

**SULIT**  
**4551/1**  
**BIOLOGI**  
**KERTAS 1**  
**SEPTEMBER**  
**2011**  
**1 ¼ jam**



## **PEPERIKSAAN PERCUBAAN BERSAMA SIJIL PELAJARAN MALAYSIA 2011**

**ANJURAN**  
**MAJLIS PENGETUA SEKOLAH MALAYSIA (MPSM)**  
**CAWANGAN PERLIS**

---

### **BIOLOGI**

**Kertas 1**

**Satu jam lima belas minit**

---

### **JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

1. Kertas soalan ini adalah dalam dwibahasa.
2. Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Melayu.
3. Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.

---

Kertas soalan ini mengandungi **32** halaman bercetak

**4551/1**

**[Lihat sebelah  
SULIT]**

1. The following informations are features of an organelle in a cell.

*Maklumat berikut adalah tentang ciri satu organel dalam sel.*

- Spherical or oblong shaped  
*Berbentuk sfera atau bujur*
- Smooth outer membrane and folded inner membrane  
*Membran luar licin dan membran dalam berlipat-lipat*

Which of the following organelle has features as stated above?

*Antara organel berikut yang manakah mempunyai ciri seperti di atas?*

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

2. Diagram 1 shows two cells, X and Y, which are stained with dilute iodine solution.

*Rajah 1 menunjukkan sel X dan sel Y yang telah diwarnakan dengan larutan iodin cair.*

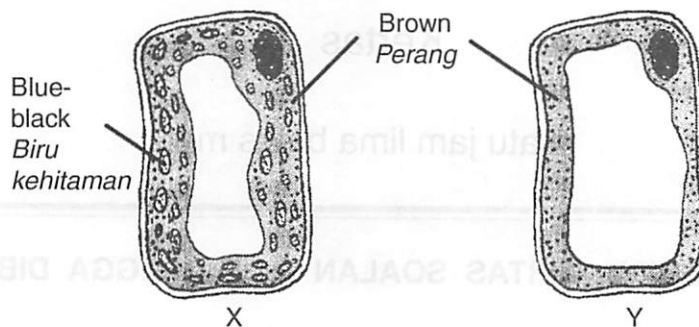


Diagram 1/Rajah 1

Which of the following explains why cell Y does not possess blue-black structure when it is stained with iodine solution?

*Antara yang berikut, yang manakah menerangkan mengapa sel Y tidak mempunyai struktur berwarna biru kehitaman apabila diwarnakan dengan larutan iodin?*

- A Cell Y does not possess centrioles.  
*Sel Y tidak mempunyai sentriol.*
- B Cell Y does not possess chloroplasts.  
*Sel Y tidak mempunyai kloroplas.*
- C Cell Y does not possess plasma membrane.  
*Sel Y tidak mempunyai membran plasma.*
- D Cell Y does not possess nucleus and cytoplasm.  
*Sel Y tidak mempunyai nukleus dan sitoplasma.*

3. Diagram 2 shows a structure of plasma membrane.  
*Rajah 2 menunjukkan struktur membran plasma.*

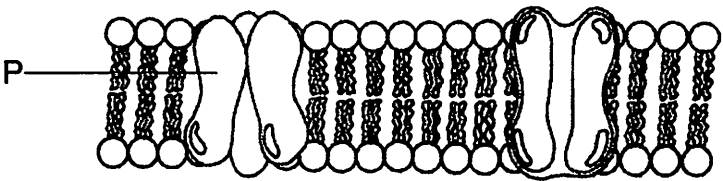


Diagram 2/Rajah 2

What is P?

*Apakah P?*

- A Cholesterol  
*Kolesterol*

C Carbohydrate  
*Karbohidrat*
- B Phospholipid  
*Fosfolipid*

D Carrier protein  
*Protein pembawa*
4. A cell is immersed in distilled water for 20 minutes. It is then taken out and immersed in 30% sucrose solution. Table 1 shows the observed condition of the cell.  
*Satu sel direndam dalam air suling selama 20 minit. Sel itu kemudian dikeluarkan dan direndam di dalam larutan sukrosa 30%. Jadual 1 menunjukkan pemerhatian ke atas keadaan sel tersebut.*

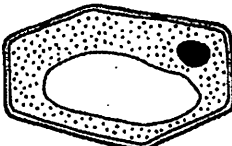
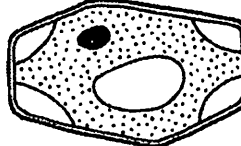
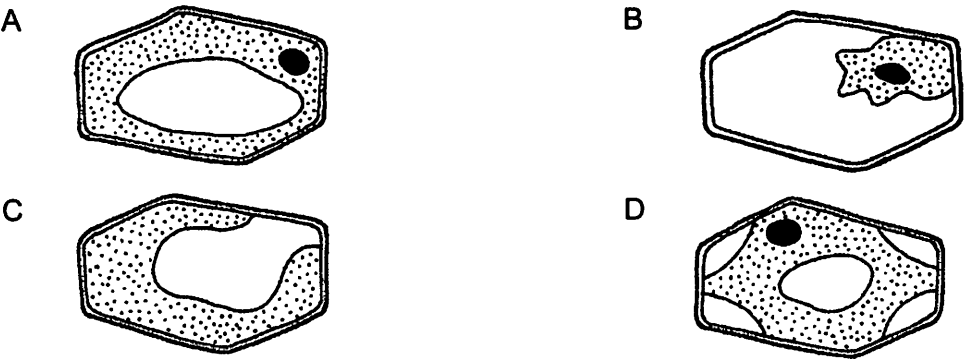
Condition of cell <i>Keadaan sel</i>		
Type of solution <i>Jenis larutan</i>	Distilled water <i>Air suling</i>	30% sucrose solution <i>Larutan sukrosa 30%</i>

Table 1/Jadual 1

If the cell is put back into the distilled water for 20 minutes, which condition of the cell would be expected?

*Jika sel itu dimasukkan semula dalam air suling selama 20 minit, yang manakah keadaan sel yang dijangkakan?*



5. Diagram 4 shows an experiment to investigate the changes of sucrose concentration in a visking tube.  
*Rajah 4 menunjukkan eksperimen untuk mengkaji perubahan kepekatan sukrosa dalam tiub visking.*

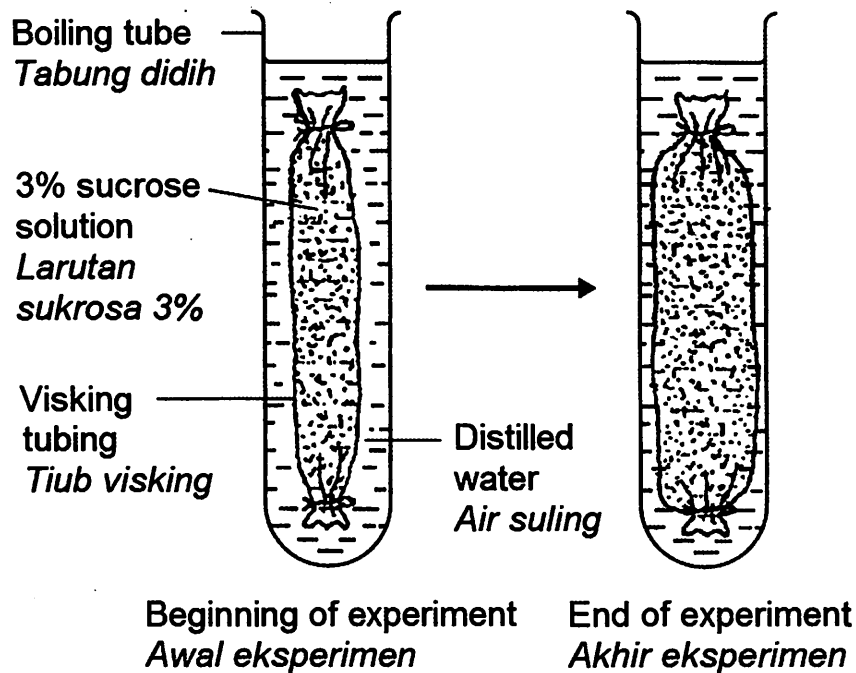
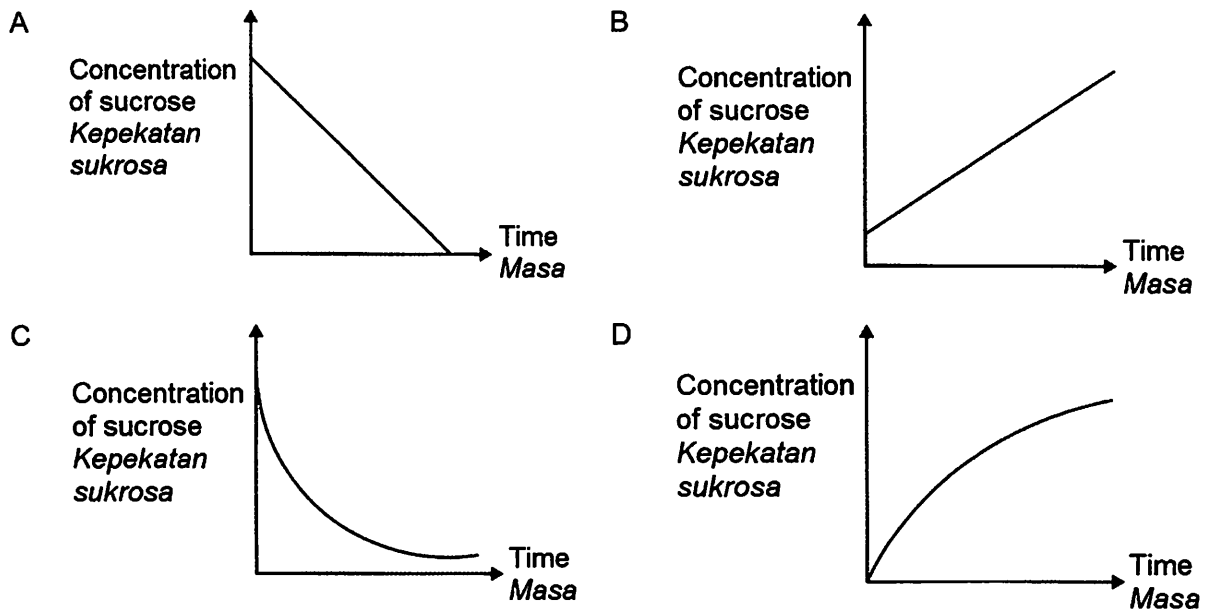


Diagram 4/Rajah 4

Which of the following graphs A, B, C or D represents the change?  
*Antara graf A, B, C dan D berikut, yang manakah mewakili perubahan itu?*



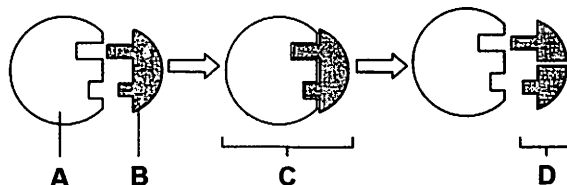


6. The figure shows the breaking down of a complex molecule by an enzyme.

Which of the molecules A, B, C or D, represents the substrate?

*Rajah menunjukkan proses penguraian molekul kompleks oleh enzim.*

***Antara molekul A, B, C dan D, yang manakah mewakili substrat?***



**Questions 7 and 8 are based on the experiment below.**

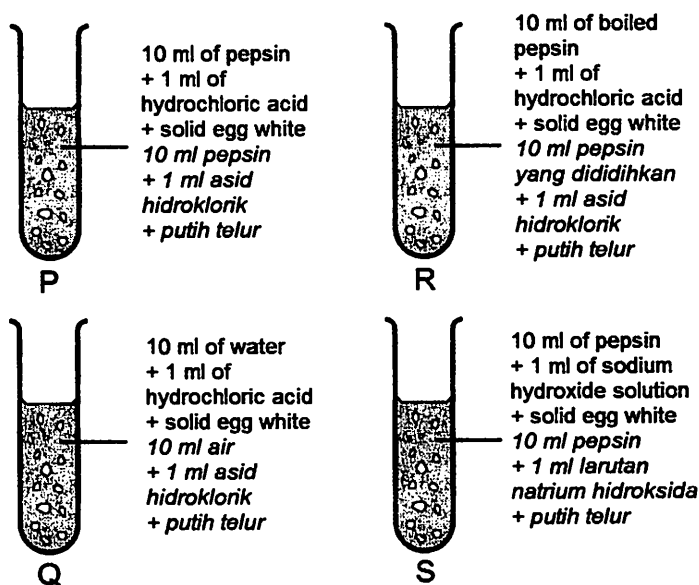
**Soalan 7 dan 8 adalah berdasarkan kepada eksperimen di bawah.**

**Diagram 5 shows an experiment to study the activity of enzyme.**

The test tubes are kept at 37°C for an hour.

**Rajah 5 menunjukkan satu eksperimen untuk mengkaji tentang aktiviti enzim.**

*Semua tabung uji tersebut dibiarkan pada suhu 37°C selama 1 jam.*



**Diagram 5/Rajah 5**

7. In which of the test tubes will the solid egg white disappear?

**Telur putih pepejal di dalam tabung uji manakah tidak akan kelihatan?**

- |  |  |
|--|--|
| <b>A</b> P only<br><i>P sahaja</i>             | <b>B</b> S only<br><i>S sahaja</i>             |
| <b>C</b> P and R only<br><i>P dan R sahaja</i> | <b>D</b> Q and S only<br><i>Q dan S sahaja</i> |

8. Which of the following is not true about this experiment?

*Antara berikut manakah tidak benar berkaitan eksperimen tersebut?*

- A Pepsin can digest solid egg white  
*Pepsin boleh mencernakan pepejal putih telur*
- B Pepsin is active in an acidic medium  
*Pepsin aktif dalam medium berasid*
- C Pepsin is active in an alkaline medium  
*Pepsin aktif dalam medium beralkali*
- D Pepsin is most active at 37°C  
*Pepsin bertindak paling aktif pada suhu 37°C*

9. Diagram 6 shows some stages of meiosis in a cell.

*Rajah 6 menunjukkan beberapa peringkat meiosis dalam suatu sel.*

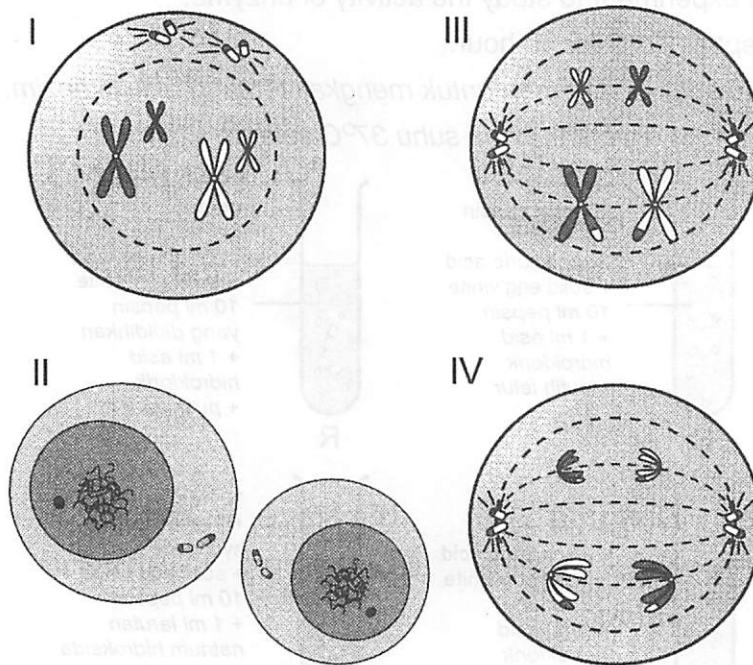


Diagram 6/Rajah 6

Which of the following is the correct sequence of the stages?

*Antara berikut, yang manakah merupakan urutan yang benar bagi peringkat-peringkat itu?*

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

10. A grasshopper has 8 chromosomes in its egg cell. Which of the following cells is the somatic cell of a grasshopper?  
*Seekor belalang mempunyai 8 kromosom di dalam sel telurnya. Antara sel-sel berikut, yang manakah merupakan sel soma bagi belalang?*

- A A cell with 4 chromosomes  
*Satu sel dengan 4 kromosom*  
 B A cell with 8 chromosomes  
*Satu sel dengan 8 kromosom*  
 C A cell with 4 pairs of chromosomes  
*Satu sel dengan 4 pasang kromosom*  
 D A cell with 8 pairs of chromosomes  
*Satu sel dengan 8 pasang kromosom*

11. Diagram 7 shows a cell at one particular stage of mitosis.  
*Rajah 7 menunjukkan satu sel pada satu peringkat mitosis.*

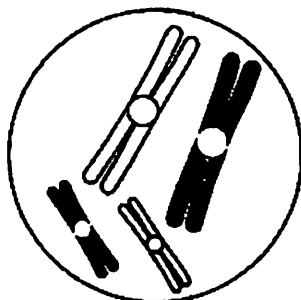
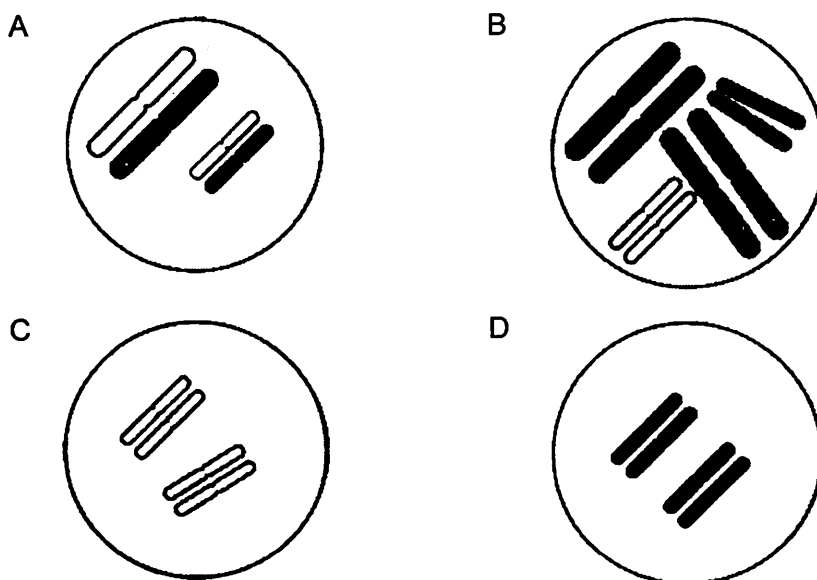


Diagram 7/Rajah 7

Which cell is produced by the cell division?  
*Sel manakah yang dihasilkan daripada pembahagian sel itu?*



12. Diagram 8 shows the process of cloning a sheep.  
*Rajah 8 menunjukkan proses pengklonan kambing biri-biri.*

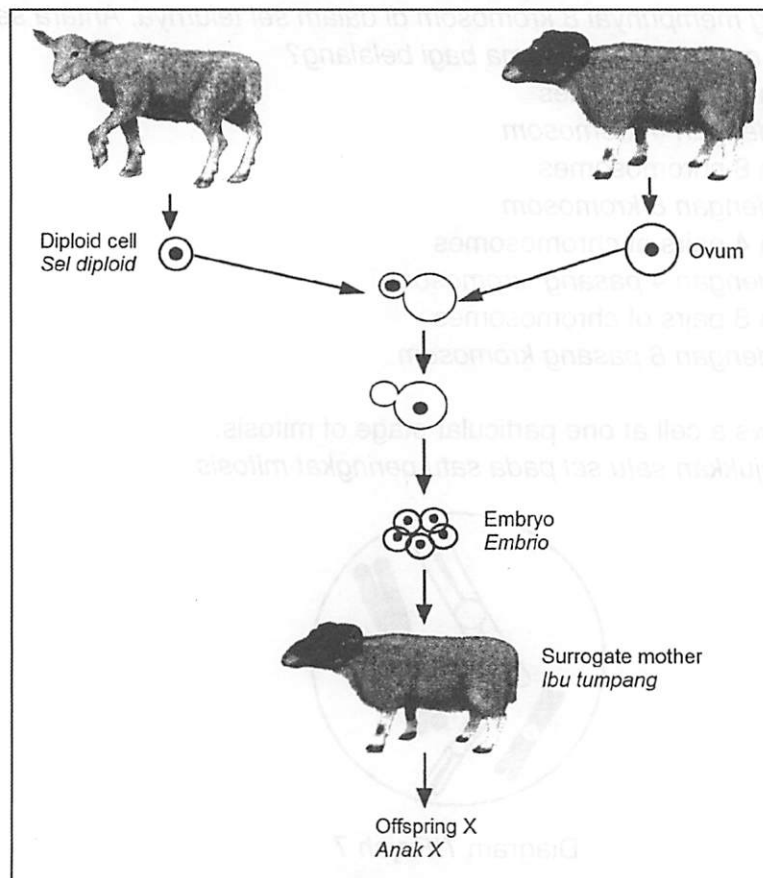
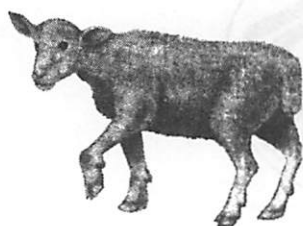


Diagram 8/Rajah 8

Which of the following is the offspring X?  
*Antara yang berikut, yang manakah anak X?*

A



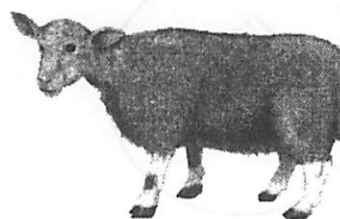
B



C



D



13. Diagram 9 shows a child with rickets.

*Rajah 9 menunjukkan seorang kanak-kanak yang mengalami penyakit riket.*

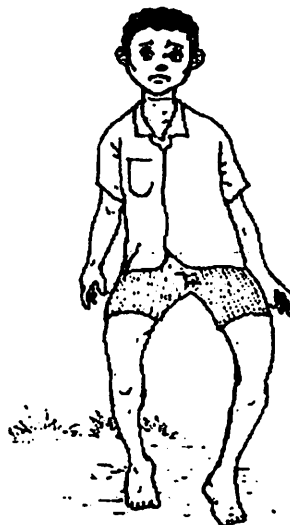


Diagram 9/Rajah 9

Which vitamin is he lacking?

*Apakah vitamin yang dia kekurangan?*

- A Vitamin B  
B Vitamin C  
C Vitamin D  
D Vitamin E
14. Which of the following method can improve the quality and quantity of food production?  
*Antara kaedah berikut manakah boleh meningkatkan kualiti dan kuantiti pengeluaran makanan?*
- I Selective breeding  
*Pemilihan baka*  
II Tissue culture  
*Kultur tisu*  
III Sterilizing the soil  
*Tanah yang di steril*  
IV Biological control of pest  
*Kawalan biologi haiwan perosak*
- A III and IV only  
*III dan IV sahaja*  
B I, II and IV only  
*I, II dan IV sahaja*  
C II, III and IV only  
*II, III dan IV sahaja*  
D I, II, III and IV  
*I, II, III dan IV*

[Lihat sebelah  
SULIT



15. Folic acid is needed by pregnant mothers to  
*Asid folik diperlukan oleh ibu yang hamil untuk*
- A produce red blood cell.  
*menghasilkan sel darah merah.*
  - B prevent muscle cramp.  
*mengelakkan kekejangan otot.*
  - C prevent the degeneration of blood vessel.  
*mengelakkan kemerosotan salur darah.*
  - D produce coenzymes for vitamin C.  
*menghasilkan koenzim untuk vitamin C.*
16. Diagram 10 is a graph showing the effect of light intensity on the rate of photosynthesis.  
*Rajah 10 ialah graf yang menunjukkan kesan keamatan cahaya ke atas kadar fotosintesis.*

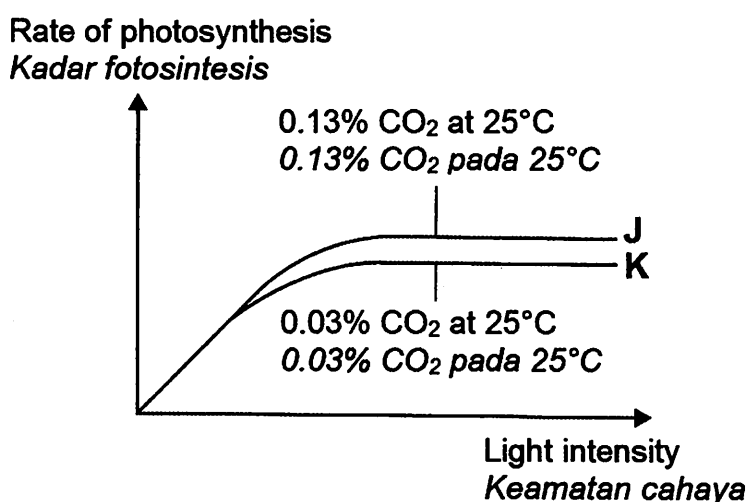


Diagram 10/Rajah 10

Which of the following can be concluded about the rate of photosynthesis between the curves J and K?

*Antara yang berikut, yang manakah boleh dirumuskan tentang kadar fotosintesis di antara lengkung J dan K?*

- A It is not influenced by the concentration of carbon dioxide.  
*Tidak dipengaruhi oleh kepekatan karbon dioksida.*
- B It is limited by the concentration of carbon dioxide.  
*Dihadkan oleh kepekatan karbon dioksida.*
- C It is limited by the light intensity.  
*Dihadkan oleh keamatan cahaya.*
- D It is not influenced by the temperature.  
*Tidak dipengaruhi oleh suhu.*

17. The following information shows the results of an experiment to determine the energy value of a cashew nut.

*Maklumat berikut menunjukkan keputusan suatu eksperimen untuk menentukan nilai tenaga sebiji kacang gajus.*

The mass of cashew nut	= 9 g
<i>Jisim kacang gajus</i>	
The volume of distilled water	= 20 ml
<i>Isipadu air suling</i>	
The density of water	= 1 g ml <sup>-1</sup>
<i>Ketumpatan air</i>	
Initial water temperature	= 29°C
<i>Suhu awal air</i>	
Final water temperature	= 38°C
<i>Suhu akhir air</i>	

Calculate the energy value of the cashew nut using the following formula below:

*Hitung nilai tenaga kacang gajus itu dengan menggunakan formula di bawah:*

Energy value =	$\frac{4.2 \text{ J g}^{-1} \text{ }^{\circ}\text{C} \times \text{mass of water (g)} \times \text{increase in temperature (}^{\circ}\text{C)}}{\text{Mass of cashew nut (g)}}$
Nilai tenaga =	$\frac{4.2 \text{ J g}^{-1} \text{ }^{\circ}\text{C} \times \text{jisim air (g)} \times \text{peningkatan suhu (}^{\circ}\text{C)}}{\text{Jisim kacang gajus (g)}}$

- A 4.2 J g<sup>-1</sup>
- B 84.0 J g<sup>-1</sup>
- C 93.3 J g<sup>-1</sup>
- D 840.0 J g<sup>-1</sup>

18. Diagram 11 shows a cross section of an alveolus in the lung of a mammal.  
*Rajah 11 menunjukkan keratan rentas satu alveolus di dalam paru-paru mamalia.*

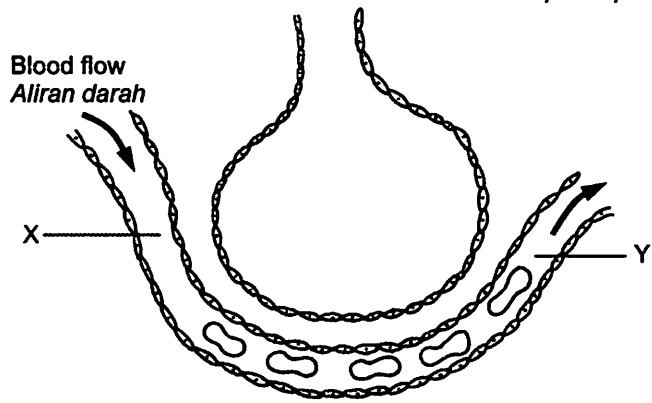


Diagram 11/Rajah 11

Which of the following is correct about oxygen and carbon dioxide concentrations at X and Y?  
*Manakah antara berikut yang benar tentang kepekatan oksigen dan karbon dioksida pada X dan Y?*

Oxygen Oksigen		Carbon dioxide Karbon dioksida	
X	Y	X	Y
A Low <i>Rendah</i>	High <i>Tinggi</i>	High <i>Tinggi</i>	Low <i>Rendah</i>
B High <i>Tinggi</i>	Low <i>Rendah</i>	Rendah <i>Low</i>	High <i>Tinggi</i>
C High <i>Tinggi</i>	Low <i>Rendah</i>	High <i>Tinggi</i>	Low <i>Rendah</i>
D Low <i>Rendah</i>	High <i>Tinggi</i>	Low <i>Rendah</i>	High <i>Tinggi</i>

19. Which of the following adaptations is meant to increase the efficiency of gaseous exchange in plants?  
*Manakah antara berikut merupakan adaptasi untuk meningkatkan keberkesanan pertukaran gas di dalam tumbuhan?*
- A Dropping the old leaves  
*Menggugurkan daun tua*
- B Having a large number of leaves  
*Mempunyai bilangan daun yang banyak*
- C More stomata in the upper epidermis  
*Lebih banyak stomata di bahagian epidermis atas*
- D Having the intercellular spaces filled with fluid  
*Mempunyai cecair di ruang antara sel.*

20. Diagram 12 shows an experimental set up used to show yeast fermentation.  
*Rajah 12 menunjukkan susunan radas untuk menunjukkan proses penapaian yis.*

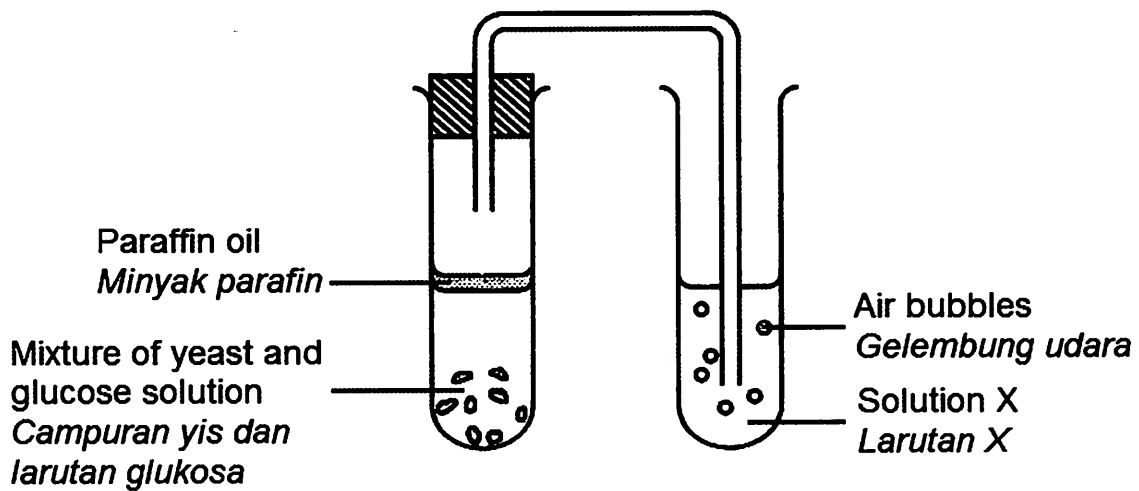


Diagram 12/Rajah 12

Which of the following solution can be used to test the gas produced?  
*Manakah antara larutan berikut boleh digunakan untuk menguji gas yang terhasil?*

- I Alkaline potassium pyrogallate solution  
*Larutan potassium pirogalat beralkali*
  - II Bicarbonate indicator solution  
*Larutan penunjuk bikarbonat*
  - III Iodine solution  
*Larutan iodin*
  - IV Lime water  
*Air kapur*
- 
- A II and III only  
*II dan III sahaja*
  - B I and III only  
*I dan III sahaja*
  - C II and IV only  
*II dan IV sahaja*
  - D III and IV only  
*III dan IV sahaja*

21. Diagram 13 shows a model of a rib cage prepared by a student to study the respiratory mechanism in humans.

*Rajah 13 menunjukkan model sangkar rusuk yang disediakan oleh seorang pelajar untuk mengkaji mekanisme respirasi manusia.*

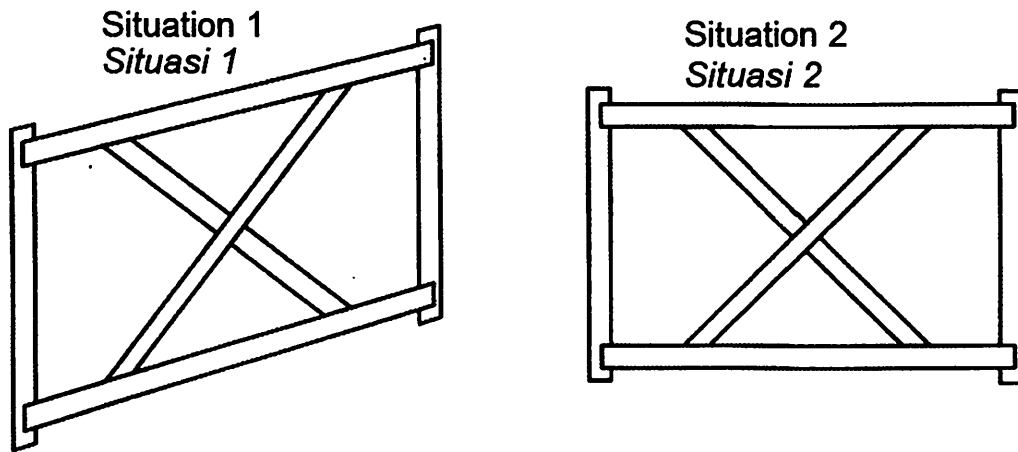


Diagram 13/Rajah 13

Which of the following will happen if the position of the ribs is changed from situation 1 to situation 2?

*Antara yang berikut, yang manakah akan berlaku sekiranya kedudukan tulang rusuk itu bertukar dari situasi 1 ke situasi 2?*

- |     |  |
|-----|--|
| I   | The pressure in the lungs increases.<br><i>Tekanan di dalam paru meningkat.</i>                |
| II  | The volume of the thoracic cavity decreases.<br><i>Isipadu rongga toraks berkurang.</i>        |
| III | The rib cage moves upwards and outwards.<br><i>Sangkar rusuk bergerak ke atas dan ke luar.</i> |
| IV  | Inhalation takes place.<br><i>Penyedutan nafas berlaku.</i>                                    |
| A   | I and II only<br><i>I dan II sahaja</i>  |
| B   | III and IV only<br><i>III dan IV sahaja</i>  |
| C   | I, III and IV only<br><i>I, III dan IV sahaja</i>  |
| D   | I, II, III and IV<br><i>I, II, III dan IV</i>  |



22. The following information is about a sampling technique to estimate the population size of garden snails in a habitat.

*Maklumat berikut adalah tentang teknik persampelan untuk menganggar saiz populasi siput babi dalam satu habitat.*

- P - Capture at random a number of garden snails and record the number which are marked.  
*Tangkap secara rawak siput babi dan catat bilangan yang bertanda.*
- Q - Release the garden snails in the same habitat.  
*Lepaskan semula siput babi dalam habitat yang sama.*
- R - Capture a large number of garden snails and mark each shell.  
*Tangkap sejumlah besar siput babi dan tandakan setiap cengkerang.*
- S - Calculate the population of the garden snails.  
*Hitung populasi siput babi.*

Which sequence is correct?

*Urutan manakah yang betul?*

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

23. Which of the following are abiotic components in an ecosystem?

*Antara yang berikut, yang manakah merupakan komponen abiotik dalam suatu ekosistem?*

- I Consumer  
*Pengeluar*
- II Humidity  
*Kelembapan*
- III Decomposer  
*Pengurai*
- IV Light intensity  
*Keamatan cahaya*

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

24. Diagram 14 shows an interaction between two organisms.  
*Rajah 14 menunjukkan interaksi antara dua organisma.*

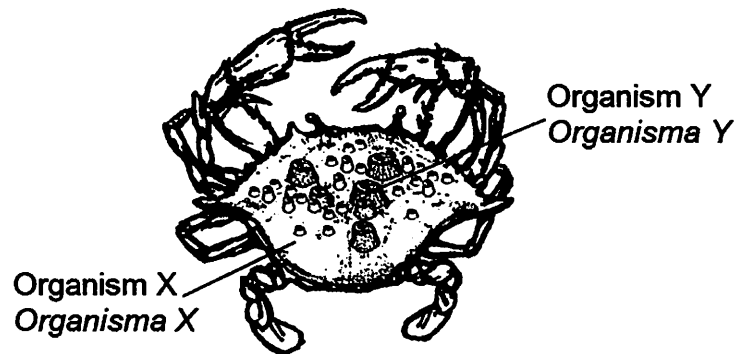


Diagram 14/Rajah 14

What is the type of interaction shown?

*Apakah jenis interaksi yang ditunjukkan?*

- |                                       |                                       |
|---------------------------------------|---------------------------------------|
| A Commensalism<br><i>Komensalisme</i> | B Mutualism<br><i>Mutualisme</i>      |
| C Parasitism<br><i>Parasitisme</i>    | D Saprophytism<br><i>Saprofitisme</i> |

25. The following information shows a type of epiphyte in a habitat.  
*Maklumat berikut menunjukkan sejenis epifit dalam satu habitat.*

Habitat: Tree trunk

*Habitat : Batang pokok*

Type of epiphyte on tree trunk: Unicellular alga, *Pleurococcus*

*Jenis epifit pada batang pokok: Alga unisel Pleurococcus*

Which of the following is most suitable to estimate the coverage of *Pleurococcus* species?

*Antara yang berikut, yang manakah paling sesuai untuk menganggar litupan spesies Pleurococcus?*

- |  |
|--|
| A A transparent quadrat of 1 cm x 1 cm<br><i>Satu kuadrat lutsinar 1 cm x 1 cm</i>           |
| B A transparent quadrat of 10cmx10cm<br><i>Satu kuadrat lutsinar 10 cm x 10 cm</i>           |
| C An iron frame quadrat of 10 cm x 10 cm<br><i>Satu kuadrat besi 10 cm x 10 cm</i>           |
| D Belt transect using nail and string<br><i>Garis transek yang menggunakan paku dan tali</i> |

26. Table 2 shows the number of plant P present in 10 different quadrats, each measuring 1 m x 1 m.

*Jadual 2 menunjukkan bilangan tumbuhan P dalam 10 kuadrat yang berlainan. setiap satu berukuran 1 m x 1 m.*

Quadrat number <i>Nombor kuadrat</i>	I	II	III	IV	V	VI	VII	VIII	IX	X
Number of plant P <i>Bilangan tumbuhan P</i>	14	10	0	22	18	16	12	0	15	13

Table 2/Jadual 2

Calculate the density of P.

*Hitung kepadatan P.*

- A    8 m<sup>-2</sup>  
B    12 m<sup>-2</sup>  
C    15 m<sup>-2</sup>  
D    120 m<sup>-2</sup>
27. The following steps are carried out to reduce damage to the environment.  
*Langkah-langkah berikut dilaksanakan untuk mengurangkan kemusnahan terhadap alam sekitar.*
- I    Replanting trees  
      *Menanam semula pokok*
  - II   Sharing transport  
      *Berkongsi kenderaan*
  - III Reducing the usage of fossil fuel  
      *Mengurangkan penggunaan bahan api fosil*
  - IV Reducing the leftovers of industrial solid waste  
      *Mengurangkan pembuangan sisa pepejal industry*

Which of the following steps can help to reduce the problem of global warming?

*Antara langkah-langkah berikut, yang manakah boleh membantu mengurangkan masalah pemanasan global?*

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

28. Which of the following activities causes the thinning of the ozone layer?

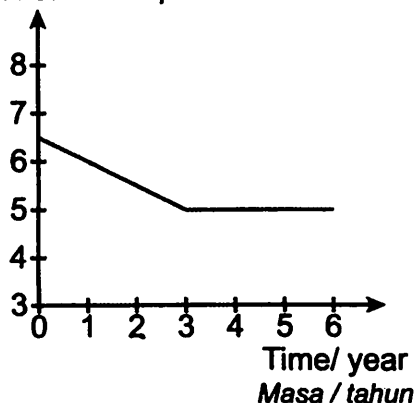
*Antara aktiviti-aktiviti berikut, yang manakah menyebabkan penipisan lapisan ozon?*

- A Burning of fossil fuels  
*Pembakaran bahan api fosil*
- B Throwing of rubbish into the rivers  
*Pembuangan sampah ke dalam sungai*
- C Use of substances that contains chlorine  
*Penggunaan bahan-bahan yang mengandungi klorin*
- D Construction of glass buildings  
*Pembinaan bangunan-bangunan berkaca*

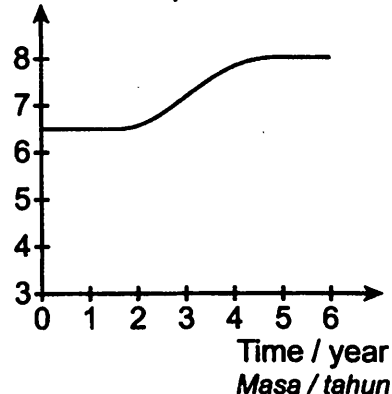
29. The acidic chemical waste from a factory is drained into a lake. Which of the following graphs shows the changes in pH value of the lake water over a period of six years?

*Sisa kimia yang berasid daripada sebuah kilang dialirkan ke sebuah tasik. Antara graf-graf berikut, yang manakah menunjukkan perubahan nilai pH air tasik dalam tempoh enam tahun?*

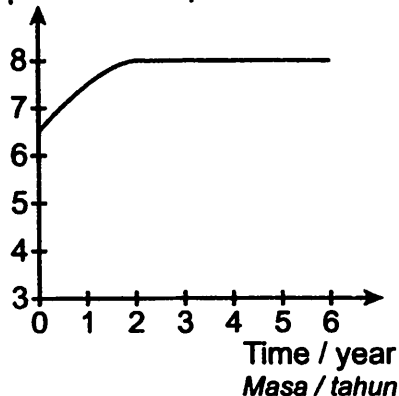
A pH of water / pH air



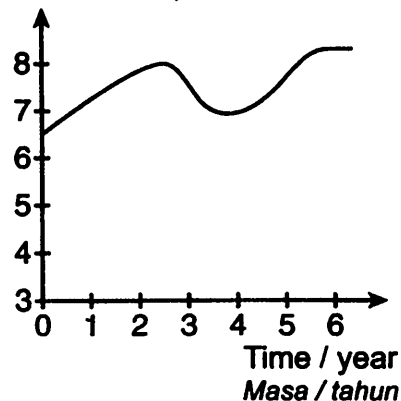
B pH of water / pH air



C pH of water / pH air



D pH of water / pH air



30. Which of the following **is not** a function of the lymphatic system?

*Antara pernyataan berikut, yang manakah **bukan** fungsi sistem limfa?*

- A Lymph nodes destroy old red blood cells.  
*Nodus limfa memusnahkan sel darah merah (eritrosit) yang lama.*
- B Lacteals transport fatty acids and glycerol from the small intestine.  
*Lakteal mengangkut asid lemak dan gliserol dari usus kecil.*
- C Lymph vessels return interstitial fluid into the circulatory system.  
*Salur limfa mengembalikan bendalir interstis ke dalam sistem peredaran.*
- D Lymph transports lymphocytes throughout the body.  
*Limfa mengangkut limfosit ke seluruh bahagian badan.*

31. Diagram 15 shows a type of vascular tissue found in plants.

*Rajah 15 menunjukkan sejenis tisu vaskular yang terdapat dalam tumbuhan.*

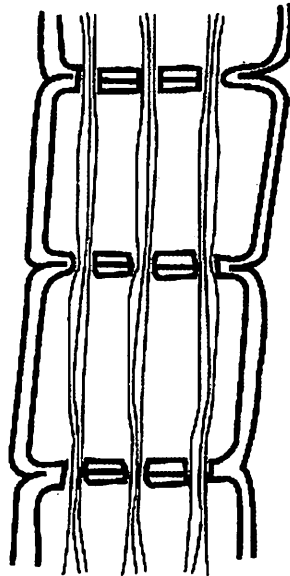


Diagram 15/Rajah 15

Which substance is transported by this tissue in a plant?

*Bahan yang manakah diangkut oleh tisu ini dalam tumbuhan?*

- A Water  
*Air*
- B Glucose  
*Glukosa*
- C Oxygen  
*Oksigen*
- D Mineral salts  
*Garam mineral*



32. Which types of leucocytes are capable of carrying out phagocytosis?  
*Antara leukosit berikut, manakah boleh menjalankan proses fagositosis?*
- I Basophils  
*Basofil*

II Eosinophils  
*Eosinofil*

III Neutrophils  
*Neutrofil*

IV Monocytes  
*Monosit*
- A I and II only  
*I dan II sahaja*

B III and IV only  
*III dan IV sahaja*

C I, II and IV only  
*I, II dan IV sahaja*

D II, III and IV only  
*II, III dan IV sahaja*

33. Diagram 16 shows part of the tracheal system of insects.  
*Rajah 16 menunjukkan sebahagian pada sistem trakea pada serangga.*

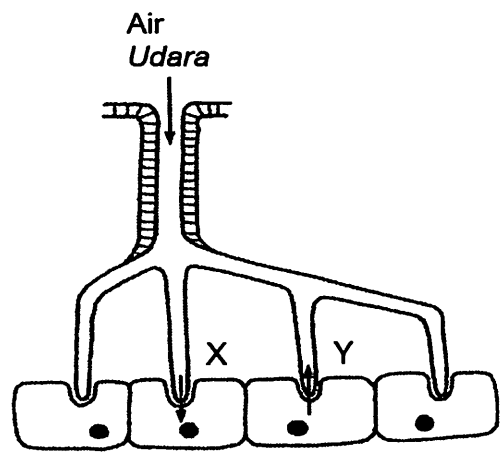


Diagram 16/Rajah 16

What are substances X and Y?  
*Apakah bahan X dan Y?*

	X	Y
A	Oxygen <i>Oksigen</i>	Carbon dioxide <i>Karbon dioksida</i>
B	Carbon dioxide <i>Karbon dioksida</i>	Oxygen <i>Oksigen</i>
C	Oxygen <i>Oksigen</i>	Water <i>Air</i>
D	Water <i>Air</i>	Oxygen <i>Oksigen</i>

34. Diagram 17 shows the lymphatic system.

*Rajah 17 menunjukkan sistem limfa.*

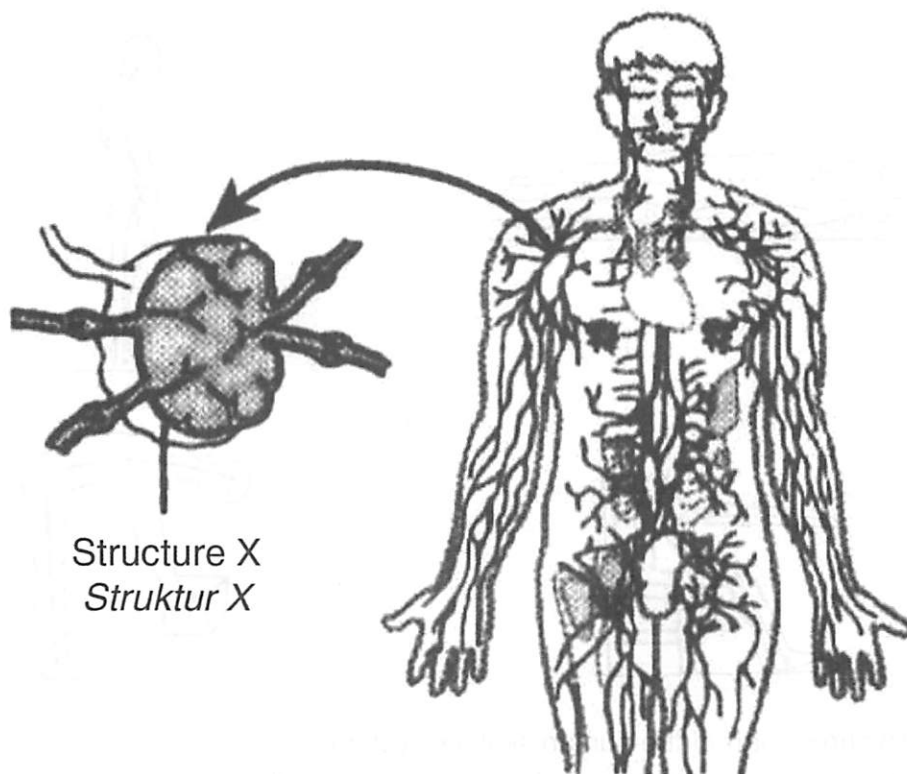


Diagram 17/Rajah 17

Which of the following are functions of structure X?

*Antara berikut manakah merupakan fungsi struktur X?*

- I It filters out foreign particles.  
*Ia menapis keluar partikel asing.*
- II Macrophages in X engulf and destroy bacteria.  
*Makrofaj di X mengepung dan memusnahkan bakteria.*
- III Lymphocytes in X produce antibodies to destroy antigens.  
*Limfosit di X menghasilkan antibody untuk memusnahkan antigen.*
- IV It prevents accumulation of tissue fluid.  
*Ia menghalang pengumpulan cecair tisu.*

A I and III only  
*I dan III sahaja*

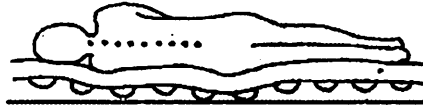
B I, II and III only  
*I, II dan III sahaja*

C I, II and IV only  
*I, II dan IV sahaja*

D I, II, III and IV only  
*I, II, III dan IV sahaja*

35. Which of the following shows a good posture?  
 Antara berikut, yang manakah menunjukkan posisi badan yang baik?

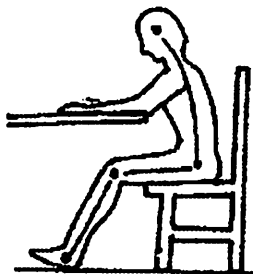
A



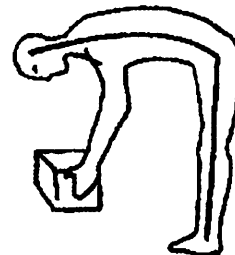
B



C



D



36. Diagram 18 shows part of the human skeletal system.  
 Rajah 18 menunjukkan sebahagian daripada sistem rangka manusia.

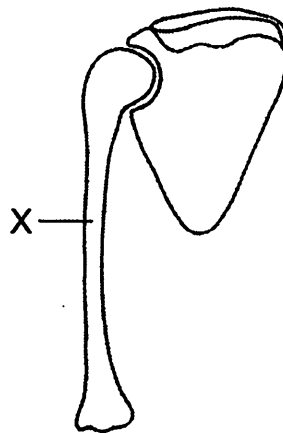


Diagram 18/Rajah 18

What is X?

Apakah X?

A Ulna

Ulna

C Humerus

Humerus

B Scapula

Skapula

D Clavicle

Klavikel

37. Diagram 19 shows the forearm of humans.

*Rajah 19 menunjukkan lengan manusia.*

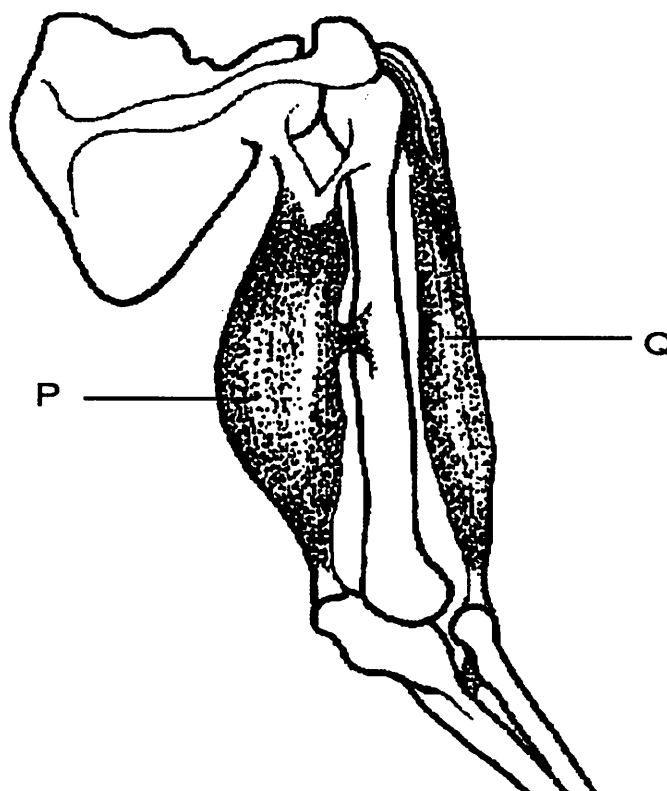


Diagram 19/Rajah 19

Which of the following makes the forearm bends upward?

*Antara berikut, yang manakah menyebabkan lengan dibengkokkan ke atas?*

- A Muscle P contracts.  
*Otot P mengecut.*
- B Muscle Q contracts.  
*Otot Q mengecut.*
- C Muscle P and and muscle Q contract.  
*Otot P dan otot Q mengecut.*
- D Muscle P and the muscle Q relax.  
*Otot P dan otot Q mengendur.*

38. Diagram 20 below shows a synapse at the nerve ending.

*Rajah 20 menunjukkan sinaps pada hujung saraf.*

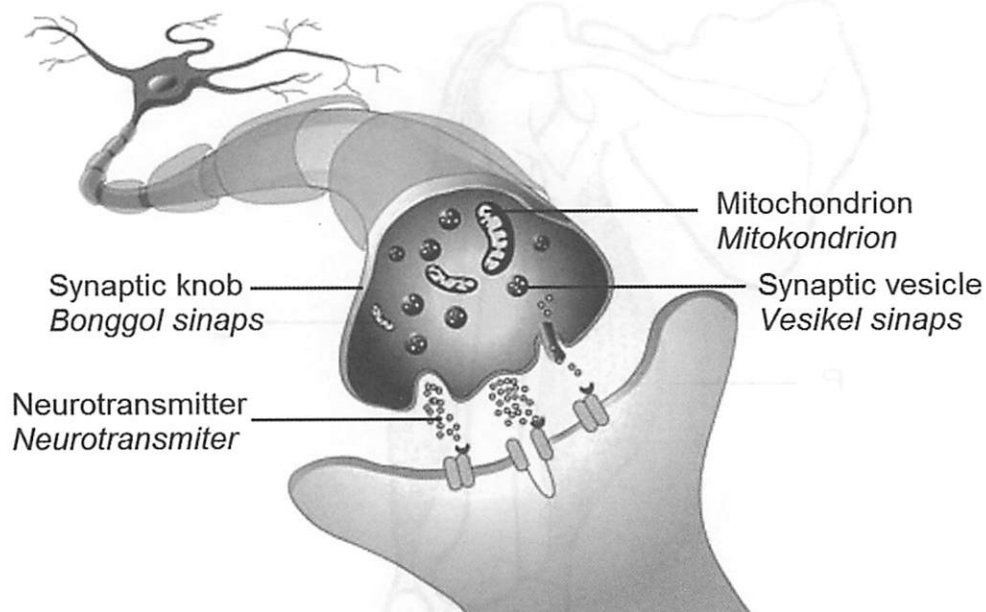


Diagram 20/Rajah 20

Neurotransmitters are released into the synapse when an impulse arrived at the synaptic knob. Which of the following are examples of neurotransmitters?

*Neurotransmitter dirembes ke dalam sinaps apabila impuls tiba di bonggol sinaps.*

*Manakah antara berikut merupakan contoh neurotransmitter?*

I Dopamine

*Dopamine*

II Adrenaline

*Adrenalin*

III Noradrenaline

*Noradrenalin*

IV Acetylcholine

*Asetilkolin*

A I, II and III

*I, II dan III*

C II, III and IV

*II, III dan IV*

B I, II and IV

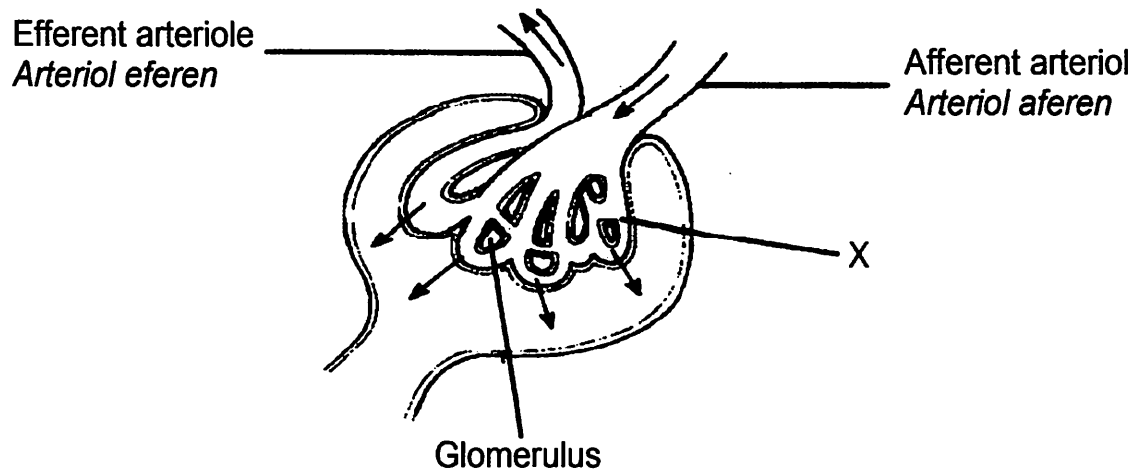
*I, II dan IV*

D I, III and IV

*I, III dan IV*



39. Diagram 21 shows ultrafiltration that occurs in kidney.  
*Rajah 21 menunjukkan ultraturasan yang berlaku dalam ginjal.*



Which of the following substances **cannot** move across X?  
*Bahan manakah antara berikut, **tidak boleh** merentasi X?*

- A Fibrinogen  
*Fibrinogen*
- B Glucose  
*Glukosa*
- C Water molecule  
*Molekul air*
- D Urea  
*Urea*

40. Diagram 22 shows part of the nervous system, including a reflex arc. It has been cut at X. The finger is pricked by a thumbtack, as shown.  
*Rajah 22 menunjukkan sebahagian daripada sistem saraf, termasuk arka reflex. Ia telah terpotong di bahagian bertanda X. Jari itu telah tertusuk paku tekan, seperti ditunjukkan.*

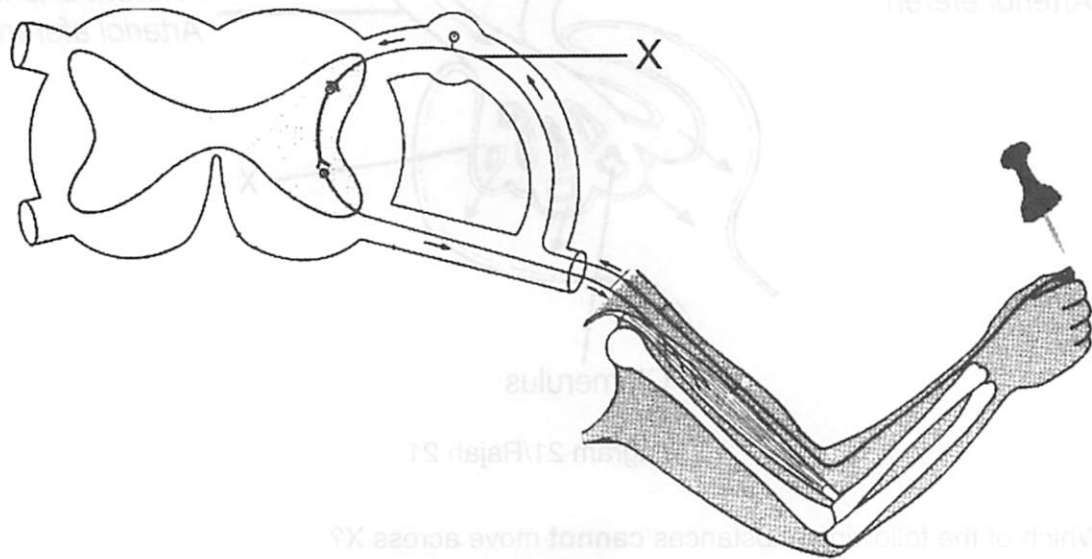


Diagram 22/Rajah 22

What are the effects of the prick?  
*Apakah kesan akibat tusukan itu?*

	Pain felt Rasa sakit	Arm moved Penarikan tangan
A	No <i>Tidak</i>	No <i>Tidak</i>
B	No <i>Tidak</i>	Yes <i>Ya</i>
C	Yes <i>Ya</i>	No <i>Tidak</i>
D	Yes <i>Ya</i>	Yes <i>Ya</i>

41. Which method of family planning prevents ovulation?  
*Manakah cara perancangan keluarga di bawah yang boleh menghalang ovulasi?*

- A Use of IUDs  
*Penggunaan IUD*

C Using diaphragm  
*Menggunakan diafragma*
- B Tubal ligation  
*Ligasi tubul*

D Consuming contraceptive pills  
*Mengambil pil perancang*

42. Diagram 23 shows part of a flower at one stage during reproduction.

*Rajah 23 menunjukkan bahagian pada sekuntum bunga pada satu peringkat semasa proses persenyawaan.*

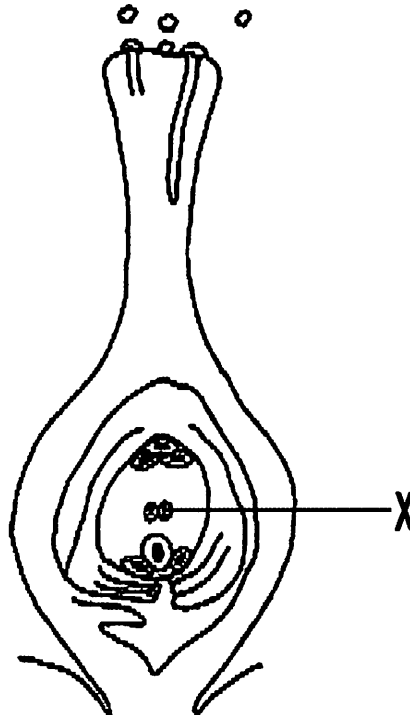


Diagram 23/Rajah 23

Which of the following is structure X?

*Manakah antara berikut merupakan struktur X?*

- A Polar nuclei  
*Nukleus kutub*
- B Pollen grain  
*Butir debunga*
- C Synergid cell  
*Sel sinergid*
- D Antipodal cell  
*Sel antipodal*

43. Diagram 24 shows the sigmoid curve of growth of an organism.  
*Rajah 24 menunjukkan lengkung sigmoid bagi pertumbuhan suatu organisma.*

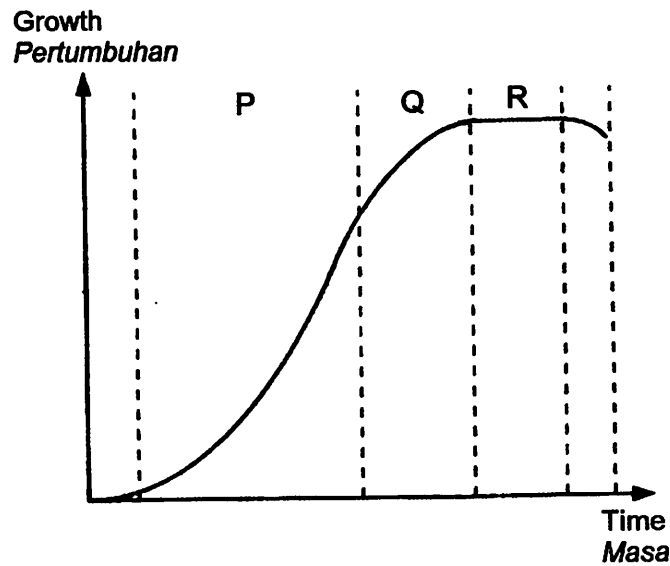


Diagram 24/Rajah 24

Which of the following shows the growth rates at parts P, Q and R?  
*Manakah di antara berikut menerangkan kadar pertumbuhan di bahagian P, Q and R?*

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

44. The following sequence is related to human spermatogenesis process.  
*Urutan berikut berkaitan dengan proses spermatogenesis manusia.*

Germinal epithelial cell → X → Primary spermatogonia → Y → Spermatids  
*Sel germa epitelial → X → Spermatogonium primer → Y → Spermatid*

Which of the following is true on the chromosomal numbers of both X and Y?  
*Antara berikut, manakah benar tentang bilangan kromosom bagi X dan Y?*

	X	Y
A	23	46
B	46	23
C	46	46
D	23	23

45. Diagram 25 shows a part of the DNA structure.  
*Rajah 25 menunjukkan sebahagian struktur DNA.*

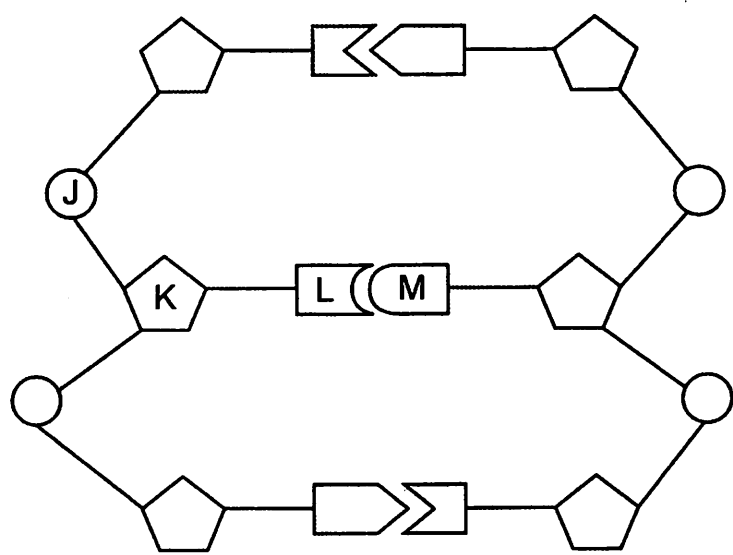


Diagram 25/Rajah 25

Which of the following represent J, K, L and M?  
*Yang manakah mewakili J, K, L dan M?*

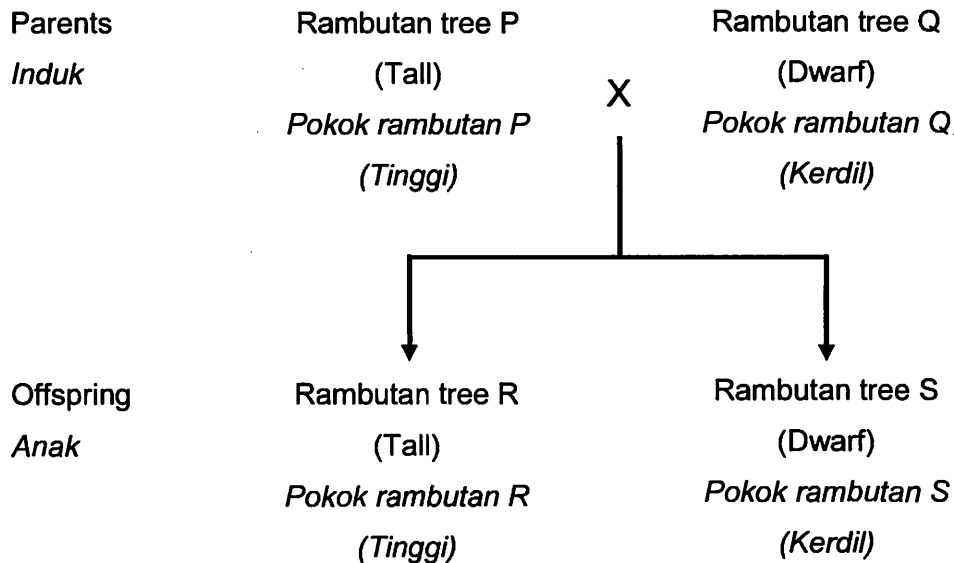
	J	K	L	M
A	Deoxyribose Sugar <i>Gula Deoksiribosa</i>	Nitrogenous Base <i>Bes Bernitrogen</i>	Phosphate Group <i>Kumpulan Fosfat</i>	Phosphate Group <i>Kumpulan Fosfat</i>
B	Phosphate Group <i>Kumpulan Fosfat</i>	Deoxyribose Sugar <i>Gula Deoksiribosa</i>	Nitrogenous Base <i>Bes Bernitrogen</i>	Nitrogenous Base <i>Bes Bernitrogen</i>
C	Phosphate Group <i>Kumpulan Fosfat</i>	Nitrogenous Base <i>Bes Bernitrogen</i>	Deoxyribose Sugar <i>Gula Deoksiribosa</i>	Phosphate Group <i>Kumpulan Fosfat</i>
D	Nitrogenous Base <i>Bes Bernitrogen</i>	Deoxyribose Sugar <i>Gula Deoksiribosa</i>	Nitrogenous Base <i>Bes Bernitrogen</i>	Phosphate Group <i>Kumpulan Fosfat</i>

46. The allele for black hair in human is dominant to the allele for brown hair. A man with black hair is heterozygous while his wife has brown hair. What is the probability of getting a child with brown hair?  
*Alel rambut hitam pada manusia adalah dominan kepada alel rambut coklat. Seorang lelaki berambut hitam adalah heterozigot manakala isteri berambut coklat. Apakah kebangkalian untuk mendapat anak berambut coklat?*

- A 1
- B 3/4
- C 1/2
- D 1/4

47. The figure shows a monohybrid cross between a rambutan tree P and a rambutan tree Q. 50% of the offspring are tall and 50% are dwarf.

*Rajah menunjukkan kacukan monohibrid antara pokok rambutan P dengan pokok rambutan Q. 50% daripada anaknya adalah tinggi dan 50% lagi adalah kerdil.*

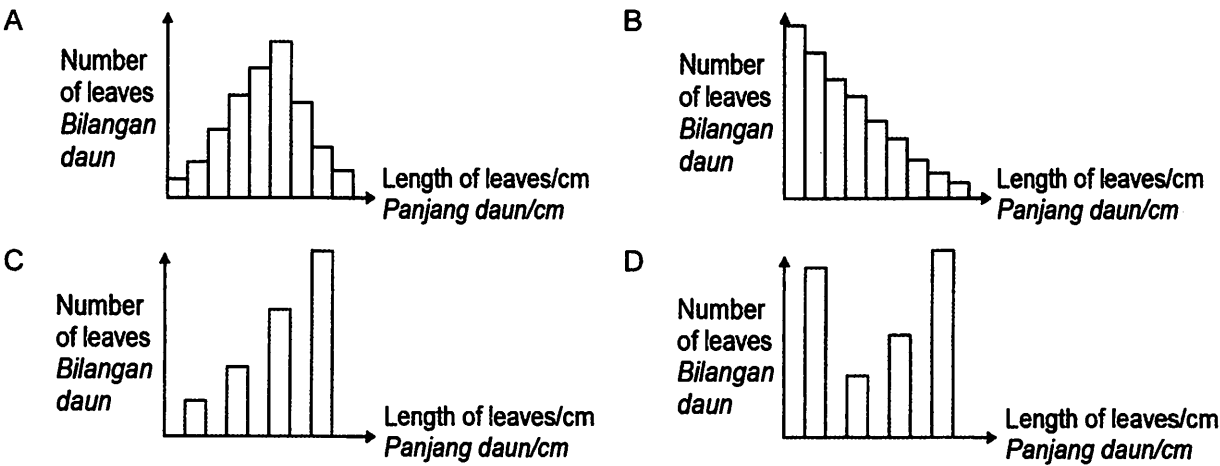


If rambutan tree R is crossed with rambutan tree S, what percentage of the trees produced will be dwarfed?

*Jika pokok rambutan R dikacukkan dengan pokok rambutan S, berapa peratus pokok rambutan yang dihasilkan adalah kerdil?*

- A 0%  
 B 25%  
 C 50%  
 D 75%
48. Which of the following examples is continuous variation?  
*Antara yang berikut, yang manakah merupakan contoh variasi selanjar?*
- A Blood group  
*Kumpulan darah*  
 B Rhesus factor  
*Faktor Rhesus*  
 C Width of palm  
*Lebar tapak tangan*  
 D Fingerprint pattern  
*Corak cap jari*

49. The durian tree has leaves of various sizes. Which of the following graphs represents the variation shown by the characteristic of the leaves?  
*Pokok durian mempunyai daun-daun yang pelbagai saiz. Antara graf berikut, manakah mewakili variasi yang ditunjukkan oleh ciri daun pokok tersebut?*



50. Table 3 shows the results of blood group tests from donors P, Q, R and S.  
*Jadual 3 menunjukkan satu keputusan ujian darah dari penderma P, Q, R dan S.*

Donor Penderma	Anti-A Anti-A	Anti-B Anti-B
P	No agglutination Tiada pengumpalan	No agglutination Tiada pengumpalan
Q	Agglutination Pengumpalan	Agglutination Pengumpalan
R	No agglutination Tiada pengumpalan	Agglutination Pengumpalan
S	Agglutination Pengumpalan	No agglutination Tiada pengumpalan

Table 3/Jadual 3

Which of the following blood groups of P, Q, R and S is true?  
*Antara yang berikut, manakah kumpulan darah bagi P, Q, R dan S yang betul?*

**A**

**B**

**C**

**D**

Individual Individu	Blood group Kumpulan darah
P	A
Q	O
R	B
S	AB

END OF QUESTION PAPER



**INFORMATION FOR CANDIDATES**  
**MAKLUMAT UNTUK CALON**

1. This question paper consists of 50 questions  
*Kertas soalan ini mengandungi 50 soalan.*
2. Answer **all** questions.  
*Jawab **semua** soalan.*
3. Answer each question by blackening the correct space on the answer sheet.  
*Jawab dengan menghitamkan ruangan yang betul pada kertas jawapan.*
4. Blacken only **one** space for each question.  
*Hitamkan **satu** ruangan sahaja bagi setiap soalan.*
5. If you wish to change your answer, erase the blackened mark that you have made. Then blacken the space for the new answer.  
*Sekiranya anda hendak menukarkan jawapan, padamkan tanda yang telah dibuat. Kemudian hitamkan jawapan yang baru.*
6. The diagrams in the questions provided are not drawn to scale unless stated.  
*Rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan.*
7. You may use a non-programmable scientific calculator.  
*Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.*

Nama : .....

Tingkatan : ..... No. Kad Pengenalan : .....



## PEPERIKSAAN PERCUBAAN BERSAMA SIJIL PELAJARAN MALAYSIA 2011

ANJURAN  
MAJLIS PENGETUA SEKOLAH MALAYSIA (MPSM)  
CAWANGAN PERLIS

### BIOLOGI

Kertas 2

Dua jam tiga puluh minit

#### JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. Tuliskan **nama, tingkatan** dan **no. kad pengenalan** pada ruang yang disediakan.
2. Kertas soalan ini adalah dalam dwibahasa.
3. Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Melayu.
4. Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam Bahasa Melayu atau Bahasa Inggeris.
5. Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.

Bahagian	Soalan	Markah Penuh	Markah Diperoleh
A	1		
	2		
	3		
	4		
	5		
B	6		
	7		
	8		
	9		
Jumlah			

Kertas soalan ini mengandungi **19** halaman bercetak termasuk kulit

[Lihat sebelah  
SULIT

Section A  
Bahagian A

[60 marks/60 markah]

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

1. Diagram 1.1 shows a plant cell as seen under an electron microscope.  
*Rajah 1.1 menunjukkan satu sel tumbuhan yang dilihat di bawah mikroskop elektron.*

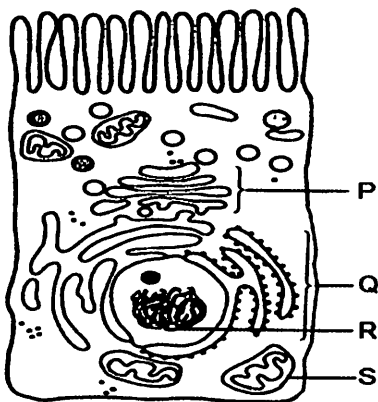


Diagram 1.1/Rajah 1.1

- a. On Diagram 1.1, label the structures P, Q, R and S.  
*Pada Rajah 1.1, labelkan struktur P, Q, R dan S.*  
P: .....  
Q: .....  
R: .....  
S: .....  
[4 marks/4 markah]
- b. State the process that occurs in organelle P and S.  
*Nyatakan process yang berlaku di dalam organel P dan S.*  
P : .....  
S : .....  
[2 marks/2 markah]
- c. If the cell is actively involved in transporting ions and molecules, predict which organelle that can be found abundantly.  
*Sekiranya cell tersebut terlibat secara aktif dalam pengangkutan ion dan molekul, ramalkan organel manakah yang didapati dengan banyaknya.*  
.....  
[1 mark/1 markah]

4
---

2
---

1
---

- d. Diagram 1.2 shows the primary growth in a root.  
*Rajah 1.2 menunjukkan tumbesaran primer pada akar.*

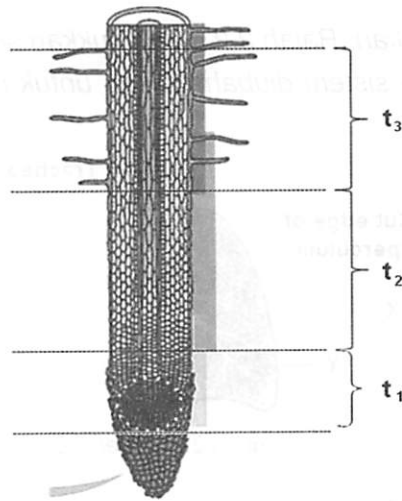


Diagram 1.2/Rajah 1.2

- i) Based on Diagram 1.2 name the zones labeled:

*Berdasarkan Rajah 1.2 namakan zon yang berlabel:*

$t_1$ : .....  
 $t_2$ : .....  
 $t_3$ : .....

[3 marks/3 markah]

- ii) Name the zone where the primary xylem tissue starts to form?

*Namakan zon di mana tisu xylem primer mula terbentuk?*

.....  
 [1 mark/1 markah]

- iii) Give **two** examples of cells that undergo the process in zone  $t_3$ .

*Berikan **dua** contoh sel yang mengalami proses seperti di zon  $t_3$ .*

1. ....  
 2. ....

[2 marks/2 markah]

3
---

1
---

2
---

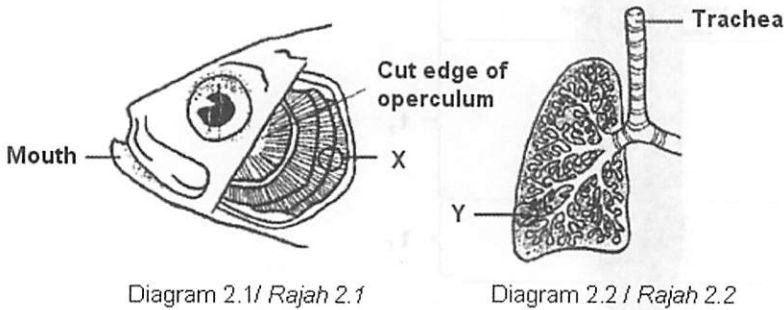
**Total A1**

13
----

[Lihat sebelah  
SULIT

2. Diagram 2.1 shows the respiratory system of a fish. Diagram 2.2 shows the respiratory system of a human. The organs in both systems are adapted for an effective gaseous exchange.

Rajah 2.1 menunjukkan sistem respirasi ikan. Rajah 2.2 menunjukkan sistem respirasi manusia. Organ-organ dalam kedua-dua sistem diubahsuaikan untuk pertukaran gas yang berkesan.



- a. i) Name the parts labelled X and Y  
Namakan bahagian berlabel X dan Y

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

[2 marks/2 markah]
- ii) State **two** similarities of structure X and Y in Diagram 2.1 and Diagram 2.2  
Nyatakan **dua** persamaan struktur X dan Y pada Rajah 2.1 dan Rajah 2.2

.....

.....

[2 marks/2 markah]
- b. Name the respiratory organ of human  
Namakan organ respirasi bagi manusia

.....

[1 mark/1 markah]
- c. Y is the respiratory surface in human. Explain how gaseous exchange occurs between structure Y and blood capillary.  
Y adalah permukaan respirasi dalam manusia. Terangkan bagaimana pertukaran gas berlaku antara struktur Y dan kapilari darah.

.....

.....

[2 marks/2 markah]

- d. Base on Diagram 2.1, describe how air is drawn from mouth to X.  
*Berdasarkan Rajah 2.1, huraikan bagaimana udara ditarik dari mulut ke X.*

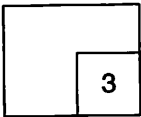
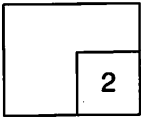
.....  
.....

[2 marks/2 markah]

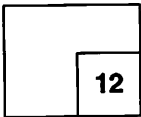
- e. Humans and fish have different respiratory systems. Explain **one** difference between the respiratory system of a human and a fish.  
*Manusia dan ikan mempunyai sistem respirasi yang berbeza. Terangkan **satu** perbezaan di antara sistem respirasi manusia dan ikan.*

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

[3 marks/3 markah]



Total A2



[Lihat sebelah  
SULIT



3. Diagram 3.1 is a graph for an experiment to show the effect of the substrate concentration on the activity of enzyme.

Rajah 3.1 adalah graf bagi eksperimen untuk menunjukkan kesan kepekatan substrat atas aktiviti enzim.

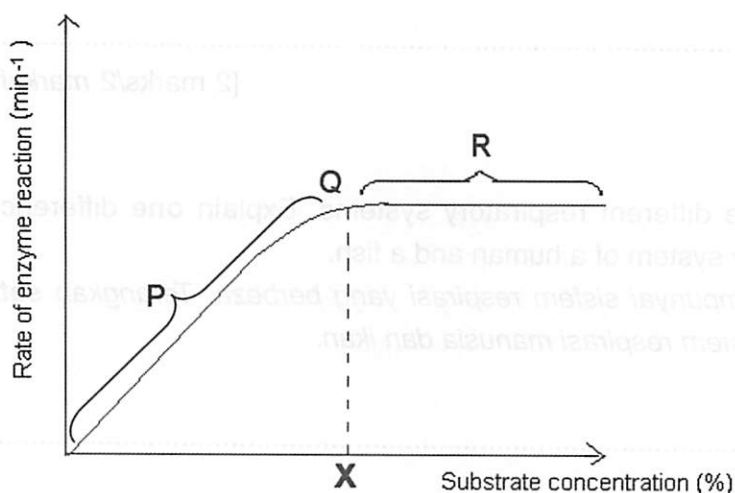


Diagram 3.1/Rajah 3.1

Table 1 shows the enzyme-substrate complex molecules at Q where the concentration of substrate is X %.

Jadual 1 menunjukkan molekul kompleks enzim-substrat pada Q dimana kepekatan substrat ialah X %.

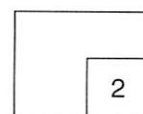
P	Q	R

Table 1/ Jadual 1

- a. i) Based on graph in Diagram 3.1, complete Diagram 3.2 by drawing the substrate molecules at region P and R respectively.

Berdasarkan graf di Rajah 3.1, lengkapkan Rajah 3.2 dengan melukis molekul substrat pada kawasan P dan R masing-masing.

[2 marks/2 markah]





ii) Based on your drawing in Diagram 3.2, explain the relationship of substrate and enzyme molecules at region P and R.

*Berdasarkan lukisan anda pada Rajah 3.2, terangkan hubungan molekul substrat dan molekul enzim pada kawasan P dan R.*

.....

.....

.....

.....

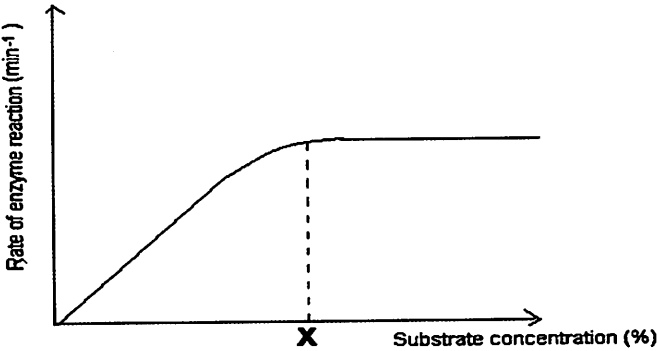
.....

[5 marks/5 markah]

5
---

b. i) If the concentration of enzyme increases, draw a line to show the enzyme activity in Diagram 3.3.

*Jika kepekatan enzim bertambah, lukiskan satu garis untuk menunjukkan aktiviti enzim pada Rajah 3.3.*



[1 mark/1 markah]

1
---

ii) Explain your answer in b. i)  
*terangkan jawapan anda di b. i)*

.....

.....

[2 marks/2 markah]

2
---

c. State **two** other factors that affect the reaction of enzyme.  
*Nyatakan **dua** faktor lain yang mempengaruhi tindakbalas enzim.*

.....

.....

[2 marks/2 markah]

2
---

Total A3

12
----

[Lihat sebelah  
SULIT

4. Diagram 4 shows the role of the pituitary gland as a 'master gland'.

Rajah 4 menunjukkan peranan kelenjar pituitari sebagai 'kelenjar utama'.

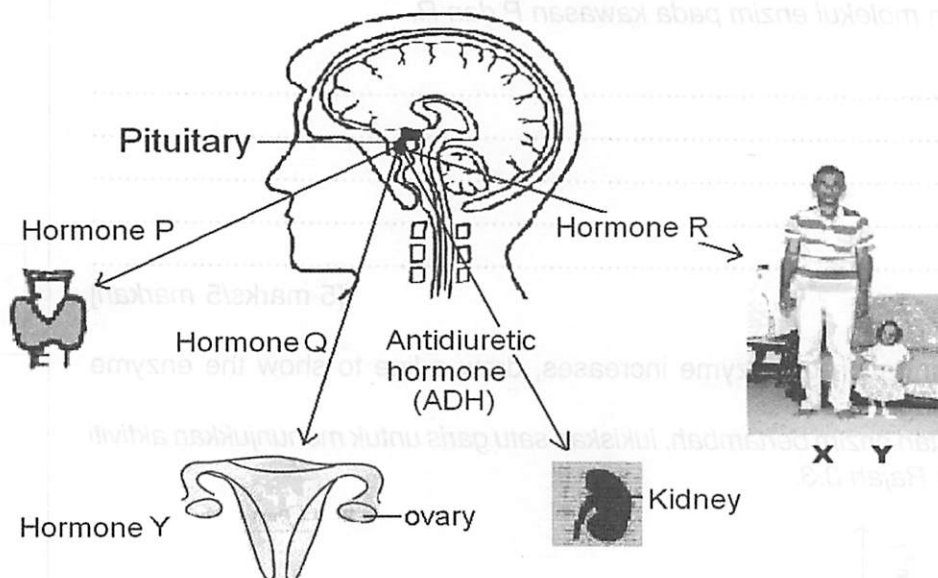


Diagram 4/Rajah 4

- a) Name hormones P and R.  
Namakan hormon P dan R.

P: .....

R: .....

[2 marks/2 markah]

- b) i) Hormone Q stimulates the development of follicle in the ovary and sperm in the testis. Identify hormone Q.  
Hormon Q merangsang pembentukan folikel di dalam ovari dan sperma di dalam testis. Kenalpasti hormon Q.

.....

[1 mark/1 markah]

- ii) The presence of hormone Q causes the secretion of hormone Y which affects the development of uterus.

Kehadiran hormon Q menyebabkan perembesan hormon Y yang mempengaruhi pembentukan uterus.

Name the hormone Y.

Namakan hormon Y.

.....

[1 mark/1 markah]

- c) Explain the effects if more antidiuretic hormone (ADH) is secreted to the targeted organ as shown in the Diagram 4.  
*Terangkan kesan jika hormon antidiuretik (ADH) dirembeskan lebih banyak ke organ sasaran seperti yang ditunjukkan dalam Rajah 4.*

.....

.....

.....

[3 marks/3 markah]

	3
--	---

- d) Based on the Diagram 4, explain how hormone R is responsible for the difference of physical appearance of individual X and Y.  
*Berdasarkan Rajah 4, terangkan bagaimana hormon R bertanggungjawab bagi perbezaan fizikal antara individu X dan Y.*

.....

.....

.....

[3 marks/3 markah]

	3
--	---

- e) The pituitary gland is known as 'master gland'. Explain why.  
*Kelenjar pituitari dikenali sebagai 'kelenjar utama'. Terangkan mengapa.*

.....

.....

.....

[2 marks/2 markah]

	2
--	---

Total A4

	12
--	----

5. Haemophilia is a disease in which the blood does not clot normally.

Diagram 5 shows a family, where the father is normal while the mother is a carrier of haemophilia.

*Haemofilia adalah sejenis penyakit di mana darah tidak membeku secara normal.*

*Rajah 5 menunjukkan satu keluarga, di mana bapanya adalah normal manakala ibunya adalah pembawa haemofilia.*

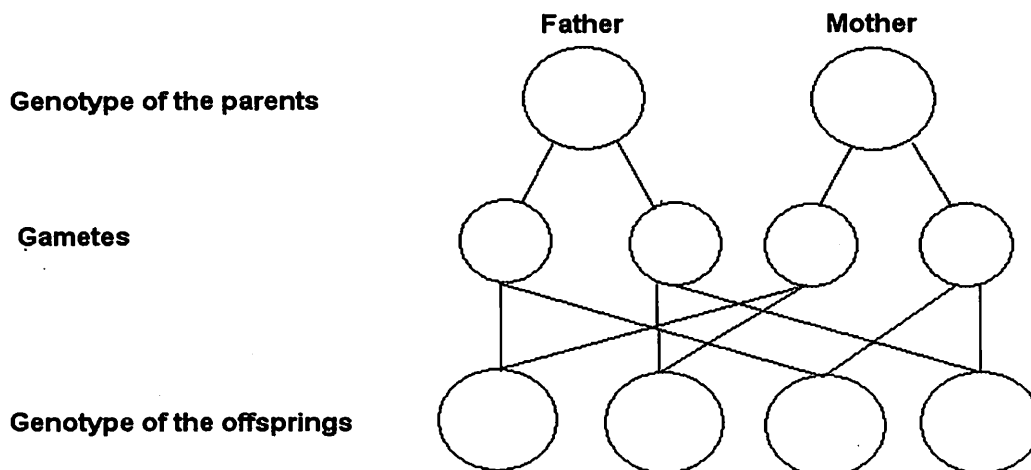


Diagram 5/Rajah 5

- a. How is haemophilia inherited?

*Bagaimana haemofilia diwarisi?*

.....  
 .....

[2 marks/2 markah]

2
---

- b. i) Complete the schematic diagram in Diagram 5 to show how haemophilia is inherited in this family.

*Lengkapkan gambarajah skema dalam Rajah 5 untuk menunjukkan bagaimana haemofilia diwarisi dalam keluarga ini.*

Key : **H** represent the normal allele  
**h** represent the haemophiliac allele

[3 marks/3 markah]

3
---

- ii) Base on your answer in b i), what percentage of the offspring which are haemophiliacs?

*Berdasarkan jawapan anda di b i), berapa peratuskah anak yang menghidapi haemofilia?*

.....

[1 mark/1 markah]

1
---

c. In another family of four children, the mother is heterozygous for haemophilia while the father is normal. None of the boys are haemophiliacs and none of the girls are carriers of the disease. Explain how this situation could have occurred.

*Dalam keluarga lain yang mempunyai empat anak, ibunya adalah heterozigot untuk haemofilia manakala ayahnya adalah normal. Tiada anak lelaki yang menghidapi haemofilia dan tiada anak perempuannya menjadi pembawa penyakit ini. Terangkan bagaimana situasi ini boleh berlaku?*

.....

.....

.....

.....

.....

[3 marks/3 markah]

	3
--	---

d. A papaya farmer wants to produce a large number of Exotica papayas in the shortest time possible. State the best technique to use by the farmer. What is the genetic advantage of using this technique?

*Seorang pekebun betik ingin menghasilkan betik Exotica dalam kuantiti yang banyak dalam masa yang paling singkat. Nyatakan teknik terbaik yang boleh digunakan oleh pekebun tersebut. Apakah kelebihan teknik ini daripada segi genetik?*

.....

.....

.....

.....

[2 marks/2 markah]

	2
--	---

Total A5

	11
--	----

**Section B**  
**Bahagian B**

[40 marks / 40 markah]

Answer any **two** questions from this section.

*Jawab mana-mana **dua** soalan daripada bahagian ini.*

- 6 (a) Figure 6.1 shows a human forearm which consists of muscles, bones, tendons and joints.  
*Rajah 6.1 menunjukkan anggota hadapan manusia yang terdiri daripada otot, tulang dan sendi.*

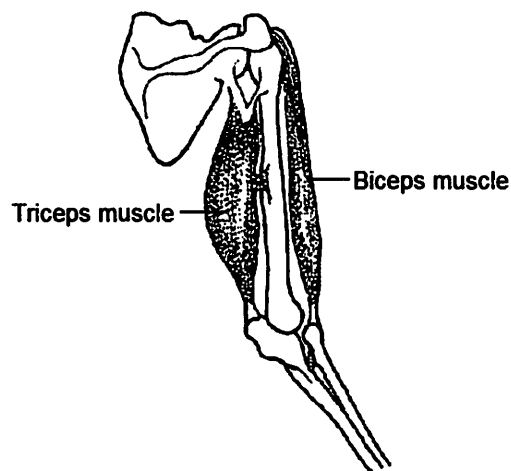


Diagram 6.1/ Rajah 6.1

- (i) Based on diagram 6.1 explain the meaning of antagonistic muscles.  
*Berdasarkan rajah 6.1 terangkan maksud otot-otot antagonis.*

[2 marks/ 2 markah]

- (ii) Describe the action of muscles, bones, tendon and joint which enable the movement of the forearm to bend and to straighten efficiently.  
*Huraikan tindakan otot, tulang, tendon dan sendi yang membolehkan anggota hadapan dibengkokkan dan diluruskan dengan efisien.*

[6 marks/ 6 markah]

- (b) Diagram 6.2 shows the movement of a fish in water.  
*Rajah 6.2 menunjukkan pergerakan seekor ikan di dalam air.*

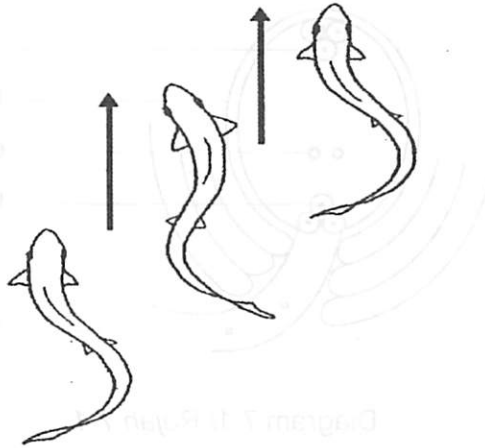


Diagram 6.2/ Rajah 6.2

Based on Diagram 6.2,  
*Berdasarkan Rajah 6.2,*

- (i) Explain the adaptations of fish to enable them to move in water.  
*Terangkan penyesuaian ikan untuk membolehkan ia bergerak di dalam air.*

[4marks/ 4 markah]

- (ii) Describe the mechanisms of locomotion of fish.  
*Huraikan mekanisme pergerakan ikan.*

[4 marks/ 4 markah]

Diagram 6.3(a) and 6.3 (b) show two diseases that are related to musculoskeletal system.  
*Rajah 6.3(a) dan 6.3(b) menunjukkan dua penyakit yang berkaitan dengan sistem otot-rangka.*

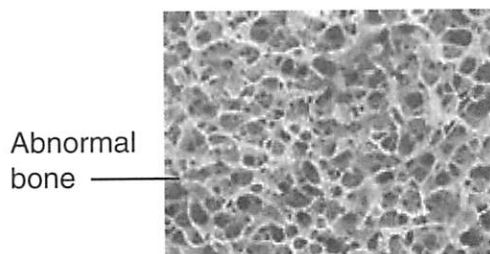


Diagram 6.3(a)/ Rajah 6.3 (a)



Diagram 6.3(b)/ Rajah 6.3 (b)

- (c) Describe both diseases.  
*Huraikan kedua-dua penyakit ini.*

[4marks/ 4 markah]



- 7 Diagram 7 shows the process of double fertilization in the flowering plant.  
*Rajah 7 menunjukkan proses persenyawaan ganda dua dalam tumbuhan berbunga.*

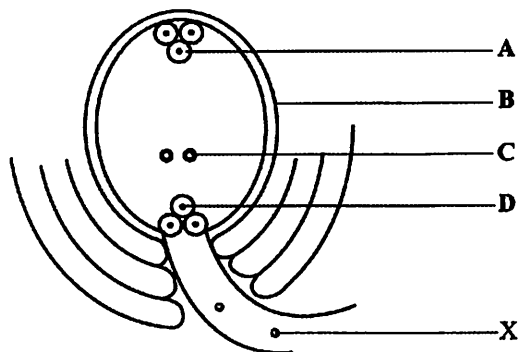


Diagram 7.1/ Rajah 7.1

- (a) Describe the process.  
*Huraikan proses tersebut.*

[4 marks/4 markah]

- (b) Based on your answer in (a), describe the formation of fruit and seed.  
*Berdasarkan jawapan anda di (a), huraikan pembentukan buah dan biji benih.*

[6 marks/ 6 markah]

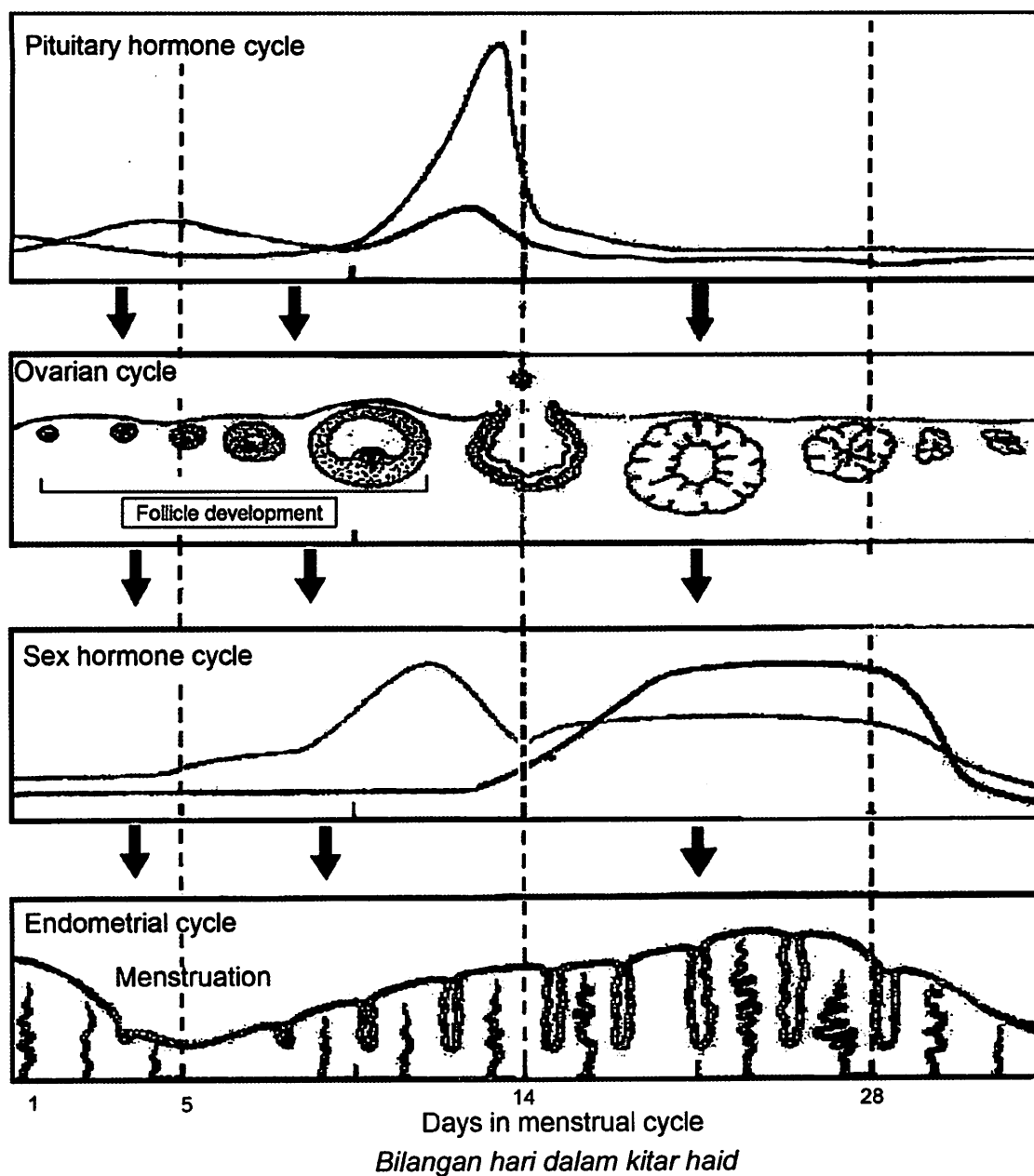


Diagram 7.2/ Rajah 7.2

- (c) Based on the above diagram, explain how pituitary hormones and sex hormones control the menstrual cycle.

*Berdasarkan rajah di atas, terangkan bagaimana hormon pituitari dan hormon seks mengawal kitar haid.*

[10 marks/ 10 markah]

- 8 Figure 8.1 shows the structure of leaf. Figure 8.2 shows the organelle M that involve in the formation of starch in green plants.

*Rajah 8.1 menunjukkan struktur daun. Rajah 8.2 menunjukkan organel M yang terlibat dalam penghasilan kanji oleh tumbuhan hijau.*

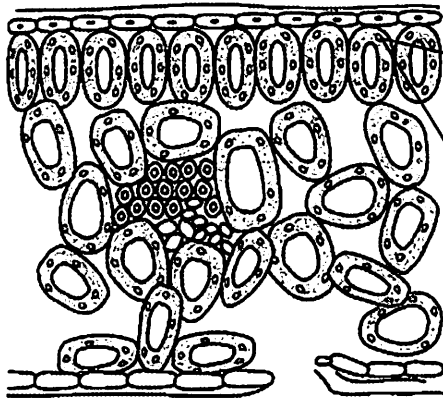


Figure 8.1/Rajah 8.1

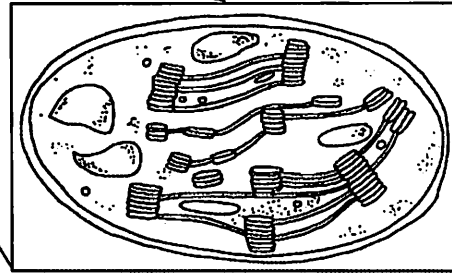


Figure 8.2/Rajah 8.2

- (a) Explain the mechanisms that takes place in organelle M that involved in the formation of starch in the green plant.

*Terangkan mekanisma yang berlaku dalam organel M yang terlibat dalam pembentukan kanji oleh tumbuhan hijau.*

[10 marks/ 10 markah]

- (b) Table 8.1 shows a daily food intake by Harith.  
*Jadual 8.1 menunjukkan makanan seharian yang diambil oleh Harith.*

Breakfast <i>Sarapan pagi</i>	Lunch <i>Makan tengahari</i>	Dinner <i>Makan malam</i>
Full cream milk <i>Susu penuh krim</i>	Rice with beef curry <i>Nasi dengan kari daging</i>	Chicken burger <i>Burger ayam</i>
Fried egg <i>Telur goreng</i>	Fried chicken <i>Ayam goreng</i>	Cheese cake <i>Kek keju</i>
Fried chicken rice <i>Nasi goreng ayam</i>	Ice cream <i>Ais krim</i>	Teh tarik
	Carbonated soft drink <i>Minuman bikarbonat</i>	

Table 8.1/*Jadual 8.1*

Explain the long term effects of consuming excess of these foods on Harith’s health.  
*Terangkan kesan jangka masa panjang pengambilan makanan tersebut yang berlebihan ke atas kesihatan Harith.*

[10 marks / 10 markah]

9.

Pioneer mangrove species colonised muddy river banks which later grow into a mangrove swamp forest.

*Spesies perintis paya bakau mengkoloni tebing berlumpur sungai yang akhirnya berkembang menjadi hutan paya bakau.*

- (a) Explain how the pioneer mangrove species are adapted to overcome the problems encountered during process of colonisation.

*Terangkan bagaimana spesies perintis paya bakau disesuaikan untuk mengatasimasaalah yang dihadapi semasa proses pengkolonian.*

[8 marks/ 8 markah]

- (b) Diagram 9.1 shows a mangrove swamp forest and Diagram 9.2 shows the same area 30 years later.

*Gambarajah 9.1 menunjukkan hutan paya bakau dan Gambarajah 9.2 menunjukkan kawasan yang sama pada 30 tahun kemudiannya.*



Diagram 9.1/ Rajah 9.1

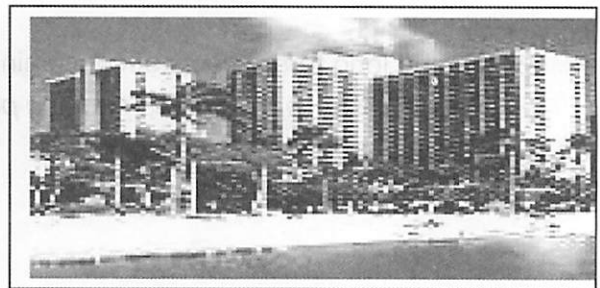


Diagram 9.2/ Rajah 9.2

Discuss the good and bad effects of the activities that caused the changes.

*Bincangkan kesan baik dan buruk akibat aktiviti yang menyebabkan perubahan tersebut.*

[12 marks /12 markah]

**END OF QUESTION PAPER / KERTAS SOALAN TAMAT**

**INFORMATION FOR CANDIDATE  
MAKLUMAT UNTUK CALON**

1. This question paper consists of **two** sections: **Section A and Section B**.  
*Kertas soalan ini mengandungi dua bahagian: **Bahagian A dan Bahagian B**.*
2. Answer **all** questions in **Section A**. Write your answers for **Section A** in the spaces provided in the question paper.  
*Jawab **semua** soalan dalam **Bahagian A**. Tulis jawapan bagi **Bahagian A** dalam ruang yang disediakan dalam kertas soalan.*
3. Answer one question from **Section B** and one question from **Section C**. Write your answers for **Section B** and **Section C** in detail. You can use equation, diagram, table, graph and any other suitable ways to clarify your answer.  
*Jawab **satu** soalan daripada **Bahagian B** dan satu soalan daripada **Bahagian C**.  
Tulis jawapan bagi **Bahagian B** dan **Bahagian C** dengan terperinci.  
Anda boleh menggunakan persamaan, rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda.*
4. Show your working. It may help you to get marks.  
*Tunjukkan kerja mengira, ini membantu anda mendapatkan markah.*
5. If you wish to change your answer, neatly cross out your answer that you have done. Then write down the new answer.  
*Sekiranya anda hendak menukar sesuatu jawapan, batalkan dengan kemas jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.*
6. The diagrams in the questions are not drawn to scale unless stated.  
*Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.*
7. Marks allocated for each question or part question are shown in brackets.  
*Markah yang diperuntukkan bagi setiap soalan atau ceraihan soalan ditunjukkan dalam kurungan.*
8. The time suggested to answer **Section A** is 90 minutes, **Section B** is 30 minutes and **Section C** is 30 minutes.  
*Masa yang dicadangkan untuk menjawab **Bahagian A** ialah 90 minit, **Bahagian B** ialah 30 minit dan **Bahagian C** ialah 30 minit.*
9. You may use a non-programmable scientific calculator.  
*Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan.*
10. Hand in all your answer sheets at the end of the examination.  
*Serahkan kertas soalan dan jawapan anda diakhir peperiksaan.*

Nama : .....

Tingkatan : ..... No. Kad Pengenalan : .....



## PEPERIKSAAN PERCUBAAN BERSAMA SIJIL PELAJARAN MALAYSIA 2011

ANJURAN  
MAJLIS PENGETUA SEKOLAH MALAYSIA (MPSM)  
CAWANGAN PERLIS

### BIOLOGI

Kertas 3

Satu jam tiga puluh minit

### JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. Tulis **nama** anda pada ruang yang disediakan.
2. Kertas soalan ini adalah dalam dwibahasa.
3. Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Melayu.
4. Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam Bahasa Melayu atau Bahasa Inggeris
5. Calon dikehendaki membaca maklumat di halaman 12.

Kod pemeriksa		
Soalan	Markah Penuh	Markah Diperoleh
1	33	
2	17	
Jumlah	50	

Kertas soalan ini mengandungi 12 halaman bercetak termasuk kulit

[Lihat sebelah  
**SULIT**



Answer **all** questions.

Jawab **semua** soalan.

1. An experiment was carried out to determine the concentration of sucrose solution which is isotonic to the cell sap of potato strips.

*Satu eksperimen telah dijalankan untuk menentukan kepekatan larutan sukrosa yang isotonik kepada sap sel jalur ubi kentang.*

Diagram 1.1 shows the set up of apparatus for this experiment. By using a cork boarer, a cylindrical potato strip was obtained. The potato strip was cut at 5 cm long.

*Rajah 1.1 menunjukkan penyediaan radas bagi eksperimen ini. Dengan menggunakan penebuk gabus, jalur ubi kentang diperolehi. Setiap jalur ubi kentang dipotong sepanjang 5 cm.*

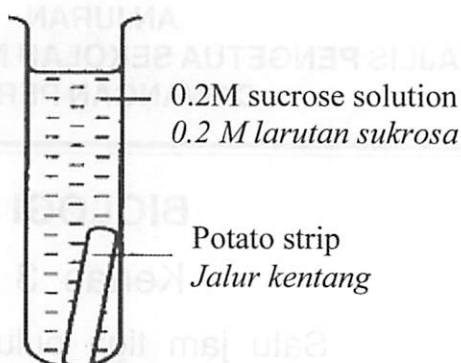
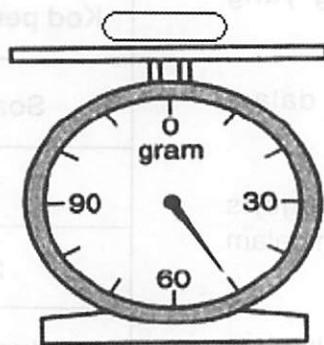


Diagram 1.1 / Rajah 1.1

Diagram 1.2 shows the initial mass for each of the potato strips.

*Rajah 1.2 menunjukkan jisim awal jalur ubi kentang.*



Initial mass of potato strips : \_\_\_\_\_ gm

*Jisim awal jalur ubi kentang*

The experiment in diagram 1.1 was repeated by using different concentrations of sucrose solution.

*Eksperimen dalam Rajah 1.1 diulang dengan menggunakan larutan sukrosa yang berbeza kepekatan.*

Table 1 shows the result of this experiment.

Jadual 1 menunjukkan keputusan eksperimen ini.

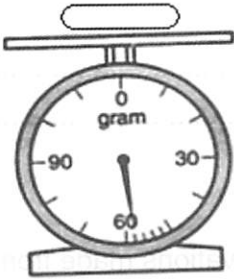
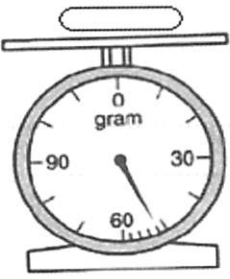

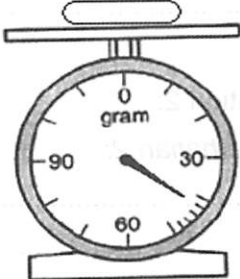
Concentration of sucrose solution / M Kepekatan larutan sukrosa / M	Final mass of potato strip after 30 minutes / g Jisim akhir jalur ubi kentang selepas 30 minit / g
0.2 M	 <input data-bbox="1141 625 1302 732" type="text"/>
0.4 M	 <input data-bbox="1141 931 1302 1037" type="text"/>
0.6 M	 <input data-bbox="1141 1362 1302 1468" type="text"/>
0.8 M	 <input data-bbox="1141 1776 1302 1882" type="text"/>

Table 1 / Jadual 1

[Lihat sebelah  
SULIT

- (a) (i) Record the initial mass of the potato strip in the space provided in Diagram 1.  
*Rekodkan jisim awal jalur ubi kentang dalam ruangan yang disediakan pada Rajah 1.2.*

- (ii) Record the final mass of the potato strip in the space provided in Table 1.  
*Rekodkan jisim akhir jalur ubi kentang dalam ruangan yang disediakan dalam Jadual 1.*

.....  
 .....

[ 3 marks / 3 markah ]

- (b) (i) State **two** different observations made from Table 1.

*Nyatakan **dua** pemerhatian yang berbeza yang dibuat daripada Jadual 1*

Observation 1:

*Pemerhatian 1:*

.....  
 .....

Observation 2:

*Pemerhatian 2:*

.....  
 .....

[ 3 marks / 3 markah ]

- (ii) State the inferences from the observations in 1 (b) (i)

*Nyatakan inferens daripada pemerhatian di 1 (b) (i)*

Inference from observation 1:

*Inferens daripada pemerhatian 1:*

.....  
 .....

Inference from observation 2:

*Inferens daripada pemerhatian 2:*

.....  
 .....

[ 3 marks / 3 markah ]

(c) Complete Table 2 based on this experiment.  
Lengkapkan Jadual 2 berdasarkan eksperimen ini.

Variable <i>Pembolehubah</i>	Method to handle variable <i>Cara mengendali pembolehubah</i>
Manipulated variable: Pembolehubah dimanipulasi  ..... ..... .....	   ..... ..... .....
Responding variable: <i>Pembolehubah bergerakbalas</i>  ..... ..... .....	   ..... ..... .....
Constant variable: Pembolehubah dimalarkan  ..... ..... .....	   ..... ..... .....

Table 2 / Jadual 2

[ 3 marks / 3 markah ]

(d) State the hypothesis for this experiment.  
*Nyatakan hipotesis bagi eksperimen ini.*

.....  
.....

[ 3 marks / 3 markah ]

- (e) (i) Construct a table and record all the data collected in this experiment.  
*Bina satu jadual dan rekodkan semua data yang dikumpul dalam eksperimen ini.*

Your table should have the following aspects:

Jadual anda hendaklah mengandungi aspek-aspek berikut:

- Concentration of sucrose solutions / *Kepekatan larutan sukrosa*
- Initial mass of potato strips / *Jisim awal jalur ubi kentang*
- Final mass of potato strips / *Jisim akhir jalur ubi kentang*
- Percentage of change in mass of potato strips / *Peratus perubahan jisim jalur ubi kentang*

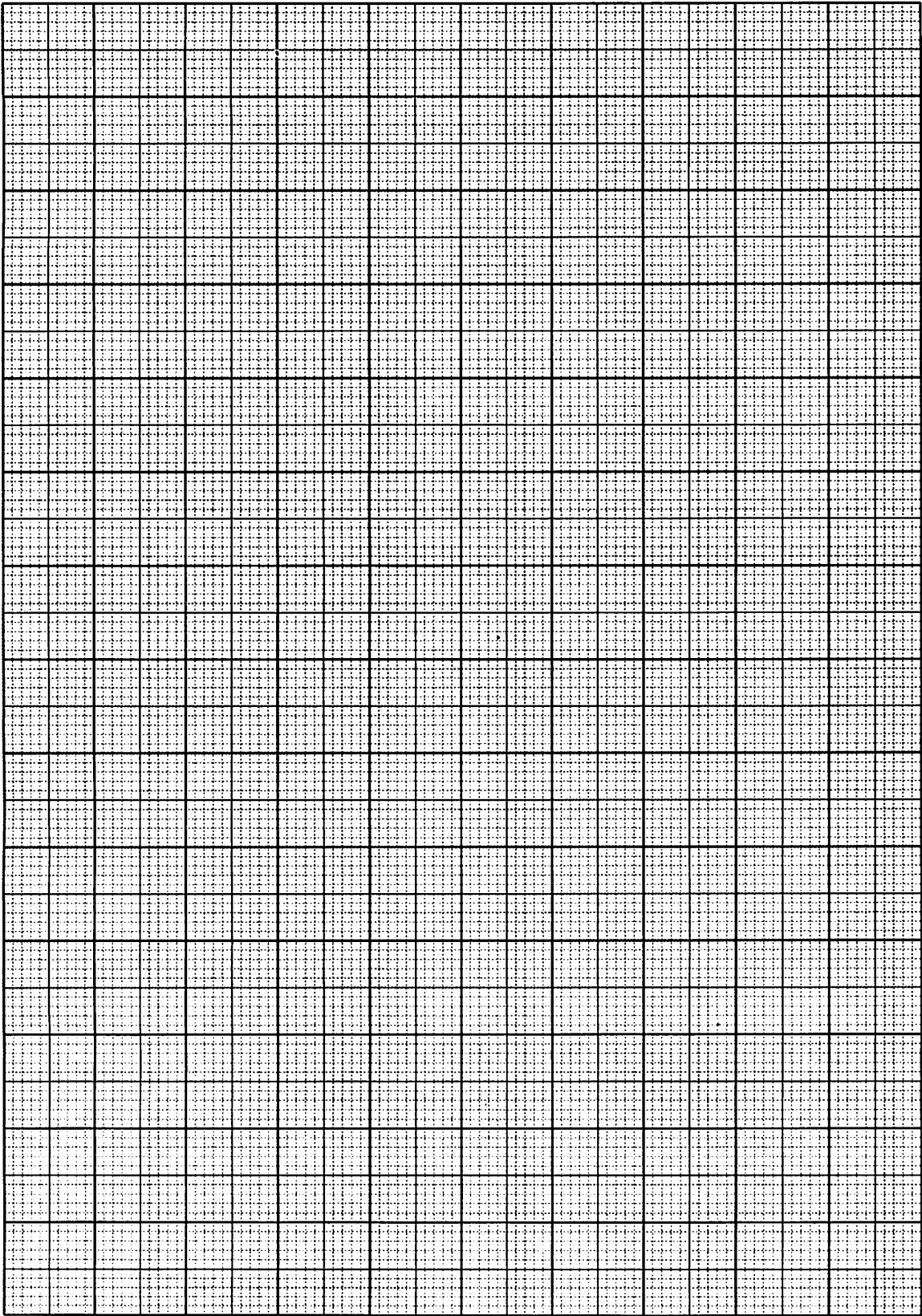
[ 3 marks / 3 markah ]

- (ii) Use the graph paper provided on page 7 to answer this question. Using the data in 1(e) (i), draw a graph to show the relationships between the percentage of change in mass of potato strips and the concentration of the sucrose solutions.

*Guna kertas graf yang disediakan di halaman 7 untuk menjawab soalan ini. Dengan menggunakan data di 1(e) (i), lukis satu graf untuk menunjukkan hubungan antara peratus perubahan jisim jalur ubi kentang dengan kepekatan larutan sukrosa.*

[ 3 marks / 3 markah ]





- (f) Based on the graph in 1 (e) (ii), state the concentration of the sucrose solution which is isotonic to the concentration of the cell sap of the potatoes.

Explain your answer.

*Berdasarkan graf di 1(e) (ii), nyatakan kepekatan larutan sukrosa yang isotonik kepada kepekatan sap sel ubi kentang.*

*Terangkan jawapan anda.*

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

[3 marks / 3 markah ]

- (g) The potato strip from 0.6 M sucrose solution was taken out and was dried with tissue paper. Then it was immersed in distilled water for 30 minutes. Based on the result of this experiment, predict the final mass of the potato strip.

Explain your prediction.

*Jalur ubi kentang dari 0.6 M larutan sukrosa telah dikeluarkan dan dikeringkan dengan menggunakan kertas tisu. Kemudian ia direndam ke dalam larutan air suling selama 30 minit. Berdasarkan keputusan eksperimen ini, ramalkan apa yang berlaku kepada jalur ubi kentang tersebut.*

*Terangkan ramalan anda.*

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

[ 3 marks / 3 markah ]

- (h) Based on this experiment, state the operational definition for osmosis.

*Berdasarkan eksperimen ini, nyatakan definisi secara operasi bagi osmosis.*

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

[ 3 marks / 3 markah ]



- (i) In another experiment, it was found that a mustard stem strip that was immersed in 0.8% natrium chloride solution did not undergo a change in mass.  
*Dalam eksperimen lain didapati bahawa satu jalur batang sawi yang telah direndam dalam larutan natrium klorida 0.8% tidak mengalami perubahan jisim.*

The following solutions are used in this experiment.  
*Larutan berikut telah digunakan dalam eksperimen ini.*

0.25 % natrium chloride solution, 0.65% natrium chloride solution 1.10 % natrium chloride solution.

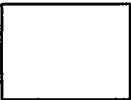
*0.25% larutan natrium klorida, 0.65% larutan natrium klorida, 1.10% larutan natrium klorida.*

Classify the above solutions into Table 3.  
*Klasifikasikan larutan di atas ke dalam Jadual 3.*

Solution concentration <i>Kepekatan larutan (%)</i>	Types of solution compared to the osmotic concentration of the cell sap. <i>Jenis larutan berbanding kepekatan osmotik sap sel.</i>

Table 3 / *Jadual 3*

[ 3 marks / 3 markah ]



2. The rate of transpiration can be affected by several factors such as air movement, temperature, relative humidity and light intensity.

A potometer can be used to measure the rate of transpiration. The stem or shoot part of the plant is cut under water to remove air in the xylem vessels. An air bubble is introduced into the capillary tube and its movement is measured.

Based on the above information, plan a laboratory experiment to study the effect of air movement on the rate of transpiration.

The planning of your experiment must include the following aspects :

*Kadar transpirasi dipengaruhi oleh beberapa faktor seperti pergerakan udara, suhu, kelembapan bandingan dan keamatan cahaya.*

*Potometer boleh digunakan untuk mengukur kadar transpirasi. Bahagian batang atau pucuk berdaun tumbuhan dipotong dalam air untuk mengelakkan udara terperangkap dalam salur xylem. Satu gelembung udara dimasukkan ke dalam tiub kapilari dan pergerakannya diukur.*

*Berdasarkan maklumat di atas, rancang satu eksperimen dalam makmal untuk mengkaji kesan pergerakan udara ke atas mempengaruhi kadar transpirasi.*

*Perancangan eksperimen anda hendaklah meliputi aspek-aspek berikut :*

- Problem statement  
*Pernyataan Masalah*
- Hypothesis  
*Hipotesis*
- Variables  
*Pembolehubah*
- List of apparatus and materials  
*Senarai radas dan bahan*
- Experimental procedure  
*Prosedur eksperimen*
- Presentation of data  
*Persembahan data*

[17 marks]

[17 markah]

**END OF QUESTION PAPER**  
**KERTAS SOALAN TAMAT**

1. Berikan jawapan kepada soalan-soalan berikut.

- a) Apakah maksud 'sistem' dan 'sistem komputer'?
- b) Apakah maksud 'peranti' dan 'peranti input/output'?
- c) Apakah maksud 'program' dan 'program komputer'?
- d) Apakah maksud 'data' dan 'data komputer'?
- e) Apakah maksud 'proses' dan 'proses komputer'?
- f) Apakah maksud 'sistem komputer' dan 'sistem komputer'?
- g) Apakah maksud 'peranti' dan 'peranti input/output'?
- h) Apakah maksud 'program' dan 'program komputer'?
- i) Apakah maksud 'data' dan 'data komputer'?
- j) Apakah maksud 'proses' dan 'proses komputer'?

2. Berikan jawapan kepada soalan-soalan berikut.

Peranti	Fungsi
Monitor	Menyediakan maklumat kepada pengguna.
Keyboard	Membolehkan pengguna memasukkan maklumat ke dalam komputer.
Mouse	Membolehkan pengguna mengawal kursor.
Printer	Menyediakan maklumat kepada pengguna.

**INFORMATION FOR CANDIDATES**

1. This question paper consists of two questions. Answer **all** questions.
2. Write your answers for **Question 1** in the spaces provided in the question paper.
3. Write your answers for **Question 2** on the 'helaian tambahan' provided by the invigilators. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answer.
4. Show your working, it may help you to get marks.
5. If you wish to change your answer, neatly cross out the answer that you have done. Then write down the new answer.
6. The diagrams in the questions are not drawn to scale unless stated.
7. Marks allocated for each question or part of the question are shown in brackets.
8. The time suggested to answer **Question 1** is 45 minutes and **Question 2** is 45 minutes.
9. You may use a non / programmable scientific calculator.
10. Hand in all your answer sheets at the end of the examination.

Marks awarded:

Score	Description
3	<b>Excellent</b> : The best response
2	<b>Satisfactory</b> : An average response
1	<b>Weak</b> : An inaccurate response
0	No response or wrong response

SULIT  
4551/2



PEPERIKSAAN PERCUBAAN BERSAMA  
SIJIL PELAJARAN MALAYSIA 2011

---

# BIOLOGI

SKEMA JAWAPAN KERTAS 1, 2 DAN 3

---

UNTUK PEMERIKSA SAHAJA

PEPERIKSAAN PERCUBAAN BERSAMA  
SPM 2011 PERLIS  
BIOLOGY  
PAPER 1 ANSWER SCHEME  
SKEMA JAWAPAN KERTAS 1

1. D	2. B	3. D
4. A	5. C	6. B
7. A	8. C	9. A
10. D	11. A	12. A
13. C	14. B	15. A
16. B	17. B	18. A
19. B	20. C	21. B
22. A	23. C	24. A
25. B	26. B	27. A
28. C	29. A	30. A
31. B	32. B	33. A
34. B	35. A	36. C
37. B	38. D	39. A
40. A	41. D	42. A
43. D	44. B	45. B
46. C	47. C	48. C
49. A	50. C	

## SKEMA PEMARKAHAN BIOLOGI KERTAS 2



## Section A

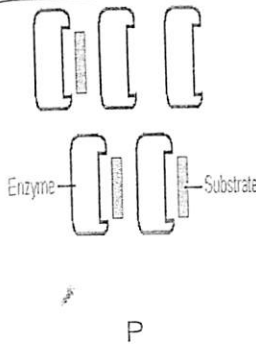
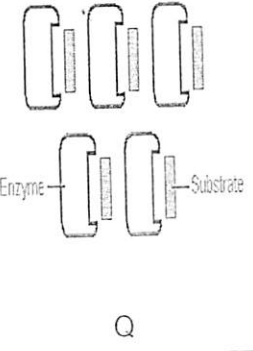
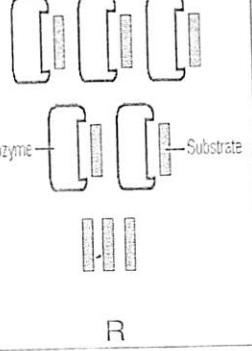
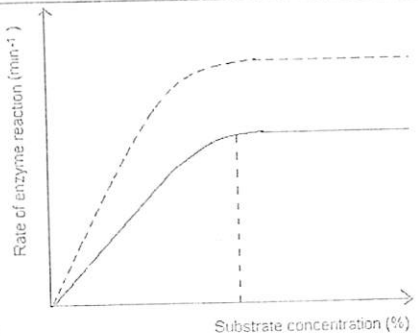
## Question 1

No	Marking Criteria	Marks	
(a)(i)	P : Golgi apparatus Q : ribosome / rough endoplasmic reticulum R : nucleus/ chromosome S : mitochondrion	1 1 1 1	4
(b)	P : Modify protein // packing protein // transport protein Q : site of protein synthesis/ transporting protein	1 1	2
(c)	Organelle S/ Mitochondria	1	
(d)(i)	t <sub>1</sub> : Zone of cell division t <sub>2</sub> : Zone of expansion/elongation t <sub>3</sub> : Zone of differentiation	1 1 1	3
(ii)	t <sub>3</sub> // Zone of differentiation	1	1
(iii)	epidermal cell // phloem cell // xylem cell // root hair cell		2
<b>TOTAL</b>		<b>13</b>	

## Question 2

No	Marking Criteria	Marks	
(a)(i)	X – gills/ gill filament Y – alveolus	1 1	2
(ii)	-Have network of blood capillaries -Moist respiratory surface	1 1	2
(b)	Lungs	1	
(c)	- the partial pressure of oxygen in Y is higher than in blood capillaries - oxygen diffuses from Y into blood capillaries by simple diffusion	1 1	2
(d)	- mouth closes - the floor of buccal cavity raised (water contain air flows to X)	1 1	2
(e)	F1 : The respiratory system of fish consist of gills while the respiratory system of human consists of a trachea and a pair of lungs. P1 : A fish has four pairs of gills which are covered by operculum // The surface of each gills filaments has many plate-like projections called lamella. P2 : The trachea of human branched into 2 bronchi which enter the right and the left lungs // The bronchi of a human branched into smaller tubes called bronchioles which ends in a cluster of sacs called alveoli.	1 1 1	3
<b>TOTAL</b>		<b>12</b>	

## Question 3

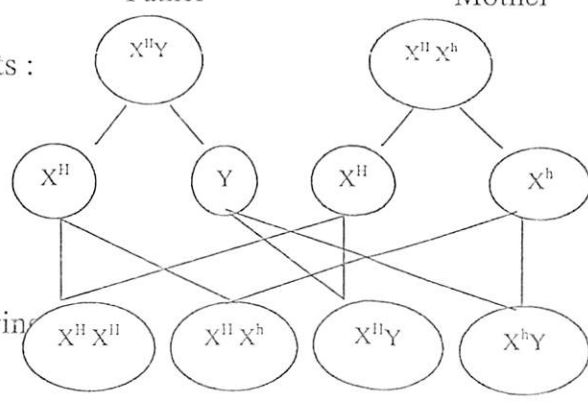
No	Marking Criteria	Marks	
(a)(i)	   <p>P</p> <p>Q</p> <p>R</p>	P-1 R-1	2
(ii)	<p>P-when the concentration of substrate increase, more substrates molecules bind to active sites of the enzyme</p> <ul style="list-style-type: none"> <li>- more product will be produced // the rate of reaction is directly proportional to the substrate concentration</li> </ul> <p>R- after the maximum rate, all active sites of enzyme molecules are filled // engaged</p> <ul style="list-style-type: none"> <li>- the rate of reaction become constant</li> <li>- the concentration of enzyme become the limiting factor</li> </ul>	1 1 1 1 1	5
(b)	 <p>(i)</p>		1
	<p>(ii) when the enzyme concentration increase, more substrate will bind to the active site of enzyme, The rate of reaction increases</p>	1 1	2
(c)	temperature and pH		2
TOTAL			12

## Question 4

No	Marking Criteria	Marks	
(a)	P – Thyroxin hormone R – Growth hormone	1 1	2
(b)	i) Follicle stimulating hormone (FSH) ii) Estrogen hormone	1 1	2
(c)	E1- More ADH will increase the permeability of distal convoluted tubule and collecting duct. E2- more water is reabsorbed into the blood capillary E3- urine become less and more concentrated	1 1 1	3

(d)	E1- Hormone R stimulate growth E2-lack of hormone R cause stunted growth in Y E3-over secretion of hormone R causes gigantism in X	1 1 1	3
(e)	F-its secreted hormones which control the activities of other endocrine glands to secrete their hormones E-FSH control the secretion of estrogen in ovary (or any other examples)	1 1	2
<b>TOTAL</b>		<b>12</b>	

## Question 5

No	Marking Criteria	Marks	
(a)	P1: Hemophilia is inherited by a recessive allele that P2: linked to the X chromosome	1 1	2
(b)(i)	<p>Genotype of parents : Father <math>X^{H}Y</math> Mother <math>X^{H}X^{h}</math></p> <p>Gametes : <math>X^{H}</math> <math>Y</math> <math>X^{H}</math> <math>X^{h}</math></p> <p>Genotype of offspring: <math>X^{H}X^{H}</math> <math>X^{H}X^{h}</math> <math>X^{H}Y</math> <math>X^{h}Y</math></p> 	1 1 1	4
(ii)	25 %	1	
(c)	P1: None of the girls are carriers because they receive one dominant allele ( $X^{H}$ ) from their father and P2: one dominant allele ( $X^{H}$ ) from their mother. P3: None of the boys are hemophiliacs because they receive dominant allele ( $X^{H}$ ) from their mother	1 1 1	3
(d)	F : Tissue culture. P1 : Able to obtain good characteristics that can be used commercially (selectivity)  P2 : can be conducted anytime does not need any pollinating agent as it carried out in the laboratory (F+any P)	1  1	2
<b>TOTAL</b>		<b>11</b>	



## Question 6

No	Marking Criteria	Marks	
(a) (i)	<ul style="list-style-type: none"> <li>- A pair of muscles that work together in apposite directions to allow movements</li> <li>- When triceps muscle contracts, biceps muscles relaxes at same time, and the arm is straightened</li> </ul>	1	Max 2m
		1	
(a)(ii)	<ul style="list-style-type: none"> <li>- When triceps muscle contracts, biceps muscle relaxes</li> <li>- Ulna is pull down, the arm is straightened</li> <li>- When biceps muscle contracts, triceps muscle relaxes</li> <li>- Ulna is pull up, the arm is bent at the elbow joint</li> <li>- Tendons which are strong and inelastic fibers attached muscles to the bones.</li> <li>- Synovial fluid which fills the space in the joint lubricates the joint to prevent friction when bones move.</li> <li>- The cartilage at the articulating surfaces of the bones serves as a shock absorber to prevent the bones from damage.</li> </ul>	1	Max 6 m
		1	
		1	
		1	
		1	
		1	
		1	
		1	
(b)(i)	<p>F1- Fish have streamlined shapes (where the anterior of the fish is smooth and rounded, and the body is long and tapers towards the end)</p> <p>E1- This will help the fish to reduce water resistance</p> <p>F2- The skin is covered with scales that have a slimy coating</p> <p>E2- This will help the fish to reduce friction</p> <p>F3- Fish have fins</p> <p>E3- the fins help the fish to stabilize the fish and help to move efficient in water.</p>	1	Mana- mana 2F dan 2E  Max 4m
		1	
		1	
		1	
		1	
		1	
b(ii)	<ul style="list-style-type: none"> <li>-The muscles of the fish called myotomes ,</li> <li>- Myotomes are arranged on both sides of the body/ anchored to both side of the vertebral column.</li> <li>- The muscles act antagonistically</li> <li>- When one side of myotomes contract, the other side of myotomes relax</li> <li>- This causes the body to bend in the direction of the contraction.</li> </ul>	1	Max 4m
		1	
		1	
		1	
		1	
c	Diagram 6.3(a) <ul style="list-style-type: none"> <li>- Type of disease is osteoporosis</li> <li>- Caused by gradual loss of bone density/ bone mass is reduced</li> <li>- Bone become porous and lighter/ easily break /brittle</li> <li>- Occur most often in old people , particularly women who</li> </ul>	1	
		1	
		1	
		1	

	<p>have gone menopause</p> <ul style="list-style-type: none"> <li>- This disease can be prevented by taking a diet rich in calcium, phosphorus and vitamin D /doing weight bearing exercise.</li> </ul>	1	Max 2m
	<p>Diagram 6.3 (b)</p> <ul style="list-style-type: none"> <li>- The disease is arthritis/ rheumatoid arthritis</li> <li>- It is caused by an inflammation or degeneration of the synovial membrane, bones and cartilage at the joints.</li> <li>- Cause joint pain , stiffness and swelling of joints/ loss of joint function.</li> </ul>	1 1 1	Max 2m
TOTAL			20

## Question 7

No	Marking Criteria	Marks	
(a)(i)	<ul style="list-style-type: none"> <li>- One of the male nuclei which is X fuses with egg cell nucleus which is D to form a diploid zygote (2n).</li> <li>- The other male nucleus fuses with the two polar nuclei which is C to form a triploid nucleus (3n).</li> <li>- This triploid nucleus divides to form the endosperm that will provide food to the embryo.</li> </ul>	1 1 1 1 1 1	Max 4m
(ii)	<ul style="list-style-type: none"> <li>- The diploid zygote divides via mitosis to form the embryo</li> <li>- The embryo develops and differentiates into three parts, a radical (young root), a plumule (young shoot) and one or two cotyledons (seed leaves).</li> <li>- (at the same time) the triploid endosperm cell undergoes repeated mitosis to become endosperm (a food store that nourishes embryo after germination).</li> <li>- The integument forms the testa ( seed coat).</li> <li>- The ovule develops into a seed,/ multiple ovules results in multiple seed in the ovary.</li> <li>- The ovary becomes a fruit (which protect the seed and help in its dispersal.)</li> </ul>	1 1 1 1 1 1	Max 6m
(b)	<p>F1 – During day 1 to day 5, endometrium wall break down and slough off ,</p> <p>F2 – Pituitary gland starts secreting FSH</p> <p>E1 – FSH causes a Graafian follicle to develop in the ovary</p> <p>E2 – During day 5 to day 10 FSH stimulate the wall of follicle and the tissues of the ovary to secrete oestrogen</p> <p>E3 – Oestrogen starts to repair of the uterine wall</p> <p>F3 – On day 12 to day 14, oestrogen inhibit pituitary gland from secreting FSH ,</p> <p>E4 – and stimulates pituitary glands to produce LH</p> <p>F4 – LH causes ovulation to occur on day 14</p>	1 1 1 1 1 1 1 1	



E5 – After day 14, the graafian follicle to change into corpus luteum	1	
F5 – Corpus luteum secretes progesterone	1	
E5 – Progesterone make up the endometrium become thicken and filled with numerous blood vessels for implantation	1	
E6 – Increase in the concentration of progesterone will inhibit the production of FSH and LH	1	Max 10m
<b>TOTAL</b>		<b>20</b>

**Question 8**

No	Marking Criteria	Marks
(a)	<b>Light reaction</b>	
	1) Take place in grana	1
	2) Chlorophyll captures light energy which excites the electrons of chlorophyll molecules to higher energy levels.	1
	3) In the excited state, the electrons can leave the chlorophyll molecules.	1
	4) Light energy is also used to split water molecules into hydrogen ion ( $H^+$ ) and hydroxyl ions ( $OH^-$ ) (Photolysis of water).	1
	5) The hydrogen ions then combine with the electrons released by chlorophyll to form hydrogen atoms.	1
	6) The energy from the excited electrons is used to form energy-rich molecules of adenosine triphosphate (ATP).	1
	7) Hydroxyl ion loses an electron to form a hydroxyl group which then combine to form water and oxygen gas.	1
	<b>Dark Reaction :</b>	
	1. Takes place in stroma.	1
	2. Does not require light.	1
	3. The hydrogen atoms are used to fix carbon dioxide and caused the reduction of carbon dioxide into glucose.	1
	4. The dark reaction need energy from ATP and catalyse by enzyme	1
	5. The glucose monomers then undergo condensation to form starch (which is temporarily stored as starch grains in the chloroplasts).	1
<b>TOTAL</b>		<b>10</b>

b (i)	<p>Able to</p> <ul style="list-style-type: none"> <li>explain the effect of consuming excess food given in the table</li> </ul> <p>Sample answer</p> <p><b>F1- Full cream milk, fried egg, fried rice chicken , beef curry, chicken burger, cheese cake contain a lot of fat</b></p> <p>E1 – a health problem will be obesity</p> <p>E2 - Excess saturated fats increases the blood cholesterol level</p> <p>E3 - Cholesterol deposits on the walls of the blood vessel narrowing them</p> <p>E4- This will contribute to cardiovascular disease/ arteriosclerosis/ hypertension/heart problem</p> <p><b>F2- Fried egg, beef curry, fried chicken, chicken burger also contain a lot of protein beside fat</b></p> <p>E5 – Excess protein will, cause very taxing on the kidneys during excretion</p> <p>E6- Might also lead to gout</p> <p><b>F3 – ice cream, cheese cake, the tarik ,carbonated soft drink contain a lot of sugar</b></p> <p>E7- that leads to obesity/ diabetes mellitus</p> <p><b>F4- His diet does not contain fruit and vegetables</b></p> <p>E8- that leads to constipation /</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>Max 10m</p>
<b>TOTAL</b>			<b>20 m</b>

## Question 9

No	Marking Criteria		Marks	
(a)	Problems faced by mangrove plants (Fact)	Adaptive characteristics of mangrove plants (Explanation)		
	1. Soft muddy soil	<ul style="list-style-type: none"> <li>Highly branched root system to support themselves./</li> <li>Eg. Avicennia have long/underground/ horizontals cable/ roots</li> </ul>	2	
	2. Waterlogged conditions of the soil/ Very little oxygen for root respiration	<ul style="list-style-type: none"> <li>(Avicennia) have breathing roots /pneumatophores /Gaseous exchange occurs through pores/ lenticels.</li> </ul>	2	



	3. The high content of salt/salinity makes the water in the soil hypertonic compared to the cell sap of the root cells/ Water diffuse out from plant/ the root cells by osmosis// dehydration	<ul style="list-style-type: none"> <li>Cell sap of (the root) cells are hypertonic compared to the soil water/.</li> <li>The root does not lose water but seawater enters the root cells instead/ Excess salt in the plant is eliminated by the salt glands</li> </ul>	2	
	4. Excessive exposure to sunlight/ intense heat// High rate of transpiration.	<ul style="list-style-type: none"> <li>The leaves (of mangrove trees) have a thick cuticle/ sunken stomata to reduce transpiration/ The leaves are thick /succulent to store water.</li> </ul>	2	
	5. High mortality rate//low survival rate of seedlings	<ul style="list-style-type: none"> <li>Have viviparous seedling // the seeds are able to germinate while still attached to the mother plant.</li> </ul>	2	
One fact and one explanation = 2 marks			10	Max 8m

(b)(ii)	Good effect(Fact)	Explanation		
	1. Provide job opportunity	<ul style="list-style-type: none"> <li>Improve the economic status</li> </ul>	2	Max 4m
	2. Provide infrastructure basic needs	<ul style="list-style-type: none"> <li>Provide hotel, hospital, school// For social activity// Better opportunity in education</li> </ul>	2	
	3. Provide better living condition/ convenient place for settlement	<ul style="list-style-type: none"> <li>Such as good sanitation system // hygienic water supply // Better electric supply</li> </ul>	2	
	4. Convenience transport system	<ul style="list-style-type: none"> <li>Faster transportation</li> </ul>	3	
Total			8	
TOTAL			20	

END OF MARKING SCHEME

SULIT  
4551/2



PEPERIKSAAN PERCUBAAN BERSAMA  
SIJIL PELAJARAN MALAYSIA 2011

---

# BIOLOGI

SKEMA JAWAPAN KERTAS

3

---

UNTUK PEMERIKSA SAHAJA

## MARKING SCHEME : PAPER 3 – TRIAL BIOLOGY 2011

**Question 1 : 1(a)**

Score	Explanation										
3	<p>Able to record <b>1</b> reading for the initial mass and all 4 reading for the final mass of potato strips correctly</p> <p>Sample answer: initial mass = 50 gm</p> <table border="1" style="margin-left: 40px;"> <tr> <th>Concentration of sucrose solution</th><th>Final mass of potato strip after 30 minutes (g)</th></tr> <tr> <td>0.2 M</td><td>58</td></tr> <tr> <td>0.4 M</td><td>52</td></tr> <tr> <td>0.6 M</td><td>46</td></tr> <tr> <td>0.8 M</td><td>42</td></tr> </table>	Concentration of sucrose solution	Final mass of potato strip after 30 minutes (g)	0.2 M	58	0.4 M	52	0.6 M	46	0.8 M	42
Concentration of sucrose solution	Final mass of potato strip after 30 minutes (g)										
0.2 M	58										
0.4 M	52										
0.6 M	46										
0.8 M	42										
2	Able to record <b>1</b> reading for the initial mass and all 3 reading for the final mass of potato strips correctly										
1	Able to record <b>1</b> reading for the initial mass and all 2 reading for the final mass of potato strips correctly										
0	No response or <b>1</b> reading for the initial mass and 1 reading for the final mass of potato strips correctly										

**1(b)(i)**

Score	Explanation
3	<p>Able to state <b>two</b> correct observations based on following criteria.  C1 – concentration of sucrose solution  C2 – the final mass of potato strip</p> <p>Sample Answer: (either 2):</p> <ol style="list-style-type: none"> <li>1. In 0.2 M sucrose solution, the final mass of the potato strips is 58gm.</li> <li>2. In 0.8 M sucrose solution, the final mass of the potato strips is 42gm.</li> </ol>
2	<p>Able to state one correct observation and one inaccurate response.</p> <p>Sample answer :</p> <ol style="list-style-type: none"> <li>1. At 0.8 M concentration , the final mass is the lowest.</li> </ol>
1	<p>Able to state one correct observation or two inaccurate response or idea.</p> <p>Sample answer :</p> <ol style="list-style-type: none"> <li>1. The final mass of potato strips changes (inaccurate)</li> </ol>
0	No response or wrong response (response like hypothesis)

1(b) (ii)

Score	Explanation
3	Able to state <b>two</b> reasonable inferences for the observation.  Sample answer: 1. At concentration of 0.2M, the increase in the mass is caused by the diffusion / movement of water molecules into the cell sap by osmosis. 2. At concentration of 0.8M, the decrease in the mass is caused by the diffusion / movement of water molecules out of the cell sap by osmosis
2	Able to state one correct inference and one inaccurate inference. Sample answer : 1. The diffusion of water is influenced by concentration.
1	Able to state one correct inference or two inaccurate inference or idea. Sample answer : 1. Osmosis occur
0	No response or wrong response (inference like hypothesis)

1 (c)

Score	Explanation								
3	<p>Able to state <b>all</b> the <b>variables</b> and the <b>method</b> to handle variable correctly (✓) for each variable and method</p> <table border="1"> <thead> <tr> <th>Variable</th><th>Method to handle the variable</th></tr> </thead> <tbody> <tr> <td>Manipulated variable Concentration of sucrose solution</td><td>Use different concentration of sucrose solutions: 0.1M, 0.2M, 0.3M and 0.4M</td></tr> <tr> <td>Responding variable 1.) Final mass of potato strips/  2.) Percentage change in mass of potato strips.</td><td>1.) Measure the final mass of potato strips by using triple beam balance/electronic balance  2.) calculate the percentage change in mass of potato strips by using formula : <math display="block">\frac{\text{Final mass} - \text{Initial mass}}{\text{Initial mass}} \times 100\%</math></td></tr> <tr> <td>Controlled variable 1.) Duration of immersion/ 2.) Size /length/mass of potato strips/  3.) volume of sucrose solution</td><td>1.) Fix the time ( 30 min) duration for the immersion of the potato strips./ 2.) Fix the diameter of the potato strips by using the same cork borer for all the strips / fix the initial length ( 5 cm) of potato strips/fix the mass at 50 gm 3.) measure the same volume of sucrose solutions using a measuring cylinder,</td></tr> </tbody> </table> <p>Reject way how to handle the variable if variable is wrong. Able to get 6 ✓ (with the correct key words)</p>	Variable	Method to handle the variable	Manipulated variable Concentration of sucrose solution	Use different concentration of sucrose solutions: 0.1M, 0.2M, 0.3M and 0.4M	Responding variable 1.) Final mass of potato strips/  2.) Percentage change in mass of potato strips.	1.) Measure the final mass of potato strips by using triple beam balance/electronic balance  2.) calculate the percentage change in mass of potato strips by using formula : $\frac{\text{Final mass} - \text{Initial mass}}{\text{Initial mass}} \times 100\%$	Controlled variable 1.) Duration of immersion/ 2.) Size /length/mass of potato strips/  3.) volume of sucrose solution	1.) Fix the time ( 30 min) duration for the immersion of the potato strips./ 2.) Fix the diameter of the potato strips by using the same cork borer for all the strips / fix the initial length ( 5 cm) of potato strips/fix the mass at 50 gm 3.) measure the same volume of sucrose solutions using a measuring cylinder,
Variable	Method to handle the variable								
Manipulated variable Concentration of sucrose solution	Use different concentration of sucrose solutions: 0.1M, 0.2M, 0.3M and 0.4M								
Responding variable 1.) Final mass of potato strips/  2.) Percentage change in mass of potato strips.	1.) Measure the final mass of potato strips by using triple beam balance/electronic balance  2.) calculate the percentage change in mass of potato strips by using formula : $\frac{\text{Final mass} - \text{Initial mass}}{\text{Initial mass}} \times 100\%$								
Controlled variable 1.) Duration of immersion/ 2.) Size /length/mass of potato strips/  3.) volume of sucrose solution	1.) Fix the time ( 30 min) duration for the immersion of the potato strips./ 2.) Fix the diameter of the potato strips by using the same cork borer for all the strips / fix the initial length ( 5 cm) of potato strips/fix the mass at 50 gm 3.) measure the same volume of sucrose solutions using a measuring cylinder,								
2	Able to get 4 – 5 ✓								
1	Able to get 2 – 3 ✓								
0	No response or wrong response								



## 1(d) Making hypothesis

Score	Explanation
3	<p>Able to state the hypothesis correctly based on the following criteria:</p> <p>V1 – State the manipulated variable</p> <p>V2 – State the responding variable</p> <p>R - State the relationship between V1 and V2./showing a specific relationship</p> <ol style="list-style-type: none"> <li>1. The concentration of an external solution which is isotonic to the cell sap is the concentration of the sucrose solution that does not change the length of the potato strip.</li> <li>2. As the concentration of sucrose solution increases/decrease, the final mass of the potato strip decreases/increase // the percentage change in mass decreases/increases</li> </ol>
2	Able to state the hypothesis but less accurate.
1	Able to state the idea of the hypothesis
0	No response or wrong response

## 1(e)(i)

Score	Explanation																				
3	<p>Able to construct a table and record the result of the experiment with the following criteria:</p> <p>1: Able to state the 4 titles with units correctly 2: Able to record all the data correctly 3: Able to calculate and record percentage change correctly</p> <p>Sample answer:</p> <table><tr><th>Concentration of sucrose solution /M</th><th>Initial mass /g</th><th>Final mass /g</th><th>Percentage change in mass : <math display="block">\frac{(\text{Final mass} - \text{initial mass}) \times 100}{\text{Initial mass}}</math> /%</th></tr><tr><td>0.2</td><td>50</td><td>58</td><td>16.0</td></tr><tr><td>0.4</td><td>50</td><td>52</td><td>4.0</td></tr><tr><td>0.6</td><td>50</td><td>46</td><td>-8.0</td></tr><tr><td>0.8</td><td>50</td><td>42</td><td>-16.0</td></tr></table>	Concentration of sucrose solution /M	Initial mass /g	Final mass /g	Percentage change in mass : $\frac{(\text{Final mass} - \text{initial mass}) \times 100}{\text{Initial mass}}$ /%	0.2	50	58	16.0	0.4	50	52	4.0	0.6	50	46	-8.0	0.8	50	42	-16.0
Concentration of sucrose solution /M	Initial mass /g	Final mass /g	Percentage change in mass : $\frac{(\text{Final mass} - \text{initial mass}) \times 100}{\text{Initial mass}}$ /%																		
0.2	50	58	16.0																		
0.4	50	52	4.0																		
0.6	50	46	-8.0																		
0.8	50	42	-16.0																		
2	Able to construct a table and record any two criteria																				
1	Able to construct a table and record any one criteria																				
0	No response or wrong response																				

## 1(e)(ii)

Score	Explanation
3	Able to draw the graph correctly with the following aspects: Axes (A) – both axis are labeled with units and uniform scales (✓) Point (P) – All points are correctly plotted / transferred correctly (✓) Shape (S) – Able to join the points to form a smooth graph / line (✓).
2	Graph with any two criteria.
1	Graph with any one criteria.
0	No response or wrong response.

1(f)

Score	Explanation
3	Able to state the concentration of the sucrose solution which is isotonic to the concentration of the cell sap of the potatoes correctly. Concentration of sucrose solution which is isotonic to the cell sap is (based on graph) // 0.44 M / 0.45 M / 0.46 M / 0.47 M E: From the graph the point where the graph cuts the x axis indicates the concentration of the sucrose solution that does not cause any changes to the length of the potato strips.
2	Able to interpret data with two aspect correctly.
1	Able to interpret data with two aspect correctly.
0	No response or wrong response

1(g)

Score	Explanation
3	Able to <b>predict</b> and explain the outcome of the experiment correctly based on the following item: Prediction : 1. Able to predict mass of the potato strip correctly Explanation : 1. Able to state distilled water is hypotonic 2. Able to state more water molecules diffuse into the potato strips Sample answer: 1. The mass of the potato strip is more than 46 g because distilled water is hypotonic compare to cell sap so more water molecules diffuse into potato strips.
2	Able to state predict and explain the outcome of the experiment correctly with two aspects
1	Able to state predict and explain the outcome of the experiment correctly with one aspects
0	No response or wrong response

1(h)

Score	Explanation
3	<p>Able to define operationally based on the result of the experiment with the following aspects:</p> <p>C1 – Movement of water in / out across the plasma membrane  C2 – difference in concentration gradient between the sucrose solution and the cell Sap  C3 – cause the change in mass of the potato strip</p> <p>Sample answer:</p> <p>A process in which water molecules diffuse into or out of the potato strip across the plasma membranes of the potato cells occur when there is a difference in concentration gradient between the cell sap and the sucrose solutions that cause the change in mass of potato strip.</p>
2	Able to define operationally based on the result of the experiment with two aspects correctly.
1	Able to define operationally based on the result of the experiment with one aspects correctly.
0	No response or wrong response

## 1(i)

Score	Explanation								
3	<p>Able to classify all 3 solutions concentration and types of solution correctly:</p> <table border="1"> <thead> <tr> <th>Solution concentrations (%)</th><th>Types of solution compared to the osmotic concentration of cell sap</th></tr> </thead> <tbody> <tr> <td>0.25% natrium chloride solution</td><td>Hypotonic</td></tr> <tr> <td>0.65% natrium chloride solution</td><td>Hypotonic</td></tr> <tr> <td>1.10 % natrium chloride</td><td>Hypertonic</td></tr> </tbody> </table> <p>Able to classify all the apparatus and material correctly.</p>	Solution concentrations (%)	Types of solution compared to the osmotic concentration of cell sap	0.25% natrium chloride solution	Hypotonic	0.65% natrium chloride solution	Hypotonic	1.10 % natrium chloride	Hypertonic
Solution concentrations (%)	Types of solution compared to the osmotic concentration of cell sap								
0.25% natrium chloride solution	Hypotonic								
0.65% natrium chloride solution	Hypotonic								
1.10 % natrium chloride	Hypertonic								
2	Able to classify two solutions concentration and types of solution correctly.								
1	Able to classify one solutions concentration and types of solution correctly.								
0	No response or wrong response								



No.	Mark Scheme	score
2(i)	<p>Able to state a <b>problem statement</b> relating the manipulated variables with the responding variables correctly</p> <p>P1: manipulated variables : air movement</p> <p>P2: responding variables : rate of transpiration/time taken for air bubble to move at a distance of 2cm or any suitable distance.</p> <p>H: relationship in question form</p> <p><u>Sample answers</u></p> <ol style="list-style-type: none"> <li>Does air movement affect the rate of transpiration of a plant?</li> <li>What is the effect of air movement on the rate of transpiration?</li> </ol>	3
	<p>Able to state a problem statement inaccurately</p> <p><u>Sample answers</u></p> <ol style="list-style-type: none"> <li>The rate of transpiration is affected by the air movement.</li> <li>What are the effect of air movement on the rate of transpiration.(No question mark)</li> </ol>	2
	<p>Able to state a problem statement at idea level</p> <p><u>Sample answers</u></p> <ol style="list-style-type: none"> <li>Air movement affect the transpiration of a plant.</li> <li>Transpiration is influenced by temperature?</li> </ol>	1
	<p>No response or incorrect response</p>	0
2(ii)	<p>Able to state <b>hypothesis</b> relating the manipulated variables to the responding variables correctly</p> <p>P1: manipulated variables : air movement</p> <p>P2: responding variables: rate of transpiration / time taken for</p>	3

	<p>air bubble to move at a distance of 5 cm or any suitable distance.</p> <p>R:relationship : faster/slower</p> <p><u>Sample answers</u></p> <ol style="list-style-type: none"> <li>1. The faster the air movement, the higher the rate of transpiration of a plant.</li> <li>2. The faster the air movement, the shorter time taken for air bubble to move for 5 cm distance.</li> <li>3. When the air movement increases, the rate of transpiration also increases.</li> </ol>	
	<p>Able to state a hypothesis inaccurately</p> <p><u>Sample answer</u></p> <ol style="list-style-type: none"> <li>1. when the temperature increases the rate of reaction increases</li> <li>2. the faster the air movement, the higher the transpiration of a plant.</li> <li>3. the air movement affect the rate of transpiration of a plant.</li> </ol>	2
	<p>Able to state a hypothesis at idea level</p> <p><u>Sample answers</u></p> <ol style="list-style-type: none"> <li>1. air movement affect/influence the transpiration of a plant.</li> </ol>	1
	<p>No response or incorrect response</p>	0
2(iii)	<p><b>Able to state all three variables correctly</b></p> <p><u>Sample answers</u></p> <ol style="list-style-type: none"> <li>1. Manipulated variable: air movement</li> <li>2. Responding variable: <ol style="list-style-type: none"> <li>i) rate of transpiration/</li> <li>ii) time taken for air bubble to move at a distance of 5 cm or any suitable distance.</li> </ol> </li> <li>3. Constant variable: <ol style="list-style-type: none"> <li>i) type of plant</li> </ol> </li> </ol>	3

	ii) relative humidity iii) temperature iv) light intensity	
	Able to state any two variables correctly	2
	Able to state any one variables correctly	1
	No response or incorrect response	0
2(iv)	Able to list all the important apparatus and materials correctly	3
	<u>Sample answers</u> (A) Apparatus : potometer, stopwatch, cutter, beaker, meter ruler, basin, marker/thread  (M) Materials : plant, water, Vaseline/gris, dry cloth  $7A + 4M$	
	Able to list at least 6 apparatus and 3 materials correctly  A=Without a meter ruler and dry cloth  $6A + 3M$	2
	Able to list at least 5 apparatus and 2 materials correctly  Without a meter ruler, Vaseline, marker and dry cloth  $5A + 2M$	1
	No response or incorrect response	0
2(v)	Able to describe the steps of the experiment procedure or method correctly.	

	Sample answers	
K1	1. The leafy shoot is selected from plant and cut off the shoot using a sharp knife.	
K1	2. The cut end is immediately <u>immersed</u> in a beaker filled with distilled water.	
K1+k2+k5	3. Then cut <u>1 cm</u> of the bottom of the stem slantly <u>under the water</u> .	
K1	4. The potometer <u>is immersed</u> in the water and moved around to remove all the air bubbles. (the tap of the reservoir is turned on to fill the graduated capillary tube with water).	
K1	5. Insert the cut end of the <u>stem</u> into the hole in the cork of the potometer under water.	
K1	6. <u>Close the reservoir tap</u> before the apparatus from the water so the graduated capillary tube is full.	
K5	7. The potometer are <u>sealed using Vaseline</u> to make apparatus <u>airtight and ensure no water leakage</u> .	
K1+k2	8. <u>Mark two point (X and Y) at a distance 5cm</u> (using a marker/thread).	
K1+k5	9. <u>Lift up the capillary tube above the water</u> surface to trap an air bubble.	
K5		
K4	10. <u>Wipe the leaves</u> and the apparatus dry by using a <u>dry cloth</u> .	
K3	11. Placed the potometer on the table under a fan with <u>low speed</u> .	
K4		
K1	12. The <u>time taken</u> for the air bubble to move from X to Y (5 cm) is recorded <u>using stop watch</u> .	
K3	13. Repeat the experiment <u>using fan speed medium and high</u> .	
	14. The result <u>are recorded</u> in the table as shown below.	
	15. The rate of transpiration is calculated by using the formula	
	$= \frac{\text{length (cm)}}{\text{Time (s)}}$	



	<p><b>Note</b></p> <p>K1: steps 1,2,3,4,5,6,8,9,13(preparing of material and apparatus)</p> <p>K2: step 3,8 (operating fixed variable)</p> <p>K3: step 12,15 (operating responding variable)</p> <p>K4: step 11,13 (operating manipulated variable)</p> <p>K5: step 3,7,10 (precaution)</p> <p>All the 'K'</p>	3																								
	Any 3-4 K	2																								
	Any 2 K	1																								
	No response or incorrect response	0																								
2(vi)	<p>Able to present all the data with units correctly</p> <p><u>Sample answers</u></p> <table border="1"> <tr> <th>Air move ment</th><th colspan="4">Time taken for air bubble move from X to Y(5cm) (min)</th><th>Rate of transpir ation (cmmin<sup>-1</sup>)</th></tr> <tr> <td>Low speed</td><td>1</td><td>2</td><td>3</td><td>Average</td><td></td></tr> <tr> <td>Medium speed</td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>High speed</td><td></td><td></td><td></td><td></td><td></td></tr> </table>	Air move ment	Time taken for air bubble move from X to Y(5cm) (min)				Rate of transpir ation (cmmin <sup>-1</sup> )	Low speed	1	2	3	Average		Medium speed						High speed						2
Air move ment	Time taken for air bubble move from X to Y(5cm) (min)				Rate of transpir ation (cmmin <sup>-1</sup> )																					
Low speed	1	2	3	Average																						
Medium speed																										
High speed																										
	Able to present a table with at least two titles correctly	1																								
	No response or incorrect response	0																								

END OF MARKING SCHEME