

SPM EXAMINATION PAPER 2011

PAPER 1

Time: 1 hour 15 minutes

This question paper consists of 50 questions. Answer all questions.
Kertas soalan ini mengandungi 50 soalan. Jawab semua soalan.

- 1 Diagram 1 shows an *Amoeba* sp.
Rajah 1 menunjukkan *Amoeba* sp.

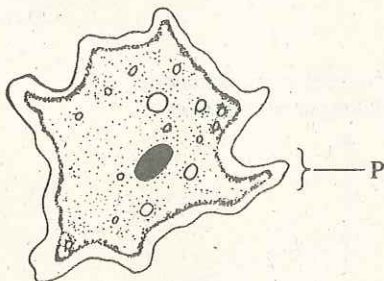


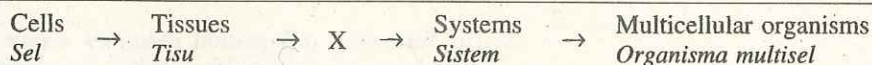
Diagram 1
Rajah 1

What is structure P?

Apakah struktur P?

- A Nucleus
Nukleus
- B Cytoplasm
Sitoplasma
- C Pseudopodium
Pseudopodium
- D Contractile vacuole
Vakuol mengecut

- 2 The following shows the cell organisation in multicellular organisms.
Maklumat berikut menunjukkan organisasi sel di dalam organisma multisel.

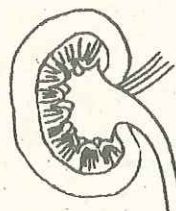


Which is an example of X?
Manakah suatu contoh bagi X?

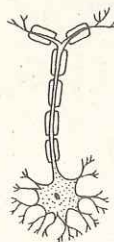
A



C



B



D



- 3 Which organelle is found abundantly in muscle tissue?

Organel manakah yang terdapat dengan banyak dalam tisu otot?

A Ribosome

Ribosom

B Mitochondria

Mitokondrion

C Golgi apparatus

Jasad Golgi

D Smooth endoplasmic reticulum

Jalinan endoplasma licin

- 4 An athlete intends to take part in the marathon event in the Olympic Games. He begins his endurance training on day X.

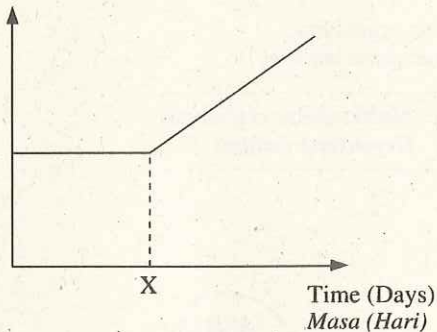
Which graph shows the changes in the number of mitochondria in the muscle cells of his legs?

Seorang atlet bercadang untuk mengambil bahagian dalam acara maraton di Sukan Olimpik. Dia me-

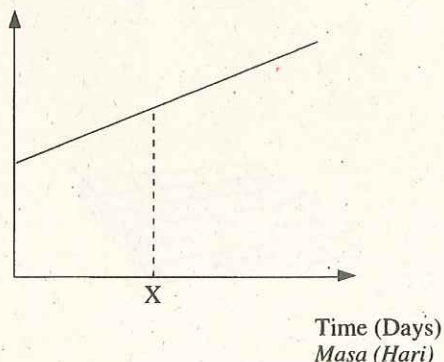
mulakan latihan daya ketahanan pada hari X. Graf manakah yang menunjukkan perubahan

bilangan mitokondrion dalam sel otot kakinya?

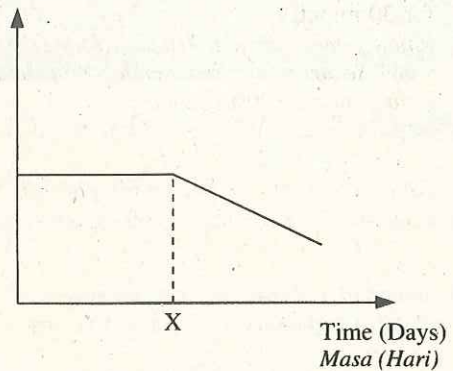
A Number of mitochondria
Bilangan mitokondrion



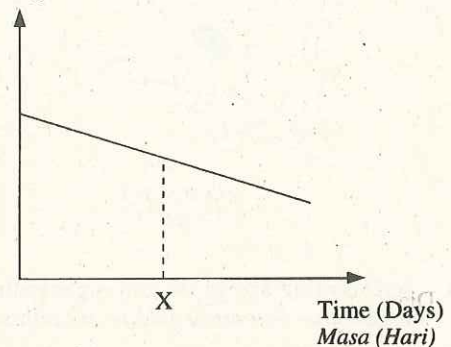
B Number of mitochondria
Bilangan mitokondrion



C Number of mitochondria
Bilangan mitokondrion



D Number of mitochondria
Bilangan mitokondrion



- 5 The following information describes a type of movement of molecules across the plasma membrane.

Maklumat berikut menerangkan sejenis pergerakan molekul-molekul merentasi membran plasma.

Molecules move down the concentration gradient with the help of carrier proteins and do not require energy

Molekul bergerak mengikut kecerunan kepekatan dengan bantuan protein pembawa dan tidak memerlukan tenaga

What type of movement is this?

Apakah jenis pergerakan ini?

A Osmosis

Osmosis

B Active transport

Pengangkutan aktif

C Simple diffusion

Resapan berbantu

D Facilitated diffusion

Resapan berbantu

- 6 Diagram 2 shows the condition of a fresh plant cell that was first immersed in 20% sucrose solution for 30 minutes and then in distilled water for 30 minutes.

Rajah 2 menunjukkan keadaan satu sel tumbuhan yang segar yang mula-mula direndam dalam larutan sukrosa 20% selama 30 minit dan kemudian direndam dalam air suling selama 30 minit.

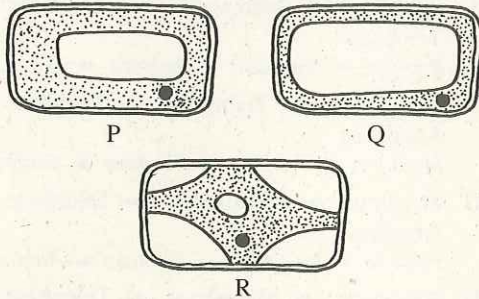


Diagram 2
Rajah 2

Which is the correct sequence of the changes in the cell?

Urutan manakah yang betul bagi perubahan di dalam sel itu?

- A $P \rightarrow R \rightarrow Q$ C $P \rightarrow Q \rightarrow R$
B $Q \rightarrow P \rightarrow R$ D $Q \rightarrow R \rightarrow P$

- 7 Diagram 3 is a graph which shows the percentage of spinach cells plasmolysed when immersed in sucrose solution with different concentration.

Rajah 3 ialah graf yang menunjukkan peratusan sel bayam yang mengalami plasmolisis apabila direndam di dalam larutan sukrosa yang berbeza kepekatan.

% cells plasmolysed

% sel yang mengalami plasmolisis

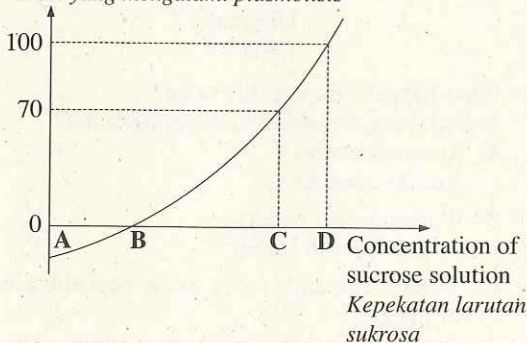


Diagram 3
Rajah 3

Which concentration of sucrose solution, A, B, C or D, is isotonic to spinach cells?

Antara kepekatan larutan sukrosa, A, B, C dan D, yang manakah isotonik pada sel bayam?

- 8 A gardener planted a herbaceous plant which is non-woody plant in a pot with soil taken from the mangrove swamp.

After a few days he found that the plant wilted. What should be done to prevent the plant from wilting?

Seorang tukang kebun menanam tumbuhan herba yang merupakan tumbuhan tidak berkayu di dalam pasu dengan menggunakan tanah dari kawasan paya bakau. Selepas beberapa hari, dia mendapati tumbuhan itu layu.

Apakah yang harus dilakukan untuk mengelakkan tumbuhan itu daripada menjadi layu?

- A Aerate the soil by digging
Mengudarakan tanah dengan menggembur
B Add fertiliser to the soil
Menambah baja ke dalam tanah
C Add water to the soil
Menambah air ke dalam tanah
D Add more soil in the pot
Menambah lebih banyak tanah ke dalam pasu

- 9 Diagram 4 shows the structure of a protein molecule.

Rajah 4 menunjukkan struktur molekul protein.

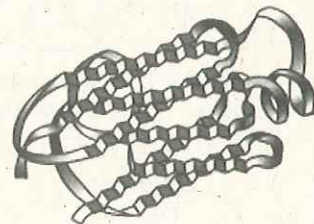


Diagram 4
Rajah 4

Which is the level of organisation of this protein?

Apakah aras organisasi protein ini?

- A Primary C Tertiary
Primer Tertier
B Secondary D Quaternary
Sekunder Kuartener

- 10 Which of the following is a polysaccharide?
Antara yang berikut, yang manakah polisakarida?

- A Cellulose
Selulosa
B Fructose
Fruktosa
C Sukrose
Sukrosa
D Glucose
Glukosa

- 11 Diagram 5 shows two shirts, P and Q, that were stained with butter. The shirts were washed with washing powder that contains enzyme X at different temperatures.

Rajah 5 menunjukkan dua helai baju, P dan Q, yang dikotori oleh mentega. Baju-baju tersebut dicuci dengan serbuk pencuci yang mengandungi enzim X pada suhu yang berbeza.

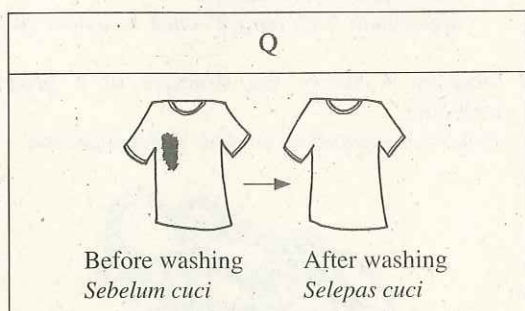
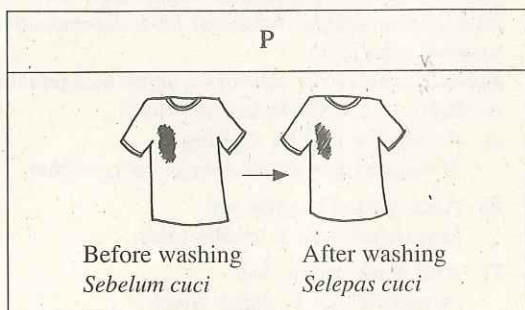


Diagram 5
Rajah 5

What is enzyme X and the possible temperatures that were used for P and Q?

Apakah enzim X dan suhu yang mungkin telah digunakan untuk P dan Q?

	Enzyme X Enzim X	Temperature for P (°C) Suhu untuk P (°C)	Temperature for Q (°C) Suhu untuk Q (°C)
A	Lipase Lipase	10	35
B	Amylase Amilase	10	35
C	Lipase Lipase	35	10
D	Amylase Amilase	35	10

- 12 What is the phase for the synthesis and replication of DNA?

Apakah fasa untuk sintesis dan replikasi DNA?

- A G₁ C G₂
B S D M

- 13 Which sequence of mitosis is correct?

Urutan mitosis manakah yang betul?

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

- 14 Diagram 6 shows Anaphase II of meiosis in an animal cell.

Rajah 6 menunjukkan Anafasa II meiosis dalam suatu sel haiwan.

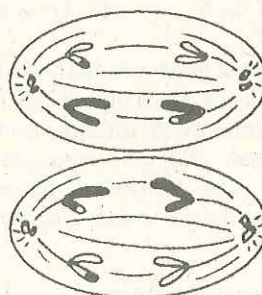


Diagram 6
Rajah 6

What happens during this stage?

Apakah yang berlaku semasa peringkat ini?

- A Synapsis occurs
Berlaku sinapsis
B Crossing over occurs
Berlaku pindah silang
C Sister chromatids move to the opposite poles of the cell
Pasangan kromatid bergerak ke kutub sel yang bertentangan
D Homologous chromosomes move to the opposite poles of the cell
Kromosom homolog bergerak ke kutub sel yang bertentangan

- 15** A boy's diet is deficient in iron.
Seorang budak lelaki kekurangan zat besi dalam pemakanannya.
- What is the condition that he might suffer from if this diet is prolonged?
Apakah keadaan yang akan dialami sekiranya diet ini berpanjangan?
- | | |
|----------------------------------|--|
| A Ricket
<i>Riket</i> | C Anaemia
<i>Anemia</i> |
| B Scurvy
<i>Skurvi</i> | D Beri-beri
<i>Beri-beri</i> |
- 16** Which class of food is digested in the mouth?
Kelas makanan manakah yang dicernakan di dalam mulut?
- | | |
|---|--------------------------------|
| A Carbohydrate
<i>Karbohidrat</i> | C Lipid
<i>Lipid</i> |
| B Protein
<i>Protein</i> | D Fibre
<i>Serat</i> |
- 17** What is the monomer produced from the digestion of protein?
Apakah monomer yang terhasil daripada pencernaan protein?
- | | |
|--------------------------------------|--|
| A Glucose
<i>Glukosa</i> | C Fatty acid
<i>Asid lemak</i> |
| B Glycerol
<i>Gliserol</i> | D Amino acid
<i>Asid amino</i> |
- 18** A farmer discovered a new banana species after several cross-pollination. He wants to increase the number of banana plants for commercial purposes.
Which technique is suitable to be used?
Seorang petani menemui sejenis spesies pisang yang baru selepas beberapa kali melakukan pendebungaan kacuk. Dia ingin menambahkan bilangan pokok pisang untuk dikomersialkan. Teknik manakah yang sesuai digunakan?
- | | |
|---|---|
| A Aeroponic
<i>Aeroponik</i> | C Direct seeding
<i>Tabur terus</i> |
| B Hydroponics
<i>Hidroponik</i> | D Tissue culture
<i>Kultur tisú</i> |
- 19** What is the main substrate of cellular respiration?
Apakah substrat utama bagi respirasi sel?
- | | |
|--------------------------------------|--|
| A Sucrose
<i>Sukrosa</i> | C Glucose
<i>Glukosa</i> |
| B Fructose
<i>Fruktosa</i> | D Galactose
<i>Galaktosa</i> |
- 20** How does fish maximise the efficiency of gaseous exchange?
Bagaimanakah ikan memaksimakan kecekapan pertukaran gas?
- A** The closing of mouth and operculum
Penutupan mulut dan operkulum
- B** The opening of mouth and operculum
Pembukaan mulut dan operkulum
- C** The opposite direction of water and blood flow through the gills
Arah pengaliran air dan darah yang bertentangan melalui insang
- D** The same direction of water and blood flow through the gills
Arah pengaliran air dan darah yang sama melalui insang
- 21** Diagram 7 shows the graph of the relationship between absorption and release of carbon dioxide and light intensity.
Rajah 7 menunjukkan graf hubungan antara penyerapan dan pembebasan karbon dioksida dengan keamatan cahaya.

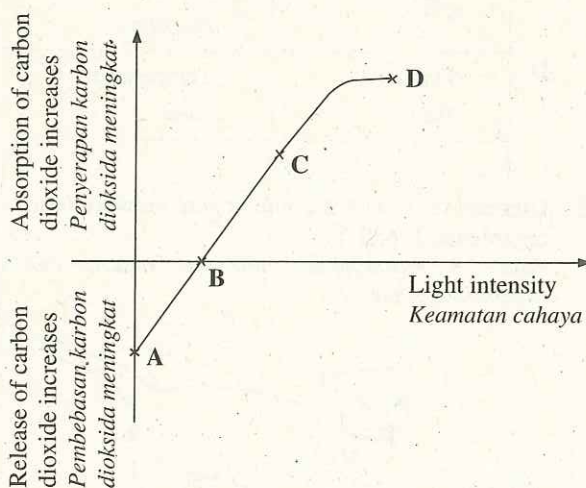


Diagram 7
Rajah 7

At which point, A, B, C or D, is the absorption of carbon dioxide equals to the release of carbon dioxide?

Pada titik manakah, A, B, C dan D, penyerapan karbon dioksida sama dengan pembebasan karbon dioksida?

- 22 What happen if alveoli are torn and punctured?
Apakah yang berlaku jika alveolus koyak dan bocor?

A Gasping
Tercungap-cungap
B Sneezing
Bersin
C Shivering
Menggigil
D Swallowing
Menelan

- 23 Which is the correct biotic and abiotic factors in a pond ecosystem?

Faktor biotik dan abiotik manakah yang betul di dalam ekosistem kolam?

	Biotic factor Faktor biotik	Abiotic factor Faktor abiotik
A	Hydrilla Hydrilla	Fish Ikan
B	Temperature Suhu	pH
C	pH	Hydrilla Hydrilla
D	Fish Ikan	Temperature Suhu

- 24 Diagram 8 shows an interaction between two organisms, X and Y.

Rajah 8 menunjukkan interaksi antara dua organisma, X dan Y.

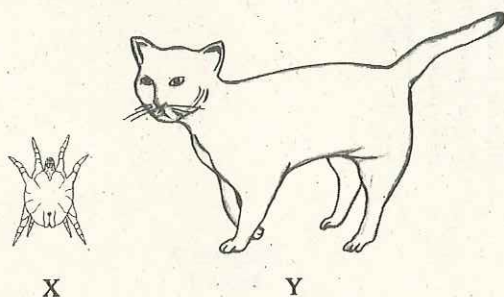


Diagram 8
Rajah 8

What is the relationship between X and Y?
Apakah hubungan antara X dan Y?

	X	Y
A	Commensal Komensal	Host Perumah
B	Endoparasite Endoparasit	Host Perumah
C	Prey Mangsa	Predator Pemangsa
D	Ectoparasite Ektoparasit	Host Perumah

- 25 Table 1 shows the result of a study carried out to estimate the population size of frogs.

Jadual 1 menunjukkan keputusan kajian yang dijalankan untuk menganggarkan saiz populasi katak.

Capture Tangkapan	Number of frogs captures Bilangan katak yang ditangkap	
	Marked Bertanda	Unmarked Tidak bertanda
First Pertama	60	—
Second Kedua	5	20

Table 1
Jadual 1

Which factor can increase the number of marked frogs to more than 5 in the second capture?

Faktor manakah yang boleh meningkatkan bilangan katak bertanda melebihi 5 dalam tangkapan kedua?

- A Emigration
Emigrasi
B Competition
Persaingan
C Decrease in the number of predators
Pengurangan bilangan pemangsa
D Increase in reproduction rate
Penambahan kadar pembiakan

- 26 The number of prawns caught in a river is drastically reduced after the mangrove swamp near the river bank is reclaimed.

Which of the following plants should be planted more to increase the prawns population in the river?

Hasil tangkapan udang di sungai berkurangan secara mendadak setelah kawasan paya bakau di tebing sungai itu ditebus guna.

Antara tumbuhan berikut, manakah yang perlu ditanam lebih banyak untuk meningkatkan populasi udang di dalam sungai itu?

I *Pandanus* sp. / *Pandanus* sp.

II *Bruguiera* sp. / *Bruguiera* sp.

III *Avicennia* sp. / *Avicennia* sp.

IV *Rhizophora* sp. / *Rhizophora* sp.

A I and II C II and IV

I dan II II dan IV

B I and III D III and IV

I dan III III dan IV

- 27 What is the effect of thermal pollution?

Apakah kesan bagi pencemaran terma?

A Deforestation
Penyahhutan

B Soil erosion
Hakisan tanah

C Rapid growth of algae
Pertumbuhan alga yang cepat

D Thinning of the ozone layer
Pemipisan lapisan ozon

- 29 Diagram 10 shows the Air Pollution Index (API) of a city over a period of 12 months.

Rajah 10 menunjukkan Indeks Pencemaran Udara (IPU) bagi sebuah bandar sepanjang tempoh 12 bulan.

Air Pollution Index
Indeks Pencemaran Udara

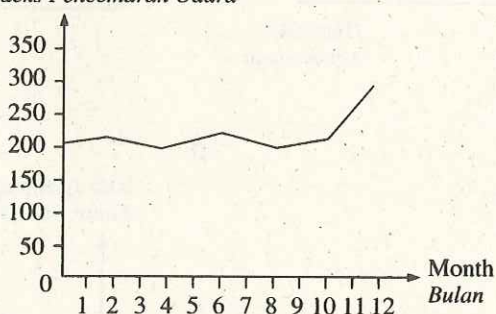


Diagram 10
Rajah 10

Which human activity contributes to the air pollution in this city?

Apakah aktiviti manusia yang menyumbang kepada pencemaran udara di bandar ini?

A Releasing of chlorofluorocarbon (CFC)
Pembebasan klorofluorokarbon (CFC)

B Dumping of radioactive waste
Pembuangan sisa radioaktif

C Dumping of domestic materials
Pembuangan bahan buangan domestik

D Open burning
Pembakaran terbuka

- 28 An experiment was carried out to determine the biochemical oxygen demand, BOD, value of different zones in a pond.

Diagram 9 shows the graph of the concentration of dissolved oxygen in zones A, B, C and D.

Satu eksperimen dijalankan untuk menentukan nilai keperluan oksigen biokimia, BOD, di zon berlainan dalam sebuah kolam.

Rajah 9 menunjukkan graf kepekatan oksigen terlarut di zon A, B, C dan D.

Concentration of dissolved oxygen
Kepekatan oksigen terlarut

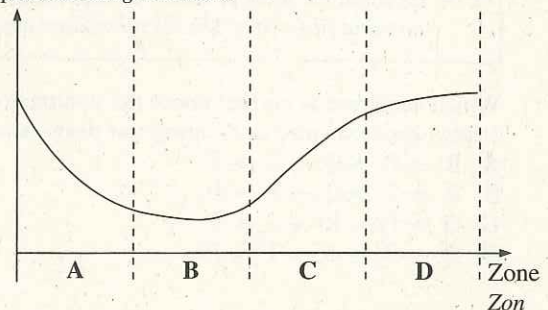


Diagram 9
Rajah 9

Which zone, A, B, C or D, has the highest BOD value?

Antara zon, A, B, C dan D, manakah yang mempunyai nilai BOD yang paling tinggi?

- 30 The following information is about the contraction of the cardiac muscle.
Maklumat berikut adalah tentang pengecutan otot kardium.

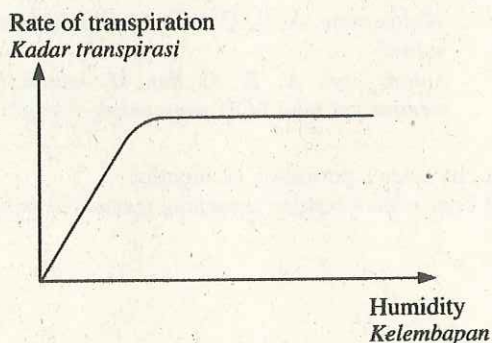
- P – The impulses spread to both ventricles and push the blood out
Impuls tersebar ke kedua-dua ventrikel dan menolak darah keluar
- Q – The impulses reach the atrio-ventricular node (AVN)
Impuls sampai ke nodus atrioventrikel (Nodus AV)
- R – The sinu-atrial node (SAN) generates impulses
Nodus sinuatrium (Nodus SA) menjana impuls
- S – The impulses spread rapidly over the walls of both atria and push blood into the ventricles
Impuls tersebar dengan cepat ke seluruh dinding kedua-dua atrium dan menolak darah ke dalam ventrikel
- T – Specialised muscle fibres conduct impulses to the apex of the heart
Gentian fiber yang khusus membawa impuls ke apeks jantung

Which sequence is correct about the contraction of the cardiac muscle?
Urutan manakah yang betul mengenai pengecutan otot kardium?

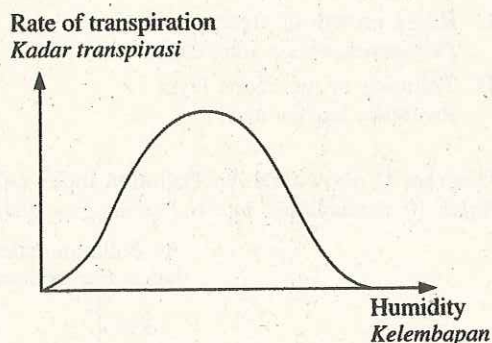
- A R → P → Q → S → T
- B R → S → Q → T → P
- C Q → P → R → S → T
- D Q → R → S → T → P

- 31 Which graph represents the effect of humidity on the rate of transpiration?
Graf manakah yang mewakili kesan kelembapan ke atas kadar transpirasi?

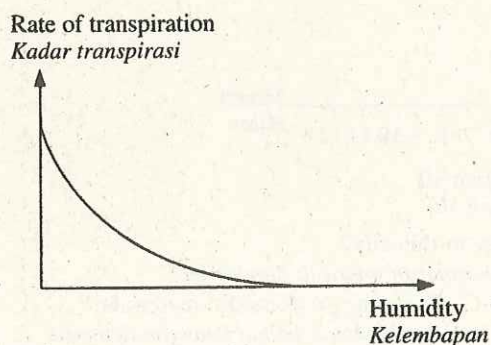
A



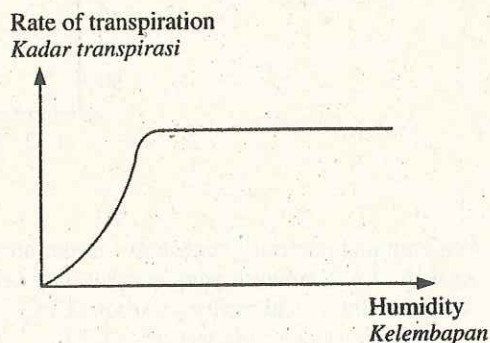
C



B



D



32 Diagram 11 shows the longitudinal section of a vein.

Rajah 11 menunjukkan keratan membujur suatu vena.

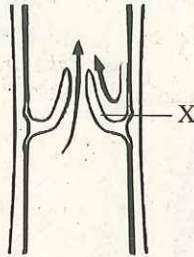


Diagram 11

Rajah 11

What is the role X?

Apakah peranan X?

- A Decrease the size of the lumen of the vein
Mengurangkan saiz lumen pada vena
- B Prevent the back flow of blood
Mengelakkan pengaliran balik darah
- C Increase the blood pressure in the vein
Meningkatkan tekanan darah dalam vena
- D Speed up the flow of blood in the vein
Meningkatkan kelajuan pengaliran darah


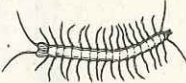
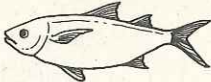
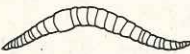
33 The following are characteristics related to locomotion in animals.

Berikut adalah ciri-ciri berkaitan dengan pergerakan dalam haiwan.

- P – Has a hydrostatic skeleton
Mempunyai rangka hidrostatik
- Q – Has a streamlined body
Mempunyai bentuk badan larus
- R – Has long rear legs
Mempunyai kaki belakang yang panjang
- S – Has antagonistic muscles
Mempunyai otot antagonistic

Which animal is correctly matched to their characteristics?

Haiwan manakah yang dipadankan dengan betul kepada ciri-cirinya?

	Animal Haiwan	Characteristics Ciri-ciri
A		P, R
B		Q, S
C		Q, R
D		P, S

- 34 Diagram 12 shows a vertebra P in human vertebral column, Q.

Rajah 12 menunjukkan vertebra P dalam turus vertebra manusia, Q.

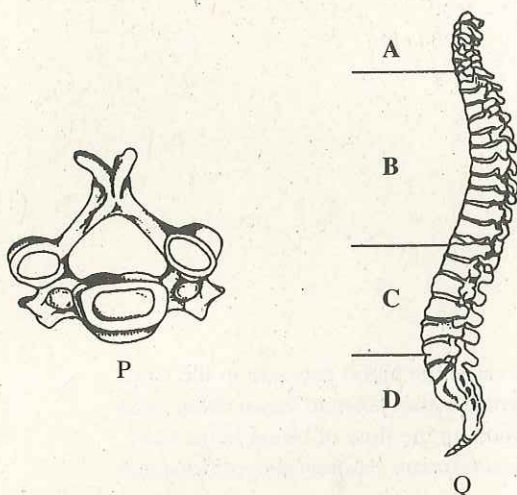


Diagram 12
Rajah 12

Which part of vertebral column, A, B, C or D, in Q contains vertebra P?

Bahagian manakah daripada turus vertebra, A, B, C dan D, dalam Q yang mengandungi vertebra P?

- 35 Diagram 13 shows an artificial joints in a knee.

Rajah 13 menunjukkan sendi palsu pada lutut.

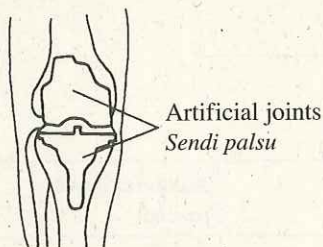


Diagram 13
Rajah 13

Which disease relates to the usage of artificial joints?

Penyakit manakah yang berkaitan dengan penggunaan sendi palsu?

- A Gout
Gout
- B Osteoporosis
Osteoporosis
- C Osteoarthritis
Osteoarthritis
- D Muscular dystrophy
Distrofi otot

- 36 Diagram 14 shows the cross-section of the thorax of a bird.

Rajah 14 menunjukkan keratan rentas toraks seekor burung.



Diagram 14
Rajah 14

What happen if muscle P is injured?

Apakah yang berlaku jika otot P cedera?

- A The bird will not be able to glide
Burung tidak boleh meluncur
- B The bird will not be able to move forward
Burung tidak boleh bergerak ke hadapan
- C The bird will not be able to move its wings upwards and forward
Burung tidak boleh menggerakkan sayap ke atas dan ke hadapan
- D The bird will not be able to move its wings downwards and backwards
Burung tidak boleh menggerakkan sayap ke bawah dan ke belakang

- 37 Diagram 15 shows the human skeleton.

Rajah 15 menunjukkan rangka manusia.

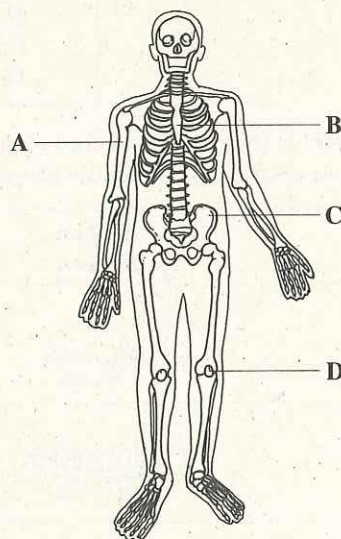


Diagram 15
Rajah 15

Which bone A, B, C or D, forms part of the axial skeleton?

Antara tulang, A, B, C dan D, manakah yang membentuk sebahagian daripada rangka paksi?

- 38 Diagram 16 shows the main components involved in coordination and response towards stimulus.
Rajah 16 menunjukkan komponen utama yang terlibat dalam koordinasi dan gerak balas terhadap rangsangan.

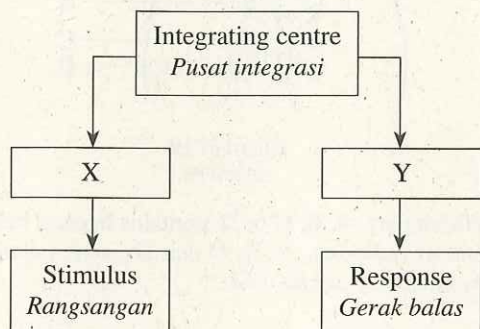


Diagram 16
Rajah 16

What are represented by X and Y?
Apakah yang diwakili oleh X dan Y?

	X	Y
A	Effector <i>Efektor</i>	Receptor <i>Reseptor</i>
B	Receptor <i>Reseptor</i>	Effector <i>Efektor</i>
C	Brain <i>Otak</i>	Spinal cord <i>Saraf tunjang</i>
D	Spinal cord <i>Saraf tunjang</i>	Brain <i>Otak</i>

- 39 Diagram 17 shows a process which occurs in the glomerulus and produced fluid X.
Rajah 17 menunjukkan suatu proses yang berlaku dalam glomerulus dan menghasilkan cecair X.

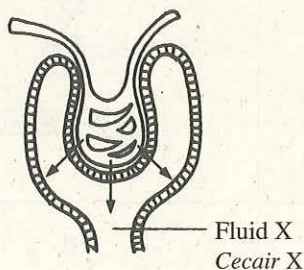


Diagram 17
Rajah 17

Which substances are found in fluid X?
Bahan manakah yang terdapat dalam cecair X?

- I Glucose
Glukosa
- II Amino acid
Asid amino
- III Erythrocyte
Eritrosit
- IV Plasma protein
Protein plasma
- A I and II
I dan II
- B I and III
I dan III
- C II and IV
II dan IV
- D III and IV
III dan IV

- 40 A man had an accident. The accident caused injury to the brain and affect his reading ability.

Which part of the brain is affected?

Seorang lelaki mengalami kemalangan. Kemalangan itu menyebabkan kecederaan pada otak dan menjejaskan kebolehannya membaca.

Bahagian otak manakah yang terjejas?

- A Cerebrum
Serebrum
- B Hypothalamus
Hipotalamus
- C Cerebellum
Serebelum
- D Medulla oblongata
Medula oblongata

- 41 Diagram 18 shows coleoptile Y being exposed to light from one direction.

Rajah 18 menunjukkan koleoptil Y yang didedahkan kepada cahaya dari satu arah.

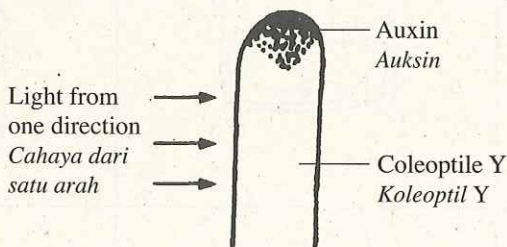


Diagram 18
Rajah 18

Which of the following shows the condition of the coleoptile Y after 3 days?

Antara yang berikut, yang manakah menunjukkan keadaan koleoptil Y itu selepas 3 hari?

A



B



C



D

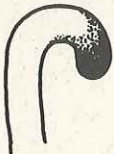


Diagram 20(b) shows the growth process in the root tip.

Rajah 20(b) menunjukkan proses pertumbuhan pada hujung akar.

X	Y	Z

Diagram 20(b)
Rajah 20(b)

42 Diagram 19 shows the male reproductive system.

Rajah 19 menunjukkan sistem pembiakan lelaki.

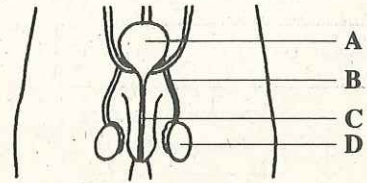


Diagram 19
Rajah 19

Which part, A, B, C or D, contains haploid cells?

Antara bahagian, A, B, C dan D, yang manakah mengandungi sel haploid?

43 Diagram 20(a) shows three growth zones, P, Q, and R, of the root tip of a plant.

Rajah 20(a) menunjukkan tiga zon pertumbuhan, P, Q, dan R, pada hujung akar sejenis tumbuhan.

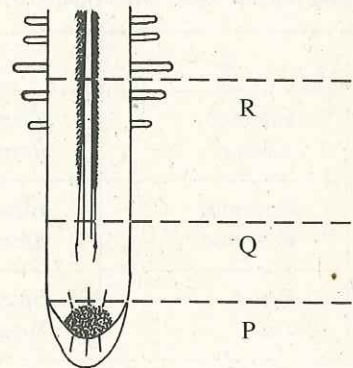


Diagram 20(a)
Rajah 20(a)

Which of the following is correctly matched to show the stages of the growth process?

Antara yang berikut, yang manakah dipadankan betul untuk menunjukkan peringkat-peringkat dalam proses pertumbuhan itu?

	P	Q	R
A	X	Y	Z
B	X	Z	Y
C	Y	X	Z
D	Z	X	Y

- 44 Diagram 21 shows a longitudinal section of a flower.

Rajah 21 menunjukkan suatu keratan membujur bagi sekuntum bunga.

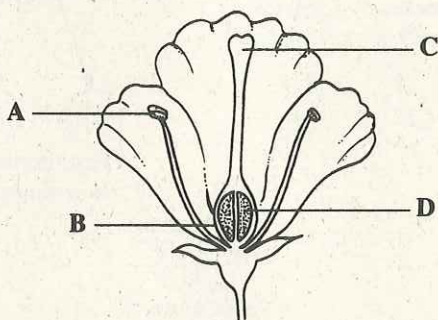


Diagram 21
Rajah 21

At which part, A, B, C or D, the development of pollen grains take place?

Antara bahagian, A, B, C dan D, di manakah perkembangan debunga berlaku?

- 45 Diagram 22 shows a pair of homologous chromosomes.

Rajah 22 menunjukkan sepasang kromosom homolog.

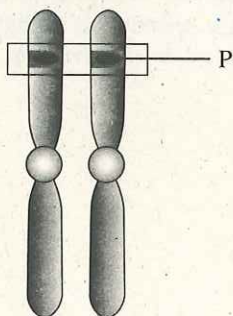


Diagram 22
Rajah 22

What is P?

Apakah P?

- A Gene
Gen
- B Trait
Trait
- C Allele
Alel
- D Characteristic
Ciri

- 46 A girl has blood group A and her brother has blood group O.

Which are the possible genotypes of the parents?
Seorang budak perempuan mempunyai kumpulan darah A dan abangnya mempunyai kumpulan darah O.

Genotip manakah yang mungkin dipunyai oleh ibu bapa mereka?

- A $I^A I^B$ and $I^A I^O$
 $I^A I^B$ dan $I^A I^O$
- B $I^A I^B$ and $I^O I^O$
 $I^A I^B$ dan $I^O I^O$
- C $I^A I^A$ and $I^B I^O$
 $I^A I^A$ dan $I^B I^O$
- D $I^A I^O$ and $I^B I^O$
 $I^A I^O$ dan $I^B I^O$

- 47 In plants, green seed colour is controlled by a recessive allele. A plant with green seed colour was crossed with a plant which is heterozygous for yellow seed colour.

What is the probability to produce an offspring with yellow seed colour?

Dalam tumbuhan, biji berwarna hijau dikawal oleh sepasang alel resesif. Sebatang pokok dengan biji berwarna hijau dikacukkan dengan sebatang pokok heterozigot dengan biji berwarna kuning.

Apakah kebarangkalian menghasilkan anak dengan biji berwarna kuning?

- A 0.25
- B 0.50
- C 0.75
- D 1.00

- 48 Diagram 23 shows parts of a DNA molecule.
Rajah 23 menunjukkan sebahagian daripada molekul DNA.

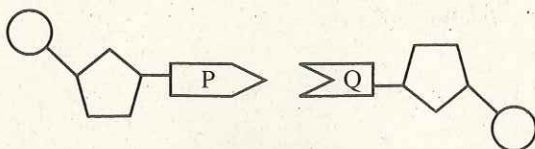


Diagram 23
Rajah 23

Which pair of nitrogenous base represent P and Q?

Pasangan bes bernitrogen manakah yang mewakili P dan Q?

	P	Q
A	Adenine Adenina	Guanine Guanina
B	Cytosine Sitosina	Guanine Guanina
C	Cytosine Sitosina	Thymine Tiamina
D	Adenine Adenina	Cytosine Sitosina

- 49 Diagram 24 shows the Punnett's square used to determine the F1 generation when two tall plants were crossed.
Rajah 24 menunjukkan segiempat sama Punnett digunakan untuk menentukan generasi F1 bila dua pokok tinggi dikacukkan.

Female gamete Gamet betina	Male gamete Gamet jantan	T	t
	T	TT	Tt
	t	Tt	tt

Diagram 24
Rajah 24

What is the percentage of short plants obtained?
Berapakah peratusan pokok rendah yang diperolehi?

- A 100%
B 75%
C 50%
D 25%

- 50 Diagram 25 shows a schematic diagram of a genetic disease.

Rajah 25 menunjukkan rajah skema pewarisan bagi satu penyakit genetik.

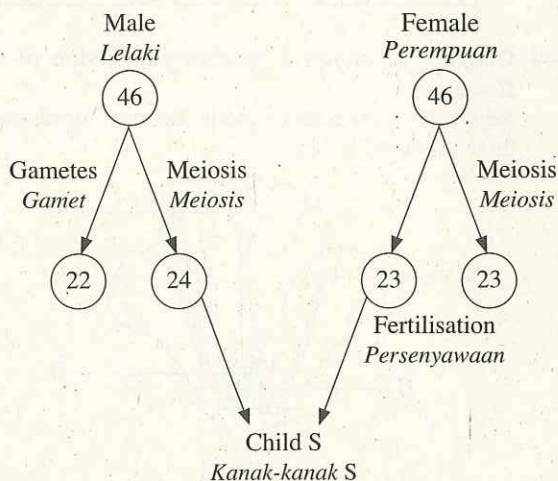


Diagram 25
Rajah 25

What is the characteristic of child S?
Apakah ciri bagi kanak-kanak S?

- A Short neck and slanted eyes
Leher yang pendek dan bermata sepet
B Rapid ageing process
Proses penuaan yang cepat
C Pinkish eyes and skin
Mata dan kulit berwarna merah jambu
D Skin very sensitive to sunlight
Kulit sangat sensitif terhadap cahaya matahari

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

This question paper consists of two sections: Section A and Section B.
Kertas soalan ini mengandungi dua bahagian: Bahagian A dan Bahagian B.

Section A Bahagian A

[60 marks]

[60 markah]

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

- 1 Diagram 1.1 shows the different levels of cell organisation in human from cell to organ.
Rajah 1.1 menunjukkan aras yang berbeza dalam organisasi sel bagi manusia daripada sel ke organ.

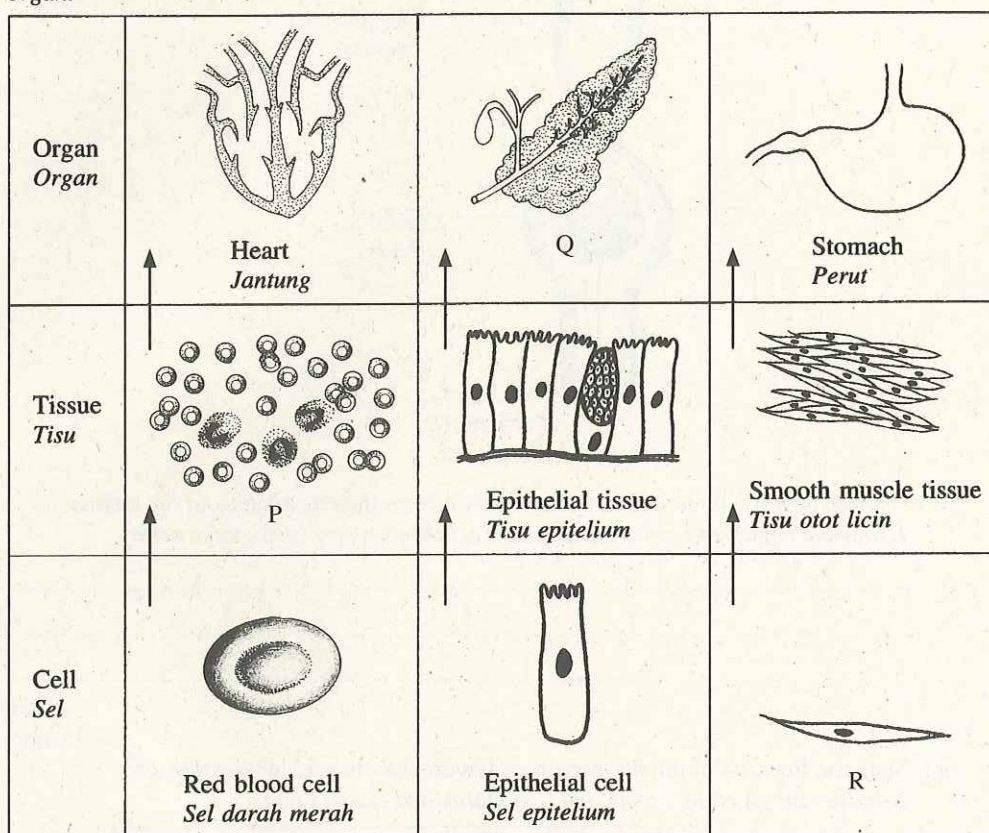


Diagram 1.1
Rajah 1.1

- (a) (i) Name P, Q and R.
Namakan P, Q dan R.

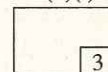
P:

Q:

R:

[3 marks]
[3 markah]

1(a)(i)



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1(a)(ii)

1

1(b)

2

- (ii) State **one** function of the red blood cell.
*Nyatakan **satu** fungsi sel darah.*

[1 mark]
[1 markah]

- (b) Explain the function of Q in regulating the blood glucose level.
Terangkan fungsi Q dalam mengawal atur aras glukosa darah.

[2 marks]
[2 markah]

- (c) Diagram 1.2 shows the movement of a bolus of food in oesophagus.
Rajah 1.2 menunjukkan pergerakan bolus makanan dalam esofagus.

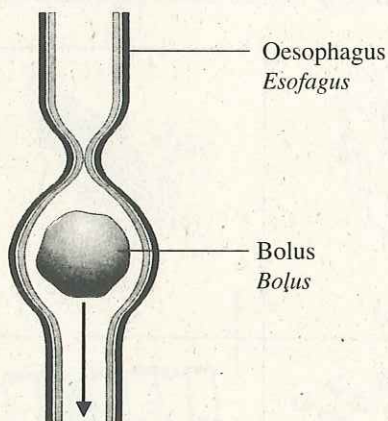


Diagram 1.2
Rajah 1.2

Explain how the bolus of food moves down from the oesophagus to the stomach.
Terangkan bagaimana bolus makanan bergerak turun dari esofagus ke perut.

1(c)

3

[3 marks]
[3 markah]

- (d) State the function of rennin, pepsin and hydrochloric acid in the stomach.
Nyatakan fungsi rennin, pepsin dan asid hidroklorik dalam perut.

	Function Fungsi
Rennin <i>Renin</i>	
Pepsin <i>Pepsin</i>	
Hydrochloric acid <i>Asid hidroklorik</i>	

[3 marks]
[3 markah]

1(d)

3

Total A1

12

- 2 Diagram 2.1 shows a plant cell that has been immersed in 30% sucrose solution.
Rajah 2.1 menunjukkan sel tumbuhan yang telah direndam dalam larutan sukrosa 30%.

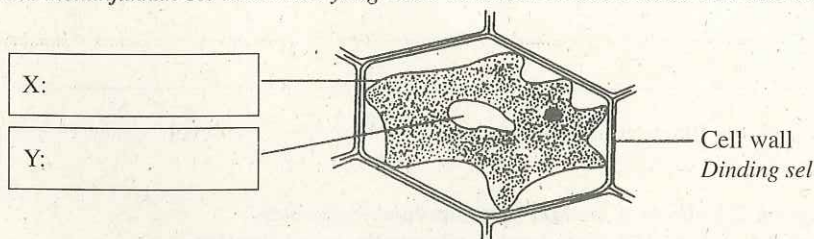


Diagram 2.1
Rajah 2.1

- (a) (i) On Diagram 2.1, label X and Y. [2 marks]
Pada Rajah 2.1, labelkan X dan Y. [2 markah]

- (ii) Name the solution which filled the space between the cell wall and X.
Explain how the solution filled the space.
Namakan larutan yang mengisi ruang antara dinding sel dan X.
Terangkan bagaimana larutan itu mengisi ruang tersebut.

Name of solution:
Nama larutan

Explanation:
Penerangan

- (b) The plant cell in Diagram 2.1 has undergone plasmolysis.
Explain how this happened.
Sel tumbuhan dalam Rajah 2.1 telah mengalami plasmolisis.
Terangkan bagaimana ini berlaku.

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

[2 marks]
[2 markah]

- (c) Diagrams 2.2 and 2.3 show the condition of two plants which are added with fertiliser.
The plant in Diagram 2.3 is added with excess fertiliser.
Rajah 2.2 dan Rajah 2.3 menunjukkan keadaan dua pokok yang telah diberi baja. Pokok pada Rajah 2.3 diberi baja secara berlebihan.



Diagram 2.2
Rajah 2.2



Diagram 2.3
Rajah 2.3

2(a)(i)

	2
--	---

2(a)(ii)

	2
--	---

2(b)

	2
--	---

Explain the condition of the plant in Diagram 2.3.
Terangkan keadaan pokok pada Rajah 2.3.

.....

.....

.....

[3 marks]
[3 markah]

- (d) Diagram 2.4 shows a method of preserving vegetables.
Rajah 2.4 menunjukkan satu kaedah pengawetan sayur-sayuran.

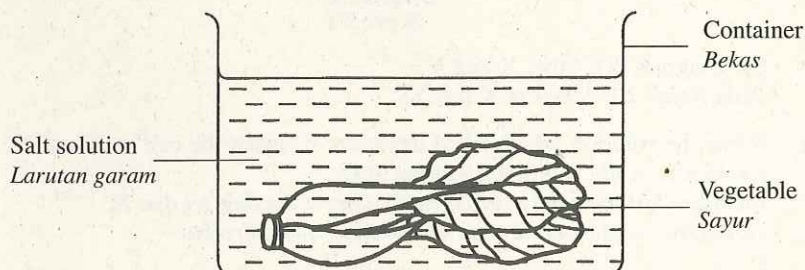


Diagram 2.4
Rajah 2.4

Explain the method used.
Terangkan kaedah yang digunakan.

.....

.....

.....

[3 marks]
[3 markah]

- 3 Diagram 3 shows a type of organelle found in muscle cells.
A biochemical reaction occurs in the organelle.
Rajah 3 menunjukkan sejenis organel yang terdapat dalam sel otot.
Tindak balas biokimia berlaku dalam organel tersebut.

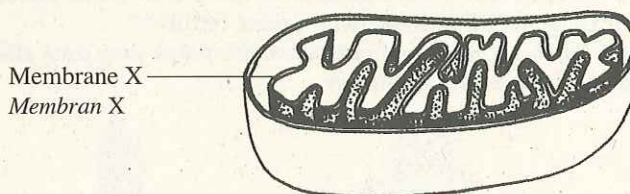


Diagram 3
Rajah 3

- (a) (i) Name this organelle.
Namakan organel ini.

.....

[1 mark]
[1 markah]

- (ii) Explain why membrane X is in the form of numerous folded layers.
Terangkan mengapa membran X adalah dalam bentuk lapisan yang berlipat-lipat.

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

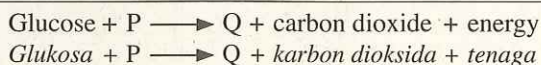
[2 marks]

[2 markah]

3(a)(ii)

	2
--	---

- (b) The biochemical reaction that occurs in this organelle is summarised as follows:
Tindak balas biokimia yang berlaku dalam organel ini diringkaskan seperti berikut:



- (i) Name gas P.
Namakan gas P.

.....

[1 mark]

[1 markah]

3(b)(i)

	1
--	---

- (ii) Name product Q.
Namakan hasil Q.

.....

[1 mark]

[1 markah]

3(b)(ii)

	1
--	---

- (iii) Explain why the muscle cell has a large number of these organelles.
Terangkan mengapa sel otot mengandungi banyak bilangan organel ini.

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

[2 marks]

[2 markah]

3(b)(iii)

	2
--	---

- (iv) If the blood sugar level is lower than the normal range, the biochemical reaction in this organelle can still occur.

Explain how.

Jika aras gula dalam darah adalah rendah daripada julat normal, tindak balas biokimia dalam organel ini masih boleh berlaku.

Terangkan bagaimana.

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

[3 marks]

[3 markah]

3(b)(iv)

	3
--	---

3(c)

2

- (c) State **two** differences on the biochemical reaction occurring between muscle cell and yeast cell in the absence of gas P.

Nyatakan dua perbezaan ke atas tindak balas biokimia yang berlaku antara sel otot dan sel yis tanpa kehadiran gas P.

Muscle cell <i>Sel otot</i>	Yeast cell <i>Sel yis</i>
1.
2.

[2 marks]
[2 markah]

- 4 Diagram 4 shows human muscles and bones involved in bending the leg.

Rajah 4 menunjukkan otot dan tulang manusia yang terlibat semasa pembengkokan kaki.

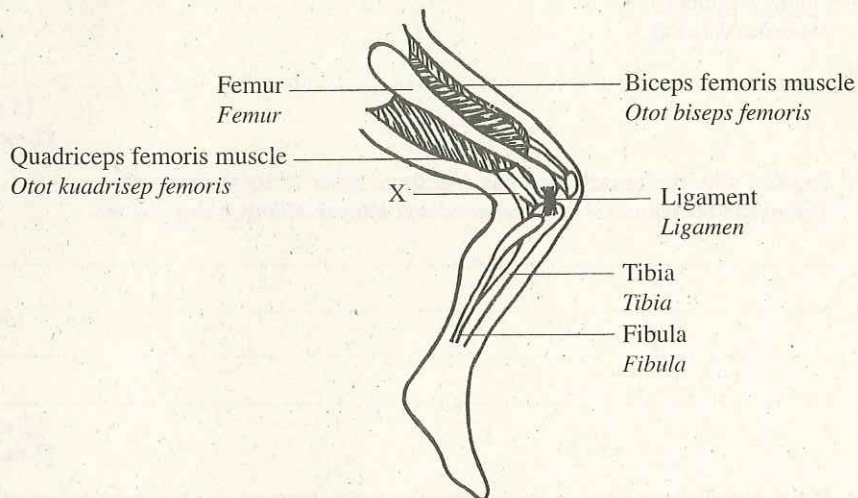


Diagram 4
Rajah 4

4(a)(i)

1

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

X:

[1 mark]
[1 markah]

4(a)(ii)

1

- (ii) State **one** function of X.
Nyatakan satu fungsi X.

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

- (b) Describe briefly how the characteristic of X is adapted for its function as stated in 4(a)(ii).

Jelaskan dengan ringkas bagaimana ciri X disesuaikan untuk menjalankan fungsi yang dinyatakan di 4(a)(ii).

.....

.....

.....

[2 marks]

[2 markah]

4(b)

	2
--	---

- (c) (i) State one function of ligament in Diagram 4.

Nyatakan satu fungsi ligamen dalam Rajah 4.

.....

[1 mark]

[1 markah]

4(c)(i)

	1
--	---

- (ii) Ligament of a gymnast are more flexible compared to ordinary people.

Explain the statement.

Ligamen seorang ahli gimnastik adalah lebih mudah lentur berbanding dengan orang biasa.

Terangkan pernyataan tersebut.

.....

.....

[2 marks]

[2 markah]

4(c)(ii)

	2
--	---

- (d) Some marathon runners experience muscle cramps at the end of a race.

Sebilangan pelari maraton mengalami kekejangan otot di akhir perlumbaan.

- (i) What is muscle cramps?

Apakah kekejangan otot?

.....

[1 mark]

[1 markah]

4(d)(i)

	1
--	---

- (ii) State one cause of muscle cramps among athlete.

Nyatakan satu sebab bagi kekejangan otot di kalangan atlet.

.....

[1 mark]

[1 markah]

4(d)(ii)

	1
--	---

- (e) Suggest three ways in which a person can maintain a healthy musculoskeletal system.

Cadangkan tiga cara bagaimana seseorang boleh mengekalkan sistem otot rangka yang sihat.

1.

.....

2.

.....

3.

.....

[3 marks]

[3 markah]

4(e)

	3
--	---

Total A4

	12
--	----

- 5 Diagram 5 shows the structure of a nephron with the blood vessels in the kidney.
Rajah 5 menunjukkan struktur satu nefron dan salur darah dalam ginjal.

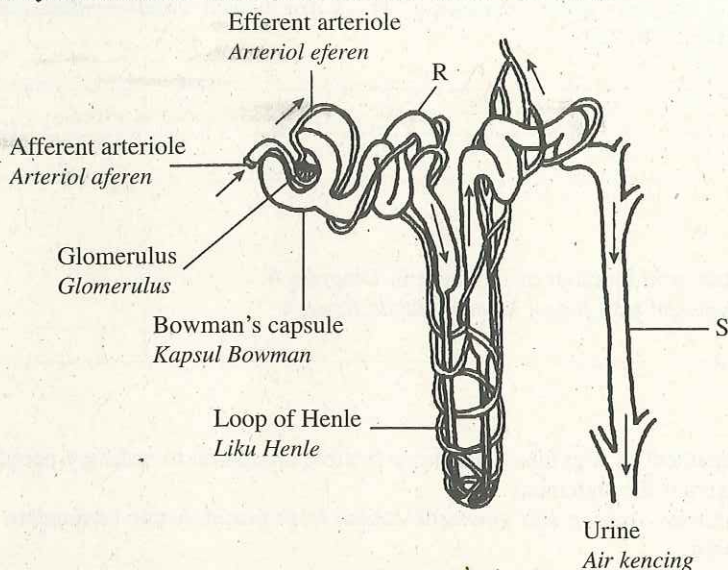


Diagram 5
Rajah 5

- (a) Explain the process that occurs between glomerulus and Bowman's capsule.
Terangkan proses yang berlaku antara glomerulus dengan kapsul Bowman.

Process / Proses:

Explanation / Penerangan:

[3 marks]

[3 markah]

- (b) Table 5 shows the filtrate content in R and S.

Jadual 5 menunjukkan kandungan hasil turasan dalam R dan S.

Filtrate content Kandungan hasil turasan	Concentration of filtrate content (%) Kepekatan kandungan hasil turasan (%)	
	R	S
Glucose Glukosa	0.1	0
Amino acid Asid amino	8.0	0
Water Air	90.0	95.0
Mineral salts Garam mineral	1.87	2.65
Urea Urea	0.03	2.0

Table 5
Jadual 5

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- (i) State **one** difference in the concentration of amino acid between R and S.
Nyatakan satu perbezaan kepekatan asid amino antara R dengan S.

.....
.....

[1 mark]
[1 markah]

5(b)(i)

	1
--	---

- (ii) Based on the answer in 5(b)(i), explain why.
Berdasarkan jawapan di 5(b)(i), terangkan mengapa.

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

[2 marks]
[2 markah]

5(b)(ii)

	2
--	---

- (c) The urine of a person contains glucose.
What is the disease he suffers from?
State why.
*Air kencing seseorang itu mengandungi glukosa.
Apakah penyakit yang dihidapinya?
Nyatakan mengapa.*

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

[2 marks]
[2 markah]

5(c)

	2
--	---

- (d) The nephrones of certain mammals living in desert have very long loops of Henle.
State the effect on the filtrate formed in S.
*Nefron sesetengah mamalia yang hidup di gurun mempunyai liku Henle yang panjang.
Nyatakan kesannya ke atas hasil turasan yang terbentuk dalam S.*

.....
.....

[1 mark]
[1 markah]

5(d)

	1
--	---

- (e) Explain the importance of kidney.
Terangkan kepentingan ginjal.

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

[3 marks]
[3 markah]

5(e)

	3
--	---

Total A5

	12
--	----

Section B Bahagian B

[40 marks]
[40 markah]

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

- 6** Diagram 6.1 shows the growth curve of a grasshopper.
Rajah 6.1 menunjukkan lengkung pertumbuhan seekor belalang.

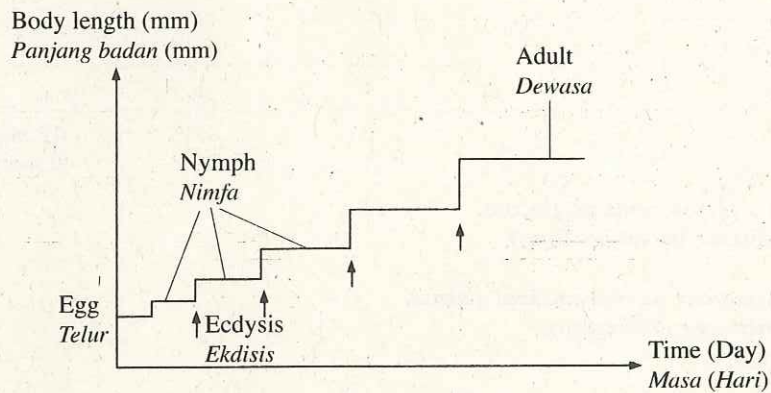


Diagram 6.1
Rajah 6.1

- (a) Explain the growth curve of the grasshopper.
Terangkan lengkung pertumbuhan belalang itu.
- (b) Diagram 6.2 shows the growth curve of human.
Rajah 6.2 menunjukkan lengkung pertumbuhan manusia.

[4 marks]
[4 markah]

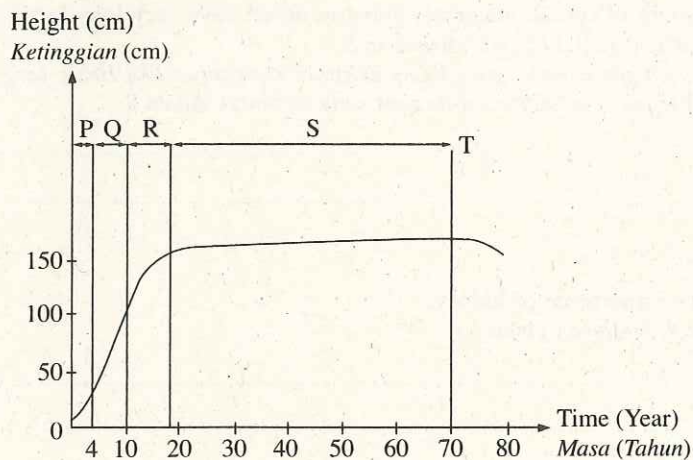


Diagram 6.2
Rajah 6.2

- P, Q, R, S and T are phases of the growth curve.
Explain the changes occur in each phase.
P, Q, R, S dan T adalah fasa-fasa pada lengkung pertumbuhan.
Terangkan perubahan yang berlaku pada setiap fasa.

[10 marks]

[10 markah]

(c) Science and technology can help married couples to overcome their infertility problems.

State **two** infertility problems and explain the various methods to overcome the problems. [10 marks]

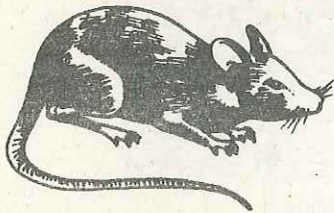
Sains dan teknologi boleh membantu pasangan yang berkahwin untuk mengatasi masalah ketidaksuburan mereka.

Nyatakan dua masalah ketidaksuburan dan terangkan pelbagai kaedah untuk mengatasi masalah itu.

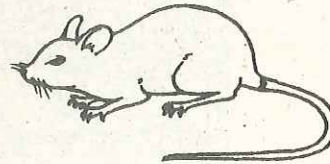
[10 markah]

- 7 (a) Diagram 7 shows a cross between a homozygous black male mouse and a homozygous white female mouse.

Rajah 7 menunjukkan kacukan di antara tikus jantan homozigot dengan tikus betina putih homozigot.



Homozygous black male mouse
Tikus jantan hitam homozigot



Homozygous white female mouse
Tikus betina putih homozigot

Diagram 7
Rajah 7

Allele B for black fur is dominant and allele b for white fur is recessive.

Draw a genetic diagram to determine the phenotypic percentage of the offsprings in the cross.

[6 marks]

Alél B untuk bulu hitam adalah dominan dan alél b untuk bulu putih adalah resesif.

Lukis rajah genetik untuk menentukan peratusan fenotip anak dalam kacukan itu.

[6 markah]

- (b) Thalassaemia is a hereditary disease.

Explain the cause of this disease and how it affects a person's health.

[4 marks]

Talasemia adalah penyakit pewarisan.

Talasemia adalah penyakit pewarisan.

Terangkan penyebab kepada penyakit ini dan bagaimana penyakit ini memberi kesan terhadap kesihatan seseorang.

[4 markah]

- (c) A man with Rhesus factor in his blood is Rh-positive. His wife who does not have Rhesus factor in her blood is Rh-negative. Their first child who is Rh-positive survives but their second child who is also Rh-positive does not survive.

Seorang lelaki yang mempunyai faktor rhesus dalam darahnya ialah Rh-positif. Isterinya yang tidak mempunyai faktor rhesus dalam darahnya ialah rhesus negatif. Anak pertama mereka yang Rh-positif dapat hidup tetapi anak kedua mereka yang juga Rh-positif tidak dapat hidup.

Explain the above passage.

[6 marks]

Terangkan pernyataan di atas.

[6 markah]

- (d) State **four** differences between Down's syndrome and colour blindness based on the cause and characteristics.

[4 marks]

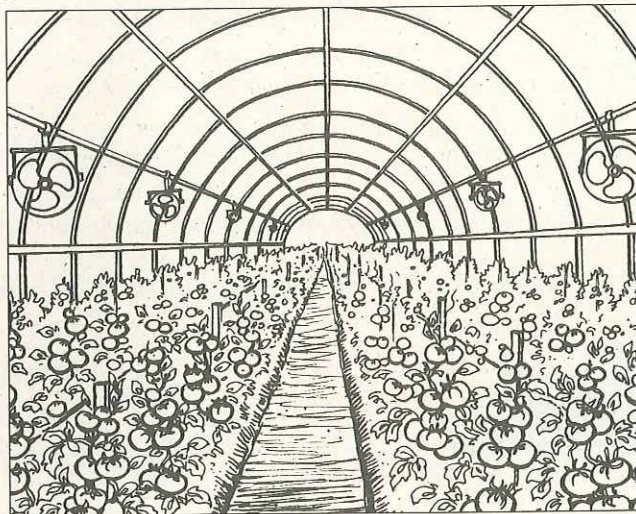
Nyatakan empat perbezaan di antara Sindrom Down dengan buta warna berdasarkan sebab ciri-cirinya.

[4 markah]

- 8 (a) Greenhouse is used to control biotic and abiotic factors to increase the yield of crops. Diagram 8 shows tomato plants grown in a greenhouse.

Rumah hijau digunakan untuk mengawal faktor biotik dan abiotik untuk meningkatkan hasil tanaman.

Rajah 8 menunjukkan pokok tomato yang ditanam dalam rumah hijau.



Tomato plants grown in a greenhouse
Pokok tomato ditanam dalam rumah hijau

Diagram 8
Rajah 8

Explain how the greenhouse influences the productivity of the tomato plants.
Terangkan bagaimana rumah hijau mempengaruhi produktiviti pokok tomato itu.

[10 marks]
[10 markah]

(b) There are various methods used in food processing.

Suggest **two** methods and discuss the advantages and disadvantages of each method.
Terdapat pelbagai kaedah yang digunakan dalam pemprosesan makanan.
Cadangkan **dua** kaedah dan bincangkan kebaikan dan keburukan setiap kaedah itu.

[10 marks]
[10 markah]

9 (a) Diagram 9.1 shows the effects of farming activities near a pond.
Rajah 9.1 menunjukkan kesan-kesan aktiviti pertanian berhampiran sebuah kolam.

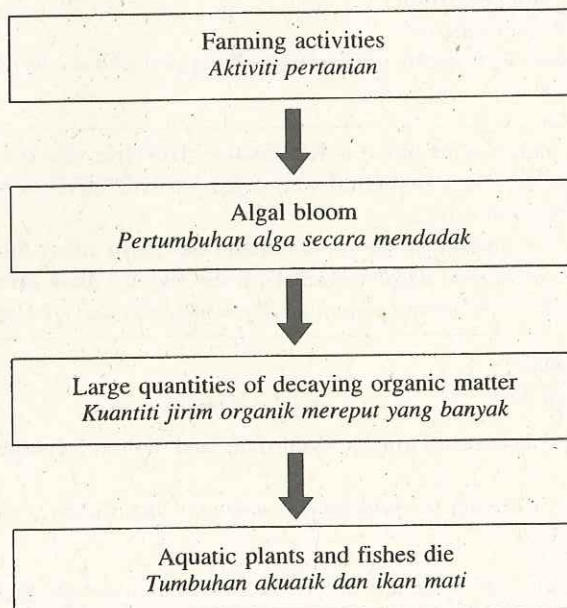


Diagram 9.1
Rajah 9.1

Explain how the farming activities cause the death of the aquatic plants and the fishes in the pond.

[10 marks]

Terangkan bagaimana aktiviti-aktiviti pertanian tersebut menyebabkan kematian tumbuhan akuatik dan ikan-ikan di dalam kolam itu.

[10 markah]

- (b) Diagram 9.2 shows a new industrial area situated near a residential area.

Rajah 9.2 menunjukkan satu kawasan perindustrian baru berdekatan dengan kawasan perumahan.

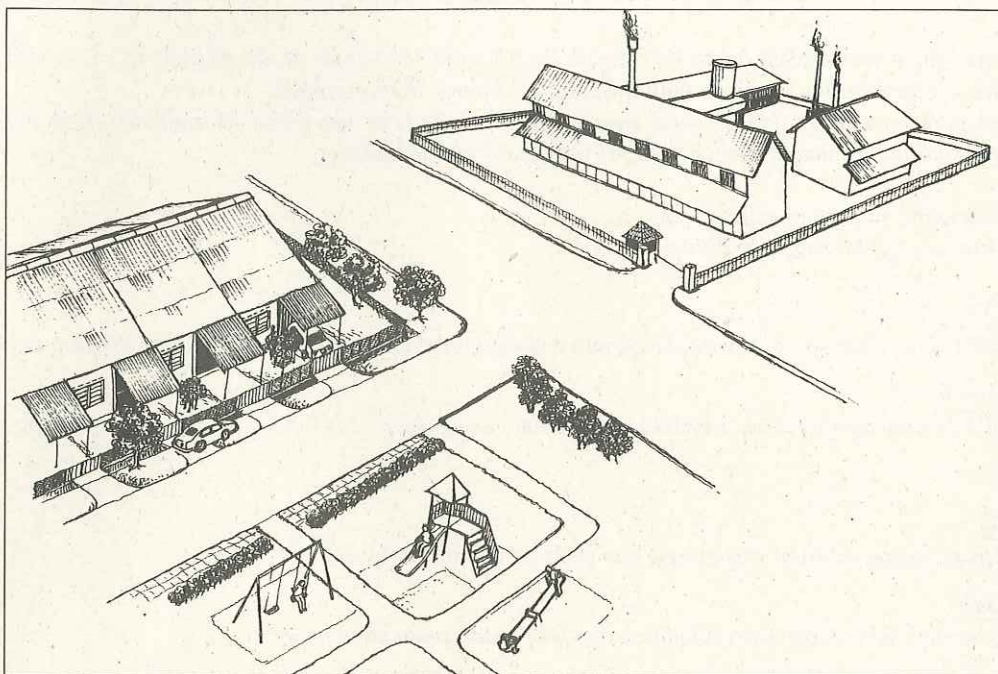


Diagram 9.2

Rajah 9.2

Discuss the good and the bad effects caused by the industrial activities on human and environment in years to come.

[10 marks]

Bincangkan kesan baik dan kesan buruk yang disebabkan oleh aktiviti-aktiviti perindustrian terhadap manusia dan alam sekitar pada tahun-tahun akan datang.

[10 markah]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

*This question paper consists of two questions: Question 1 and Question 2.
Kertas soalan ini mengandungi dua soalan: Soalan 1 dan Soalan 2.*

Answer all questions.

Jawab semua soalan.

- 1** An experiment was carried out to investigate the effect of pH values on the hydrolysis of starch by amylase enzyme. Several buffer solutions with different pH values were prepared.
Satu eksperimen telah dijalankan untuk mengkaji kesan nilai pH ke atas hidrolisis kanji oleh enzim amilase. Beberapa larutan penimbal dengan nilai pH yang berbeza disediakan.

The following steps were carried out.

Langkah-langkah berikut telah dijalankan.

Step 1

2 ml of 1% amylase solution was placed into a boiling tube containing 5 ml of buffer solution at pH 6.

Langkah 1

2 ml 1% larutan amilase telah dimasukkan ke dalam tabung didih yang mengandungi 5 ml larutan penimbal pada pH 6.

Step 2

2 drops of iodine solution was placed into each groove on a white tile.

Langkah 2

2 titis larutan iodin diletakkan ke dalam setiap lekuk pada suatu jubin putih.

Step 3

3 ml of 1% of starch solution was added into the boiling tube and the stopwatch is started immediately.

Langkah 3

3 ml 1% larutan kanji ditambah ke dalam tabung didih itu dan jam randik dimulakan dengan segera.

Step 4

Every 2 minutes, a drop of the mixture from the boiling tube was dropped into a new groove of iodine solution on the white tile by using a clean dropper.

Langkah 4

Setiap 2 minit, satu titik larutan campuran daripada didih itu dititiskan ke atas lekuk baru yang mengandungi larutan iodin pada jubin putih itu dengan menggunakan penitis yang bersih.

Step 5

The time taken for the iodine solution to remain yellow is recorded.

Langkah 5

Masa diambil untuk larutan iodin itu kekal kuning direkodkan.

Step 6

Steps 1 – 5 are repeated using buffer solutions at pH 5, 7, 8, 9.

Langkah 6

Langkah 1 – 5 diulang dengan menggunakan larutan penimbal pada pH 5, 7, 8 dan 9.

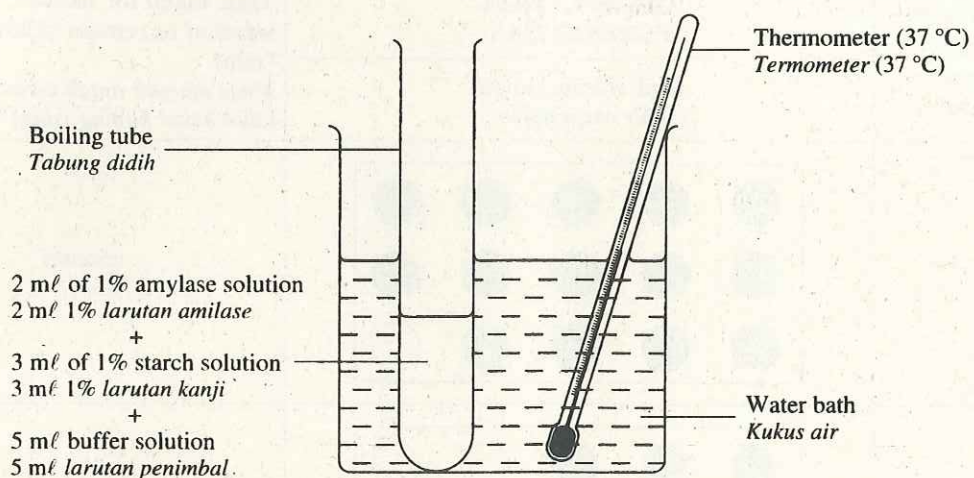


Diagram 1
Rajah 1

1(a)

3

Table 2 shows the results of this experiment.
 Jadual 2 menunjukkan keputusan eksperimen ini.

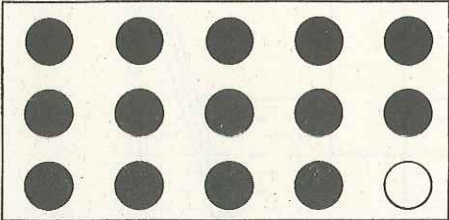
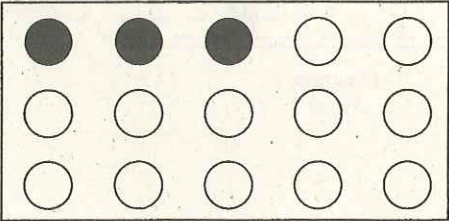
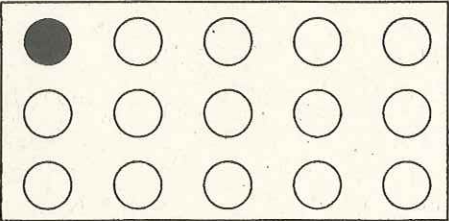
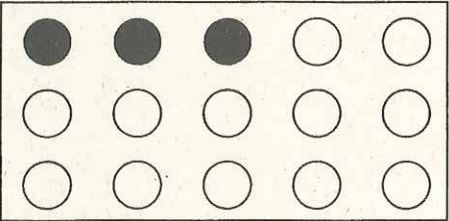
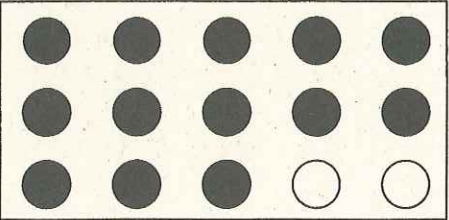
pH of buffer solution pH larutan penimbal	OBSERVATION PEMERHATIAN	Time taken for iodine solution to remain yellow (min) Masa diambil untuk larutan iodin kekal kuning (min)
	End of experiment Akhir eksperimen	
5	 minutes minit
6		6 minutes 6 minit
7		2 minutes 2 minit
8	 minutes minit
9	 minutes minit

Table 2
 Jadual 2

- (b) Record the time taken for iodine solution to remain yellow in Table 2 on page 66.
Rekod masa yang diambil untuk larutan iodin kekal kuning di dalam Jadual 2 pada halaman 66.

[3 marks]

[3 markah]

1(b)

	3
--	---

- (c) (i) State **two** different observations made from Table 2.
*Nyatakan **dua** pemerhatian yang berbeza yang dibuat daripada Jadual 2.*

Observation 1:

Pemerhatian 1:

.....

.....

Observation 2:

Pemerhatian 2:

.....

.....

[3 marks]

[3 markah]

1(c)(i)

	3
--	---

- (ii) State the inferences from the observations in 1(c)(i).
Nyatakan inferens daripada pemerhatian di 1(c)(i).

Inference from observation 1:

Inferens daripada pemerhatian 1:

.....

.....

Inference from observation 2:

Inferens daripada pemerhatian 2:

.....

.....

[3 marks]

[3 markah]

1(c)(ii)

	3
--	---

- (d) Complete Table 3 based on this experiment.
Lengkapkan Jadual 3 berdasarkan eksperimen ini.

Variable <i>Pemboleh ubah</i>	Method to handle the variable <i>Cara mengendali pemboleh ubah</i>
Manipulated variable <i>Pemboleh ubah dimanipulasikan</i>	
Responding variable <i>Pemboleh ubah bergerak balas</i>	
Constant variable <i>Pemboleh ubah dimalarkan</i>	

Table 3
Jadual 3

[3 marks]

[3 markah]

1(d)

	3
--	---

1(e)

	3
--	---

- (e) State the hypothesis for this experiment.

Nyatakan hipotesis bagi eksperimen ini.

[3 marks]

[3 markah]

- (f) (i) Construct a table and record all the data collected in this experiment.

Your table should have the following titles:

Bina satu jadual dan rekodkan semua data yang dikumpul dalam eksperimen ini.

Jadual anda hendaklah mengandungi tajuk-tajuk berikut:

- pH
pH
- Time taken for iodine solution to remain yellow
Masa diambil untuk larutan iodin kekal kuning
- Rate of amylase activity on starch
Kadar aktiviti amilase terhadap kanji

$$\left[\text{Rate of amylase activity} = \frac{1}{\text{Time taken for iodine solution to remain yellow}} \right]$$

$$\left[\text{Kadar aktiviti amilase} = \frac{1}{\text{Masa diambil untuk larutan iodin kekal kuning}} \right]$$

1(f)(i)

	3
--	---

[3 marks]

[3 markah]

- (ii) Use the graph paper provided on page 69 to answer this question.

Using the data 1(f)(i), draw a graph of the rate of amylase activity on starch against the pH values of the mixture solution.

Guna kertas graf yang disediakan di halaman 69 untuk menjawab soalan ini.

Menggunakan data di 1(f)(i), lukis graf kadar aktiviti amilase ke atas kanji melawan nilai pH bagi larutan campuran.

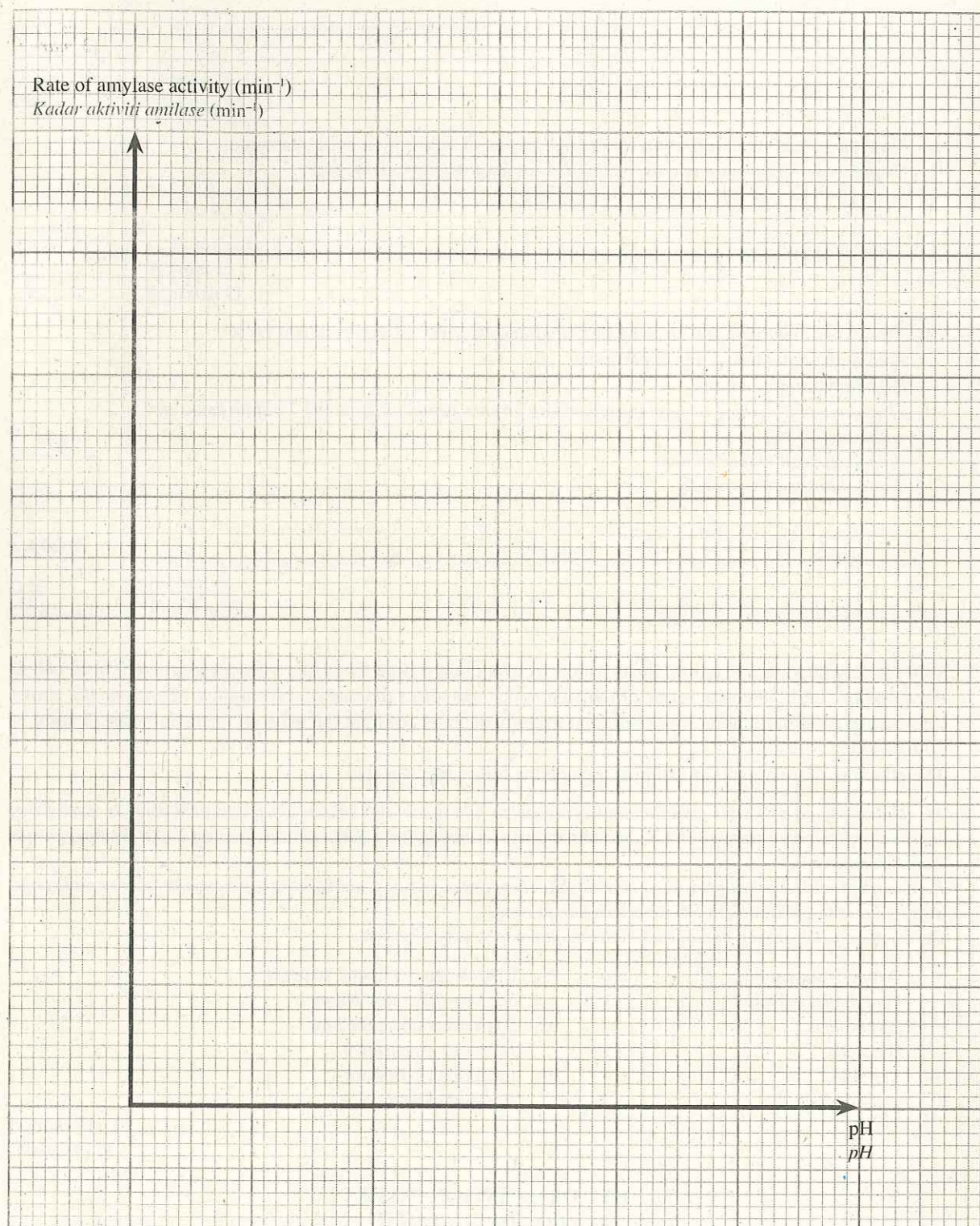
[3 marks]

[3 markah]

1(f)(ii)

	3
--	---

Graph of the rate of amylase activity against the pH of the mixture solution
Graf kadar aktiviti amilase melawan pH larutan campuran



- (g) Based on the graph in 1(f)(ii), explain the relationship between the rate of amylase activity on starch and the pH values of the mixture solution.
Berdasarkan graf di 1(f)(ii), terangkan hubungan antara kadar aktiviti amilase dan nilai pH larutan campuran.

[3 marks]

[3 markah]

- (h) State the operational definition for the hydrolysis of starch by amylase enzyme.
Nyatakan definisi secara operasi bagi hidrolisis kanji oleh enzim amilase.

[3 marks]

[3 markah]

- (i) This experiment is repeated using buffer solution at pH 7 in water bath at 20 °C.
 Predict the outcome of this experiment.

Explain your prediction.

Eksperimen ini diulang dengan menggunakan larutan penimbal pada pH 7 dalam kukus air pada suhu 20 °C.

Ramalkan hasil eksperimen ini.

Terangkan ramalan anda.

[3 marks]

[3 markah]

For
Examiner's
Use

1(g)

3

1(h)

3

1(i)

3

Total 1

33

- 2 Water is very important to plants. It can be lost by evaporation from the plants to the atmosphere. This is called transpiration. Light intensity is one of the factors that can affect the rate of transpiration. Based on the above information, design a laboratory experiment to study the effect of light intensity on the rate of transpiration in *Hibiscus* sp.

The planning of your experiment must include the following aspects:

Air adalah sangat penting kepada tumbuhan. Ia boleh hilang melalui sejatan daripada tumbuhan ke atmosfera. Ini dipanggil sebagai transpirasi. Keamatan cahaya merupakan satu daripada faktor yang dapat mempengaruhi kadar transpirasi.

Berdasarkan maklumat di atas, reka bentuk satu eksperimen makmal untuk mengkaji kesan keamatan cahaya ke atas kadar transpirasi dalam Hibiscus sp. (Bunga raya).

Perancangan eksperimen anda hendaklah meliputi aspek-aspek berikut:

- | | |
|--|---|
| • Problem statement
<i>Pernyataan masalah</i> | • List of apparatus and materials
<i>Senarai radas dan bahan</i> |
| • Hypothesis
<i>Hipotesis</i> | • Experimental procedure
<i>Prosedur eksperimen</i> |
| • Variables
<i>Pemboleh ubah</i> | • Presentation of data
<i>Persembahan data</i> |

[17 marks]

[17 markah]

END OF QUESTION PAPER
 KERTAS SOALAN TAMAT