mencegah penyakit genetik

Preventing genetic diseases

B. Merawat pencemaran minyak melalui bioremediasi

Treating oil pollution through bioremediation

C. Menguji keserasian penderma organ dengan penerima

Testing the compatibility of an organ donor with the recipient

D. Mengurangkan penggunaan racun perosak dalam pertanian

Reducing the use of pesticides in agriculture

40. Bakteria *Alcanivorax borkumensis* digunakan untuk merawat pencemaran minyak akibat tumpahan minyak di lautan. Antara yang berikut, bidang bioteknologi manakah yang digunakan untuk merawat masalah ini?

Alcanivorax borkumensis bacteria is used to treat oil spillage in the ocean. Which of the following fields of biotechnology is used to treat this problem?

A. Terapi gen

Gene therapy

B. Bioinformatik

Bioinformatics

C. Bioremediasi

Bioremediation

D. Pemprofilan DNA

DNA profiling

KERTAS SOALAN TAMAT

END OF QUESTIONS