BAHAN KECEMERLANGAN SPM 2015

BK 1

BIOLOGI

KERTAS 2

NAMA : .....

KELAS : .....

DIBIAYAI OLEH
KERAJAAN NEGERI TERENGGANU

NAMA : ..... *TINGKATAN :* .....

SULIT
4551/2
Biologi
KERTAS 2
Feb 2015
2 ½ jam

UJIAN PENGESANAN TOV 2015
TINGKATAN LIMA

BIOLOGI
Kertas 2

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini mengandungi dua bahagian :* **Bahagian A** dan **Bahagian B**

2. *Jawab* **semua** *soalan dalam* **Bahagian A.** *Jawapan kepada* **Bahagian A** *hendaklah ditulis dalam ruang jawapan yang disediakan*

3. *Jawab* **dua** *soalan dari* **Bahagian B** *dan jawapan kepada* **Bahagian B** *hendaklah ditulis dalam ruang bergaris yang disediakan dibahagian akhir kertas soalan. Anda diminta menjawab dengan lebih terperinci untuk* **Bahagian B**, *Jawapan mestilah jelas dan logik. Dalam jawapan anda, persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda boleh digunakan.*

4. *Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.*

5. *Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.*

6. *Sekiranya anda hendak membatalkan sesuatu jawapan, buat garisan di atas jawapan itu.*

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

7. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram. Walau bagaimanapun, langkah mengira perlu ditunjukkan*

8. *Masa yang dicadangkan untuk menjawab* **Bahagian A** *ialah 90 minit,* **Bahagian B** *60 minit.*

9. *Semua kertas jawapan hendaklah diserahkan di akhir peperiksaan.*

Kertas soalan ini mengandungi 21 halaman bercetak.

SECTION A
[60 *marks*]
Answer **all** the questions
*Jawab **semua** soalan dalam bahagian ini*

1. Diagram 1 shows one type of cell which is observed under electron microscope.
Rajah 1 menunjukkan sejenis sel yang diperhatikan di bawah mikroskop elektron.

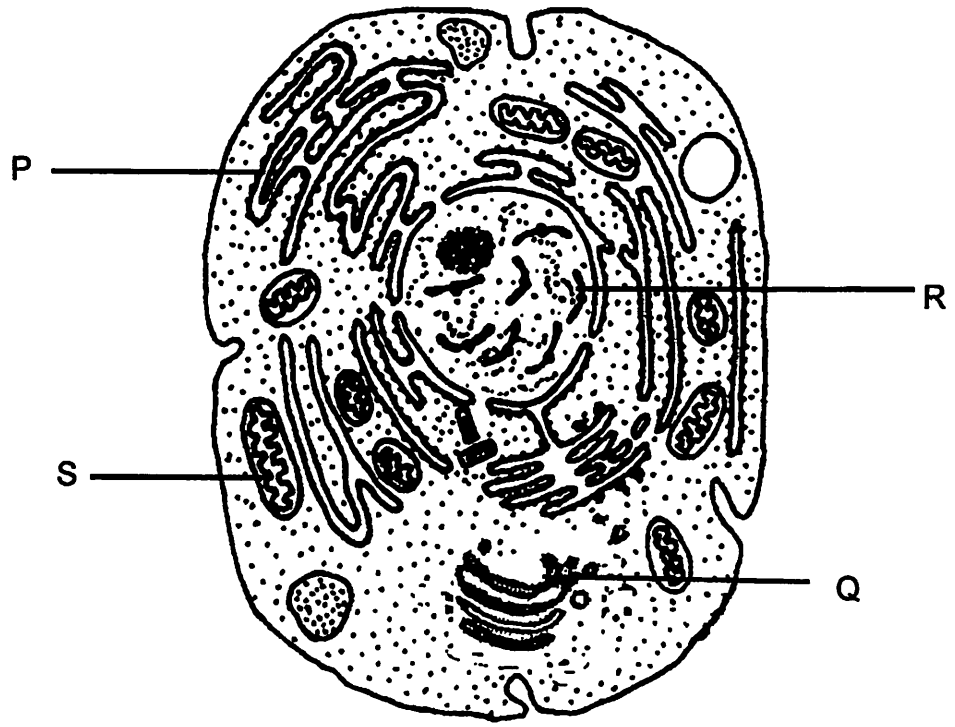

Diagram 1 // *Rajah 1*

(a) (i) Name structure labelled P and Q
Namakan struktur yang berlabel P dan Q.

P: .....

Q: .....

[2 *marks*]

(ii) P and Q involve in enzyme synthesis process. Descibe the role of P and Q in the process
P dan Q terlibat dalam proses sintesis enzim. Huraikan peranan P dan Q dalam proses tersebut.

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[3 *marks*]

(b) (i) Another student observed an onion epidermis cell under light microscope. Draw a labelled diagram of the cell that can be observed.
Seorang pelajar lain memerhati sel epidermis bawang di bawah mikroskop cahaya. Lukiskan satu gambar rajah berlabel bagi sel yang dapat diperhatikan

[2 *marks*]

(ii) State one difference between the structure of cell in Diagram 1 and cell that can be observed in (b)(i).
Nyatakan satu perbezaan dari segi struktur antara sel dalam Rajah 1 dan sel yang diperhatikan dalam (b)(i).

.....

.....

[1 *marks*]

(c) Structure R is removed from the cell. Explain what happen to the growth of the cell.
Struktur R dikeluarkan daripada satu sel. Terangkan apakah akan berlaku terhadap pertumbuhan sel itu.

.....

.....

[2 *marks*]

(d) Explain why meristematic cell has abundant of organelle S compare to the cheek cell.
Terangkan mengapa sel meristem mempunyai lebih banyak organel S berbanding sel pipi

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.....

[2 *marks*]

2. Diagram 2.1 shows the three process of the movement of substances across the plasma membrane, P, Q and R.
Rajah 2.1 menunjukkan tiga proses pergerakan bahan merentas membran plasma, P, Q dan R.

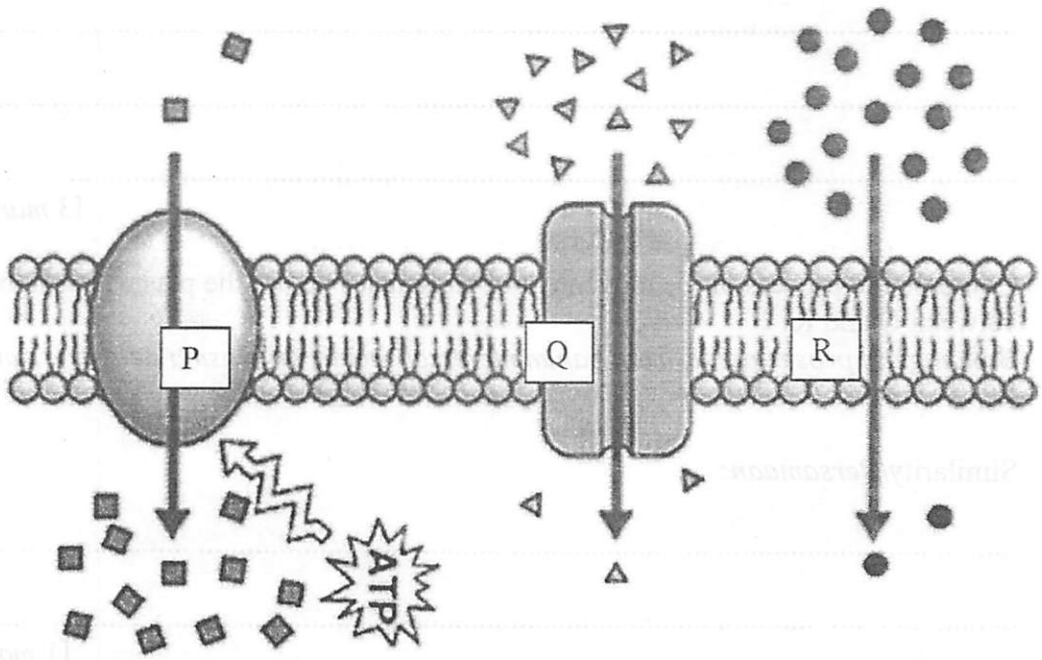

Diagram 2.1 // *Rajah 2.1*

(a)(i) Label the major component that form the plasma membrane in Diagram 2.1 using letter **T**.
Labelkan komponen utama yang membentuk membran plasma dalam Rajah 2.1 menggunakan huruf ***T***

[1 *mark*]

(ii) Explain the role of the part labelled in (a)(i) for the movement of substance across the plasma membrane.
Terangkan peranan bahagian yang dilabelkan dalam (a)(i) bagi pergerakan bahan merentas membran plasma.

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[2 *marks*]

(b) Describe how the substances across the plasma membrane through process P.
Huraikan bagaimana bahan-bahan merentasi membran plasma melalui proses P.

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[3 *marks*]

(c) Compare the process of the movement of substances across the plasma membrane between Q and R?
Bandingkan proses pergerakan bahan merentas membran plasma antara Q dan R?

Similarity/*Persamaan:*

.....

.....

[1 *mark*]

Differences/*Perbezaan*:

Q	R

[2 *marks*]

(d) Diagram 2.2 shows an herbaceous plant before and after immersed its root in a solution containing metabolic poison such as cyanide
Rajah 2 menunjukkan satu tumbuhan herba sebelum dan selepas direndam akarnya dalam larutan yang mengandungi racun metabolisme seperti sianida

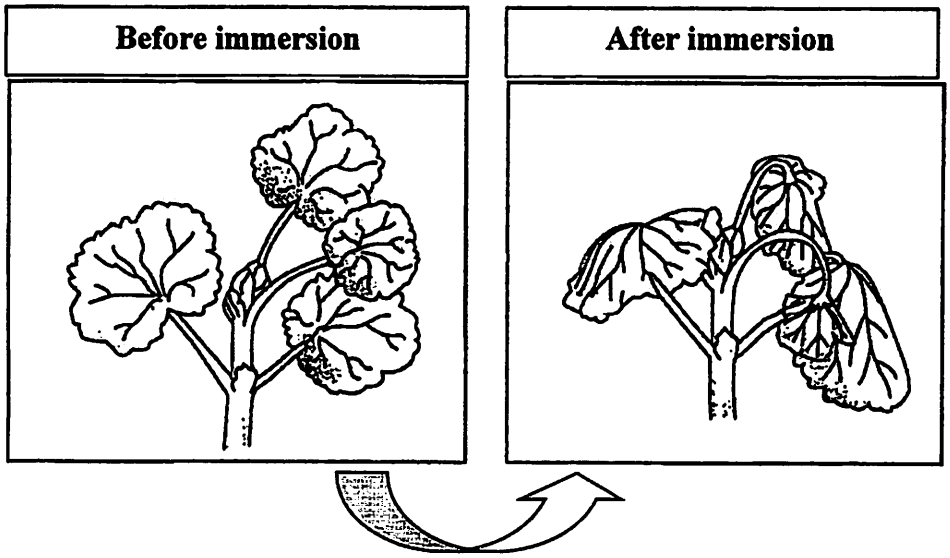

Diagram 2.2 // *Rajah 2.2*

Explain what happens to the plant after immersion.
Terangkan apa yang berlaku kepada tumbuhan itu selepas rendaman.

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[3 *marks*]

3. Diagram 3.1 shows a stage of mitosis in an animal cell.
Rajah 3.1 menunjukkan suatu peringkat mitosis dalam sel haiwan.

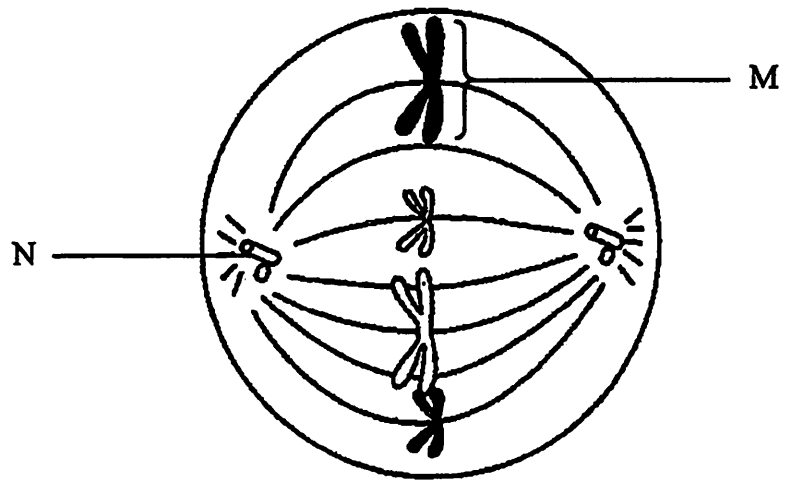

Diagram 3.1 // *Rajah 3.1*

(a) (i) Name the stage.
Namakan peringkat itu.

.....

[1 *mark*]

(ii) Describe the chromosomes behaviour during the stage.
Huraikan pelakuan kromosom semasa peringkat itu.

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[2 *marks*]

(b) If the cell in Diagram 3.1 divided in ovary to produce a reproductive cell, draw **one** of the daughter cells that are produced at the end of the division.
Jika sel dalam Rajah 3.1 membahagi di ovari untuk menghasilkan sel pembiakan, lukiskan salah satu sel anak yang mungkin terhasil di akhir pembahagian sel itu.

[2 *marks*]

(c) (i) Name structure N.
Namakan struktur N.

.....

[1 *mark*]

(ii) What happen to the structure M if structure N fails to function in this division?
Apakah yang berlaku kepada struktur M jika struktur N gagal berfungsi dalam pembahagian ini?

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[2 *marks*]

(d) Diagram 3.2 shows an experiment carried out on animal cloning by using two different species of frogs.
Rajah 3.2 menunjukkan satu eksperimen pengklonan haiwan dengan menggunakan dua spesies katak yang berbeza.

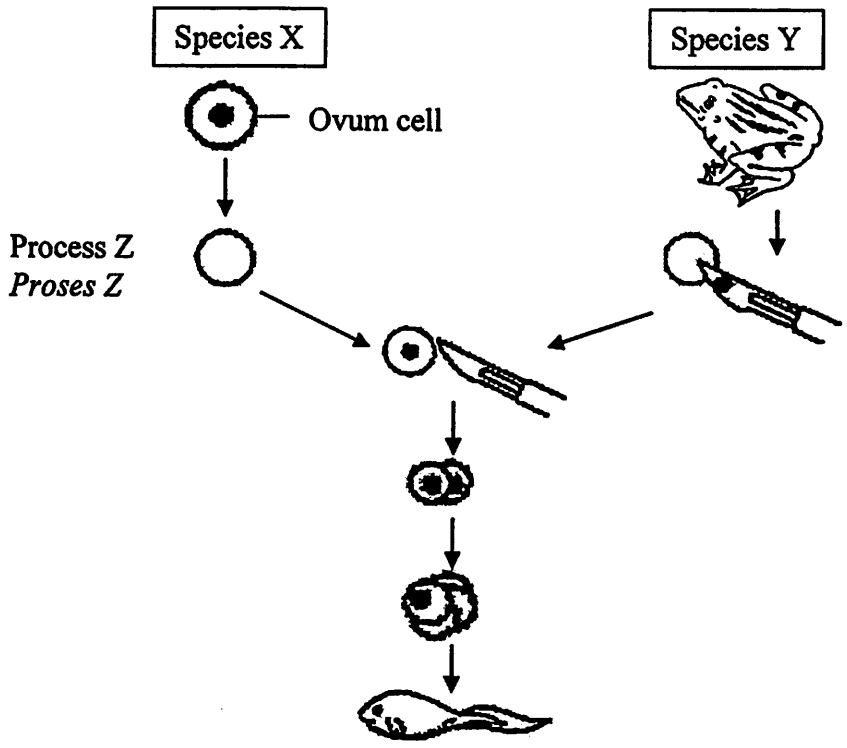

Diagram 3.2 // *Rajah 3.2*

Based on Diagram 3.2
Berdasarkan Rajah 3.2

(i) Describe **two** differences of process Z between species X and species Y.
*Huraikan **dua** perbezaan proses Z di antara spesies X dengan spesies Y.*

Species X	Species Y

[2 *marks*]

(ii) Name the species of frog that will be produced at the end of the experiment.
Namakan spesies katak yang akan dihasilkan di akhir eksperimen.

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[1 *mark*]

(iii) State **one** disadvantage in this method.
*Nyatakan **satu** keburukan dalam kaedah ini.*

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[1 *mark*]

4. Diagram 4 show the part of digestive system of goat
Rajah 4 menunjukkan bahagian sistem pencernaan bagi kambing

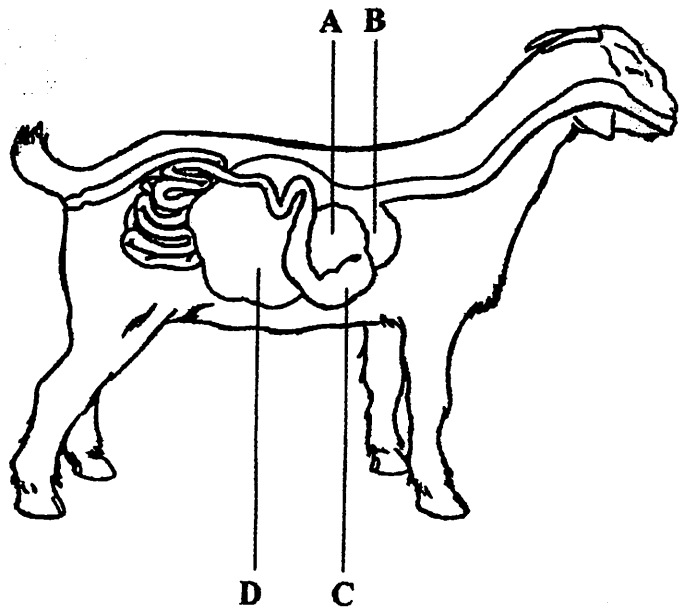

Diagram 4 // *Rajah 4*

(a)(i) Mark (X) for the types of digestive system of a goat
Tandakan (X) bagi jenis sistem pencernaan kambing

Rodent *Rodensia*		Ruminant *Ruminan*	

[1 *mark*]

(ii) Name the part label A, B, C and D
Namakan bahagian berlabel A, B, C dan D

A ..... C .....

B ..... D .....

[2 *marks*]

(b)(i) Name the enzyme that produced by bacteria found in D
Namakan enzim yang dihasilkan oleh bakteria yang terdapat dalam D

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[1 *mark*]

(ii) State the function of enzyme that state in (b)(i)
Nyatakan fungsi enzim yang dinyatakan dalam (b)(i)

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[1 *mark*]

(iii) Explain what happen when food enter section B
Terangkan apakah yang berlaku apabila makanan memasuki bahagian B

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[2 *marks*]

(c) State three differences of digestive system between human and rabbit
Nyatakan 3 perbezaan sistem pencernaaan antara manusia dan arnab

Human *Manusia*	Rabbit *Arnab*

[3 *marks*]

(d)

Pak Ali breeds rabbit and goat. He found that his rabbit produced liquid and soft feaces during night. The rabbit ingest their feaces pellets and produce hard feaces.

Pak Ali memelihara arnab dan kambing. Beliau mendapati arnabnya menghasilkan sejenis tinja seperti cecair yang lembik pada waktu malam. Arnab ini memakan semula tinjanya dan menghasilkan tinja yang keras

Based on the observation, explain why rabbit need to ingest their feaces whereas goat does not need to do that
Berdasarkan pemerhatian ini, mengapa arnab perlu memakan semula tinjanya manakala situasi ini tidak berlaku pada kambing.

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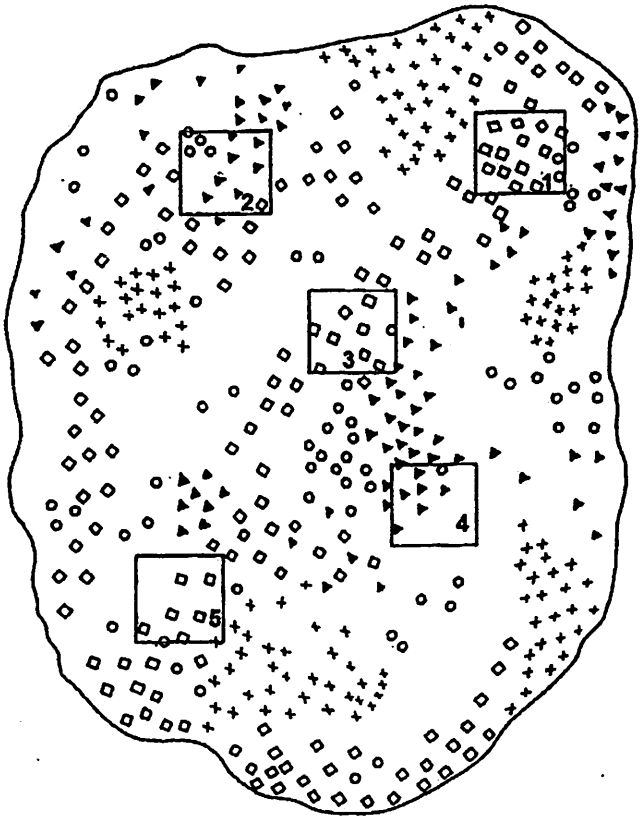
[2 *marks*]

5. Diagram 5 shows distribution population of aquatic plant in the pond. Population study using quadrat sampling technique. Five quadrat samplings were taken at random.
Rajah 5 menunjukkan taburan populasi tumbuhan akuatik dalam kolam. Kajian populasi menggunakan teknik persampelan kuadrat. Lima persampelan kuadrat diambil secara rawak.



Key/Kekunci

- ○ *Eichornia sp* / Keladi bunting
- ▲ *Nelumbium sp* / Teratai
- □ *Colocasia sp* / Keladi
- x *Sagittaria sp* / Rusiga

Quadrat size/ Saiz kuadrat

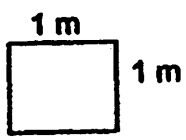


Diagram 5 // *Rajah 5*

(a) State two abiotic factors influence distribution population of aquatic plant in pond.
Nyata dua faktor abiotik yang mempengaruhi taburan populasi tumbuhan akuatik dalam kolam.

(i) .....

(ii) .....

[2 marks]

(b) Calculate the density of *Colocasia* sp. in the pond.
Kira ketumpatan Colocasia sp dalam kolam.

[2 *marks*]

(c) Explain one abiotic factor state in (a) that influence distribution of *Colocasia sp.*
Terangkan satu faktor abiotik yang dinyatakan dalam (a) yang mempengaruhi taburan Colocasia sp

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[3 *marks*]

(d) The area around the pond has been developed for vegetable cultivation where farmers use pesticides without following the recommended amount which is 25ml insecticide in 1 liter of water, but farmers using pesticides 50ml in 1 liter of water.
Kawasan di sekeliling kolam telah dibangunkan untuk penanaman sayur di mana peladang menggunakan racun serangga tanpa mengikut sukatan yang disyorkan ialah 25ml racun serangga dalam 1 liter air tetapi peladang itu menggunakan 50ml racun serangga dalam 1 liter air.

(i) Explain the effect of activities on aquatic plant in pond
Terangkan kesan aktiviti tersebut keatas tumbuhan akuatik dalam kolam.

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[3 *marks*]

(ii) Suggest suitable method to overcome the effect in (d)(i)
Cadangkan langkah yang lebih sesuai bagi mengatasi kesan di (d)(i)

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[2 *marks*]

BAHAGIAN B
[40 *marks*]

Answer **only two questions** in this section
*Jawab **dua soalan sahaja** dalam bahagian ini*

6(a) Diagram 6.1(a) shows the cross section of a leaf.
Diagram 6.1(b) shows an organelle which found abundantly in cell X and Y
Rajah 6.1(a) menunjukkan keratan rentas sehelai daun
Rajah 6.1(b) menunjukkan organel yang banyak terdapat dalam sel X dan Y

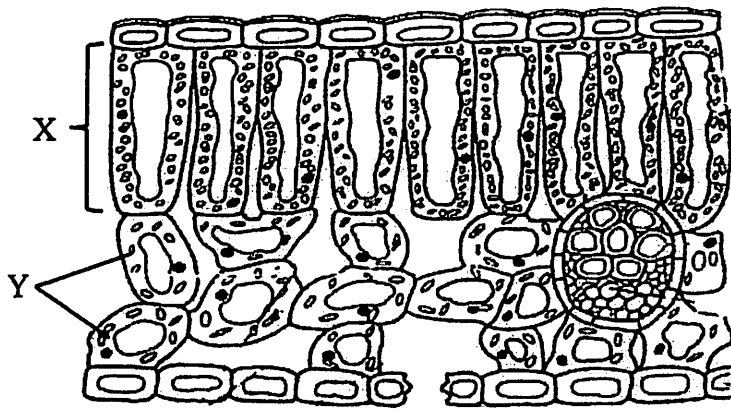


Diagram 6.1(a)
Rajah 6.1(a)

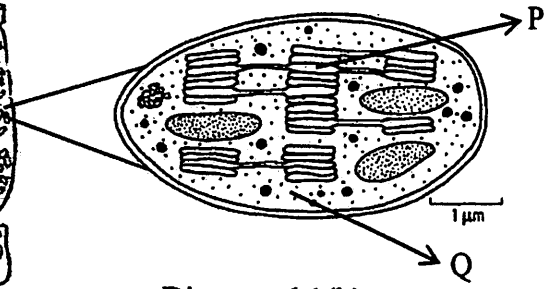


Diagram 6.1(b)
Rajah 6.1(b)

(i) Name the biochemical reaction occurs in structure labelled P and Q.
Explain the differences between both reactions.
Namakan tindakbalas biokimia yang berlaku dalam struktur yang berlabel P dan Q.
Terangkan perbezaan di antara kedua-dua tindakbalas.

[6 *marks*]

(ii) Explain how the structure of the leaf are adapted to optimize the process occurs in (a)(i)
Terangkan bagaimana struktur daun diadaptasi untuk mengoptimumkan proses yang berlaku dalam (a)(i)

[8 *marks*]

(b) Diagram 6.2 shows relationship between the rate of photosynthesis and the light intensity
Rajah 6.2 menunjukkan hubungan antara kadar fotosintesis dan keamatan cahaya

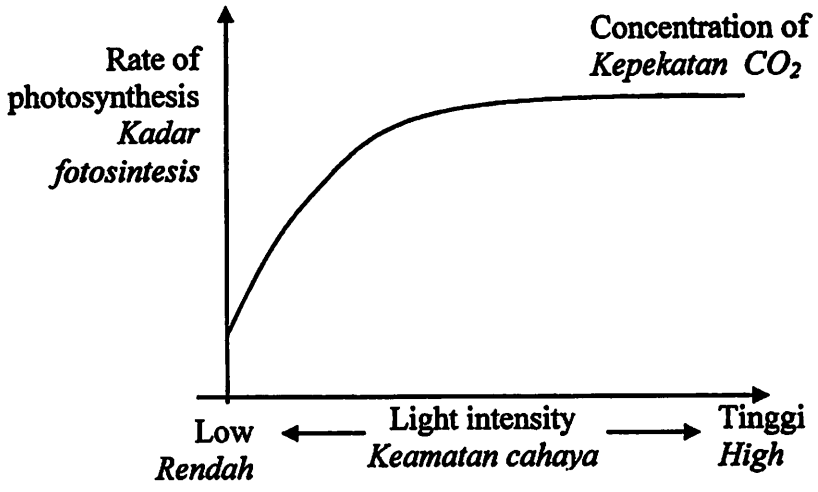
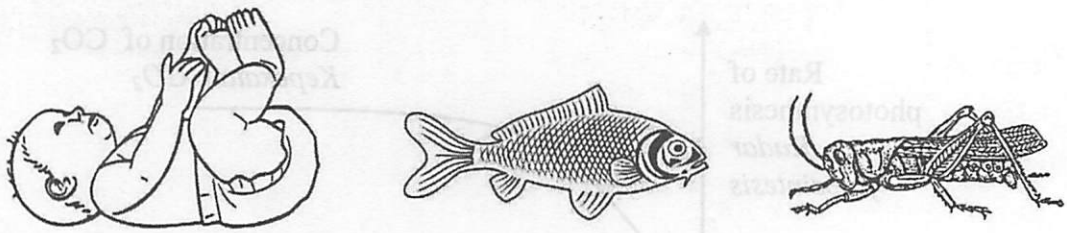


Diagram 6.2 // *Rajah 6.2*

Describe how the light intensity affect the rate of photosynthesis and the limiting factor involves.
Huraikan bagaimana keamatan cahaya mempengaruhi kadar fotosintesis dan faktor penghad yang terbabit

[6 *marks*]

7. Diagram 7 shows the three types of organisms which have different respiration systems.
Rajah 7 menunjukkan tiga jenis organisma yang mempunyai sistem respirasi yang berbeza.



P Q R

Diagram 7 // *Rajah 7*

(a) Explain how the adaptation of the respiratory structure of organism R prevents it from collapsing, when the air pressure drops.
Terangkan bagaimana penyesuaian struktur respirasi organ R menghalangnya daripada kempis apabila tekanan udara berkurang.

[4 *marks*]

(b) Describe how the respiratory structures of Q and R were adapted to increase the efficiency of gaseous exchange.
Huraikan bagaimana struktur respirasi Q dan R disesuaikan bagi menambah kecekapan pertukaran gas.

[6 *marks*]

(c) Explain the similarities and differences of respiratory systems between organisms P and Q.
Terangkan persamaan dan perbezaan sistem respirasi antara organisma P dan Q.

[10 *marks*]

8. Diagram 8 show the colonisation and succession take place in the pond.
Rajah 8 menunjukkan proses pengkolonian dan sesaran yang berlaku di dalam kolam

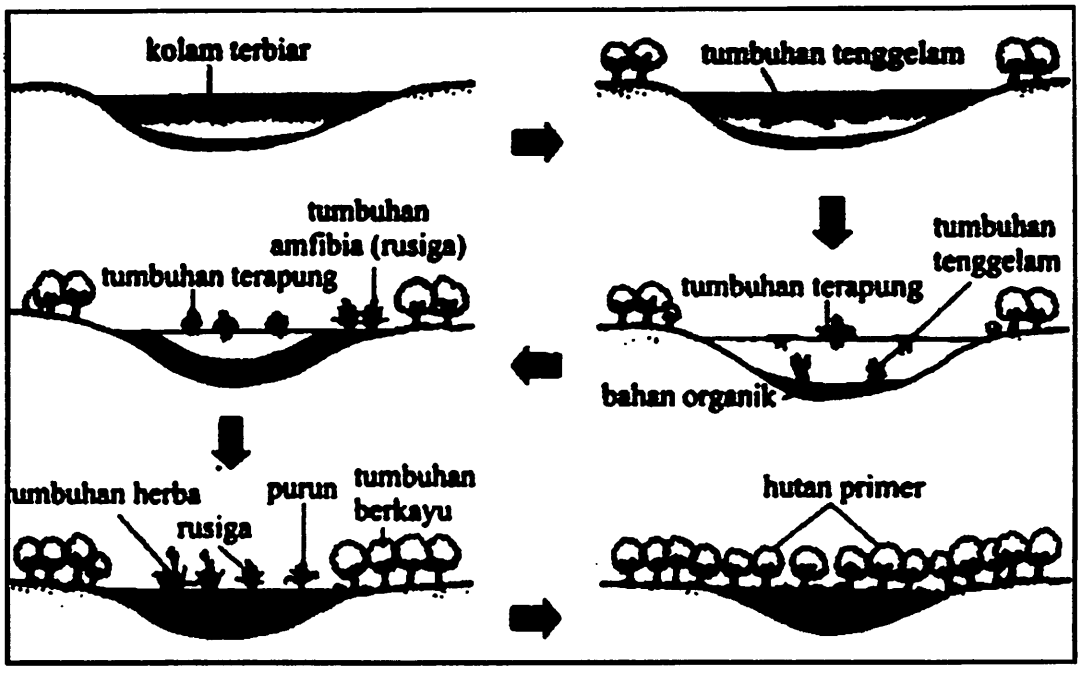


Diagram 8 // *Rajah 8*

Based on Diagram 8,
Berdasarkan Rajah 8,

(a) (i) State the meaning of colonization and succession in the pond.
Nyatakan maksud pengkolonian dan sesaran di dalam kolam.

[2 *marks*]

(ii) Describe how the pond habitat changes until the primary forest is formed.
Huraikan bagaimanakah habitat kolam mengalami perubahan sehingga terbentuk hutan primer.

[8 *marks*]

(b)

FARMING IS A BUSINESS
PERTANIAN ADALAH SATU PERNIAGAAN

Vegetables planting activity is carried actively to increase the food supply and the economy of a country
Aktiviti penanaman sayur-sayuran aktif dilakukan untuk menambah bekalan makanan dan meningkatkan ekonomi negara.

This activity can reduce dependence supply of vegetables from abroad.
Aktiviti ini dapat mengurangkan kebergantungan bekalan sayur-sayuran dari negara luar.

To reduce the cost of draining, these activities are conducted near the pool
Untuk mengurangkan kos pengairan, aktiviti ini dijalankan berhampiran dengan kolam

Based on the above statement and situation, explain the effects may be occur in the pond within the next three years.
Berdasarkan pernyataan dan situasi di atas, Terangkan kesan yang mungkin berlaku di dalam kolam itu dalam tempoh tiga tahun akan datang.

[10 *marks*]

9. (a) Diagram 9.1 and Diagram 9.2 show the impact of human activities to the quality of natural environment.
Rajah 9.1 dan Rajah 9.2 menunjukkan impak aktiviti manusia ke atas kualiti alam semulajadi.

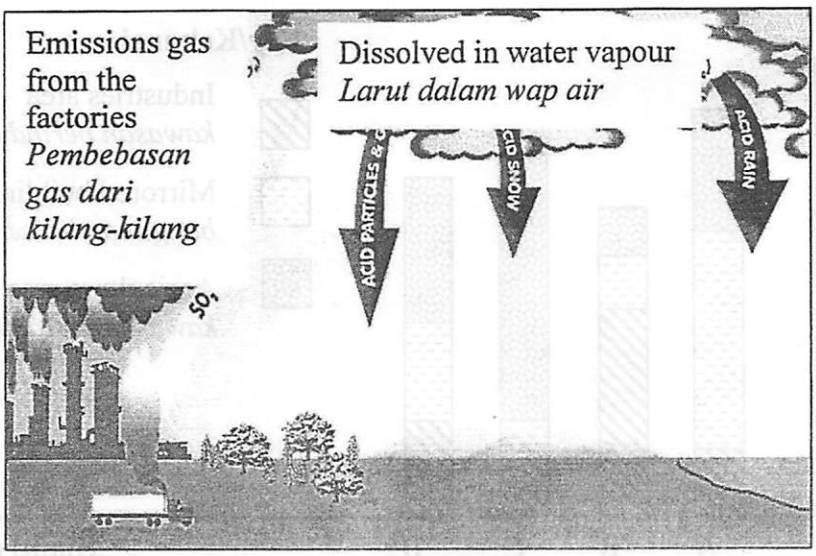


Diagram 9.1 // *Rajah 9.1*

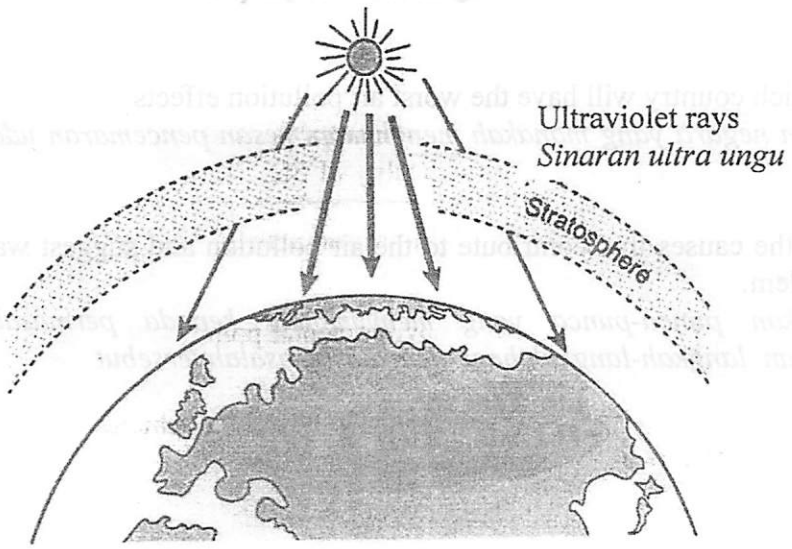


Diagram 9.2 // *Rajah 9.2*

Name the phenomena in Diagram 9.1 and 9.2. Explain the effects of each phenomenon on living things and ecosystem.

Namakan fenomena dalam Rajah 9.1 dan 9.2. Terangkan kesan-kesan setiap fenomena terhadap hidupan dan ekosistem.

[10 *marks*]

(b) Diagram 9.3 shows the number of industries area, mirrored building and agriculture area at four countries A, B, C and D.
Rajah 9.3 menunjukkan bilangan kawasan perindustrian, bangunan bercermin, dan kawasan pertanian, dalam empat buah negara A, B, C, dan D.

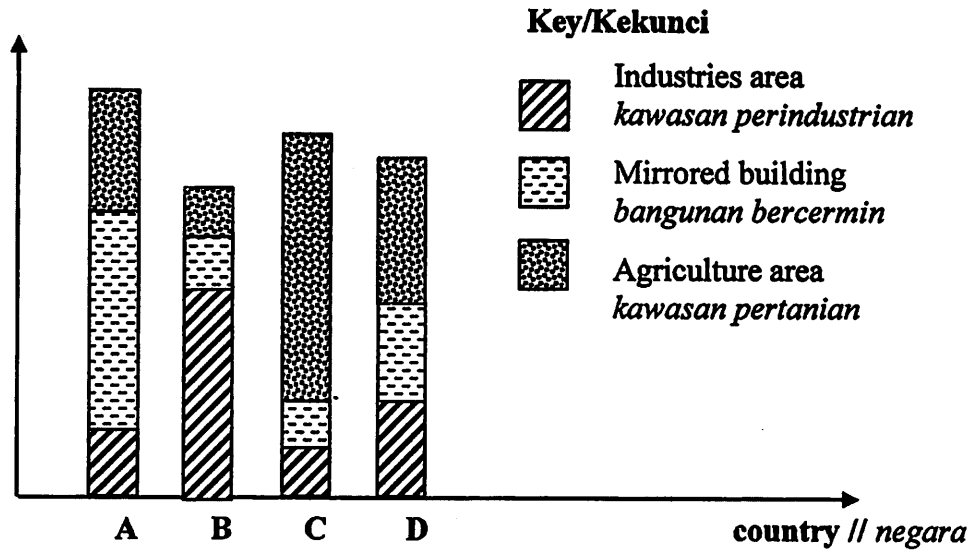


Diagram 9.3 // *Rajah 9.3*

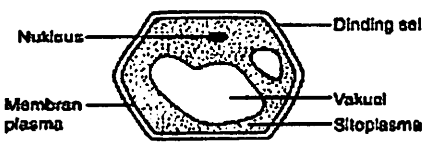
State which country will have the worst air pollution effects.
Nyatakan negara yang manakah menghadapi kesan pencemaran udara yang paling teruk.

Discuss the causes that contribute to the air pollution and suggest ways to overcome the problem.
Bincangkan punca-punca yang menyumbang kepada permasalahan itu dan cadangkan langkah-langkah bagi mengatasi masalah tersebut.

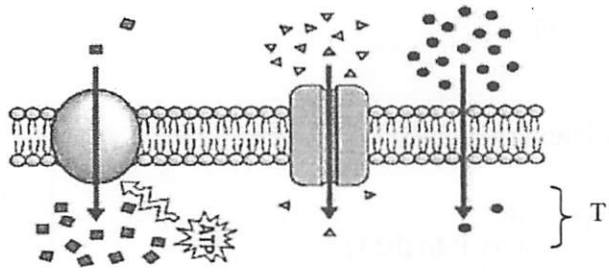
[10 *marks*]

END OF QUESTIONS

PERATURAN PEMARKAHAN

<table>
<tr><th>No.</th><th>Scoring criteria</th><th colspan="2">Marks</th></tr>
<tr><td>1(a)(i)</td><td>Able to name the structure P and Q correctly
Answer:
P: Rough endoplasmic reticulum
Q: Golgi apparatus</td><td>1
1</td><td>2</td></tr>
<tr><td>(a)(ii)</td><td>Able to describe the role of P and Q
Sample answer :
P1: ribosome at P synthesis protein
P2: protein then being transported by P to the Q
P3: Q modified protein into enzyme//Q packaged the enzyme/ modified protein</td><td>1
1
1</td><td>3</td></tr>
<tr><td>(b)(i)</td><td>Able to draw and label a diagram of epidermis cell
Answer:
 

Notes:
Diagram – 1m
Label – 1m</td><td></td><td>2</td></tr>
<tr><td>(b)(ii)</td><td>Able to state one difference between cheek cell and epidermis cell
Sample answer:
<table>
<tr><th>Cheek cell</th><th>Epidermis cell</th></tr>
<tr><td>Do not have cell wall</td><td>Have cell wall</td></tr>
<tr><td>Do not have vacuole</td><td>Have vacuole</td></tr>
</table>
Any one</td><td>1</td><td>1</td></tr>
<tr><td>(c)</td><td>Able to explain the effect of cell growth without R correctly
Sample answer:
P1: Cell cannot divide / mitosis / differentiate because
P2: Do not have gene / DNA (that control mitosis/differentiation)</td><td>1
1</td><td>2</td></tr>
<tr><td>(d)</td><td>Able to explain why meristem cell need more S
Sample answer:
P1: S is a mitochondria
P2: generate energy (by cellular respiration)
P3: (Meristematic) cell need a lot energy
P4: For mitosis/ cellular division.</td><td>1
1
1</td><td>Max
2</td></tr>
<tr><td></td><td>**Total**</td><td colspan="2">**12**</td></tr>
</table>

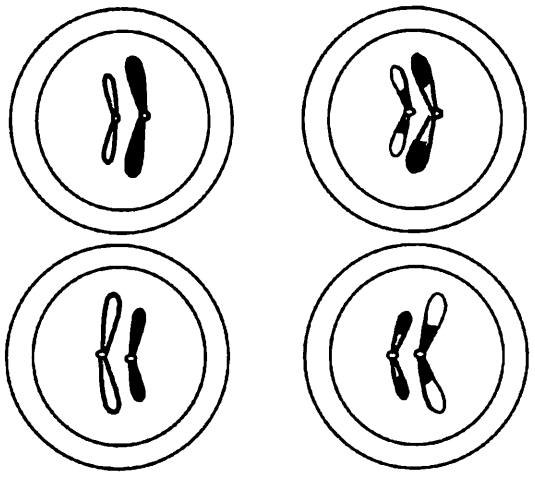
Num	SCORING CRITERIA	MARK	
2(a)(i)	*Able to name and label the major part that form the plasma membrane in Diagram 2.1.*  	1	1
2(a)(ii)	*Able to explain the role of the part labeled in (a)(i) for the movement of substance across plasma membrane.* F: T is phospholipid (bilayer) P1: Allow the molecules that can dissolve in lipid (lipid-soluble molecules) /Non-polar /uncharged molecules/Very small molecules P2: such as fatty acid and glycerol/ oxygen and carbon dioxide/water molecules. P3: to across the plasma membrane freely P4: by osmosis (for water) / simple diffusion P1 and P2 dependent	1 1 1 1 1	Max 3
2(b)	*Able to describe how the sodium ions are transported out the cell through P.* F: sodium ion // any suitable example P1: Movement (of sodium ion is) against the concentration gradient P2: It needs energy / ATP molecules P3: ATP molecules bind to one site of carrier protein P4: (At another site) carrier protein bind with sodium ions // any suitable example P5: Carrier protein changes its shape (to carry the sodium ions out of the cell) P6: through active transport	1 1 1 1 1 1 1	Max 3

2(c)	*Able to compare the process of the movement of substances across plasma membrane between Q and R.* <u>Similarity:</u> 1. Both of Q and R are passive transport 2. Energy is not required// No ATP/energy used 3. Down the concentration gradient / Substances moves from higher concentration to lower concentration 4. Occurs until reach dynamic equilibrium state. **Any 1** <u>Differences:</u>	1 1 1 1	

Q	R	
1. Fasilitated diffusion	1. Simple diffusion	1
2. Need the help of pore/carrier protein	2. No need any protein	1
3. Allow the movement of molecules which are not soluble in lipid (but soluble in water)	3. Allow the movement of molecules which are soluble in lipid	1
4. Example molecules that transported such as ions/nucleic acid/ amino acid/glucose.	4. Example molecules that transported such as small uncharged polar molecules /such as oxygen/carbon dioxide/water molecules//lipid-soluble molecules/ such as fatty acid /glycerol /vitamin A, D, E and K .	1

Any 2 — Max 3m

2(d)	*Able to explain what happens to the plant after immersion.* F1: Plant wilt/die P1: cyanide inhibit cellular respiration in (the root hair)cell P2: No energy/ATP will be generated/produced P3: Active transport cannot be occur to transport mineral salt P4: The root cell become hypotonic than the soil water P5: No diffusion of water molecules into the root cell by osmosis//Water molecules diffuse out from cell to soil water by osmosis. P6: Plasmolysis occurs//Plant cell flaccid//Cytoplasm <u>and</u> vacuole shrink//plasma membrane pulls away from the cell wall. Any 3	1 1 1 1 1 1 1	Max 3m
	Total	**12 Marks**	

No	Marking Scheme	Mark	
3(a)(i)	**Able to name stage.** *Answer* : Metaphase	 1	 **1**
3(a)(ii)	**Able to state two differences between chromosomal behaviour at the stage.** *Suggested Answer :* P1 - Chromosomes move to equator plane/ metaphase plate P2 - Chromosomes line up/ arranged at equator plane/ metaphase plate P3 - Chromosome/ Centromere attached/ hold on to the spindle fibre *Any two.*	 1 1 1	 **2**
3(b)	**Able to draw <u>one</u> daughter cell produced at the end of the meiotic division.**  *Notes:* Any **one** daughter cell with the correct combination of chromosome – D1 Correct drawing number of chromosome and size (one short and one long) – D2	 1 1	 **2**
3(c)(i)	**Able to name structure N** *Answer:* Centriole	 	
3(c)(ii)	**Able to state what happen to the structure M if structure N fails to function** *Suggested Answer:* P1 - Spindle fibre are not formed / cannot contract P2 - Structure M / chromosome cannot separate P3 - During anaphase *Any two*	 1 1 1	 **2**

<table>
<tr><td>3(d)(i)</td><td>Able to describe two differences of process Z

Suggested Answer:<table><tr><th>Species X</th><th>Species Y</th></tr><tr><td>Nucleus of <u>unfertilised</u> egg cell/ovum</td><td>Nucleus of somatic cell/ liver / example</td></tr><tr><td>Destroyed by ultraviolet rays</td><td>Removed/ taken out // place inside the egg cell/ovum</td></tr></table></td><td>1

1</td><td>2</td></tr>
<tr><td>3(d)(ii)</td><td>Able to name the species

Answer: Species Y</td><td>1</td><td>1</td></tr>
<tr><td>3(c)(iii)</td><td>Able to state the disadvantage of cloning

Suggested Answer:
E1: No variation
E2: Has same resistance to certain diseases
Any one.

TOTAL</td><td>1
1</td><td>1

12</td></tr>
</table>

<table>
<tr><th>Number</th><th>Scoring criteria</th><th colspan="2">Marks</th></tr>
<tr><td>4(a)(i)</td><td>Able to mark the types of digestive system of a goat
Answer: Ruminant</td><td>1</td><td>1</td></tr>
<tr><td>(a)(ii)</td><td>Able to name the part labelled A,B,C,D
Answer:
A : Omasum
B : Retikulum
C : Abomasum
D : Rumen
3 – 4 √=2m
1- 2 √=1m</td><td>2</td><td>2</td></tr>
<tr><td>(b)(i)</td><td>Able to name the enzyme produced by bacteria in the rumen
Answer: Cellulase</td><td>1</td><td>1</td></tr>
<tr><td>(b)(ii)</td><td>Able to state the function of enzyme that state in (b)(i)
Suggested answer:
To hydrolyse /breakdown/digest cellulose into glucose</td><td>1</td><td>1</td></tr>
<tr><td>(b)(iii)</td><td>Able to explain what happen when food enter the reticulum
Suggested answer:
P1: When food enter reticulum, cellulose is hydrolysed
P2: The content of the reticulum/cud is then regurgitated into the mouth to be throughly chewed again
P3: This process help to soften and break down cellulose, making it more accessible to further microbial action / reaction of enzymes</td><td>1
1
1</td><td>max 2</td></tr>
<tr><td>(c)</td><td>Able to state three differences between human and rodent digestive system
Suggested answer
<table>
<tr><th>Human</th><th>Rodent</th></tr>
<tr><td>Small caecum</td><td>Large caecum</td></tr>
<tr><td>Cannot digest cellulose</td><td>Can digest cellulose into simple sugar</td></tr>
<tr><td>Cellulase producing bacteria is absent</td><td>Cellulase producing bacteria is present</td></tr>
<tr><td>Food passes through the alimentary canal once</td><td>Food passes through the alimentary canal twice</td></tr>
</table></td><td>1
1
1
1</td><td>max 3</td></tr>
<tr><td>(d)</td><td>Able to explain why rabbit need to ingest their feaces
Suggested answer:
P1: In goat cellulose is hydrolysed in the rumen whereas in rabbit cellulose is hydrolysed in the caecum
P2: Therefore rabbit need to ingest the faeces pellet to recover the nutrients initially lost in their faeces
P3This allows the small intestine to absorb the nutrients</td><td>1
1
1</td><td>max 2</td></tr>
<tr><td></td><td>Total</td><td colspan="2">12</td></tr>
</table>

Num	SCORING CRITERIA	MARK	
5(a)	**Able to state two abiotic influence distribution population of plant in pond.** *Answer:* 1.light intensity 2. temperature	 1 1	 2
(b)	**Able to calculate the density of *Colocasia* sp. in the pond.** *Answer:* Density = Total number of individuals of species in all quadrat / Quadrat area X Num of quadrats = 28 / 4X 5 = 1.4 per meter square	 1 1	 2
(c)	**Able to explain one abiotic state in (a) influence distribution of *Colocasia sp.*** *Suggested answer:* F: Light intensity E1: more light energy absorb by chloroplast in *Colocasia* leaf E2: rate of photosynthesis high E3: cause growth rate high	 1 1 1 1	 max 3
(d)	**Able to effect of the activities on the plant pond.** *Suggested answer:* F1: water pond become toxic E1: damage the root plant in pond E2: decrease the rate of growth of plant Or F2: insecticide contain carcinogenic compound E1: lead to mutation in plant E2: due to gene alteration/ change in DNA	 1 1 1 1 1 1	 3
(e)	**Able to suggest suitable methods to overcome the condition of the pond for better distribution of plant.** *Suggested answer:* F1: used biological method/ prey and predator E1: using bird as predator eat prey/ grasshopper F2: using lime powder/ Calcium carbonate/ dolomite E2: neutralise acidic condition in pond	 1 1 1 1	 Max 2
	Total	**12**	

BAHAGIAN B

<table>
<tr><th>Num</th><th>Scoring Criterias</th><th>Marks</th><th>Remarks</th></tr>
<tr><td>6(a)</td><td>Able to name the reaction occurs in structure labeled P and Q and explain the differences between both reactions
Answer:
Reaction in P
F1: Light reaction occur (in P)
E1: P is grana
Reaction in Q
F2: Dark reaction occur (in Q)
E2: Q is stroma

Differences:
<table><tr><td>Reaction in P</td><td>Reaction in Q</td></tr><tr><td>F2. Requires light energy</td><td>Does not require light energy</td></tr><tr><td>E2: to breakdown/fotolysis of water molecules</td><td>Need atom H to reduce carbon dioxide</td></tr><tr><td>E3: to form ion H and ion OH</td><td>to form glucose and water</td></tr><tr><td>F3. Form ATP</td><td>Uses ATP</td></tr></table></td><td>1
1
1
1

1
1
1
1</td><td>max 6</td></tr>
<tr><td>6(b)</td><td>Able to explain the adaptation structure of the leaf

Suggested answer:
F1: Epidermis is transparent
E1: to allow sunlight to penetrate into the leaf.

F2: Cuticle layer is waxy (and water-proof)
E2: to prevent loss of water and to protect the leaf

F3: Cell X / Palisade cells are closely arranged and at right angles to the surface of the leaf.
E3: They also contain many chloroplasts
E4: receive / absorb / trap maximum sunlight

F4: Cell Y / Spongy mesophyll cells are loosely arranged and has large air space
E5: allow easy diffusion of water and carbon dioxide

F5: (lower) epidermis layer has stomata
E6: support photosynthesis by allowing exchange of gases

F6:Veins contain xylem and phloem
E7: to transport water and minerals
E8: to transport the products of photosynthesis / (dissolves) organic products</td><td>1
1
1
1
1
1
1
1
1
1
1
1
1
1
1</td><td>Max 8</td></tr>
</table>

6(c)	**Able to describe how the light intensity affect the rate of photosynthesis and the limiting factors involves** *Suggested answer:* P1: At low light intensity, rate of photosynthesis low P2: Increase light intensity will increase the rate of photosynthesis P3: until reach a maximum / saturated point / level P4: due to concentration of CO_2 become limiting factor P5: At extreme / very high light intensity, rate of photosynthesis decrease again P6: because enzyme in chloroplast denatured	 1 1 1 1 1 1	 Max 6
	TOTAL		**20**

No	Mark Scheme	Mark	
7(a)	**Able to explain adaptation of the respiratory structure of organism R prevents it from collapsing, when the air pressure drops.** *Suggested answer:* F1 spiracles have valves which can open and close E1 to allow air to go in and out of the body F2 trachea are lined with ring of chitin E2 chitin is strong to which prevent them collapse F3 air sac to assist the control of air pressure in the body E3 speed up movement of gases (to and from tissues during vigorous body movement)	 1 1 1 1 1 1	 max 4
7(b)	**Able to describe how the respiratory structures of organisma Q and R are adapted to increase the efficiency of gaseous exchange.** *Suggested answer:* <u>*Organisma Q/insect:*</u> P1 Each muscle cell in the body of the insect has one tracheole which can channel oxygen directly to the cell. P2 The tracheole has a thin wall which allows for easy diffusion of respiratory gases. P3 The tracheole consists of a moist layer so that respiratory gases can dissolve in it. P4 The large number of tracheoles also provides a large surface area for gaseous exchange. <u>*Organisma R/fish*</u> P1 numerous of filament and lamellae which increase the total surface area (for efficiency of gaseous exchange in fish) P2 membrane of gills is thin which allow diffusion of respiratory gases (into blood capillary) P3 The filament is supplied with (abundant) blood capillaries (for efficiency of gaseous exchange and) to transport respiratory gases P4 The filament is surrounded by water which enables the respiratory gases to dissolve easily.	 1 1 1 1 1 1 1 1	 Max 3 Max 3 6 m

7(c)	**Able to explain the similarities and differences of respiratory systems between organisms P and Q** *Suggested answer:* Similarities F1: a large surface area to volume E1:to maximise respiration gaseous exchange F2:cells lining the respiratory structures are thin. E2:to allows gas diffusion to take place efficiently F3:the surface of respiration structures are moist E3:to allow the respiration gases to dissolve in [note; F correct and E correct = 2 marks, F correct E incorrect = 1 mark, F incorrect E correct = 0 mark]	1 1 1 1 1 1	max 4
	Differences characteristic / P/human / Q/fish respiratory organ: lungs / gills — 1 respiratory structure: alveoli / Filament/lamellae — 1 Large surface area: Numerous alveoli / Numerous filament/lamellae — 1 respiratory openings: nostrils / Mouths and operculum — 1 Network of blood capillary: Alveoli are rich with blood capillary / Filament/lamella are rich with blood capillary — 1 Air passage: Nostrils > trachea > bronchi > bronchioles > alveoli. / Mouth > operculum cavity > gills and lamella > operculum — 1 Other structures which help in external respiration: Diaphragm, rib cage and intercostal muscle / Operculum and the muscular wall of floor buccal cavity — 1		max 6
			10m
		TOTAL	**20**

Num	Scoring Criterias	Marks	Remarks
8(a)(i)	**Able to state the meaning of colonization and succession in the pond** *Suggested answer:* F1: Colonization is the process by which living organisms conquer or occupy a new area that has never been occupied by other organisms. F2: Succession is the process of replacing a species by other species gradually and sequentially	1 1	2
8(a)(ii)	**Able to describe how the pond habitat changes until the primary forest is formed** *Suggested answer:* P1: The pioneer species in the pond is aquatic plants / phytoplankton/ algae/ submerged plants / *Hydrilla sp/, Cabomba sp./ Elodea sp.* P2: These plant have **fibrous roots** for penetrate deep into the soil to absorb nutrients and bind sand particles together. P3: When the pioneer species die and decompose, more organic nutrients/ humus are released into the pond. P4: The humus/ and soil which erode from the pond apron are deposited at the base of the pond and this causes the pond to become shallow. P5: The condition becomes unfavourable for submerged plants but more suitable for floating plants / duckweeds (*Lemna sp.) /* water hyacinths (*Eichornia sp.)* / lotus plants(*Nelumbium sp.*) P6: The floating plants spread to cover a large area of the water surface and prevent sunlight from reaching the submerged plants. P7: As a result, the submerged plants die because they can not photosynthesise. P8: The decomposed remains of submerged plants add more organic matter to the base of the pond. P9: As a result, the pond becomes more and more shallow which makes it unsuitable for the floating plants. P10: The floating plants are subsequently replaced by emergent /sedges /cattails. P11: The emergent plants grow from the edge of the pond towards the middle of the pond as the pond becomes more shallow. P12: The condition of the pond now becomes more favourable for land plants/small herbaceous weeds / *Ageratum conyzoides*, / *Euphorbia hirta / Oldentandia dichotoma.* P13: As time passes, the land becomes very much drier. P14: Land plants such as shrubs, bushes and woody plants become more numerous. P15: A jungle emerges and eventually turns into a tropical rainforest which is also known as **a climax community.**	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Max 8

8(b)	**Able to explain the effects may be occur in the pond within the next three years.** *Suggested answer:* P1: Excess fertilisers which has very high content of nitrates / phosphates dissolved in the rain water / flow into the pond P2 : enhances the growth of algae / causes algae to grow rapidly P3: which leads to eutrophication // algal bloom P4: the alga covers the surface of the pond and blocking sunlight to penetrate into the water P5: causes aquatic plant's rate of photosinthesis lower //lower the rate of photosynthesis of aquatic plants P6: less oxygen released P7: aquatic, organism's rate of respiration lower P8: (aquatic organism) competing with the algae for oxygen P9: leads to the death of aquatic organism P10: rate of decomposition by bacteria higher P11: less oxygen dissolved in water P12: BOD of water higher / water polluted	1 1 1 1 1 1 1 1 1 1 1 1	Max 8
	TOTAL		**20**

<table>
<tr><th>Num</th><th>Scoring Criterias</th><th>Marks</th><th>Remarks</th></tr>
<tr><td>9(a)</td><td>Able to name the phenomena and explain the effects on living things and ecosystem

Suggested answer:
<table>
<tr><th>Diagram 9.1</th><th>Diagram 9.2</th></tr>
<tr><td>F1: (The phenomenon is) acid rain</td><td>F2:(The phenomenon is) thinning/ depletion of ozone layer</td></tr>
<tr><td colspan="2">The effects</td></tr>
<tr><td>E1: Leaching of minerals// the soil become acidic</td><td>E5: Leaf cells and chlorophyll are damaged by ultraviolet rays// lower the rate of photosynthesis// reduce crop yield</td></tr>
<tr><td>E2: Increase acidity in the aquatic ecosystem// kill phytoplankton// destroyed photosynthetic tissues// accumulate insoluble Aluminium ions in lakes and rivers which kill aquatic organisms</td><td>E6: Ultraviolet rays kill microorganisms/ phytoplankton// destroy // disrupt the (marine) food chain/web</td></tr>
<tr><td>E3: Acidic soil releases ions of certain heavy metals/ contaminate the supply of drinking water// irritate the lungs/ make breathing difficult/ asthma/ bronchitis.</td><td>E7: Prolonged exposure to ultraviolet radiation lead to skin cancer// melanoma// cataract/ /weakened the immune system / /genetic disorder/disease</td></tr>
<tr><td>E4: Corrode metal railing/ bridges/ damage buildings/ statues/ automobiles/ structures made of stone/ metal/ historic buildings</td><td>E8: Greenhouse effect/ global warming// damage the eggs of certain amphibians// wind patterns change// climatic changes // extinction of organisms/flora and fauna</td></tr>
</table></td><td>1+1

1+1

1+1

1+1

1+1</td><td>Max 10</td></tr>
<tr><td>9(b)</td><td>Able to state which country will have the worst air pollution effects

Answer: Country B</td><td>1</td><td>1</td></tr>
</table>

	Able to discuss the causes that contribute to air pollutions and suggest ways to overcome the problem *Suggested answer:* C1 : Burning/combustion of fossil fuels in factories, power generator stations and vehicles C2 : release CO_2/ oxides of nitrogen/ oxides of sulphur/ acidic gases C3 : Open burning of rubbish/forest release a lot of carbon dioxide C4 : Deforestation causes less carbon dioxide to be absorbed by plants. C5 : Increase concentration of CO2 in atmosphere C6 : lead to greenhouse effect/global warming C7 : Smoke and dust from factories/ vehicle exhaust/ quarries/sawmill C8 : Motorized vehicle released lead compounds C9 : Usage of agrochemical substances/pesticides/ insecticides/herbicides C10 : Urbanisation **Any five** **Ways to overcome the problem:** P1 : Fitting smoke filters on chimneys of factories (to reduce the release of toxic gases/ oxides of nitrogen/ sulphur) // use a catalytic converter P2 : Use alternative energy // substitute fossil fuel with solar/ wind/hydro energy P3 : Stop open burning // Burning solid effluent/ rubbish in a burner/ incinerator P4 : Practice carpooling // hybrid car // P5 : Reduce/stop combustion of fossil fuel// use unleaded petrol P6 : Replanting // stop deforestation P7 : Law enforcement//educations **Any 4 marks**	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 10	Max 5 Max 4
	TOTAL		**20**