

# KERTAS MODEL SPM

**Kertas 1**  
**Paper 1**

**Skor**

**/140**

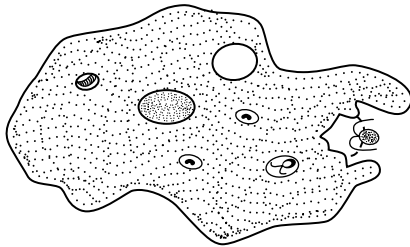
Satu jam lima belas minit  
*One hour fifteen minutes*  
[40 markah / 40 marks]

**Arahan:** Soalan 1 hingga Soalan 40 diikuti oleh empat pilihan jawapan, iaitu **A, B, C,** dan **D** atau tiga pilihan jawapan, iaitu **A, B** dan **C**. Pilih jawapan terbaik bagi setiap soalan.

**Instruction:** Question 1 to Question 40 are followed by four options, **A, B, C,** and **D** or three options, **A, B** and **C**. Choose the best option for each question.

1. Rajah 1 menunjukkan proses hidup yang dijalankan oleh *Amoeba* sp.

*Diagram 1 shows a life process that is carried out by Amoeba sp.*



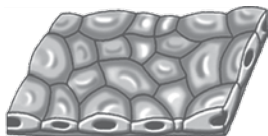
Rajah 1 / Diagram 1

Apakah proses hidup yang ditunjukkan?

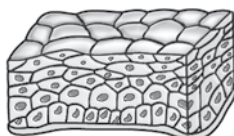
*What is the life process shown?*

- A** Pergerakan / *Movement*
  - B** Pemakanan / *Nutrition*
  - C** Respirasi / *Respiration*
  - D** Perkumuhan / *Excretion*
2. Antara yang berikut, yang manakah tisu epitelium yang melapisi duktus ginjal?  
*Which of the following is the epithelial tissue that lines the kidney duct?*

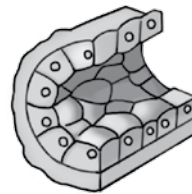
**A**



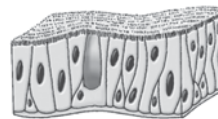
**B**



**C**



**D**



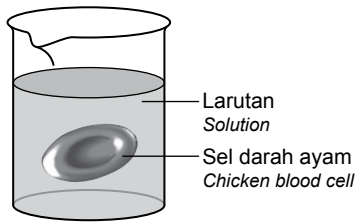
3. Satu sel tumbuhan direndam di dalam air suling. Antara yang berikut, yang manakah benar tentang pergerakan molekul air sebelum keseimbangan dinamik tercapai?

*A plant cell is immersed in distilled water. Which of the following is true about the movement of water before dynamic equilibrium is achieved?*

- A** Kadar air meresap masuk ke dalam sel adalah lebih tinggi daripada kadar air meresap keluar daripada sel.  
*The rate of water diffuses into the cell is higher than the rate of water diffuses out of the cell.*
- B** Kadar air meresap keluar daripada sel adalah lebih tinggi daripada kadar air meresap masuk ke dalam sel.  
*The rate of water diffuses out of the cell is higher than the rate of water diffuses into the cell.*
- C** Kadar air meresap masuk dan keluar daripada sel adalah sama.  
*The rate of water diffuses into and out of the cell is the same.*
- D** Tiada molekul air meresap masuk ke dalam sel atau meresap keluar daripada sel.  
*No water molecules diffuse into the cell or diffuse out from the cell.*

4. Rajah 2 menunjukkan satu eksperimen untuk mengkaji kesan kepekatan larutan yang berbeza terhadap sel darah ayam.

Diagram 2 shows an experiment to study the effect of different concentration solution on chicken blood cells.



Rajah 2 / Diagram 2

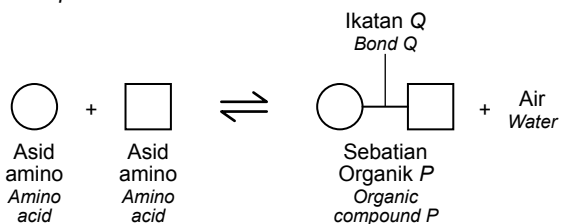
Antara pemerhatian berikut, yang manakah dipadankan dengan betul?

Which observation is correctly matched?

	Kepekatan larutan Concentration of solution	Pemerhatian Observation
A	Larutan natrium klorida 0.9% 0.9% sodium chloride solution	
B	Air suling Distilled water	
C	Larutan natrium klorida 1.5% 1.5% sodium chloride solution	

5. Rajah 3 menunjukkan pembentukan dan penguraian sebatian organik P.

Diagram 3 shows the formation and breakdown of organic compound P.



Rajah 3 / Diagram 3

Apakah sebatian organik P dan ikatan Q?

What are organic compound P and bond Q?

	Sebatian organik P Organic compound P	Ikatan Q Bond Q
A	Dipeptida Dipeptide	Peptida Peptide
B	Dipeptida Dipeptide	Dipeptida Dipeptide
C	Dipeptida Dipeptide	Glikosidik Glycosidic
D	Dipeptida Dipeptide	Ester Ester

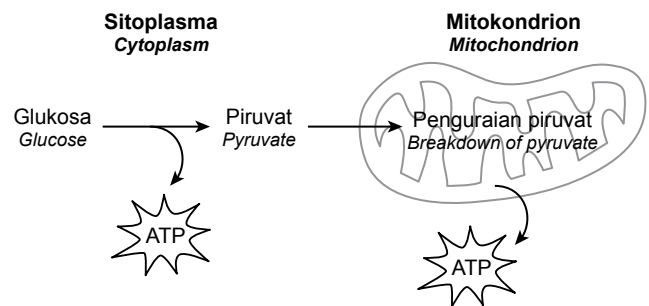
6. Antara pernyataan berikut, yang manakah benar mengenai lemak tak tepu?

Which of the following statements is true about unsaturated fats?

- A Tidak mengandungi ikatan ganda dua antara karbon dalam asid lemak  
Has no double bond between carbons in the fatty acids
- B Mempunyai takat lebur yang tinggi  
Has high melting point
- C Meningkatkan aras kolesterol dalam darah  
Increases the cholesterol level in the blood
- D Cecair pada suhu bilik  
Liquid at room temperature

7. Rajah 4 menunjukkan satu proses yang berlaku di dalam respirasi sel.

Diagram 4 shows a process that occurs in cellular respiration.



Rajah 4 / Diagram 4

Antara pernyataan berikut, yang manakah benar?

Which of the following statements is true?

- I Penguraian glukosa kepada piruvat tidak memerlukan oksigen  
The breakdown of glucose into pyruvate does not require oxygen
- II Penguraian glukosa kepada piruvat memerlukan oksigen  
The breakdown of glucose into pyruvate requires oxygen

III Jumlah keseluruhan ATP yang dihasilkan ialah 38

*Total number of ATP produced is 38*

IV Jumlah keseluruhan ATP yang dihasilkan ialah 2

*Total number of ATP produced is 2*

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

8. Maklumat berikut menunjukkan perlakuan kromosom ketika pembahagian sel.

*The following information shows the chromosomal behaviour during a cell division.*

- Kromosom homolog berpasangan melalui proses sinapsis  
*The pairing of homologous chromosomes through the process of synapsis*
- Pindah silang berlaku  
*Crossing over occurs*

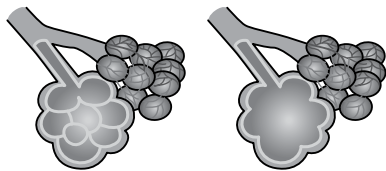
Apakah peringkat yang dinyatakan?

*What is the stage stated?*

- A Profasa / Prophase
- B Profasa I / Prophase I
- C Metafasa / Metaphase
- D Metafasa I / Metaphase I

9. Rajah 5 menunjukkan struktur alveolus yang normal dan alveolus yang mengalami emfisema.

*Diagram 5 shows the structure of a normal alveolus and alveolus with emphysema.*



Rajah 5 / Diagram 5

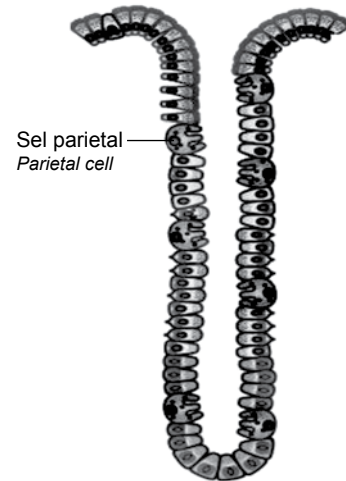
Apakah kesan emfisema kepada seseorang?

*What is the effect of emphysema to an individual?*

- A Keradangan pada dinding salur pernafasan  
*Inflammation of the walls of airways*
- B Kebarangkalian mendapat kanser paru meningkat  
*The probability of getting lung cancer increases*
- C Kecekapan dalam pertukaran gas berkurang  
*The efficiency in gaseous exchange reduces*
- D Kesukaran bernafas berkurang  
*Difficulty in breathing reduces*

10. Rajah 6 menunjukkan kelenjar gaster pada dinding perut manusia.

*Diagram 6 shows the gastric gland in the human stomach wall.*



Rajah 6 / Diagram 6

Apakah bahan yang dirembeskan oleh sel parietal?

*What is the substance secreted by the parietal cell?*

- A Mukus / Mucus
- B Pepsinogen / Pepsinogen
- C Asid hidroklorik / Hydrochloric acid

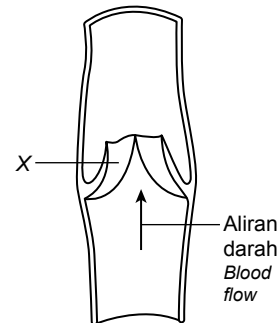
11. Apakah monomer yang terhasil daripada pencernaan protein?

*What is the monomer produced from the digestion of protein?*

- A Asid lemak / Fatty acids
- B Gliserol / Glycerol
- C Asid amino / Amino acid
- D Glukosa / Glucose

12. Rajah 7 menunjukkan salur darah manusia.

*Diagram 7 shows human blood vessel.*

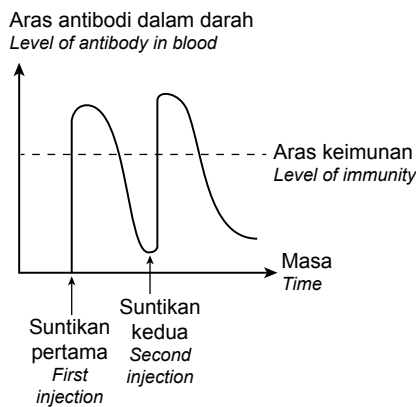


Rajah 7 / Diagram 7

Apakah kesan terhadap aliran darah jika X rosak?  
*What is the effect to the blood flow if X is damaged?*

- A** Darah mengalir balik  
*Blood flow backwards*
- B** Darah mengalir dalam satu arah  
*Blood flows in one direction*
- C** Aliran darah meningkat  
*Blood flow increases*
- D** Darah berhenti mengalir  
*Blood stop flowing*

**13.** Rajah 8 menunjukkan suatu graf aras antibodi dalam darah bagi sejenis keimunan.  
*Diagram 8 shows a graph of antibody level in blood for a type of immunity.*

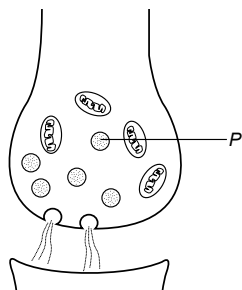


Rajah 8 / Diagram 8

Apakah jenis keimunan tersebut?  
*What is the type of immunity?*

- A** Keimunan aktif semula jadi  
*Natural active immunity*
- B** Keimunan pasif semula jadi  
*Natural passive immunity*
- C** Keimunan aktif buatan  
*Artificial active immunity*
- D** Keimunan pasif buatan  
*Artificial passive immunity*

**14.** Rajah 9 menunjukkan keratan rentas sinaps.  
*Diagram 9 shows a cross section of a synapse.*



Rajah 9 / Diagram 9

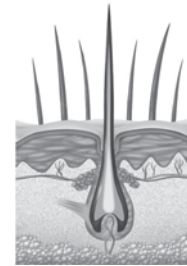
Apakah fungsi P?  
*What is the function of P?*

- A** Menghasilkan neurotransmitter  
*Produces neurotransmitter*
- B** Menghasilkan tenaga  
*Produces energy*
- C** Menghasilkan impuls  
*Produces impulses*
- D** Menghasilkan hormon  
*Produces hormones*

**15.** Reseptor deria manakah yang dipadankan dengan betul kepada rangsangannya?  
*Which sensory receptor is correctly matched to its stimulus?*

	<b>Reseptor deria</b> <i>Sensory receptor</i>	<b>Rangsangan</b> <i>Stimulus</i>
<b>A</b>	Mekanoreseptor <i>Mechanoreceptor</i>	Suhu <i>Temperature</i>
<b>B</b>	Fotoreseptor <i>Photoreceptor</i>	Bahan kimia <i>Chemical substances</i>
<b>C</b>	Nosiseptor <i>Nociceptor</i>	Kesakitan <i>Pain</i>
<b>D</b>	Baroreseptor <i>Baroreceptor</i>	Cahaya <i>Light</i>

**16.** Rajah 10 menunjukkan gerak balas kulit dalam persekitaran yang sejuk.  
*Diagram 10 shows the response of skin in cold surroundings.*



Rajah 10 / Diagram 10

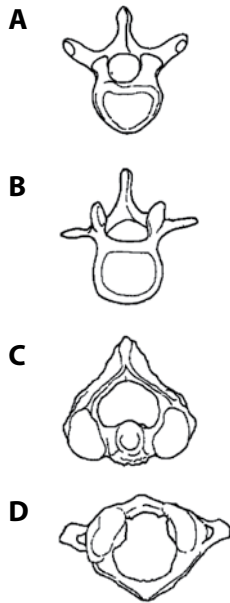
Apakah peranan Q?  
*What is the role of Q?*

- A** Untuk meningkatkan kadar metabolisme badan  
*To increase the rate of body metabolism*
- B** Untuk mengelakkan haba terbebas ke persekitaran  
*To prevent heat loss to the surrounding*
- C** Untuk membekalkan lebih banyak darah ke permukaan kulit  
*To provide more blood to the surface of the skin*
- D** Untuk menghasilkan lebih banyak peluh  
*To produce more sweat*



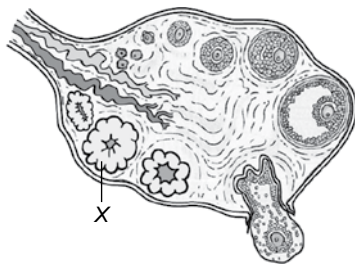
17. Antara yang berikut, yang manakah vertebra atlas?

Which of the following is an atlas vertebra?



18. Rajah 11 menunjukkan perkembangan folikel dalam ovari perempuan.

Diagram 11 shows the development of follicles in the female ovary.



Rajah 11 / Diagram 11

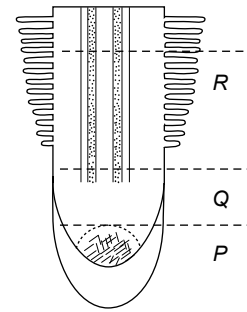
Apakah hormon yang dirembeskan oleh X?

What hormone is secreted by X?

- A** Progesteron  
Progesterone
- B** Estrogen  
Oestrogen
- C** Hormon peluteinan  
Luteinising hormone
- D** Hormon perangsang folikel  
Follicle stimulating hormone

19. Rajah 12 menunjukkan tiga zon pertumbuhan, P, Q dan R, pada hujung akar tumbuhan.

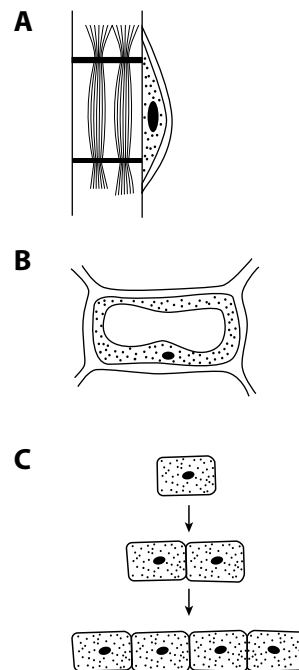
Diagram 12 shows three growth zones, P, Q and R, of the root tip of a plant.



Rajah 12 / Diagram 12

Sel manakah yang menunjukkan proses pertumbuhan pada zon Q?

Which cell shows the growth process in zone Q?



20. Apakah faktor yang menyebabkan pembukaan dan penutupan stoma?

What are the factors that lead to the opening and closing of the stoma?

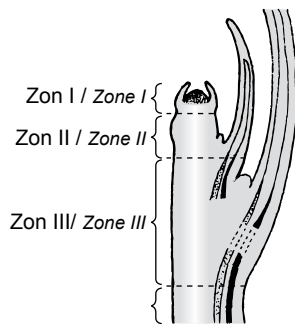
- I** Perbezaan dalam ketebalan dinding sel pengawal  
The difference in the thickness of the cell wall of the guard cells
- II** Kehadiran kloroplas yang banyak dalam sel pengawal  
Presence of abundant chloroplasts in the guard cells
- III** Pengambilan ion kalium oleh sel pengawal  
The uptake of potassium ions by the guard cells
- IV** Kepekatan sukrosa dalam sel pengawal  
Sucrose concentration in the guard cells

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

**21.** Apakah tisu yang terlibat dalam pemanjangan pucuk dan akar?  
*What are the tissues involved in the elongation of shoot and root?*

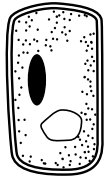
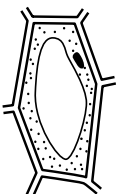

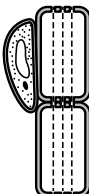
- A** Tisu meristem lateral  
*Lateral meristem tissues*
- B** Tisu meristem apeks  
*Apical meristem tissues*
- C** Tisu kambium gabus  
*Cork cambium tissues*

**22.** Rajah 12 menunjukkan tiga zon pertumbuhan pada hujung pucuk iaitu zon I, II dan III.  
*Diagram 12 shows three zones of growth, zones I, II and III.*



Rajah 12 / Diagram 12

Sel manakah yang terdapat di zon I?  
*Which is the cell found in zone I?*

- A** 
- B** 
- C** 
- D** 

**23.** Apakah kepentingan transpirasi kepada tumbuhan?  
*What is the significance of transpiration to plants?*

*What is the significance of transpiration to plants?*

- A** Mengangkut hasil fotosintesis  
*Transports photosynthetic products*
- B** Memastikan stoma terbuka  
*Ensure the stoma is always open*
- C** Menyejukkan tumbuhan  
*Cooling the plants*

**24.** Antara perbezaan antara fotosintesis dan respirasi sel, yang manakah benar?  
*Which of the following differences between photosynthesis and cellular respiration is correct?*

*Which of the following differences between photosynthesis and cellular respiration is correct?*

	<b>Fotosintesis</b> <i>Photosynthesis</i>	<b>Respirasi sel</b> <i>Cellular respiration</i>
<b>A</b>	Berlaku dalam mitokondria <i>Occurs in the mitochondria</i>	Berlaku dalam kloroplas <i>Occurs in the chloroplast</i>
<b>B</b>	Memerlukan cahaya <i>Requires light</i>	Tidak memerlukan cahaya <i>Does not require light</i>
<b>C</b>	Menggunakan glukosa dan oksigen <i>Uses glucose and oxygen</i>	Menghasilkan glukosa dan oksigen <i>Produces glucose and oxygen</i>
<b>D</b>	Menghasilkan karbon dioksida dan air <i>Produces carbon dioxide and water</i>	Menghasilkan glukosa dan oksigen <i>Produces glucose and oxygen</i>

**25.** Rajah 13 menunjukkan dua jenis penyesuaian tumbuhan, X dan Y, untuk mendapatkan nutrisi.  
*Diagram 13 shows two types of adaptations in plants, X and Y, to obtain nutrients.*

*Diagram 13 shows two types of adaptations in plants, X and Y, to obtain nutrients.*



X

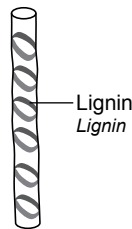
Y

Rajah 13 / Diagram 13

Apakah jenis tumbuhan X dan Y?  
*What are the types for plants X and Y?*

	X	Y
A	Parasit <i>Parasitic</i>	Karnivor <i>Carnivorous</i>
B	Epifit <i>Epiphytic</i>	Karnivor <i>Carnivorous</i>
C	Saprofit <i>Saprophytic</i>	Karnivor <i>Carnivorous</i>
D	Karnivor <i>Carnivorous</i>	Epifit <i>Epiphytic</i>

26. Rajah 14 menunjukkan sejenis tisu vaskular dalam tumbuhan.  
*Diagram 14 shows a type of vascular tissues in plants.*

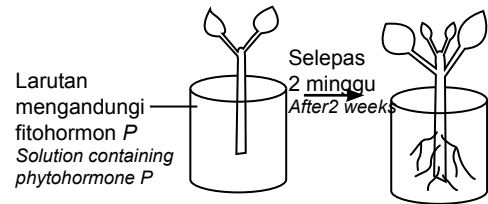


Rajah 14 / Diagram 14

Apakah fungsi lignin?  
*What is the function of lignin?*

- A Menghalang kehilangan air berlebihan  
*Prevents excess loss of water*
  - B Memberi sokongan mekanikal  
*Provides mechanical support*
  - C Membantu dalam fotosintesis  
*Aids in photosynthesis*
  - D Membantu menyerap air  
*Aids in water absorption*
27. Antara yang berikut, yang manakah benar tentang gutasi?  
*Which of the following is correct about guttation?*
- I Ia berlaku pada hari panas dan cerah.  
*It occurs during a hot and sunny day.*
  - II Ia berlaku pada waktu malam dan awal pagi.  
*It occurs during the night and early morning.*
  - III Ia disebabkan oleh tarikan transpirasi.  
*It is caused by transpirational pull.*
  - IV Ia disebabkan oleh tekanan akar.  
*It is caused by root pressure.*
- A I dan II / I and II
  - B I dan III / I and III
  - C II dan IV / II and IV
  - D III dan IV / III and IV

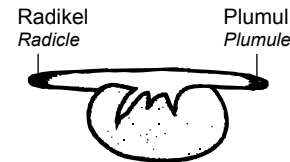
28. Rajah 15 menunjukkan satu keputusan eksperimen.  
*Diagram 15 shows the observation of an experiment.*



Rajah 15 / Diagram 15

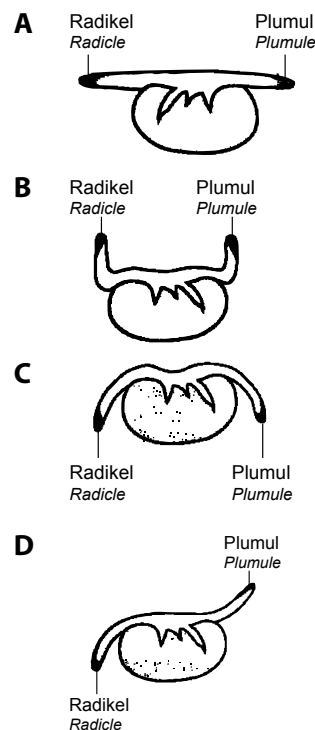
Apakah fitohormon P?  
*What is phytohormone P?*

- A Asid abisisik / *Abscisic acid*
  - B Giberelin / *Gibberelin*
  - C Etilena / *Ethylene*
  - D Auksin / *Auxin*
29. Rajah 16 menunjukkan biji benih yang diletakkan dalam keadaan mengufuk.  
*Diagram 16 shows a seedling placed in a horizontal position.*



Rajah 16 / Diagram 16

Apakah keadaan biji benih tersebut selepas 48 jam?  
*What is the condition of the seedling after 48 hours?*



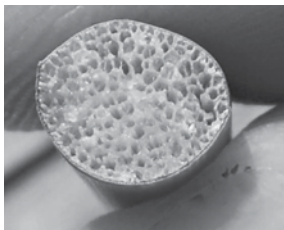
**30.** Antara yang berikut, yang manakah merupakan organ pembiakan jantan pada bunga?  
Which of the following is the male reproductive organ in a flower?

- A Stamen / *Stamen*
- B Stigma / *Stigma*
- C Ovul / *Ovule*
- D Stil / *Style*

**31.** Pernyataan yang manakah benar tentang persenyawaan ganda dua?  
Which statement is correct regarding double fertilisation?

- A Sel sinergid berkembang menjadi zigot  
*Synergid cell develops into a zygote*
- B Pembahagian zigot menghasilkan endosperma  
*The division of zygote give rise to the endosperm*
- C Satu nukleus gamet jantan bercantum dengan dua nukles sel antipodal membentuk zigot  
*One male gamete nucleus fuses with two nuclei of antipodal cells to form a zygote*
- D Satu nukleus gamet jantan bercantum dengan dua nukles kutub membentuk nukleus endosperma yang triploid  
*One male gamete nucleus fuses with two polar nuclei to form a triploid endosperm nucleus*

**32.** Rajah 17 menunjukkan keratan rentas batang bagi tumbuhan X.  
Diagram 17 shows a cross section of the stem of plant X.



Rajah 17 / Diagram 17

Apakah tumbuhan X?

What is plant X?

- A Pokok bunga kertas / *Bougainvillea*
- B Pokok bunga raya / *Hibiscus plant*
- C Pokok keladi bunting / *Water hyacinth*
- D Pokok bakau / *Mangrove tree*

**33.** Pernyataan yang manakah benar tentang virus?  
Which statement is correct about viruses?

- I Virus mempunyai sitoplasma dan nukleus  
*Viruses have cytoplasm and nucleus*

II Virus hanya membiak dalam sel hidup  
*Viruses only reproduce in living cells*

III Bahan genetik dikelilingi berada dalam nukleus

*The genetic material is in the nucleus*

IV Bahan genetik dikelilingi oleh kapsid

*The genetic material is surrounded by capsid*

- A I dan II / *I and II*
- B I dan III / *I and III*
- C II dan IV / *II and IV*
- D III dan IV / *III and IV*

**34.** Organisma yang manakah berada pada aras trof pertama dalam piramid nombor?  
Which organisms is at the first trophic level in the pyramid of numbers?

*Which organisms is at the first trophic level in the pyramid of numbers?*

- A Helang / *Eagle*
- B Tumbuhan / *Plants*
- C Tikus / *Mouse*
- D Ular / *Snake*

**35.** Antara yang berikut, yang manakah merupakan kesan pemanasan global?  
Which of the following is the effect of global warming?

*Which of the following is the effect of global warming?*

- A Populasi manusia bertambah  
*Human population increases*
- B Perubahan iklim  
*Climatic changes*
- C Eutrofikasi  
*Eutrophication*
- D Letusan gunung berapi  
*Volcanic eruption*

**36.** Berdasarkan keputusan eksperimen berikut, sampel air yang manakah paling tercemar?  
Based on the result of the experiment below, which water sample is the most polluted?

*Based on the result of the experiment below, which water sample is the most polluted?*

Sampel air <i>Water sample</i>	Masa yang diambil untuk melunturkan warna larutan metilena biru (jam) <i>Time taken to decolourise methylene blue solution (hour)</i>
A	P 5
B	Q 4.5

<b>C</b>	R	0.5
<b>D</b>	S	3.0

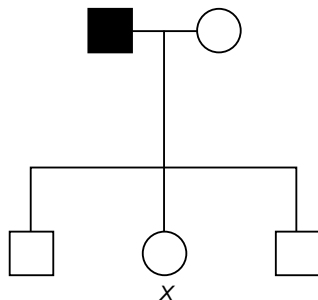
**37.** Ciri warna bunga dikawal oleh sepasang alel, R dan r. Apakah genotip anak yang mungkin terhasil daripada kacukan antara induk homozigot dominan dengan induk homozigot resesif?

*The characteristic for the colour of flower is controlled by a pair of alleles, R and r. What are the possible genotypes of offspring from a cross between a homozygous dominant parent and a homozygous recessive parent?*

- A** 100% Rr
- B** 100% RR
- C** 50% RR, 50% Rr
- D** 75% Rr, 25% rr

**38.** Rajah 18 menunjukkan pewarisan buta warna dalam satu keluarga.

*Diagram 18 shows the inheritance of colour blindness in a family.*



Rajah 18 / Diagram 18

Jika X berkahwin dengan seorang yang buta warna, apakah kebarangkalian anak perempuannya akan menghidap buta warna?

*If X marries a colour blind man, what is the probability that her daughter will inherit the colour blindness?*

- A** 0%
- B** 25%
- C** 50%
- D** 75%

**39.** Ali menghidap penyakit talasemia. Apakah penyebab penyakit ini?

*Ali has thalassaemia. What is the cause of this disease?*

- A** Perubahan pada struktur kromosom  
*A change in the structure of chromosome*
- B** Perubahan pada bilangan kromosom  
*A change in the number of chromosome*
- C** Perubahan pada bilangan bes dalam gen  
*A change in the number of bases in a gene*
- D** Perubahan pada jujukan bes dalam gen  
*A change in the sequence of bases in a gene*

**40.** Antara enzim berikut, yang manakah enzim yang diperlukan untuk menghasilkan DNA rekombinan?

*Which of the following enzymes are required to produce recombinant DNA?*

- I** DNA ligase  
*DNA ligase*
  - II** DNA polimerase  
*DNA polymerase*
  - III** Enzim pembatasan  
*Restriction enzyme*
  - IV** RNA polimerase  
*RNA polymerase*
- A** I dan II / I and II
  - B** I dan III / I and III
  - C** II dan IV / II and IV
  - D** III dan IV / III and IV



**Kertas 2**

**Paper 2**

Dua jam tiga puluh minit

*Two hour thirty minutes*

**Bahagian A**

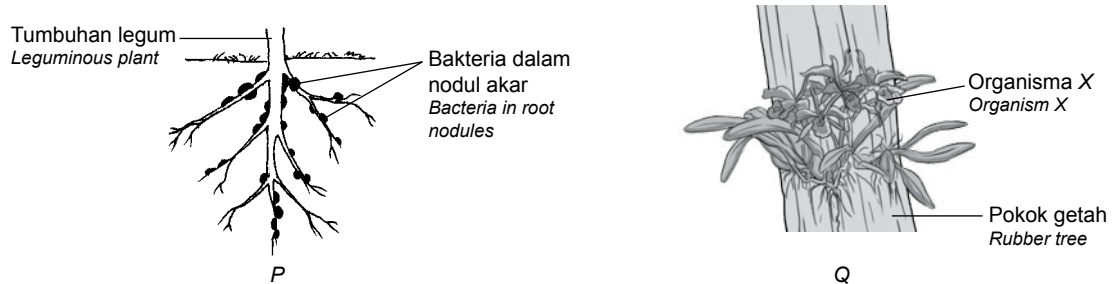
**Section A**

[60 markah / 60 marks]

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

1. Rajah 1 menunjukkan dua jenis interaksi antara organisma.

*Diagram 1 shows two types of interactions between organisms.*



Rajah 1 / *Diagram 1*

(a) (i) Nyatakan nama jenis interaksi yang diwakili oleh P dan Q.  
*State the names of the type of interaction represented by P and Q.*

P: \_\_\_\_\_

Q: \_\_\_\_\_

[2 markah / 2 marks]

(ii) Terangkan jenis interaksi yang diwakili oleh P.  
*Explain the type of interaction represented by P.*

\_\_\_\_\_ [1 markah / 1 mark]

(b) (i) Nyatakan jenis tumbuhan berdasarkan penyesuaian nutrisi bagi organisma X.  
*State the type of plant based on the nutritional adaptation of organism X.*

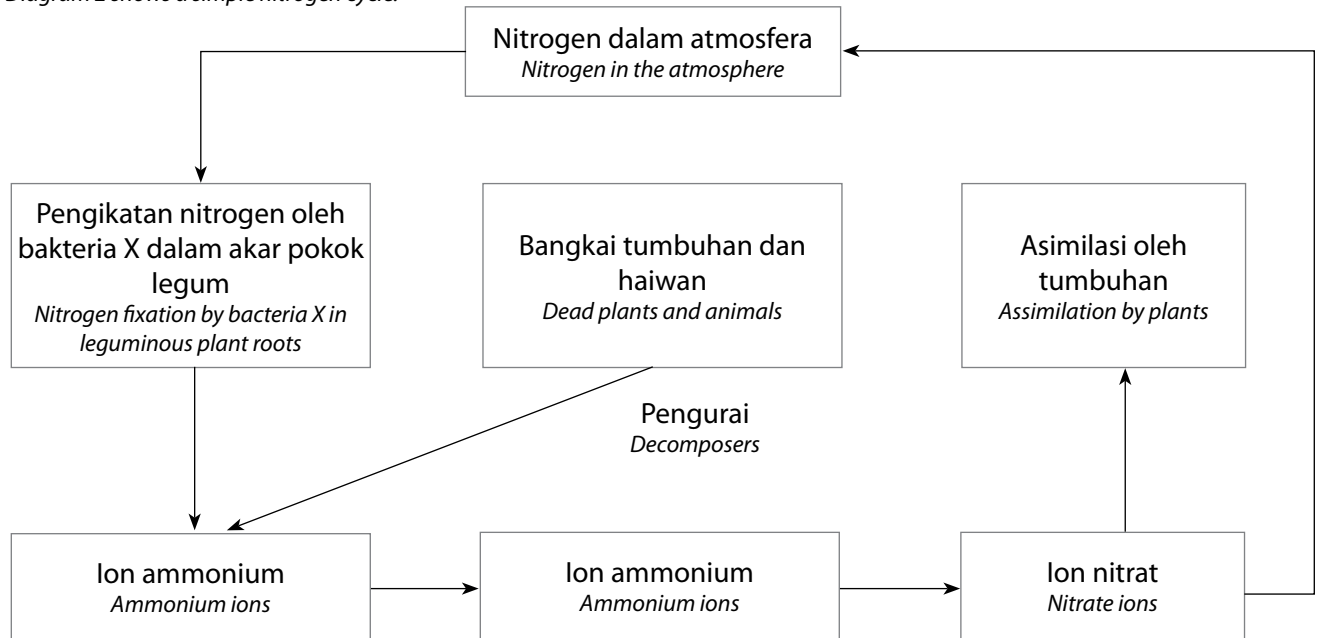
\_\_\_\_\_ [1 markah / 1 mark]

(ii) Pokok getah yang ditumpangangi oleh organisma X mati. Terangkan apa akan berlaku kepada organisma X.  
*The rubber tree where organism X live dies. Explain what will happen to organism X.*

\_\_\_\_\_ [2 markah / 2 marks]

2. Rajah 2 menunjukkan suatu kitar nitrogen ringkas.

Diagram 2 shows a simple nitrogen cycle.



Rajah 2 / Diagram 2

- (a) (i) Namakan bakteria X.  
Name bacteria X.

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[1 markah / 1 mark]

- (ii) Terangkan jenis interaksi yang wujud antara bakteria X dengan akar pokok legum.  
Explain the interaction that exists between bacteria X and the leguminous plant roots.

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[2 markah / 2 marks]

- (b) (i) Namakan sejenis mikroorganisma yang bertindak sebagai pengurai.  
Name a type of microorganism which acts as decomposer.

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[1 markah / 1 mark]

- (ii) Terangkan peranan pengurai dalam kitar nitrogen.  
Explain the role of decomposer in the nitrogen cycle.

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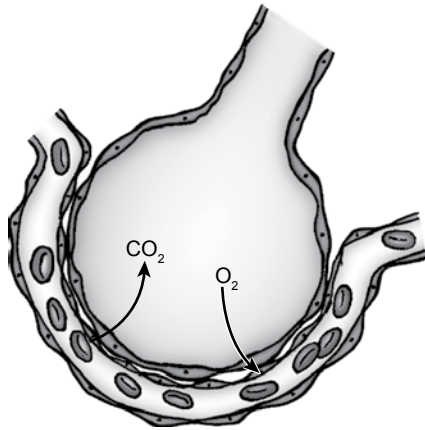


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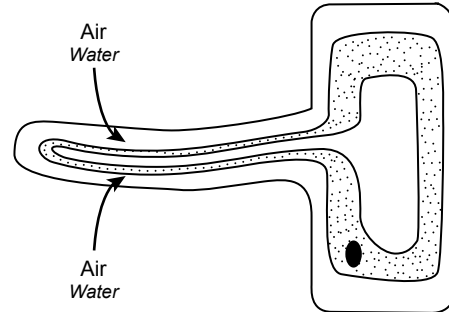
[2 markah / 2 marks]

3. Rajah 3.1(a) dan Rajah 3.1(b) menunjukkan dua jenis pengangkutan pasif bagi pergerakan molekul merentasi membran plasma.

Diagrams 3.1(a) and 3.1(b) show two types of passive transport for the movement of molecules across the plasma membrane.



Rajah 3.1(a) / Diagram 3.1(a)



Rajah 3.1(b) / Diagram 3.1(b)

(a) (i) Nyatakan jenis pergerakan yang ditunjukkan dalam Rajah 3.1(a) dan 3.1(b).  
State the types of movement shown in Diagram 3.1(a) and 3.1(b).

Rajah 3.1(a) / Diagram 3.1(a): \_\_\_\_\_

Rajah 3.1(b) / Diagram 3.1(b): \_\_\_\_\_

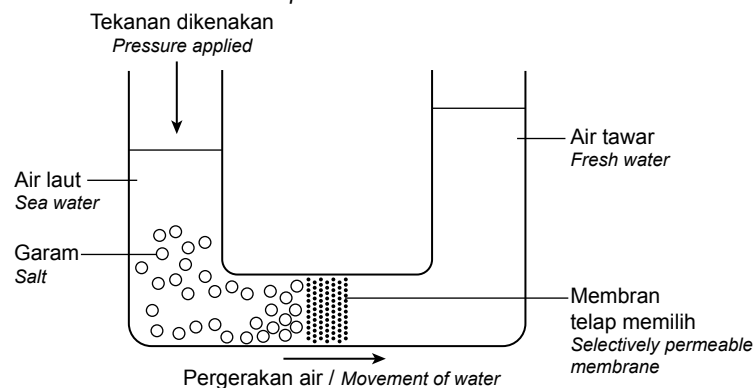
[2 markah / 2 marks]

(ii) Berikan **satu** persamaan bagi pergerakan yang dinyatakan dalam 3(a)(i).  
Give **one** similarity for the movements stated in 3(a)(i).

\_\_\_\_\_

[1 markah / 1 mark]

(b) Rajah 3.2 menunjukkan satu proses yang digunakan dalam penyahgaraman air laut.  
Diagram 3.2 shows a process used in the desalination process.



Rajah 3.2 / Diagram 3.2

(i) Namakan proses yang ditunjukkan dalam Rajah 3.2.  
Name the process shown in Diagram 3.2.

\_\_\_\_\_

[1 markah / 1 mark]

- (ii) Nyatakan tujuan menjalankan proses yang dinamakan dalam 3(b)(i).  
*State the purpose of carrying out the process named in 3(b)(i).*

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[1 markah / 1 mark]

- (iii) Berdasarkan Rajah 3.2, terangkan proses tersebut.  
*Based on Diagram 3.2, explain the process.*

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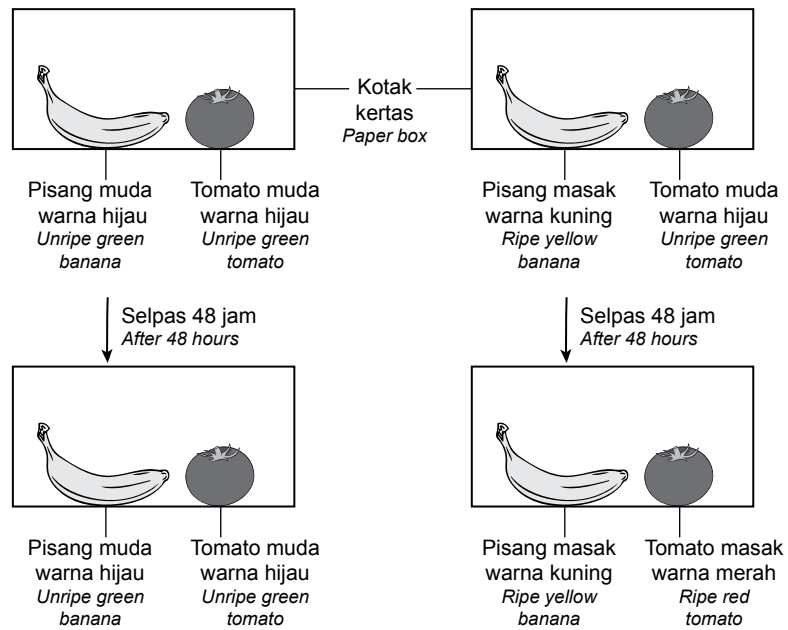


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[2 markah / 2 marks]

4. Rajah 4.1(a) dan Rajah 4.1(b) menunjukkan satu eksperimen yang dijalankan untuk mengkaji kesan fitohormon X ke atas pemasakan buah-buahan.

*Diagrams 4.1(a) and 4.1(b) show an experiment to study the effect of phytohormone X on fruits ripening.*



Rajah 4.1(a) / Diagram 4.1(a)

Rajah 4.1(b) / Diagram 4.1(b)

- (a) (i) Namakan fitohormon X.  
*Name phytohormone X.*

---

[1 markah / 1 mark]

- (ii) Hubung kaitkan tindakan fitohormon X dengan keputusan eksperimen.  
*Relate the action of phytohormone X with the results of the experiment.*

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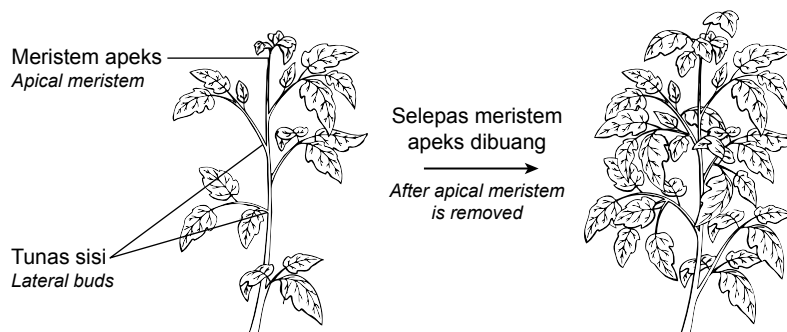
[2 markah / 2 marks]

- (iii) Bagi memelihara kesegaran buah-buahan yang dihantar ke lokasi yang jauh, buah-buahan tersebut biasanya dihantar dalam keadaan yang belum masak. Terangkan bagaimana buah-buahan ini boleh masak apabila tiba ke destinasi.

*In order to protect the freshness of fruit that is being shipped long distances, the fruit is often shipped in an unripened state. Explain how the fruits can be ripened when they reached their destinations.*

[2 markah / 2 marks]

- (b) (i) Rajah 4.2 menunjukkan peranan auksin dalam pembentukan tumbuhan yang rendah dan rimbun. Diagram 4.2 shows the role of auxin in promoting the growth of low-lying and bushy plants.



Rajah 4.2 / Diagram 4.2

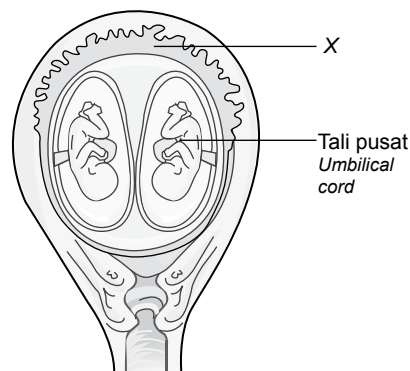
Seorang tukang kebun mencantas hujung pucuk pokok hiasan tanamannya untuk menjadikan pokok itu rimbun. Berdasarkan Rajah 4.2, terangkan bagaimana perlakuan tukang kebun itu menjadikan pokok rimbun.

*A gardener removed the shoot of his outdoor plants to make the plants bushy. Based on Diagram 4.2, explain how the behaviour of the gardener makes the plants bushy.*

[2 markah / 2 marks]

5. Rajah 5 menunjukkan perkembangan anak kembar dalam manusia.

*Diagram 5 shows the development of twins in human.*



Rajah 5 / Diagram 5



- (a) (i) Apakah jenis kembar yang ditunjukkan dalam Rajah 5?  
*What is the type of twins shown in Diagram 5?*

[1 markah / 1 mark]

- (ii) Jelaskan jawapan anda di 5(a)(i).  
*Explain your answer in 5(a)(i).*

[1 markah / 1 mark]

- (iii) Terangkan apa yang akan berlaku jika pasangan kembar yang dinamakan di 5(a)(i) tidak terpisah dengan lengkap.  
*Explain what will happen if the twins named in 5(a)(i) is incompletely separated.*

[2 markah / 2 marks]

- (b) (i) Namakan struktur berlabel X.  
*Name the structure labelled X.*

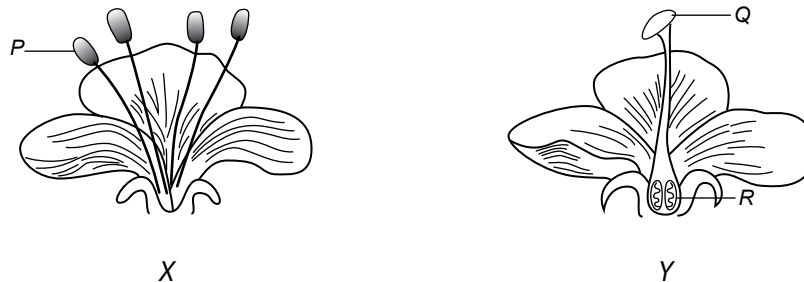
[1 markah / 1 mark]

- (ii) Pada minggu ke-16, seorang ibu hamil dijangkiti penyakit. Penyakit itu menyebabkan struktur X tidak berfungsi. Terangkan apa yang akan berlaku kepada kehamilan tersebut.  
*At week 16th, a pregnant woman is infected with a disease. The disease causes X to stop functioning. Explain what happens to the pregnancy.*

[3 markah / 3 marks]

6. Rajah 6 menunjukkan keratan rentas dua bunga, X dan Y, yang diambil dari dua pokok yang berasal dari spesies yang sama.

*Diagram 6 shows the longitudinal section of two flowers, X and Y, taken from two trees of the same species.*



Rajah 6 / Diagram 6

- (a) (i) Berdasarkan Rajah 1, kenal pasti yang mana bunga betina dan yang mana bunga jantan.  
Based on Diagram 1, identify which is a female flower and which is a male flower.

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[2 markah / 2 marks]

- (ii) Justifikasikan jawapan anda di 1(a)(i).  
Justify your answer in 1(a)(i).

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[1 markah / 1 mark]

- (b) (i) Namakan struktur P dan Q.  
Name structure P and Q.

P: \_\_\_\_\_

Q: \_\_\_\_\_

[2 markah / 2 marks]

- (ii) Terangkan apa yang akan berlaku jika kandungan di dalam struktur P dipindahkan ke atas struktur Q.  
Explain what happens if the content in structure P is transferred to structure Q.

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[3 markah / 3 marks]

7. Jadual 7 menunjukkan pengelasan hierarki taksonomi bagi nyamuk aedes.  
Table 7 shows the hierarchical taxonomic classification of an aedes mosquito.

Peringkat/Level	Takson/Taxon
Domain/ Domain	Eukarya
Alam/ Kingdom	Animalia
Filum/ Phylum	Arthropoda
Kelas/ Class	Insecta
Order/ Order	Diptera
Famili/ Family	Culicidae
Genus/ Genus	Aedes
Spesies/ Species	aegypti

Jadual 7 / Table 7



Rajah 7 / Diagram 7

- (a) Berikan dua ciri alam yang diduduki oleh nyamuk aedes. / Give two characteristics of the aedes mosquito kingdom.
1. \_\_\_\_\_
  2. \_\_\_\_\_

[2 markah / 2 marks]

- (b) (i) Berdasarkan Jadual 7, apakah nama saintifik bagi nyamuk aedes?  
Based on Table 7, what is the scientific name of the aedes mosquito?

\_\_\_\_\_ [1 markah / 1 mark]

- (ii) Dengan menggunakan jawapan anda di 7(b)(i), terangkan sistem tatanama binomial yang diperkenalkan oleh Carolus Linnaeus.  
Using yours answer in 7(b)(i), explain the binomial nomenclature system proposed by Carolus Linnaeus.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

[3 markah / 3 marks]

- (c) Nyamuk aedes merupakan suatu vektor yang membawa patogen.  
*Aedes mosquito is a vector which transmits pathogen.*

- (i) Berikan dua cara patogen boleh menyebabkan penyakit kepada manusia.  
Give two ways how pathogens can cause diseases to humans.

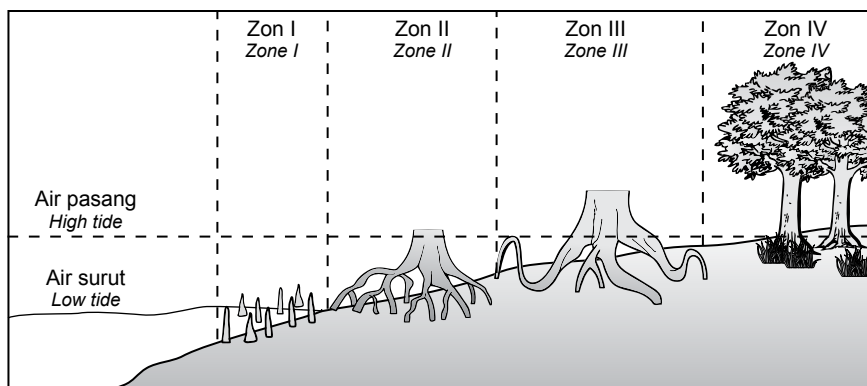
1. \_\_\_\_\_
2. \_\_\_\_\_

[2 markah / 2 marks]

- (ii) Namakan patogen yang dibawa oleh nyamuk aedes.  
Name the pathogen transmitted by the aedes mosquito.

\_\_\_\_\_ [1 markah / 1 mark]

8. Rajah 8 menunjukkan zon yang terdapat di paya bakau.  
Diagram 8 shows the zones in the mangrove swamps.



Rajah 8 / Diagram 8

(a) (i) Namakan spesies pokok bakau yang hidup di zon I, II dan III.

*Name the species of mangrove trees that live in zones I, II and III.*

Zon/ Zone I : \_\_\_\_\_

Zon/ Zone II : \_\_\_\_\_

Zon/ Zone III : \_\_\_\_\_

[3 markah / 3 marks]

(ii) Terangkan ciri penyesuaian akar bagi spesies pokok bakau di zon I.

*Explain the adaptive features of the mangrove tree roots in zone I.*

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[2 markah / 2 marks]

(b) Jika kawasan paya bakau itu tidak diganggu oleh aktiviti manusia dalam masa 100 tahun, namakan sejenis tumbuhan yang boleh didapati di zon IV. Terangkan jawapan anda.

*If the mangrove swamp is undisturbed by human activities for about 100 years, name a type of a common plant that can be found in zone IV. Explain your answer.*

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[2 markah / 2 marks]

(c) Berikan dua sebab mengapa tumbuhan darat lain tidak boleh hidup di kawasan paya bakau.

*Give two reasons why other terrestrial plants are not able to live in the mangrove swamp.*

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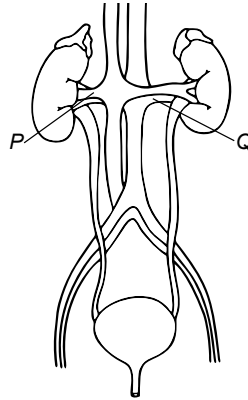
[2 markah / 2 marks]

**Bahagian B / Section B**

[20 markah / 20 marks]

Jawab mana-mana **satu** soalan daripada bahagian ini.  
 Answer any **one** question from this section.

9. (a) Rajah 9.1 menunjukkan sistem urinari manusia. / Diagram 9.1 shows the human urinary system.



Rajah 9.1 / Diagram 9.1

Namakan salur darah P dan salur darah Q. Nyatakan fungsi kedua-dua salur darah.  
 Name blood vessels P and Q. State the function for both blood vessels.

[4 markah / 4 marks]

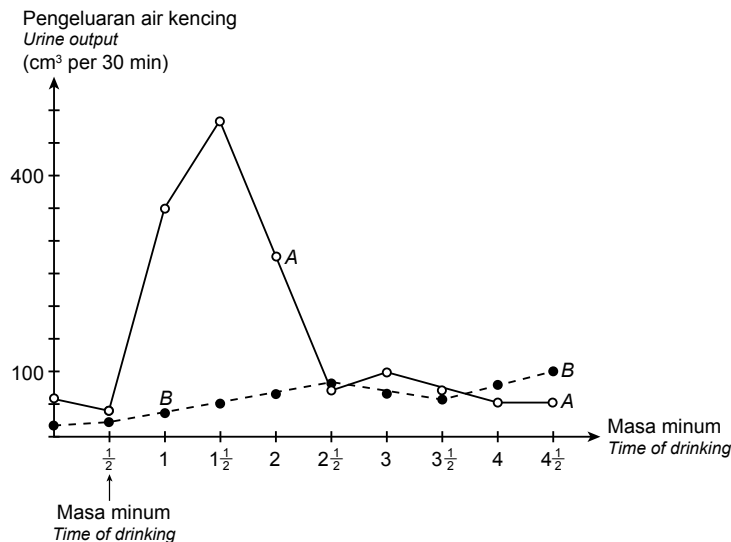
- (b) Batu karang boleh terbentuk dalam ginjal bagi sesetengah individu. Terangkan tiga cara untuk mengelakkan pembentukan batu karang.

Kidney stones may develop in certain individuals. Explain three ways to prevent the development of kidney stones.

[7 markah / 7 marks]

- (c) Satu eksperimen telah dijalankan ke atas seorang lelaki yang mempunyai ginjal yang sihat. Rajah 9.2 menunjukkan dua lengkung, A dan B, yang mewakili kesan pengeluaran air kencing selepas lelaki tersebut meminum 1 liter air dan selepas meminum 1 liter larutan natrium klorida 0.9% masing-masing.

An experiment was carried out on a man with healthy kidneys. Diagram 9.2 shows two curves, A and B, which represent the effects on urine output after the man drank 1 litre of water and 1 litre of 0.9% sodium chloride solution respectively.



Rajah 9.2 / Diagram 9.2



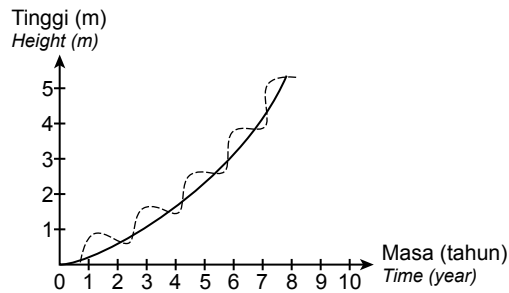
- (i) Lengkung yang manakah, A atau B, menunjukkan kesan selepas meminum 1 liter air? Jelaskan jawapan anda.  
Which curves, A or B, shows the effect of drinking 1 litre of water? Explain your answer.

[3 markah / 3 marks]

- (ii) Terangkan mekanisme suap balik negatif yang berlaku selepas meminum 1 liter air.  
Explain the negative feedback mechanism that occur after drinking 1 litre of water.

[6 markah / 6 marks]

10. (a) Rajah 10.1 menunjukkan lengkung pertumbuhan bagi tumbuhan saka.  
Diagram 10.1 shows the growth curve of a perennial plant.

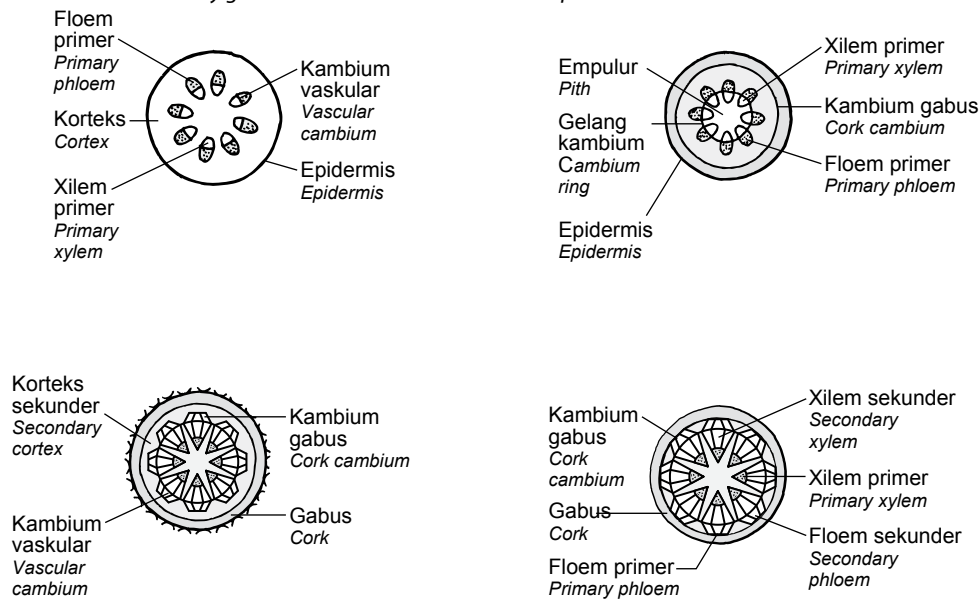


Rajah 10.1 / Diagram 10.1

- Terangkan corak pertumbuhan bagi tumbuhan itu.  
Explain the growth pattern of the plant.

[4 markah / 4 marks]

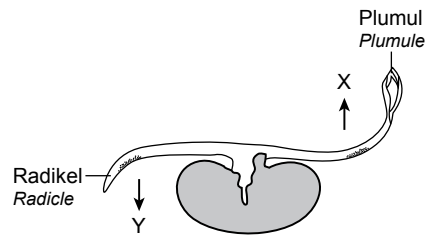
- (b) Rajah 10.2 menunjukkan pertumbuhan sekunder yang berlaku dalam batang tumbuhan.  
Diagram 10.2 shows the secondary growth that occurs in the stem of a plant.



Rajah 10.2 / Diagram 10.2

- Berdasarkan Rajah 10.2, terangkan bagaimana pertumbuhan sekunder berlaku untuk menambahkan diameter batang.  
Based on Diagram 10.2, explain how secondary growth occurs to increase the diameter of the stem.

- (c) Rajah 10.3 menunjukkan arah pertumbuhan plumul dan radikel biji benih yang diletakkan secara mendatar semasa percambahan.  
 Diagram 10.3 shows the direction of growth of the plumule and the radicle of a seedling which is placed in a horizontal position during germination.



Rajah 10.3 / Diagram 10.3

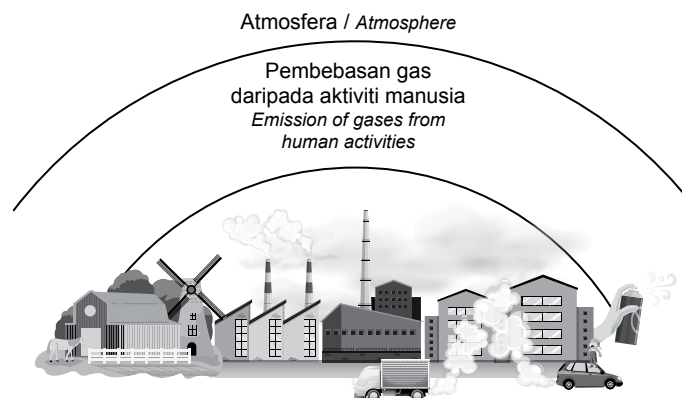
- (i) Nyatakan jenis gerak balas oleh plumul dan radikel. Terangkan kepentingan gerak balas tersebut kepada tumbuhan itu pada habitat semula jadi.  
 State the type of response of the plumule and the radicle. Explain the importance of the responses to the plant in their natural habitat.
- [4 markah / 4 marks]
- (ii) Berdasarkan Rajah 10.1, huraikan mengapa plumul tumbuh ke arah X dan radikel tumbuh ke arah Y.  
 Based on Diagram 10.1, explain why the plumule grows towards direction X and the radicle grows towards direction Y.
- [6 markah / 6 marks]

### Bahagian C / Section C

[20 markah / 20 marks]

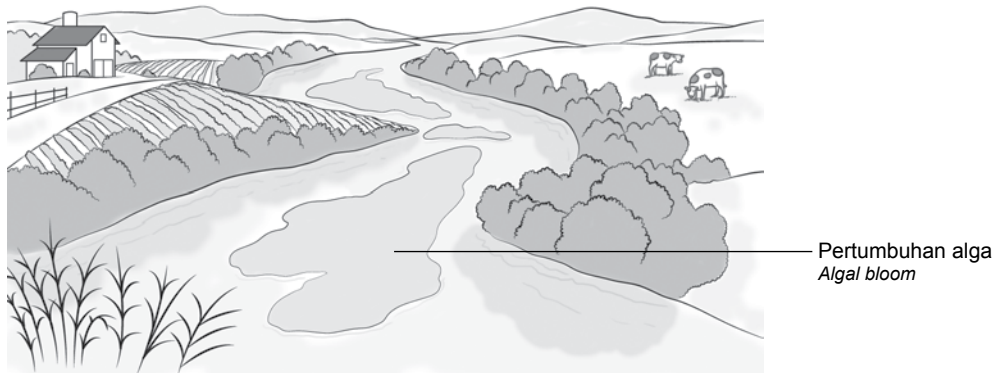
Jawab **semua** soalan dalam bahagian ini / Answer **all** questions in this section.

11. Rajah 11.1 menunjukkan satu fenomena alam sekitar yang sering menjadi isu perbincangan.  
 Diagram 11.1 shows an environmental phenomenon which has always been a topic of discussion.



Rajah 11.1 / Diagram 11.1

- (a) (i) Nyatakan nama fenomena ini.  
*State the name of this phenomenon.* [1 markah / 1 mark]
- (ii) Berdasarkan Rajah 11.1, terangkan bagaimana aktiviti-aktiviti manusia yang ditunjukkan boleh menyebabkan peningkatan suhu bumi.  
*Based on Diagram 11.1, explain how the human activities shown can cause the increase the earth's temperature.* [5 markah / 5 marks]
- (iii) Cadangkan **empat** cara untuk mengurangkan kesan fenomena yang dinamakan di 11(a)(i).  
*Suggest **four** ways to decrease the effect of the phenomenon named in 11(a)(i).* [4 markah / 4 marks]
- (b) Rajah 11.2 menunjukkan satu keadaan yang berlaku di sebatang sungai yang terletak di antara kawasan pertanian dan penternakan.  
*Diagram 11.2 shows a condition of a river which is located between the agricultural and cattle farming areas.*



Rajah 11.2 / Diagram 11.2

- (i) Terangkan punca berlakunya keadaan tersebut.  
*Explain the reason that caused the condition.* [4 markah / 4 marks]
- (ii) Cadangkan **satu** kaedah yang boleh digunakan untuk merawat sungai tersebut. Ramalkan kesan kaedah yang digunakan ke atas kandungan oksigen terlarut dalam sungai tersebut dalam tempoh 6 bulan akan datang. Terangkan ramalan anda.  
*Suggest **one** method that can be used to treat the river. Predict the dissolved oxygen content in the river in the next 6 months. Explain your prediction.* [6 markah / 6 marks]