BAHAGIAN PENGURUSAN SEKOLAH BERASRAMA PENUH
DAN SEKOLAH KECEMERLANGAN
KEMENTERIAN PELAJARAN MALAYSIA

PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2012
PERCUBAAN SIJIL PELAJARAN MALAYSIA

BIOLOGI

Kertas 1

Satu jam lima belas minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini adalah dalam dwibahasa.*

2. *Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Melayu.*

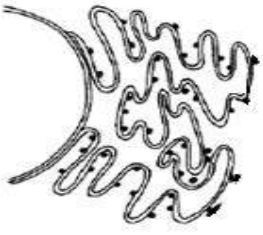
3. *Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*

This question paper consists of 28 printed pages.
Kertas soalan ini mengandungi 28 halaman bercetak.

Answer **all** questions.
*Jawab **semua** soalan.*

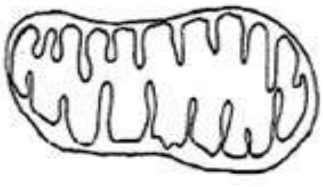
1 Which organelle modifies synthesised protein in a cell?
Organel manakah yang mengubahsuai protein yang disintesiskan dalam satu sel?

A

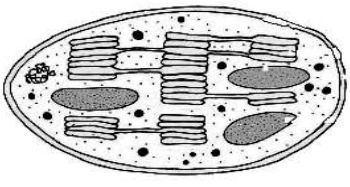


B

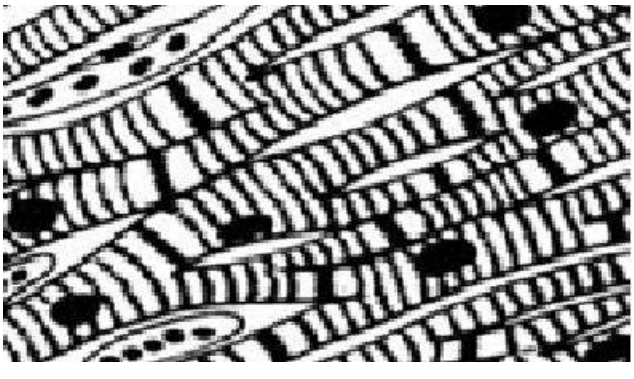
C



D



2 The diagram shows an animal muscle tissue.
Rajah menunjukkan satu tisu otot haiwan.



Which of the following is the function of the tissue when it contracts?
Antara berikut, yang manakah fungsi tisu itu apabila ia mengecut ?

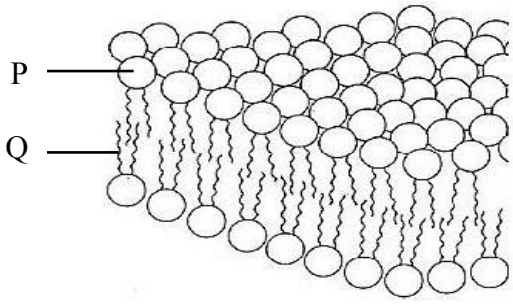
A Moves the bones
Menggerakan tulang

B Pumps blood to all parts of the body
Mengepam darah ke seluruh badan

C Detects stimulus and transmits impulse
Mengesan rangsangan dan menghantar impuls

D Peristaltic movement along the digestive tract
Pergerakan peristalsis sepanjang salur pencernaan

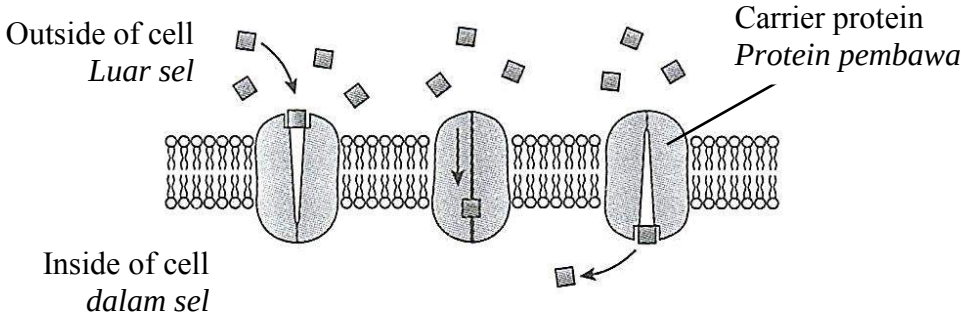
3 The diagram shows the phospholipid bilayer which forms the plasma membrane.
Rajah menunjukkan dwilapisan fosfolipid yang membentuk membran plasma.



What are the parts labelled P and Q ?
Apakah bahagian yang berlabel P *dan* Q *?*

	P	Q
A	Lipophobic head *Kepala lipofobik*	Lipophilic tail *Ekor lipofilik*
B	Lipophilic head *Kepala lipofilik*	Lipophobic tail *Ekor lipofobik*
C	Hydrophilic head *Kepala hidrofilik*	Hydrophobic tail *Ekor hidrofobik*
D	Hydrophobic head *Kepala hidrofobik*	Hydrophilic tail *Ekor hidrofilik*

4 The diagram shows the movement of molecules across a plasma membrane by process W.
Rajah menunjukkan pergerakan molekul-molekul merentasi satu membran plasma secara proses W.



Which of the following is process W ?
Antara berikut, yang manakah proses W *?*

A Facilitated diffusion
Resapan berbantu

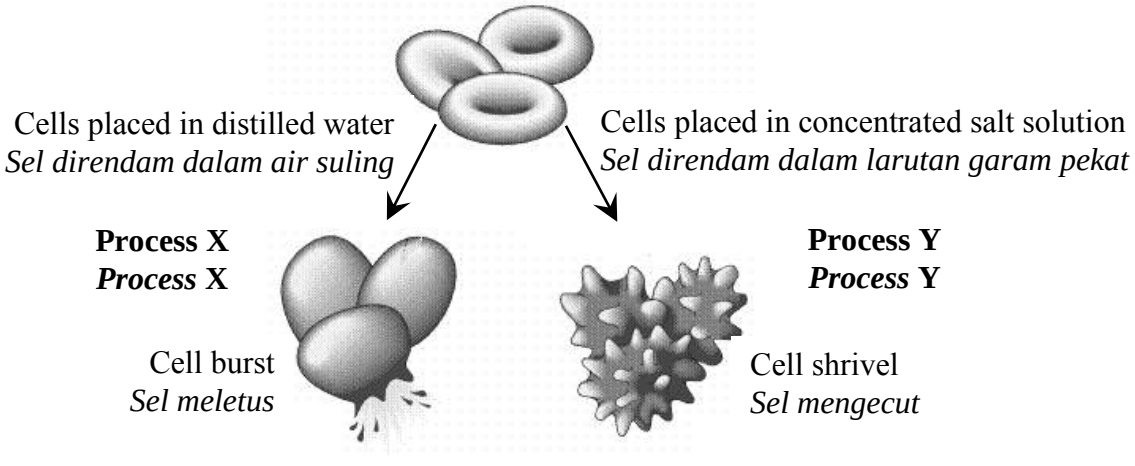
B Active transport
Pengangkutan aktif

C Simple diffusion
Resapan ringkas

D Osmosis
Osmosis

5 The diagram shows processes X and Y which occur when erythrocytes are immersed in distilled water and concentrated salt solution respectively.

Rajah menunjukkan proses-proses X *dan* Y *yang berlaku apabila eritrosit masing-masing direndam dalam air suling dan larutan garam pekat.*



Which of the following are processes X and Y ?

Antara berikut, yang manakah proses-proses X *dan* Y *?*

	Process X *Proses X*	Process Y *Proses Y*
A	Heamolysis *Hemolisis*	Plasmolysis *Plasmolisis*
B	Heamolysis *Hemolisis*	Crenation *Krenasi*
C	Crenation *Krenasi*	Heamolysis *Hemolisis*
D	Plasmolysis *Plasmolisis*	Crenation *Krenasi*

6 Why does salted fish remain preserved after a few months?

Mengapakah ikan masin kekal terawet selepas beberapa bulan?

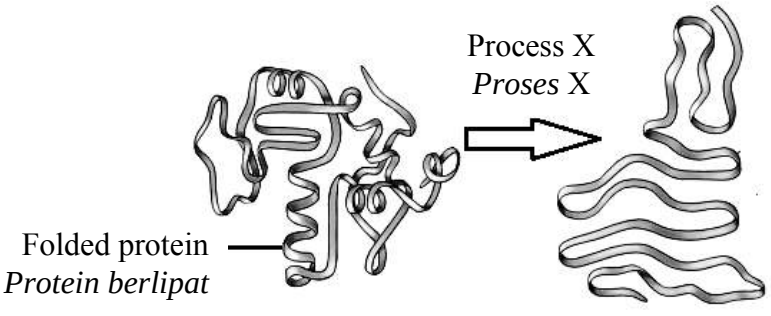
A The growth of bacteria is inhibited
Pertumbuhan bakteria tidak berlaku

B The pH of the solution used is low
pH larutan yang digunakan adalah rendah

C The water content in the fish is maintained
Kandungan air di dalam ikan dikekalkan

D Water molecules enter the fish cells by osmosis
Molekul air memasuki sel-sel ikan secara osmosis

7 The diagram shows a protein structure which has undergone process X.
Rajah menunjukkan satu struktur protein yang telah mengalami proses X.



What is process X ?
Apakah proses X *?*

A Hydrolysis
Hidrolisis

B Denaturation
Nyahasli

C Condensation
Kondensasi

D Deamination
Pendeaminan

8 Which enzyme is correctly matched to its function?
Enzim manakah yang dipadankan dengan betul kepada fungsinya?

	Enzyme *Enzim*	Function *Fungsi*
A	Protease *Protease*	Removing hair *Menanggalkan bulu*
B	Amylase *Amilase*	Soften the vegetables *Melembutkan sayuran*
C	Lipase *Lipase*	Production of yogurt *Penghasilan yogurt*
D	Cellulase *Selulase*	Convert starch to glucose *Menukarkan kanji kepada glukosa*

9 Which characteristic of saturated fats that distinguishes them from unsaturated fats?
Ciri lemak tepu manakah yang membezakannya daripada lemak tak tepu?

A Do not contain cholesterol
Tidak mengandungi kolestrol

B Contain high proportion mass of oxygen
Mengadungi nisbah jisim oksigen yang tinggi

C Contain only unbranched fatty acids
Mengadungi hanya asid lemak tidak bercabang

D Have no double bonds between their carbon atoms
Tidak mempunyai ikatan dubel di antara atom-atom karbon

10 Which event occurs only in meiosis?
Kejadian yang manakah hanya berlaku dalam meiosis?

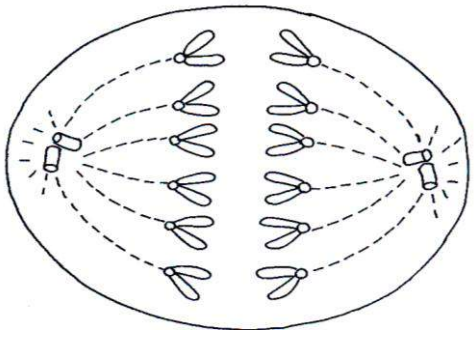
A Chromatid formation
Pembentukan kromatid

B Chromosome pairing
Kromosom berpasangan

C Chromosome condensation
Kromosom menebal

D Chromosomes move to poles of cell
Kromosom bergerak ke kutub sel

11 The diagram shows stage anaphase of mitosis of an animal cell.
Rajah menunjukkan peringkat anafasa dalam mitosis satu sel haiwan.



Which of the following is the number of chromosomes in the parent cell?
Antara berikut, yang manakah adalah bilangan kromosom dalam sel induknya?

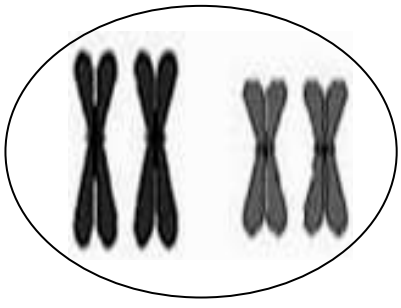
A 6

B 12

C 18

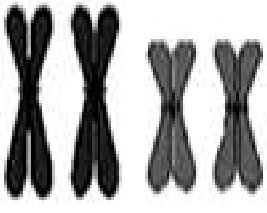
D 24

12 The diagram shows the chromosomes in a cell during prophase of mitosis.
Rajah menunjukkan kromosom dalam satu sel semasa profasa mitosis.

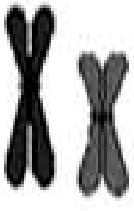


Which of the following is the condition of chromosomes during telophase?
Antara berikut, yang manakah keadaan kromosom semasa telofasa?

A



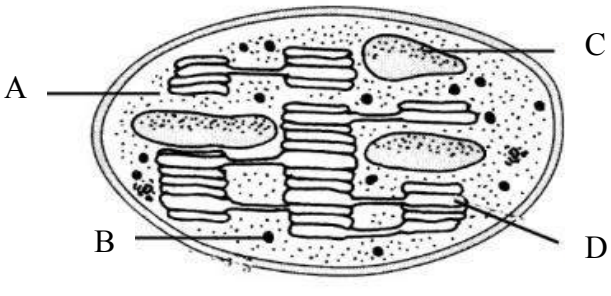
B



C

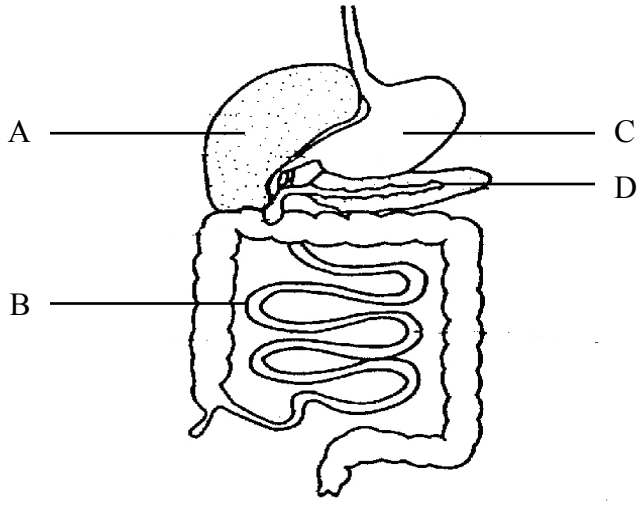
D

13 The diagram shows the structure of a chloroplast.
Rajah menunjukkan struktur satu kloroplas.



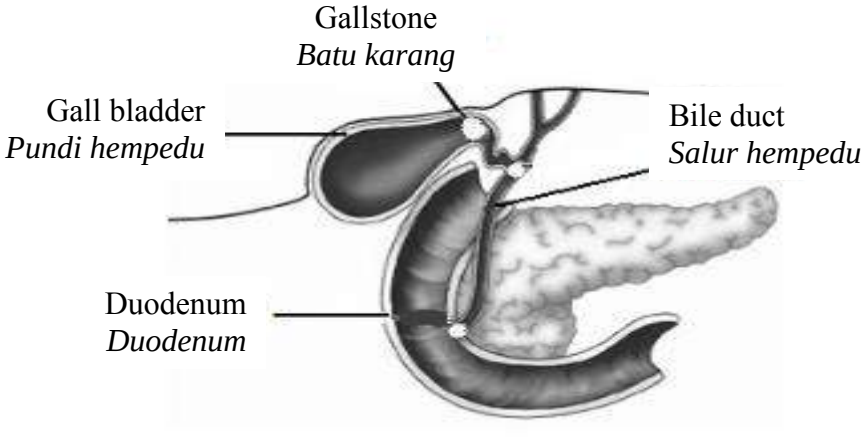
Which of the parts labelled A, B, C or D is the site for light reaction in photosynthesis?
Antara bahagian yang berlabel A, B, C *dan* D, *di manakah berlakunya tindak balas cahaya dalam fotosintesis?*

14 The diagram shows human digestive system.
Rajah menunjukkan sistem pencernaan manusia.



Which of the organs A, B, C or D secretes hydrochloric acid?
Antara organ A, B, C *dan* D*, yang manakah merembeskan asid hidroklorik?*

15 The diagram shows the bile duct is blocked by a gallstone.
Rajah menunjukkan salur hempedu yang tersumbat oleh batu hempedu.



Which of the following is the consequence of the occurrence?
Antara berikut, yang manakah adalah akibat daripada kejadian itu?

A Amylase is not produced
Enzim amilase tidak dapat dihasilkan.

B Lipase is not produced
Enzim lipase tidak dapat dihasilkan

C Digestion of starch will not occur
Pencernaan kanji tidak akan berlaku

D Digestion of lipids will be slow
Pencernaan lipid menjadi perlahan.

16 The following information shows the result of an experiment to determine the energy value of a cashew nut.
Maklumat berikut menunjukkan keputusan suatu eksperimen untuk menentukan nilai tenaga bagi gajus.

Mass of cashew *Jisim kacang gajus*	2 g
Volume of distilled water *Isipadu air suling*	20 ml
Initial temperature of water *Suhu awal air*	30 °C
Final temperature of water after burning the cashew nut *Suhu air selepas pembakaran gajus*	74 °C
Specific heat density of water *Muatan haba tentu air*	4.2 $Jg^{-1}°C$

Determine the calorific value of cashew nut.
Tentukan nilai kalori kacang gajus

A 1.488 kJg^{-1} **B** 1.848 kJg^{-1}

C 2.772 kJg^{-1} **D** 3.818 kJg^{-1}

17 Which of the following show the adaptations of small intestine in the absorption of digested food?
Antara berikut, yang manakah penyesuaian usus kecil dalam penyerapan makanan tercerna?

I Small intestine is very long
Usus kecil adalah panjang

II Dense network of blood capillaries
Jaringan kapilari darah yang padat

III Internal surface of small intestine is moist
Permukaan dalam usus kecil adalah lembab

IV The wall of small intestine is made up by smooth muscle
Dinding usus kecil terbina daripada otot licin

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

18 The diagram shows the stages of protein digestion in human alimentary canal. Q, R and S are the enzymes which hydrolyse protein substrates.

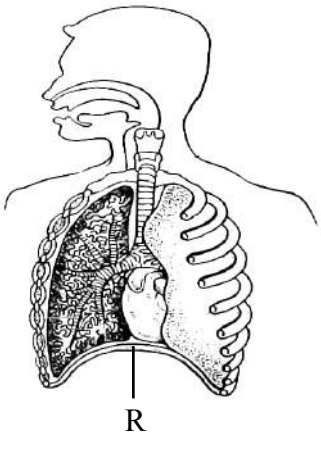
Rajah menunjukkan peringkat pencernaan protein dalam salur alimentari manusia. Q, R *dan* S *ialah enzim-enzim yang menghidrolisiskan substrat protein.*

Protein *Protein* —Q→ Polypeptide *Polipeptida* —R→ Peptide *Peptida* —S→ Amino acid *Asid amino*

What are Q, R and S ?
Apakah Q, R *dan* S *?*

	Q	R	S
A	Rennin *Renin*	Peptidase *Peptidase*	Trypsin *Tripsin*
B	Rennin *Renin*	Pepsin *Pepsin*	Trypsin *Tripsin*
C	Pepsin *Pepsin*	Trypsin *Tripsin*	Peptidase *Peptidase*
D	Pepsin *Pepsin*	Rennin *Renin*	Trypsin *Tripsin*

19 The diagram shows human respiratory system.
Rajah menunjukkan sistem respirasi pada manusia.



What happen to structure R during exhalation?
Apakah yang berlaku kepada struktur R *semasa hembus nafas?*

A Relaxes and becomes flatten
Mengendur dan menjadi mendatar

B Contracts and becomes flatten
Mengecut dan menjadi mendatar

C Relaxes and becomes dome shape
Mengendur dan menjadi bentuk kubah

D Contracts and becomes dome shape
Mengecut dan menjadi bentuk kubah

20 What is produced during the anaerobic respiration in human muscles and yeast?
Apakah yang dihasilkan semasa respirasi anaerob dalam otot manusia dan yis?

A Ethanol
Etanol

B Lactic acid
Asid laktik

C Heat energy
Tenaga haba

D Carbon dioxide
Karbon dioksida

21 Which of the following changes will increase the rate of respiration in an organism?
Antara perubahan berikut, yang manakah akan meningkatkan kadar respirasi suatu organisma?

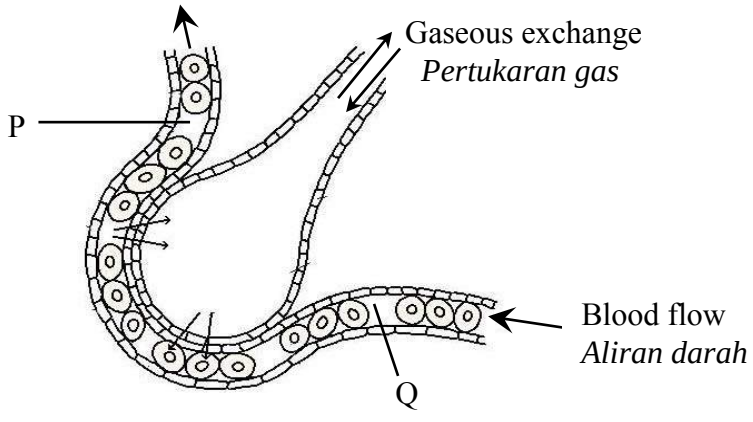
A Body temperature decreases
Suhu badan menurun

B The glucose concentration of blood decreases
Kepekatan glukosa dalam darah menurun

C The oxygen concentration in the blood increases
Kepekatan oksigen dalam darah meningkat

D The carbon dioxide concentration in the blood increases
Kepekatan karbon dioksida dalam darah meningkat

22 The diagram shows an alveolus and a surrounding blood capillary.
Rajah menunjukkan satu alveolus dan satu kapilari darah berdekatan.



Which of the following is true about the blood in vessels P and Q ?
Antara berikut, yang manakah adalah benar mengenai darah di dalam salur P *dan* Q *?*

	P	Q
A	More oxygen *Lebih oksigen*	Less carbon dioxide *Kurang karbon dioksida*
B	Less oxygen *Kurang oksigen*	More carbon dioxide *Lebih karbon dioksida*
C	More carbon dioxide *Lebih karbon dioksida*	More oxygen *Lebih oksigen*
D	Less carbon dioxide *Kurang karbon dioksida*	Less oxygen *Kurang oksigen*

23 Which of the following describes a niche?
Antara berikut, yang manakah menerangkan tentang nic?

A The function of an organism in an ecosystem.
Peranan suatu organisma dalam suatu ekosistem.

B The natural surroundings where organisms live.
Persekitaran semulajadi dalam mana organisma hidup.

C Different spesies which live together in an ecosystem.
Spesies berlainan yang tinggal bersama dalam ekosistem.

D Several spesies of organisms which live together in a place.
Beberapa spesies organisma yang tinggal bersama di satu tempat.

24 The diagram shows an adaptation of the seedling of a mangrove plant.
Rajah menunjukkan penyesuaian anak benih pokok bakau.

Which of the following is the importance of the adaptation?
Antara berikut, yang manakah kepentingan penyesuaian itu?

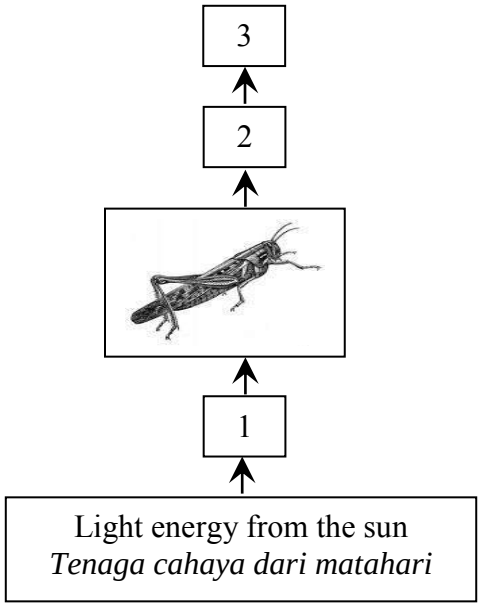
A Supplying water to the seedling
Membekalkan water kepada anak benih

B Securing a stable grasp to the substrate
Mendapatkan cengkaman yang kukuh pada substrat

C Protecting the seedling from the saline habitat
Melindungi anak benih daripada habitat air masin

D Ensuring a successful fertilisation to form seed
Memastikan kejayaan persenyawaan membentuk biji benih

25 The diagram shows the energy flow in an ecosystem.
Rajah menunjukkan aliran tenaga dalam satu ecosystem.



Which represents the carnivores?
Yang manakah mewakili karnivor?

A 1 and 2
1 dan 2

B 2 and 3
2 dan 3

C 1 and 3
1 dan 3

D 3 only
3 sahaja

26 The following information shows the results of an activity to determine the frequency of *Mimosa pudica* in a school field.

Maklumat berikut menunjukkan keputusan bagi aktiviti untuk mmenentukan frekuensi Mimosa pudica di padang sekolah.

Quadrat *Kuadrat*	1	2	3	4	5	6	7	8	9	10
Area covered *Luas litupan* (m^2)	0.01	0.23	0.04	0.15	0	0	0.81	0	0	0.02

Which of the following is the frequency of *Mimosa pudica*?
Antara berikut, yang manakah adalah frekuensi bagi Mimosa pudica itu?

A 13.5%

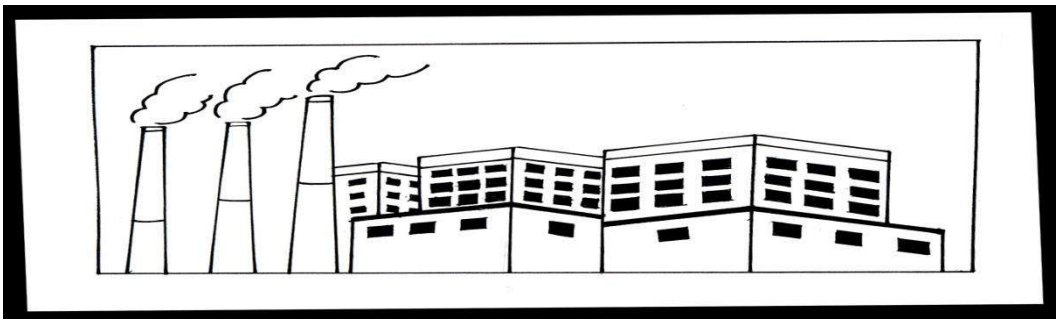
B 40.0%

C 60.0%

D 86.5%

27 The diagram shows an industrial area.

Rajah menunjukkan sebuah kawasan perindustrian.



Which of the following steps should be taken to reduce air pollution?

Antara berikut, manakah langkah yang harus diambil untuk mengurangkan pencemaran udara?

A Close the chimneys
Menutup cerobong asap

B Lower the chimneys
Merendahkan cerobong asap

C Fit filters at the chimneys
Meletakkan penapis pada cerobong asap

D Direct the chimneys to rural area
Mengarahkan cerobong asap ke kawasan pedalaman

28 Which of the following refers to the phenomenon in which infrared radiation from the sun is reradiated from the surface of the earth and trapped in the atmosphere?

Antara berikut, yang manakah adalah merujuk kepada fenomena radiasi infra-merah daripada matahari yang dipantulkan semula oleh permukaan bumi dan terperangkap di dalam atmosfera?

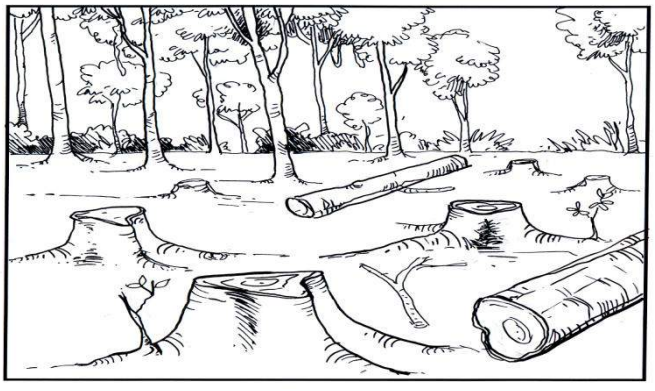
A Ozone depletion
Penipisan lapisan ozon

B Climate change
Perubahan iklim

C Thermal pollution
Pencemaran terma

D Greenhouse effect
Kesan rumah hijau

29 The diagram shows a human activity.
Rajah menunjukkan satu aktiviti manusia.



Which of the following are the effects of the activity?
Antara berikut, yang manakah kesan-kesan aktiviti itu?

I Soil erosion
Hakisan tanah

II Flash floods
Banjir kilat

III Euthrophication
Eutrofikasi

IV Ozone depletion
Penipisan lapisan ozon

A I and II only
I dan II sahaja

B I and III only
I dan III sahaja

C II and III only
II dan III sahaja

D II and IV only
II dan IV sahaja

30 Water samples were taken from two areas P and R to compare their BOD values.

Sampel air telah diambil daripada kawasan P *dan* R *untuk membandingkan nilai BOD.*

Water sample *Sampel air*	Time taken for methylene blue to decolourised (minute) *Masa yang diambil untuk metilena biru dinyahwarna (minit)*
P	25
R	40

Which of the following statements explain the results of the experiment?

Antara berikut, yang manakah menerangkan keputusan eksperimen itu?

I There is more dissolved oxygen in water sample from area P.
Terdapat lebih banyak oksigen di dalam sampel air dari kawasan P.

II Water sample from area P is more polluted than area R.
Sampel air dari kawasan P *adalah lebih tercemar berbanding kawasan* R.

III Water sample from area P has lower BOD value than area R.
Sampel air dari kawasan P *mempunyai nilai BOD yang lebih rendah daripada kawasan* R.

IV The methylene blue solution is decolourised rapidly if the water sample is more polluted.
Larutan metilena biru dinyahwarnakan dengan pantas sekiranya sampel air lebih tercemar.

A I and II only
I dan II sahaja

B I and III only
I dan III sahaja

C II and III only
II dan III sahaja

D II and IV only
II dan IV sahaja

31 Which of the following is the valve that prevents the back flow of blood from the right ventricle into the right atrium in human heart?

Antara berikut, manakah injap yang menghalang pengaliran balik darah dari ventrikel kanan ke atrium kanan dalam jantung manusia?

A Bicuspid valve
Injap bikuspid

B Semilunar valve
Injap sabit

C Tricuspid valve
Injap trikuspid

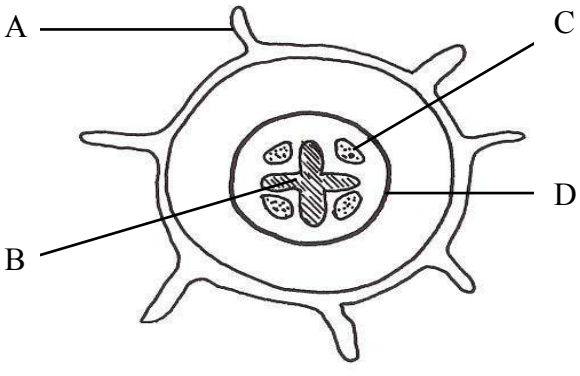
D Pocket valve
Injap poket

32 The diagram shows the cross section of dicotyledonous root.

Which of the following structures labelled A, B, C or D transport substance from root to leaves?

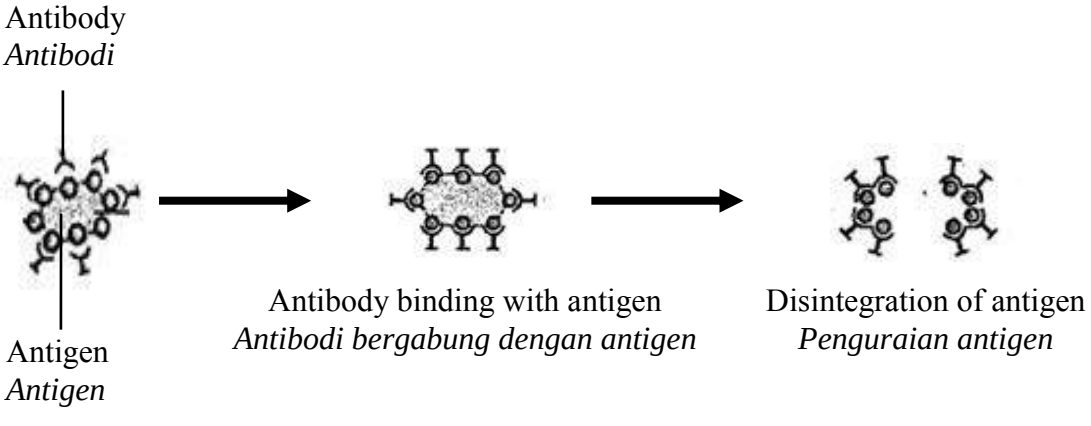
Rajah menunjukkan satu keratan rentas akar dikotiledon.

Antara struktur berlabel A, B, C *dan* D, *manakah struktur yang mengangkut bahan dari akar ke daun?*



33 The diagram shows a mechanism of antibody destroying an antigen.

Rajah menunjukkan satu mekanisme antibodi memusnahkan antigen.



Which of the following is the mechanism?

Antara berikut, yang manakah mekanisme itu?

A Lysis
Lisis

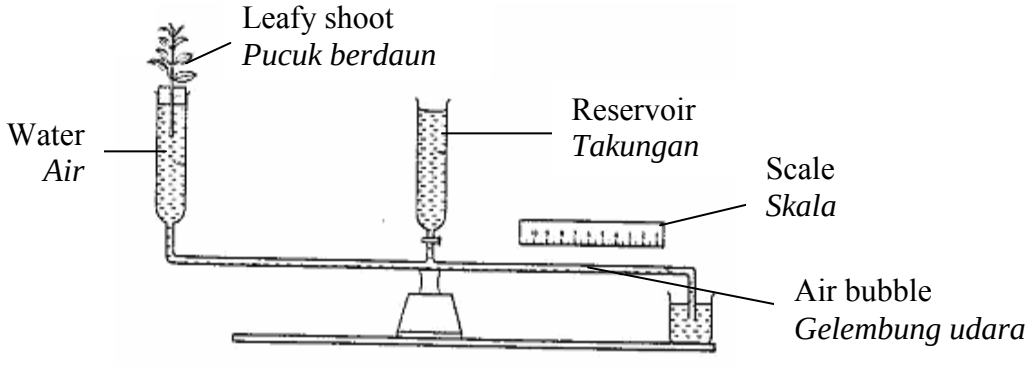
B Neutralisation
Peneutralan

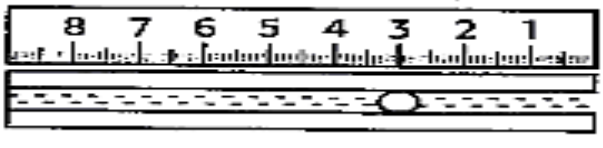
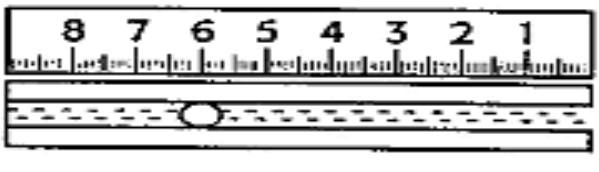
C Precipitation
Pemendakan

D Agglutination
Penggumpalan

34 The diagram shows a potometer which is set up to measure the rate of transpiration in a plant.

Rajah menunjukkan satu potometer yang disediakan untuk mengukur kadar transpirasi dalam tumbuhan.



Time(minute) *Masa (minit)*	Position of air bubble (cm) *Kedudukan gelembung udara(cm)*
0	Beginning of experiment *Awal eksperimen* 
5	End of experiment *Akhir eksperimen* 

The positions of the air bubble at the beginning and at the end of the experiment are shown in the table.

Which of the following is the rate of transpiration of the plant?

Kedudukan gelembung udara semasa peringkat awal dan akhir eksperimen ditunjukkan dalam jadual.

Antara berikut, yang manakah kadar transpirasi tumbuhan itu?

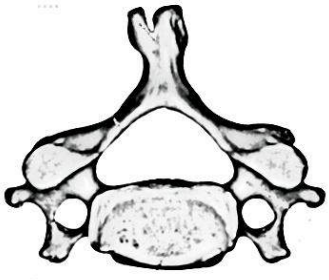
A 0.03 cm minute^{-1}

B 0.60 cm minute^{-1}

C 1.20 cm minute^{-1}

D 1.67 cm minute^{-1}

35 The diagram shows a type of vertebrae.
Rajah menunjukkan sejenis vertebra.



Which of the following is the vertebrae?
Antara berikut, yang manakah vertebra itu?

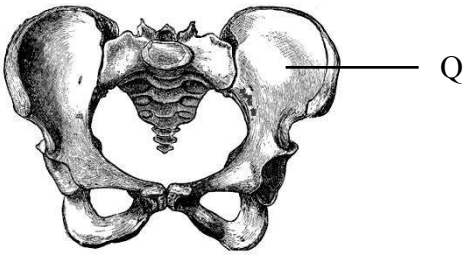
A Lumbar vertebrae
Vertebra lumbar

B Thoracic vertebrae
Vertebra toraks

C Atlas vertebrae
Vertebra atlas

D Cervical vertebrae
Vertebra serviks

36 The diagram shows a pelvic girdle of human.
Rajah menunjukkan lengkungan pelvik manusia.



What is part Q ?
Apakah bahagian Q *?*

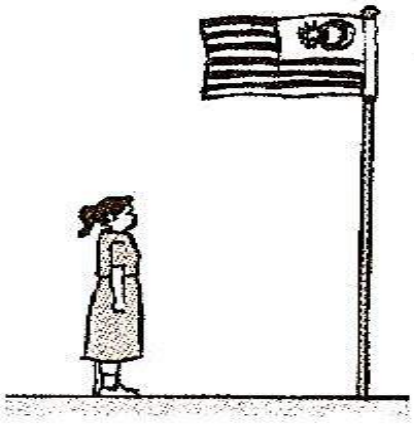
A Ilium
Ilium

B Ischium
Iskium

C Pubis
Pubis

D Coccyx
Koksik

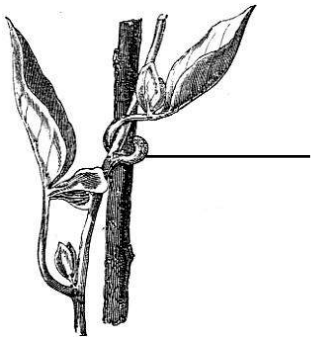
37 The diagram shows a student standing in front of a flag.
Rajah menunjukkan seorang pelajar berdiri di depan bendera.



Which of the following is true about the muscles in her arm in this posture?
Antara berikut, yang manakah benar tentang otot-otot pada lengan pelajar dalam postur ini?

	Biceps muscle *Otot biseps*	Triceps muscle *Otot triseps*
A	Relaxes *Mengendur*	Relaxes *Mengendur*
B	Contracts *Mengecut*	Contracts *Mengecut*
C	Contracts *Mengecut*	Relaxes *Mengendur*
D	Relaxes *Mengendur*	Contracts *Mengecut*

38 The diagram shows the response of a plant to a stimulus.
Rajah menunjukkan gerakbalas tumbuhan terhadap satu rangsangan.



Which of the following is the response?
Antara berikut , yang manakah gerakbalas itu?

A Phototropism
Fototropisma

B Thigmotropism
Tigmotropisma

C Thermonasty
Termonasti

D Seismonasty
Seismonasti

39 Which part of nephron is involved in the reabsorption of glucose in the kidney?
Bahagian nefron manakah yang terlibat dalam penyerapan semula glukosa dalam ginjal?

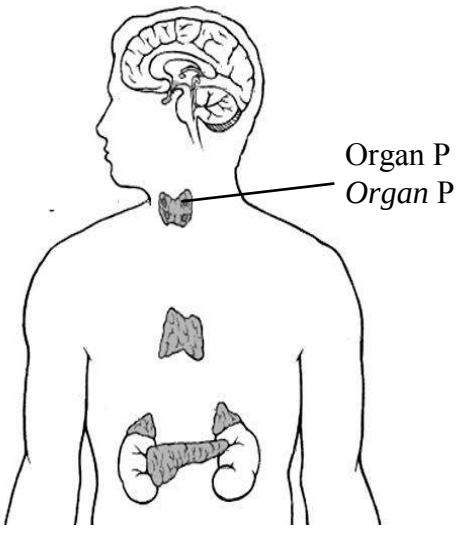
A Loop of Henle
Liku Henle

B Collecting duct
Tubul pengumpul

C Distal convoluted tubule
Tubul berlingkar distal

D Proximal convoluted tubule
Tubul berlingkar proksimal

40 The diagram shows human endocrine system.
Rajah menunjukkan sistem endokrin manusia.



Which of the following is the effect if gland P failed to secrete its hormone?
Antara berikut, yang manakah kesan sekiranya kelenjar P *gagal merembeskan hormonnya?*

A Metabolic rate decreases
Kadar metabolisma menurun

B Blood glucose level increases
Aras glukosa darah meningkat

C Formation of sperm decreases
Pembentukan sperma menurun

D Heartbeat rate increases
Kadar denyutan jantung meningkat

41 Drinking alcohol inhibits the release of a hormone, resulting in the production of dilute urine. This occurs because the alcohol is disrupting the function of an organ.

Which of the following is the organ?

Meminum alkohol menghalang perembesan sejenis hormone menyebabkan penghasilan air kencing yang cair. Ini berlaku kerana alkohol menjejaskan fungsi suatu organ.

Antara berikut, yang manakah organ itu?

A Thyroid gland
Kelenjar tiroid

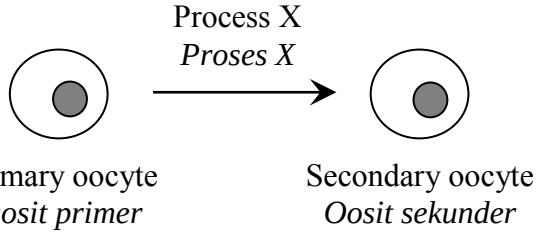
B Pituitary gland
Kelenjar pituitari

C Adrenal gland
Kelenjar adrenal

D Pancreatic gland
Kelenjar pankreas

42 The diagram shows a process in oogenesis.

Rajah menunjukkan satu proses dalam oogenesis.



Which of the following is process X ?

Antara berikut, yang manakah proses X *?*

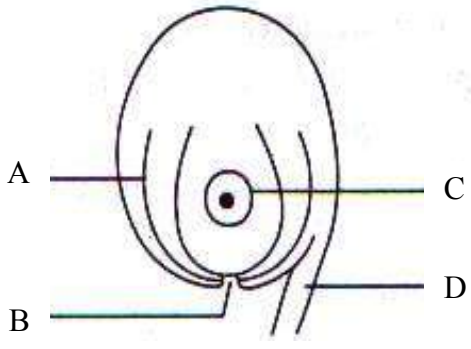
A Meiosis I
Meiosis I

B *Meiosis II*
Meiosis II

C Cytokinesis
Sitokinesis

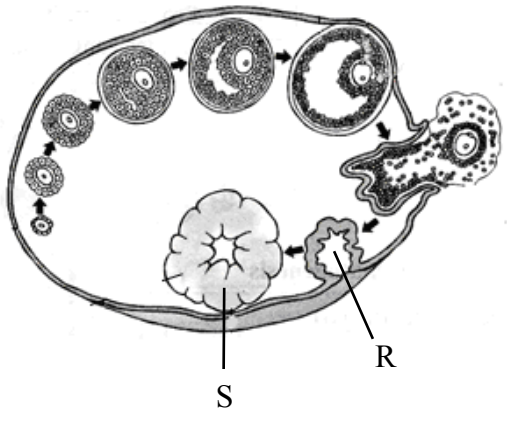
D Mitosis
Mitosis

43 The diagram shows the structure of an ovule.
Rajah menunjukkan struktur satu ovul.



Which of the parts labelled A, B, C or D develops into testa after fertilisation?
Antara bahagian yang berlabel A, B, *C and* D, *manakah yang akan berkembang menjadi testa selepas persenyawaan?*

44 The diagram shows the stages in the development of follicle in the ovary of human. R develops into S.
Rajah menunjukkan peringkat perkembangan folikel di dalam ovari manusia. R berkembang menjadi S.



Which of the following are the changes of the hormonal levels in the blood?
Antara berikut, yang manakah perubahan aras hormon di dalam darah?

	Progesterone *Progesteron*	Folicle stimulating hormone (FSH) *Hormon Perangsang Folikel (FSH)*
A	Increases *Meningkat*	Increases *Meningkat*
B	Decreases *Menurun*	Increases *Meningkat*
C	Increases *Meningkat*	Decreases *Menurun*
D	Decreases *Menurun*	Decreases *Menurun*

45 What is the main cause of menopause in female humans?
Apakah sebab utama berlaku putus haid pada wanita?

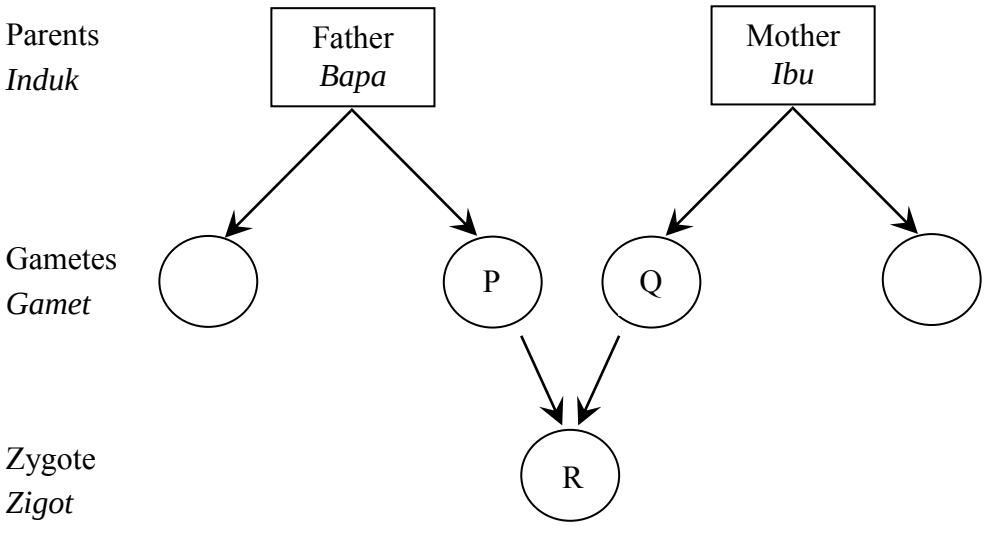
A Ovary secretes less oestrogen
Ovari merembeskan kurang estrogen

B Ovary secretes less progesterone
Ovari merembes kurang progesteron

C Pituitary secretes less leutinising hormone (LH)
Pituitari merembes kurang hormon peleutinan (LH)

D Pituitary secretes less follicle stimulating hormone (FSH)
Pituitari merembes kurang hormon perangsang folikel (FSH)

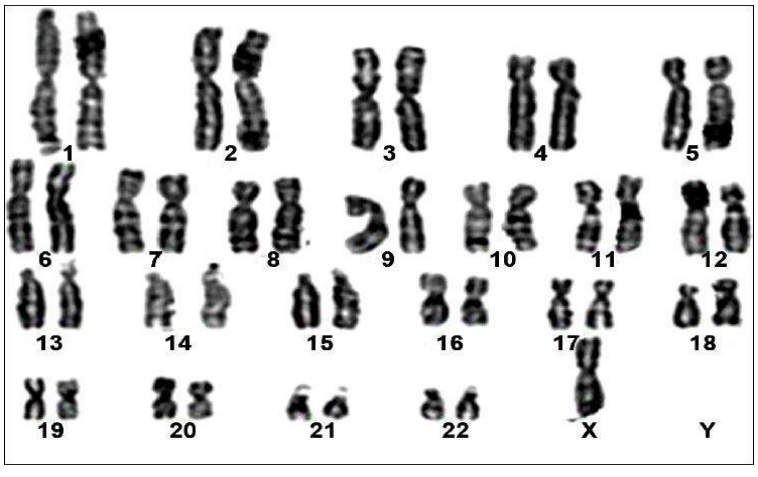
46 The diagram shows a genetic diagram for sex determination in human.
Rajah menunjukkan gambarajah genetik penentuan jantina manusia.



If the parents get a baby boy, what are the chromosomal contents of P, Q and R ?
Jika pasangan induk itu mendapat anak lelaki, apakah kandungan kromosom bagi P, Q *dan* R *?*

	P	Q	R
A	22+X	22+X	22+XX
B	22+X	22+Y	22+XY
C	22+Y	22+X	44+XY
D	22+X	22+X	44+XX

47 The diagram shows a karyotype of a person with a genetic abnormality.
Rajah menunjukkan kariotip seseorang dengan ketidaknormalan genetik.



Which of the following is the phenotype of the person?
Antara berikut, yang manakah fenotip bagi individu itu?

A Down Syndrome female
Perempuan sindrom Down

B Haemophiliac male
Lelaki hemophilia

C Klinefelter's Syndrome
Sindrom Klinefelter

D Turner's Syndrom
Sindrom Turner

48 The following information shows some alleles found in human.
Maklumat berikut menunjukkan beberapa alel dalam manusia.

F	Dominant allel for free earlobes *Alel dominan untuk cuping telinga bebas*
f	Recessive allele for attached earlobes *Alel resesif untuk cuping telinga melekap*
H	Dominant allel for curly hair *Alel dominan untuk rambut keriting*
h	Recessive allele for straight hair *Alel resesif untuk rambut lurus*

What is the probability of a couple getting a child with genotype, FFhh, if the husband is homozygous dominant for both traits while the wife is homozygous recessive for both traits?

Apakah kebarangkalian satu pasangan mendapat anak dengan genotip, FFhh, *jika suami adalah homozigus dominan bagi kedua-dua trait manakala isterinya homozigus resesif bagi kedua-dua trait?*

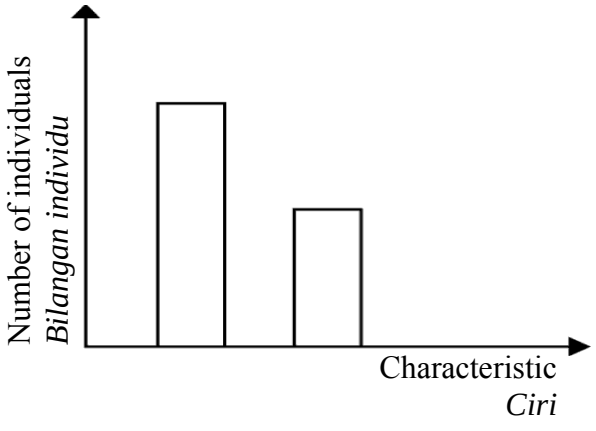
A 0%

B 25%

C 50%

D 100%

49 The diagram shows the distribution of individuals for a type of variation.
Rajah menunjukkan taburan individu bagi sejenis variasi.



Which of the following is the characteristics of the variation?
Antara berikut, yang manakah ciri bagi variasi itu?

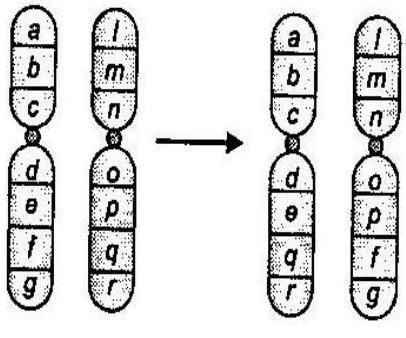
A Height
Ketinggian

B Body mass
Jisim badan

C Skin colour
Warna kulit

D Ability to roll tongue
Kebolehan menggulung lidah

50 The diagram shows a change in the structure of a chromosome due to an occurence.
Rajah menunjukkan satu perubahan pada struktur kromosom akibat satu kejadian.



Which of the following is the occurence ?
Antara berikut, yang manakah kejadian itu?

A Deletion
Pelenyapan

B Duplication
Penggandaan

C Translocation
Translokasi

D Inversion
Penyonsangan

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

INFORMATION FOR CANDIDATES

MAKLUMAT UNTUK CALON

1. This question paper consists of **50** questions.
Kertas soalan ini mengandungi **50** *soalan.*

2. Answer **all** questions.
Jawab ***semua*** *soalan.*

3. Answer each question by blackening the correct space on the answer sheet.
Jawab setiap soalan dengan menghitamkan ruangan yang betul dalam helaian jawapan.

4. Blacken only **one** space for each question.
Hitamkan ***satu*** *ruangan sahaja bagi setiap soalan.*

5. If you wish to change your answer, erase the blackened mark that you have made. Then blacken the space for the new answer.
Sekiranya anda ingin mengubah jawapan anda, padamkan tanda hitam yang telah dibuat. Kemudian hitamkan ruangan untuk jawapan baru.

6. The diagrams in the questions provided are not drawn to scale unless stated.
Rajah yang diberikan dalam soalan tidak dilukiskan mengikut skala melainkan diberitau.

7. You may use a non-programmable scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan.

SULIT Nama: ..... Tingkatan: ……..... **4551/2**
4551/2
BIOLOGI
Kertas 2
Ogos 2012
2½ jam

BAHAGIAN PENGURUSAN SEKOLAH BERASRAMA PENUH
DAN SEKOLAH KECEMERLANGAN
KEMENTERIAN PELAJARAN MALAYSIA

PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2012
PERCUBAAN SIJIL PELAJARAN MALAYSIA

BIOLOGI
Kertas 2
Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

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

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

This question paper consists of 21 printed pages and 1 blank page.
Kertas soalan ini mengandungi 21 *halaman bercetak dan* 1 *halaman kosong.*

[See next page
[*Lihat halaman sebelah*

For Examiner's Use

Section A
Bahagian A

[60 marks]
[60 *markah*]

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

1 Diagram 1.1 shows a plant cell in normal condition, and two conditions of the plant cell when immersed in different concentrations of sucrose solutions.

Rajah 1.1 *menunjukkan satu sel tumbuhan dalam keadaan normal, dan dua keadaan sel itu apabila direndam di dalam larutan sukrosa berlainan kepekatan.*

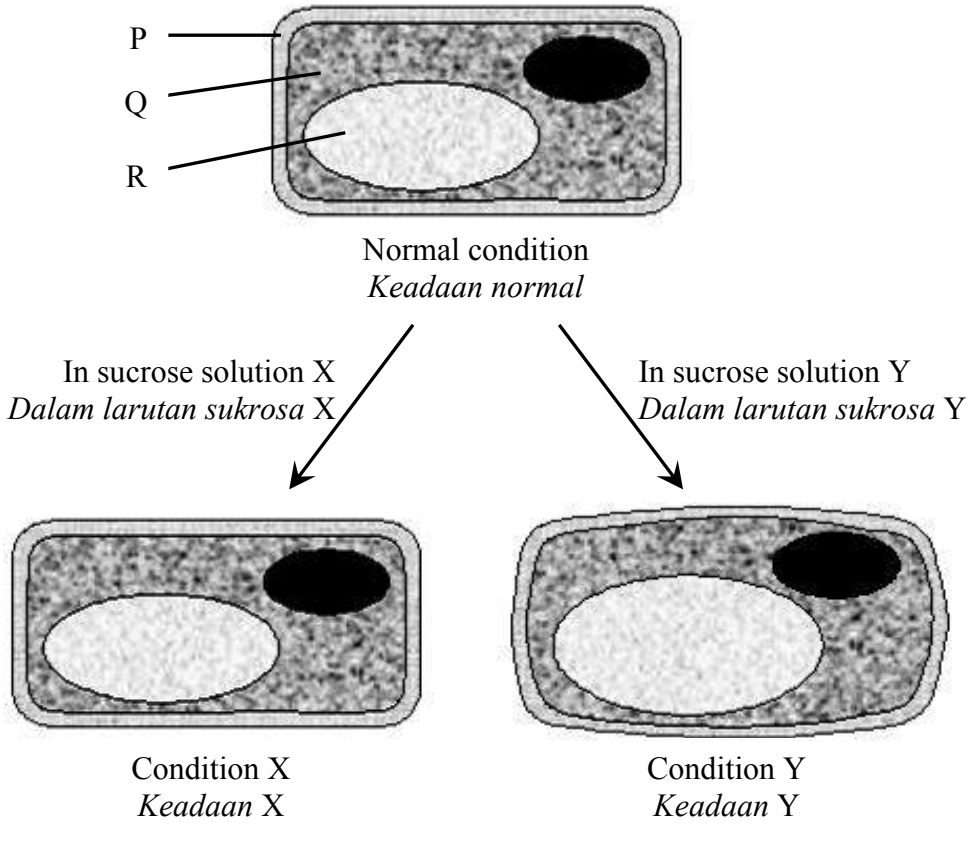


Diagram 1.1
Rajah 1.1

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

P : .....

Q : .....

R : .....

[3 marks]
[3 *markah*]

1(a)(i)

For Examiner's Use

(ii) State condition Y of the plant cell.
Nyatakan keadaan Y *sel tumbuhan itu.*

……

[1 mark]
[1 *markah*]

1(a)(ii)

(b) Explain how condition X and condition Y of the plant cell occur.
Terangkan bagaimana keadaan X dan keadaan Y sel tumbuhan itu berlaku.

Condition X :
Keadaan X :

……

……

……

Condition Y :
Keadaan Y :

……

……

……

[4 marks]
[4 *markah*]

1(b)

(c) A chemical substance inhibits the respiration process in the root hair cells of the plant.
Explain the effect to the transport of mineral ions into the root hair cells.

Satu bahan kimia telah merencat proses respirasi di dalam sel-sel rerambut akar tumbuhan itu.
Terangkan kesan ke atas pengangkutan ion mineral ke dalam sel-sel rerambut akar itu.

……

……

……

……

[2 marks]
[2 *markah*]

1(c)

For Examiner's Use

(d) Diagram 1.2 shows a wilted plant after supplied with an excess amount of fertiliser.

Rajah 1.2 *menunjukkan satu tumbuhan layu setelah diberikan baja yang berlebihan.*

Diagram 1.2
Rajah 1.2

Draw a labelled diagram to show the condition of a leaf cell of the plant.

Lukis satu rajah berlabel yang menunjukkan keadaan sel daun bagi tumbuhan itu.

1(d)

[2 marks]
[2 *markah*]

A1

For Examiner's Use

2 Diagram 2 shows a meiotic division of an animal cell.
Rajah 2 *menunjukkan pembahagian meiosis satu sel haiwan.*

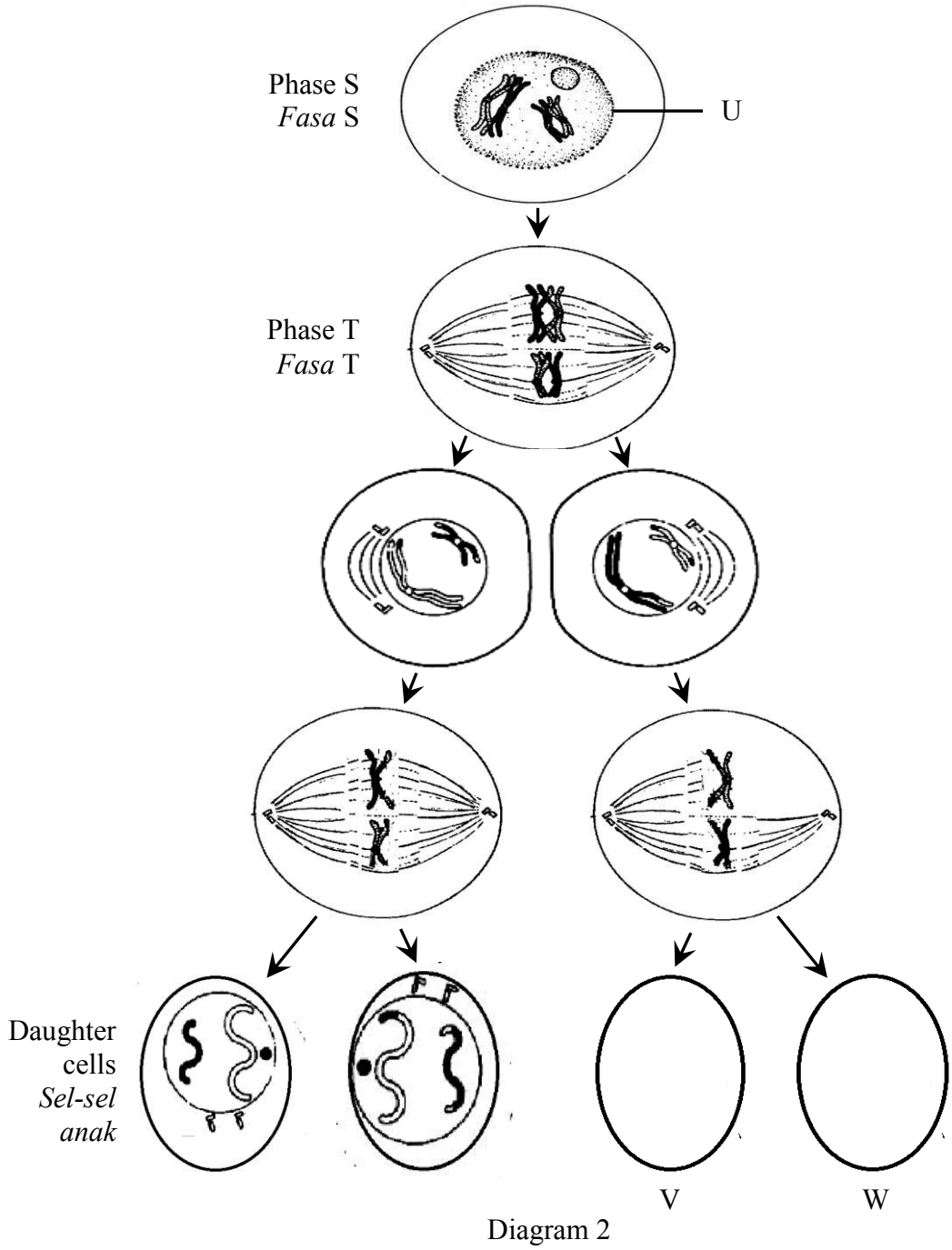


Diagram 2
Rajah 2

(a) Name phase S and membrane U.
Namakan fasa S *dan membran* U.

Phase S / *Fasa* S : .....

Membrane U / *Membran* U : .....

[2 marks]
[2 *markah*]

2(a)

For Examiner's Use

(b) (i) Explain the chromosomal behaviour during phase S.
Terangkan perlakuan kromosom semasa fasa S.

……
……
……
……

[2 marks]
[2 *markah*]

2(b)(i)

(ii) Explain how the chromosomal behaviour in (b) (i) contributes to the survival of an animal species.
Terangkan bagaimana perlakuan kromosom di (b) (i) *menyumbang kepada kemandirian suatu spesies haiwan*.

……
……
……
……

[2 marks]
[2 *markah*]

2(b)(ii)

(c) Explain the chromosomal behaviour during phase T.
Terangkan perlakuan kromosom semasa fasa T.

……
……
……
……

[2 marks]
[2 *markah*]

2(c)

(d) Complete the diagram of the daughter cells.
Explain the occurrence of daughter cells V and W.
Lengkapkan rajah sel-sel anak.
Terangkan kejadian sel-sel anak V *dan* W.

……
……
……
……

[4 marks]
[4 *markah*]

2(d)

A2

For Examiner's Use

3 Diagram 3.1 shows flight muscles of a bird.
Rajah 3.1 *menunjukkan otot penerbangan seekor burung.*

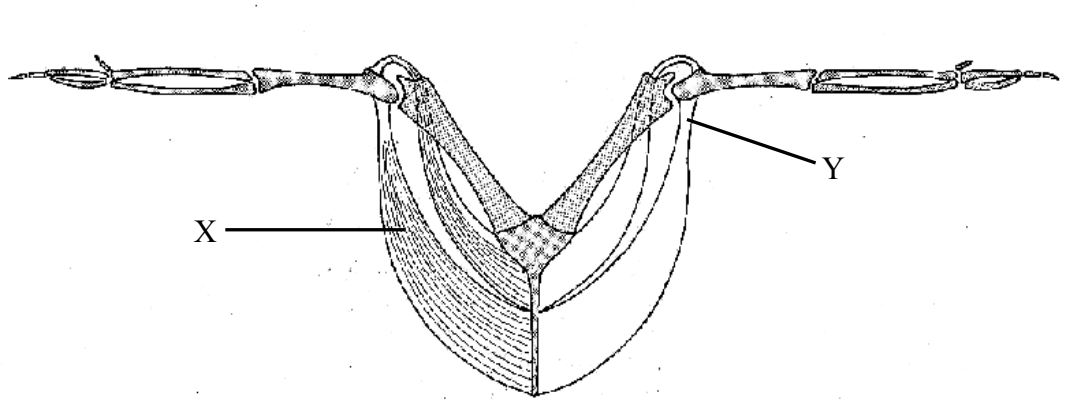


Diagram 3.1
Rajah 3.1

(a) Name X and Y.
Namakan X *dan* Y.

X : .....

Y : .....

[2 marks]
[2 *markah*]

3(a)

(b) (i) Explain why structure X has an abundance of mitochondria.
Terangkan kenapa stuktur X *mengandungi banyak mitokondria.*

.....

.....

.....

[2 marks]
[2 *markah*]

3(b)(i)

(ii) Explain the function of X in locomotion of bird.
Terangkan peranan X *dalam pergerakan burung.*

.....

.....

.....

[2 marks]
[2 *markah*]

3(b)(ii)

For Examiner's Use

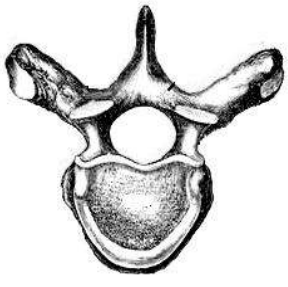
(c) Explain the effect to the locomotion of bird if structure Y is torn.
Terangkan kesan terhadap pergerakan burung jika stuktur Y *terkoyak.*

……
……
……
[2 marks]
[2 *markah*]

3(c)

(d) Diagram 3.2 shows two types of vertebrae in human backbone.
Rajah 3.2 *menunjukkan dua jenis vertebrae dalam tulang belakang manusia.*

Vertebra P
Vertebra P



Vertebra Q
Vertebra Q

Diagram 3.2
Rajah 3.2

State two differences in structure between the vertebra P and vertebra Q.
Nyatakan dua perbezaan struktur bagi vertebra P *dan vertebra* Q.

P	Q

[2 marks]
[2 *markah*]

3(d)

(e) A man has swollen ankle and is painful during movement after having a habit of taking high protein diet.
Explain the relationship between the diet and the disease he suffers.

Seorang lelaki mengalami bengkak buku lali dan berasa sakit ketika bergerak setelah mengamalkan pengambilan diet yang tinggi kandungan protein.

Terangkan hubungkait antara diet dan penyakit yang dialaminya.

……
……
……
[2 marks]
[2 *markah*]

3(e)

A3

For Examiner's Use

4 Diagram 4 shows the flow of blood and lymph in human body.
Rajah 4 *menunjukkan pengaliran darah dan cecair limfa dalam badan manusia.*

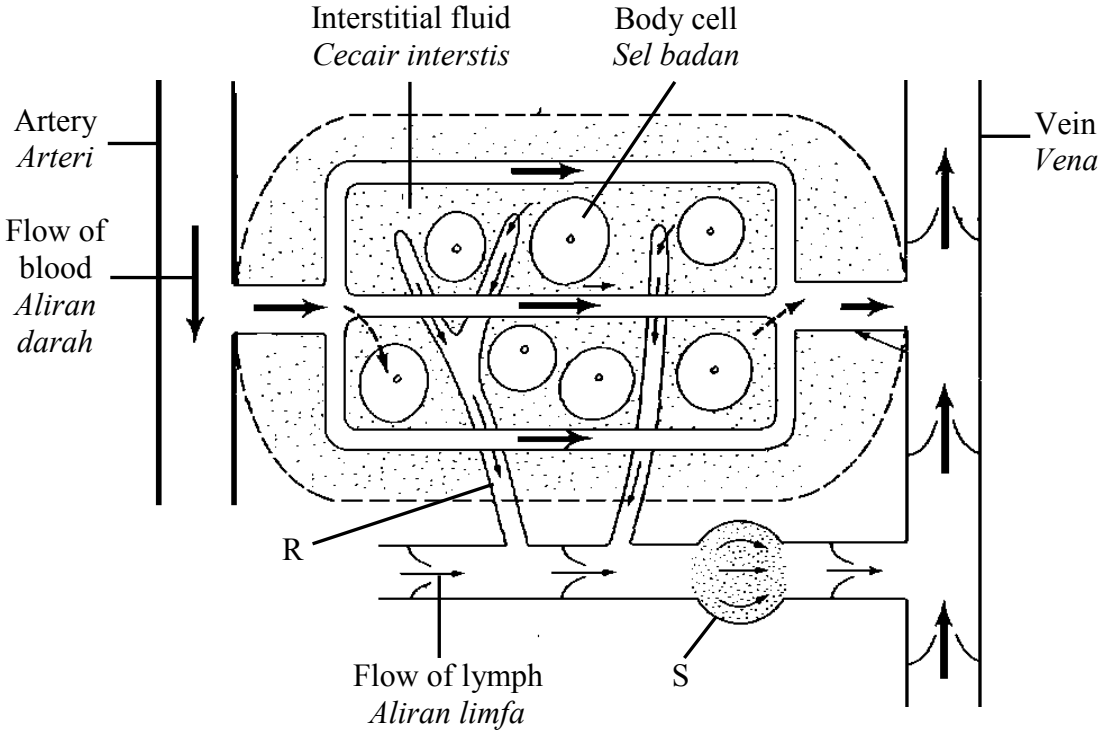


Diagram 4
Rajah 4

(a) Name R and S.
Namakan R *dan* S.

R : ……

S : ……

[2 marks]
[2 *markah*]

4(a)

(b) Explain the formation of lymph in R.
Terangkan pembentukan cecair limfa dalam R.

……

……

……

……

……

[3 marks]
[3 *markah*]

4(b)

For Examiner's Use

(c) (i) State the disease when vessels R in the leg are blocked by filarial worms.

Nyatakan penyakit apabila salur-salur R *pada kaki tersumbat oleh cacing filaria.*

……..

[1 mark]
[1 *markah*]

4(c)(i)

(ii) Explain your answer in c (i).

Terangkan jawapan anda di c (i).

……

……

……..

[2 marks]
[2 *markah*]

4(c)(ii)

(d) Explain one difference between the composition of interstitial fluid and lymph.

Terangkan satu perbezaan antara kandungan cecair interstis dan cecair limfa.

……

……

……

……..

[2 marks]
[2 *markah*]

4(d)

(e) Explain the importance of lymphatic system in human.

Terangkan kepentingan sistem limfa kepada manusia.

……

……

……

……..

[2 marks]
[2 *markah*]

4(e)

A4

For Examiner's Use

5 Diagram 5 shows the changes and regulation of hormones during a menstrual cycle.
Rajah 5 menunjukkan perubahan dan kawal atur hormon semasa kitar haid.

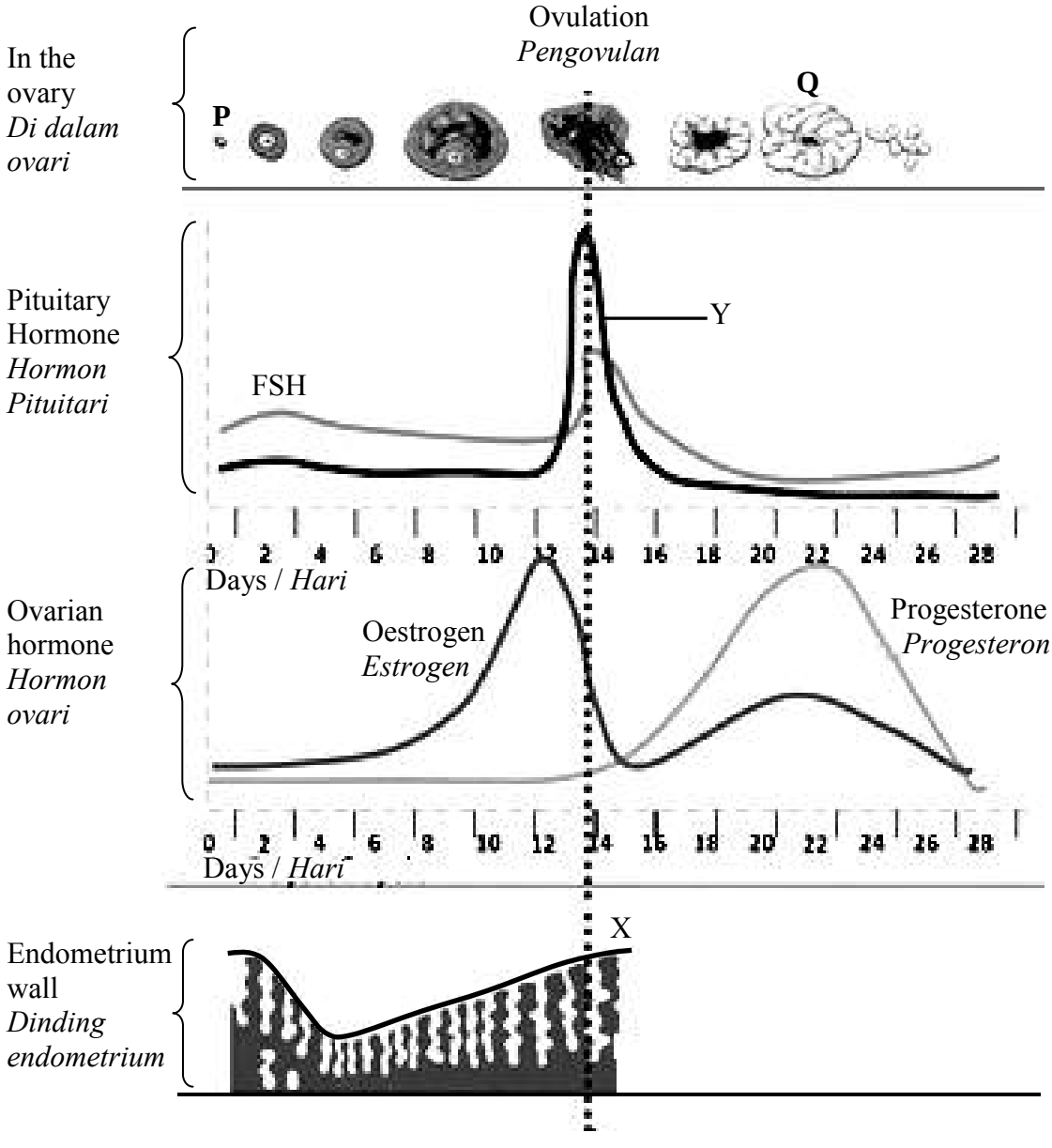


Diagram 5
Rajah 5

(a) Explain the effect of follicle stimulating hormone (FSH) on structure P.
*Terangkan kesan hormon perangsang folikel (*FSH*) ke atas struktur* P.

……

……

……

5(a)

[2 marks]
[2 *markah*]

For Examiner's Use

(b) Explain the effect if the level of hormone Y is low.
Terangkan kesan sekiranya paras hormone Y *adalah rendah.*

……
……
……
[2 marks]
[2 *markah*]

5(b)

(c) Explain one difference between primary oocyte and secondary oocyte.
Terangkan satu perbezaan di antara oosit primer dan oosit sekunder.

……
……
……
……
[2 marks]
[2 *markah*]

5(c)

(d) (i) Complete the graph starting from point X in Diagram 5 to show the changes in the thickness of endometrium wall if fertilization does not occur.
Lengkapkan graf bermula daripada titik X *dalam Rajah* 5 *untuk menunjukkan perubahan ketebalan dinding endometrium sekiranya persenyawaan tidak berlaku.*
[1 mark]
[1 *markah*]

5(d)(i)

(ii) Explain the graph that you drawn in d(i).
Terangkan tentang graf yang telah anda lukis dalam d(i).

……
……
……
[2 marks]
[2 *markah*]

5(d)(ii)

(e) Explain the importance of structure Q during foetal development.
Terangkan kepentingan struktur Q *semasa perkembangan fetus.*

……
……
……
……
[3 marks]
[3 *markah*]

5(e)

A5

Section B
***Bahagian* B**

[40 marks]
[40 *markah*]

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

6 (a) Diagram 6.1 shows the surface view of lower epidermis in a leaf of a plant.
Diagram 6.2 shows part of cross section of a woody stem.

Rajah 6.1 *menunjukkan pandangan permukaan epidermis bawah daun tumbuhan.*
Rajah 6.2 *menunjukkan sebahagian keratan rentas batang berkayu.*

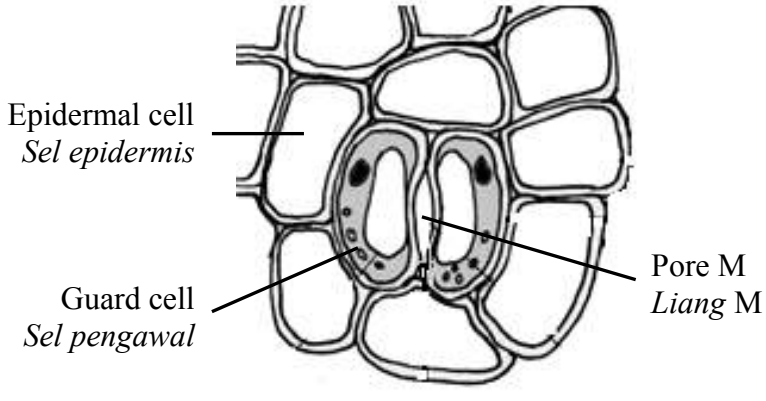


Diagram 6.1
Rajah 6.1

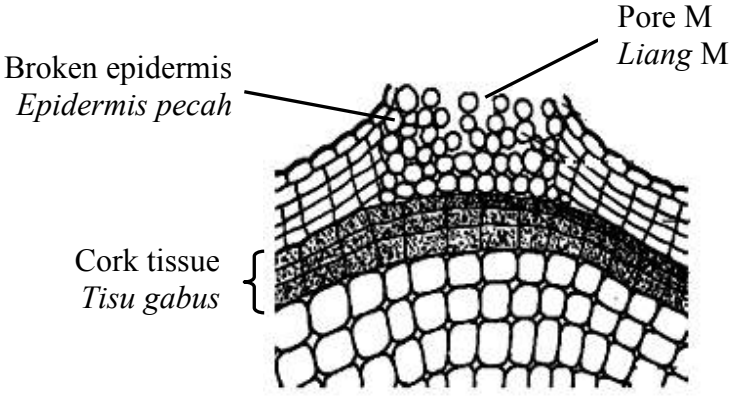


Diagram 6.2
Rajah 6.2

Explain the gas uptake for respiration through pores M and N in the plant.

Terangkan pengambilan gas untuk respirasi melalui liang M *dan liang* N *pada tumbuhan.*

[6 marks]
[6 *markah*]

(b) Diagram 6.3 shows a rice plants in a paddy field.
Rajah 6.2 *menunjukkan pokok padi yang hidup di sawah padi.*

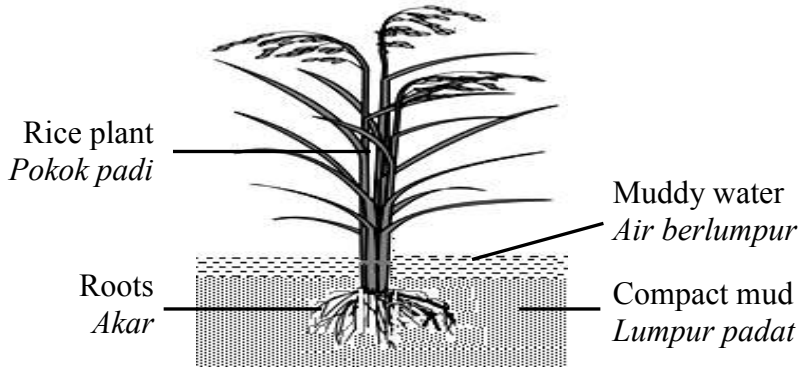


Diagram 6.3
Rajah 6.3

Explain the respiration that occurs in the root cells. [6 marks]
Terangkan respirasi yang berlaku di dalam sel-sel akar. [6 *markah*]

(c) Diagram 6.4 shows the changes in the volume of carbon dioxide absorbed or released by a plant in different light intensity.

Rajah 6.4 *menunjukkan perubahan isipadu karbon dioksida yang diserap atau dibebaskan oleh satu tumbuhan dalam keamatan cahaya yang berbeza.*

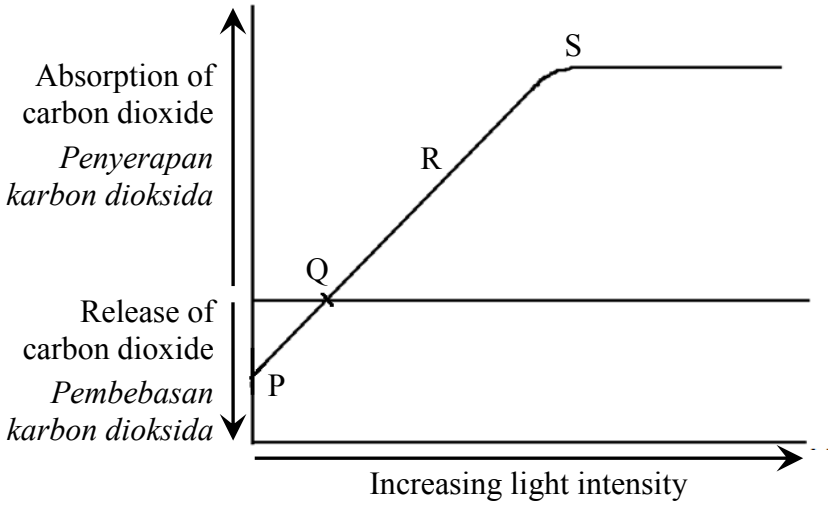


Diagram 6.4
Rajah 6.4

Explain the relationship between the rate of photosynthesis and the rate of respiration in the plant at points P, Q, R and S.

Terangkan hubungan antara kadar fotosintesis dan kadar respirasi dalam tumbuhan itu pada titik-titik P, Q, R *dan* S.

[8 marks]
[8 *markah*]

7 (a) Diagram 7.1 shows the negative feedback mechanism in regulating the water balance in human blood.

Rajah 7.1 *menunjukkan mekanisme suapbalik negatif dalam mengawalatur keseimbangan air di dalam darah manusia.*

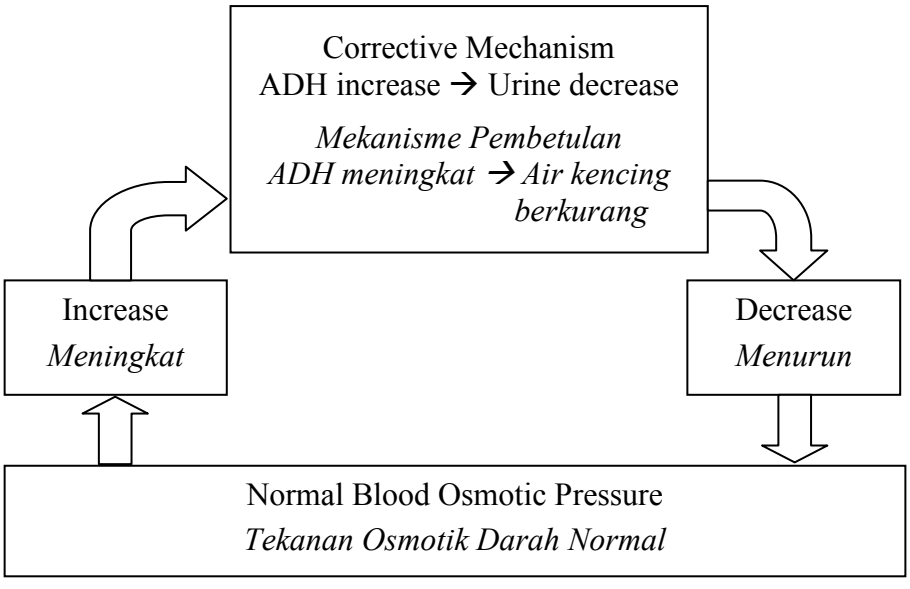


Diagram 7.1
Rajah 7.1

Explain the corrective mechanism when the osmotic pressure of the blood increases.

Terangkan mekanisme pembetulan apabila tekanan osmotik darah meningkat.

[6 marks]
[6 *markah*]

(b) Diagram 7.2 shows the sequence of organs and tissue that responded when a man was attacked by a robber.

Rajah 7.2 menunjukkan urutan organ-organ dan tisu yang bergerak balas apabila seorang lelaki diserang oleh perompak.

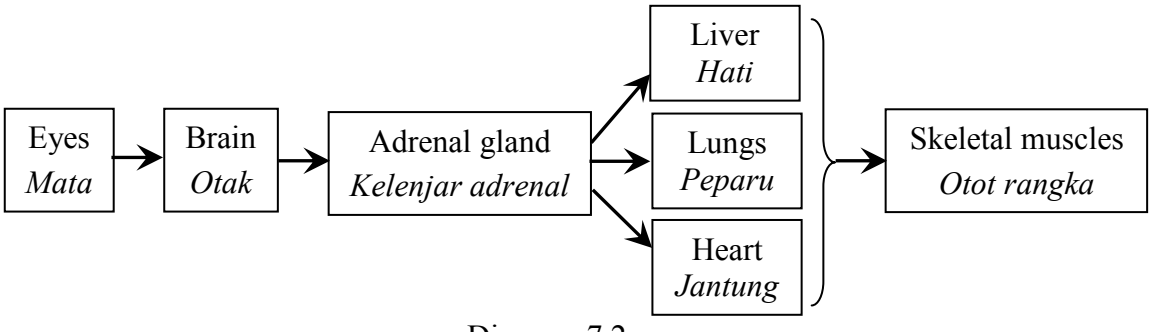


Diagram 7.2
Rajah 7.2

Explain the involvement of nervous system and endocrine system in this situation.

Bincangkan penglibatan sistem saraf dan sistem endokrin dalam situasi ini.

[8 marks]
[8 *markah*]

(c) Diagram 7.3 shows transmission of impulse through a synapse.

Rajah 7.3 menunjukkan penghantaran impuls melalui satu sinaps.

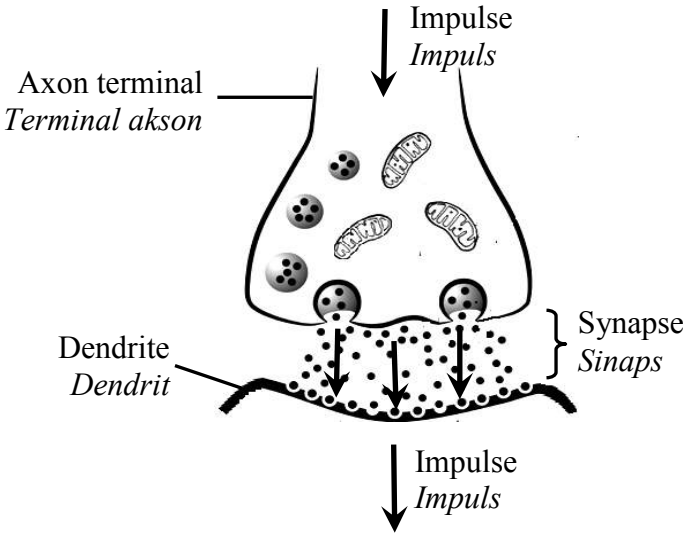


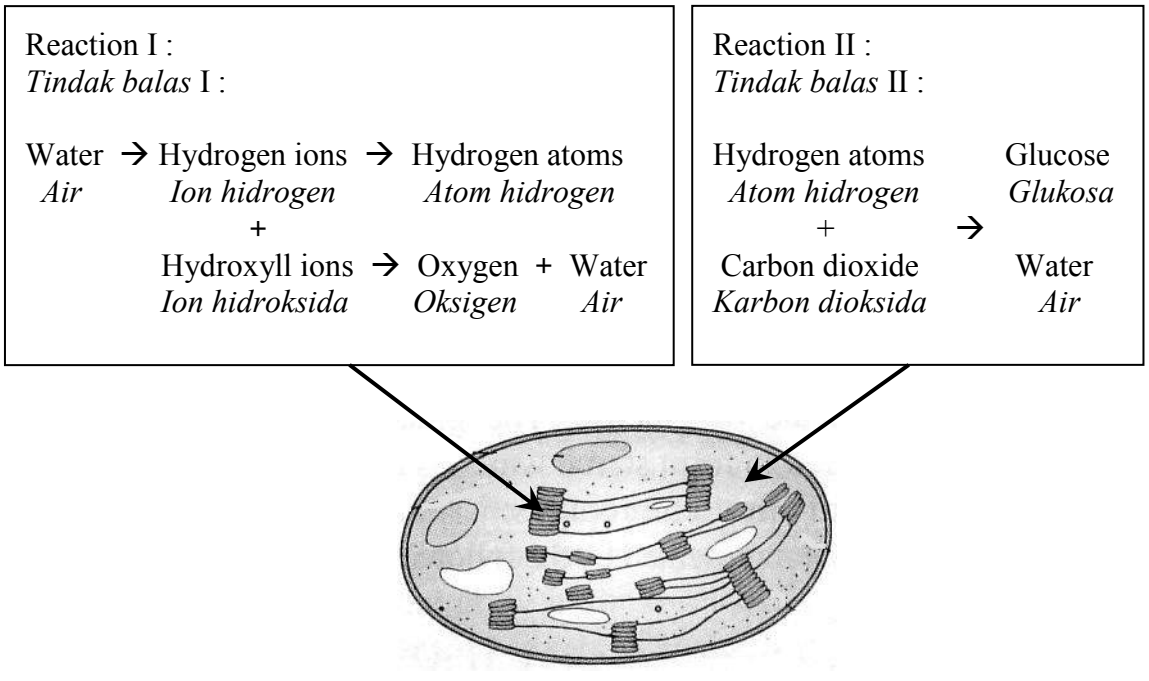
Diagram 7.3
Rajah 7.3

Explain the effect of a pain killer drug on the transmission of nerve impulses.

Terangkan kesan ubat tahan sakit ke atas penghantaran impuls saraf.

[6 marks]
[6 *markah*]

8 (a) Diagram 8.1 shows two reactions that occur is a chloroplast.
Rajah 8.1 *menunjukkan dua tindak balas yang berlaku di dalam kloroplas.*



Chloroplast
Kloroplas

Diagram 8.1
Rajah 8.1

Based on Diagram 8.1, describe both reactions.
Berdasarkan Rajah 8.1*, huraikan kedua-dua tindak balas,*

[10 marks]
[10 *markah*]

(b) Diagram 8.2 shows the daily menu of a pregnant woman.
Rajah 8.2 *menunjukkan menu harian bagi seorang wanita mengandung.*

Breakfast / *Sarapan Pagi*

A plate of fried rice
Sepinggan nasi goreng

A cup of fresh milk
Satu cawan susu segar

Lunch / *Makan Tengahari*

A bowl of chicken rice
Semangkuk nasi ayam

A piece of roasted chicken
Seketul ayam panggang

A bowl of chicken soup
Semangkuk sup ayam

A glass of carbonated drink
Segelas minuman bergas

Dinner / *Makan Malam*

A plate of fried noodle
Sepinggan mee goreng

A banana
Sebiji pisang

A cup of coffee
secawan kopi

Diagram 8.2
Rajah 8.2

Does the menu provide a balanced diet for the pregnant woman?
Discuss your opinion.

Adakah menu ini membekalkan diet seimbang untuk wanita mengandung?
Bincangkan pendapat anda.

[10 marks]
[10 *markah*]

9 (a) Diagram 9.1 shows one benefit of bacteria to human life.

Rajah 9.1 *menunjukkan satu kebaikan bakteria kepada kehidupan manusia.*

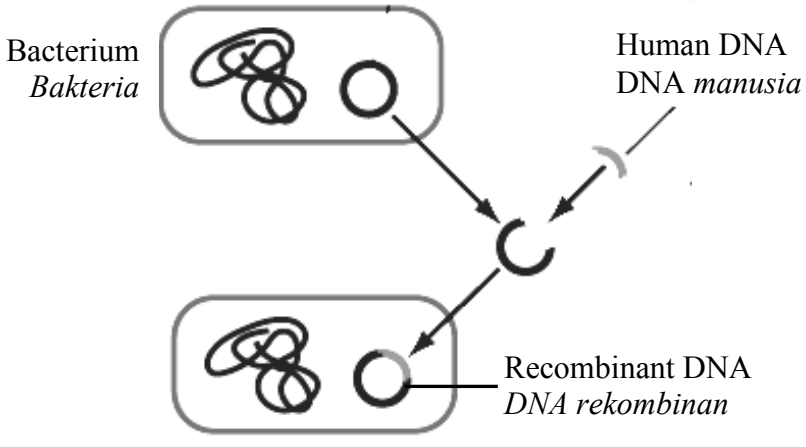


Diagram 9.1
Rajah 9.1

(i) Based on Diagram 9.1, describe the use bacteria in producing insulin.

Berdasarkan Rajah 9.1*, huraikan kegunaan bakteria dalam menghasilkan insulin.*

[5 marks]
[5 *markah*]

(ii) Explain how the following microorganisms are useful in medicinal field.

Terangkan bagaimana mikroorganisma berikut berguna dalam bidang perubatan.

- *Penicillium notatum*
- Dead or weakened virus
  Virus mati atau dilemahkan

[5 marks]
[5 *markah*]

(b) Diagram 9.2 shows the impact of human activity on environment.
Rajah 9.2 *menunjukkan impak aktiviti manusia ke atas alam sekitar.*

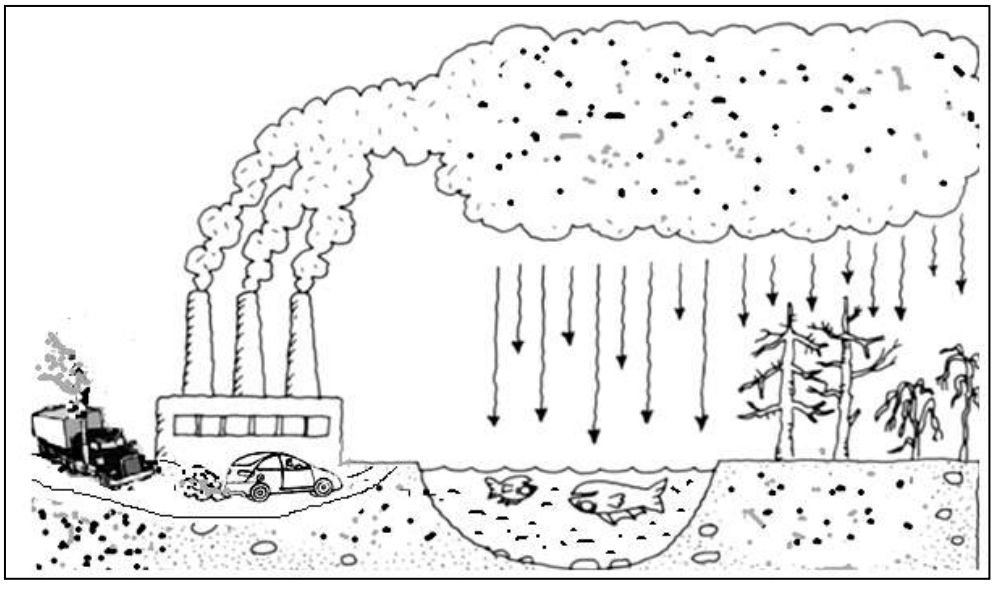


Diagram 9.2
Rajah 9.2

Based on Diagram 9.2, discuss the good and bad effects of the human activity.
Berdasarkan Rajah 9.2*, bincangkan kebaikan dan keburukan aktiviti manusia itu.*

[10 marks]
[*10 markah*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

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Halaman Kosong

INFORMATION FOR CANDIDATES

MAKLUMAT UNTUK CALON

1. This question paper consists of **two sections**.
   *Kertas soalan ini mengandungi **dua bahagian**.*

2. Answer **all** questions in **Section A**. Write your answers in the spaces provided in the question paper.
   *Jawab **semua** soalan dalam **Bahagian A**. Tuliskan jawapan anda di dalam ruangan yang disediakan pada kertas soalan.*

3. Answer any **two** questions from **Section B**. Write your answer on the lined paper in detail.
   *Jawab mana-mana **dua** soalan dalam **Bahagian B**. Tuliskan jawapan anda pada kertas bergaris dengan terperinci.*

4. The diagrams in the questions provided are not drawn to scale unless stated.
   Rajah yang diberikan dalam soalan tidak dilukiskan mengikut skala melainkan diberitau.

5. The marks allocated is shown in brackets.
   Markah yang diperuntukkan ditunjukkan di dalam kurungan.

6. You may use a non-programmable scientific calculator.
   Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan.

7. The time suggested to complete Section A is 90 minutes, and Section B is 60 minutes.
   Cadangan tempoh melengkapkan Bahagian A ialah 90 minit, dan Bahagian B ialah 60 minit.

SULIT Nama: ..... Tingkatan: ……..... **4551/3**
4551/3
BIOLOGI
Kertas 3
Ogos 2012
1½ jam

BAHAGIAN PENGURUSAN SEKOLAH BERASRAMA PENUH
DAN SEKOLAH KECEMERLANGAN
KEMENTERIAN PELAJARAN MALAYSIA

PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2012
PERCUBAAN SIJIL PELAJARAN MALAYSIA

BIOLOGI
Kertas 3
Satu jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

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

Untuk Kegunaan Pemeriksa		
Soalan	**Markah Penuh**	**Markah**
1	33	
2	17	
Jumlah		

This question paper consists of 11 printed pages and 1 blank page.
Kertas soalan ini mengandungi 11 *halaman bercetak dan* 1 *halaman kosong.*

[See next page
[*Lihat halaman sebelah*

Answer **all** questions.

*Jawab **semua** soalan.*

Question 1

***Soalan* 1**

An experiment was carried out to investigate the effect of light intensity on the growth rate of *Mucor* sp. on white bread. *Mucor* sp. is a bread mould.

The growth of *Mucor* sp. on white bread is determined by using quadrat sampling technique. Three pieces of white breads labelled as R, S and T, are damped with 10 ml of distilled water each. The breads are placed in separate transparent plastic bags and are sealed tightly. The breads are placed in three cabinets with different lightings as follows.

R : Lighted by one 40 watt florescence bulb

S : Lighted by two 40 watt florescence bulbs

T : Lighted by three 40 watt florescence bulbs

Diagram 1 shows the calculation on the total area covered by *Mucor* sp. on a sample white bread.

Satu eksperimen telah dijalankan untuk mengkaji kesan keamatan cahaya ke atas kadar pertumbuhan Mucor sp. *di atas roti putih. Mucor* sp. *adalah sejenis kulapuk roti.*

Pertumbuhan Mucor sp. *di atas roti putih ditentukan dengan menggunakan teknik persampelan kuadrat. Tiga keping roti putih dilabelkan sebagai* R, S *dan* T, *dilembabkan dengan* 10 *ml air suling setiap satu. Roti-roti ini diletakkan ke dalam beg plastik lutsinar yang berasingan dan ditutup rapat. Roti-roti ini disimpan di dalam tiga kabinet dengan pencahayaan berbeza seperti berikut:*

R : *Pencahayaan oleh satu mentol floresen* 40 *watt*

S : *Pencahayaan oleh dua mentol floresen* 40 *watt*

T : *Pencahayaan oleh tiga mentol floresen* 40 *watt*

Rajah 1 *menunjukkan pengiraan jumlah luas yang dilitupi oleh Mucor* sp. *di atas sekeping sampel roti putih.*

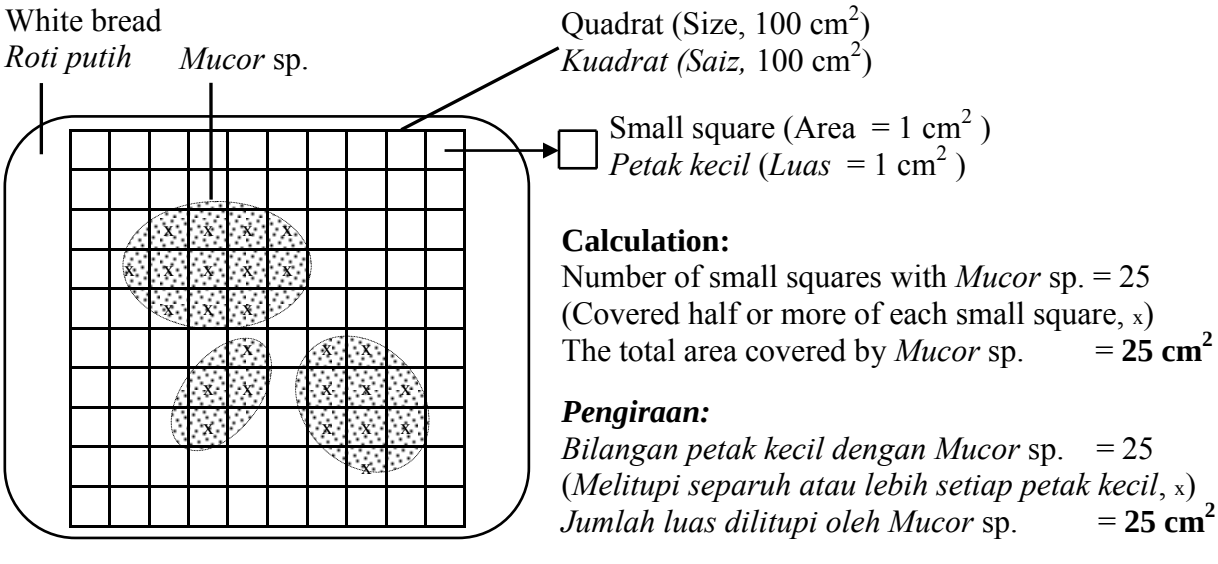


Diagram 1

Rajah 1

Table 1.1 shows the results of the experiment after two weeks of growing period.
Jadual 1.1 *menunjukkan keputusan eksperimen selepas dua minggu tempoh pertumbuhan.*

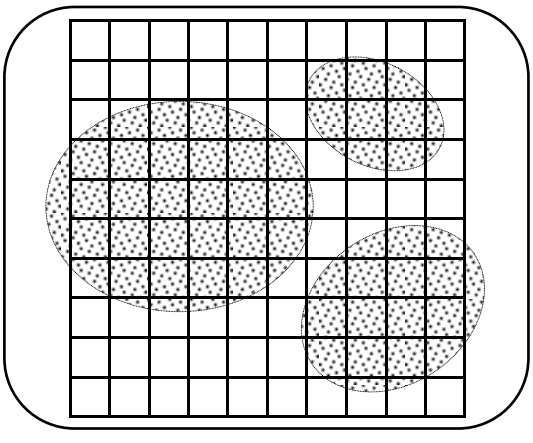
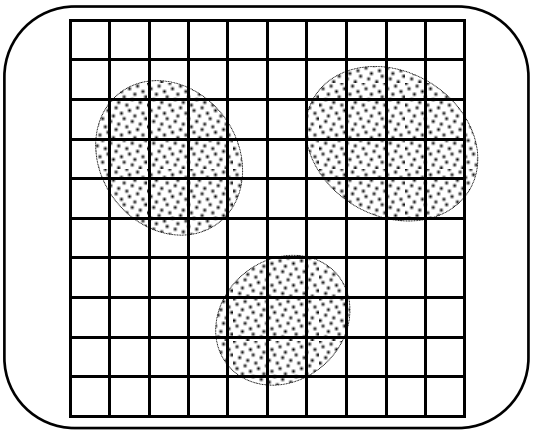
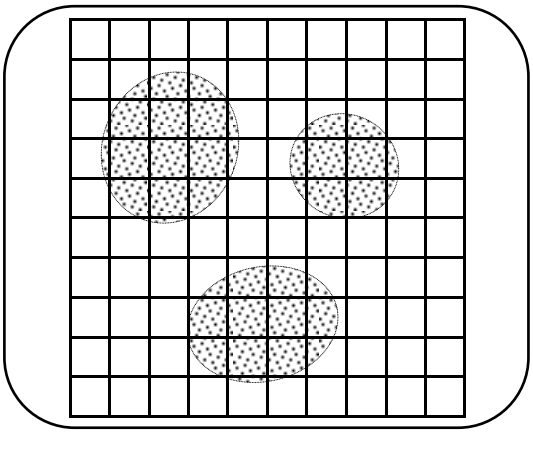
Bread *Roti*	Number of 40 watt florescence bulb *Bilangan mentol floresen* 40 *watt*	*Mucor* sp. on white bread after 2 weeks *Mucor* sp. *di atas roti putih selepas 2 minggu*	The total area covered by *Mucor* sp. / cm^2 *Jumlah luas dilitupi oleh Mucor* sp. / cm^2
R	1		.....
S	2		.....
T	3		.....

Table 1.1
Jadual 1.1

(a) Record the total area covered by *Mucor* sp. on each bread, in the spaces provided in Table 1.1.

Rekodkan jumlah luas yang dilitupi oleh Mucor sp. *di atas setiap roti, di dalam ruangan yang disediakan dalam Jadual* 1.1.

[3 marks]
[3 *markah*]

1(a)

(b) (i) State **two** different observations made on Table 1.1.
*Nyatakan **dua** pemerhatian yang berbeza yang dibuat ke atas Jadual* 1.1.

Observation 1 :
Pemerhatian 1 :

……

……

Observation 2 :
Pemerhatian 2 :

……

……

[3 marks]
[3 *markah*]

1(b)(i)

(ii) State the inference for each observation made in (b) (i).
Nyatakan inferens bagi setiap pemerhatian yang dibuat dalam (b) (i).

Inference for observation 1 :
Inferens bagi pemerhatian 1 :

……

……

……

Inference for observation 2 :
Inferens bagi pemerhatian 2 :

……

……

……

[3 marks]
[3 *markah*]

1(b)(ii)

(c) Complete Table 1.2 based on the experiment.
Lengkapkan Jadual 1.2 *berdasarkan eksperimen ini.*

[3 marks]
[3 *markah*]

1(c)

Variable *Pembolehubah*	Method to handle the variable *Cara mengendali pembolehubah*
Manipulated variable *Pembolehubah dimanipulasikan* …… …… ……	…… …… …… ……
Responding variable *Pembolehubah bergerak balas* …… …… ……	…… …… …… ……
Controlled variable *Pembolehubah dimalarkan* …… …… ……	…… …… …… ……

Table 1.2
Jadual 1.2

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

……

……

……

[3 marks]
[3 *markah*]

1(d)

(e) (i) Construct a table and record all the data collected in the experiment which include the following aspects:

- Light intensity
- The total area covered by *Mucor* sp.
- The growth rate of *Mucor* sp. (cm^2 day^{-1})

$$\text{Growth rate of } \textit{Mucor} \text{ sp.} = \frac{\text{Total area covered by } \textit{Mucor} \text{ sp. } (cm^2)}{\text{Growing period (day)}}$$

Bina satu jadual dan rekodkan semua data yang dikumpul dalam eksperimen ini yang meliputi aspek-aspek berikut:

- *Keamatan cahaya*
- *Jumlah luas dilitupi oleh Mucor* sp.
- *Kadar pertumbuhan Mucor* sp. (cm^2 $hari^{-1}$)

$$\textit{Kadar pertumbuhan Mucor} \text{ sp.} = \frac{\textit{Jumlah luas dilitupi oleh Mucor} \text{ sp. } (cm^2)}{\textit{Tempoh pertumbuhan} \text{ (hari)}}$$

[3 marks]
[3 *markah*]

1(e)(i)

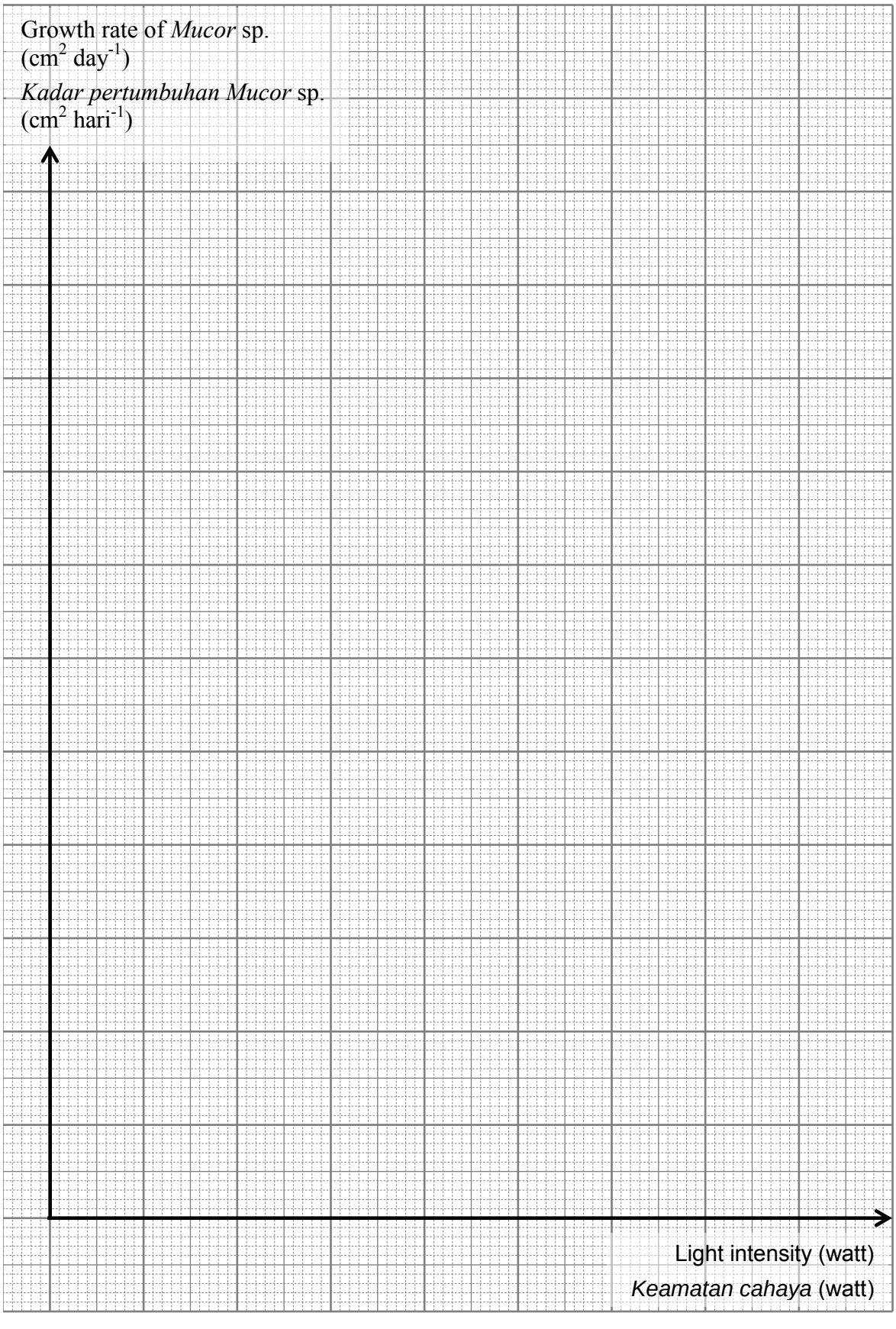
(ii) Draw a graph of the growth rate of *Mucor* sp. against light intensity, on the graph paper provided.

Lukiskan satu graf kadar pertumbuhan Mucor sp. *melawan keamatan cahaya, di atas kertas graf yang disediakan.*

[3 marks]
[3 *markah*]

1(e)(ii)

The graph of the growth rate of *Mucor* sp. against light intensity
Graf kadar pertumbuhan Mucor sp. *melawan keamatan cahaya*



(f) Based on the graph drawn in 1 (e) (ii), explain the relationship between the growth rate of *Mucor* sp. and light intensity.

Berdasarkan kepada graf yang dilukiskan dalam 1 (e) (ii), *terangkan hubungan antara kadar pertumbuhan Mucor* sp. *dengan keamatan cahaya.*

……

……

……

……

[3 marks]
[3 *markah*]

1(f)

(g) Based on the result of the experiment, state the meaning of growth operationally.
Berdasarkan keputusan eksperimen ini, nyatakan pengertian pertumbuhan secara operasi.

……

……

……

……

[3 marks]
[3 *markah*]

1(g)

(h) The experiment is repeated by using a white bread labelled X. The bread is damped with 5 ml of distilled water, wrapped in a transparent plastic bag, and kept in a cabinet lighted by one 40 watt florescence bulb for two weeks.

Predict the total area covered by *Mucor* sp. on the white bread X by using the same sampling technique. Explain your prediction.

Eksperimen ini diulang dengan menggunakan satu roti putih berlabel X. *Roti ini dilembabkan dengan* 5 *ml air suling, dibungkus dengan beg plastik lutsinar, dan disimpan di dalam kabinet dengan pencahayaan oleh satu mentol floresen* 40 *watt selama dua minggu.*

Ramalkan jumlah luas yang dilitupi oleh Mucor sp. *di atas roti putih* X *dengan menggunakan teknik persampelan yang sama. Terangkan ramalan anda.*

……

……

……

……

[3 marks]
[3 *markah*]

1(h)

(i) Classify the following list into biotic and abiotic factors in Table 1.3.

Kelaskan senarai berikut kepada faktor-faktor biotik dan abiotik dalam Jadual 1.3.

Light intensity *Keamatan cahaya*	Humidity *Kelembapan*	Parasites *Parasit*
Decomposer *Pengurai*	Temperature *Suhu*	Nutrient *Nutrien*

Biotic factor *Faktor biotik*	Abiotic factor *Faktor abiotik*

Table 1.3
Jadual 1.3

[3 marks]
[3 *markah*]

1(i)

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Halaman Kosong

Question 2
***Soalan* 2**

Albumen suspension is cloudy if the protein molecules are not broken down into simpler form. When an enzyme such as pepsin is added to the albumen suspension, the suspension turns clear. This shows that the hydrolysis of protein has occurred.

Ampaian albumen adalah keruh sekiranya molekul-molekul protein tidak diuraikan kepada bentuk yang lebih ringkas. Apabila satu enzim seperti pepsin dicampurkan kepada ampaian albumen, ampaian itu menjadi jernih. Ini menunjukkan hidrolisis protein telah berlaku.

By using materials and apparatus available in the laboratory, plan an experiment to investigate the effect of temperature on the rate of enzyme activity.
Your experimental planning must include the following aspects:

Dengan menggunakan bahan dan radas yang terdapat di dalam makmal, rancang satu eksperimen untuk mengkaji kesan suhu ke atas kadar aktiviti enzim.
Perancangan eksperimen anda hendaklah meliputi aspek-aspek berikut:

- Problem Statement
  Pernyataan masalah
- Variables
  Pembolehubah
- Hypothesis
  Hipotesis
- List of materials and apparatus
  Senarai bahan dan radas
- Experimental procedures
  Prosedur eksperimen
- Presentation of data
  Persembahan data

[17 marks]
[17 *markah*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

INFORMATION FOR CANDIDATES

MAKLUMAT UNTUK CALON

1. This question paper consists of **2** questions. Answer **all** questions.
   Kertas soalan ini mengandungi **2** *soalan. Jawab* ***semua*** *soalan.*

2. Write your answers for **Question 1** in the spaces provided in the question paper.
   Tuliskan jawapan anda bagi ***Soalan*** **1** *di dalam ruangan yang disediakan pada kertas soalan.*

3. Write your answers for **Question 2** on the lined paper in detail.
   Tuliskan jawapan anda bagi ***Soalan*** **2** *pada kertas bergaris dengan terperinci.*

4. The diagrams in the questions provided are not drawn to scale unless stated.
   Rajah yang diberikan dalam soalan tidak dilukiskan mengikut skala melainkan diberitahu.

5. The marks allocated is shown in brackets.
   Markah yang diperuntukkan ditunjukkan di dalam kurungan.

6. The time suggested to complete **Question 1** is **45** minutes, and **Question 2** is **45** minutes.
   Cadangan tempoh melengkapkan Soalan **1** *ialah* **45** *minit, dan* ***Soalan*** **2** *ialah* **45** *minit.*

7. You are allowed to use a non-programmable scientific calculator.
   Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan.

4551
BIOLOGI
Kertas 1, 2 & 3
Ogos 2012

BAHAGIAN PENGURUSAN SEKOLAH BERASRAMA PENUH
DAN SEKOLAH KECEMERLANGAN
KEMENTERIAN PELAJARAN MALAYSIA

PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2012

PERCUBAAN SIJIL PELAJARAN MALAYSIA

BIOLOG1

PERATURAN PEMARKAHAN

This marking scheme consists of 19 printed pages.
Peraturan pemarkahan ini mengandungi 19 *halaman bercetak.*

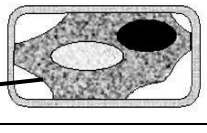
[See next page
[*Lihat halaman sebelah*

PAPER 1

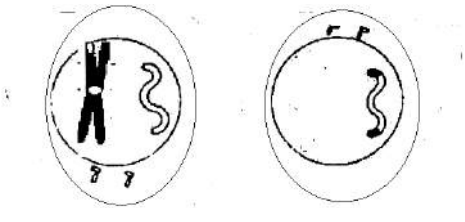
No	Answer	No	Answer	No	Answer	No	Answer	No	Answer
1	B	11	A	21	D	31	C	41	B
2	A	12	C	22	D	32	B	42	A
3	C	13	D	23	A	33	A	43	A
4	A	14	C	24	B	34	B	44	C
5	B	15	D	25	B	35	D	45	D
6	A	16	B	26	C	36	A	46	C
7	B	17	A	27	C	37	D	47	D
8	A	18	C	28	D	38	B	48	A
9	D	19	C	29	A	39	D	49	D
10	B	20	C	30	D	40	A	50	C

PAPER 2

Question 1

No	Criteria	Marks	
(a)(i)	Able to name structure labeled P,Q and R. Answer : ▪ P : Cell wall ▪ Q : Cytoplasm ▪ R : Vacoule / Cell sap	 1 1 1	3
(a)(ii)	Able to state the condition Y of cell. Answer: Turgid	 1	1
(b)	Able to explain how conditions X and Y occur. Answer: Condition X: ▪ Cell is in normal condition / maintain its shape / not change. ▪ Solution outside the cell is isotonic to the sap cell of plant cell. ▪ Water diffuses in and out of the cell at equal rate. Any 2 Condition Y : ▪ Solution outside the cell is hypertonic to cell sap of plant cell. ▪ Water diffuse out from the cell by osmosis ▪ Plasma membrane is pulled away from cell wall. Any 2	 1 1 1 2 1 1 1 2	4
(c)	Able to explain the effect to the transport of mineral ions into the root hair cell. ▪ The cell unable to produce energy // energy is not generated ▪ Active transport does not occurs. ▪ Thus, mineral ions cannot be transported into the cell. Any 2	 1 1 1 2	2
(d)	Able to draw a diagram to show the condition of a leaf cell. ▪ Diagram ▪ Label : Plasma membrane 	 1 1	2
TOTAL			**12**

Question 2

No	Criteria	Marks	
(a)	Able to name. Answers: ▪ Phase S : Prophase 1 ▪ Membrane U : Nuclear membrane	 1 1	2
(b)(i)	Able to explain the chromosomal behavior during phase S. Sample answer : ▪ Crossing Over ▪ Exchange of genetic material between homologous chromosome	 1 1	2
(b)(ii)	Able to explain how the chromosomal behaviour contribute to the survival of an animal species. Sample answer : ▪ (crossing over) causes variation to occur among animal species ▪ This will enhance the ability to adapt in different environment	 1 1	2
(c)	Able to explain the chromosomal behaviour during metaphase I Sample answer: ▪ Homologous chromosomes are arranged in line ▪ at metaphase plate // cell equator	 1 1	2
(d)	Able to complete the diagram of the daughter cells and explain the occurrence. Sample answer:  V W ▪ Drawing : V W ▪ During Anaphase 2 ▪ Sister chromatids (of one chromosome) is not separated } Any 2 ▪ spindle fibres are not (fully) formed	 1 1 1 1 1	4
TOTAL			**12**

Question 3

No	Criteria	Marks	
(a)	Able to name structure X and Y. Answer: ▪ Structure X – Pectoralis major muscle ▪ Structure Y – Tendon	 1 1	2
(b)(i)	Able to explain why structure X has an abundance of mitochondria. Sample answer: ▪ Mitochondria generate / produce energy / ATP // Structure X needs a lot of energy ▪ For contraction	 1 1	2

<table>
<tr><td>(b)(ii)</td><td>Able to explain the function of structure X in locomotion of bird.
Sample answer:
▪ X contracts
▪ Create pulling force
▪ To pull the wing downward/down stroke
Any 2</td><td>

1
1
1</td><td>2</td></tr>
<tr><td>(c)</td><td>Able to explain the effect to locomotion of bird if structure Y is torn.
Sample answer:
▪ (Pulling) force (that created by contraction of muscle) cannot be transferred to the bone.
▪ Bone cannot be pulled downward.</td><td>

1

1</td><td>2</td></tr>
<tr><td>(d)</td><td>Able to state two differences in structure between vertebrae P and vertebrae Q.
Sample answer:
<table><tr><th>Structure P</th><th>Structure Q</th></tr><tr><td>Smaller centrum</td><td>Larger centrum</td></tr><tr><td>Has vertebratrial canal</td><td>Has no vertebratrial canal</td></tr><tr><td>Has no zygapophysis at the transverse process and side of centrum</td><td>Has zygapophysis at the transverse process and side of centrum</td></tr><tr><td>Has short transverse process</td><td>Has long transverse process</td></tr><tr><td>Has large neural canal</td><td>Has small neural canal.</td></tr></table>Any 2 pairs</td><td>

1
1

1

1
1</td><td>2</td></tr>
<tr><td>(e)</td><td>Able to explain the relationship the diet and disease.
Answer:
▪ He suffers gout arthritis
▪ Due to deposition of uric acid in his joint
▪ His diet contain a lot of / excess protein
Any 2</td><td>

1
1
1</td><td>2</td></tr>
<tr><td colspan="3">TOTAL</td><td>12</td></tr>
</table>

Question 4

<table>
<tr><th>No</th><th>Criteria</th><th colspan="2">Marks</th></tr>
<tr><td>(a)</td><td>Able to name the structure of R and S
Answers:
▪ R – Lymph capillary
▪ S – Lymph node</td><td>

1
1</td><td>2</td></tr>
<tr><td>(b)</td><td>Able to explain the formation of lymph.
Sample answer:
▪ The high hydrostatic pressure at the arterial end of the capillaries
▪ Forces blood constituents except large molecules diffuse out (through capillaries) into intercellular spaces between cells / to form tissues fluid
▪ At venous end of capillaries where hydrostatic pressure is low
▪ (90% of tissues fluid returned to circulatory system and) 10% diffused into lymph capillaries to form lymph.
Any 3</td><td>

1
1

1
1</td><td>3</td></tr>
</table>

	OR ▪ Lymph originate from tissues fluid / interstitial fluid ▪ At venous end of capillaries where hydrostatic pressure is low // Hydrostatic pressure is high in the interstitial fluid ▪ (90% of tissues fluid / interstitial fluid / X is returned to circulatory system and) 10% is diffused into lymph capillaries to form lymph	1 1 1	
(c)(i)	Able to state the disease when filarial worms block vessels R. Sample answer ▪ Elephantiasis / filariasis / oedema / tissue swelling	 1	1
(c)(ii)	Able to explain how filarial worms cause the disease ▪ (When R is blocked,) excess tissues fluid is not returned to the bloodstream ▪ The body tissues become swollen ▪ because of too much fluid accumulates in the space between the cells (Any 2)	 1 1 1	2
(d)	Able explain one difference between the composition of interstitial fluid and lymph ▪ lymph contains more / higher lymphocytes than interstitial fluid because ▪ lymph nodes along lymphatic system produces lymphocytes OR • lymph contains more fatty substances because • lacteals / lymph capillaries in villus transport fatty acid and glycerol / droplets of lipids / fat soluble vitamins to the blood stream (Any 2)	 1 1 1	2
(e)	Able to explain importance of lymphatic system in human. Sample answer: ▪ Maintain the fluid balance in the body ▪ by returning excess interstitial fluid to the bloodstream OR ▪ Transport fatty acids and glycerol ▪ from lacteal to circulatory system	 1 1 1 1	2
TOTAL			**12**

Question 5

No	Criteria	Marks	
(a)	Able to explain the effect of FSH on structure P. Sample answer : ▪ (FSH) stimulates the growth / development of the primary follicle ▪ Structure P will grow / develop / becomes secondary follicle / Grafiaan follicle.	 1 1	2
(b)	Able to explain the effect if the level of hormone Y is low. Sample answer : ▪ Ovulation will not occur ▪ Grafiaan follicle will not release the secondary oocyte (into the Fallopian tube).	 1 1	2

(c)	Able to explain one difference between the primary oocyte and the secondary oocyte. Sample answer : ▪ Difference : primary oocyte is diploid while secondary oocyte is haploid. ▪ Exlpanation : Primary oocyte has undergo meiosis (I).	 1 1	2
(d)(i)	Able to complete the graph that shows the thickness of endometrium wall is decreasing / thinning.	1	1
(d)(ii)	Able to explain the graph drawn. Sample answer : ▪ Corpus luteum degenerate ▪ No progesterone is secreted (to thicken the endometrium wall).	 1 1	2
(e)	Able to explain the importance of structure Q during foetal development. Sample answer : ▪ Q secrete progesterone ▪ (progesterone will thickened and) maintained the endometrium wall ▪ Endometrium wall ready for implantation of embryo // prevent misscarriage / abortion.	 1 1 1	3
TOTAL			**12**

Question 6

No	Criteria	Marks	
(a)	Able to explain the gas uptake for respiration through pores M and N. Sample answer: <u>Through M:</u> ▪ (In day time) stoma / M (in the epidermis of the leaf) open ▪ Oxygen from the atmosphere diffuses (through stoma) ▪ into intercellular air spaces ▪ of spongy mesophyll (and palisade mesophyll) ▪ follow the concentration gradient (Any 3) <u>Through N:</u> ▪ At the lenticels (N) ▪ oxygen from atmosphere diffuses ▪ into the air spaces ▪ between cork cells which are loosely arranged ▪ then diffuses into the cells at the stem /and old roots (Any 3)	 1 1 1 1 1 3 1 1 1 1 1 3	6

(b)	Able to explain the respiration in the root cells of rice plant. Sample answer: ▪ The plant carry out anaerobic respiration ▪ glucose is broken down ▪ in the absence of oxygen to release energy ▪ produces ethanol, CO_2 (and energy) ▪ cells in the roots of rice plants are extremely tolerant of ethanol ▪ Many of the roots are very shallow ▪ the roots use the oxygen which diffuses into the water surface. ▪ Rice stem contain a large number of air spaces ▪ (the air space) allow oxygen to penetrate through to the cells of roots(growing in the absence of oxygen) (Any 6)	 1 1 1 1 1 1 1 1 1	6
(c)	Able to explain the relationship between the rate of photosynthesis and the rate of respiration at points P, Q, R and S. Sample answer: <u>At P :</u> ▪ In the dark / low light (intensity), only respiration occurs ▪ hence large quantity of CO2 is produced/released ▪ As light (intensity) increases the quantity of CO2 / produce decreases ▪ because part of CO2 produced during respiration is used for photosynthesis ▪ sugar used in respiration more rapidly than it is produced in photosynthesis <u>At Q:</u> ▪ (At this point of light inensity) all the CO2 release from respiration is reused / equivalent to CO2 used up during photosynthesis // no net gain or loss in CO2 / sugar produced ▪ rate of photosynthesis is equal to the rate of respiration ▪ this point is called compensation point ▪ net gaseous exchange is zero <u>At R:</u> ▪ as light intensity increases, the rate of photosynthesis become faster than / exceed the rate of respiration ▪ the CO2 needed is obtained from the atmosphere ▪ (at the same time) excess O2 is releases (into the atmosphere) <u>At S:</u> ▪ is the light saturation point ▪ an increase in light intensity does not increase the rate of photosynthesis // maximum rate of photosynthesis (Any 8)	 1 1 1 1 1 1 1 1 1 1 1 1 1	8
TOTAL			**20**

Question 7

No	Criteria	Marks	
(a)	Able to explain the corrective mechanism when the osmotic pressure of the blood increases. Sample answer: ▪ Water content in the blood is low // Blood is hypertonic ▪ Detected by osmoreceptor ▪ In hypothalamus ▪ Send nerve impulse to pituitary gland ▪ Secretes ADH ▪ Transported by blood to kidney ▪ Distal convoluted tubule / collecting duct of nephron ▪ More permeable towards water ▪ More water reabsorbed by blood (and less urine produced) (Any 6)	 1 1 1 1 1 1 1 1 1	6
(b)	Able to explain the involvement of nervous system and endocrine system in the situation. Sample answer: ▪ The receptors / eyes detect stimulus ▪ Sent nerve impulse to brain ▪ Integration and interpretation of information ▪ Sent nerve impulse to adrenal gland ▪ Secretes adrenalin ▪ Transported by blood (to liver, lungs and heart) ▪ (In the liver,) glycogen converted into glucose ▪ Increase breathing rate ▪ Increase ventilation rate // gaseous exchange in the lungs ▪ Increase heartbeats ▪ More blood / glucose / oxygen (in skeletal muscles) ▪ More cellular respiration ▪ More energy released ▪ For muscles contraction // To respond / fight back / run away. (Any 8)	 1 1 1 1 1 1 1 1 1 1 1 1 1 1	8
(c)	Able to explain the effect of a pain killer drug on the transmission of nerve impulses. Sample answer: ▪ Nerve impulses reach axon terminal / synaptic knob ▪ Energy from mitochondria ▪ Vesicles containing neurotransmitter ▪ Merged / fused with (pre-synaptic) membrane ▪ Releases neurotransmitters ▪ Into synapse ▪ Drugs Neutralised / blocked / disintegrate the neurotransmitters ▪ No / less neurotransmitters reach dendrite / next neurone ▪ No / less new nerve impulses transmitted. (Any 6)	 1 1 1 1 1 1 1 1 1 1 1	8
TOTAL			**20**

Question 8

No	Criteria	Marks	
(a)	Able to describe mechanism of photosynthesis. Sample answer: ▪ (Reaction I) : Light reaction ▪ Occurs in granum / grana ▪ That contains chlorophyll ▪ Water molecules are broken down by light ▪ Into hydrogen ions and hydroxyl ions ▪ Called photolysis of water ▪ Electrons from chlorophyll ▪ Discharged hydrogen ions into hydrogen atoms ▪ Hydroxyl ions release electrons (to the chlorophyll) ▪ Form oxygen gas and water ▪ (Reaction II) : Dark reaction ▪ Occurs in stroma (of chloroplast) ▪ Contains enzymes ▪ Receives ATP from light reation ▪ Hydrogen from light reaction react with carbon dioxide ▪ Reduction of carbon dioxide ▪ Forms glucose (and water) (Any 10)	 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 	10
(b)	Able to discuss the menu whether it provides a balanced diet for the pregnant woman or not. Sample answers: ▪ No ▪ Contains too much fat ▪ In fried rice / chicken rice / fried noodle ▪ Increase cholesterol level ▪ Cause excess body weight / hypertension / cardiovascular problems ▪ Carbonated drink contains excess sugar ▪ Cause diabetics ▪ Contains colouring / preservatives / chemicals / acids ▪ Cause cancer / gastritis ▪ Coffee contains caffeine / drugs / chemicals ▪ Acting on the nerves ▪ Less / no vegetables ▪ Cause contipation ▪ Less vitamin / minerals / ferum // other examples ▪ for good health / make blood // other examples (10 marks) OR ▪ Yes ▪ Rice provides carbohydrates ▪ For energy ▪ Fresh milk provides proteins ▪ For growth of foetus ▪ Calcium for bone formation ▪ Roasted chicken provides proteins	 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	10

	▪ less fats so less risk of cardiovascular problems ▪ chicken soup provides minerals // examples ▪ for good health // other examples ▪ Banana provides fibres ▪ Avoid contipation (Any 10)	1 1 1 1 1	
TOTAL			**20**

Question 9

No	Criteria	Marks	
(a) (i)	Able to describe the use bacteria in producing insulin. Sample answer: ▪ Genetic engineering ▪ (Segment of) DNA / gene / gene code ▪ for insulin production ▪ taken from human cell / pancreas ▪ insert into bacteria ▪ form bacteria DNA recombinant ▪ Culture / mitosis / binary fission ▪ Forms more bacteria (DNA recombinant) ▪ Synthesis insulin ▪ Extraction of insulin ▪ Use to treat diabetics (Any 5)	 1 1 1 1 1 1 1 1 1 1 1	5
(a)(ii)	Able to explain how the microorganisms are useful in medicinal field. Sample answer: ▪ *Penicillium notatum* is a fungus ▪ Produces antibiotics ▪ Kill / fight / prevent growth of other microorganisma ▪ Treat disease such as gonorhoea / syphilis / lungs infection (Any 2) ▪ Suspension of dead or weakened called vaccine ▪ Injected into human / blood ▪ Stimulates lymphocytes ▪ Produce antibody ▪ Kills / fights / neutralises toxins / chemicals ▪ Immune to chicken pox / rubella / tuberculosis (Any 3)	 1 1 1 1 1 1 1 1 1 1	5
(b)	Able to discuss the good and bad effects of the human activity. Sample answer: Good effect: ▪ Produce goods / materials // any examples ▪ Use in daily life ▪ Motor vehicles for transport (Any 2) Bad effects: ▪ Releases sulphur dioxide / nitrogen dioxide ▪ Dissolve in atmospheric water vapour	 1 1 1 2 1 1	10

	▪ Forms sulphuric acid / nitric acid / acid ▪ Down pour as acid rain ▪ Dissolves minerals in soil ▪ Less fertile for plant growth ▪ Releases poisonous chemicals / aluminium // other examples ▪ Water in rivers / lakes lower pH ▪ Upsets ecological balance ▪ Death of planktons / flora / fauna ▪ Destruction of food chain / web ▪ Extinction of species ▪ Acid cause leaves turn purple / death ▪ Destroy marbles / buildings // other examples (Any 8)	1 1 1 1 1 1 1 1 1 1 1 1 8	
TOTAL			**20**

PAPER 3

Question 1

1 (a) [KB0603 – Measuring Using Number]

Score	Criteria
3	Able to record the total area covered by *Mucor* sp. on each bread correctly: Sample answers: Bread: R — 49 / 50; S — 31; T — 24 (The total area covered by *Mucor* sp. / cm^2)
2	Able to measure and record **2 answers correctly**
1	Able to measure and record **1 answers correctly**
0	No response or wrong response

1 (b) (i) [KB0601 – Observation]

Score	Criteria
3	Able to state **two** observations correctly according to 2 criteria: ▪ Bread // Number of 40 watt florescence bulb ▪ The total area covered by *Mucor* sp. // Number of small squares which are covered half or more by *Mucor* sp. **Sample answers:** 1. On bread R, the total area covered by *Mucor* sp. is 49/50 cm^2 / the largest. 2. Two 40 watt florescence bulbs, the number of small squares which are covered half or more by *Mucor* sp. is 31. 3. The total area covered by *Mucor* sp. on bread S is higher than on bread T.

2	Able to state **any one** observation correctly, ***or*** Able to state **any two incomplete** observations (any 2 criteria) **Sample answers:** 1. The total area covered by *Mucor* sp. on bread R and bread S are different. 2. The number of small squares which are covered half or more by *Mucor* sp. depends on the number of 40 watt florescence bulbs.
1	Able to state **any one idea** of observation.(any 1 criteria) **Sample answers:** 1. The total area covered by *Mucor* sp. are different. 2. The number of small squares which are covered half or more by *Mucor* sp. depends on the number of bulbs.
0	Not able to response or wrong response.

1 (b) (ii) [KB0604 – Making Inferences]

Score	Criteria
3	**Able to make** one logical inference **for each observation based on the criteria:** ▪ Light intensity // Degree of brightness ▪ Rate / degree of growth // Favourable condition for growth **Sample answers:** 1. The higher the light intensity, the lower the rate of growth of *Mucor* sp. / bread mould / fungus / microorganism. 2. The less lighted the area, the more suitable for the growth of *Mucor* sp. 3. The growth of *Mucor* sp. is the **best** in a dark place.
2	**Able to make** one logical inference **for any one observation**. *or* Able to make **one logical** and **incomplete inference** base on one criterion for each observation. **Sample answers for incomplete inferences:** 1. Light intensity affects the growth of *Mucor* sp. 2. The *Mucor* sp. grows in a darker place.
1	Able to make an **idea** of inference with one criterion. **Sample answers:** 1. The growth of fungus is different on the bread. 2. The growth of fungus depends on the number of bulbs.
0	Not able to response or wrong response.

1 (c) [KB061001 – Controlling Variables]

Sample answers:

Variables	Method to handle the variables

Manipulated variable:
Light intensity
// Number of 40 watt florescence bulb
// Degree of brightness
	Using different number of 40 watt florescence bulbs
	// Use one, two and three 40 watt florescence bulbs

Responding variable:
The total area covered by *Mucor* sp.
// The number of small squares which are covered half or more by *Mucor* sp.
// Rate / degree of growth
	Count and record the number of small squares which are covered half or more by *Mucor* sp.
	// Calculate by using formula:
	Rate of growth = Number of small squares OR Total area / Time

Controlled variable:
Type of bread // Volume of water
// Type of water
	By using **white** bread
	// Watered by **10 ml** of (distilled) water
	// Use **distilled** water

Score	Criteria
3	Able to state **all (6)** variables and the method to handle the variables.
2	**Able to state** any 4-5 **of the variables and the method to handle the variables.**
1	**Able to state** any 2-3 **of the variables and the method to handle the variables.**

1 (d) KB0611 – Making Hypothesis]

Score	Criteria
3	Able to state a hypothesis to show a relationship between the manipulated variable and responding variable and the hypothesis can be validated, based on 3 criteria: ▪ Manipulated variable ▪ Responding variable ▪ Relationship **Sample answers:** 1. The higher the light intensity, the lower the growth rate of Mucor sp. / bread mould / fungus / microorganism. 2. The less lighted / darker the area, the more suitable for the growth of *Mucor* sp. 3. The growth of *Mucor* sp. is the best in a dark place.
2	Able to state a less accurate hypothesis to show a relationship between manipulated variable and responding variable based on 2 criteria. **Sample answers:** 1. The total area covered by *Mucor* sp. on bread R and bread S are different. 2. The number of small squares which are covered half or more by *Mucor* sp. depends on the number of 40 watt florescence bulbs.
1	Able to state idea of hypothesis to show a relationship between manipulated variable and responding variable based on 1 criterion.

	Sample answers: 1. Light affects the growth of *Mucor* sp. 2. The Mucor sp. grows in a darker place.
0	Not able to response or wrong response.

1 (e) (i) [KB0606 – Communicating]

Score	Criteria
3	Able to construct a table and record all the data with all columns / rows labelled with correct units. Sample answers: Light intensity (watt) / The total area covered by *Mucor* sp. (cm^2) / The growth rate of *Mucor* sp. (cm^2 day^{-1}) 40 / 49 / 50 / 3.5 / 3.57 / 3.571 80 / 31 / 2.2 / 2.21 / 2.214 120 / 24 / 1.7 / 1.71 / 1.714
2	Able to draw a table with columns / rows labelled and correct units, but incomplete data.
1	Able to draw a table with columns / rows labelled and correct units, but no data.
0	Not able to response or wrong response.

1 (e) (ii) [KB0607 – Space and Time Relationship]

Score	Criteria
3	Able to draw a graph of the growth rate of *Mucor* sp. against light intensity with **3** criteria correctly. ▪ Both axes with regular values ▪ All points are correctly plotted ▪ Correct shape which touches all points (and not more than 3 small squares)
2	Able to draw a graph of the growth rate of *Mucor* sp. against light intensity with **any 2** criteria correctly.
1	Able to draw a graph of the growth rate of *Mucor* sp. against light intensity with **any 1** criteria correctly.
0	Not able to response or wrong response.

1 (f) [KB0608 – Interpreting Data]

Score	Criteria
3	Able to explain the relationship between the growth rate of *Mucor* sp. and light intensity clearly and accurately based on **3** criteria: ▪ Light intensity ▪ The growth rate of *Mucor* sp. ▪ Explanation – Favourable / suitable condition for growth.

	Sample answer: 1. The higher the light intensity, the lower the rate of growth of *Mucor* sp. This is because the condition is favourable for growth. (Reject: number of bulbs) (Reject: bread mould / fungus / microorganism)
2	Able to explain the relationship between the growth rate of *Mucor* sp. and light intensity clearly and accurately based on **any 2** criteria.
1	Able to explain the relationship between the growth rate of *Mucor* sp. and light intensity clearly and accurately based on **any 1** criterion.
0	No graph drawn in I (e) (ii). OR Not able to response or wrong response.

1 (g) [KB0609 – Define Operationally]

Score	Criteria
3	Able to state the meaning of growth operationally based on **3** criteria: ▪ The total area covered by *Mucor* sp. / bread mould / fungus / microorganism on (white) bread ▪ Determined by using a quadrat (sampling technique) ▪ Affected by light intensity **Sample answer:** 1. (Growth is) the total area covered by *Mucor* sp. / bread mould / fungus / microorganism and is determined by using a quadrat (sampling technique), which is affected by light intensity
2	Able to state the meaning of growth operationally based on **any 2** criteria.
1	Able to state the meaning of growth operationally based on **any 1** criterion.
0	Not able to response or wrong response.

1 (h) [KB0605 – Predicting]

Score	Criteria
3	Able to predict the total area covered by *Mucor* sp. on the white bread X accurately based on **2** criteria: 1. Expected total area // Comparing with recent condition 2. Reason **Sample answer:** 1. (The total area covered by *Mucor* sp. on the white bread X is) less than 49 / 50 cm^2 // any value less than 49 cm^2 // less than the area on bread R, because less water / moisture / humidity // less / not suitable for growth of *Mucor* sp. / fungus / mould.
2	Able to predict the total area covered by *Mucor* sp. on the white bread X accurately based on criteria 1.
1	Able to predict the total area covered by *Mucor* sp. on the white bread X based on criteria 1 inaccurately.

	Sample answer: 1. Less than 49 / 50 small squares // any value less than 49 / 50 // less than the other breads.
0	Not able to response or wrong response.

1 (i) [KB0602 – Classifying]

Score	Criteria
3	Able to classify down **all** six factors accurately. **Sample answers:** Biotic factor: Parasites, Decomposer Abiotic factor: Light intensity, Humidity, Temperature, Nutrient
2	Able to classify down **any 4-5** factors accurately.
1	Able to classify down **any 2-3** factors accurately.
0	Not able to response or wrong response.

Question 2

Problem Statement

Score	**Criteria**
3	Able to state the problem statement of the experiment **correctly** that include criteria: ▪ Manipulated variable ▪ Responding variable ▪ Relation in question form and question symbol [?] **Sample answers:** 1. What is the effect of temperature on the rate of enzyme activity? 2. Does temperature affect the activity of pepsin? 3. Does temperature affect the time taken for albumen suspension to turn clear? 4. How temperature affecting the time taken for complete hydrolysis of albumen / substrate / protein / starch? 5. Does 37°C, is the **best** temperature for the enzyme activity?
2	Able to state the problem statement of the experiment with **any 2** criteria. **Sample answers:** 1. What is the effect of temperature on the rate of enzyme activity. 2. Does temperature affect the enzyme?

1	Able to state the of problem statement with **any 1** criterion. **Sample answers:** 1. Does temperature affect the enzyme? 2. What is the rate of reaction?
0	Not able to response or wrong response.

Variables

Score	Criteria

3	Able to state the **3** variables correctly.
	
	Sample answers:
	Manipulated variable: Temperature
	Responding variable: The rate of enzyme / pepsin activity
	// The time taken for albumen suspension to turn clear
	// The time taken for complete hydrolysis of albumen / substrate / protein / starch?
	Controlled variable: Concentration / volume of albumen (suspension) / pepsin (solution) // pH

2	Able to state **any 2** variables correctly.
1	Able to state **any 1** variable correctly.
0	Not able to response or wrong response.

Hypothesis

Score	Criteria
3	Able to state the hypothesis **correctly** based on **3** criteria: ▪ Manipulated variable ▪ Responding variable ▪ Relationship of the variable **Sample answers:** 1. The rate of pepsin activity is **highest** at 37°C. 2. The higher the temperature the longer / shorter the time taken for the complete hydrolysis of albumen / starch. (Reject: substrate) 3. At 37°C, the time taken for albumen suspension to turn clear is fastest / faster than at 10 / 60°C.
2	Able to state the hypothesis with **any 2** criteria **Sample answers:** 1. The rate of pepsin activity depends on temperature. 2. The pepsin activity changes at different temperature. 3. The enzyme activity depends on / affected by the temperature.

1	Able to state the **idea** of the hypothesis. **Sample answers:** 1. The enzyme activity depends on heat. 2. The enzyme activity changes.
0	Not able to response or wrong response.

Materials and Apparatus

Score	Criteria
3	Able to state **all** functional materials / 2*materials + 2*apparatus + 1 other material + 2 other apparatus for the experiment. Materials: *Albumen (suspension), *pepsin (solution), distilled water and ice cubes. Apparatus: *Water bath OR Bunsen burner, beaker and thermometer, *Stopwatch, test tube, and measuring cylinder. (Accept if not separately)
2	Able to state **all** functional materials / 2*materials + 2*apparatus + 1 other apparatus for the experiment.
1	Able to state **all** functional materials / 2*materials + 2*apparatus for the experiment.
0	Not able to response or wrong response.

Procedure

Score	Criteria
3	Able to state **5Ps,** procedures P1, P2, P3, P4 and P5 correctly. P1 : How to Set Up The Apparatus (4P1) P2 : How to Make Constant The Controled Variable (1P2) P3 : How to Manipulate The Manipulated Variable (1P3) P4: How to Record The Responding Variable (2P4) P5 : Precaution (1P5)
2	Able to state **3-4Ps** of any procedures P1, P2, P3, P4 and P5 correctly
1	Able to state **2Ps** of any procedures P1, P2, P3, P4 and P5 correctly
0	Not able to response or wrong response.

Example of Procedure:

1. Label three test tubes, A, B and C.	P1
2. Fill each test tube with 5 ml of albumen suspension. P1 P2	P1 P2
3. Add 5 ml pepsin into every test tube. P1 P2	P1 P2
4. Record the initial observation on the albumen suspension.	P1
5. Immerse the test tubes A in water bath of 30°C, B in 40°C and C in 60°C. P1 P3	P1 P3
6. Start the stopwatch.	P1
7. Record the time taken for the albumen suspension turns clear.	P4
8. Calculate the rate of enzyme activity using the following formula; Rate of enzyme activity = 1/Time	P4
9. Tabulate the data (in a table).	P4
10. Repeat the experiment / steps 1-9 to get average readings.	P5
Accept if use other substrates and enzymes. Example: Materials; *starch, *amylase solution and iodine solution. Apparatus; white tiles, droppers	

Data

Score	Criteria
2	Able to construct a table of data based on **2** criteria: ▪ Correct title and units ▪ Manipulated variable **Sample answers:**

Temperature (°C)	The time taken for the albumen suspension turns clear (min)	Rate of (enzyme) activity (min^{-1})
30		
40		
60		

1	Able to tabulate the data with any **1** criterion.
0	Not able to response or wrong response.

END OF MARKING SCHEME