

1. Diagram 1 shows a typical animal cell  
*Rajah 1 menunjukkan satu sel tipikal haiwan*

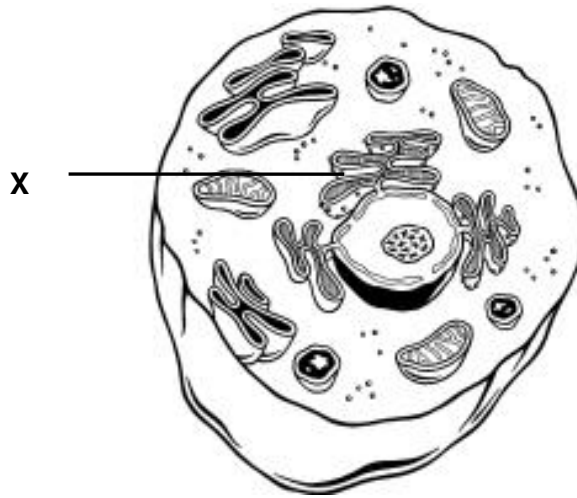


Diagram 1  
*Rajah 1*

What is X ?  
*Apakah X ?*

- |   |   |
|---|---|
| A Lysosome<br><i>Lisosom</i>            | C Rough Endoplasmic Reticulum<br><i>Jalinan Endoplasma Kasar</i>  |
| B Golgi Apparatus<br><i>Jasad Golgi</i> | D Smooth Endoplasmic Reticulum<br><i>Jalinan Endoplasma Licin</i> |

2. The following information refers to structure P of a cell  
*Maklumat berikut merujuk pada struktur P pada satu sel.*

- A membranous sac which occupies a large part of a mature plant cell  
*Sebuah kantung yang memenuhi sebahagian besar sel tumbuhan yang matang*
- Contains water, stores food, salts and waste substances.  
*Mengandungi air, menyimpan makanan dan bahan-bahan kumuh*

What is structure P ?  
*Apakah struktur P ?*

- |   |                           |   |                                 |
|---|---------------------------|---|---------------------------------|
| A | Nucleus<br><i>Nukleus</i> | C | Chloroplast<br><i>Kloroplas</i> |
| B | Vacuole<br><i>Vakuol</i>  | D | Lysosome<br><i>Lisosom</i>      |

3. Diagram 2 shows one of the human tissues.  
*Rajah 2 menunjukkan salah satu daripada tisu manusia*



Diagram 2  
*Rajah 2*

What is the tissue ?  
*Apakah tisu tersebut ?*

- |   |   |   |  |
|---|---|---|--|
| A | Nervous tissue<br><i>Tisu saraf</i>         | C | Epithelial tissue<br><i>Tisu epitelial</i> |
| B | Connective tissue<br><i>Tisu penghubung</i> | D | Muscle tissue<br><i>Tisu otot</i>          |

4. Diagram 3 shows a human organ  
*Rajah 3 menunjukkan organ manusia*

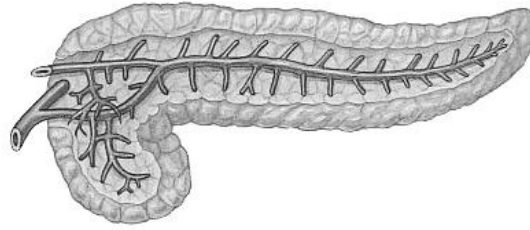


Diagram 3  
*Rajah 3*

In which human system the organ can be found ?  
*Dalam sistem manusia yang manakah organ ini boleh didapati ?*

- |  |  |
|--|--|
| A Excretory system<br><i>Sistem perkumuhan</i>   | C Nervous system<br><i>Sistem saraf</i>      |
| B Reproductive system<br><i>Sistem pembiakan</i> | D Endocrine system<br><i>Sistem endokrin</i> |
5. Which of the following are the main components of a plasma membrane?  
*Manakah antara berikut merupakan komponen utama bagi membran plasma ?*
- |  |  |
|--|--|
| A Protein and carbohydrate<br><i>Protein dan karbohidrat</i> | C Phospholipid and carbohydrate<br><i>Fosfolipid dan karbohidrat</i>                   |
| B Protein and phospholipid<br><i>Protein dan fosfolipid</i>  | D Protein, phospholipid and carbohydrate<br><i>Protein, fosfolipid dan karbohidrat</i> |

6. Diagram 4 shows the fluid compositions of the human body.  
*Rajah 4 menunjukkan kandungan cecair di dalam badan manusia.*

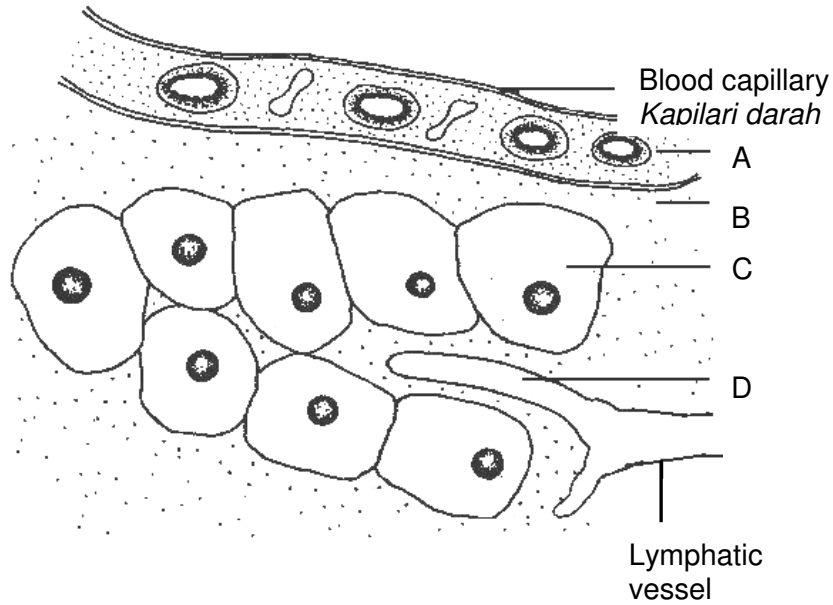


Diagram 4  
*Rajah 4*

Which of the parts A, B, C and D does regulation of chemical and physical factors occur ?

*Antara bahagian A, B C dan D, dimanakah pengawalaturan faktor kimia dan fizikal berlaku ?*

7. Diagram 5 shows the plasma membrane that consists of molecules arranged in a double layer.  
Rajah 5 menunjukkan membran plasma yang terdiri daripada molekul yang disusun dalam dua lapisan

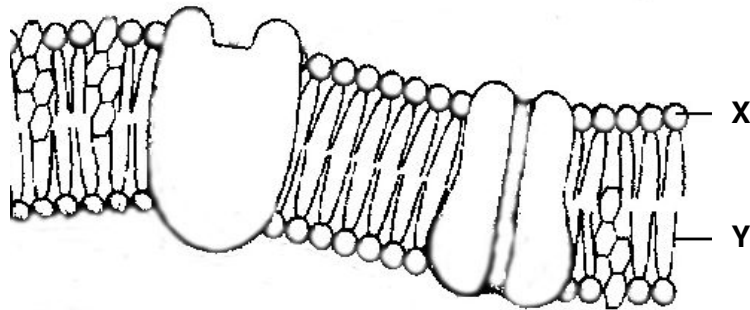


Diagram 5  
Rajah 5

What is the characteristic of X and Y ?  
Apakah sifat X dan Y ?

	X	Y
A	Hydrophilic <i>Hidrofilik</i>	Hydrophilic <i>Hidrofilik</i>
B	Hydrophilic <i>Hidrofilik</i>	Hydrophobic <i>Hidrofobik</i>
C	Hydrophobic <i>Hidrofobik</i>	Hydrophilic <i>Hidrofilik</i>
D	Hydrophobic <i>Hidrofobik</i>	Hydrophobic <i>Hidrofobik</i>

8. Diagram 6 shows the movement of molecules through plasma membrane.  
*Rajah 6 menunjukkan pergerakan molekul melalui membran plasma.*

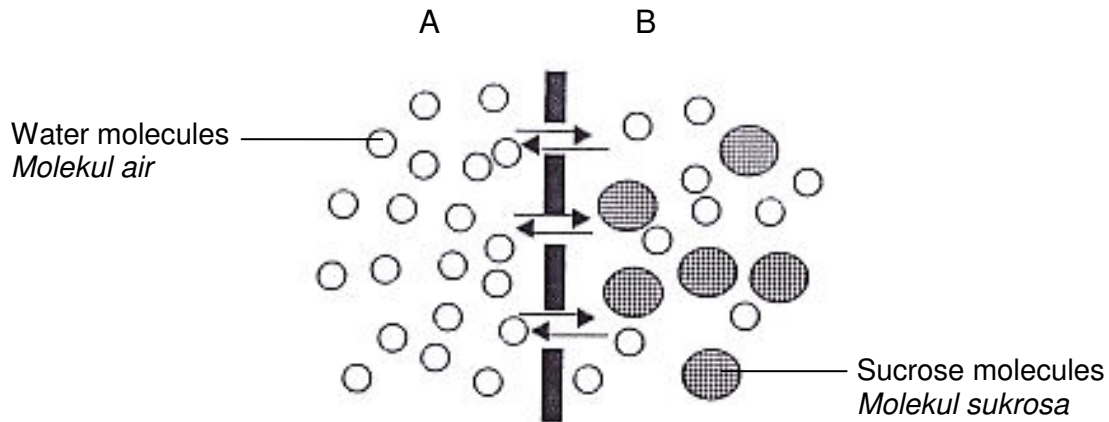


Diagram 6  
*Rajah 6*

Which of the following is true about the movement of the water molecules ?  
*Di antara berikut, yang manakah benar tentang pergerakan molekul air tersebut ?*

- A The movement occurs due to osmosis  
*Pergerakan tersebut berlaku disebabkan osmosis*
- B The movement requires ATP energy  
*Pergerakan tersebut memerlukan tenaga ATP*
- C The movement occurs with the aid of carrier protein  
*Pergerakan tersebut berlaku di atas bantuan protein pembawa*
- D The movement occurs against the concentration gradient  
*Pergerakan tersebut berlaku menentang cerun kepekatan.*

9. The following information refers to a condition of a red blood cell after being immersed in a solution.  
*Maklumat berikut merujuk kepada keadaan sel darah merah selepas direndam ke dalam sejenis larutan*

- The cell shrinks  
*Sel mengecut*
- The plasma membrane crinkles up  
*Membran plasma berkedut*

What is the process that has occurred to the red blood cell?  
*Apakah proses yang telah berlaku terhadap sel darah merah ?*

- A Crenation  
*Krenasi*
- B Plasmolysis  
*Plasmolisis*
- C Haemolysis  
*Hemolisis*
- D Deplasmolysis  
*Deplasmolisis*
10. Diagram 7 shows an experiment which is carried out to study diffusion through a semi permeable membrane.  
*Rajah 7 menunjukkan satu eksperimen yang dijalankan untuk mengkaji resapan melalui membran plasma separa telap.*

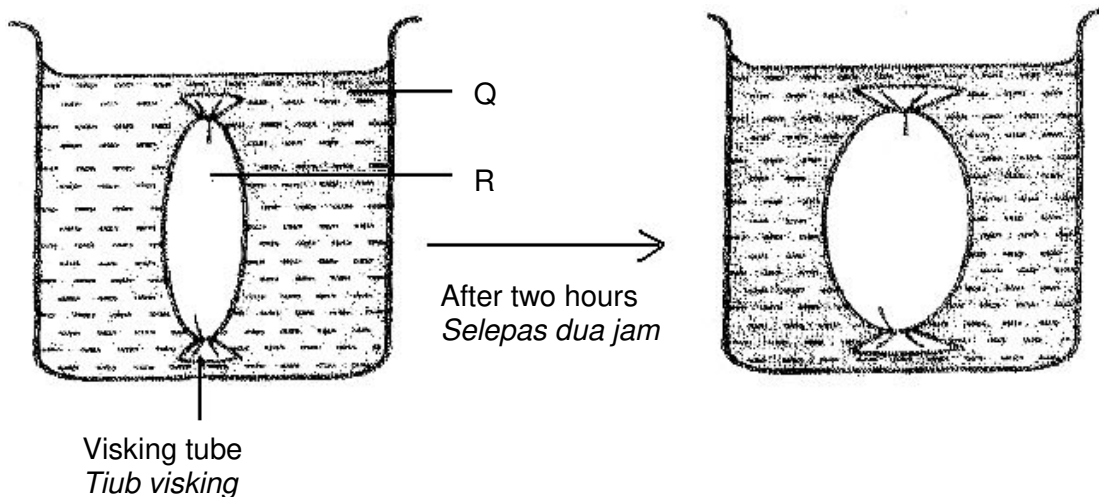


Diagram 7  
*Rajah 7*

What are Q and R?  
*Apakah Q dan R ?*

	<b>Q</b>	<b>R</b>
A	Sucrose solution 30% <i>Larutan sukrosa 30 %</i>	Distilled water <i>Air suling</i>
B	Sucrose solution 50% <i>Larutan sukrosa 50 %</i>	Sucrose solution 30% <i>Larutan sukrosa 30 %</i>
C	Sucrose solution 30% <i>Larutan sukrosa 30 %</i>	Sucrose solution 30% <i>Larutan sukrosa 30 %</i>
D	Sucrose solution 10% <i>Larutan sukrosa 10 %</i>	Sucrose solution 30% <i>Larutan sukrosa 30 %</i>

11. Diagram 8 shows the appearance of an epidermal cell which was placed in solution P at the beginning of an experiment and then transferred to solution Q at the end of the experiment.  
*Rajah 8 menunjukkan rupabentuk sel epidermis yang telah diletakkan ke dalam larutan P pada peringkat permulaan dan dipindahkan ke larutan Q diakhir eksperimen.*

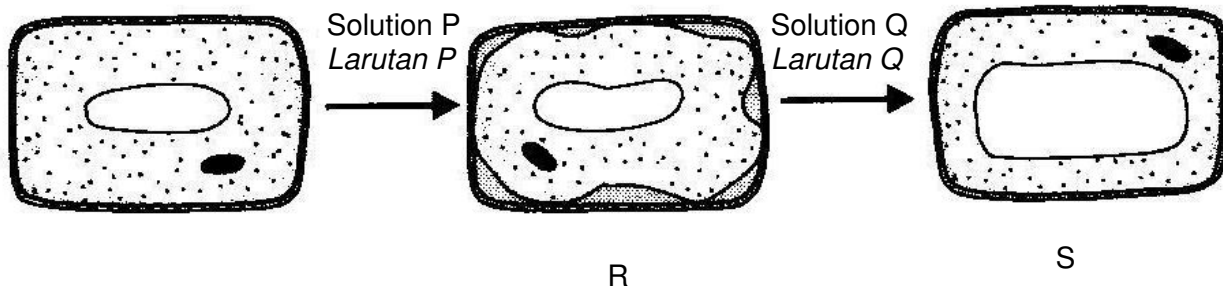


Diagram 8  
*Rajah 8*

What are the conditions observed at R and S?  
*Apakah keadaan yang boleh diperhatikan pada R dan S ?*



	<b>R</b>	<b>S</b>
A	Deplasmolysis <i>Deplasmolisis</i>	Plasmolysis <i>Plasmolisis</i>
B	Crenation <i>Krenasi</i>	Haemolysis <i>Hemolisis</i>
C	Plasmolysis <i>Plasmolisis</i>	Deplasmolysis <i>Deplasmolisis</i>
D	Deplasmolysis <i>Deplasmolisis</i>	Haemolysis <i>Hemolisis</i>

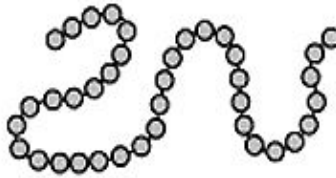
12. Which of the following statements is true about DNA and RNA ?  
*Antara pernyataan berikut, yang manakah benar tentang DNA dan RNA ?*

- I Both have pentose sugar  
*Kedua-duanya mempunyai gula pentosa*
- II Both can be found in a nucleus  
*Kedua-dua boleh didapati di dalam nukelus*
- III Both form double helix structure  
*Kedua-dua membentuk struktur heliks*
- IV Both consist of nucleotides  
*Kedua-dua terdiri daripada nukleotida*

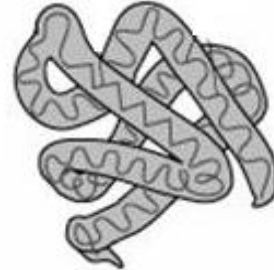
- A I and III only
- B II and IV only
- C I, II and IV only
- D III, III and IV only

13. Amylase is a protein. Which of the following protein structure forms the amylase.  
*Amilase adalah protein. Antara struktur protein berikut, yang manakah membentuk amilase ?*

A



B



C



D

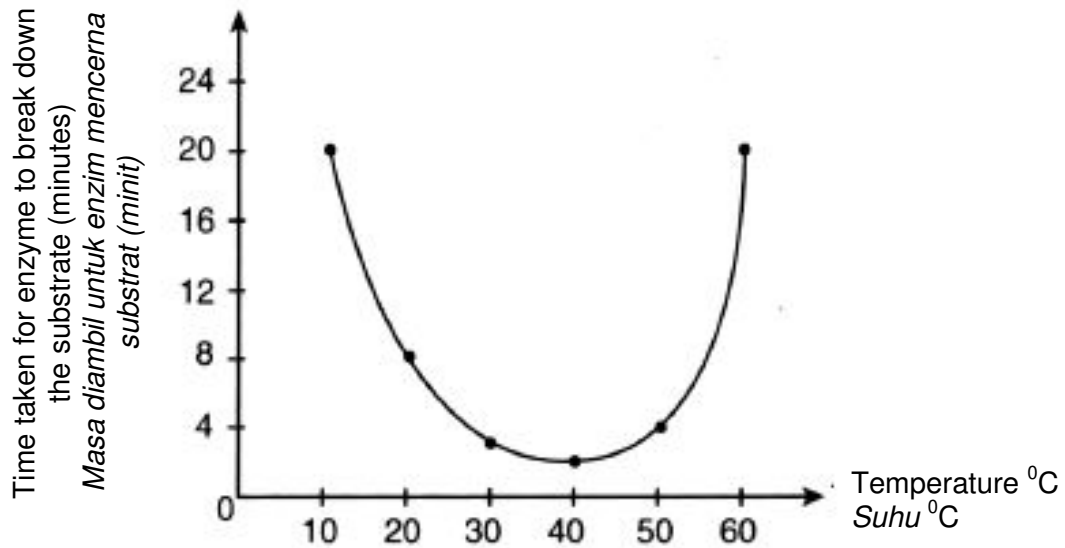


14. Which of the following is true about the formation of a triglyceride molecule ?  
*Manakah antara berikut benar tentang pembentukan molekul trigliserida ?*

- A It consists of three molecules of glycerol and one molecule of fatty acid  
*la terdiri tiga molekul gliserol dan satu molekul asid lemak*
- B It involves one molecule of glycerol and three molecules of fatty acid  
*la melibatkan satu molekul gliserol dan tiga molekul asid lemak*
- C It involves three molecules of glycerol and two molecules of fatty acids  
*la melibatkan tiga molekul gliserol dan dua molekul asid lemak*
- D It involves two molecules of glycerol and three molecules of fatty acids  
*la melibatkan dua molekul gliserol dan tiga molekul asid lemak*

15. Diagram 9 shows a graph obtained from a chemical reaction catalysed by enzyme R at pH 6.8.

*Rajah 9 menunjukkan graf yang diperolehi daripada tindak balas kimia yang dimangkinakan oleh enzim R pada pH 6.8.*



Rajah 9  
Rajah 9

What is enzyme R and the gland in human body that secretes the enzyme ?.

*Apakah enzim R dan kelenjar dalam badan manusia yang merembes enzim tersebut ?*

	<b>Enzyme R</b> <i>Enzim R</i>	<b>Gland</b> <i>Kelenjar</i>
A	Pepsin <i>Pepsin</i>	Pancreas <i>Pankreas</i>
B	Trypsin <i>Tripsin</i>	Duodenum <i>Duodenum</i>
C	Amylase <i>Amilase</i>	Salivary gland <i>Kelenjar Saliva</i>
D	Lipase <i>Lipase</i>	Intestinal gland <i>Kelenjar usus kecil</i>

16. The following information refers to a sequence of events in the synthesis of enzymes .  
*Maklumat berikut merujuk kepada urutan proses dalam sintesis enzim.*

- I The information for synthesis of enzyme is carried by DNA  
*Maklumat untuk sintesis enzim dibawa oleh DNA*
- II The messenger RNA leaves the nucleus and moves to ribosome  
*RNA pengutus meninggalkan nukleus dan bergerak ke ribosom*
- III DNA double helix unwinds and exposes it two strands  
*DNA heliks ganda dua memutuskan lingkaran dan menjadi dua rantaian*
- IV The genetic information is translated into the primary structure of a specific enzyme.  
*Maklumat genetik ditafsirkan kepada dua struktur primer bagi suatu enzim yang spesifik.*

Which of the followings is the correct sequence ?  
*Manakah di antara berikut merupakan urutan yang betul ?*

- A I → III → II → IV
- B II → III → IV → I
- C IV → II → I → III
- D I → II → III → IV

17. What is the role of enzyme cellulase in food industry ?  
*Apakah peranan enzim cellulase dalam industri makanan ?*
- A Soften vegetables, extract seed husks such as wheat, and extract agar from seaweed  
*Melembutkan sayur, mengupas kulit biji seperti gandum dan mengekstrak agar daripada rumpai laut.*
  - B Decompose and separate fats during the processing of canned fatty foods  
*Mengurai dan mengasingkan lemak semasa proses pengetinan makanan berlemak*
  - C Produce lactic acid that causes milk to turn sour.  
*Menghasilkan asid laktik yang menyebabkan susu menjadi masam*
  - D It converts glucose into ethanol in the beer and wine-making industry  
*Menukarkan glukosa kepada etanol didalam industri penghasilan bir dan wain.*

18. Which of the following organ carries out mitosis?  
*Organ yang manakah menjalani mitosis ?*

- |                           |                          |
|---------------------------|--------------------------|
| A Testis<br><i>Testis</i> | C Anther<br><i>Anter</i> |
| B Ovary<br><i>Ovari</i>   | D Skin<br><i>Kulit</i>   |

19. Diagram 10 shows a cell of an organism.  
*Rajah 10 menunjukkan sel bagi satu organisma*



Diagram 10  
*Rajah 10*

What is the stage of the cell division ?  
*Apakah peringkat pembahagian sel tersebut ?*

- |                                    |                                      |
|------------------------------------|--------------------------------------|
| A Prophase I<br><i>Profasa I</i>   | C Metaphase I<br><i>Metafasa I</i>   |
| B Prophase II<br><i>Profasa II</i> | D Metaphase II<br><i>Metafasa II</i> |

20. P, Q, R and S are events of meiosis.  
*P, Q, R and S adalah turutan peristiwa dalam meiosis.*

P – Synapsis occurs / *Sinapsis berlaku*

Q – Sister chromatids separate / *Kromatid berpisah*

R – Spindle fibres shorten / *Gentian gelendung memendek*

S – Homologous chromosomes separate / *kromosom homolog berpisah*

Which of the following events occur during anaphase I of meiosis?

*Antara peristiwa berikut, yang manakah berlaku semasa anafasa 1 meiosis ?*

A P and Q only  
*P dan Q sahaja*

C P, R and S only  
*P, R dan S sahaja*

B R and S only  
*R dan S sahaja*

D P, Q and R only  
*P, Q dan R sahaja*

21. Diagram 11 below shows the phases in the mitotic cell division.  
Rajah 11 menunjukkan fasa – fasa dalam pembahagian sel secara mitosis

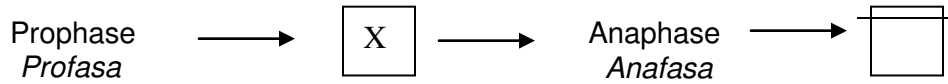


Diagram 11  
Rajah 11

	<b>x</b>	<b>y</b>
A	The chromosomes start to shorten and thicken <i>Kromosom mula memendek dan menebal</i>	The chromosomes form chromatids which move to the opposite poles of the cell <i>Kromosom membentuk kromatid yang bergerak ke kutub bertentangan</i>
B	The chromosomes have replicated <i>Kromosom bereplikasi</i>	The chromosomes start to elongate and not clearly visible <i>Kromosom mula memanjang dan tidak kelihatan jelas</i>
C	The chromosomes aligned at the equator plane <i>Kromosom tersusun di plat khatulistiwa</i>	The chromosomes are at the opposite poles in the cell <i>Kromosom berada di kutub bertentangan</i>
D	The chromosomes form sister chromatids <i>Kromosom membentuk kromatid beradik</i>	The homologous chromosomes are in pairs <i>Kromosom homolog berpasangan</i>



- 22 Which of the following statements is true about the chromosomes at stages X and Y?  
*Yang manakah antara pernyataan berikut benar tentang kromosom di peringkat X dan Y ?*

Diagram 12 shows some of the stages in meiosis which takes place in a diploid cell,  $2n=4$ .  
*Rajah 12 menunjukkan beberapa peringkat dalam meiosis yang berlaku dalam sel diploid,  $2n=4$ .*

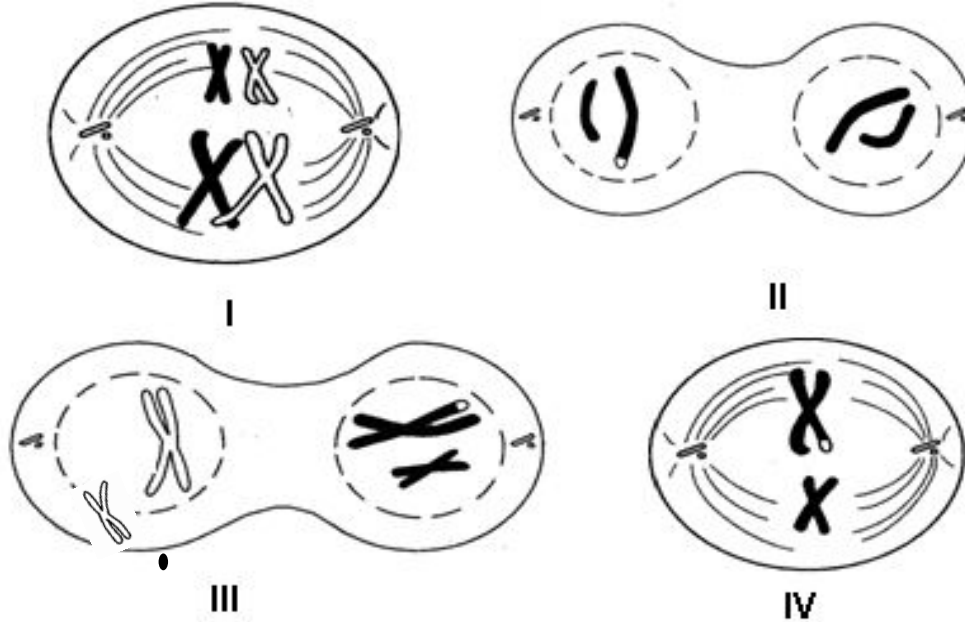


Diagram 12  
*Rajah 12*

Which of the following is the correct sequence of the stages ?  
*Manakah antara berikut merupakan urutan yang betul bagi peringkat-peringkat tersebut ?*

- A I, II, III, IV                      C I, III, IV, II  
B I, IV, II, III                      D I, IV, III, II

- 23 Diagram 13 shows steps in tissue culture technique.  
*Rajah 13 menunjukkan langkah-langkah yang digunakan dalam teknik kultur tisu*

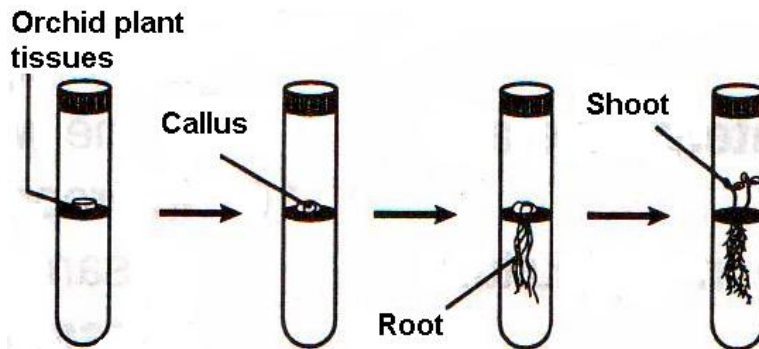


Diagram 13  
*Rajah 13*

What is the main purpose of the steps ?  
*Apakah tujuan utama langkah-langkah ini ?*

- A To produce a clone with similar resistance  
*Untuk menghasilkan klon yang mempunyai daya rintangan yang sama*
- B To produce a clone which will mature faster  
*Untuk menghasilkan klon yang cepat matang*
- C To produce a clone with similar characteristics  
*Untuk menghasilkan klon yang mempunyai ciri yang sama*
- D To produce plantlets which have different characteristics from the parent plant  
*Untuk menghasilkan plantlet yang mempunyai ciri-ciri yang berbeza daripada pokok induk*

24. Diagram 14 shows a part of digestive and circulatory system of a human being.  
*Rajah 14 menunjukkan sebahagian daripada sistem pencernaan dan peredaran darah manusia.*

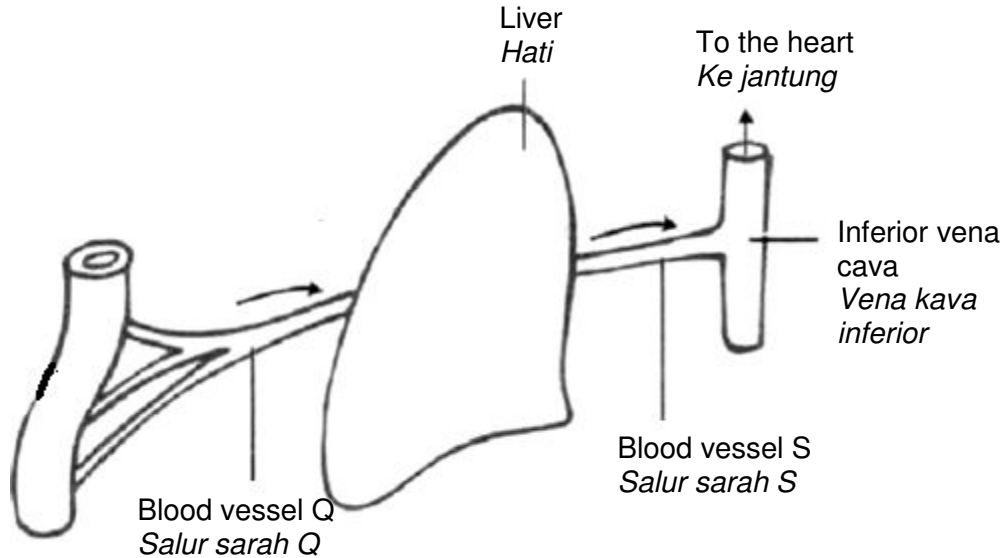


Diagram 14  
*Rajah 14*

What is the composition of the blood in blood vessel Q shortly after taking rice and fried fish ?

*Apakah komposisi darah di dalam salur darah Q sebaik sahaja selepas makan nasi dan ikan goreng ?*

- A. The concentration of carbohydrates and protein in blood vessel Q would increase  
*Kepekatan karbohidrat dan protein dalam salur darah Q akan meningkat .*
- B. The concentration of glucose and amino acid in blood vessel Q would increase  
*Kepekatan glukosa dan asid amino dalam salur darah Q akan meningkat .*
- C. The concentration of carbohydrates and amino acids in blood vessel Q would increase  
*Kepekatan karbohidrat dan asid amino dalam salur darah Q akan meningkat .*
- D. The concentration of glucose and protein in blood vessel Q would increase  
*Kepekatan glukosa dan protein dalam salur darah Q akan meningkat .*

25. Diagram 15 shows organisms P, Q, R and S.  
*Rajah 15 menunjukkan organism P, Q, R dan S*

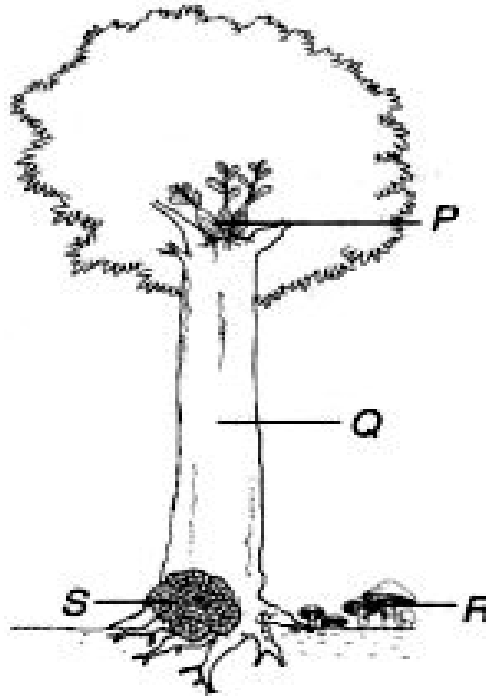


Diagram 15  
*Rajah 15*

Which of the following pairs show the correct group of organism P, Q, R, and S based on their nutritional habits ?

*Manakah antara pasangan berikut menunjukkan kumpulan yang betul bagi organism-organisma P, Q, R, dan S berdasarkan kepada amalan pemakanannya ?*

	<b>Organism</b> <i>Organisma</i>	<b>Group</b> <i>Kumpulan</i>
A	P	Epiphyte <i>Epifit</i>
B	Q	Heterotroph <i>Heterotrof</i>
C	R	Parasite <i>Parasit</i>
D	S	Saprophyte <i>Sapofit</i>

26. Table 1 shows the results of an experiment to study the effects of macronutrient deficiency in plants  
*Jadual 1 menunjukkan keputusan eksperimen untuk mengkaji kesan kekurangan makronutrien dalam tumbuhan.*

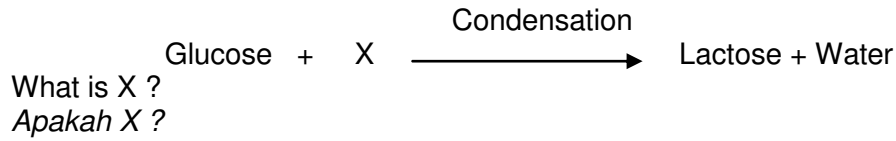
<b>Solution Larutan</b>	<b>Observation after a few weeks Pemerhatian selepas beberapa minggu</b>	
	<b>Plants Tumbuhan</b>	<b>Leaf Colour Warna Daun</b>
P	Stunted root growth <i>Pertumbuhan akar terbantut</i>	Red or purple spot on old leaves <i>Tompokan merah atau ungu pada daun yang tua</i>
Q	Premature death <i>Kematian pramatang</i>	Yellow edge leaves <i>Bahagian tepi daun berwarna kuning</i>

Table 1 / *Jadual 1*

What are solution P and Q ?  
*Apakah larutan P dan Q ?*

	<b>Solution P Larutan P</b>	<b>Solution Q Larutan Q</b>
A	Phosphorus <i>Fosforus</i>	Magnesium <i>Magnesium</i>
B	Potassium <i>Kalium</i>	Nitrogen <i>Nitrogen</i>
C	Magnesium <i>Magnesium</i>	Phosphorus <i>Fosforus</i>
D	Phosphorus <i>Fosforus</i>	Potassium <i>Kalium</i>

27. The following equation refers to formation of a disaccharide.  
*Persamaan berikut merujuk kepada pembentukan disakarida*



- A Fructose  
*Fruktosa*
- B Glucose  
*Glukosa*
- C Galactose  
*Galaktosa*
- D Maltose  
*Maltosa*
28. Table 2 shows the chemical constituents of some foods  
*Jadual 2 menunjukkan kandungan bahan kimia di dalam beberapa jenis makanan*  
Which food gives a negative result when tested with the Biuret test ?  
*Makanan yang manakah akan memberikan keputusan yang negatif apabila diuji dengan Ujian Biuret*

	Food <i>Makanan</i>	Carbohydrates <i>Karbohidrat (%)</i>	Fat <i>Lemak (%)</i>	Protien <i>Protien (%)</i>
A	I	5	4	3
B	II	8	0	18
C	III	0	25	9
D	IV	82	2	0

Table 2  
*Jadual 2*

- A I only  
*I sahaja*
- B II only  
*II sahaja*
- C III only  
*III sahaja*
- D IV only  
*IV sahaja*

29. Diagram 16 shows an experiment to measure heat energy produced by the burning of food.

*Rajah 16 menunjukkan eksperimen untuk mengukur tenaga haba yang dihasilkan melalui pembakaran makanan.*

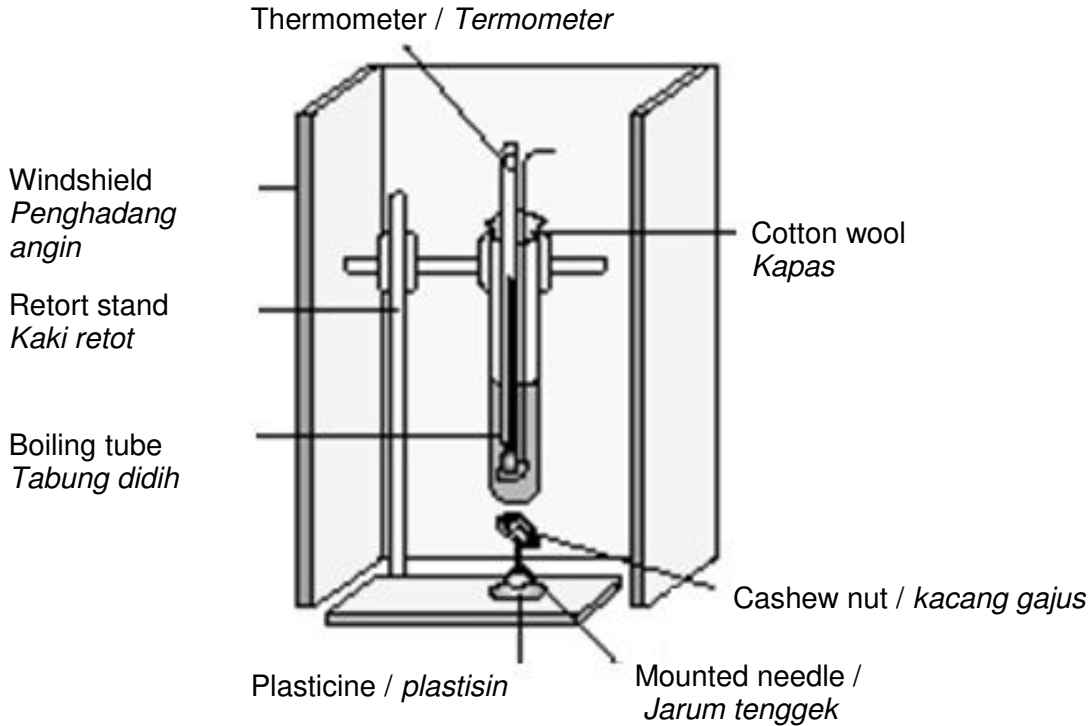


Diagram 16  
*Rajah 16*

The following data are the experimental results obtained from burning of a cashew nut.  
*Data berikut adalah keputusan eksperimen yang diperolehi daripada pembakaran kacang gajus*

Mass of cashew nut <i>Jisim kacang gajus</i>	0.4 g <i>0.4 g</i>
Volume of water <i>Isipadu air</i>	20 cm <sup>3</sup> <i>20 cm<sup>3</sup></i>
Initial temperature of water <i>Suhu awal air</i>	26 °C <i>26 °C</i>
Final temperature of water <i>Suhu akhir air</i>	68 °C <i>68 °C</i>

The specific heat capacity of water is  $4.2 \text{ Jg}^{-1} \text{ } ^\circ\text{C}^{-1}$ .  
*Kapasiti haba spesifik bagi air adalah  $4.2 \text{ Jg}^{-1} \text{ } ^\circ\text{C}^{-1}$ .*

Calculate the energy value of cashew nut. [ 1000 joules = 1 kilojoules ]  
*Kira nilai tenaga bagi kacang gajus . [ 1000 joules = 1 kilojoules ]*

A 8.82 kJg<sup>-1</sup>

C 35.36 kJg<sup>-1</sup>

B 17.68 kJg<sup>-1</sup>

D 88.23 kJg<sup>-1</sup>

30. The following information refers to stage X in photosynthesis  
*Maklumat berikut merujuk kepada peringkat X dalam fotosintesis*

Produces hydrogen ions to reduce carbon dioxide  
*Menghasilkan ion hidrogen bagi menurunkan karbon dioksida*

Water molecules broken down with the help of energy  
*Molekul air di uraikan dengan bantuan tenaga*

Occurs in the granum  
*Berlaku di dalam grana*

What is stage X?  
*Apakah peringkat X ?*

- A. Decomposition of hydrocarbons  
*Pereputan hidrokarbon*
- B. Photolysis of carbon dioxide  
*Fotolisis karbon dioksida*
- C. Photolysis of water  
*Fotolisis air*
- D. Calvin cycle  
*Kitar Calvin*



31. Diagram 17 shows an aeroponic method of planting a plant.  
*Rajah 17 menunjukkan kaedah aerofonik bagi menanam tumbuhan.*

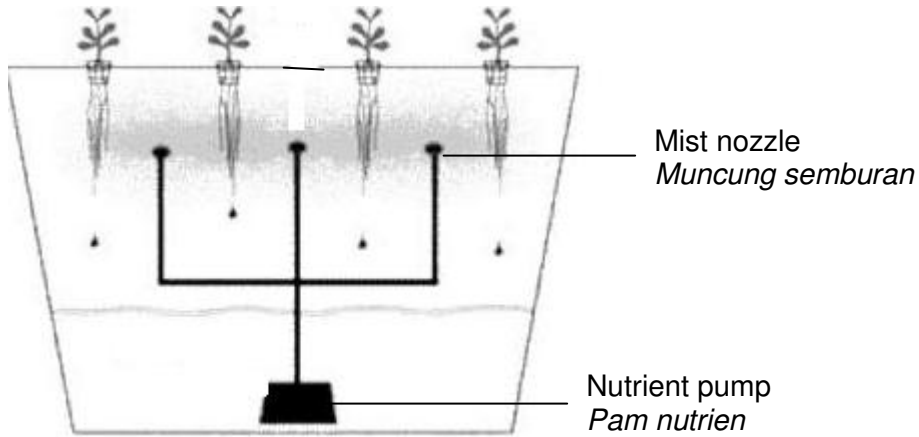


Diagram 17  
*Rajah 17*

Pak Ahmad plants tomatoes using this method. What is probably the reason of him using this method ?

*Pak Ahmad menanam tomato menggunakan kaedah ini. Apakah kemungkinan sebab Pak Ahmad menggunakan kaedah ini?*

- I Environmental factors can be controlled at optimum level for maximum growth  
*Faktor alam sekitar yang boleh dikawal pada aras optimum bagi pertumbuhan yang maksima*
- II The plants can be grown all year round  
*Tumbuhan boleh ditanam sepanjang tahun*
- III Plants root can absorb more oxygen  
*Akar tumbuhan dapat menyerap lebih oksigen*
- IV Produce a higher yield  
*Memberikan hasil yang lebih banyak*

A I, II and III only

B I, III and IV only

C II, III and IV only

D I, II, III and IV only

32. Diagram 18 shows an experiment set-up to investigate factors which affect the rate of photosynthesis of hydrilla  
*Rajah 18 menunjukkan satu eksperimen untuk mengkaji faktor yang mempengaruhi kadar fotosintesis bagi hidrilla.*

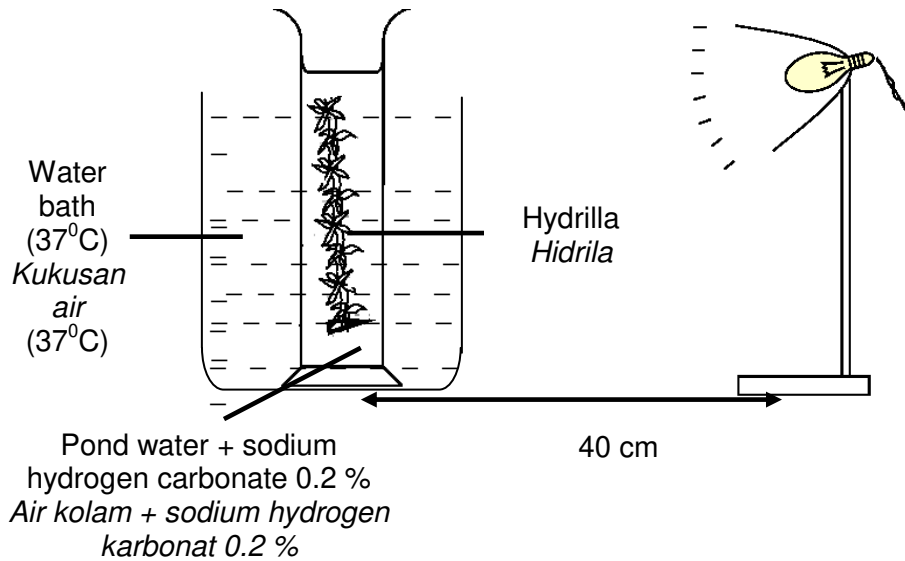


Diagram 18 / *Rajah 18*

Which of the following can increase the gas production by the hydrilla ?  
*Antara berikut yang manakah boleh meningkatkan penghasilan gas oleh hydrilla ?*

- A Using a waterbath at 60° C  
*Menggunakan kukus air pada suhu 60° C*
- B Placing a 100W bulb 20 cm from the hydrilla  
*Meletakkan 100W lampu pada jarak 20cm daripada hidrilla*
- C Using 0.1% sodium hydrogen carbonate solution  
*Menggunakan 0.1% larutan sodium hydrogen*
- D Replacing the *Hydrilla* with *Elodea*  
*Menggantikan Hidrilla dengan Elodea*

33. Which of the following is the correct equation for the respiration in muscle cells?  
*Yang manakah antara berikut merupakan persamaan yang betul bagi respirasi di dalam sel otot ?*

- A Glucose  $\longrightarrow$  Lactic acid + energy  
*Glukosa  $\longrightarrow$  Asid Laktik + tenaga*
- B Glucose  $\longrightarrow$  Carbon dioxide + ethanol + energy  
*Glukosa  $\longrightarrow$  Karbon dioksida + etanol + tenaga*
- C Glucose + Oxygen  $\longrightarrow$  Carbon dioxide + ethanol + energy  
*Glukosa + oksigen  $\longrightarrow$  Karbon dioksida + etanol + tenaga*
- D Glucose + Oxygen  $\longrightarrow$  Carbon dioxide + water + ethanol + energy  
*Glukosa + oksigen  $\longrightarrow$  Karbon dioksida + air + etanol + tenaga*

34. Diagram 19 shows a respiratory system of an insect.  
*Rajah 19 menunjukkan sistem respirasi seekor serangga.*

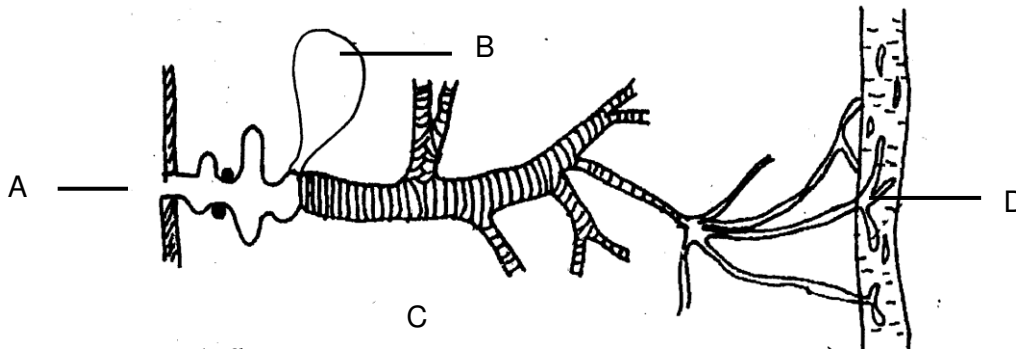


Diagram 19  
*Rajah 19*

Which of the parts A, B, C and D does exchange of gases occur ?  
*Antara bahagian A, B, C dan D, dimanakah pertukaran gas berlaku ?*

35. Diagram 20 shows a model of a rib cage.  
*Rajah 20 menunjukkan model sebuah sangkar rusuk.*

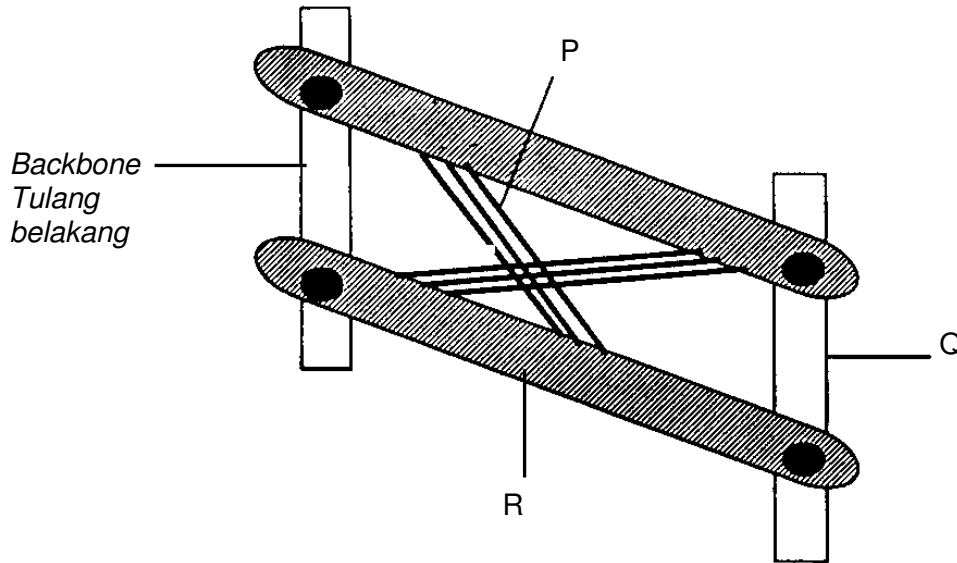


Diagram 20  
*Rajah 20*

Which of the following is represented by P, Q and R?  
*Yang manakah antara berikut diwakili oleh P, Q dan R ?*

	<b>P</b>	<b>Q</b>	<b>R</b>
A	Sternum <i>Sternum</i>	Rib <i>Tulang rusuk</i>	Intercostal muscle <i>Otot interkosta</i>
B	Intercostal muscle <i>Otot interkosta</i>	Sternum <i>Sternum</i>	Rib <i>Tulang rusuk</i>
C	Sternum <i>Sternum</i>	Intercostal muscle <i>Otot interkosta</i>	Rib <i>Tulang rusuk</i>
D	Intercostal muscle <i>Otot interkosta</i>	Rib <i>Tulang rusuk</i>	Sternum <i>Sternum</i>



What will happen if muscle X fails to contract ?  
*Apakah yang akan berlaku sekiranya otot X gagal mengecut ?*

- A The rib cage cannot move upwards and outwards.  
*Sangkar rusuk tidak dapat bergerak ke atas dan ke luar.*
  - B The rib cage cannot move downwards and inwards.  
*Sangkar rusuk tidak dapat bergerak ke bawah dan ke dalam.*
  - C The diaphragm cannot form a dome shape  
*Diafragma tidak dapat membentuk kubah.*
  - D The diaphragm cannot flatten  
*Diafragma tidak dapat mendatar*
38. Diagram 22 shows an example of interaction between two organisms.  
*Rajah 22 menunjukkan interaksi di antara dua organisma.*

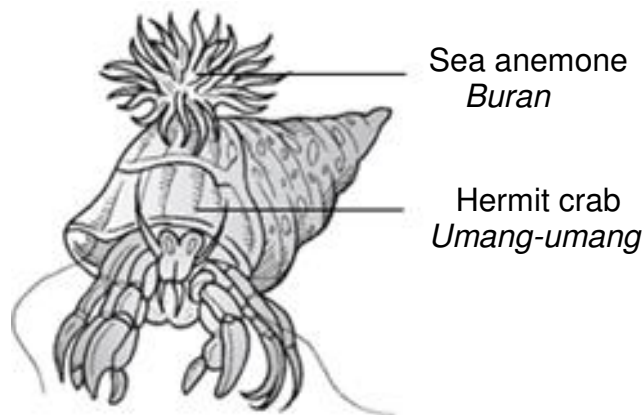


Diagram 22  
*Rajah 22*

What is the type of interaction between the two organisms ?  
*Apakah jenis interaksi antara kedua-dua organism ?*

- A Saprophytism  
*Saprofitisma*
- B Commensalism  
*Komensalisme*
- C Mutualism  
*Mutualisma*
- D Parasitism  
*Parasitisma*

39. Diagram 23 shows the energy flow from phytoplankton to the tertiary consumer.  
*Rajah 23 di bawah menunjukkan aliran tenaga dari fitoplankton ke pengguna Tertiar.*

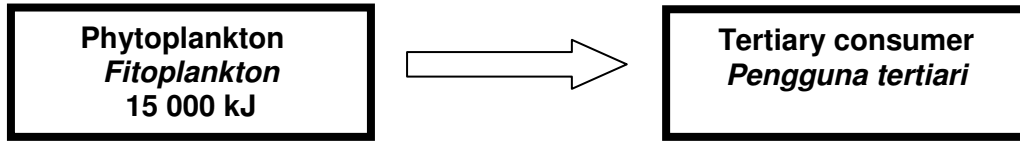


Diagram 23  
*Rajah 23*

If 90% of energy is loss from one trophic level to the next trophic, how much energy is received by the tertiary consumer ?

*Jika 90% tenaga hilang dari satu aras trof ke aras trof yang lain, berapakah tenaga yang diterima oleh pengguna tertiar*

- A 15 kJ  
B 150 kJ  
C 85 kJ  
D 13500 kJ
40. An abandoned pond can form a primary forest.  
Which of the following sequence is correct in the formation of the primary forest :  
*Kolam yang terbiar boleh membentuk hutan primer.*  
*Antara urutan berikut, manakah yang betul dalam pembentukan hutan primer tersebut ?*
- A Successor , climax community, pioneer  
*Penyesar, komuniti klimaks, perintis*
- B Pioneer , climax community, successor  
*Perintis, komuniti klimaks, penyesar*
- C Successor, pioneer , climax community  
*Penyesar, perintis, komuniti klimaks*
- D Pioneer, successor , climax community  
*Perintis , penyesar , komuniti klimak*

41. Diagram 24 (a) shows a root system in a mangrove tree while diagram 24 (b) shows the profile of a mangrove swamp.  
*Rajah 24 (a) menunjukkan sistem akar pokok paya bakau manakala rajah 24 (b) menunjukkan profil sebuah paya bakau*



Diagram 24 (a)  
Rajah 24 (a)

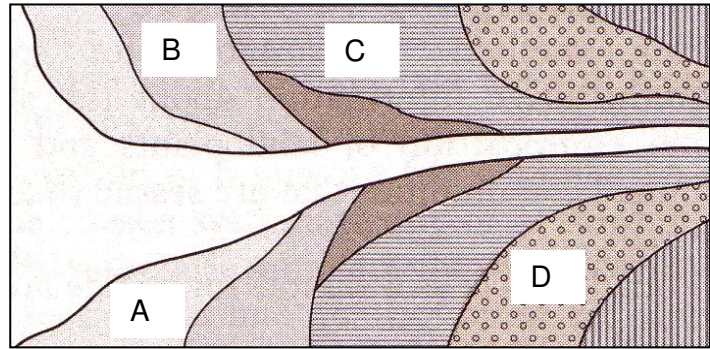


Diagram 24 (b)  
Rajah 24 (b)

Which zone that the root system in diagram 25 (a) can be found ?  
*Zon yang manakah sistem akar di dalam rajah 25 (a) boleh didapati ?*

42. Table 3 shows the number of plant **S** present in 8 different quadrat, each measuring 1.5 m X 1.5 m  
*Jadual 3 menunjukkan bilangan tumbuhan **S** dalam 8 kuadrat yang berlainan, setiap satu berukuran 1.5 m X 1.5m.*

Quadrat number <i>Nombor kuadrat</i>	I	II	III	IV	V	VI	VII	VIII
Number of plant <b>S</b> <i>Bilangan tumbuhan <b>S</b></i>	15	10	11	22	13	11	0	8

Table 3  
Jadual 3

Calculate the density of plant **S**  
*Hitung kepadatan tumbuhan **S***

- A 5 m<sup>2</sup>  
 B 0.2 m<sup>2</sup>

- C 25.3 m<sup>2</sup>.  
 D 320 m<sup>2</sup>



43. Diagram 25 shows the classification hierarchy of organisms.  
*Rajah 25 menunjukkan hierarki pengelasan organism.*

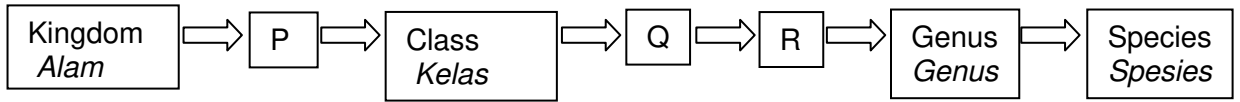


Diagram 25  
*Rajah 25*

What are P , Q and R ?  
*Apakah P, Q dan R ?*

	<b>P</b>	<b>Q</b>	<b>R</b>
A	Family <i>Famili</i>	Order <i>Order</i>	Phylum <i>Filum</i>
B	Phylum <i>Filum</i>	Order <i>Order</i>	Family <i>Famili</i>
C	Order <i>Order</i>	Family <i>Famili</i>	Phylum <i>Filum</i>
D	Family <i>Famili</i>	Phylum <i>Filum</i>	Order <i>Order</i>

44. Diagram 26 shows the root nodules of a leguminous plant.  
*Rajah 26 menunjukkan akar nodul sebatang tumbuhan legum.*

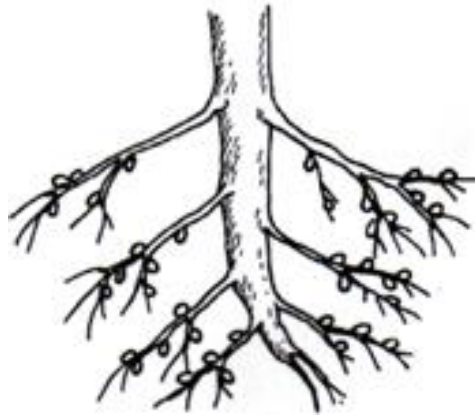


Diagram 26  
*Rajah 26*

What bacteria can be found in the root nodules of the plant ?  
Apakah bakteria yang boleh didapati di akar nodul tumbuhan tersebut ?

- |   |                              |   |                            |
|---|------------------------------|---|----------------------------|
| A | Azotobacter<br>Azotobakter   | C | Rhizobium<br>Rizobium      |
| B | Nitrosomonas<br>Nitrosomonas | D | Nitrobacter<br>Nitrobakter |

45. Diagram 27 shows a human activity  
Rajah 27 menunjukkan aktiviti manusia

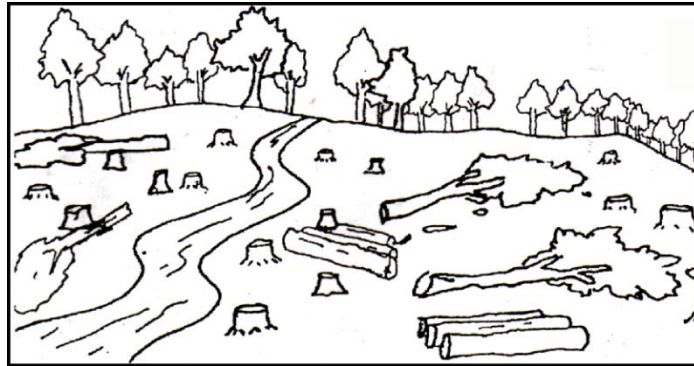


Diagram 27 / Rajah 27

What is the effect of the activity ?  
Apakah kesan daripada aktiviti tersebut ?

- A Decrease in BOD level  
Aras BOD menurun
- B Increase the habitat of the fauna  
Habitat fauna bertambah
- C Decrease the temperature in north pole  
Suhu di kutub utara menurun
- D Increase the carbon dioxide level in the atmosphere  
Aras karbon dioksida di atmosfera bertambah

46. What is the effect of dust and smog on leaves of plants ?  
*Apakah kesan habuk dan jerebu ke atas daun tumbuhan ?*
- A Decrease the water transport  
*Pengurangan pengangkutan air*
  - B Damages the chlorophyll in the leaf  
*Merosakkan klorofil dalam daun*
  - C Decreases the amount of light received by the leaf  
*Pengurangan jumlah cahaya yang diterima oleh daun*
  - D Damages the mesophyll cells in leaf  
*Merosakkan sel mesofil dalam daun*
47. A water sample from a lake shows a very low biochemical demand (BOD value). *What will be the cause of this ?*  
*Sampel air dari sebuah tasik menunjukkan nilai keperluan oksigen biokimia yang rendah. Apakah yang menyebabkan ianya berlaku ?*
- A The increase in temperature of the water in the lake  
*Peningkatan suhu air di dalam tasik*
  - B The quantity of dissolved oxygen in the lake is high  
*Kuantiti oksigen terlarut yang tinggi di dalam tasik*
  - C The increase in microorganisms activity in the lake  
*Peningkatan aktiviti mikroorganisma di dalam tasik*
  - D The lake water is contaminated  
*Air tasik telah tercemar*

48. Diagram 28 shows a natural phenomenon.  
*Rajah 28 menunjukkan satu fenomena semulajadi*

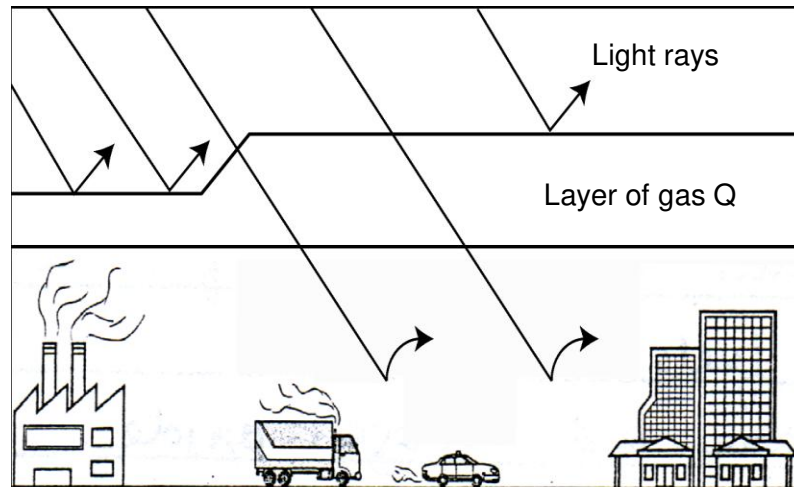


Diagram 28 / *Rajah 28*

What are the effects of the phenomenon?  
*Apakah kesan fenomena tersebut ?*

- I Sea level increases / *Aras laut meningkat*
- II Skin cancer / *kanser kulit*
- III Cataract / *katarak*
- IV Atmospheric temperature increases / *suhu atmosfera meningkat*

- A I and II only
- B I and IV only

- C II and III only
- D I, II, III and IV

49. Diagram 29 shows a tropical rain forest before and after clearing for agricultural use.  
*Rajah 29 menunjukkan hutan hujan tropika sebelum dan selepas pembersihan bagi tujuan pertanian.*

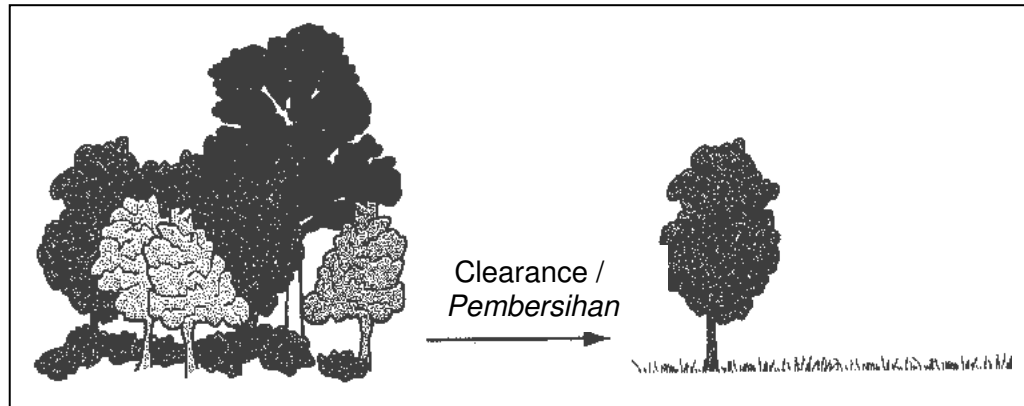


Diagram 29  
Rajah 29

Which of the following effects on the environment is caused by the above human activity?  
*Antara berikut yang manakah merupakan kesan ke atas persekitaran yang disebabkan oleh aktiviti manusia di atas ?*

- A Acid rain  
*Hujan asid*
- B Eutrofication  
*Eutrofikasi*
- C Greenhouse effect  
*Kesan rumah hijau*
- D Thinning of the ozone layer  
*Penipisan lapisan ozon*

50.

Diagram 30 shows some organisms living together on a tree

*Rajah 30 menunjukkan beberapa organism yang tinggal bersama di atas sebatang pokok.*

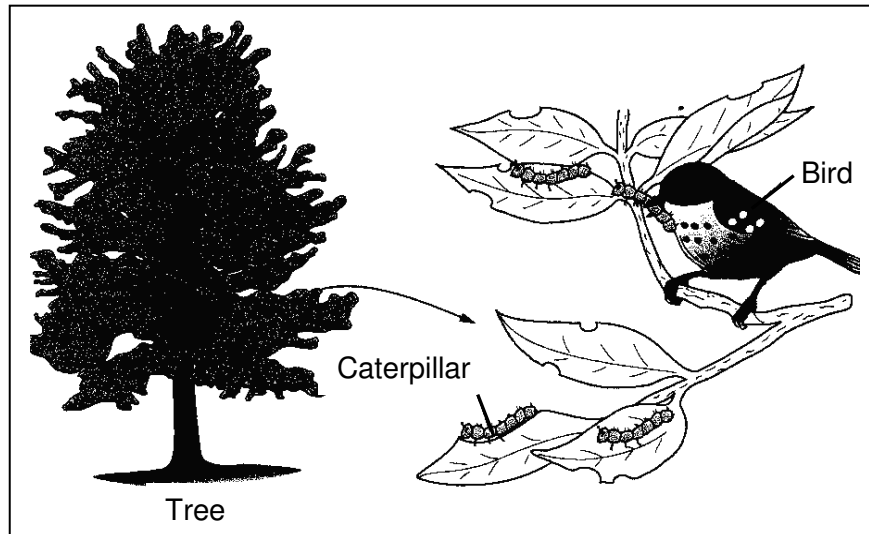


Diagram 30  
*Rajah 30*

Which of the following factors can destroy this interaction?

*Antara berikut yang manakah boleh memusnahkan hubungan ini ?*

- I Deforestation / *Penyahutan*
- II Use of pesticides / *Penggunaan racun serangga*
- III Acid rain / *Hujan asid*
- IV Thinning of the ozone layer / *Penipisan lapisan ozon*

A I, II and III

C II and III only

B I, II and IV

D I, II, III and IV

**INFORMATION FOR CANDIDATES**

1. *These question paper consists of 50 questions.*
2. *Answer **all** questions*
3. *Answer each question by blackening the correct space on the answer sheet.*
4. *Blacken **only one** space for each question.*
5. *If you wish to change your answer, erase the blackened mark that you have made. Then blacken the space for the new answer.*
6. *The diagrams in the questions provided are not drawn to scale unless stated.*
7. *You may use a non-programmable scientific calculator.*