



NAMA : _____

KELAS : _____

JABATAN PELAJARAN NEGERI SABAH

**SIJIL PELAJARAN MALAYSIA 2010
EXCEL 2
BIOLOGY
Kertas 1
OGOS 2010**

4551/1

1 Jam 15 minit

Satu jam lima belas minit

-
1. Kertas soalan ini adalah dalam dwibahasa.
 2. Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Malaysia.
 3. Calon dikehendaki membaca dengan teliti arahan di dalam kertas soalan ini.

**DO NOT OPEN THE QUESTION PAPER UNTIL INSTRUCTED
(JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU)**

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 objective sheet. (*Jawab setiap soalan 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 dan hitamkan jawapan yang baru*)
6. The diagram in the question 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*)

Kertas soalan ini mengandungi 23 halaman bercetak.

1. The following statements are about organelles H in a cell.
Pernyataan berikut adalah berkaitan dengan organel H di dalam sel

- Provides support and protection for the cell
Memberi sokongan dan melindungi sel
- Composed of cellulose
Terdiri daripada selulosa
- Permeable to all fluids
Telap pada semua larutan

What is H?
Apakah H?

- A Nucleus
Nukleus
- B Vacuole
Vakuol
- C Vesicle
Vesikel
- D Cell wall
Dinding Sel
2. Choose the correct sequence of Phagocytosis in *Amoeba* sp.
Pilih urutan yang paling tepat bagi proses fagositosis dalam Amoeba sp.
- I Food vacuole fuses with lysosome to be digested
Vakuol makanan akan bergabung dengan lisosom untuk dihadamkan
- II Food particles then packed in a food vacuole
Partikel makanan akan dikumpul dalam vakuol makanan
- III Two pseudopodia extend out and enclose the food particles
Dua unjuran pseudopodia akan mengepung partikel makanan
- IV Digested food then absorbed into the cytoplasm
Makanan yang telah dihadam akan diserap kedalam sitoplasma
- A III→II→I→IV
III→II→I→IV
- B II→III→I→IV
II→III→I→IV
- C I→IV→II→III
I→IV→II→III
- D IV→III→II→I
IV→III→II→I
3. Which part of the cell allows substances to move in and out of the cell?
Bahagian sel yang manakah membolehkan bahan tertentu bergerak ke dalam dan keluar sel?
- A. Cell wall *Dinding sel*
- B. Plasma Membrane *Membran Plasma*
- C. Nucleus *Nukleus*
- D. Cytoplasm *Sitoplasma*

4. The onion cell in the diagram below was immersed into solution A then into B. The onion cell in X and Y has undergone...
Sel bawang dalam gambarajah di bawah ini telah dimasukkan kedalam dua jenis larutan iaitu A dan kemudian B. Sel bawang dalam X dan Y dikatakan telah mengalami....



	X	Y
A	Deplasmolysis <i>Deplasmolisis</i>	Haemolysis <i>Hemolisis</i>
B	Haemolysis <i>Hemolisis</i>	Crenation <i>Krenasi</i>
C	Crenation <i>Krenasi</i>	Deplasmolysis <i>Deplasmolisis</i>
D	Plasmolysis <i>Plasmolisis</i>	Deplasmolysis <i>Deplasmolisis</i>

5. Diagram 1 shows the structure of a chloroplast.
Rajah 1 menunjukkan struktur satu kloroplas,

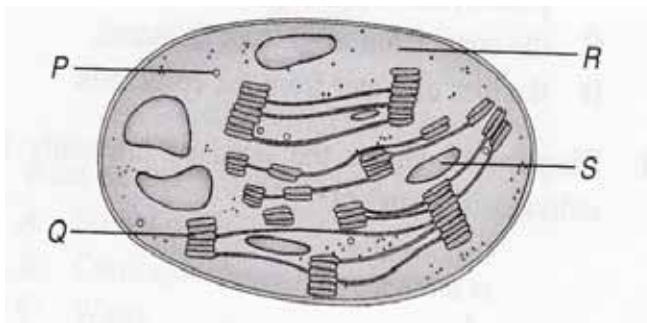


Diagram 1

Where do the light reactions of photosynthesis occur?
Dimanakah tindakbalas cahaya bagi fotosintesis berlaku?

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

6. Diagram 2 shows the structure of a plasma membrane. Which of the following structures A, B, C or D are involve in active transport?
Gambarajah 2 menunjukkan struktur plasma membran. Manakah antara struktur A, B, C atau D yang terlibat dalam proses pengangkutan aktif

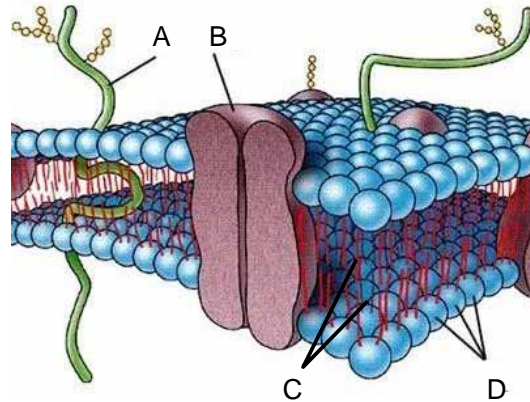


Diagram 2

7. Which of the following is **not true** about enzymes?
*Antara berikut yang manakah **tidak benar** tentang enzim?*
- A. Enzymes are highly specific
Enzim adalah sangat spesifik
 - B. Enzymes cannot be destroyed
Enzim tidak dapat dimusnahkan
 - C. Enzymes are needed in big quantities
Enzim diperlukan dalam kuantiti yang banyak.
 - D. Enzymes are synthesized in the ribosomes.
Enzim disintesis di dalam ribosom.
8. Which of the following tissues protect the outer parts of an organism?
Manakah antara tisu berikut yang melindungi bahagian luar organisma?
- A muscle
otot
 - B epidermis
epidermis
 - C connective tissue
Tisu penghubung
 - D epithelium
epitelium

9. Meiosis occurs in
Meiosis berlaku dalam

- I. Petal
Petal
 - II. Sepal
Sepal
 - III. Ovaries
Ovari
 - IV. Testes
Testis
-
- A. I and II
 - B. III and IV
 - C. I, II and III
 - D. II, III and IV

10. Diagram 3 shows a phase of mitotic division.
Rajah 3 menunjukkan satu fasa pembahagian mitosis.

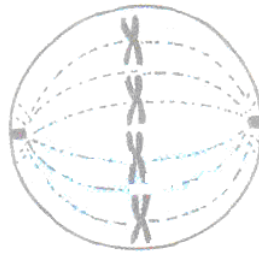


Diagram 3

What is the next stage after this phase?
Apakah peringkat seterusnya selepas fasa ini?

- A. Metaphase
Metafasa
- B. Telophase
Telofasa
- C. Anaphase
Anafasa
- D. Prophase
Profasa

11. Which of the following are the differences between mitosis and meiosis
Antara berikut, yang manakah merupakan perbezaan diantara mitosis dan meiosis.

	Mitosis	Meiosis
I	Produces two daughter cells <i>Menghasilkan dua sel anak</i>	Produces four gametes <i>Menghasilkan empat gamet</i>
II	Conserves the number of chromosomes <i>Mengekalkan bilangan kromosom</i>	Conserves the diploid number of chromosomes <i>Mengekalkan bilangan kromosom diploid</i>
III	Cytokinesis occurs only once <i>Sitokinesis berlaku hanya sekali</i>	Cytokinesis occurs twice <i>Sitokinesis berlaku sebanyak dua kali</i>
IV	Number of chromosomes is haploid <i>Bilangan kromosom adalah haploid</i>	Number of chromosomes is diploid <i>Bilangan kromosom adalah diploid</i>

- A. I and III only *I dan III sahaja*
 B. II and IV only *II dan IV only*
 C. I, II and III only *I, II dan III only*
 D. I, II, III and IV *I, II, III dan IV*
12. Diagram 4 shows the level of various food classes in a food pyramid.
Rajah 4 menunjukkan aras pelbagai kelas makanan dalam piramid makanan.

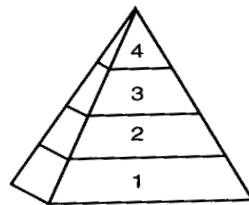
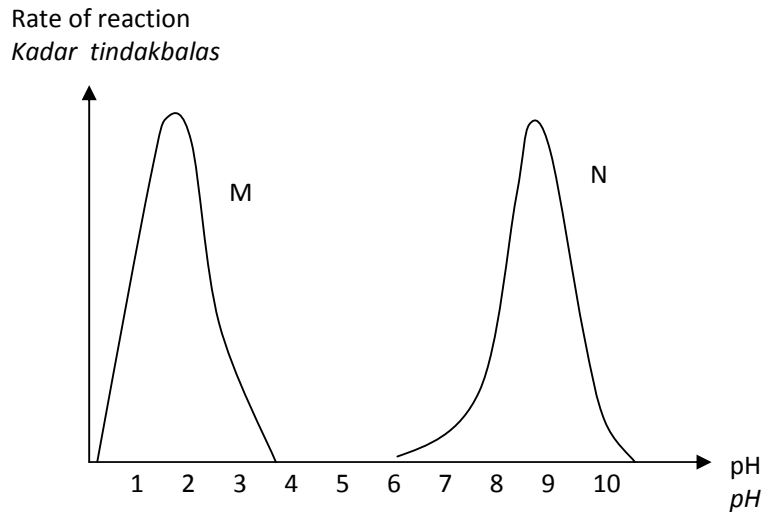


Diagram 4

- Which of the following shows the **correct** classes of food in the food pyramid?
Antara pernyataan berikut yang manakah menunjukkan aras kelas makanan yang betul dalam piramid makanan?

	1	2	3	4
A	Fats <i>Lemak</i>	Proteins <i>Protein</i>	Carbohydrates <i>Karbohidrat</i>	Vitamins and minerals <i>Vitamin dan garam mineral</i>
B	Carbohydrates <i>Karbohidrat</i>	Vitamins and minerals <i>Vitamin dan garam mineral</i>	Proteins <i>Protein</i>	Fats <i>Lemak</i>
C	Proteins <i>Protein</i>	Carbohydrates <i>Karbohidrat</i>	Fats <i>Lemak</i>	Vitamins and minerals <i>Vitamin dan garam mineral</i>
D	Carbohydrates <i>Karbohidrat</i>	Fats <i>Lemak</i>	Vitamins and minerals <i>Vitamin dan garam mineral</i>	Proteins <i>Protein</i>

13. The graph below shows the optimum pH of enzyme M and N in its reaction
Graf di bawah menunjukkan pH optimum bagi enzim M dan N di dalam tindakbalasnya



What is enzyme M and N?
Apakah enzim M dan N?

- | | M | N |
|---|---------------------------|---------------------------|
| A | Pepsin
<i>Pepsin</i> | Trypsin
<i>Tripsin</i> |
| B | Amylase
<i>Amilase</i> | Trypsin
<i>Tripsin</i> |
| C | Pepsin
<i>Pepsin</i> | Amylase
<i>Amilase</i> |
| D | Trypsin | Amylase |

14.
 - Muscle unable to contract
Otot tidak boleh mengecut
 - Red Blood Cells unable to carry oxygen
Sel Darah Merah tidak dapat mengangkut oksigen
 - Ions would not be able to enter or leave cell
Ion tidak dapat meresap masuk atau keluar daripada sel

The condition stated above are the consequences of a nutrient deficiency.
 What is this nutrient?

Situasi yang digambarkan di atas adalah kesan daripada kekurangan nutrien tertentu
Apakah nutrien tersebut?

- | | |
|---|------------------------------------|
| A | Protein
<i>Protein</i> |
| B | Lipid
<i>Lipid</i> |
| C | Carbohydrate
<i>Karbohidrat</i> |
| D | Vitamins |

15. Which of the following best explains why animals store energy in the form of lipids?
Yang manakah antara berikut paling sesuai menerangkan mengapa haiwan menyimpan tenaga dalam bentuk lipid?
- A lipids supply a large amount of energy
lipid membekalkan tenaga yang banyak
 - B lipids are polar and soluble in blood plasma
lipid adalah berkutub dan larut dalam plasma darah
 - C lipids have active sites to which substrate bind
lipid mempunyai tapak aktif untuk substrat mengikat padanya.
 - D lipids can easily link subunits into macromolecules
lipid boleh menghubungkan subunit-subunitnya untuk membentuk makromolekul dengan mudah
16. What will happen if the bile duct is blocked?
Apakah yang akan terjadi sekiranya duktus hempedu tersumbat?
- A. bile production is stopped
Penghasilan hempedu akan terhenti
 - B. the contents of the small intestine will become neutral
kandungan di dalam usus kecil akan menjadi neutral
 - C. lipid digestion will be slowed down
Pencernaan lipid akan menjadi perlahan
 - D. protein and carbohydrate digestion will be stopped
Pencernaan protein dan karbohidrat akan terhenti
17. During vigorous exercise, what are the end products of anaerobic respiration in human muscle tissues?
Semasa senaman cergas, apakah hasil akhir pernafasan anaerobik dalam tisu otot manusia?
- A. Carbon dioxide and water
Karbon dioksida dan air
 - B. Ethanol and carbon dioxide
Etanol dan karbon dioksida
 - C. Lactic acid and energy
Asid laktik dan tenaga
 - D. Lactic acid and carbon dioxide
Asid laktik dan karbon dioksida
18. A plant can possibly reach the compensation point
Suatu tumbuhan mungkin mencapai takat tepu
- I. When light intensity is high
Apabila keamatan cahaya adalah tinggi
 - II. When light intensity is low
Apabila keamatan cahaya adalah rendah
 - III. At night
Sewaktu malam
 - IV. At dusk
Sewaktu senja

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

19.. Which of the following describes a habitat?
Manakah antara berikut menerangkan tentang habitat?

- A The natural surroundings where organisms live.
Persekitaran semulajadi untuk organima hidup.
- B The role of an organism in an ecosystem
Peranan suatu organisma dalam ekosistem
- C Various species which live together in the same place
Pelbagai spesis yang tinggal di kawasan yang sama.
- D Several species of organisms which live together in the same place.
Beberapa spesis organism yang tinggal di kawasan yang sama

20.

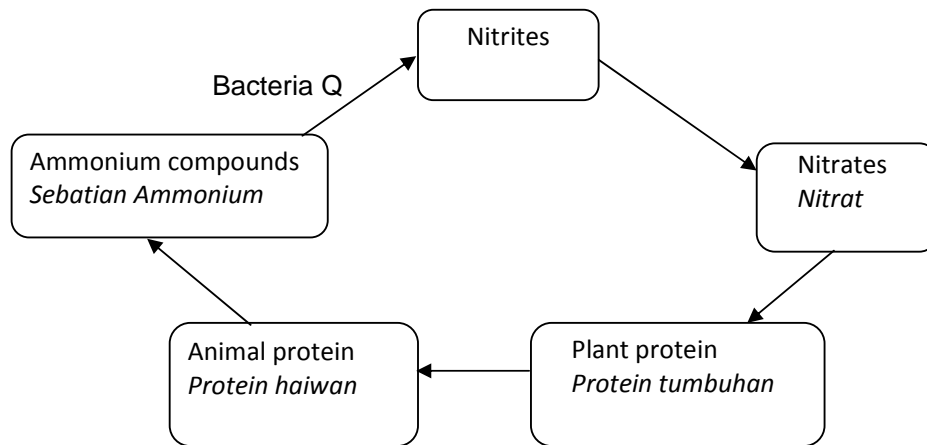


Diagram 5

Diagram 5 shows part of the Nitrogen cycle. What is Q?
Gambarajah 5 menunjukkan sebahagian dari Kitar Nitrogen. Apakah Q?

- A Nostoc sp.
- B Rhizobium sp.
- C Nitrobacter sp.
- D Nitrosomonas sp.

21.

Size : 100m X 100m
Type of vegetation : Small, woody and creeping plant
Jenis tumbuhan : Kecil, berkayu dan menjalar.

Which is the best method to measure the population above?
Manakah kaedah terbaik untuk mengukur populasi di atas?

- A Quadrat sampling
Sample Kuadrat
- B Transect sampling
Sampel transek
- C Random counting
Pengiraan secara rawak
- D Capture, mark, release and recapture technique
Teknik tangkap, tanda, lepas dan tangkap semula

22. What is the cause of the increase in greenhouse gases in the atmosphere?
Apakah penyebab peningkatan gas rumah hijau di atmosfera?

- I The use of pesticide
Penggunaan racun serangga
 - II Industrial activities
Aktiviti perindustrian
 - III Burning of fossil fuels
Pembakaran bahan api fosil
 - IV Rubbish dumping
Pembuangan sampah sarap.
- A I and II
 - B II and III
 - C II and IV
 - D II and IV

23. The following information is about eutrophication.
Maklumat di bawah menerangkan mengenai eutrofikasi.

P : Bacteria multiply rapidly
Bakteria membiak dengan cepat
Q : The BOD value increase
Nilai BOD meningkat
R : Run-off organic fertilizers into a lake
Pengaliran baja organik ke dalam tasik
S : Algae grow rapidly and cover the entire surface of the lake.
Alga membiak dengan cepat dan menutupi keseluruhan permukaan tasik

Which is correct sequence of eutrophication?
Manakah urutan eutrofikasi yang betul?

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

24. Which of the following measures taken in the management of development activities and the ecosystem can help to promote the efficient usage of energy?
Antara langkah-langkah yang diambil dalam pengurusan aktiviti pembangunan dan ekosistem yang manakah dapat membantu mengurangkan penggunaan tenaga?

- A Reduce use of fertilisers
Mengurangkan penggunaan baja.
- B Use of biological control.
Menggunakan kawalan biologi.
- C Sharing transport.
Berkongsi kenderaan.
- D Installation of factory chimneys.
Pemasangan corong kilang.

25 Diagram 6 shows part of the mechanism of blood clotting.
Rajah 6 menunjukkan sebahagian daripada mekanisma pembekuan darah.

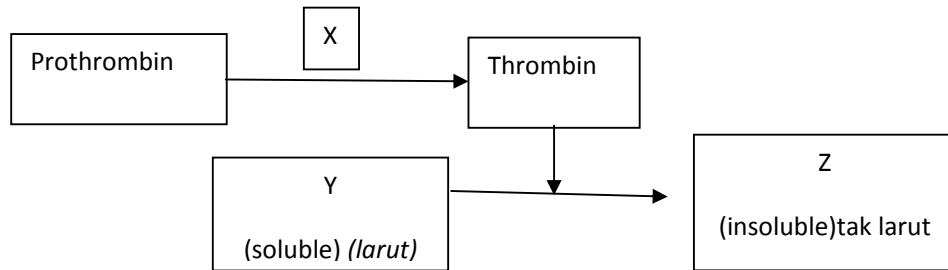


Diagram 6

What are X, Y and Z?
 Apakah X, Y and Z?

	X	Y	Z
A	Thromboplastin <i>Tromboplastin</i>	Fibrin <i>Fibrin</i>	Fibrinogen <i>Fibrinogen</i>
B	Fibrinogen <i>Fibrinogen</i>	Thromboplastin <i>Tromboplastin</i>	Fibrin <i>Fibrin</i>
C	Fibrin <i>Fibrin</i>	Fibrinogen <i>Fibrinogen</i>	Thromboplastin <i>Tromboplastin</i>
D	Thromboplastin <i>Tromboplastin</i>	Fibrinogen <i>Fibrinogen</i>	Fibrin <i>Fibrin</i>

26.

Diagram 7 shows the relationship between the lymphatic vessel, blood capillary and body cells

Rajah 7 menunjukkan perhubungan di antara salur limfa, kapilari darah dan sel-sel badan

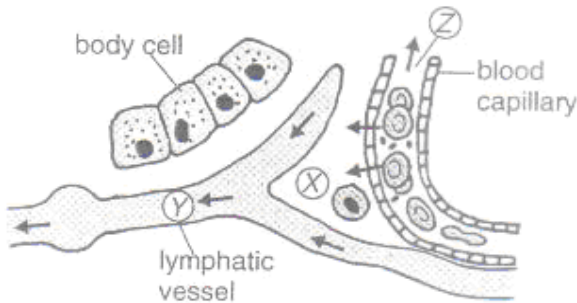


Diagram 7

Which statements are **true**?

*Manakah di antara pernyataan berikut adalah **benar**?*

- I. Fluid X contain leucocytes
Bendalir X mengandungi leukosit
 - II. Fluid Y does not contain platelets
Bendalir Y tidak mengandungi platlet
 - III. Z does not contain erythrocytes
Z tidak mengandungi eritrosit
 - IV. Fluid Y has a higher content of lymphocyte compared to fluid X
Bendalir Y mempunyai kandungan leukosit lebih tinggi berbanding bendalir X
- A. I and II only
I dan II sahaja
 - B. II and IV only
II dan IV sahaja
 - C. I, II and III only
I, II dan III sahaja
 - D. I, II and IV only
I, II dan IV sahaja

27.

What is the function of pulmonary circulation?

Apakah fungsi peredaran pulmonari?

- A. To deliver blood to body cells
Untuk menghantar darah ke sel-sel badan
- B. To deliver blood to the lungs
Untuk menghantar darah ke peparu
- C. To deliver blood to all parts of the body
Untuk menghantar darah ke semua bahagian badan
- D. To deliver blood to all parts of the body except the lungs
Untuk menghantar darah ke semua bahagian badan kecuali peparu

28.

Diagram 8 shows a cross section of a part of a plant .
Rajah 8 menunjukkan keratan rentas satu bahagian pada tumbuhan .

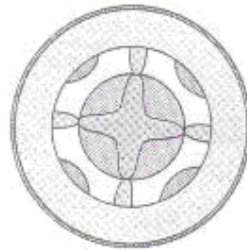


Diagram 8

This is a cross-section of a
Ini adalah keratan rentas

- A. Monocotyledonous root
Akar monokotiledon
- B. Monocotyledonous stem
Batang monokotiledon
- C. Dicotyledonous stem
Batang dikotiledon
- D. Dicotyledonous root
Akar dikotiledon

29.

Diagram 9 shows the cross section of a dicotyledonous stem.
Rajah 9 menunjukkan keratan rentas batang tumbuhan dikotiledon.

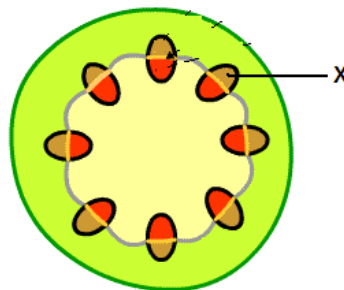


Diagram 9

What is the importance of X?

Apakah kepentingan struktur X?

- A It transport organic substance
Mengangkut bahan organik
- B It transport water
Mengangkut air
- C It transport inorganic substance
Mengangkut bahan tak organik
- D Divides actively to form new vascular bundles

30. *Membahagi secara aktif untuk membentuk sistem vaskular yang baru.*
Which of the following is the result of a poor posture?
Manakah antara berikut merupakan kesan daripada postur badan yang tidak baik?
- A. feeling tired after sleeping
berasa letih selepas bangun dari tidur
 - B. feeling weak when standing for a long time
berasa lemah apabila berdiri untuk satu jangka masa yang lama
 - C. feeling alert when sitting
berasa waspada apabila sedang duduk
 - D. cause backache
menyebabkan sakit belakang

31. Diagram 10 shows the muscles on the upper arm.
Rajah 10 menunjukkan otot-otot di bahagian atas lengan.

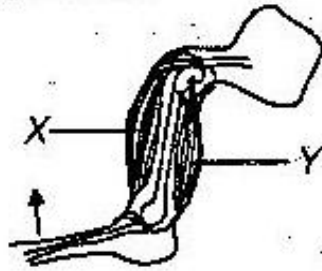


Diagram 10

How does muscle X and muscle Y act to pull the lower arm upwards?
Bagaimana otot X dan Y bertindak untuk menarik bahagian bawah lengan untuk bergerak ke atas?

	Muscle X	Muscle Y
A	Contract mengecut	Contract mengecut
B	Contract mengecut	Relax mengendur
C	Relax mengendur	Contract mengecut
D	Relax mengendur	Relax mengendur

32. Diagram 11 shows the pathway of an impulse in a reflex arc.
Rajah 11 menunjukkan laluan impuls saraf dalam arka refleks.

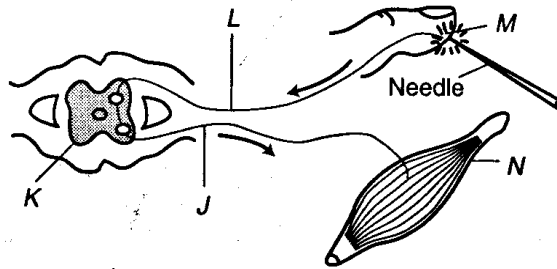


Diagram 11

Which statement is **not** true about Diagram 11?

*Antara pernyataan berikut yang manakah **tidak** benar tentang Rajah 11?*

- A The nerve impulses are transmitted along L toward the spinal cord.
Impuls dihantar melalui L ke saraf tunjang.
- B In K, the nerve impulses are transmitted from L to an interneurone.
Impuls dihantar dari L ke interneuron di K.
33. C From the interneurone, the nerve impulses are transmitted to J.
Impuls dihantar dari interneuron ke J.
- D Receptors in N generate nerve impulses.
Reseptor pada N mencetuskan impuls.

What causes the shoot of a plant to grow towards light?

Apakah yang menyebabkan pucuk tumbuhan itu tumbuh ke arah cahaya?

- A. The shoot needs light to carry out photosynthesis
Pucuk memerlukan cahaya untuk menjalankan fotosintesis.
- B. The shoot needs to grow longer to compete for light.
Pucuk perlu lebih panjang untuk bersaing mendapatkan cahaya.
- C. The accumulation of auxin on the side of the shoot exposed to the light.
Pengumpulan auksin di sisi pucuk yang terdedah kepada cahaya.
- D. The cells on the side of the shoot in the shade elongate faster than the cell on the exposed side.
Sel di sisi pucuk yang terlindung memanjang dengan lebih cepat daripada sel disisi yang terdedah.
34. Diagram 12 shows the changes in the level of hormones involved in the menstrual cycle.
Rajah 12 menunjukkan perubahan aras hormon yang terlibat dalam kitar haid.

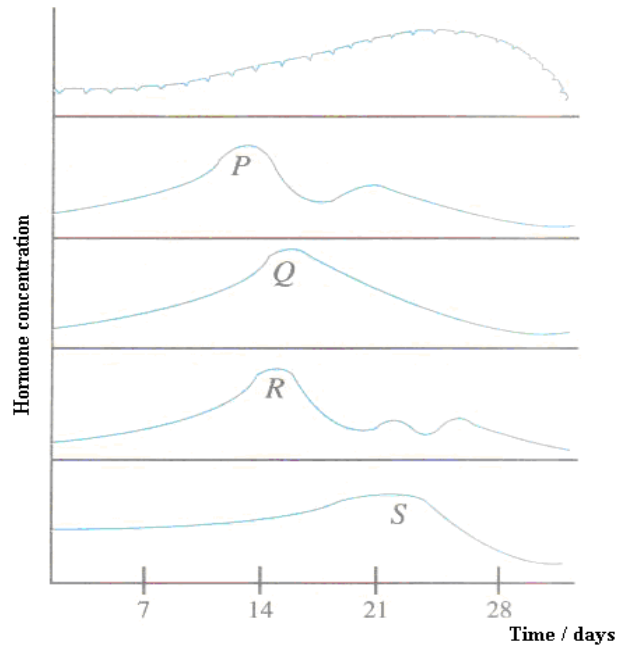


Diagram 12

Which of the following represents P, Q, R and S?
 Manakah di antara berikut mewakili P, Q, P dan S?

	P	Q	R	S
A	FSH FSH	Progesterone Progesteron	Oestrogen Estrogen	LH LH
B	FSH FSH	LH LH	Progesterone Progesteron	Oestrogen Estrogen
C	Progesterone Progesteron	FSH FSH	LH LH	Oestrogen Estrogen
D	Oestrogen Estrogen	Progesterone Progesteron	LH LH	FSH FSH

35. All immature pollen grains contains
 Kesemua debunga yang tidak matang mengandungi
- Pollen mother cell and microspores
Sel induk debunga dan mikrospora
 - Tube nucleus and generative nucleus
Tiub nukleus dan nukleus generatifi
 - Microspores and tube nucleus
Mikrospora dan tiub nukleus
 - Generative nucleus and pollen mother cell
Nukleus generatif dan sel induk debunga
36. Diagram 13 shows a type of mutation involving the change in a chromosome structure.
 Rajah 13 menunjukkan sejenis mutasi yang melibatkan perubahan dalam struktur kromosom.

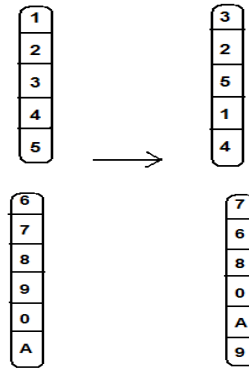


Diagram 13

Which of the following shows the type of mutation?

Yang manakah antara berikut menunjukkan mutasi tersebut?

- A Deletion
Pemadaman
- B Duplication
Penggandaan
- C Inversion
Persilangan
- D Translocation
Translokasi

37. Which of the following is true regarding genetic engineering?

Yang manakah antara berikut benar mengenai kejuruteraan genetik?

- A It is the procedure used in producing thousands of clones
la adalah kaedah menghasilkan ribuan klon
- B It is gene manipulation of DNA to produce new genes
la adalah kaedah pemanipulasian DNA untuk membentuk gen baru
- C It is the production of new animal and plant species for food sources
la adalah penghasilan haiwan dan tumbuhan baru untuk dijadikan sumber makanan.
- D It is the steps used to study and analyse one's DNA fragments
la adalah langkah untuk mempelajari fragmen DNA seseorang.

38. Which of the following shows the normal sex chromosomes in humans correctly?

Yang manakah antara berikut menunjukkan kromosom sex normal dalam manusia?

- | Male/ <i>Lelaki</i> | Female / <i>Perempuan</i> |
|---------------------|---------------------------|
| A XX | XY |
| B XYY | XO |
| C XY | XX |
| D Y | X |

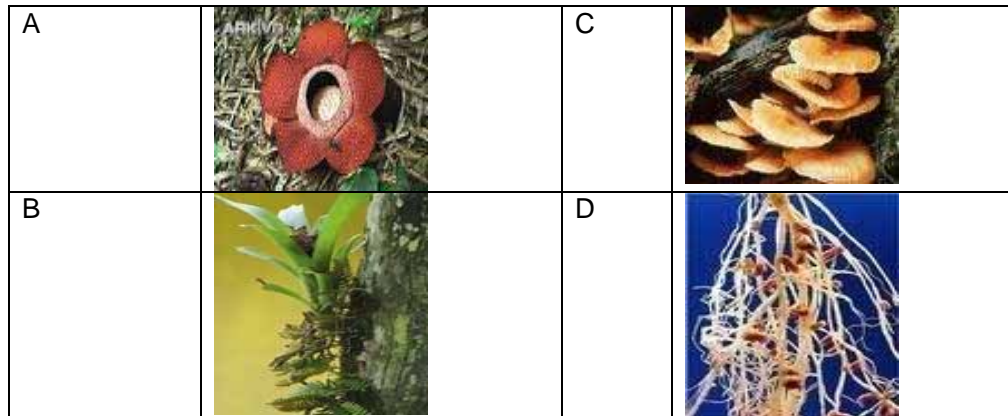
39. How can infertility in a female be overcome?

Bagaimanakah cara untuk mengatasi kemandulan pada seorang perempuan?

- I. *In vitro* fertilization
Persenyawaan In vitro
- II. Artificial insemination .
Permanian Beradas
- III. Using a surrogate mother
Ibu tumpang.

- IV Vasectomy
Vasektomi
- A. I and II only
I dan II sahaja
- B. II and III only
II dan III sahaja
- C. I, II and III only
I, II dan III sahaja
- D. I, II, III and IV
I, II, III dan IV

40. Which organism is a parasite?



41 Terrestrial woody plants adapt themselves for support by having
Tumbuhan berkayu daratan dapat menyesuaikan diri untuk sistem sokongan dengan mempunyai

- A. buoyancy
Daya apung
- B. big and sticky stems
Batang yang besar dan melekit
- C. lignified xylem vessels and tracheid
Xilem berlignin dan trakeid
- D. fibrous root
Akar serabut

42. Diagram 14 shows two people of different height and size.
Rajah 14 menunjukkan dua individu yang mempunyai ketinggian dan saiz badan yang berbeza.

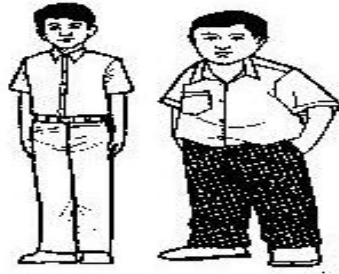


Diagram 14

What is the main reason for this difference?

Apakah faktor utama yang menyebabkan berlakunya perbezaan tersebut?

- A the nutrition in their daily diet
Pemakanan seharian mereka
 - B the imbalance of growth hormones
Ketidakseimbangan hormon tumhesharan
 - C the imbalance of the rate of their heart beat
Ketidakseimbangan kadar denyutan jantung mereka
 - D the imbalance of body metabolic control
Ketidakseimbangan kawalan metabolisme dalam badan
43. Diagram 15 shows a stage in the cell division of apical meristem cells in a plant
Rajah 15 menunjukkan satu peringkat di dalam pembahagian sel meristem apeks pada tumbuhan.

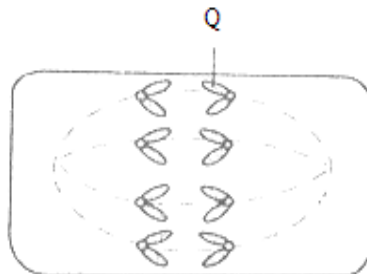


Diagram 15

Which of the following is true about the cell at the end of cell division?

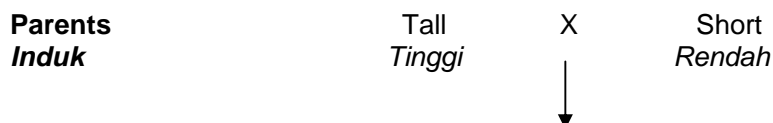
Antara berikut, yang manakah benar tentang sel itu pada akhir pembahagian sel?

- A. At the end of telophase, four gametes are produced with each having eight of structure Q
Pada akhir telofasa, empat sel gamet terhasil, dengan setiap satunya mempunyai lapan struktur Q
- B. At the end of telophase, four gametes are produced with each having two structure Q
Pada akhir telofasa, empat sel gamet terhasil dengan setiap satunya mempunyai dua struktur Q
- C. At the end of telophase, two somatic cells are produced with each having eight structure Q
Pada akhir telofasa, dua sel somatik terhasil, dengan setiap satunya mempunyai lapan struktur Q
- D. At the end of telophase, two somatic cells are produced with each having four structure Q
Pada akhir telofasa, dua sel somatik terhasil, dengan setiap satunya mempunyai empat struktur Q

44. Which of the following statement is **true** about the differences between continuous variation and discontinuous variation?
*Antara pernyataan berikut, yang manakah **benar** tentang perbezaan di antara variasi selanjur dan variasi tak selanjur?*

	Continuous variation <i>Variasi selanjur</i>	Discontinuous variation <i>Variasi tak selanjur</i>
A	Influenced by environmental factors <i>Dipengaruhi oleh faktor persekitaran</i>	Not influenced by environmental factors <i>Tidak dipengaruhi oleh faktor persekitaran</i>
B	Has distinct differences <i>Mempunyai perbezaan ketara</i>	No distinct differences <i>Tidak mempunyai perbezaan ketara</i>
C	No intermediate in phenotype <i>Tidak mempunyai fenotip perantaraan</i>	Have intermediate in phenotype <i>Mempunyai fenotip perantaraan</i>
D	Can be inherited <i>Boleh diwarisi</i>	Cannot be inherited <i>Tidak boleh diwarisi</i>

45. Diagram 16 shows schematic hybrid of a pea plant.
Rajah 16 menunjukkan skema kacukan tumbuhan kekacang.



F1

All tall
Semua tinggi

Diagram16

The results of F1 generation is self pollinated to produce the F2 generation.
Which cross would give a phenotype ratio of 3:1?

Keputusan generasi F1 telah dikacukan sesama sendiri untuk menghasilkan generasi F2. Kacukan yang manakah akan menghasilkan nisbah fenotip 3:1?

- A. TT X tt
- B. Tt X tt
- C. TT X Tt
- D. Tt X Tt

46. Diagram 17 shows the formation of pollen grains.
Rajah 17 menunjukkan pembentukan debunga.

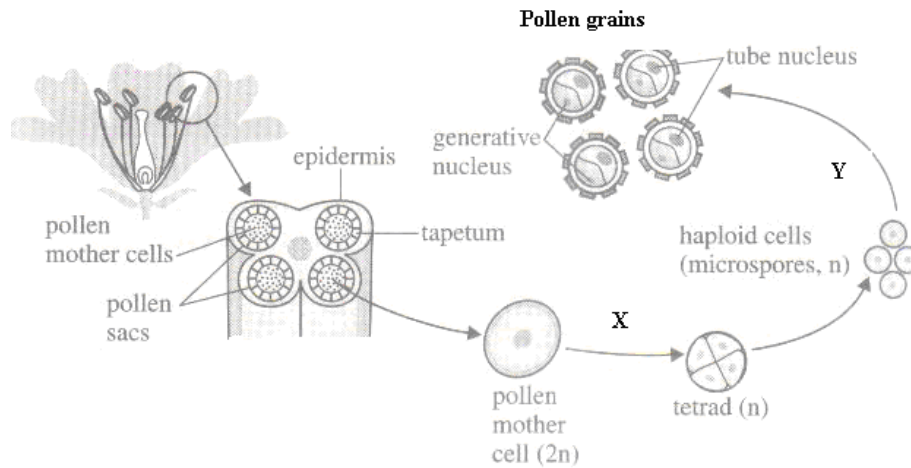


Diagram 17

What is the name of the process X and Y?
Apakah nama proses X dan Y?

	X	Y
A	Mitosis	Meiosis
B	Meiosis	Mitosis
C	Meiosis	Meiosis
D	Mitosis	Mitosis

47. Diagram 18 shows four plant cells that have been placed in solution P, Q, R and S respectively for 30 minutes.
Rajah 18 menunjukkan keadaan empat sel tumbuhan yang masing-masing telah direndam dalam larutan P, Q, R dan S selama 30 minit.

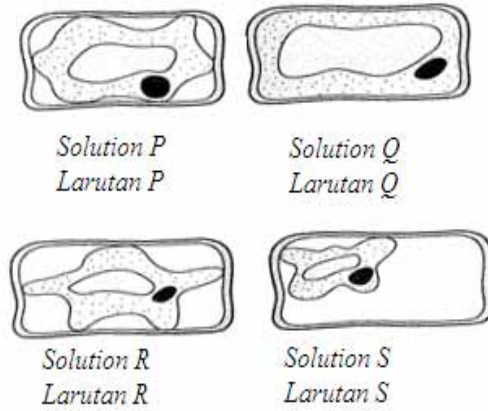
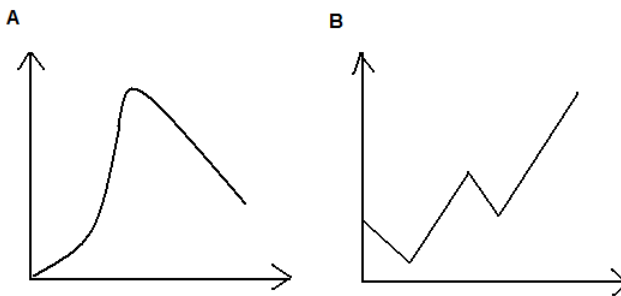


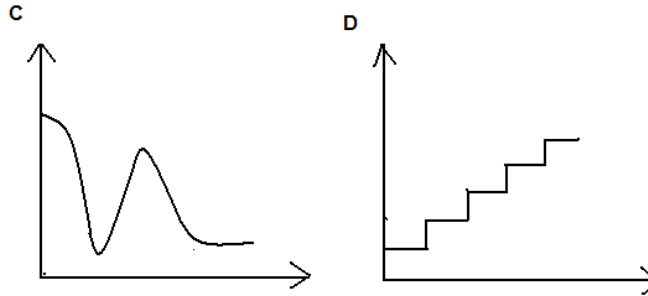
Diagram 18

Which of the following shows the ascending order of the concentration of the solution compared with the cell sap?

Antara susunan berikut, yang manakah menunjukkan susunan menaik kepekatan larutan itu berbanding dengan sap selnya?

- A. P, R, S, Q
 B. S, R, P, Q
 C. Q, P, R, S
 D. R, S, P, Q
48. Which of the following shows the growth curve of a grasshopper?
Yang manakah antara berikut menunjukkan graf tumbesaran bagi belalang?





49. In Malaysia, why is it important for us to respect each other's differences?
Di Malaysia, mengapakah penting untuk kita menghormati perbezaan sesama kita?
- A To show which culture is the strongest one
Menunjukkan siapa yang mempunyai budaya terkuat
 - B To live peace and harmony in a multiracial culture
Untuk hidup aman dan harmoni dalam budaya yang berbeza.
 - C To compete with other races
Untuk bersaing dengan bangsa lain
 - D To encourage mix marriage between different cultures
Untuk menggalakkan perkahwinan campur antara budaya yang berbeza.
50. In plants, variations can arise when two non-identical pure breeding plants of the same species are crossed. The progeny shows an intermediate phenotype. This is a result of
- Dalam tumbuhan, variasi boleh berlaku apabila dua pokok baka tulen yang tak seiras dari spesies sama dikacukkan. Progeni menonjolkan fenotip perantaraan. Ini disebabkan*
- A mutation
mutasi
 - B codominance
kodominan
 - C artificial selection
pemilihan tiruan
 - D random fertilisation
Persenyawaan rawak



NAMA : _____

KELAS : _____

JABATAN PELAJARAN NEGERI SABAH

**SIJIL PELAJARAN MALAYSIA 2010
EXCEL 2
BIOLOGY
Kertas 2**

4551/2

OGOS 2010

2 Jam 30 minit

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Tuliskan No. Kad Pengenalan dan Angka Giliran anda pada ruangan yang disediakan.*
2. *Kertas soalan ini adalah dalam dwibahasa*
3. *Soalan dalam B. Inggeris mendahului soalan yang sepadan dalam B. Melayu*
4. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan samada dalam B. Inggeris atau B. Melayu*
5. *Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini*

Untuk Kegunaan Pemeriksa			
Kod Pemeriksa :			
Bahagian	Soalan	Markah Penuh	Markah Diperolehi
A	1	12	
	2	12	
	3	12	
	4	12	
	5	12	
B	6	20	
	7	20	
	8	20	
	9	20	
Jumlah			

Kertas soalan ini mengandungi 18 halaman bercetak

INFORMATION FOR CANDIDATES

MAKLUMAT KEPADA 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** clearly in spaces provided in the question paper.
*Jawab semua soalan dalam **Bahagian A**. Jawapan anda bagi **Bahagian A** hendaklah ditulis pada ruang yang disediakan dalam kertas soalan ini.*
3. Answer any **two** question from **Section B**. Write your answers for **Section B** on the 'helaian tambahan' provided by the invigilators. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answer.
*Jawab mana-mana **dua** soalan daripada **Bahagian B**. Jawapan anda bagi **Bahagian B** hendaklah ditulis dalam helaian tambahan yang dibekalkan oleh pengawas peperiksaan. Anda boleh menggunakan persamaan, rajah, jadual, graf, dan cara lain yang sesuai untuk menjelaskan jawapan anda.*
4. The diagrams in the questions are not drawn to scale unless stated. *Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan*
5. The marks allocated for each question or sub-part of a question are shown in brackets.
Markah yang diperuntukan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.
6. If you wish to change your answer, cross out the answer that you have done. Then write down the new answer. *Jika anda hendak menukar jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.*
7. *You may use a non-programmable scientific calculator.*
Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.
8. You are advised to spend 90 minute to answer question in **Section A** and 60 minutes for **Section B**.
*Anda dinasihati supaya mengambil masa 90 minit untuk menjawab soalan dalam **Bahagian A** dan 60 minit untuk **Bahagian B**.*
9. Detach **Section B** from this question paper. Tie the 'helaian tambahan' together with this question paper and hand in to the invigilator at the end of the examination.
*Ceraikan **Bahagian B** daripada kertas soalan ini. Ikat helaian tambahan bersama-sama kerts soalan ini dan serahkan kepada pengawas peperiksaan pada akhir peperiksaan.*

Section A
Bahagian A

[60 marks]

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

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examiners
use*

- 1. Diagram 1 shows the structure of a liver cell.
Rajah 1 menunjukkan struktur satu sel hati.

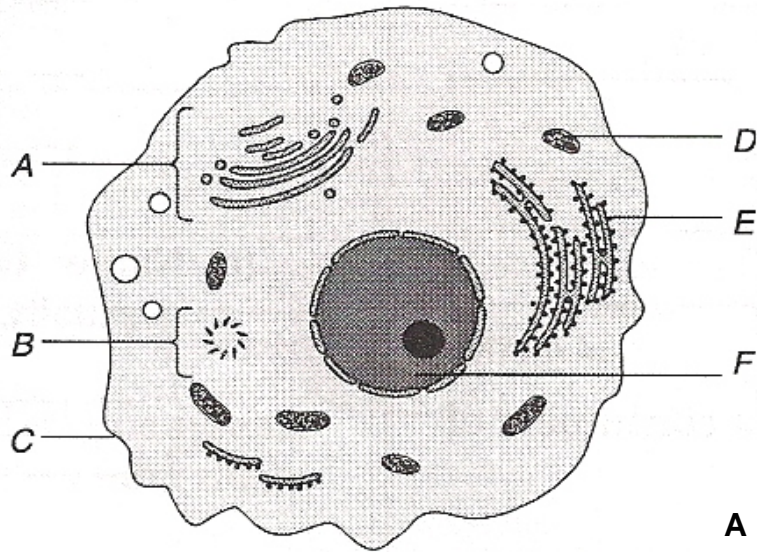


Diagram 1

(a)

- (i) Name organelle A.
Namakan organel A.

_____ [1 mark]

1(a)(i)

- (ii) State the function of organelle :
Nyatakan fungsi organel berikut :

B : _____

E : _____ [2 marks]

1(a)(ii)

- (b) Suggest **one** reason why liver cells contain many organelle D.
*Cadangkan **satu** alasan mengapa sel hati mengandungi banyak organel D.*

1(b)

[2 marks]

- (c) Cell wall is absent in liver cells.
State **another** difference between animal cells and plant cells.
Dinding sel tidak wujud dalam sel hati.
Nyatakan **SATU** lagi perbezaan antara sel haiwan dan sel tumbuhan.

1 (c)

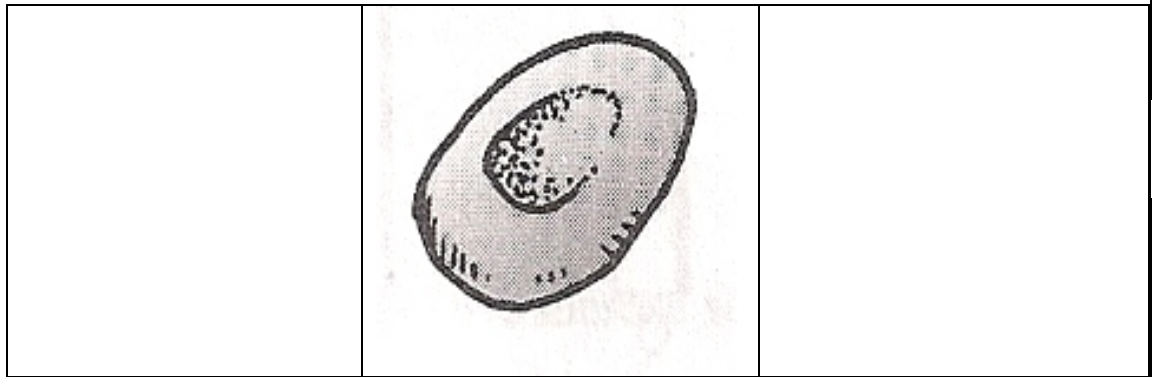
[1 mark]

- (d) An experiment is conducted to investigate the effects of salt concentrations on the human red blood cells. Three test tubes P, Q and R, each containing 1.5% salt concentration, 0.8% salt concentration and distilled water respectively are prepared. A drop of human blood is dropped into each of the test tubes. All three test tubes are left at room temperature for half an hour.

Satu eksperimen telah dijalankan untuk mengkaji kesan larutan garam terhadap sel darah merah manusia. Tiga tabung uji P, Q dan R, setiap satu mengandungi 1.5% kepekatan garam, 0.8% kepekatan garam dan air suling disediakan. Setitik darah dititiskan pada setiap tabung uji. Ketiga-tiga tabung uji diletakkan di dalam suhu bilik untuk satu jam setengah.

- (i) Draw the shape of the red blood cell in test tubes P and R when viewed under a light microscope.

Lukiskan bentuk sel darah merah dalam tabung uji P dan R apabila dilihat di bawah mikroskop cahaya.



Test tube P

Test tube Q

Test tube R

[2 marks]

- (ii) Name the process that happens in test tubes P and R respectively. Explain how do these events occur.

Namakan proses yang berlaku dalam tabung uji P dan R. Terangkan bagaimana kejadian ini boleh berlaku.

Test tube P:

Test tube R:

[4 marks]

1 (d)(i)

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use*

1 (d)(ii)

TOTAL

2. Diagram 2 shows a section through the leaf lamina of a dicotyledonous plant.
Rajah 2 menunjukkan keratan rentas menerusi lamina daun tumbuhan dikotiledon.

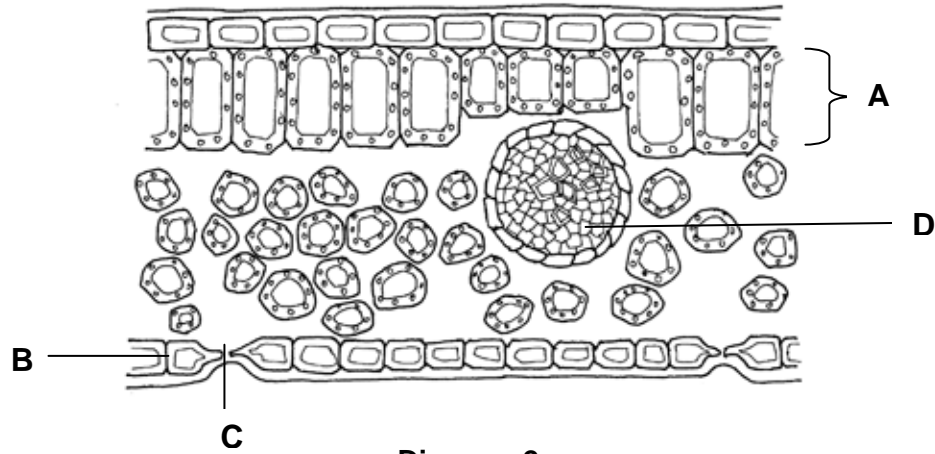


Diagram 2

- (a) Name the parts labelled A, B and C.

Namakan bahagian berlabel A, B dan C.

A : _____

B : _____

C : _____

[3 marks]

- (b) State the function of A and B.

Nyatakan fungsi bahagian berlabel B dan C.

A : _____

B : _____

[2 marks]

- (c)

- (i) D are important structure in plant transport system.

Explain how structure D in the leaf help in plant transportation.

Q merupakan struktur penting yang terdapat dalam sistem pengangkutan tumbuhan.

Terangkan bagaimana struktur Q disesuaikan bagi membantu proses pengangkutan tersebut.

[2 marks]

2 (a)

2 (b)

2 (c)(i)

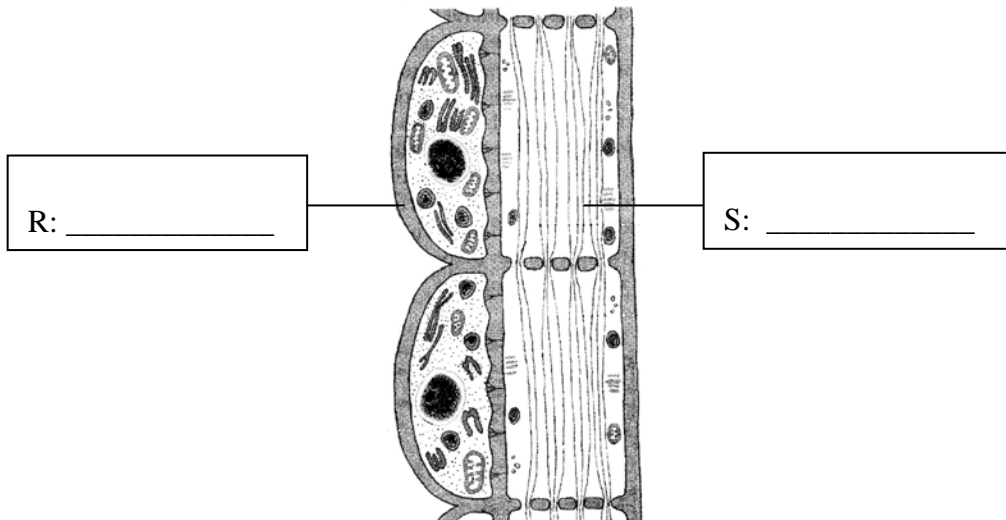
2 (c)(ii)

- (ii) Name the process occurs in (c) (i).
Namakan proses yang berlaku dalam (c)(i) .

_____ [1 mark]

2 (d)(i)

- (d) (i) Diagram 2.1 shows a longitudinal section of structure D.
Rajah 1.2 menunjukkan keratan memanjang bagi struktur Q.



2 (d)(ii)

TOTAL

DIAGRAM 2.1

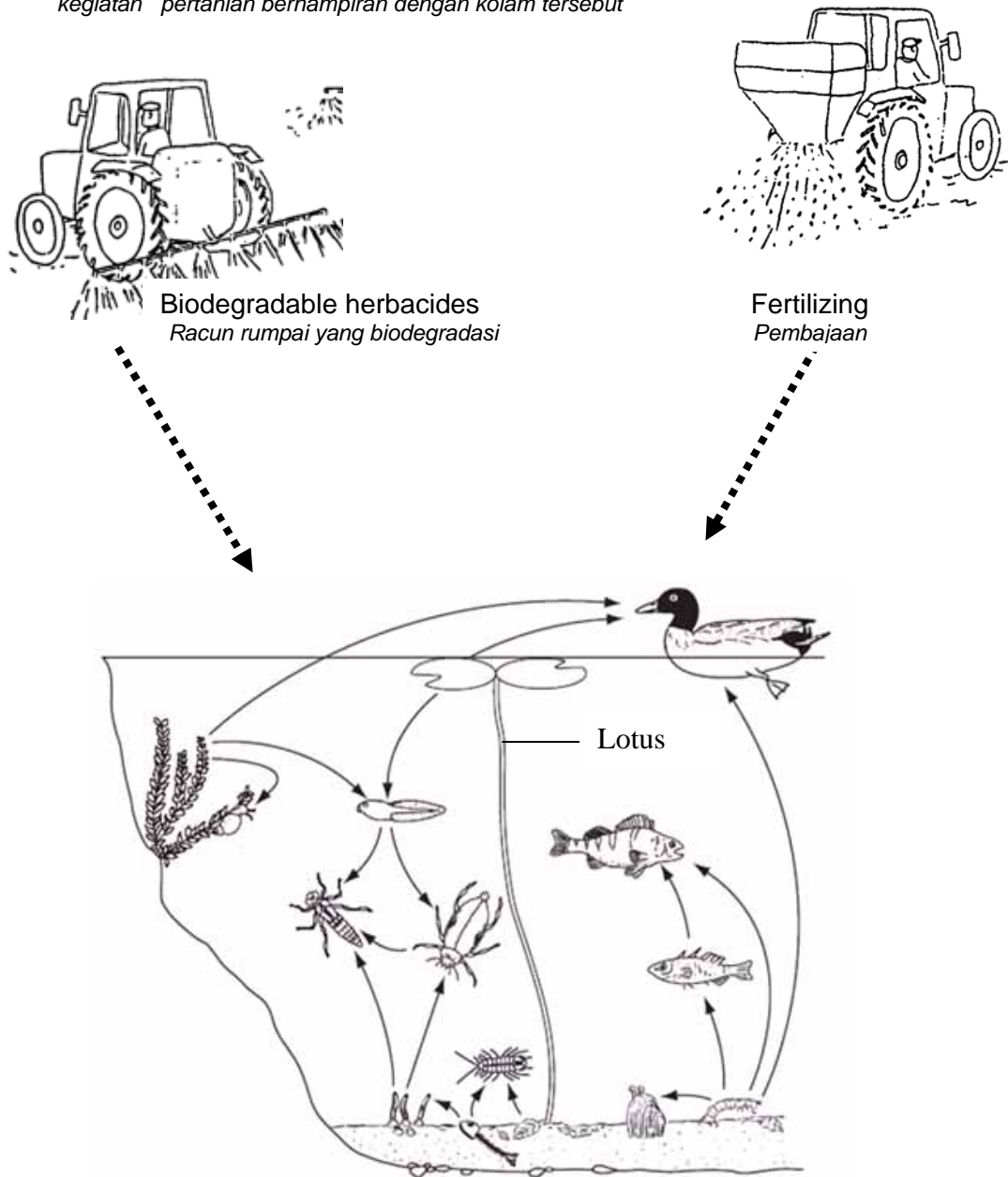
On Diagram 2.1 label the cells R and S. [2 marks]
Labelkan struktur R dan S pada Rajah 2.1.

- (ii) R plays an important role in helping S in the plant transportation. Predict what happen to the plant if structure R is not presence ?
memainkan peranan penting dalam membantu struktur S dalam menjalankan proses pengangkutan .
Ramalkan apakah yang akan berlaku ke atas tumbuhan sekiranya struktur R tiada.

[2 marks]

3. Diagram 3 shows a food web in a freshwater pond and some farming activities that are carried out nearby the pond.

Rajah 3 menunjukkan satu jaringan makanan di dalam sebuah kolam air tawar dan beberapa kegiatan pertanian berhampiran dengan kolam tersebut



For
Examiner
's use

DIAGRAM 3
RAJAH 3

4551/2
sebelah

[Lihat

SULIT

(a) In Diagram 3, mark and label one example of the following organisms.
Pada Rajah 3, tanda dan label satu contoh organisma berikut.

(i) Producer .
Pengeluar

(i) Secondary consumer
Pengguna sekunder

[2 marks]

For examiners use

(b) State the niche of duck in Diagram 3.
Nyatakan nic bagi itik dalam Rajah 3

_____ [1 mark]

3 (a)

(c) Explain the role of lotus plants in the amount and composition of organic matter on the base of the pond.
Terangkan peranan pokok teratai dalam perubahan jumlah kandungan organik pada dasar kolam tersebut.

[2 marks]

3 (b)

(d)

Biodegradable herbicides from the nearby farm was drained into the freshwater pond in a control manner
Racun rumpai yang biodegradasi daripada ladang berdekatan dialirkan ke dalam kolam airtawar tersebut dalam keadaan terkawal

3 (c)

Explain the benefit of the biodegradable herbicides in maintaining the depth of this freshwater pond
Terangkan faedah racun rumpai yang biodegradasi ini dalam mengekalkan kedalaman kolam airtawar tersebut.

[2 marks]

(e) Explain how the excessive used of fertilizer in farming can polluted this freshwater pond.

Terangkan bagaimana penggunaan baja yang berlebihan dalam pertanian boleh mencemarkan kolam air tawar tersebut.

[3 marks]

3(d)

(f)

Below is a food chain which includes three organisms found in Diagram 3
Di bawah menunjukkan satu siratan makanan yang melibatkan tiga organisma yang boleh dijumpai dalam Rajah 3



3(e)

Hydrilla sp in the 1 st trophic level absorbs 20 000 kJ solar energy.
Energy loss at each trophic level is 90 %.
Calculate the total energy transferred to the black beetle

Hydrilla sp pada aras trof pertama menyerap 20 000 kJ tenaga cahaya matahari.
Tenaga yang hilang pada setiap aras trof ialah 90 %.
Kirakan jumlah tenaga yang dipindahkan kepada kumbang air.

= _____ KJ
[2 marks]

4. Diagram 4 shows the relationship between the pituitary gland and ovarian cycle of a woman.
Rajah 4 menunjukkan perkaitan antara kelenjar pituitari dan kitar ovari seorang wanita.

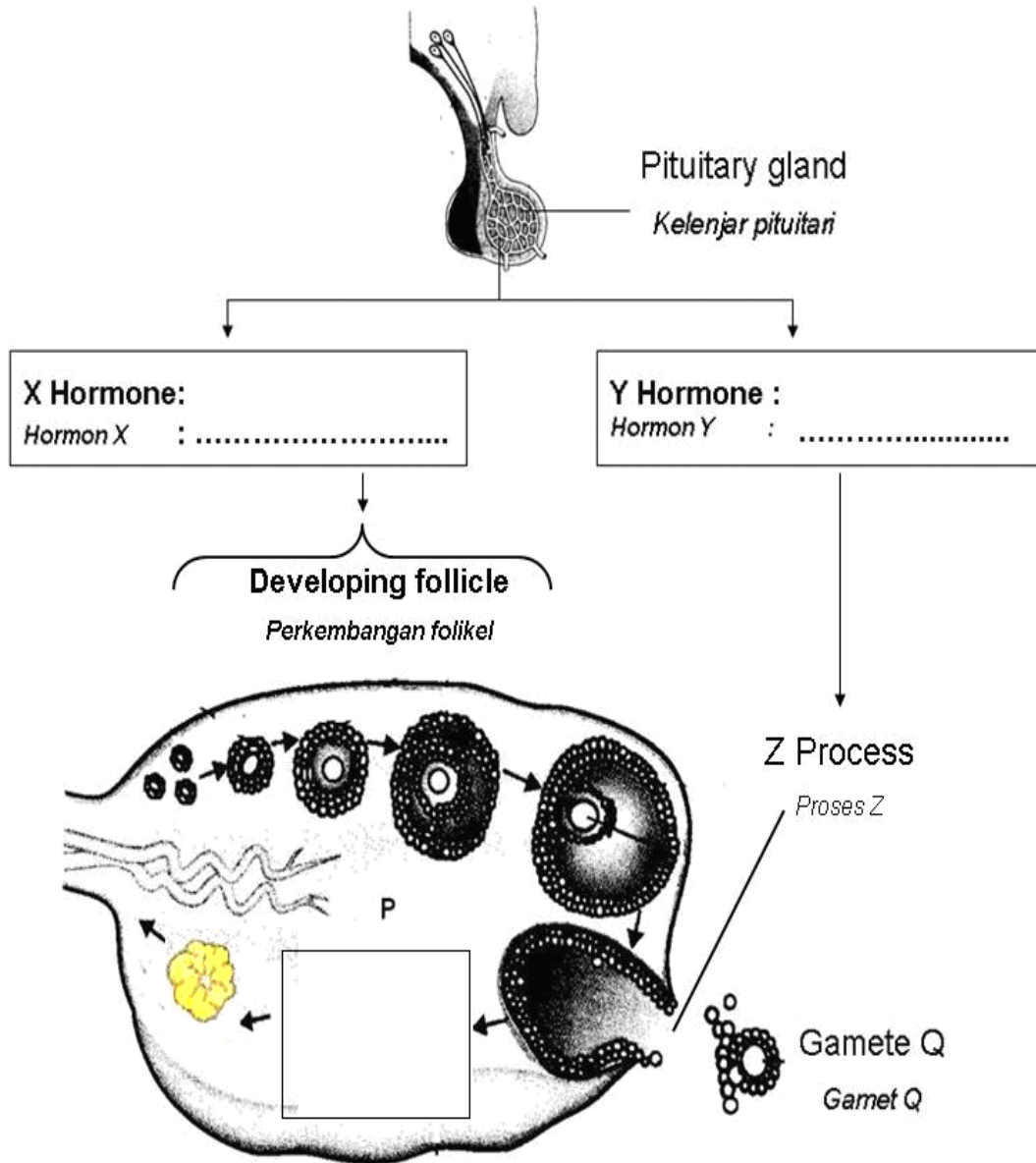


DIAGRAM 4
RAJAH 4

3 (f)

TOTAL

4551/2
sebelah

[Lihat

SULIT

(a) In Diagram 4, Name the hormone labelled X and Y .
Pada Rajah 4, Namakan hormon yang berlabel X dan Y. [2 marks]

(b) (i) Structure P is formed after the process Z. What is structure P ?
Lukiskan struktur berlabel P selepas berlakunya proses Z.

[1 mark]

(ii) State the function of P.
Nyatakan fungsi P.

[1 mark]

(c) Explain how the process of cell division which produces gamete Q can result in the variation of the offspring.
Terangkan bagaimana proses pembahagian sel yang menghasilkan gamet Q boleh menyebabkan variasi kepada anak yang terhasil.

[3 marks]

(d)

This woman has a problem conceiving due to the failure in process Z. A doctor advised her to take a hormone replacement therapy that has similar function to hormone Y.
Wanita tersebut menghadapi masalah tidak boleh hamil akibat kegagalan dalam proses Z. Doktor menasihatkan beliau untuk mengambil hormon gantian yang mempunyai fungsi yang sama seperti hormon Y.

What explanation would you give to the woman to convince her about the treatment that enable her to get pregnant .

Apakah penerangan yang sepatutnya anda beri kepada wanita tersebut untuk meyakinkan beliau tentang rawatan yang membolehkannya untuk hamil.

4 (a)

4 (b) (i)

4 (b) (ii)

4 (c)

[3 marks]

(e) Explain how an imbalance of hormone X and oestrogen hormone can cause the disruption of the developing follicle.

Terangkan bagaimana ketidakseimbangan hormon X dan hormon estrogen boleh menyebabkan gangguan terhadap perkembangan folikel.

[2 marks]

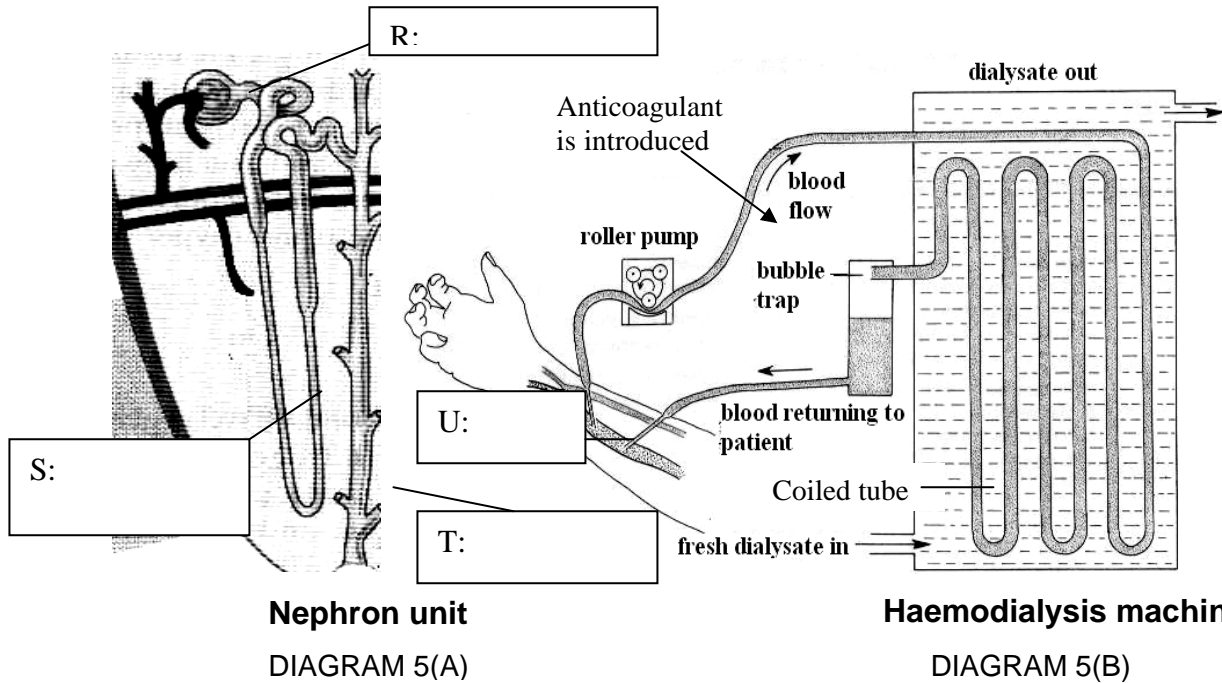
4 (d)

4 (e)

TOTAL

- 5 Diagram 5(A) shows a human excretory unit and Diagram 5(B) shows a sketch of haemodialysis unit.

Gambarajah 5(A) menunjukkan unit perkumuhan manusia dan Gambarajah 5(B) menunjukkan lakaran unit hemodialisis.



5 (a)

5 (b)

5(c)

Study the comparison between the nephron (filtration) unit in a kidney and the dialysis (filtration) unit in a haemodialysis machine. Fresh dialysate (dialysis fluid) contains water and nutrients such as glucose. Filtration unit in the haemodialysis machine consists of coiled tube made of cellophane membrane which is semi-permeable.

Kaji perbandingan antara unit nefron (penurasan) dalam kidney dan unit dialysis (penurasan) dalam mesin hemodialisis. Bendalir dialisis segar (baru) mengandungi air dan nutrien seperti glukosa. Unit penurasan dalam mesin hemodialisis terdiri daripada salur berlingkar diperbuat daripada selofen yang separa-telap.

- a) Name the parts labelled R, S, T and U in the Diagram 5(A) and 5(B).
 Namakan bahagian-bahagian yang berlabel R, S, T dan U dalam gambarajah 5(A) dan 5(B). [2 marks]
- b) Describe the processes that occur in R.
 Huraikan proses-proses yang berlaku dalam R.

R : _____

[3 marks]

5 (d)

c) Name TWO substances in the blood (plasma) circulated through the coiled tube of the haemodialysis unit which are unable to diffuse out into the dialysate.
Namakan DUA bahan dalam (plasma) darah yang tidak dapat meresap ke dalam bendalir dialysis semasa dialirkan melalui salur berlingkar unit hemodialisis.

_____ [2 marks]

d) Explain how an excretory substance like urea is eliminated by the haemodialysis machine.
Terangkan bagaimana bahan kumuh seperti urea disingkirkan oleh mesin hemodialisis

_____ [2 marks]

e) The kidney also functions in regulating the osmotic pressure of the body fluid in a normal person. Explain how the haemodialysis machine may perform this function in a person suffering from kidney failure.
Ginjal juga berfungsi mengawalatur tekanan osmosis yang normal dalam bendalir badan manusia. Terangkan bagaimana mesin hemodialisis dapat menjalankan fungsi tersebut dalam seorang yang mengalami kegagalan ginjal.

_____ [2 marks]

f) Why an anticoagulant is introduced into the blood entering the haemodialysis Unit?
Mengapakah bahan anti-pembeku darah dimasukkan ke dalam darah yang memasuki unit hemodialisis ?

_____ [1 mark]

5 (e)

5(f)

TOTAL

Section B
Bahagian B

[40 marks]

Answer **any two** questions from this section.
Jawab **mana-mana dua** soalan daripada bahagian ini.

6.

- a) Diagram 6.1 shows the longitudinal section through the thorax of a man.
Rajah 6.1 menunjukkan kertas rentas toraks seorang lelaki.

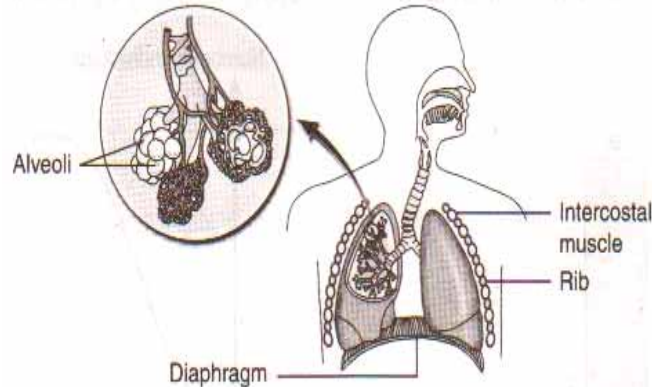


Diagram 6.1

Describe briefly the mechanism of breathing in man. In your answer, describe the parts played by the intercostal muscles, rib cage, diaphragm and alveoli.

Terangkan secara ringkas mekanisma pernafasan dalam seorang lelaki. Dalam jawapan anda, terangkan peranan yang dimainkan oleh otot interkostal, sangkar rusuk, diafragma dan alveolus.

[12 marks]

- b) Based on the Diagram 6.2, explain how the gaseous exchange of respiratory gases between the blood capillaries and the body cells take place.

Berdasarkan gambarajah 6.2, terangkan bagaimana pertukaran gas-gas respirasi berlaku di antara kapilari darah dan sel-sel badan.

[8 marks]

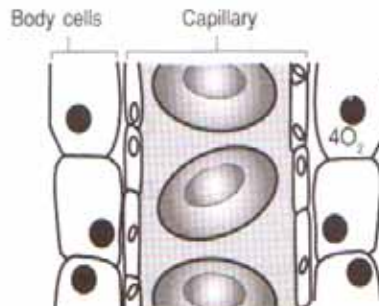


Diagram 6.2

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7.

- a) Diagram 7.1 shows a reflex arc when hand touches a hot object and diagram 7.2 shows a synapse in the reflex arc.

Rajah 7.1 menunjukkan arka refleks apabila tangan menyentuh object panas dan Rajah 7.2 menunjukkan sinaps dalam arka refleks.

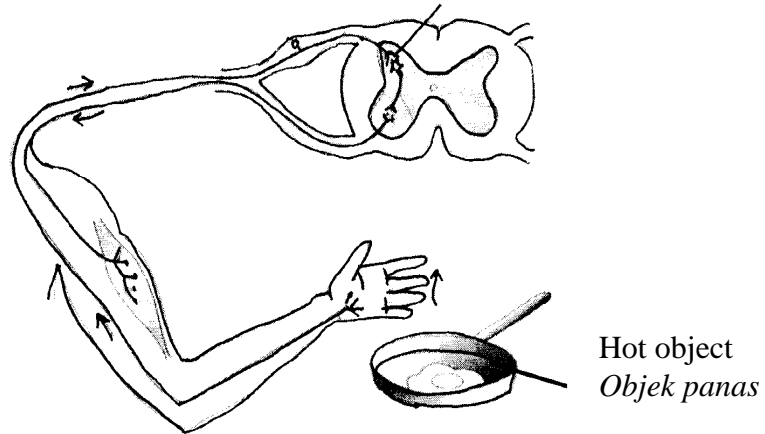
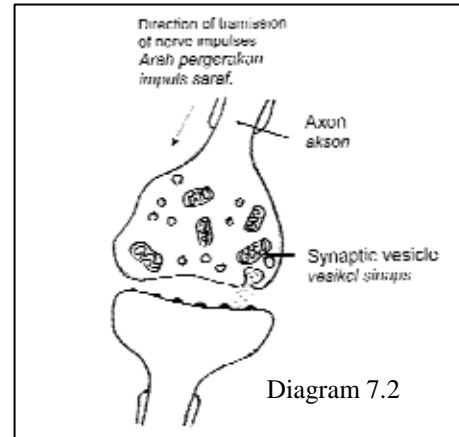


Diagram 7.1

Based on Diagram 7.1 and 7.2, explain the pathway of an impulse in a reflex arc.

Berdasarkan Rajah 7.1 dan 7.2, jelaskan laluan impuls dalam arka refleks.

[8 marks]

b)



Diagram 7.3

- (i) Diagram 7.3 shows a man in a dangerous situation. Explain the involvement of both the nervous system and endocrine system in bringing changes in the body of the man.

Rajah 7.3 menunjukkan seorang lelaki dalam situasi yang berbahaya. Jelaskan penglibatan sistem saraf dan sistem endokrin dalam membawa perubahan dalam badan lelaki tersebut.

[8 marks]

- (ii) Describe the differences between the nervous system and endocrine system.

Terangkan perbezaan di antara sistem saraf dan sistem endokrin.

[4 marks]

8. Diagram 8 shows the blood groups of a married couple.

Rajah 8 menunjukkan kumpulan darah bagi sepasang suami isteri.



En Ahmad
Blood group A (I^oI^A)
Kumpulan darah A (I^oI^A)



Pn Amalina
Blood group B (I^oI^B)
Kumpulan darah B (I^oI^B)

Diagram 8

a)

- (i) Explain the possible genetic combinations in their children.

Terangkan kemungkinan kombinasi genetic dalam anak-anak mereka.

[10 marks]

- (ii) Explain the sources of genetic variation which result in all the possible combinations above.

Jelaskan punca-punca variasi genetic yang menghasilkan semua kombinasi yang berlainan di atas. [6 marks]

- b) Describe the differences between the of variation in human blood group and variation in human height.

Huraikan perbezaan di antara variasi dalam kumpulan darah dan variasi dalam ketinggian. [4 marks]

9.

- a) The mangroves is a complex and dynamic ecosystem. It is dependent on both biotic and abiotic factors.

Paya bakau adalah suatu ekosistem yang kompleks dan dinamik. Ia bergantung kepada kedua-dua factor biotik dan abiotik.



Diagram 9.1

Based on Diagram 9.1, discuss the importance of mangrove.

Berdasarkan Rajah 9.1, bincangkan kepentingan paya bakau.

[10 marks]

- b) A farmer decides to apply larger amount of insecticides to control the population of pest that attack his crops. Explain why this is not a good idea. Suggest an alternative to the farmer to overcome this problem.

Seorang petani membuat keputusan untuk menggunakan racun serangga yang lebih banyak untuk mengawal populasi serangga perosak yang memusnahkan hasil tanamannya. Jelaskan kenapa ini bukan suatu idea yang baik. Cadangkan satu alternative lain kepada petani untuk menyelesaikan masalah ini.

[10 marks]

**END OF QUESTION PAPER
KERTAS SOALAN TAMAT**



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<http://edu.joshuatly.com/>
<http://www.joshuatly.com/>

SULIT

NAMA : _____

KELAS : _____



JABATAN PELAJARAN NEGERI SABAH

**SIJIL PELAJARAN MALAYSIA 2010
EXCEL 2
BIOLOGY
Kertas 3
OGOS 2010**

4551/3

1 Jam 30 minit

Satu jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. Tulis **nama dan kelas** anda pada petak 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 Inggeris atau bahasa Melayu.

Untuk Kegunaan Pemeriksa		
Kod Pemeriksa :		
Soalan	Markah Penuh	Markah Diperolehi
1	33	
2	17	
Jumlah	50	

**INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON**

1. This question paper consists of two questions : **Question 1** and **Question 2**. Answer **all** questions. Kertas soalan ini mengandungi dua soalan : **Soalan 1** dan **Soalan 2**. Jawab **semua** soalan.
2. You are advised to spend 45 minutes to answer **Question 1** and 45 minutes for **Question 2**. Anda dinasihati supaya mengambil masa 45 minit untuk menjawab **Soalan 1** dan 45 minit untuk **Soalan 2**.

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INFORMATION FOR THE CANDIDATES

1. *This question paper consists of two questions. Answer all the questions.*
2. *Answers for question 1 must be written in the spaces provided in the question paper.*
3. *Write down the answers for question 2 in a separate answer sheets. You can also include in your answers , where ever possible the chemical equations, diagrams, table , graph or any other means of communication which are suitable .*
4. *Show your working where ever possible to help you get more marks*
5. *Diagrams which accompany the questions are not drawn to scale, or otherwise stated.*
6. *Time suggested for each question is 45 minutes.*
7. *You are allowed to use a nonprogrammable calculator.*

Allocation of marks:

Score	Description
3	Excellent : The best possible responses
2	Good : Average responses
1	Week : Inaccurate responses
0	The responses are wrong or no response at all

Answer all questions.
Jawab semua soalan.

1. A group of students carried out an experiment to study the effect of temperature to rate of plant transpiration.

Diagram 1.1(a) shows an experiment set-up of the apparatus used in this experiment. The apparatus are prepared and kept in laboratory with difference temperature. The whole experiment in Diagram 1 was repeated using different temperature.

(Sekumpulan pelajar menjalankan eksperimen untuk mengkaji kesan suhu ke atas kadar transpirasi tumbuhan.

Rajah 1.1 (a) menunjukkan kaedah yang digunakan oleh sekumpulan pelajar itu. Alat radas disediakan dan diletakkan di dalam makmal dengan suhu dengan suhu tertentu. Keseluruhan eksperimen diulang dengan menggunakan suhu yang berbeza)

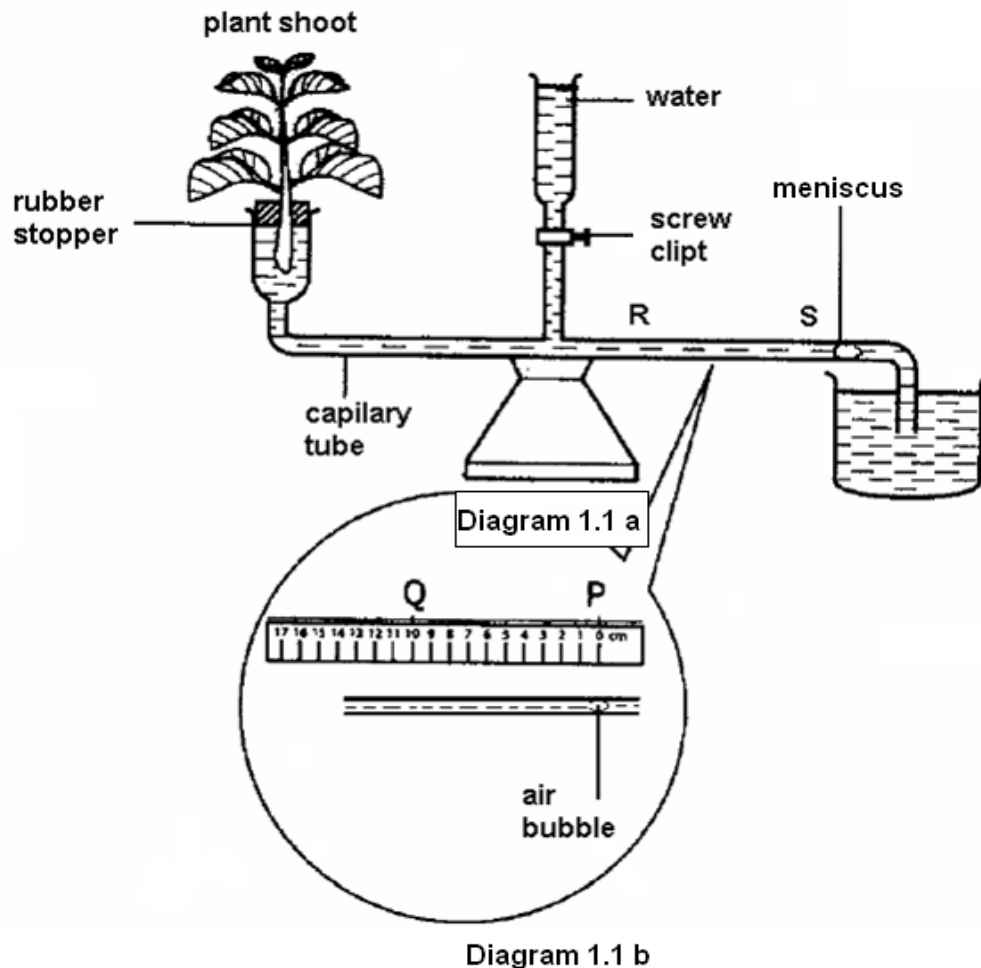
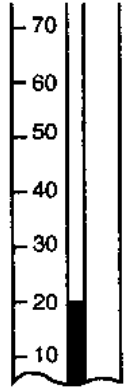
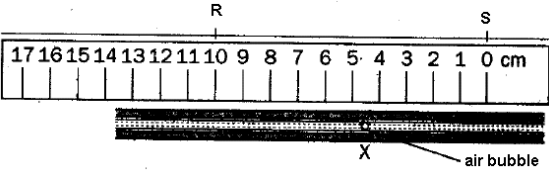
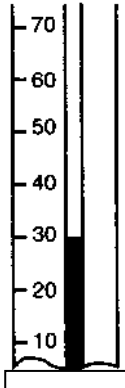
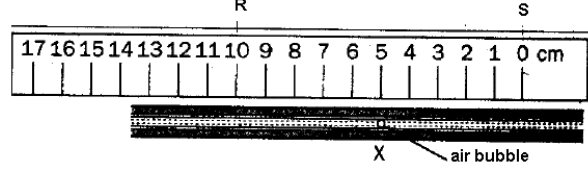


Diagram 1.1 (b) shows the position of the meniscus at the initial of the experiment. Two points, P and Q are mark with 10 cm distance at the tube of photometer.

Table 1.1 shows the reading of temperature and location of meniscus in the tube of photometers after 5 minutes.

(Rajah 1.1(b) menunjukkan kedudukan awal gelembung udara pada awal eksperimen. Dua titik, P dan Q ditandakan pada tiub fotometer dengan jarak 10 cm.

Jadual 1.1 menunjukkan bacaan jangkasuhu dan kedudukan gelembung udara di dalam tiub fotometer selepas 5 minit)

Thermometers	The location of meniscus in tube (X) of photometer after 5 minutes
 <input data-bbox="483 1142 630 1241" type="text"/>	 <input data-bbox="1154 1129 1297 1228" type="text"/>
 <input data-bbox="483 1619 630 1717" type="text"/>	 <input data-bbox="1154 1614 1297 1713" type="text"/>

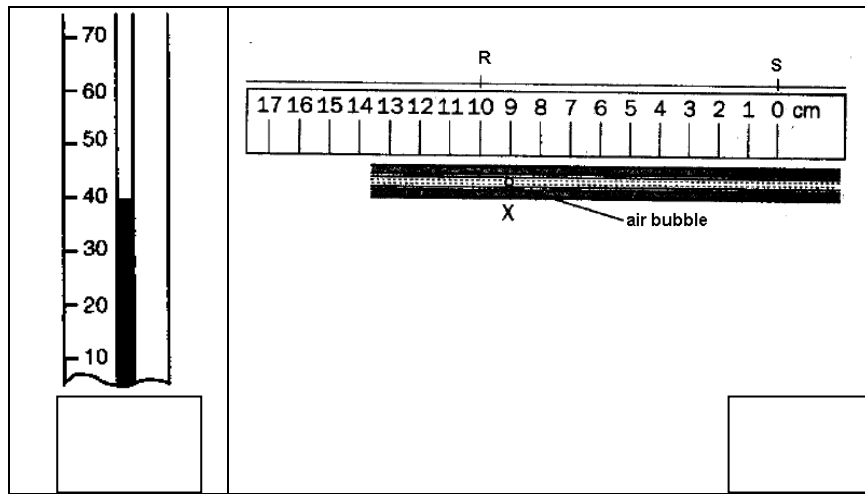


Table 1.1
Jadual 1.1

[3 marks]

- (a) Complete the Table 1.1 by recording the temperature and the final position of meniscus.
Lengkapkan dalam Jadual 1.1 dengan mencatat suhu dan jarak pergerakan gelembung udara

[3 marks]

1(a)

- (b) (i) Based on table 1.1 state two different observations.
(Berdasarkan Jadual 1.1 state dua pemerhatian yang berbeza.)

1.....

.....

2.....

.....

1(b)
(i)

[3 marks]

- (ii) State the inference which corresponds to the observations in 1 (a) (i)
 (Nyatakan inferens yang sepadan dengan pemerhatian di 1 (a) (i).

1.....

.....

2.....

.....

1(b)
(ii)

[3 marks]

- (c) Complete the Table 1.2 base on the experiment that was carried out.
 Lengkapkan Jadual 1.2 berdasarkan eksperimen yang dijalankan.

Variable <i>Pembolehubah</i>	Method to handle the variable <i>Cara mengendali pembolehubah</i>
Manipulated variable <i>Pembolehubah dimanipulasi</i>
Responding variable <i>Pembolehubah bergerak balas</i>
Constant variable <i>Pembolehubah dimalarkan</i>

1(c)

Table 1.2
Jadual 1.2

[3 marks]

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

.....

1 (d)

[3 marks]

(e) (i) Construct a table and record all the data collected in this experiment.
Your table should have the following titles :-
(Bina satu jadual dan rekod semua data yang dikumpul dalam eksperimen ini.
Jadual anda hendaklah mengandungi

- Temperature
- (suhu)
- The distance of meniscus movement
- (Jarak pergerakan gelembung udara)
- Rate of transpiration

$$\text{Rate of transpiration} = \frac{\text{Distance}}{\text{Time}}$$

- (Kadar transpirasi

$$\text{Kadar transpirasi} = \frac{\text{Jarak}}{\text{Masa}}$$

1 (e)
(i)

[3 marks]

(ii)

Use the graph paper provided on pada 9 to answer this part of the question.
Using the data in 1 (e) (i), draw the graph of rate of transpiration against the temperature.

(Guna kertas graf yang disediakan di halaman 10 untuk menjawab ceraian soalan ini.)

(Menggunakan data di 1 (e) (i), lukis graf kadar transpirasi melawan suhu.

1 (e)
(ii)

[3 marks]

(f) Based on the graph 1 (e) (ii), explain the relationship between the rate of transpiration and the temperature
(Berdasarkan graph di 1 (e) (ii), (terangkan hubungan antara kadar transpirasi dan suhu.)

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

1 (f)

[3 marks]

(g) Based on the result of this experiment, state the operational definition for the process of transpiration
(Berdasarkan keputusan eksperimen ini, nyatakan definisi secara operasi bagi proses transpirasi.)

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

1 (g)

[3 marks]

(h) Another group of students carried out the same experiment. The apparatus is located under the sun shine.
Predict the outcome of this experiment. Explain your prediction.
(Sekumpulan murid yang lain menjalankan eskperimen yang sama. Radas ini diletakkan dibawah sinar matahari)
(Ramalkan hasil eksperimen ini. Terangkan ramalan anda)

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

1 (h)

[3 marks]

(i)

The following list is part of the apparatus and material used in this experiment.

Senarai berikut adalah sebahagian daripada radas dan bahan yang digunakan dalam eksperimen ini.

Thermometer, stop watch, ruler, capillary tube, plant leaves, water

Complete Table 1.3 by matching each variable with the apparatus and material used in this experiment.

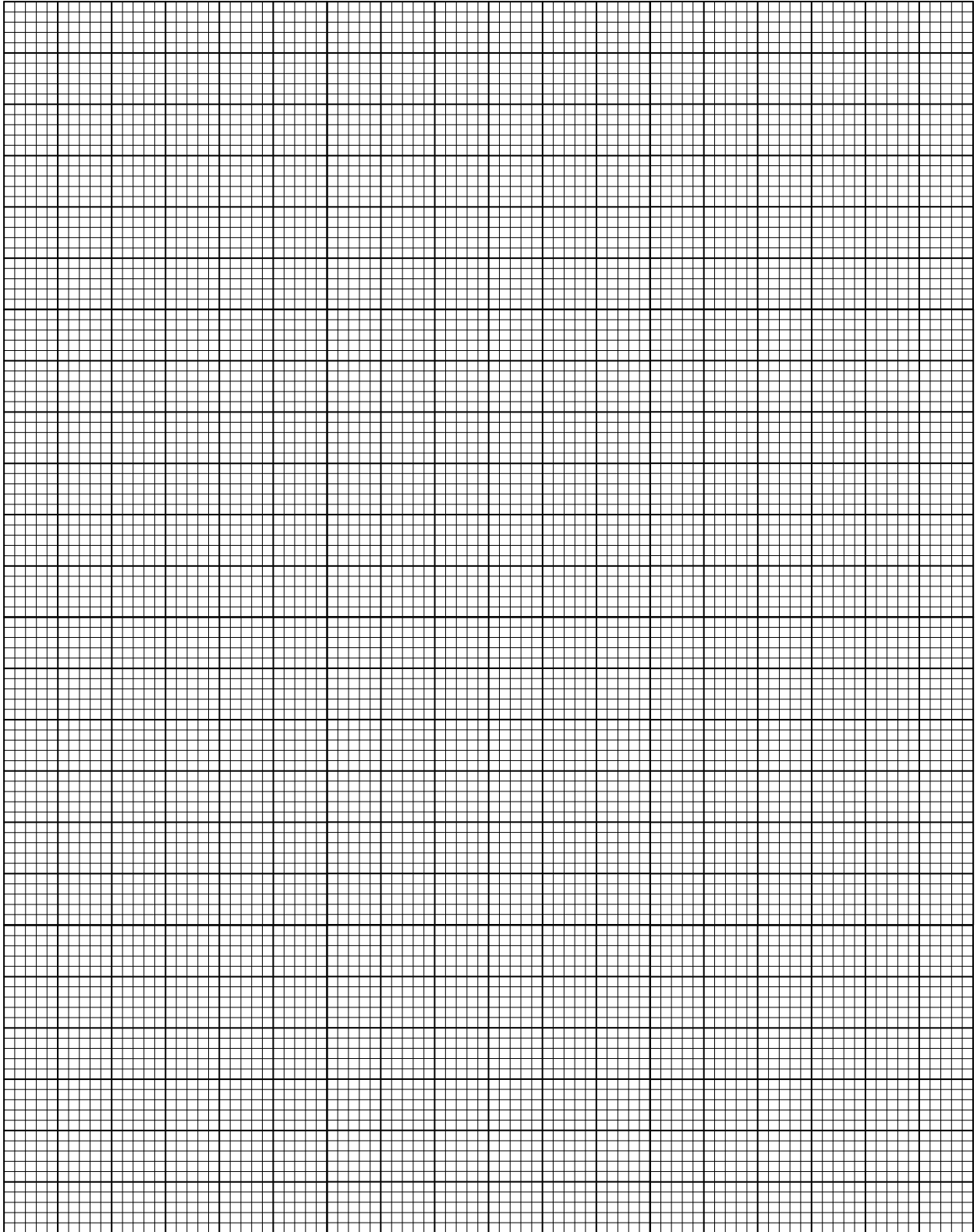
(Lengkapkan Jadual 1.4 dengan memadankan Setiap pembolehubah dengan radas dan bahan yang digunakan dalam eksperimen ini)

Variable	Apparatus	Material
Manipulated		
Responding		
Controlled		

1 (i)

Table 1.3
Jadual 1.3

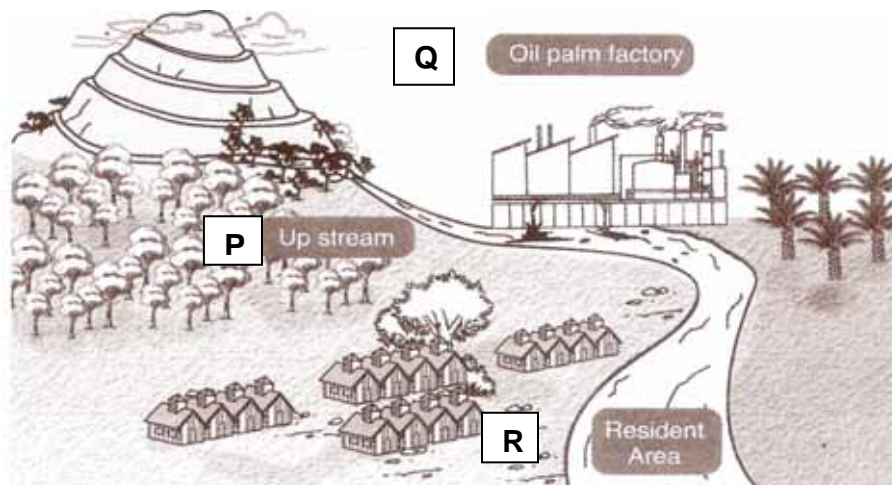
[3 marks]



2. The District Council had received many complaints from residents that the river water in their residential area is polluted by nearby manufacturing and oil palm estate activities. *Majlis Daerah telah menerima banyak aduan daripada penduduk yang menyatakan bahawa sungai berhampiran kawasan kediaman mereka dicemari oleh aktiviti daripada kilang dan ladang kelapa sawit berhampiran.*

Based on the above situation, you as a representative from the Department of Environment is required to plan a laboratory experiment to investigate the level of river pollution from three locations along the river as shown in diagram below.

Berdasarkan maklumat di atas, anda sebagai wakil dari Bahagian Alam Sekitar dikehendaki merancang satu eksperimen untuk mengkaji tahap pencemaran sungai di tiga lokasi seperti yang ditunjukkan dalam gambarajah di bawah.



The planning of your experiment must include the following aspects:
Perancangan eksperimen anda hendaklah meliputi aspek-aspek berikut:

- Problem statement
Pernyataan masalah
- Aim of investigation
Objektif Kajian
- Hypothesis
Hipotesis
- Variables
Pembolehubah
- List of apparatus and materials
Senarai radas dan bahan
- Technique used
Teknik yang digunakan
- Experimental procedure or method
Kaedah atau prosedur eksperimen
- Presentation of data
Cara data dipersembahkan
- Conclusion
Kesimpulan

[17 marks]

[17 markah]

**END OF QUESTION PAPER
KERTAS SOALAN TAMAT**

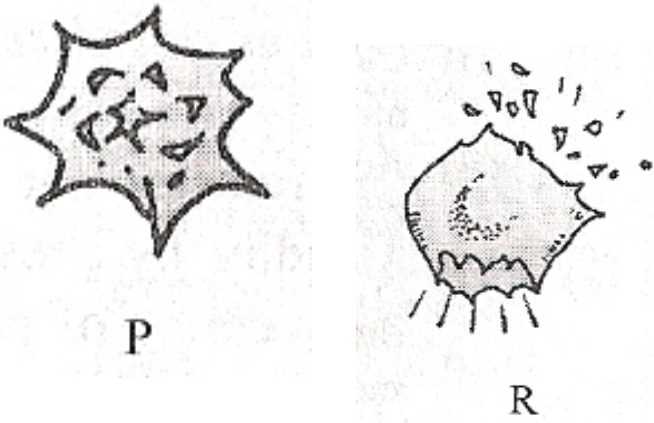
SKEMA JAWAPAN
BIOLOGY PAPER 1
FORM 5 / 2010

No	Answers	No	Answers
1.	D	26.	D
2.	A	27.	B
3.	B	28.	D
4.	D	29.	A
5.	B	30.	D
6.	B	31.	B
7.	C	32.	D
8.	D	33.	D
9.	B	34.	A
10.	C	35.	A
11.	A	36.	C
12.	B	37.	B
13.	A	38.	C
14.	D	39.	C
15.	D	40.	A
16.	C	41.	C
17.	C	42.	A
18.	C	43.	D
19.	A	44.	A
20.	D	45.	D
21.	A	46.	B
22.	B	47.	C
23.	D	48.	D
24.	C	49.	B
25.	D	50.	B

**JABATAN PELAJARAN NEGERI SABAH
MARK SCHEME
BIOLOGY PAPER 2
2010**

SECTION A

Question 1

No	Marking Criteria	Marks	
1(a)(i)	Able to name A A :Golgi apparatus	1	1
1(a)(ii)	Able to state the function of organelle B and E B : Form spindle fibres during cell division in animal cells. E : Transport proteins synthesised by ribosomes.	1 1	2
1(b)	Able to give ONE reason why liver cells contain many organelle D P1 : Metabolism of carbohydrates, lipids and proteins take place in liver. P2 : Mitochondria or Organelle D are present in large number to generate ATP which is an instant energy source for liver cell to carry out these biochemical reactions.	1 1	2
1(c)	Able to state ONE different between animal cells and plant cells - Do not have chloroplast/ Do not have vacuole/ Present but vacuoles are usually small and numerous.	1	1
(d) (i)	Able to draw the shape of the red blood cell in test tubes P and R  P R		
d(ii)	Able to name the processes in P and R and explanation In P : Crenation. Salt solution in test tube P is hypertonic to the red blood cell. Water molecules tend to move out from the cell causing the cell shrink. In R : Haemolysis. Solution in test tube R is hypotonic to the red blood cell. Water molecules tend to move into the cell causing the cell swell and burst.	1 1 1 1	2 2
	Total		12

Question 2

No	Marking Criteria	Marks	
2	Able to label A, B and C A : Palisade mesophyll B : Guard cell C : Stoma	1 1 1	3
2(b)	Able to state the function of A and B A : Carry out photosynthesis B : Responsible for regulating the size of the stomata pore Opening	1 1	2
2(c)(i)	Able to explain how structure D in the leaf help in plant transportation. P1 : D / Phloem tissue composed of sieved tubes P2 : with the end walls of each cell are perforated by pores to form sieves plates P3 : which allow substances to pass from one cell to another.	1 1 1 Max 2	2
2(c)(ii)	Able to name the process in 2(c)(i) - Translocation	1	1
2(d) (i)	Able to label the cells R and S R : Companion cell S : Sieve tube cell	1 1	2
2(d)(ii)	Able to explain what will happen to the plant if R is not presence F : The plant will die; P1 : without R / companion cell ; no energy will be provided to the sieve tube; P2 : hence dissolve organic substances/sucrose/ cannot be transported (from leaves to the storage organ/other part of plant)	1 1 1 Max 2	2
Total			12

Question 3

No	Marking Criteria	Marks	
3 (a)	Able to mark and label Producers : Hydrilla sp or lotus plants	1	
	Secondary consumer : Small fish/big fish/duck/tadpole/ black beetle	1	2
3(b)	Able to state the niche of duck P1 : Duck eat the lotus plant/ duck eat Hydrilla sp/Duck eat prawn	1	1
3(c)	Able to explain the role of lotus plant		
	P1 : Lotus plants(is a floating plant that spread to cover a large area of the surface of water) prevent sunlight from reaching the submerged plant	1	
	P2 : The submerged plants die because they cannot photosynthesise	1	
	P3 : Decomposition of the dead submerged plant add more organic matter (on the base of the pond)	1	
		Max 2	2
3(d)	Able to explain the benefits of this biogradable herbicides		
	P1 : Herbicide kills/destroys most of the aquatic plants in pond	1	
	P2 : Preventing/delaying further growth of aquatic plants	1	
	P3 : reducing sedimentation of the dead plants at pond base (therefore the depth of pond is maintained)	1	
		Max 2	2
3(e)	Able to explain how the excess fertilizer pollute the freshwater pond		
	P1 : Cause more minerals/nutrients to be drained away into the pond by rain/drainage water/leaching	1	
	P2 : results in the rapid growth of algae/algae bloom/eutrofication	1	
	P3 : The excessive growth of algae restricts the penetration of light into the water	1	
	P4 : And when they die,decomposer used up all the dissolved oxygen/supply of oxygen in the pond decrease	1	
		Max 3	3
3(f)	$10/100 \times 20\,000 = 2000 \text{ kJ}$	1	
	$10/100 \times 2\,000 = 200 \text{ kJ}$	1	2
Total			12

Question 4

No	Marking Criteria	Marks	
4 (a)	Able to name the hormone labelled X and Y X- FSH Y- LH	1	
		1	2
4(b) (i)	Able to name structure P P : corpus luteum	1	1
4(b)(ii)	Able to state the function of P P1 : produces progesterone (and oestrogen) hormones	1	1
4(c)	Able to explain the process of cell division which produce gamete Q can result in the variation. P1 : Crossing over during prophase I/prophase of meiosis I P2 : where exchange of genetic materials(between non-sister chromatid of homologous chromosome) P3 : resulting new/different combinations of genes from the parents OR P4 : Independent / random assortment (of homologous Chromosome P5 : during metaphase I (of meiosis) P6 : Random arrangement and separation of each homologous pair results in new / different combination of chromosome in the gametes	1	
		1	
		1	3
		1	
		1	
		1	
		1	3
4(d)	Able to convince the woman about the treatment P1 : The replacement hormone stimulates ovulation P2 : Causing the graafian follicle to form corpus luteum P3 : corpus luteum secretes progesterone to maintain the thickness of the endometrium P4 : this enables implantation to occur	1	
		1	
		1	
		1	3
		Max 3	
4(e)	Able to explain an imbalance of hormone X & oestrogen to the disruption of the developing follicle P1 : low oestrogen level and an elevated of FSH P2 : which is normally associated with delay of puberty and loss of periods P3 : which means no eggs / oocytes are being produced in the ovary	1	
		1	
		1	
		Max 2	2
	Total		12

Question 5

No	Marking Criteria	Marks	
5 (a)	Able to labelled R : glomerulus / Malphigian capsule S : Loop of Hemle T : Collecting tubule / duct U : Blood Vessel		2
5(b)	Able to describe the processes that occur in R : ultra-filtration process P1 : A difference in blood partial pressure in afferent and efferent arteriole // high hydrostatic pressure in the glomerulus P2 : causes some components of blood plasma (at least TWO examples : glucose/ amino acids/ water/ salts) to be filtered out (from glomerulus) into Bowman capsule	1 1 1	3
5(c)	Able to name TWO substances that are unable to diffuse out into dialysate : P1 : protein plasma P2 : red blood cells	1 1	2
5(d)	Able to explain the elimination of urea in haemodialysis unit P1 : by a diffusion process P2 : from a region of higher concentration of urea in the blood into dialysate where there is lower concentration of urea P3 : through cellophane / dialysis membrane (which is semi-permeable)	1 1 1 Max 2	2
5(e)	Able to the explain the function of haemodialysis machine in regulating the osmotic pressure of a patient P1 : osmosis also takes place between dialysate and blood plasma flowing in the dialysis tube P2 : so that the dialysate is isotonic to the blood plasma (of a normal person) thus enables regulation of normal osmotic pressure / amount of water in the patient's body fluid	1 1	2
5(f)	Addition of anticoagulant : P1 : to prevent blood clot in the dialysis unit	1	1
Total			12

SECTION B

No	Scoring criteria	Mark	Remark
1 (a)	<ul style="list-style-type: none"> • During inhalation, the external intercostal muscles contract (while the internal intercostals muscles relaxes) • This action causes the rib cage to move upwards and outwards. • (At the same time, the diaphragm muscles contract causing) the diaphragm to be flattened /lowered. • (These two actions cause) the volume of the thoracic cavity to increase • And the pressure of the thoracic cavity decreases. • (Higher atmospheric pressure on the outside) forces the air into the lungs/alveoli • During exhalation, the external intercostals muscles relaxes (while the internal intercostals muscles relaxes) • This action causes the rib cage to move downward and inward. • (At the same time, the diaphragm muscles relaxes causing) the diaphragm to curve upwards. • (These two actions cause) the volume of the thoracic cavity to decrease • And the pressure of the thoracic cavity increase. • (Higher atmospheric pressure on the inside) forces the air out of the lungs/alveoli (to the atmosphere). • Oxygen from the atmosphere dissolves in the moist wall of the alveoli • Into the network of blood capillaries which surrounds the alveoli. • Carbon dioxide diffuses out of the blood capillaries into the alveoli (to be expelled into the atmosphere). 	<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>1</p> <p>1</p> <p>1</p>	<p>Max 5</p> <p>Max 5</p> <p>Max 2</p> <p>Total 12</p>
1 (b)	<ul style="list-style-type: none"> • Oxygen is carried in the form of oxyhaemoglobin//oxygen combines with haemoglobin the red blood cells to form oxyhaemoglobin. • (In the capillary surrounding the body cells,) the partial pressure of oxygen in the blood is higher than that of the body cells. • Oxyhaemoglobin dissociates/breakdown to release oxygen • That diffuse through the capillary walls into the body cells. • In the body cells, oxygen is used for cellular respiration • Cellular respiration releases/produces carbon dioxide. • This makes the partial pressure of carbon dioxide higher than that in the blood capillaries • Carbon dioxide diffuses out of the cells into the blood capillaries (to be transported back to the lungs). 	<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>Total 8</p>

7 (a)	<ul style="list-style-type: none"> - The heat on the object stimulates/is detected by the nerve endings/receptors in the skin/finger. 1 - Receptor generate (electrical) impulse 1 - That travels along the sensory/afferent neurone (to the spinal cord) 1 - In the spinal cord, the impulse is transmitted across the synapse 1 - In the synapse, the impulse triggers (the synaptic vesicles to) release neurotransmitter 1 - The neurotransmitter diffuses across the synaptic cleft 1 - And bind to the (protein) receptors (attached) on the postsynaptic memberane 1 - The binding leads to generation of new impulse. 1 - Impulse from sensory neurone travel to the interneurone(and across another synapse)to the motor neurone 1 - (From the motor neurone), impulse travel to the effector (which is the biceps) 1 - Biceps/effector contracts and brings about a sudden withdrawal of the hand (from the hot object). 1 	Any 8								
7 (b) (i)	<ul style="list-style-type: none"> - The situation is called ' fight or flight' situation 1 - The nervous system and endocrine systems both work together 1 - Nerve impulses from the eye/receptors travel to the brain (via the afferent neurone) 1 - The information is interpreted and the brain sends nerve impulses (via efferent neurone) to the adrenal glands. 1 - The adrenal glands are stimulated to release adrenaline/noradrenaline. 1 - The hormone increases the heartbeat rate/ blood pressure and blood flow to the muscle 1 - The breathing rate become faster and deeper/increased 1 - To supply oxygen to the body cells/tissues 1 - Increase cellular respiration/metabolic activity 1 - To generate energy to the skeletal muscles (enable a person to fight or flight off the attacker immediately) 1 	Any 8								
7 (b) (ii)	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Nervous System</td> <td style="width: 50%;">Endocrine System</td> </tr> <tr> <td>It conveys electrical signals (nerve impulse)</td> <td>It conveys chemical signals (hormones)</td> </tr> <tr> <td>Messages are conducted via</td> <td>Messages are conducted via</td> </tr> </table>	Nervous System	Endocrine System	It conveys electrical signals (nerve impulse)	It conveys chemical signals (hormones)	Messages are conducted via	Messages are conducted via			
Nervous System	Endocrine System									
It conveys electrical signals (nerve impulse)	It conveys chemical signals (hormones)									
Messages are conducted via	Messages are conducted via									

	neurons.	the bloodstream.		
	Messages are conveyed rapidly	Messages are conveyed slowly.		
	Controls voluntary and involuntary actions	Controls involuntary actions		
	Messages are carried between specific location.	Messages are carried from the source to various destination		
	The responses or effects are temporary.	The responses or effects are long lasting.	Any 4	

8	P1: The ABO blood group is controlled by three alleles I^A , I^B and I^O .	1	
(a)	P2: Allele I^A and I^B are codominant and I^O is recessive	1	
(i)	P3: The husband/man is heterozygous for blood group A/ Genotype of the husband is $I^A I^O$.	1	
	P4: The wife/ woman is heterozygous for blood group B/ Genotype of the wife is $I^B I^O$.	1	
	P5: Both the husband and the wife will produce gametes through meiosis.	1	
	P6: The husband produces gametes/sperms that carry allele I^A and I^O respectively	1	
	P7: The wife produces gametes/ovum that carries allele I^B and I^O respectively.	1	
	P8: When the sperm with allele I^A fertilizes with ovum with I^B , the offspring/child will have the genotype of $I^A I^B$ /phenotype/ blood group AB.	1	
	P9: When the sperm with allele I^A fertilizes with ovum with I^O , the offspring/ child will have the genotype of $I^O I^A$ / phenotype/ blood group A.	1	
	P10: When the sperm with allele I^O fertilizes with ovum with allele I^B , the child will have the genotype of $I^O I^B$ /genotype/blood group B.	1	
	P11: When the sperm with allele I^O fertilizes with ovum with allele I^O , the child will have the genotype of $I^O I^O$ /genotype/blood group O.	1	
	P12: The possibility/probability of the children having the blood group O, A, B and AB is 25% respectively//Blood group O: Blood group A: Blood group B: Blood group AB = 1: 1: 1: 1	1	
		Any 10	

<p>Schematic diagram:</p> <p>Husband: Blood group A, Genotype $I^O I^A$ (P3)</p> <p>Wife: Blood group B, Genotype $I^O I^B$ (P4)</p> <p>Meiosis (P5) produces gametes: I^O and I^A from the husband; I^O and I^B from the wife.</p> <p>Fertilisation (P6) results in offspring (P8/P9/P10) with genotypes: $I^O I^O$, $I^O I^B$, $I^O I^A$, and $I^A I^B$.</p> <p>Phenotype: Blood group O, Blood Group B, Blood Group A, Blood Group AB (P11)</p> <p>Phenotypic ratio: 1 : 1 : 1 : 1 (P12)</p> <p>Keys: I^O – recessive allele for blood group O (P2) I^A - codominant allele for blood group A I^B - codominant allele for blood group B</p> <p>If answer only using schematic diagram: Max 8 marks</p>									
8	<ul style="list-style-type: none"> - Genetic variations (in offsprings) is a result of sexual reproduction (which involves) the production and fertilization of gametes. - (There are 3 sources of genetic variation:) - Crossing over (between non sister chromatids) during meiosis - Which happens during prophase I (resulting in new different combinations of genes from the parents) - Independent assortment during meiosis//random arrangement and separation of each homologous pair during meiosis - Which happens during metaphase I (producing various genetic combination) - Random fertilization between a male and female gamete (during fertilization) - Producing a unique zygote//variation in the zygote. 	1							
(a) (ii)		1 1 1 1 1 1 1 1 1							
(b)	<table border="1"> <tr> <td>Human Blood group</td> <td>Human height</td> </tr> <tr> <td>Discontinuous variation</td> <td>Continous variation</td> </tr> <tr> <td>Exhibit/shows a few</td> <td>Exhibits/shows a spectrum of</td> </tr> </table>	Human Blood group	Human height	Discontinuous variation	Continous variation	Exhibit/shows a few	Exhibits/shows a spectrum of	1 1	
Human Blood group	Human height								
Discontinuous variation	Continous variation								
Exhibit/shows a few	Exhibits/shows a spectrum of								
		Any 6							

	distinctive phenotypes (without any intermediate characters)	phenotypes (with intermediate characters)			
	The characters are qualitative	The characters are quantitative		1	
	It shows a discrete distribution	It shows a normal distribution		1	
	The phenotypes are not influenced by environmental factors	The phenotypes are influenced by environmental factors.		1	
	A single gene determines the differences in the traits of a character	Two or more genes control the same character		1	
				Any 4	

9 (a)	F1: Stabilise the shore/ coastal line/ protect the shore/coastal line		1	
	E1: dense network of prop roots/pneumatophores/stilt roots		1	
	E2: trap sediments		1	
	E3: Prevent the shore from erosion/strong wind/ tsunami		1	
	F2: Nutrient recycling/food chain		1	
	E4: decomposition of litter fall (from the trees)		1	
	E5: by detritus/heterotrophic microorganisms.		1	
	E6: (Presence of detritus microorganisms) form a food source		1	
	E7: for suspension/deposit feeders//consumed by juveniles of bivalves/shrimps/fishes		1	
	F3: Biodiversity		1	
	E8 – (The mangrove forest) is the habitat for varieties of species of animals and		1	

	<p>plants</p> <p>F4: Economic value</p> <p>E9: (The mangrove water which is rich in detritus) is a habitat for many fish and shrimp</p> <p>E10: coastal fisheries/providing income for the fishermen.</p> <p>E11: The trees for firewood/ boat building/timber</p> <p>E12: habitat for fireflies – tourism industry</p> <p>(Any suitable explanation)</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>Any 10</p>	
9 (b)	<p>Justification for reducing the use of insecticide:</p> <ul style="list-style-type: none"> - It may kill other beneficial insects (such as insects that pollinate flowers) - It may cause mutation in the insects - The pest insect may develop resistance to the insecticide - More/stronger insecticide has to be used to (kill these resistant insects) - It may leach into underground water/ nearby water source/river - And enter the food chain - Causing death of animals of higher trophic level/fish/aquatic animal. - It may be hazardous to/endanger the health of the farmer if inhaled. <p>Suggestions:</p> <ul style="list-style-type: none"> - Biological control - Prey-predator method - More specific - Less harmful to the environment <p>OR</p> <ul style="list-style-type: none"> - Genetic engineering - Pest/insect resistant plant <p>OR</p> <ul style="list-style-type: none"> - Farming in shade net - Protect against the entrance of insects 	<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>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>8 marks</p> <p>Max 2 Total 10</p>

Answer Scheme

BIOLOGY FORM 5 PAPER 3 EXCEL II 2010

Question 1

1 (a)

Score	Explanation
3	Able to record three readings of temperature and the distance movement of water in the potometer correctly. 20 °C = 4.5 cm 30 °C = 5.0 cm 40 °C = 9.0 cm
2	Able to record any two distances.
1	Able to record any one distance.
0	No response or wrong response

1 (b) (i)

Score	Explanation
3	Able to state two correct observations based on following criteria. C1 – Temperature C2 – The distance of air bubble movement. Sample Answer:(either 2): 1. The air bubble moves from 0 cm to 4.5 cm at the temperature 20°C. 2. The air bubble moves from 0 cm to 5.0 cm at the temperature 30°C. 3. The air bubble moves from 0 cm to 9.0 cm at the temperature 40°C. 4. The air bubble moves under temperature 40°C is more than under temperature 30°C
2	Able to state one correct observation and one inaccurate response.
1	Able to state one correct observation or two inaccurate response or idea.
0	No response or wrong response (response like hypothesis)

1(b) (ii)

Score	Explanation
3	Able to state two reasonable inferences for the observation. Sample answer: 1. The water molecules evaporate from surface of the leaves slowly under low temperature causing the air bubble to move in short distance. 2. The water molecules evaporate from surface of the leaves rapidly under high temperature causing the air bubbles to move in long distance. 3. The water molecule lost cause by transpiration process under high temperature.
2	Able to state one correct inference and one inaccurate inference.
1	Able to state one correct inference or two inaccurate inference or idea.
0	No response or wrong response (inference like hypothesis)

1 (c)

Score	Explanation
3	Able to state all the variables and the method to handle variable correctly (√) <i>for each variable and method</i> Manipulated Variable: Temperature (√) Method to handle: The potometer is put under different temperature. (√) Responding Variable: The distance of air bubble . (√) Method to handle: Measure and record the distance by using the ruler. (√) Controlled variable : Size of plant shoot/ size of air bubble/ humidity/intensity of light (√) Method to handle: Use the plant shoot with the same size/ maintain the size of air bubble/ humidity / intensity of light. (√) Able to get 6 √
2	Able to get 4 – 5 √
1	Able to get 2 – 3 √
0	No response or wrong response

1 (d)

Score	Explanation
3	Able to state the hypothesis correctly based on the following criteria: V1 – State the temperature. V2 – State the meniscus movement R - State the relationship between V1 and V2. The rate of transpiration/(meniscus movement) is higher when the temperature increase
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	Able to construct a table and record the result of the experiment with the following criteria: C – The 3 titles (with units) (✓) D – Transfer all data correctly. (✓) T – Calculate the rate of transpiration (1/minute) (✓) If without unit (x). <table border="1" data-bbox="391 1066 1247 1276"> <thead> <tr> <th>Temperature (⁰C)</th> <th>Distance of air bubble (cm)</th> <th>Rate of transpiration (cm/min)</th> </tr> </thead> <tbody> <tr> <td>20</td> <td>4.5</td> <td>0.9</td> </tr> <tr> <td>30</td> <td>5.0</td> <td>1.0</td> </tr> <tr> <td>30</td> <td>9.0</td> <td>1.8</td> </tr> </tbody> </table>	Temperature (⁰ C)	Distance of air bubble (cm)	Rate of transpiration (cm/min)	20	4.5	0.9	30	5.0	1.0	30	9.0	1.8
Temperature (⁰ C)	Distance of air bubble (cm)	Rate of transpiration (cm/min)											
20	4.5	0.9											
30	5.0	1.0											
30	9.0	1.8											
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 a graph of rate of transpiration against the temperature.. Axes (A) – both axis are labeled an uniform scales, independent variable on horizontal axis. (✓) Point (P) – All points are correctly plotted. (✓) Shape (S) – All points are connected smoothly (✓). (If the graph attaches the axis (x).
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 explain the relationship between rate of transpiration and the temperature correctly. When the temperature increase, the rate of transpiration increase, because the light intensity increases.
2	Able to explain briefly the relationship between rate of transpiration and the temperature
1	Able to explain the idea of the relationship between rate of transpiration and the temperature
0	No response or wrong response

1 (g)

Score	Explanation
3	Able to state the definition of transpiration operationally , complete and correct, based on the following criteria. C1 – the function of transpiration C2 – the effect on plant C3 – the factor that affect on transpiration. The transpiration is the loss of water vapour from the leaves causing water movement in the plant affected by the temperature.
2	Able to state the definition of transpiration based on any two criteria.
1	Able to state the definition of transpiration based on any one criteria.
0	No response or wrong response

1 (h)

Score	Explanation
3	Able to predict correctly and explain the prediction based on the following item: C1 – the distance of air bubble. C2 – the transpiration rate C3 – higher temperature and higher light intensity. The distance of the air bubble is further/more than 9 cm because the transpiration rate is higher due to a higher temperature and higher light intensity .
2	Able to predict based on any two criteria.
1	Able to predict based on any one criteria.
0	No response or wrong response

1 (i)

Score	Explanation															
3	Able to match the apparatus and material used to obtain data for the three variables correctly. <table><thead><tr><th>Variable</th><th>Apparatus</th><th>Material</th></tr></thead><tbody><tr><td>Manipulated</td><td>Thermometer</td><td>plant leaves</td></tr><tr><td>Responding</td><td>stop watch</td><td>water</td></tr><tr><td></td><td>Ruler</td><td>capillary tube</td></tr><tr><td>Controls</td><td>Stop watch</td><td>capillary tube</td></tr></tbody></table>	Variable	Apparatus	Material	Manipulated	Thermometer	plant leaves	Responding	stop watch	water		Ruler	capillary tube	Controls	Stop watch	capillary tube
Variable	Apparatus	Material														
Manipulated	Thermometer	plant leaves														
Responding	stop watch	water														
	Ruler	capillary tube														
Controls	Stop watch	capillary tube														
2	Able to match the apparatus and material for any two variables correctly.															
1	Able to match the apparatus and material for any one variable correctly.															
0	No response or wrong response															

Question 2:

Score	Explanation
01	Identified the problem How does light intensity affect the rate of photosynthesis ?
3	Able to state problem statement correctly
2	Able to state problem statement but slightly incorrect
1	Able to state idea only

√	Objective of study/Aim To study the effect of light intensity on the rate of photosynthesis.
√	Variables Manipulated: light intensity/distance of <i>Hydrilla</i> sp. to sources of light. Responding: Number of gas bubbles that are release in 1 minute/ rate of photosynthesis. Control : Concentration of carbon dioxide/temperature of water.

02	Statement of hypothesis The rate of photosynthesis increase when the light intensity is higher.
3	Able to state the hypothesis correctly by relating two variables. correctly.
2	Able to state hypothesis but slightly incorrect.
1	Able to state idea only.
0	No response or wrong response.

05	List of materials <i>Hydrilla</i> plant, 0.3 % sodium hydrogen bicarbonate, plasticine, List of apparatus 60 W electric bulb, 500 ml beaker, a glass funnel, test tube, stop watch, razor blade, thermometer, meter ruler
3	Able to list down 6 apparatus and 2 material.
2	Able to list down 4 apparatus and 2 material.
1	Able to list down 2 apparatus and 1 material.
0	No response or wrong response.

B1 – 1	Technique used Count the number of gas bubbles released in one minute using stop watch (B1).
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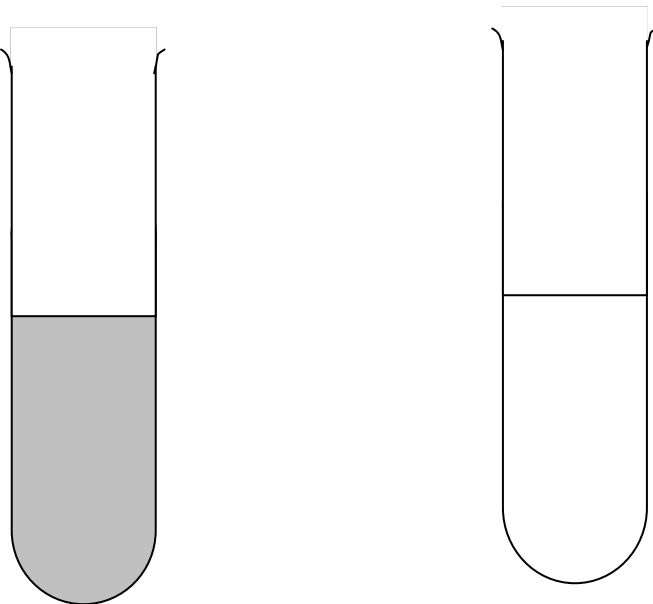
04	Experimental procedure
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√	<ol style="list-style-type: none"> 1. The apparatus setup as diagram above. (K1) 2. The temperature of water in beaker is maintained at 28°C. (K2) 3. A few strands of <i>Hydrilla</i> sp. is chosen and the stem end is cut obliquely with a sharp razor blade under water. (K1)(K5) 4. The strands of <i>Hydrilla</i> sp. S is placed inside a glass filter funnel.(K1) 5. The funnel is placed up side down in a 500 ml beaker.(K1) 6. The beaker is filled with 400 ml of 0.3 % sodium bicarbonate.(K2) 7. The beaker is placed at a distance of 50 cm from the 60 W bulb as a light source.(K3) 8. The number of gas bubbles released in one minute are counted and recorded in a table.(K4) . This step is repeated twice.(K5) 9. Step 7 is repeated by placing the apparatus at distance 40 cm, 30 cm, 20 cm and 10 cm from the light sources.(K3) 10. The results are recorded in a table(K4) 11. The graph of the rate of photosynthesis against the light source is plotted. (K1)
3	All 5 criteria correct (K1,K2,K3,K4,K5)
2	3 – 4 criteria correct.
1	At least 2 criteria correct.
0	No response or wrong response.

B2 – 1	<p>Presentation of data</p> <p>√ Data is presented in a table with the right units for</p> <ul style="list-style-type: none"> - Distance of light sources. - Number of gas bubbles. - The rate of photosynthesis (number of bubbles/time) (to get B2) <p>If without the unit, but give the idea (√)</p> <p>Transfer the data to graph with correct x-axis and y-axis.</p>
√	<p>Conclusion</p> <p>Write the hypothesis or another statement.</p>
03	Report writing
3	Score 3 = 7-9 √
2	Score 2 = 4-6 √
1	Score 1 = 1-3 √
0	No response or wrong response.

Question 1: 33 Marks

Question 2.

No.	Mark Scheme	Notes on Scoring
2 (i)	<p>Able to state a problem statement relating the manipulated variable with the responding variable correctly based on the following aspects.</p> <p>P1 : What / WH questions P2 : the level of water pollution in stations P, Q and R P3 : ? (a question mark)</p> <p><u>Sample answer</u></p> <p>What is the level of water pollution in stations P, Q and R ?</p>	3
	<p>Able to state a problem statement based on two aspects</p> <p><u>Sample answer</u></p> <p>What is the level of water pollution in stations P, Q and R</p>	2
	<div style="display: flex; justify-content: space-around; align-items: center;">  </div> <p>Able to state a problem statement based on one aspect</p>	<p>1</p> <p><i>Remarks :</i> <i>Put a tick (✓) if the candidate get at least one mark</i></p>

	<u>Sample answer</u> The level of water pollution in stations P, Q and R are different	
	No response <u>or</u> incorrect response	0
2 (ii)	Able to state the objective of the investigation corerctly <u>Sample answer</u> To investigate the level of pollution of the water taken from three different stations, P,Q and R	<i>Put a tick (√) if the answer is correct</i>
2 (iii)	Able to state a hypothesis relating the manipulated variable to responding variable correctly <u>Sample answer</u> The more polluted is the water, the lower is the amount of oxygen in it or the higher is the BOD value.	3
	Able to state a hypothesis inaccurately <u>Sample answer</u> The more polluted is the water, the lower is the BOD value	2
	Able to state hypothesis at idea level <u>Sample answer</u>	1
		<i>Remarks :</i>

	Polluted water has lower oxygen level	<i>Put a tick (✓) if the candidate get at least one mark</i>
	No response <u>or</u> incorrect response	0
2 (iv)	<p>Able to state all the three variables correctly</p> <p><u>Sample answer</u></p> <ul style="list-style-type: none"> • Manipulated variables Water samples from stations P,Q and R • Responding variables Time taken for methylene blue solution to turn colourless or decolourise • Constatnt variables Volume of water sample / Volume of methylene blue solution / Concentration of methylene blue solution 	<i>Put a tick (✓) if all the 3 variables are stated correctly</i>
2 (v)	<p>Able to list at least 5/6 apparatus and 3 materials correctly</p> <p><u>Sample answer</u></p> <p>Apparatus : Reagent boottle, stopwatch, syringe, stoppers, beakers, aluminium foil / black paper</p> <p>Materials : Methylene blue solution, water sample from area P, Q and R, distilled water</p>	3

	Able to list at least 3/4 apparatus and at least 3 materials correctly	2
	Able to list at least 1/2 apparatus and at least 3 materials correctly	1 <i>Remarks : Put a tick (✓) if the candidate get at least one mark</i>
	No response <u>or</u> incorrect response <u>or</u> list 1 apparatus and 1 materials correctly	0
2 (vi)	Able to state a suitable technique used for the experiment <u>Sample answer</u> Measure and record the time taken for methylene blue solution to turn colourless or decolourise using a stopwatch.	B1 = 1 <i>Put a tick (✓) if the answer is correct</i>
2 (vii)	Able to describe the steps of the experiment correctly based on the following aspects: K1 – Appaartus set-up K2 – Operating Fixed Variables	3

K3 – Operating Responding Variables
K4 – Operating Manipulated Variables
K5 – Precaution / Accuracy of experiment

Sample answer

1. Water samples are collected from 4 different sources.
2. The reagent bottles are labelled P, Q, R and S
3. The reagent bottles are filled with 200 ml of the following water samples:
P – Water from up stream area
Q – Water from oil palm factory area
R – Water from resident area
S – Distilled water
Each reagent bottle is then closed with a stopper.
4. If water samples are not tested immediately, the reagent bottles should be wrapped in aluminium foil of black paper to shield them from light.
5. The tests for all the water samples are run on the same day.
6. A syringe is used to add 1 ml of 0.1% methylene blue solution to the base of each water sample.
7. The reagent bottles are closed quickly. The contents of the bottles cannot be shaken.
8. All the bottles are placed in dark cupboard and the stopwatch is activated.
9. The bottles are examined every one hour.
10. The time taken for the methylene blue solution to decolourised (become colourless) is recorded for all the water samples.

Remarks :

K1 – step 1,2,3
K2 – step 3
K3 – step 8,10

	<p>K4 – step 2,5,6,9 K5 – step 4,5,6,7,8</p>										
	Able to state any 3 – 4 K correctly	2									
	Able to state 2 K correctly	1									
	No response <u>or</u> incorrect response <u>or</u> only 1 K	0									
2 (viii)	<p>Able to construct a table to record data</p> <ul style="list-style-type: none"> • 3 titles with correct unit • No data is required <p><u>Sample answer</u></p> <table border="1" data-bbox="360 1556 1208 1864"> <thead> <tr> <th>Water Sample</th> <th>Reagent bottle</th> <th>Time taken for methylene blue solution to turn colourless (hours)</th> </tr> </thead> <tbody> <tr> <td>Up stream</td> <td>P</td> <td></td> </tr> <tr> <td>Oil palm factory</td> <td>Q</td> <td></td> </tr> </tbody> </table>	Water Sample	Reagent bottle	Time taken for methylene blue solution to turn colourless (hours)	Up stream	P		Oil palm factory	Q		<p>B2 = 1</p> <p>Put a tick (✓) if the answer is correct</p>
Water Sample	Reagent bottle	Time taken for methylene blue solution to turn colourless (hours)									
Up stream	P										
Oil palm factory	Q										

	Resident area	R		
	Distilled water	S		
2 (ix)	<p>Able to make the right conclusion</p> <p>Note : Rewrite the hypothesis. The hypothesis is accepted</p> <p><u>Sample answer</u></p> <p>The more polluted is the water, the lower is the amount of oxygen in it or the higher is the BOD value. Hypothesis is accepted</p>			<p><i>Put a tick (✓) if the answer is correct</i></p>
Planning of experiment	<p>7 - 9 ticks = 3 marks</p> <p>4 - 6 ticks = 2 marks</p> <p>1 - 3 ticks = 1 marks</p>			

SKILLS	SCORE
Problem statement	3
Hypothesis	3
Apparatus and materials	3
Procedure	3
Technique used	1 (bonus mark)
Table constructed	1 (bonus mark)
Overall plan 7 - 9 ticks = 3 marks 4 - 6 ticks = 2 marks 1 - 3 ticks = 1 marks	3
Total	17 marks

END OF MARKING SCHEME