JABATAN PELAJARAN NEGERI SELANGOR
MAJLIS PENGETUA SEKOLAH MALAYSIA NEGERI SELANGOR

ROGRAM PENINGKATAN PRESTASI AKADEMIK
EPERIKSAAN PERCUBAAN
IJIL PELAJARAN MALAYSIA 2011

4551/1

IOLOGY
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ptember
$\frac{1}{4}$ jam

Satu jam lima belas minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

Kertas soalan ini adalah dalam dwibahasa.

Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.

Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.

Kertas soalan ini mengandungi 32 halaman bercetak.

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1 Diagram 1 shows structure of a cell.
Rajah 1 menunjukkan struktur satu sel.

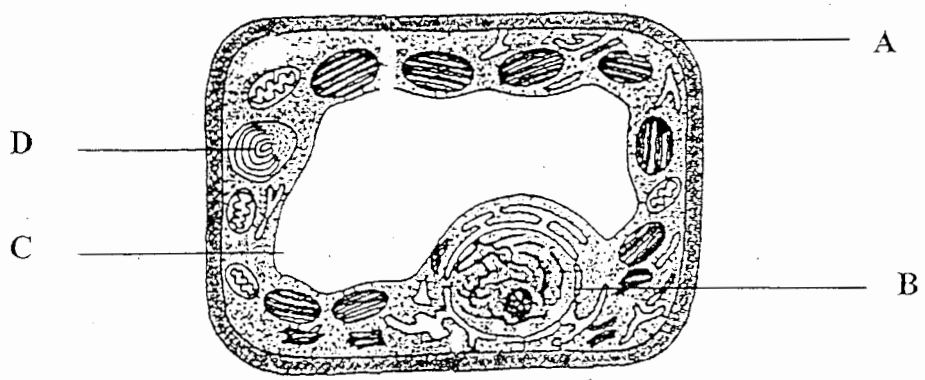

Diagram 1
Rajah 1

Which structure, **A**, **B**, **C** or **D** contains chromosomes?
Antara struktur **A**, **B**, **C** *dan* **D** *yang manakah mengandungi kromosom?*

2 Diagram 2 shows the cell organisation level in a multicellular organism.
Rajah 2 menunjukkan aras organisasi sel dalam organisma multisel.

Cell *Sel*	→	T	→	Organ *Organ*	→	System *Sistem*	→	Multicellular organism *Organisma multisel*

Diagram 2
Rajah 2

Which structure in the plant can be represented by T?
Struktur manakah dalam tumbuhan yang boleh diwakili oleh T?

A Leaf
Daun

B Xylem
Xilem

C Stem
Batang

D Fruit
Buah

3 Diagram 3 shows a structure of plasma membrane.
Rajah 3 menunjukkan struktur membran plasma.

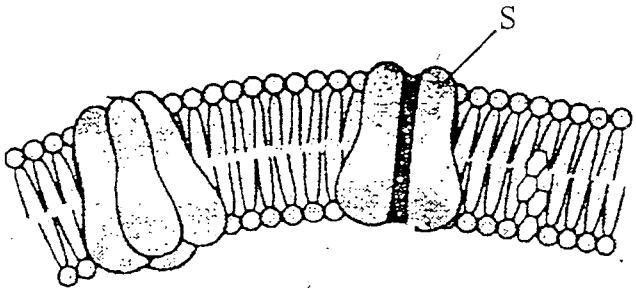

Diagram 3
Rajah 3

What is S?
Apakah S?

A Pore protein
Protein liang

B Carrier protein
Protein pembawa

C Hydrophilic head
Kepala hidrofilik

D Hydrophobic tail
Ekor hidrofobik

4 Diagram 4 shows a cell which has been immersed in a solution.
Rajah 4 menunjukkan satu sel yang telah direndamkan di dalam satu larutan.

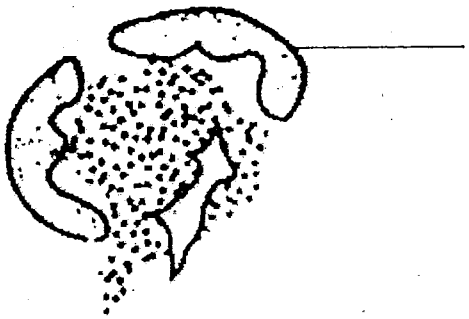

Diagram 4
Rajah 4

What happened to the cell?
Apakah yang berlaku kepada sel itu?

A Crenated
Krenasi

B Plasmolysed
Plasmolisis

C Haemolysed
Hemolisis

D Deplasmolysed
Deplasmolisis

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5 Which factors affect the rate of diffusion in passive transport?
Faktor manakah yang mempengaruhi kadar resapan dalam pengangkutan pasif?

I Energy from ATP
Tenaga dari ATP

II Volume of the liquid
Isi padu cecair

III Size of the particles
Saiz partikel

IV Concentration gradient between the two regions
Cerun kepekatan di antara dua kawasan

A I and II
I *dan* II

B I and IV
I *dan* IV

C II and III
II *dan* III

D III and IV
III *dan* IV

What are the processes which are involved in the reabsorption of amino acids and water in the kidney?
Apakah proses yang terlibat dalam penyerapan semula asid amino dan air dalam ginjal?

	Amino Acid ***Asid Amino***	**Water** ***Air***
A	Passive transport *Pengangkutan Pasif*	Passive transport *Pengangkutan pasif*
B	Facilitated diffusion *Resapan berbantu*	Passive transport *Pengangkutan pasif*
C	Active Transport *Pengangkutan Aktif*	Active Transport *Pengangkutan Aktif*
D	Passive transport *Pengangkutan pasif*	Facilitated diffusion *Resapan berbantu*

7 Table 1 shows three equations, P, Q and R that are involved in hydrolysis process.
Jadual 1 menunjukkan tiga persamaan P, Q dan R yang terlibat dalam proses hidrolisis.

P	Glucose + Glucose ⟶ Maltose + Water *Glukosa + Glukosa ⟶ Maltosa + Air*
Q	Glucose + Sucrose ⟶ Fructose + Water *Glukosa + Sukrosa ⟶ Fruktosa + Air*
R	Glucose + Galactose ⟶ Lactose + Water *Glukosa + Galaktosa ⟶ Laktosa + Air*

Table 1
Jadual 1

Which are the correct equation for the hydrolysis process?
Persamaan manakah yang betul bagi proses hidrolisis tersebut?

A P and S
P *dan* S

B P and Q
P *dan* Q

C P and R
P *dan* R

D Q and R
Q *dan* R

8 The following statements are characteristics about a chemical compound in a cell.
Pernyataan berikut adalah ciri-ciri tentang satu sebatian kimia dalam sel.

- *Medium for chemical reactions*
  Medium tindak balas kimia
- *Maintains osmotic pressure*
  Mengekalkan tekanan osmosis

Which chemical compound has the characteristics?
Sebatian kimia manakah yang mempunyai ciri-ciri tersebut?

A Lipid
Lipid

B Water
Air

C Enzyme
Enzim

D Protein
Protein

  [Lihat halaman sebelah

9 Diagram 5 shows a graph of the rate of enzyme reaction on a substrate in the human digestive system.

Rajah 5 menunjukkan satu graf kadar tindak balas enzim ke atas satu substrat dalam sistem pencernaan manusia.

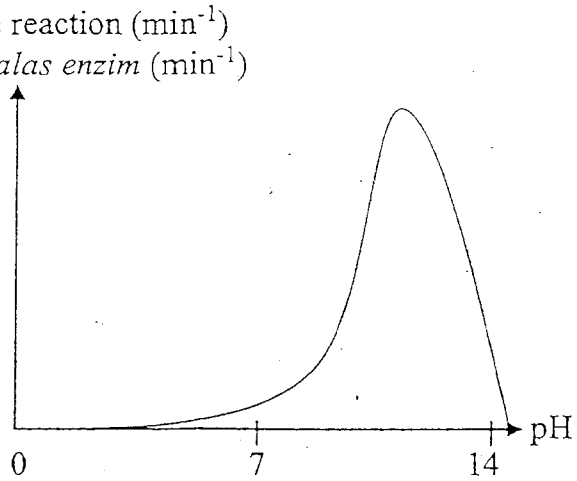


Diagram 5
Rajah 5

Which digestive organ provides the most suitable medium for the reaction of the enzyme?

Organ pencernaan manakah yang menyediakan medium paling sesuai untuk tindak balas enzim tersebut?

A Mouth
Mulut

B Stomach
Perut

C Duodenum
Duodenum

D Ileum
Ileum

10 Which part of the plant carries out mitosis actively?

Bahagian tumbuhan yang manakah menjalankan mitosis secara aktif?

A Root tip
Hujung pucuk

B Fruit
Buah

C Flower
Bunga

D Leaf
Daun

11 A parent cell which has 24 chromosomes divides by meiosis.
What is the number of chromosome in the daughter cell?
Satu sel induk yang mempunyai 24 kromosom membahagi secara meiosis.
Berapakah bilangan kromosom dalam sel anak?

A 24 chromosomes
24 *kromosom*

B 12 chromosomes
12 *kromosom*

C 8 chromosomes
8 *kromosom*

D 4 chromosomes
4 *kromosom*

12 Diagram 6 shows the chromosomes of a parent cell.
Rajah 6 menunjukkan kromosom satu sel induk.

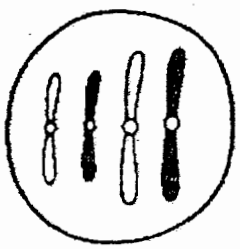
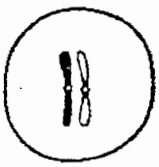


Diagram 6
Rajah 6

Which daughter cell is produced after the cell undergoes meiosis?
Sel anak manakah yang terhasil selepas sel tersebut mengalami meiosis?

A 

B 

C 

D 

13 Which organism is able to synthesise their own food from simple inorganic substance?
Organisma manakah yang dapat mensintesiskan makanannya sendiri daripada bahan inorganik ringkas?

A Worm
Cacing

B Amoeba
Ameba

C Mushroom
Cendawan

D Grass
Rumput

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16 Diagram 8 shows a child lacking a type of vitamin.
Rajah 8 menunjukkan kanak-kanak yang mengalami kekurangan sejenis vitamin.

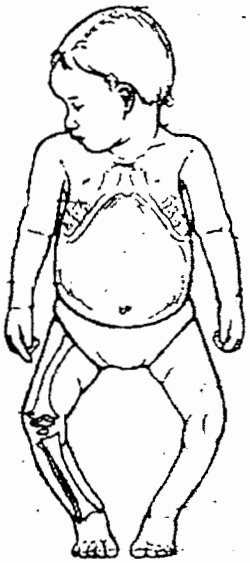

Diagram 8
Rajah 8

What is the type of vitamin?
Apakah jenis vitamin tersebut?

A Vitamin A
Vitamin A

B Vitamin B
Vitamin B

C Vitamin C
Vitamin C

D Vitamin D
Vitamin D

  [Lihat halaman sebelah

14 What is the function of dietary fibre?
Apakah fungsi serat makanan?

A Makes food stay longer in intestine
Menjadikan makanan tahan lebih lama dalam usus

B Gives colour to faeces
Memberi warna pada tinja

C Stimulates peristalsis
Merangsang peristalsis

D Prevents defaecation
Mencegah pembuangan najis

15 Diagram 7 shows part of the human digestive system.
Rajah 7 menunjukkan sebahagian daripada sistem pencernaan manusia.

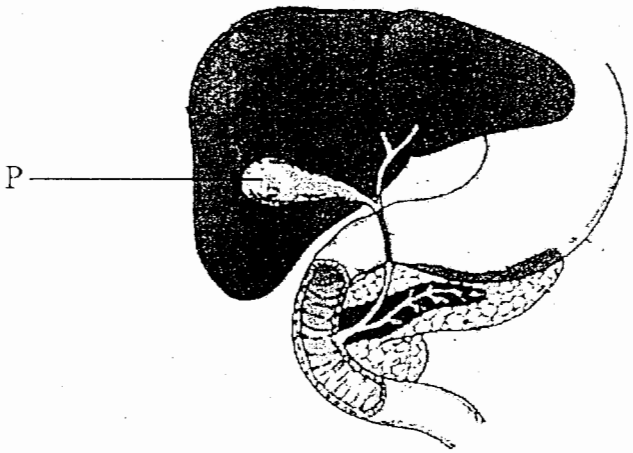

Diagram 7
Rajah 7

Structure P was removed from the system due to bile stone problem.
Which food classes must be reduced in his dietary intake?
Struktur P telah dibuang daripada sistem tersebut berikutan masalah batu hempedu.
Kelas makanan manakah yang perlu dikurangkan dalam dietnya.

A Water
Air

B Fats
Lemak

C Protein
Protein

D Carbohydrate
Karbohidrat

17 Diagram 9 shows the structure of a villus in the ileum.
Rajah 9 menunjukkan struktur vilus dalam ileum.

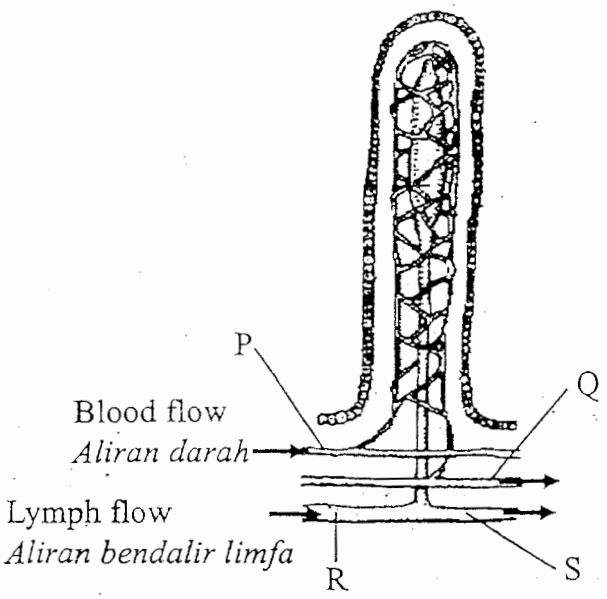

Diagram 9
Rajah 9

Which vessels, P, Q, R, or S carry the largest amount of glucose, amino acids, fatty acids and fat-soluble vitamins?
Antara saluran P, Q, R *dan* S, *yang manakah mengangkut paling banyak glukosa, asid amino, asid lemak dan vitamin larut lemak*?

	Glucose *Glukosa*	Amino acids *Asid amino*	Fatty acids *Asid lemak*	Fat-soluble vitamins *Vitamin larut lemak*
A	Q	Q	S	S
B	Q	Q	R	S
C	R	R	P	Q
D	P	P	R	S

18 Which statements are true about photosynthesis?
Pernyataan manakah yang benar tentang fotosintesis?

I Oxygen is released to the atmosphere
Oksigen dibebaskan ke atmosfera

II Photolysis of water takes place in the light reaction
Fotolisis air berlaku dalam tindak balas cahaya

III Water molecules are formed in the dark reaction
Molekul air terbentuk semasa tindak balas gelap

IV Carbon dioxide combines with the hydroxyl ions to produce simple sugars
Karbon dioksida berpadu dengan ion hidroksil untuk menghasilkan gula ringkas

A I and II
I *dan* II

B I and IV
I *dan* IV

C II and III
II *dan* III

D III and IV
III *dan* IV

19 Diagram 10 shows the structure of the gill in a fish.
Rajah 10 *menunjukkan struktur insang seekor ikan.*

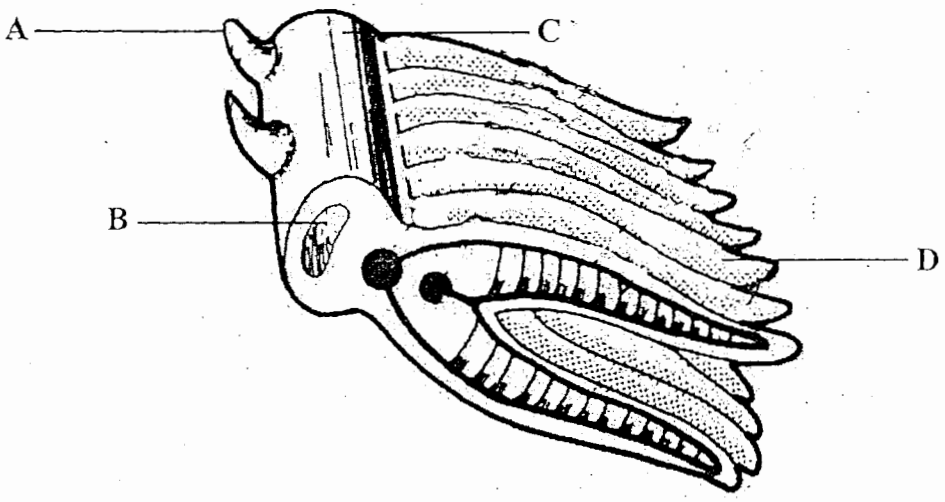

Diagram 10
Rajah 10

Which part, **A**, **B**, **C** or **D** is involved in gaseous exchange?
Antara bahagian **A**, **B**, **C** *dan* **D**, *yang manakah terlibat dalam pertukaran gas?*

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20 Diagram 11 shows part of human respiratory system.
Rajah 11 *menunjukkan sebahagian daripada sistem respirasi manusia.*

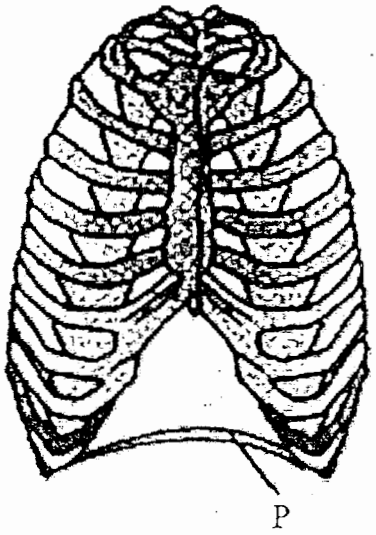

Diagram 11
Rajah 11

What will happen if P moves downward?
Apakah yang akan berlaku jika P *bergerak ke bawah?*

A Volume of thoracic cavity increases
Isi padu rongga toraks bertambah

B Volume of thoracic cavity decreases
Isi padu rongga toraks berkurangan

C Pressure of thoracic cavity increases
Tekanan dalam rongga toraks bertambah

D Pressure of thoracic cavity remain the same
Tekanan rongga toraks kekal sama

21 Diagram 12 shows the equation of fermentation process in yeast.
Rajah 12 menunjukkan persamaan tindak balas bagi proses penapaian dalam yis.

Glucose / *Glukosa* $\xrightarrow{X}$ Y + Carbon dioxide / *Karbon dioksida* + Energy / *Tenaga*

Diagram 12
Rajah 12

What are **X** and **Y**?
Apakah **X** *dan* **Y**?

	X	Y
A	Zymase *Zimase*	Lactic acid *Asid laktik*
B	Zymase *Zimase*	Ethanol *Etanol*
C	Oxygen *Oksigen*	Lactic acid *Asid laktik*
D	Oxygen *Oksigen*	Ethanol *Etanol*

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22 Diagram 13 shows a rib cage model.
Rajah 13 menunjukkan model sangkar rusuk.

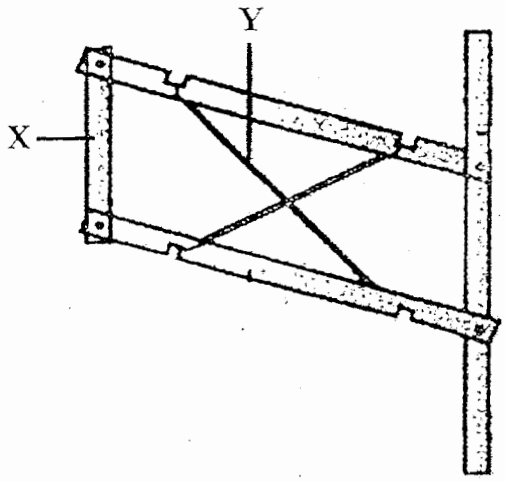

Diagram 13
Rajah 13

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

	X	Y
A	Vertebral column *Turus vertebra*	Sternum *Sternum*
B	Vertebral column *Turus vertebra*	Rib *Tulang rusuk*
C	Sternum *Sternum*	Intercostal muscle *Otot interkosta*
D	Intercostal muscle *Otot interkosta*	Rib *Tulang rusuk*

23 Diagram 14 shows the interaction between bacteria in X and plant Y.
Rajah 14 *menunjukkan interaksi antara bakteria dalam* X *dan tumbuhan* Y.

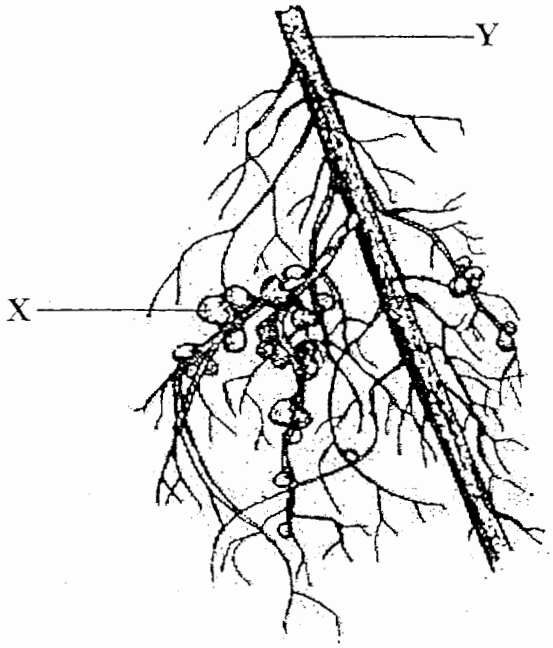

Diagram 14
Rajah 14

What is the type of interaction between the organism?
Apakah jenis interaksi antara organisma tersebut?

A Commensalism
Komensalisme

B Saprophytism
Saprofitisme

C Parasitism
Parasitisme

D Mutualism
Mutualisme

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24 Diagram 15 shows part of the nitrogen cycle.
Rajah 15 menunjukkan sebahagian daripada kitar nitrogen.

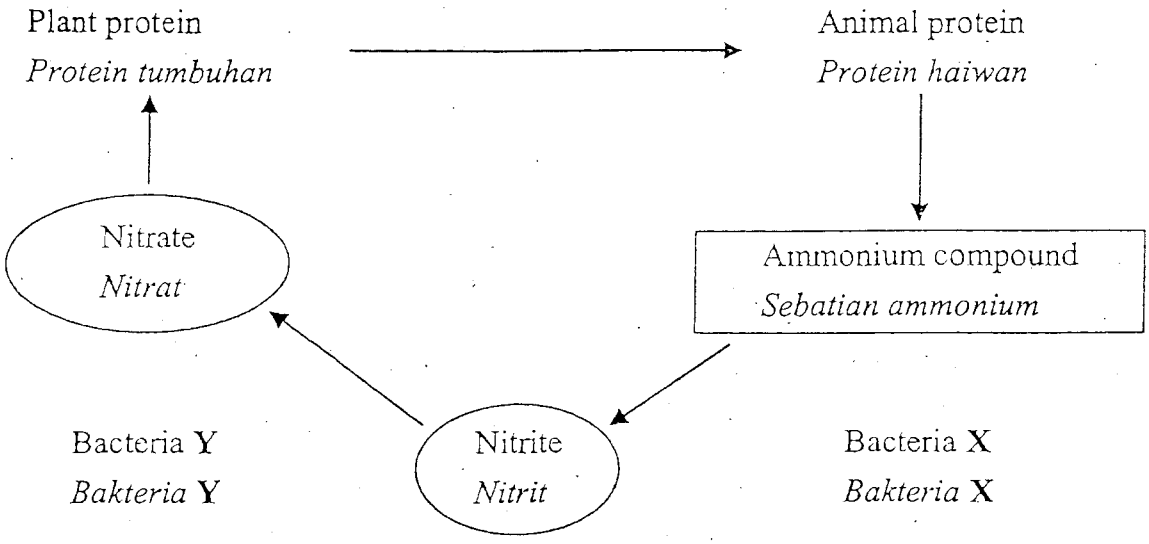

Diagram 15
Rajah 15

What are bacteria X and Y?
Apakah bakteria X dan Y?

	X	Y
A	*Rhizobium* sp	*Nitrobacter* sp
B	*Nitrosomonas* sp	*Nitrobacter* sp
C	*Nitrosomonas* sp	*Rhizobium* sp
D	*Rhizobium* sp	*Nitrosomonas* sp

25 An experiment was carried out to estimate the rat population in a farm. 70 rats were captured and marked before releasing them. After a week, 60 rats were caught and 5 have marking.
What is the estimated rat population in the farm?
Satu eksperimen dijalankan untuk menganggar populasi tikus di sebuah ladang. 70 ekor tikus ditangkap dan ditanda sebelum dilepaskan. Selepas seminggu, 60 ekor tikus ditangkap dan didapati 5 bertanda.
Berapakah anggaran populasi tikus di ladang tersebut?

A 300 B 350

C 370 D 840

26 Which is the correct sequence of ecological changes that occur to a barren land over a long period of time?

Urutan manakah yang betul tentang perubahan ekologi yang berlaku pada tanah tandus untuk satu tempoh yang panjang?

A Colonization, climax community, succession
Pengkolonian, komuniti klimaks, sesaran

B Succession, colonization, climax community
Sesaran, pengkolonian, komuniti klimaks

C Colonization, succession, climax community
Pengkolonian, sesaran, komuniti klimaks

D Succession, climax community, colonization
Sesaran, komuniti klimaks, pengkolonian

27 Which substance has the least effect on water pollution?

Bahan manakah yang mempunyai kesan paling sedikit ke atas pencemaran air?

A Mercury
Raksa

B Cadmium
Kadmium

C Plumbum
Plumbum

D Fluoride
Florida

28 Which human activities maintain the balance of an ecosystem?

Aktiviti manusia manakah yang mengekalkan keseimbangan satu ekosistem?

A Deforestation
Penebangan hutan

B Tree replanting
Penanaman semula pokok

C Forest burning
Pembakaran hutan

D Intensive farming
Peladangan intensif

  [Lihat halaman sebelah

29 Global warming is a phenomenon which may cause imbalance in an ecosystem.
Which steps should be taken to prevent the phenomena?

Pemanasan global adalah fenomena yang boleh membawa kepada ketidakseimbangan dalam satu ekosistem.
Langkah manakah yang perlu diambil untuk mencegah fenomena tersebut?

I Prevent open burning
Menghalang pembakaran terbuka

II Reduce the use of chemical fertilizer
Mengurangkan penggunaan baja kimia

III Reduce the release of nitrogen oxide gas
Mengurangkan pembebasan gas nitrogen oksida

IV Have replanting programs after deforestation
Mengadakan program penanaman semula selepas penebangan hutan

A I and II
I *dan* II

B I and IV
I *dan* IV

C II and III
II *dan* III

D III and IV
III *dan* IV

30 Diagram 16 shows a graph of the dissolved oxygen content in a river.
Rajah 16 *menunjukkan graf kandungan oksigen terlarut dalam sungai.*

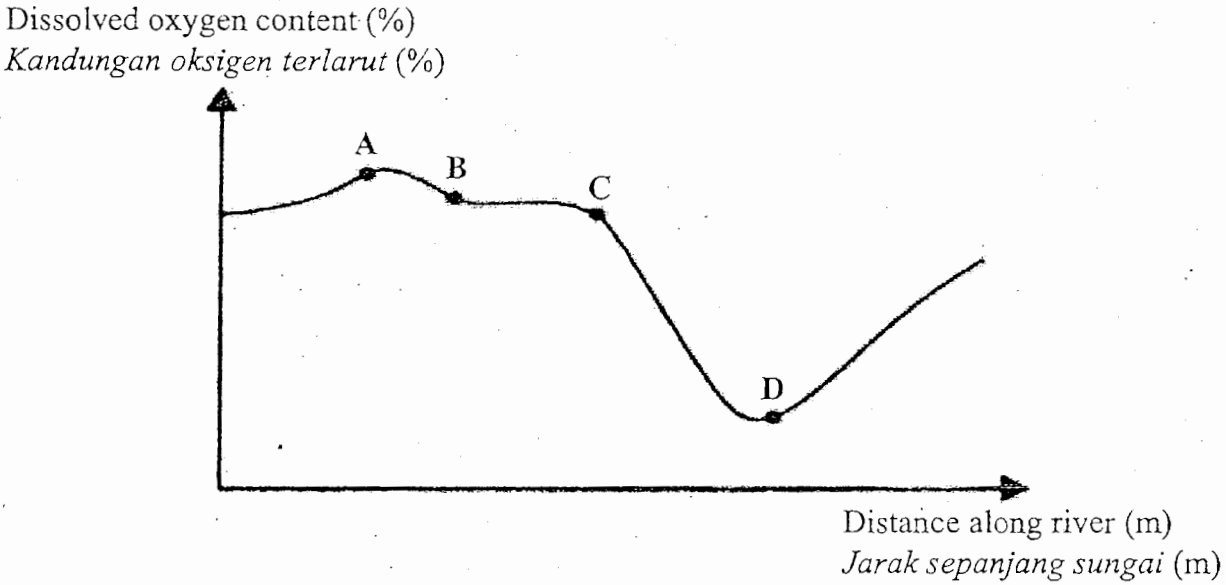

Diagram 16
Rajah 16

Which point, **A**, **B**, **C** or **D** has the highest BOD value?
Antara titik **A**, **B**, **C** *dan* **D**, *yang manakah mempunyai nilai* BOD *paling tinggi*?

31 Diagram 17 shows the component of body fluid in human.
Rajah 17 menunjukkan komponen bendalir badan dalam manusia.

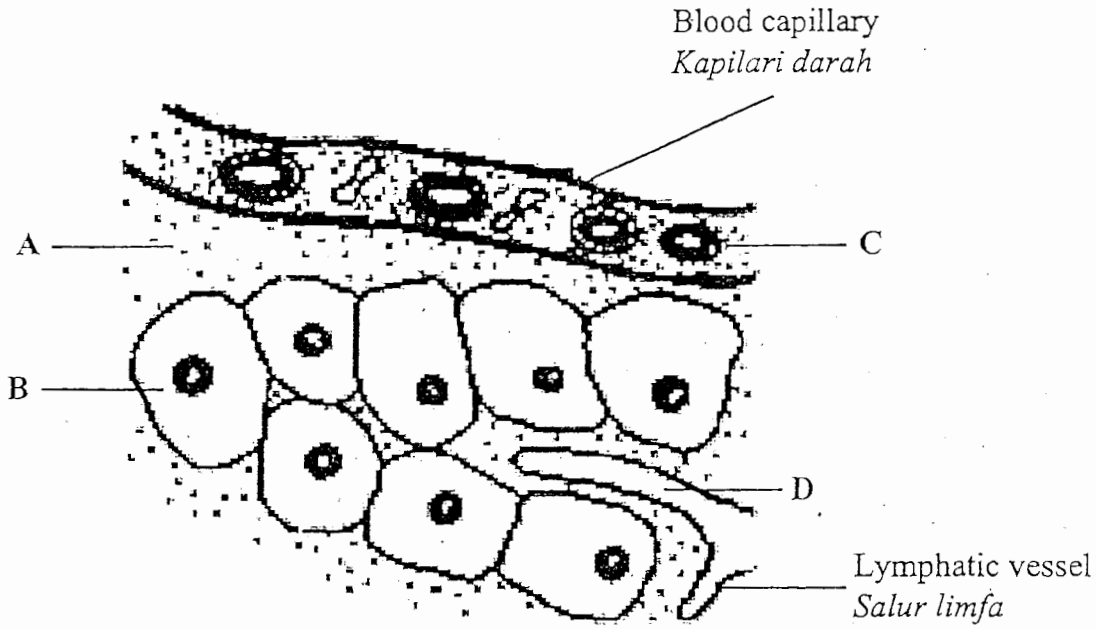

Diagram 17
Rajah 17

Which part, **A**, **B**, **C** or **D** contains the interstitial fluid?
Antara bahagian **A**, **B**, **C** *dan* **D**, *yang manakah mengandungi bendalir interstis*?

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32 Diagram 18 shows a blood circulatory system of an organism.
Rajah 18 menunjukkan sistem peredaran darah suatu organisma.

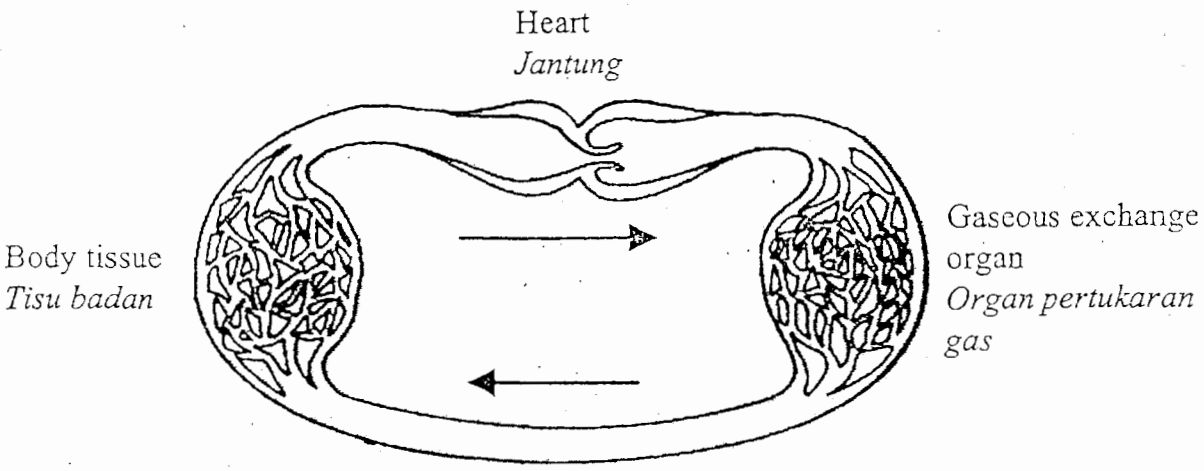


Diagram 18
Rajah 18

Which statement is true about the blood circulatory system?
Pernyataan manakah yang benar mengenai sistem peredaran darah tersebut?

A Heart pumps out a mixture of oxygenated and deoxygenated blood
Jantung mengepam keluar campuran darah beroksigen dan terdeoksigen

B Blood enters the body tissue at low pressure
Darah memasuki tisu badan pada tekanan rendah

C It is a double circulatory system
Ia adalah sistem peredaran ganda dua

D It is a open circulatory system
Ia adalah sistem peredaran terbuka

33 Diagram 19 shows structures of an alveolus and blood capillary.
Rajah 19 menunjukkan struktur satu alveolus dan kapilari darah.

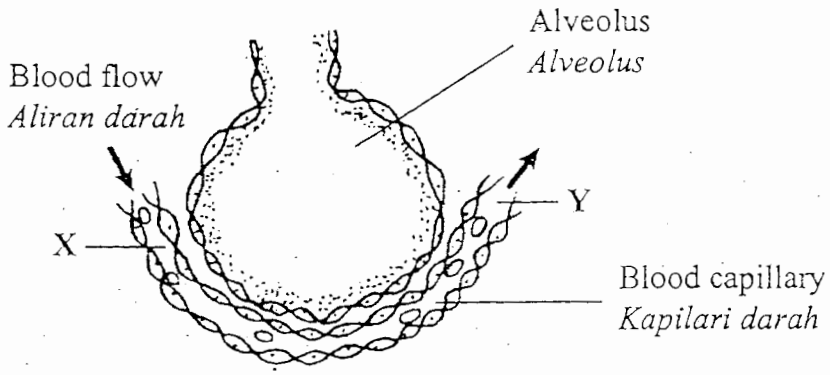


Diagram 19
Rajah 19

Which statement is correct about concentration of oxygen and carbon dioxide at **X** and **Y**?
Pernyataan manakah benar mengenai kepekatan oksigen dan karbon dioksida pada **X** *dan* **Y**?

	Concentration of oxygen *Kepekatan oksigen*		Concentration of carbon dioxide *Kepekatan karbon dioksida*	
	X	Y	X	Y
A	Low *Rendah*	High *Tinggi*	High *Tinggi*	Low *Rendah*
B	High *Tinggi*	Low *Rendah*	Low *Rendah*	High *Tinggi*
C	High *Tinggi*	Low *Rendah*	High *Tinggi*	Low *Rendah*
D	Low *Rendah*	High *Tinggi*	Low *Rendah*	High *Tinggi*

  [Lihat halaman sebelah

34 Diagram 20 shows treatment P on a plant to study process Q.
Rajah 20 menunjukkan rawatan P *ke atas suatu tumbuhan untuk mengkaji proses* Q.

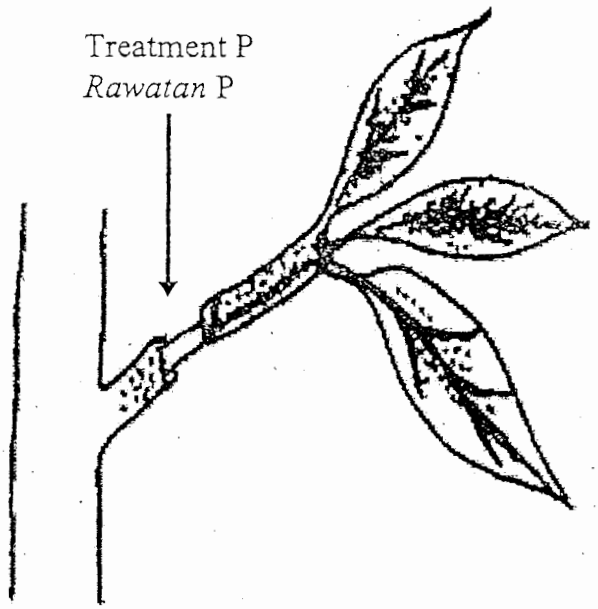


Diagram 20
Rajah 20

What is process Q?
Apakah proses Q?

A Translocation through phloem
Translokasi melalui floem

B Transport of water through xylem
Pengangkutan air melalui xilem

C Absorption of water by the roots
Penyerapan air oleh akar

D Mechanical support of the plant by the stem
Sokongan mekanikal tumbuhan oleh batang

35 Diagram 21 shows the cross-section of an earthworm.
Rajah 21 menunjukkan keratan rentas seekor cacing tanah.

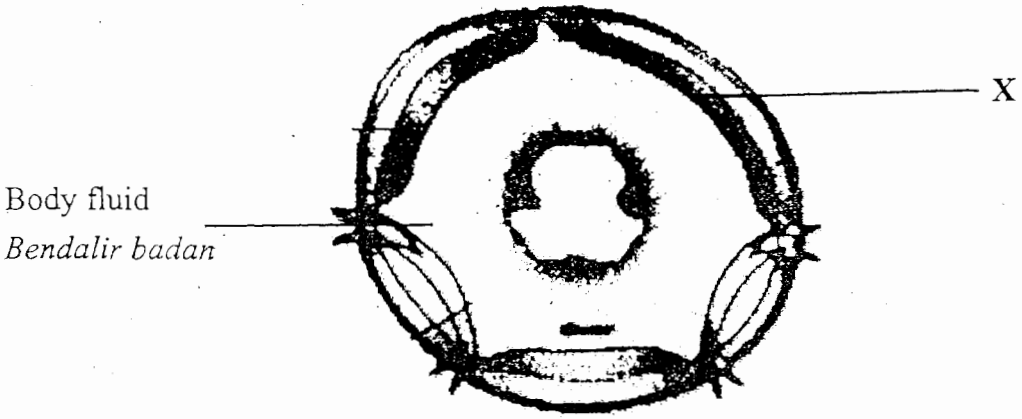


Diagram 21
Rajah 21

What is **X**?
Apakah **X**?

A Chaetae
Keta

B Body cavity
Rongga badan

C Circular muscle
Otot membulat

D Longitudinal muscle
Otot membujur

  [Lihat halaman sebelah

36 What will happen to a fish if the caudal fin is injured?
Apakah yang akan terjadi kepada seekor ikan jika sirip kaudal cedera?

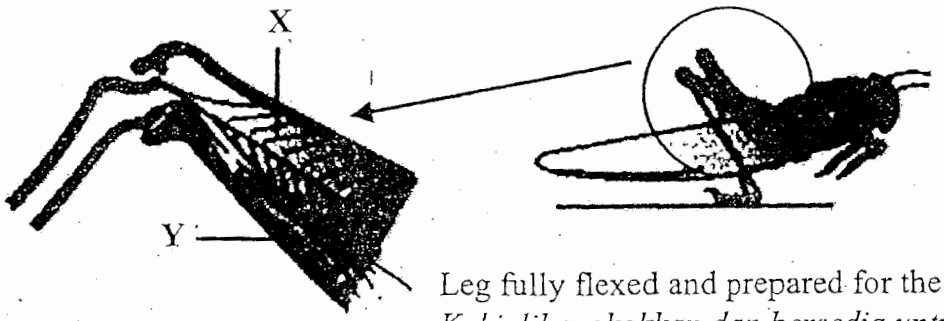
A Unable to move forward
Tidak boleh bergerak ke hadapan

B Unable to yaw
Tidak boleh mengoleng

C Unable to stop moving
Tidak boleh berhenti bergerak

D Unable to pitch
Tidak boleh menjunam

37 Diagram 22 shows a grasshopper in stage of preparation for a jump.
Rajah 22 menunjukkan seekor belalang dalam peringkat bersedia untuk melompat.



Leg fully flexed and prepared for the jumping
Kaki dibengkokkan dan bersedia untuk melompat

Diagram 22
Rajah 22

What happen to muscles **X** and **Y** during the stage?
Apakah yang berlaku pada otot **X** dan **Y** semasa peringkat itu?

	X	Y
A	Contracts *Mengecut*	Contracts *Mengecut*
B	Relaxes *Mengendur*	Relaxes *Mengendur*
C	Contracts *Mengecut*	Relaxes *Mengendur*
D	Relaxes *Mengendur*	Contracts *Mengecut*

38 What is the function of the axon in an afferent neurone of the nervous system?
Apakah fungsi akson dalam neuron aferen di dalam sistem saraf?

A Releases neurotransmitter in the synaptic cleft
Membebaskan neurotransmiter ke dalam celah sinaps

B Carries impulse away from the cell body
Membawa impuls keluar dari badan sel

C Speeds up the conduction of impulse
Mempercepatkan penghantaran impuls

D Carries impulse towards the cell body
Membawa impuls ke badan sel

39 A student steps into a very cold room.
Which actions occur to regulate his body temperature?
Seorang murid melangkah ke dalam bilik yang sangat sejuk.
Tindakan manakah yang berlaku untuk mengawal atur suhu badannya?

A Sweating and vasodilation of blood vessels
Perpeluhan dan salur darah mengalami pemvasodilatan

B Shivering and vasoconstriction of blood vessels
Mengigil dan salur darah mengalami pemvasocerutan

C Sweating and vasoconstriction of blood vessels
Perpeluhan dan salur darah mengalami pemvasocerutan

D Shivering and vasodilation of blood vessels
Mengigil dan salur darah mengalami pemvasodilatan

  [Lihat halaman sebelah

40 Diagram 23 shows the human endocrine system.
Rajah 23 menunjukkan sistem endokrin manusia.

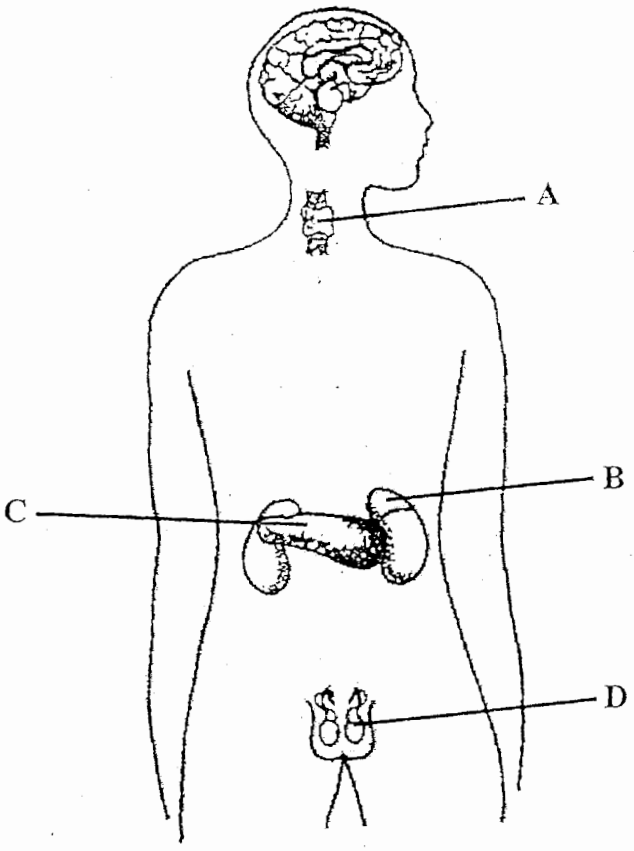


Diagram 23
Rajah 23

Which organ, **A**, **B**, **C** or **D** produces insulin?
Antara organ **A**, **B**, **C** *dan* **D** *yang manakah menghasilkan insulin?*

1 Diagram 24 shows a synapse at the terminal axon.
Rajah 24 menunjukkan sinaps pada hujung akson.

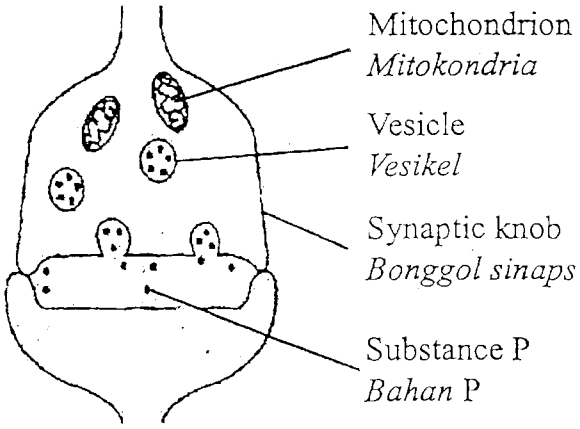


Diagram 24
Rajah 24

What is substance P?
Apakah bahan P?

A Enzyme
Enzim

B Antibody
Antibodi

C Hormone
Hormon

D Neurotransmitter
Neurotransmiter

2 Diagram 25 shows the embryo sac of a flowering plant.
Rajah 25 menunjukkan pundi embrio tumbuhan berbunga.

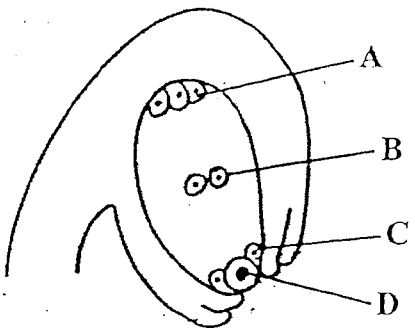


Diagram 25
Rajah 25

Which nuclei, **A**, **B**, **C** or **D** will form a triploid nucleus?
Antara nukleus **A**, **B**, **C** *dan* **D**, *yang manakah akan membentuk nukleus triploid?*

  [Lihat halaman sebelah

43 Diagram 26 shows the growth curve of an insect.
Rajah 26 menunjukkan lengkung pertumbuhan seekor serangga.

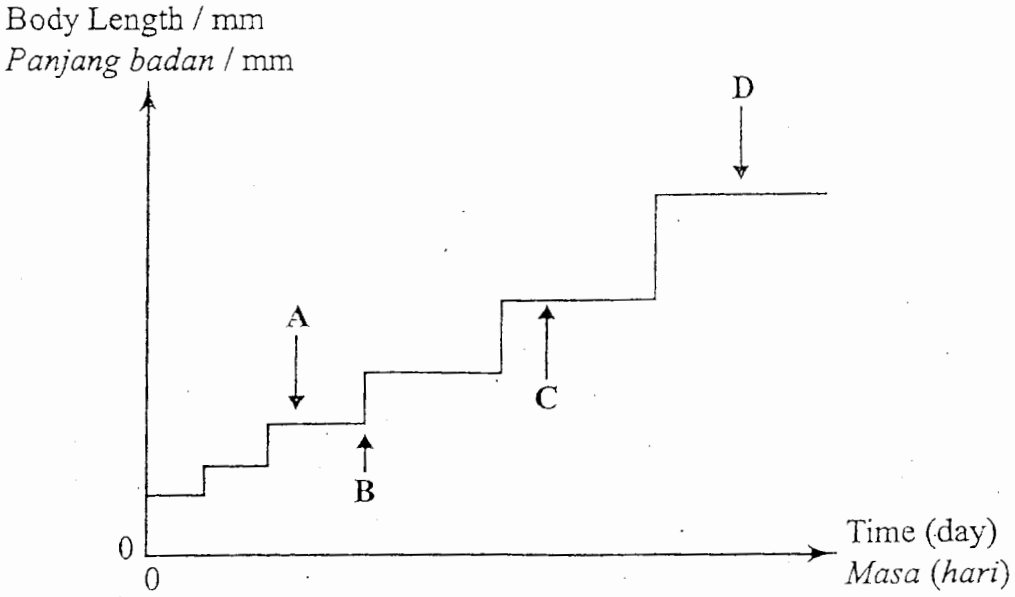


Diagram 26
Rajah 26

Which stage, **A**, **B**, **C** or **D** shows ecdysis?
Antara peringkat **A**, **B**, **C** *dan* **D**, *yang manakah menunjukkan ekdisis*?

44 Diagram 27 shows the development of a pollen grain.
Rajah 27 menunjukkan perkembangan sebutir debunga.

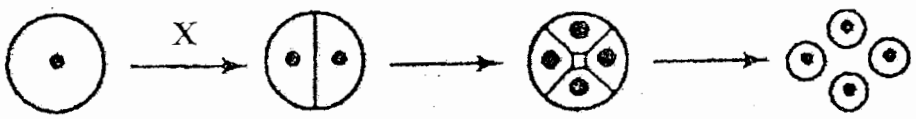


Diagram 27
Rajah 27

What is process **X**?
Apakah proses **X**?

A Growth
Tumbesaran

B Mitosis
Mitosis

C Meiosis I
Meiosis I

D Meiosis II
Meiosis II

45 The following informations are conditions of a woman after reaching process X.
Berikut adalah maklumat keadaan seorang perempuan setelah mencapai proses X.

- Sleeping problem
  Sukar untuk tidur
- Menstruation stop
  Haid berhenti
- Hot flush
  Panas badan

What is process X?
Apakah proses X?

A Menopause
Menopaus

B Pregnancy
Kehamilan

C Menstruation
Haid

D Premenstrual syndrom
Sindrom prahaid

46 Diagram 28 shows a pair of homologous chromosomes.
Rajah 28 *menunjukkan sepasang kromosom homolog.*

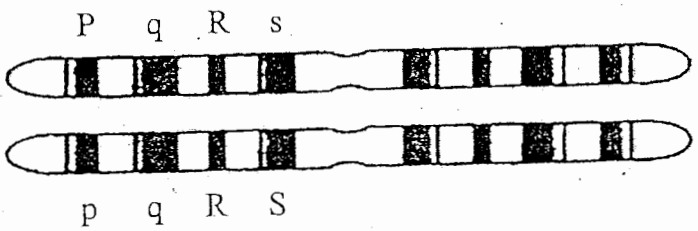


Diagram 28
Rajah 28

Which alphabets represent genes?
Abjad manakah yang mewakili gen?

A Pp

B Pq

C RS

D Rs

[Lihat halaman sebelah

47 Diagram 29 shows the karyotype of a male suffering from genetic disease.
Rajah 29 menunjukkan suatu kariotip lelaki yang mengalami penyakit genetik.

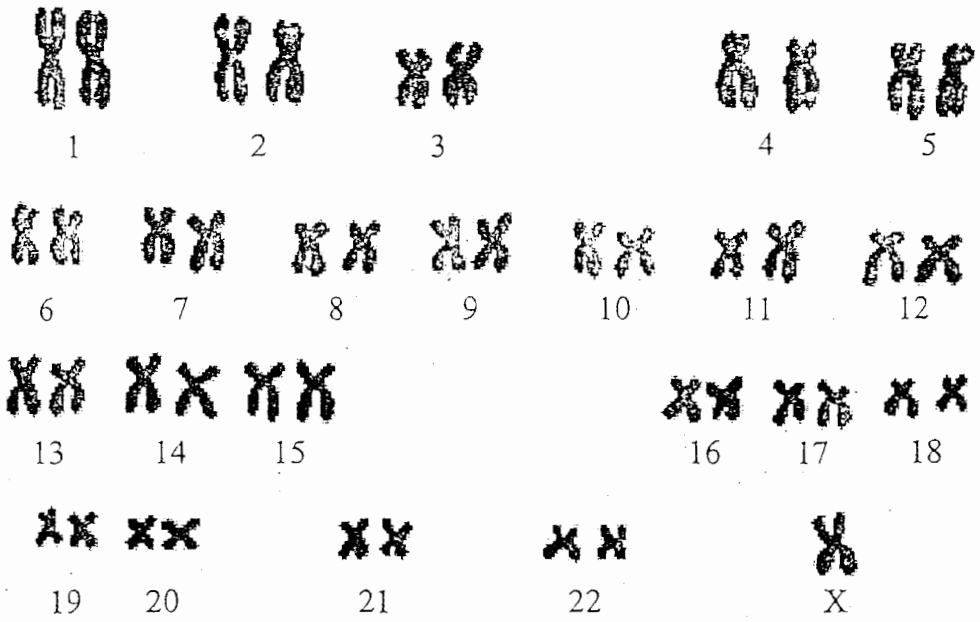


Diagram 29
Rajah 29

What is the disease?
Apakah penyakit tersebut?

A Albinism
Albinisme

B Haemophilia
Hemofilia

C Turner's syndrome
Sindrom Turner

D Klinefelter's syndrome
Sindrom Klinefelter

48 A woman is infected with a disease in the 12th week of her pregnancy. The infection causes malfunction of the placenta.
What is the effect of the infection?
Seorang wanita dijangkiti oleh suatu penyakit dalam minggu ke-12 kehamilannya. Jangkitan tersebut menyebabkan plasenta gagal berfungsi.
Apakah kesan jangkitan tersebut?

A Spontaneous loss of foetus
Keguguran fetus

B The foetus continues to develop
Fetus terus berkembang

C Down's syndrome child is born
Anak sindrom Down dilahirkan

D The uterine wall continues to be thicken
Dinding uterus terus menebal

29 Which is the characteristic of discontinuous variation?
Ciri yang manakah merupakan variasi tak selanjar?

A Height
Ketinggian

B Intelligence
Kecerdikan

C Skin colour
Warna kulit

D Ear lobe attachment
Lekapan cuping telinga

30 Diagram 30 shows a type of variation in thumb print.
Rajah 30 menunjukkan satu jenis variasi pada cap ibu jari.

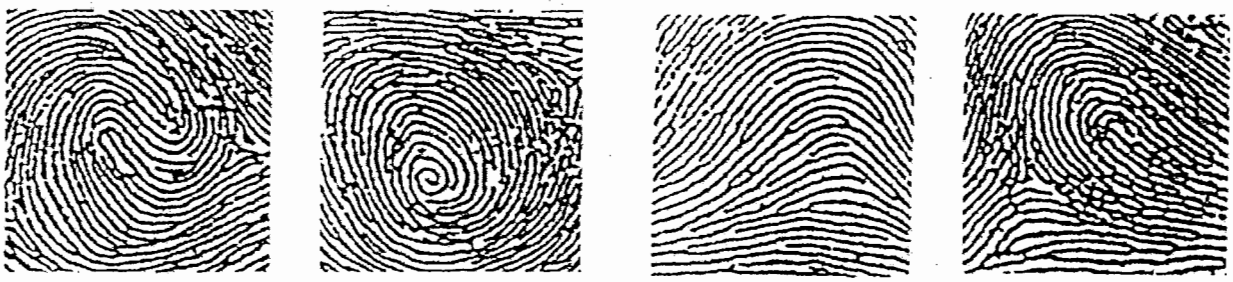


Diagram 30
Rajah 30

Which statement describes the variation?
Pernyataan manakah yang menerangkan variasi tersebut?

A Has intermediate value
Mempunyai nilai perantaraan

B Shows a normal curve graph
Menunjukkan graf taburan normal

C Shows distinct differences
Menunjukkan perbezaan yang jelas

D Affected by environmental factor
Dipengaruhi oleh faktor persekitaran

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

NO. KAD PENGENALAN | | | | | | | | - | | | - | | | | |

ANGKA GILIRAN | | | | | | | | | |

Nama ..... Tingkatan .....

JABATAN PELAJARAN NEGERI SELANGOR
MAJLIS PENGETUA SEKOLAH MALAYSIA NEGERI SELANGOR

PROGRAM PENINGKATAN PRESTASI AKADEMIK
PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2011

4551/2

BIOLOGY
Kertas 2
September
$\frac{1}{2}$ jam

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

- *Tulis* **nombor kad pengenalan, angka giliran, nama** *dan* **tingkatan** *anda pada petak yang disediakan.*
- *Kertas soalan ini adalah dalam dwibahasa.*
- *Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.*
- *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau bahasa Melayu.*
- *Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*

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

Kertas soalan ini mengandungi 23 halaman bercetak dan 1 halaman tidak bercetak.

Section A
Bahagian A

[60 *marks*]
[60 *markah*]

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

1 Diagram 1 shows two structures, P and Q that are found in human.
Rajah 1 *menunjukkan dua struktur,* P *dan* Q *yang terdapat dalam manusia.*

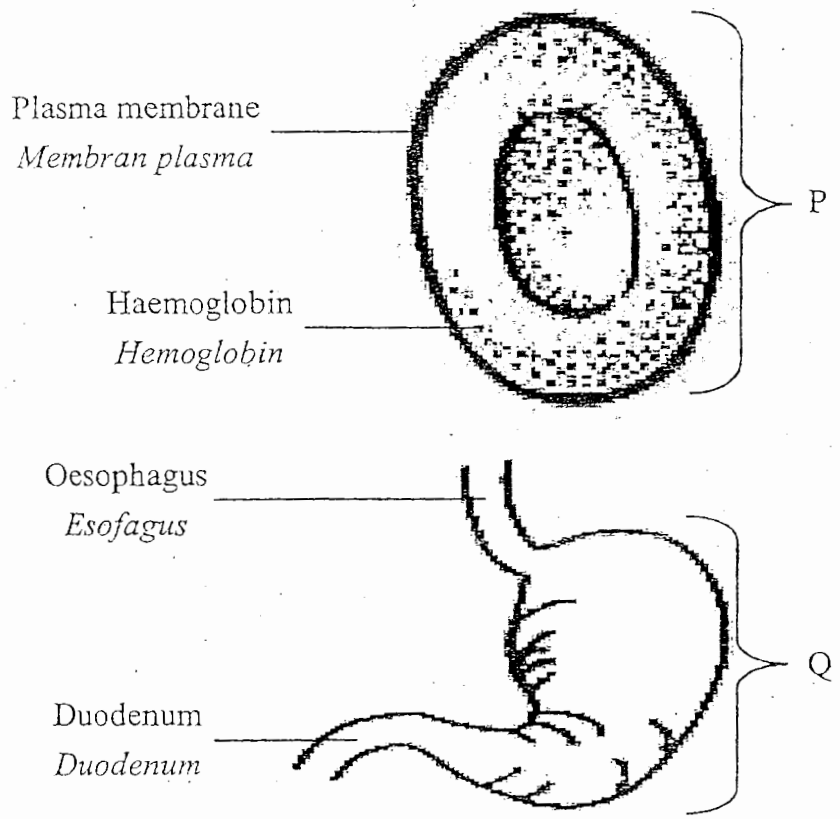


Diagram 1
Rajah 1

(*a*) Name P and Q.
Namakan P *dan* Q.

1(*a*) 2

P :.....

Q :.....

[2 *marks*]
[2 *markah*]

For Examiner's Use

(b) Using arrows (⟶), match P and Q to the correct level of cell organization.

Dengan menggunakan anak panah (⟶), padankan P dan Q kepada aras organisasi sel yang betul.

Structure *Struktur*	Level of cell organization *Aras organisasi sel*
	Cell *Sel*
P	Tissue *Tisu*
Q	Organ *Organ*
	System *Sistem*

1(b) 2

[2 *marks*]
[2 *markah*]

(c) State the function of structures P and Q.
Nyatakan fungsi struktur P *dan struktur* Q.

P : .....

Q : .....

1(c) 2

[2 *marks*]
[2 *markah*]

(d) (i) State the main tissue that builds up Q related to its function.
Nyatakan tisu utama yang membina Q *berhubung dengan fungsinya.*

.....

1(d)(i) 1

[1*mark*]
[1 *markah*]

(ii) Explain how the main tissue in (*d*)(i) carries out its function.
Terangkan bagaimana tisu utama dalam (*d*)(i) *menjalankan fungsinya.*

.....

.....

.....

.....

1(d)(ii) 2

[2 *marks*]
[2 *markah*]

For Examiner's Use

(e) An individual has very few P in his blood count. The number of P is below normal.
Explain the effect of this condition to his health.

Seorang individu mempunyai bilangan P *yang sedikit dalam kiraan darahnya. Bilangan* P *adalah rendah daripada normal.*
Terangkan kesan keadaan ini terhadap kesihatannya.

.....

.....

.....

.....

[3 *marks*]
[3 *markah*]

1(e)
3

Total
A1
12

For Examiner's Use

2 Diagram 2.1 shows the condition of a plant cell before treatment.
Diagram 2.2(*a*) and Diagram 2.2(*b*) show the condition of the plant cell after it has been immersed in solutions X and Y.

Rajah 2.1 *menunjukkan keadaan satu sel tumbuhan sebelum dirawat.*
Rajah 2.2(*a*) *dan Rajah* 2.2(*b*) *menunjukkan keadaan sel tumbuhan tersebut selepas direndam dalam larutan* X *dan* Y.

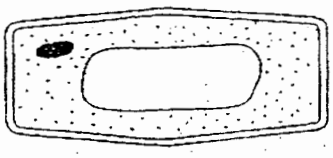
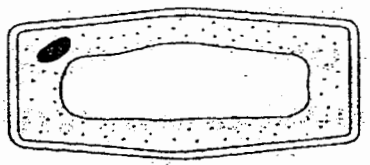
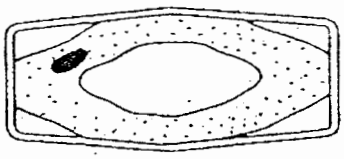


Diagram 2.1
Rajah 2.1



Solution X
Larutan X
Diagram 2.2(*a*)
Rajah 2.2(*a*)



Solution Y
Larutan Y
Diagram 2.2(*b*)
Rajah 2.2(*b*)

(*a*) (i) Name solutions X and Y.
Namakan larutan X *dan* Y.

X :.....

Y :.....

[2 *marks*]
[2 *markah*]

2(*a*)(i)
2

(ii) State the condition of the plant cell after it has been immersed in solutions X and Y.
Nyatakan keadaan sel tumbuhan tersebut selepas direndam dalam larutan X *dan* Y.

Solution *Larutan*	Condition of plant cell *Keadaan sel tumbuhan*
X	.....
Y	.....

[2 *marks*]
[2 *markah*]

2(*a*)(ii)
2

(b) Explain the process that caused the condition of the plant cell in Diagram 2.2(a).
Terangkan proses yang menyebabkan keadaan sel tumbuhan dalam Rajah 2.2(a).

.....

.....

.....

.....

[4 *marks*]
[4 *markah*]

2(b) 4

(c) Explain how the condition of the cell in Diagram 2.2(a) is important to a herbaceous plant.
Terangkan bagaimana keadaan sel dalam Rajah 2.2(a) penting bagi tumbuhan herba.

.....

.....

.....

.....

[2 *marks*]
[2 *markah*]

2(c) 2

(d) A housewife dried fishes under the hot sun.
Explain how this method is able to preserve the fishes.
Seorang suri rumah mengeringkan ikan-ikan di bawah matahari yang terik.
Terangkan bagaimana kaedah ini dapat mengawet ikan-ikan tersebut.

.....

.....

.....

.....

[2 *marks*]
[2 *markah*]

2(d) 2

Total A2 12

For Examiner's Use

3 Diagram 3.1 shows human respiratory system.
Diagram 3.2 shows fish respiratory system.
Rajah 3.1 *menunjukkan sistem respirasi manusia.*
Rajah 3.2 *menunjukkan sistem respirasi ikan.*

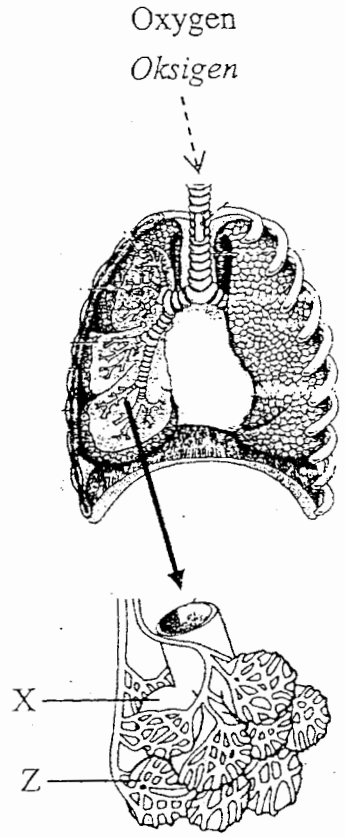


Diagram 3.1
Rajah 3.1

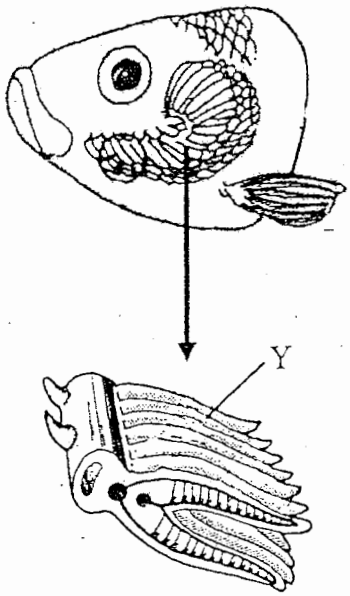


Diagram 3.2
Rajah 3.2

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

X :.....

Y :.....

[2 *marks*]
[2 *markah*]

3(*a*) 2

(*b*) Explain how exchange of oxygen occurs between X and Z.
Terangkan bagaimana pertukaran oksigen berlaku antara X *dan* Z.

.....

.....

.....

.....

[2 *marks*]
[2 *markah*]

3(*b*) 2

(c) Explain **one** feature that the human respiratory system and the fish respiratory system have in common.

Terangkan **satu** *ciri yang mempunyai persamaan di antara sistem respirasi manusia dan sistem respirasi ikan.*

.....

.....

.....

.....

[2 *marks*]
[2 *markah*]

3(c) 2

(d) Many factories are located nearby a river. The factories release abundant of harmful gases.
Explain the effect of these harmful gases to the population of the fishes.

Banyak kilang terletak berdekatan sungai. Kilang-kilang itu membebaskan banyak gas-gas yang merbahaya.
Terangkan kesan gas-gas merbahaya ini terhadap populasi ikan.

.....

.....

.....

.....

[3 *marks*]
[3 *markah*]

3(d) 3

(e) Diagram 3.3 shows a food chain in a river.

Rajah 3.3 *menunjukkan satu rantai makanan dalam sungai.*

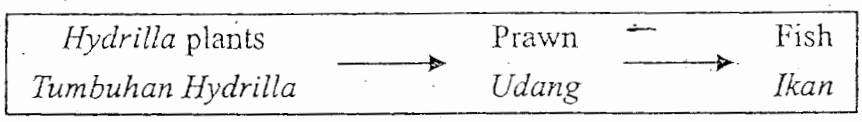


Diagram 3.3
Rajah 3.3

Explain the importance of *Hydrilla* plants in the food chain.
Terangkan kepentingan tumbuhan Hydrilla dalam rantai makanan tersebut.

.....

.....

.....

.....

[3 *marks*]
[3 *markah*]

3(e) 3

Total A3 12

For Examiner's Use

4 Diagram 4 shows the female reproductive organ of a flowering plant.
Rajah 4 menunjukkan organ pembiakan betina suatu bunga.

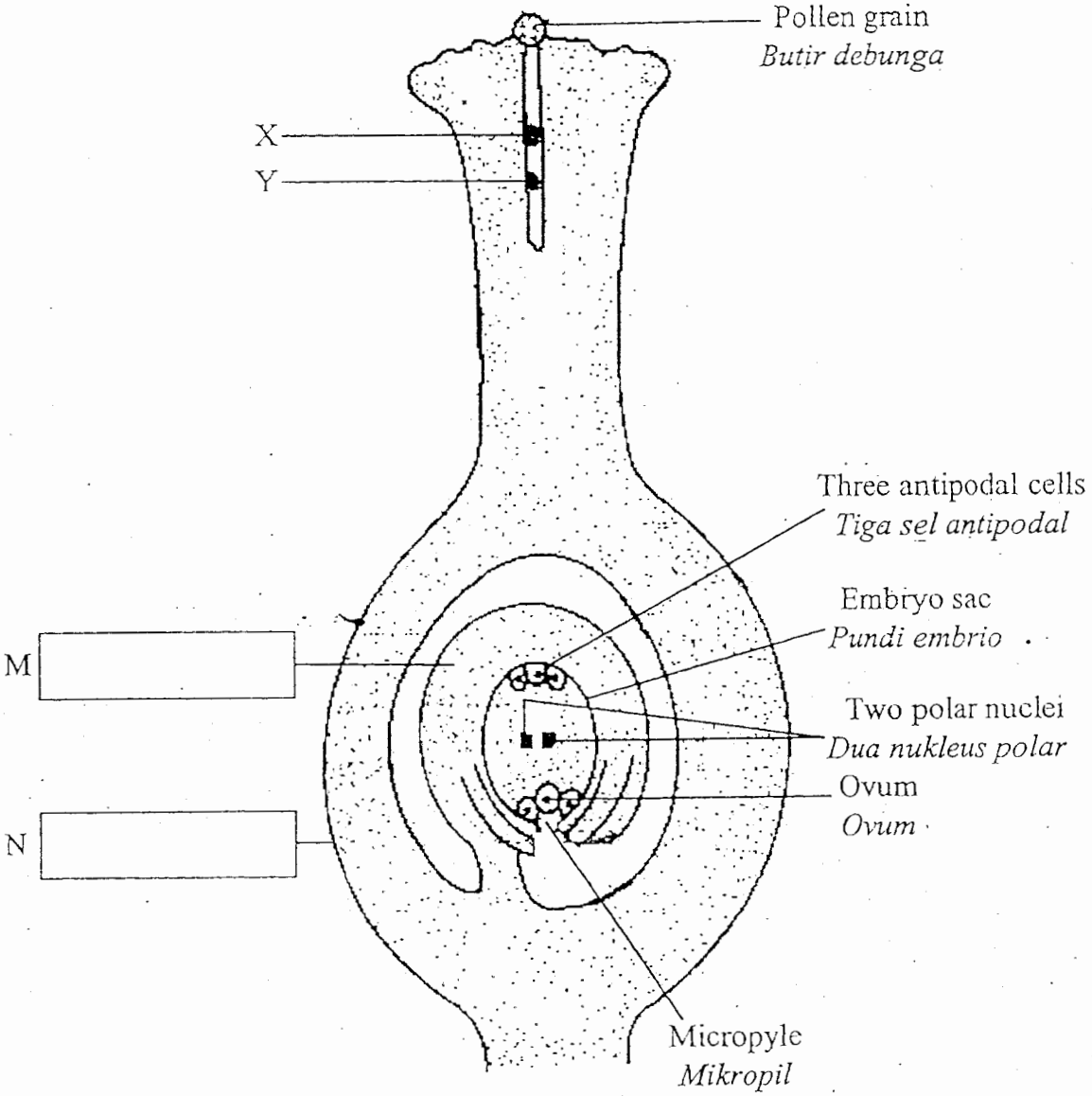


Diagram 4
Rajah 4

(a) (i) Label structures M and N in the boxes provided. [2 *marks*]
Labelkan struktur M *dan* N *dalam kotak yang disediakan.* [2 *markah*]

4(a)(i) 2

(ii) State the function of X and Y.
Nyatakan fungsi X *dan* Y.

X :.....

Y :.....

[2 *marks*]
[2 *markah*]

4(a)(ii) 2

(*b*) Describe double fertilization in the plant.
Huraikan persenyawaan ganda dua dalam tumbuhan tersebut.

.....

.....

.....

.....

[4 *marks*]
[4 *markah*]

4(*b*) 4

(*c*) Explain **one** importance of double fertilization to the plant.
Terangkan **satu** *kepentingan persenyawaan ganda dua pada tumbuhan tersebut.*

.....

.....

.....

.....

[2 *marks*]
[2 *markah*]

4(*c*) 2

(*d*) Some guava fruits are found to have no seed.
Describe **one** disadvantage of this condition for the survival of the plant.
Terdapat jenis buah jambu yang tanpa biji.
Huraikan **satu** *keburukan keadaan ini dalam kemandirian tumbuhan tersebut.*

.....

.....

.....

.....

[2 *marks*]
[2 *markah*]

4(*d*) 2

Total
A4 12

For Examiner's Use

5 Ahmad has blood group A, while his wife Fatimah has blood group O.
I^A is the dominant allele while I^O is the recessive allele.
Their offspring has blood group O.
The inheritance of blood group is summarized in Diagram 5.

Ahmad mempunyai kumpulan darah A *manakala isterinya Fatimah mempunyai kumpulan darah* O. I^A *adalah alel dominan manakala* I^O *adalah alel resesif.*
Anak mereka mempunyai kumpulan darah O.
Perwarisan kumpulan darah diringkaskan dalam Rajah 5.

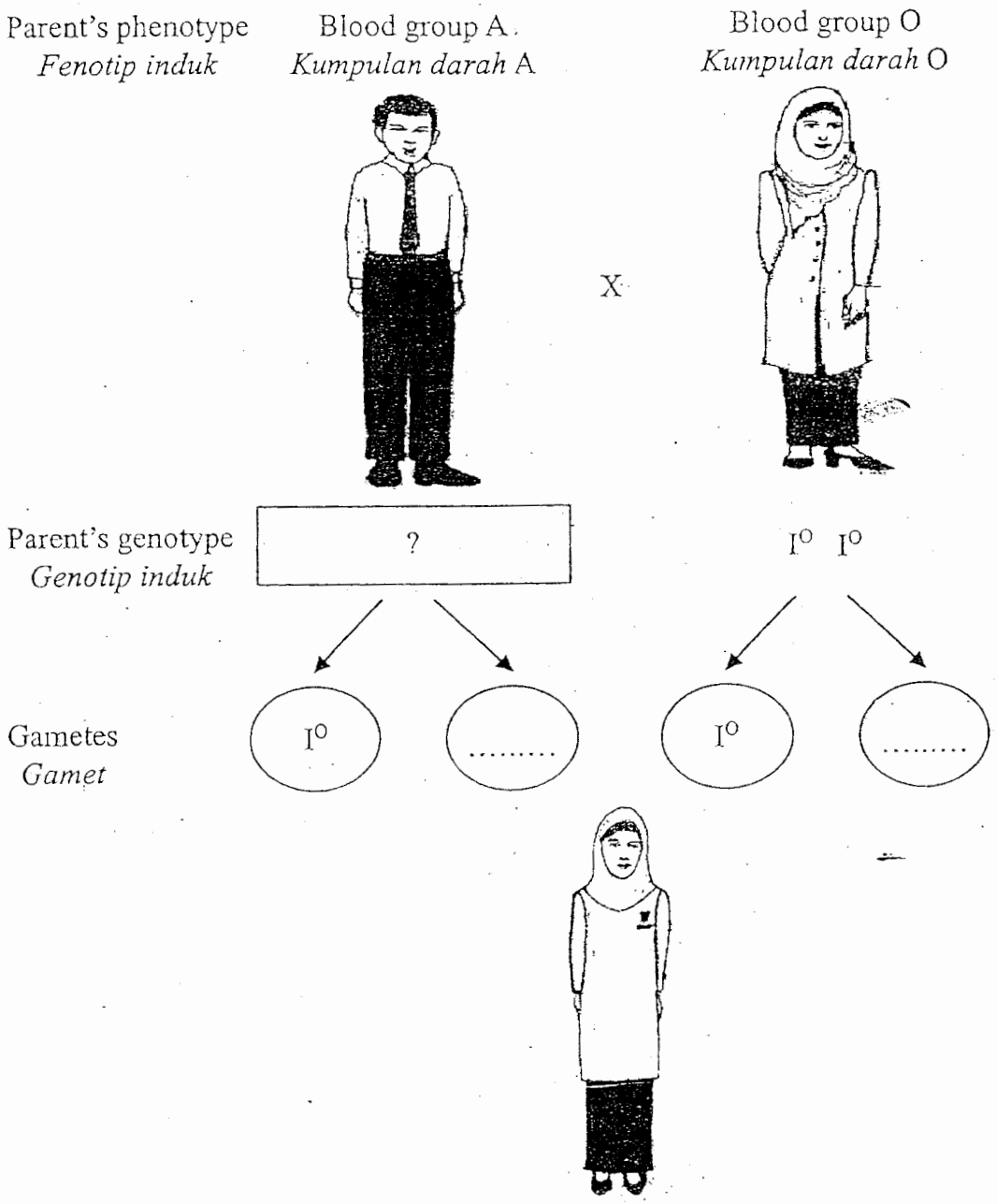


Diagram 5
Rajah 5

  [Lihat halaman sebelah

(a) State the possible genotypes of the following individuals.
Nyatakan genotip yang mungkin bagi individu berikut.

5(a)(i)(ii) 2

(i) Ahmad : .....
Ahmad :

(ii) Offspring : .....
Anak :

[2 *marks*]
[2 *markah*]

(b) Fill in all the circles in Diagram 5 with the allele of Ahmad's gamete and the allele of Fatimah's gamete.
Isikan dalam semua bulatan pada Rajah 5 alel bagi gamet Ahmad dan alel bagi gamet Fatimah.

5(b) 2

[2 *marks*]
[2 *markah*]

(c) Explain how the offspring inherits blood group O.
Terangkan bagaimana anak mewarisi kumpulan darah O.

.....

.....

.....

.....

5(c) 3

[3 *marks*]
[3 *markah*]

(d) Blood group is a type of variation.
State the type of variation for blood group.
State **one** reason for your answer.
Kumpulan darah adalah sejenis variasi.
Nyatakan jenis variasi untuk kumpulan darah.
Nyatakan **satu** *sebab untuk jawapan anda.*

Type of variation : .....
Jenis variasi :

5(d) 2

Reason : .....
Sebab :

[2 *marks*]
[2 *markah*]

For Examiner's Use

(e) Fatimah lost a lot of blood during an operation. She needs to undergo blood transfusion.
Explain why Ahmad is **not** a compatible donor for Fatimah.

Fatimah telah kehilangan darah yang banyak ketika pembedahan. Beliau perlu menjalani pemindahan darah.
Terangkan mengapa Ahmad **bukan** *penderma darah yang sesuai bagi Fatimah.*

.....

.....

.....

.....

[3 *marks*]
[3 *markah*]

5(e) 3

Total A5 12

Section B
Bahagian B

[40 *marks*]
[40 *markah*]

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

6 Diagram 6.1 shows a food chain in a terrestrial ecosystem. The Sun is the source of energy for the organisms.

Rajah 6.1 *menunjukkan satu rantai makanan dalam ekosistem daratan. Matahari adalah sumber tenaga bagi organisma-organisma tersebut.*

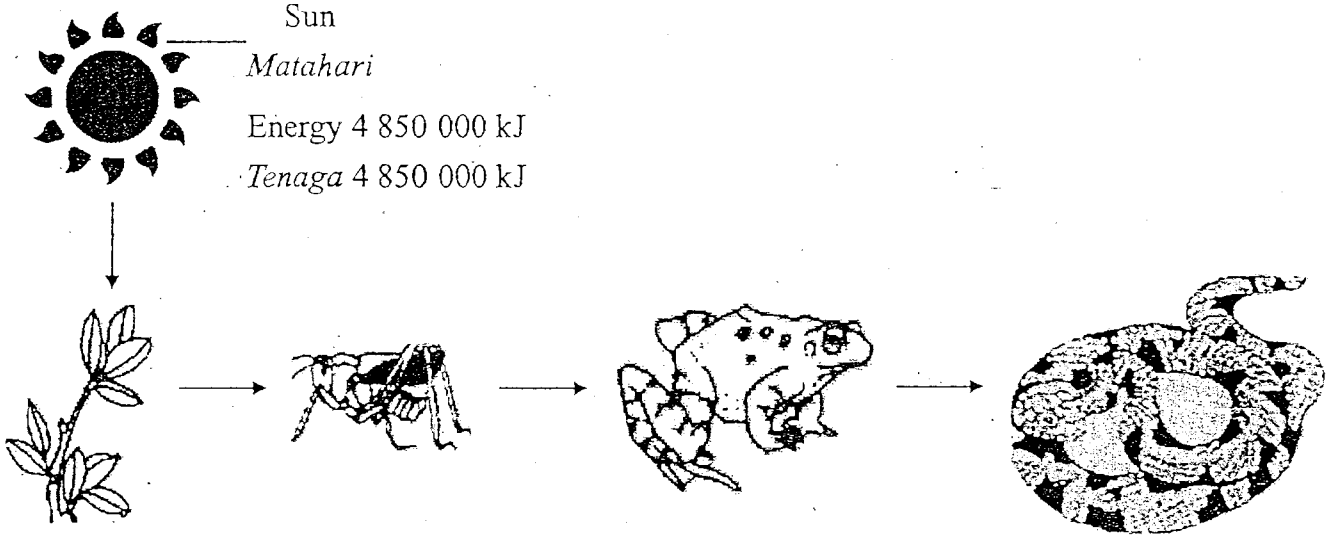


Diagram 6.1
Rajah 6.1

(*a*) (i) Explain the role of the plant and the frog in the food chain. [6 *marks*]
Terangkan peranan tumbuhan dan katak dalam rantai makanan tersebut. [6 *markah*]

(ii) Explain the energy transfer in the food chain. [4 *marks*]
Terangkan pemindahan tenaga dalam rantai makanan tersebut. [4 *markah*]

  [Lihat halaman sebelah

(b) Pathogens are microorganisms which cause diseases.
Explain how the following methods helps in preventing the widespread of the disease.
Patogen adalah mikroorganisma yang menyebabkan penyakit.
Terangkan bagaimana kaedah di bawah dapat membantu untuk mengelakkan perebaka penyakit tersebut secara meluas.

(i) Vaccination
Vaksinasi

(ii) Intake of antibiotics
Pengambilan antibiotik

(iii) Applying antiseptic
Menggunakan antiseptik

[6 mark
[6 markal

(c) Diagram 6.2 shows the interaction between an owl and a rat.
Rajah 6.2 menunjukan interaksi antara burung hantu dan tikus.

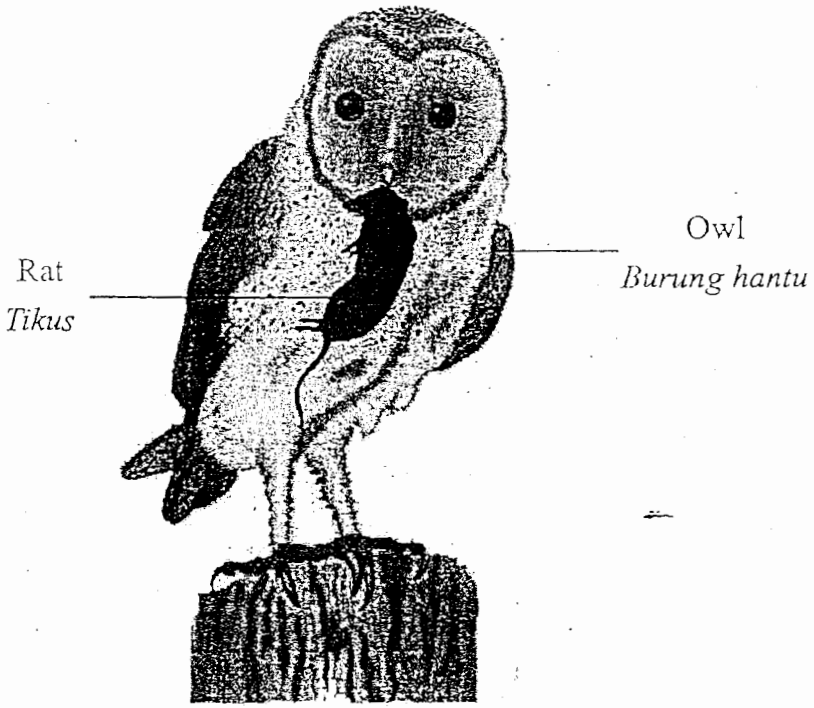


Diagram 6.2
Rajah 6.2

Explain how the interaction between these two organisms which are found in the paddy field brings benefits to the farmers and the environment.
Terangkan bagaimana interaksi antara kedua-dua organisma ini yang terdapat di sawah padi tersebut membawa faedah kepada petani dan alam sekitar.

[4 marks
[4 markah

7 Diagram 7.1(*a*) and 7.1(*b*) show growth curves of two different organisms.
Rajah 7.1(*a*) *dan* 7.1(*b*) *menunjukkan lengkung pertumbuhan bagi dua organisma yang berbeza.*

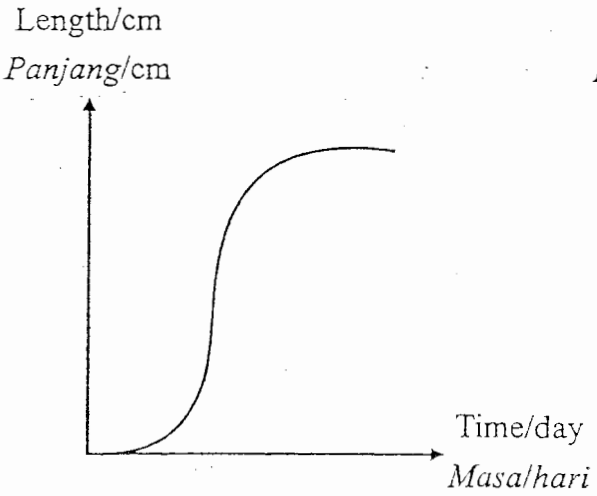


Diagram 7.1(*a*)
Rajah 7.1(*a*)

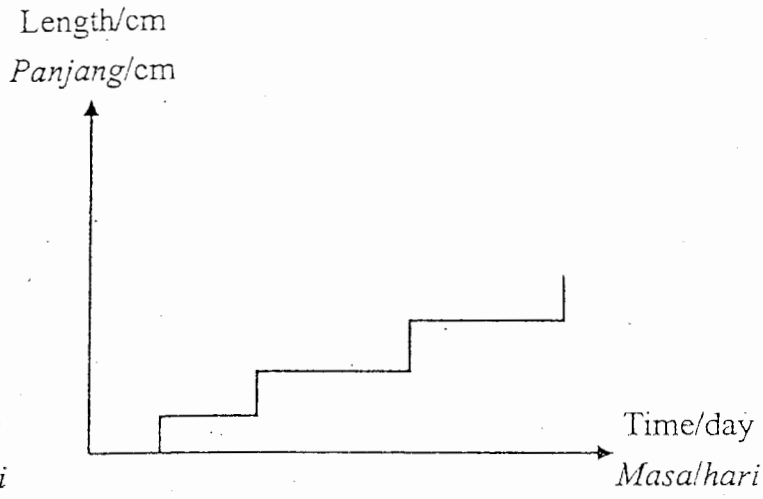


Diagram 7.1(*b*)
Rajah 7.1(*b*)

(*a*) (i) Name **one** organism that has a growth curve shown in Diagram 7.1(*a*) and 7.1(*b*) respectively.
Namakan **satu** *organisma yang mempunyai lengkung pertumbuhan seperti yang ditunjukkan dalam Rajah* 7.1(*a*) *dan* 7.1(*b*) *masing-masing.*
[2 *marks*]
[2 *markah*]

(ii) State **two** differences between growth curve in Diagram 7.1(*a*) and 7.1(*b*).
Nyatakan **dua** *perbezaan antara lengkung pertumbuhan dalam Rajah* 7.1(*a*) *dan* 7.1(*b*).
[2 *marks*]
[2 *markah*]

(iii) Describe the growth curve in Diagram 7.1(*b*).
Terangkan lengkung pertumbuhan Rajah 7.1(*b*).
[6 *marks*]
[6 *markah*]

(*b*) Diagram 7.2 shows a part of a female reproductive system.
Rajah 7.2 menunjukkan sebahagian daripada sistem pembiakan perempuan.

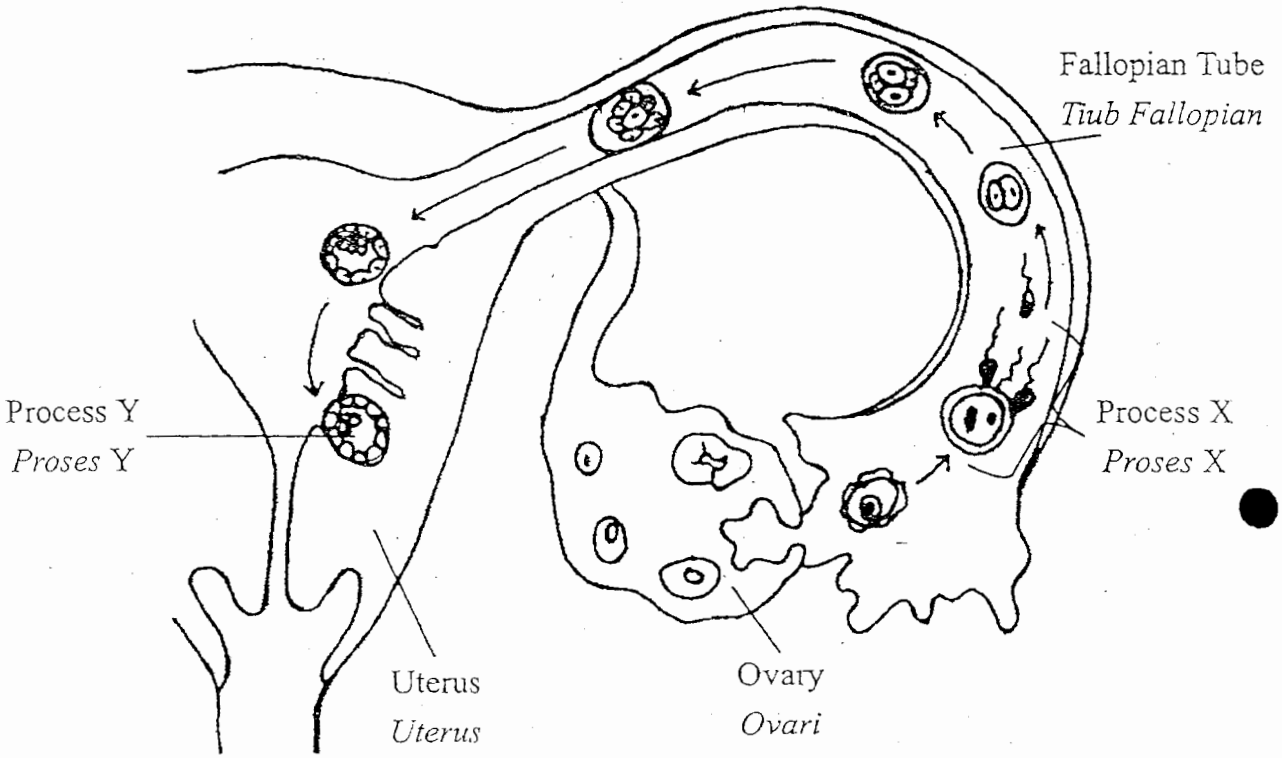


Diagram 7.2
Rajah 7.2

(i) Explain the importance of processes X and Y. [4 *marks*]
Terangkan kepentingan proses X *dan* Y. [4 *markah*]

8 Diagram 8.1 shows the role of skin in regulating the body temperature in human.
Rajah 8.1 menunjukkan peranan kulit dalam pengawalaturan suhu badan manusia.

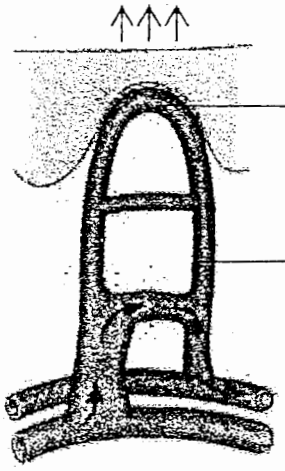
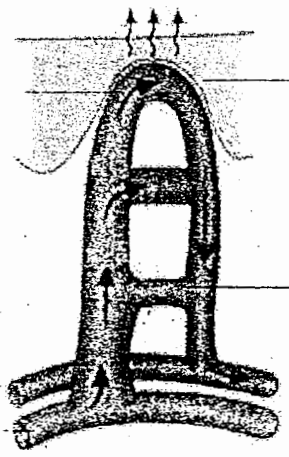
Condition and temperature of the surrounding *Keadaan dan suhu persekitaran*	Condition of the blood capillary in the skin *Keadaan kapilari darah dalam kulit*
Cold *Sejuk* 10 °C	Heat lost from skin surface *Kehilangan haba dari permukaan kulit* 
Hot *Panas* 38 °C	Heat lost from skin surface *Kehilangan haba dari permukaan kulit* 

Diagram 8.1
Rajah 8.1

(*a*) Explain the action of the blood capillaries in regulating the body temperature at the **two** different conditions of the surrounding.
Terangkan tindakan kapilari darah dalam pengawalaturan suhu badan manusia dalam **dua** *keadaan persekitaran yang berbeza.*

[10 *marks*]
[10 *markah*]

(*b*) Diagram 8.2 shows the regulating of blood glucose level in human.
Rajah 8.2 menunjukkan pengawalaturan aras glukosa dalam darah manusia.

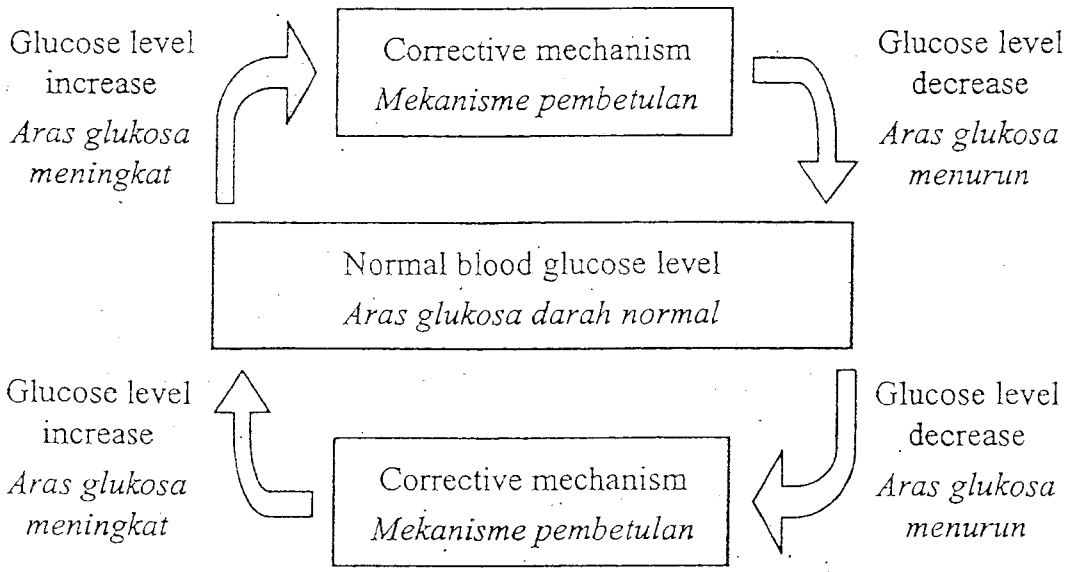


Diagram 8.2
Rajah 8.2

Describe how the regulation of blood glucose level occurs when the blood glucose level is higher than normal.
Huraikan bagaimana pengawalaturan aras glukosa darah berlaku apabila aras glukosa darah lebih tinggi daripada normal.

[5 *marks*]
[5 *markah*]

A person with impaired kidneys has to undergo haemodialysis. A dialysis machine is used in this process.
Explain how the machine works.
Seorang individu yang mengalami kegagalan ginjal menjalani hemodialisis. Mesin dialisis digunakan untuk proses ini.
Terangkan bagaimana mesin ini berfungsi.

[5 *marks*]
[5 *markah*]

9 Diagram 9.1 shows the effects of human activities on the environment.
Rajah 9.1 menunjukkan kesan aktiviti manusia ke atas alam sekitar.

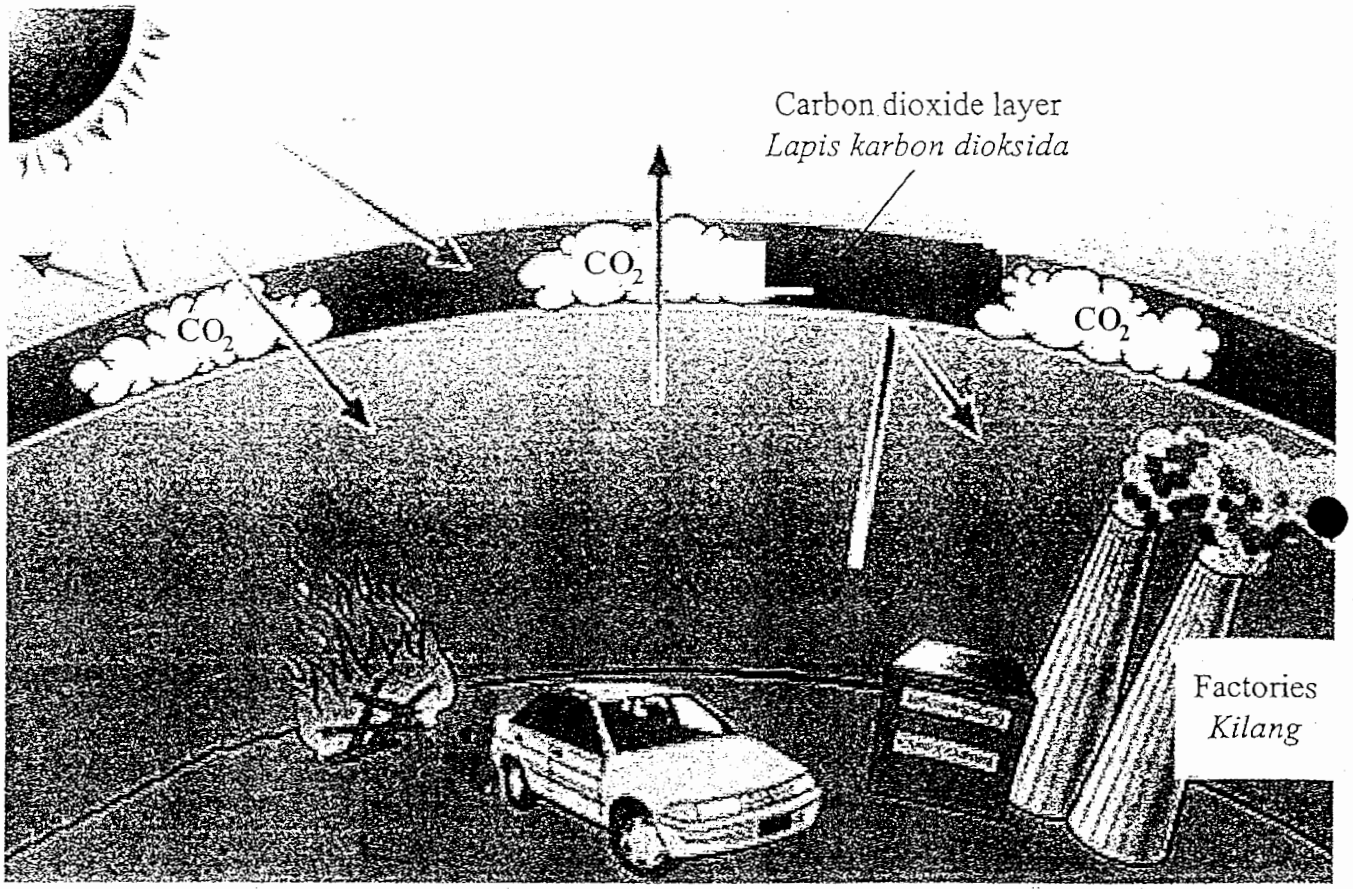


Diagram 9.1
Rajah 9.1

(*a*) Explain the effects of the human activities on the environment. [5 *marks*]
Terangkan kesan aktiviti manusia ke atas alam sekitar. [5 *markah*]

(*b*) Diagram 9.2 shows the emission of gases from factories.
Rajah 9.2 menunjukkan pelepasan gas daripada kilang.

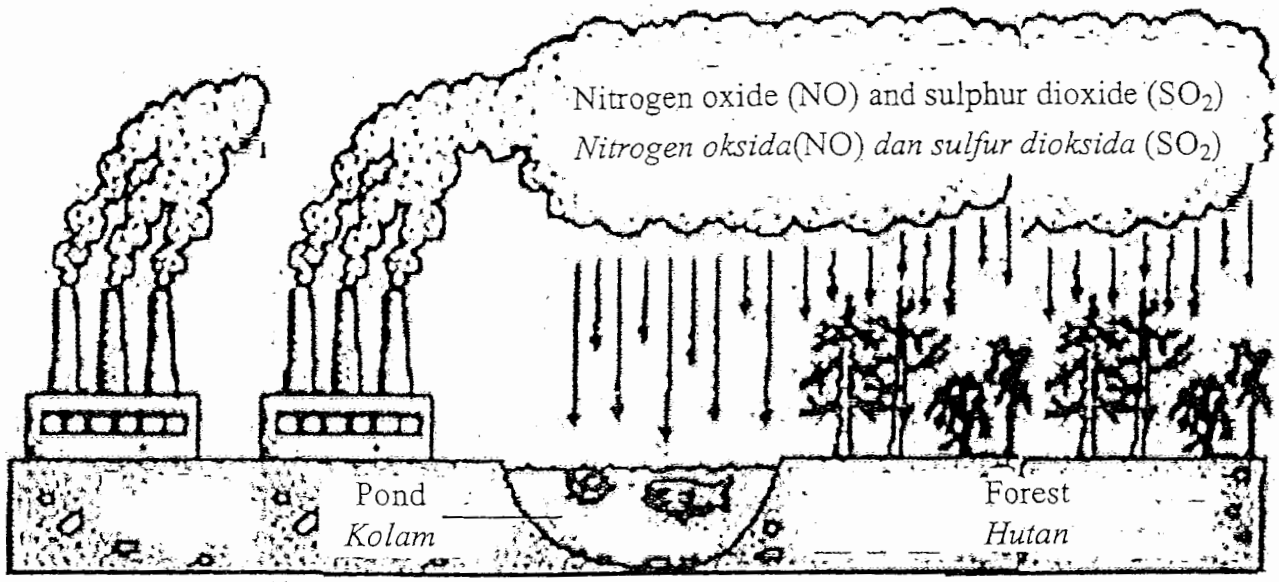


Diagram 9.2
Rajah 9.2

(i) Explain the effects of the emission of the gases to the ecosystem. [5 *marks*]
Terangkan kesan pembebasan gas tersebut kepada ekosistem. [5 *markah*]

(ii) The trees in the forest are producers.
Explain the role of the trees in maintaining a balance ecosystem.
Pokok dalam hutan adalah pengeluar.
Terangkan peranan pokok dalam mengekalkan ekosistem seimbang. [10 *marks*]
[10 *markah*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

NO. KAD PENGENALAN | | | | | | | - | | | - | | | | |

ANGKA GILIRAN | | | | | | | | | |

Nama ..... Tingkatan .....

JABATAN PELAJARAN NEGERI SELANGOR
MAJLIS PENGETUA SEKOLAH MALAYSIA NEGERI SELANGOR

ROGRAM PENINGKATAN PRESTASI AKADEMIK
EPERIKSAAN PERCUBAAN
IJIL PELAJARAN MALAYSIA 2011 4551/3

IOLOGY
ertas 3
eptember
$\frac{1}{2}$ jam Satu jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

Tulis nombor kad pengenalan, angka giliran, nama *dan* tingkatan *anda pada petak yang disediakan.*

Kertas soalan ini adalah dalam dwibahasa.

Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.

Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau bahasa Melayu.

Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.

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

Kertas soalan ini mengandungi 12 halaman bercetak.

  [Lihat halaman sebelah

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

1 An experiment was carried out to determine the energy value in three samples of food; dried white bread, copra (dried coconut) and dried fish meat.
The mass of each food sample used is 2 g.
The volume of distilled water used is 20 ml.
The density of water is 1 gml^{-1}.
Satu eksperimen telah dijalankan untuk menentukan nilai tenaga dalam tiga sampel makanan; roti putih kering, kopra (isi kelapa kering) dan isi ikan kering.
Jisim setiap sampel makanan yang digunakan ialah 2 g.
Isi padu air suling yang digunakan ialah 20 ml.
Ketumpatan air ialah 1 gml^{-1}.

Diagram 1 shows the set-up apparatus used in this experiment.
Rajah 1 *menunjukkan susunan radas yang digunakan dalam eksperimen ini.*

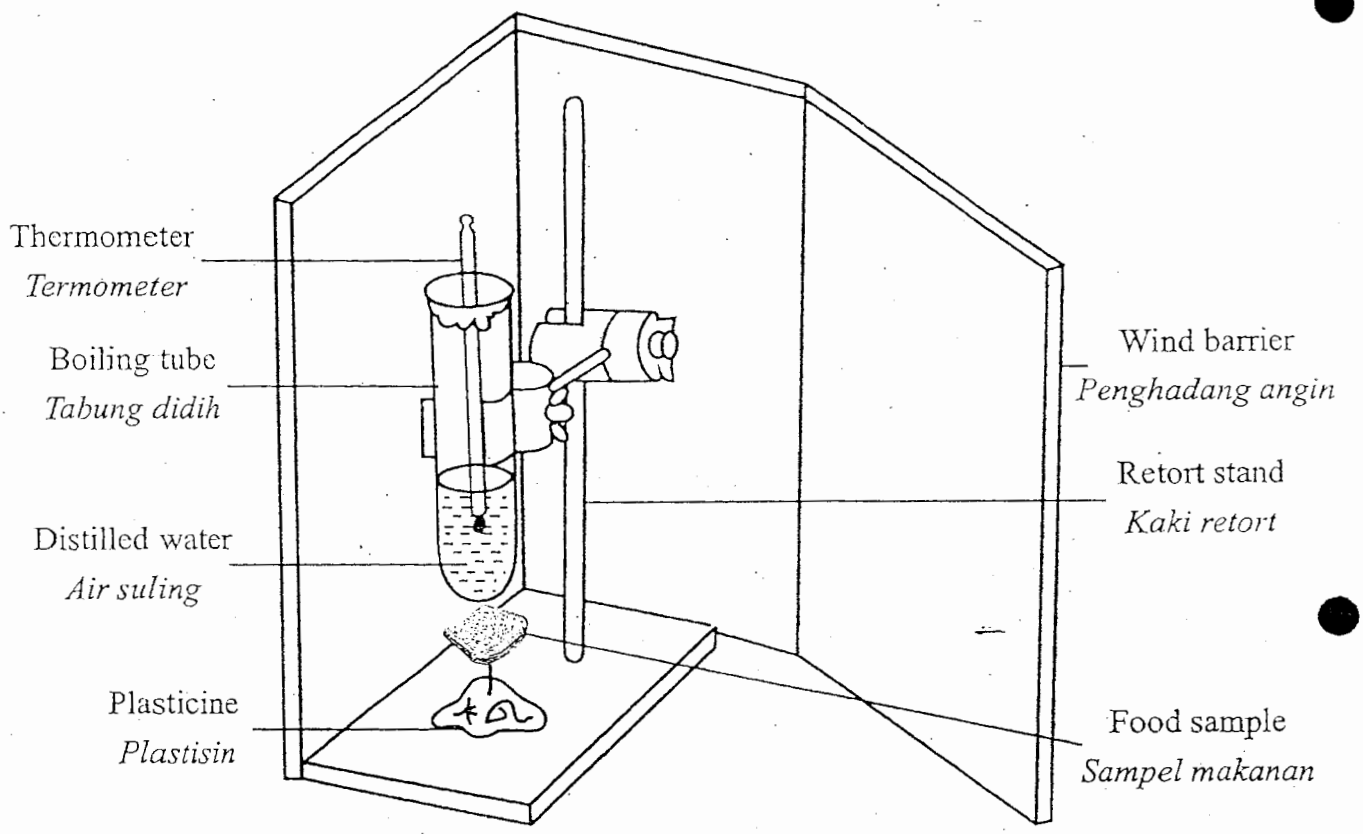
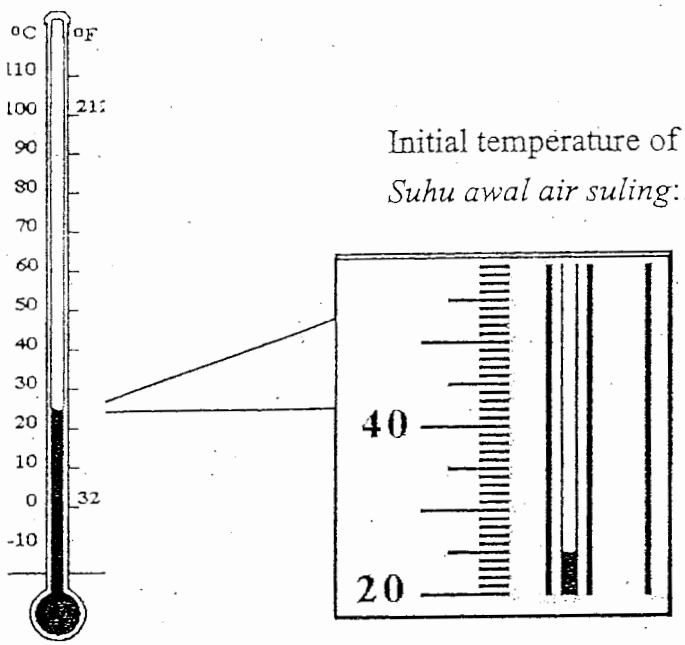


Diagram 1
Rajah 1

Diagram 2 sho[redacted]the initial distilled water temperature for every food sample.
Rajah 2 menunjukkan suhu awal air suling bagi semua sampel makanan.



Initial temperature of distilled water:.....°C
Suhu awal air suling:.....°C

Diagram 2
Rajah 2

  [Lihat halaman sebelah

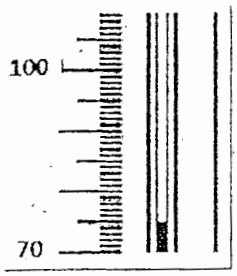
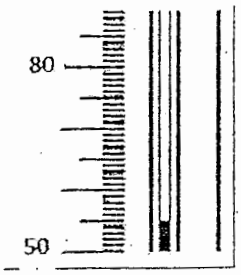
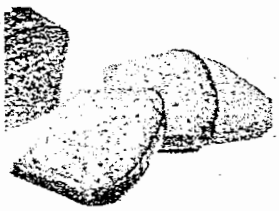
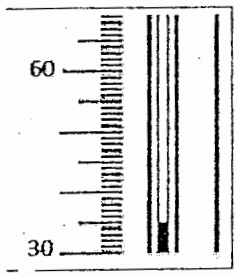
Food sample *Sampel makanan*	Final temperature of distilled water °C *Suhu akhir air suling* °C	Reading of final temperature °C *Bacaan suhu akhir* °C
Copra (dried coconut) *Kopra (isi kelapa kering)* 		.....
Dried fish meat *Isi ikan kering* 		.....
Dried white bread *Roti putih kering* 		.....

Table 1
Jadual 1

1(a)

3

(a) Record the final temperature of distilled water in Table 1. [3 *marks*]
Rekod suhu akhir air suling dalam Jadual 1. [3 *markah*]

For Examiner's Use

(*b*) (i) State two different observations made from Diagram 2 and Table 1.
Nyatakan **dua** *pemerhatian yang berbeza yang dibuat daripada Rajah 2 dan Jadual 1.*

Observation 1:
Pemerhatian 1:

.....

.....

Observation 2:
Pemerhatian 2:

.....

.....

[3 *marks*]
[3 *markah*]

1(*b*)(i) 3

(ii) State the inference from the observations in **1**(*b*)(i).
Nyatakan inferens dari pemerhatian dalam **1**(*b*)(i).

Inference from observation 1:
Inferens daripada pemerhatian 1:

.....

.....

Inference from observation 2:
Inferens daripada pemerhatian 2:

.....

.....

[3 *marks*]
[3 *markah*]

1(*b*)(ii) 3

  [Lihat halaman sebelah

(c) Complete Table 2 based on this experiment.
Lengkapkan Jadual 2 berdasarkan eksperimen ini.

Variables *Pembolehubah*	**Method to handle the variables** *Cara mengendali pembolehubah*
Manipulated variable *Pembolehubah dimanipulasikan*	....
Responding variable *Pembolehubah bergerak balas*	....
Controlled variable *Pembolehubah dimalarkan*	....

Table 2
Jadual 2

1(c) 3

[3 *marks*]
[3 *markah*]

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

.....

.....

.....

.....

1(d) 3

[3 *marks*]
[3 *markah*]

For Examiner's Use

(e) (i) Construct a table and record all the data collected in this experiment based on the following criteria:

Bina satu jadual dan rekodkan semua data yang dikumpul dalam eksperimen ini berdasarkan kriteria berikut:

- Food samples
  Sampel makanan
- Initial temperature
  Suhu awal
- Final temperature
  Suhu akhir
- Increase in water temperature
  Kenaikan suhu air
- Energy Value ($J\ g^{-1}$)
  Nilai tenaga ($J\ g^{-1}$)

Specific heat capacity of water is $4.2J\ g^{-1}\ °C^{-1}$
Muatan haba tentu air ialah $4.2J\ g^{-1}\ °C^{-1}$

Formula for energy value:
Formula untuk nilai tenaga:

$$\text{Energy Value / } \textit{Nilai tenaga} = \frac{\text{Mass of water / } \textit{Jisim air} \times \text{Specific heat capacity of water / } \textit{Muatan haba tentu air} \times \text{Temperature increase / } \textit{Kenaikan suhu}}{\text{Mass of food samples / } \textit{Jisim sampel makanan}}$$

1(e)(i)
3

[3 *marks*]
[3 *markah*]

  [Lihat halaman sebelah

1(e)(ii)

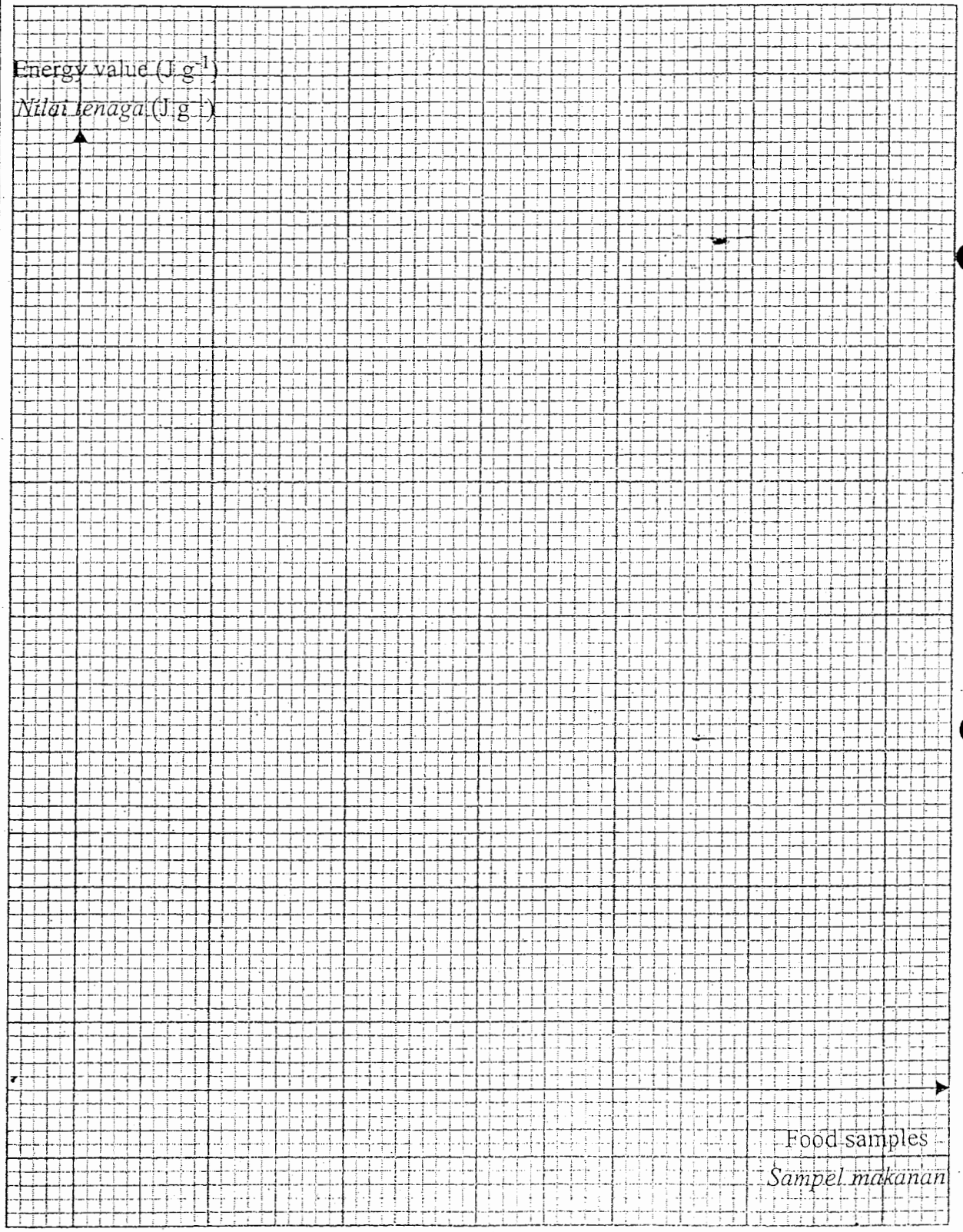
3

(ii) Using the data in 1(*e*)(i), draw a bar chart to show the relationship between energy value and food samples.

Gunakan data dalam 1(*e*)(i), *lukis satu carta bar yang menunjukkan hubungan antara nilai tenaga dan sampel makanan.*

[3 *marks*]
[3 *markah*]

Graph of the relationship between energy value and food samples
Graf bagi hubungan antara nilai tenaga dan sampel makanan



For Examiner's Use

(*f*) Based on the bar chart draw in 1(*e*)(ii), state the relationship between the food class and energy value.
Explain your answer.
Berdasarkan carta bar yang dilukis pada 1(*e*)(ii), *nyatakan hubungan antara kelas makanan dan nilai tenaga.*
Terangkan jawapan anda.

.....

.....

.....

[3 *marks*]
[3 *markah*]

1(*f*) 3

(*g*) Based on the result of the experiment, define energy value operationally.
Berdasarkan keputusan eksperimen, beri definisi nilai tenaga secara operasi.

.....

.....

.....

[3 *marks*]
[3 *markah*]

1(*g*) 3

(*h*) The experiment is repeated by using cashew nut.
Predict the energy value that will be obtained.
Explain your prediction.
Eksperimen diulang dengan menggunakan kacang gajus.
Ramalkan nilai tenaga yang mungkin diperoleh.
Terangkan ramalan anda.

.....

.....

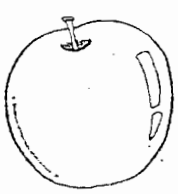
.....

[3 *marks*]
[3 *markah*]

1(*h*) 3

  [Lihat halaman sebelah

(*i*) The picture below shows various type of foods samples.
Gambar di bawah menunjukkan pelbagai jenis sampel makanan.



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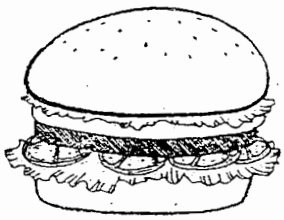

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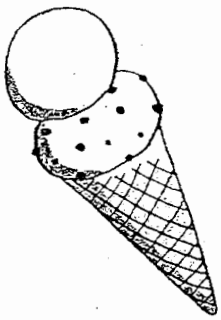

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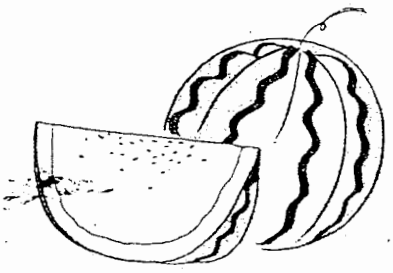
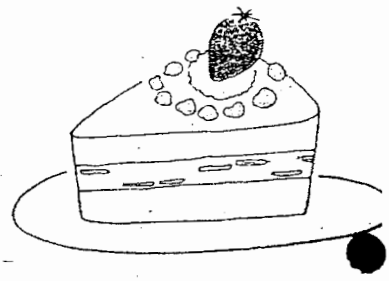


T



U

Classify the food in the pictures into high calories food and low calories food i
Table 3.
Kelaskan makanan ini kepada makanan berkalori tinggi dan makanan berkalo
rendah dalam Jadual 3.

High calories food *Makanan berkalori tinggi*	Low calories food *Makanan berkalori rendah*

Table 3
Jadual 3

[3 mark
[3 markai

1(*i*) 3

Total 1 33

For Examiner's Use

2 During transpiration in a plant, water vapours diffuse out through the stomata of the leaves. The rate of water loss to the environment is affected by the number of stomata and the environmental factors.

Based on the information, design a laboratory experiment to investigate the effect of the number of leaves on the rate of transpiration.
Any chemicals and scientific apparatus in the laboratory can be used in the experimental design.

The planning of your experiment must include the following aspects:

Semasa proses transpirasi dalam tumbuhan, wap air meresap keluar melalui stoma di daun. Kadar kehilangan air ke persekitaran dipengaruhi oleh bilangan stoma dan faktor persekitaran.

Berdasarkan maklumat ini, reka bentuk satu ekperimen makmal untuk mengkaji kesan bilangan daun ke atas kadar transpirasi.
Apa-apa bahan kimia dan radas sains di dalam makmal boleh digunakan dalam mereka bentuk eksperimen ini.

Perancangan eksperimen anda hendaklah meliputi aspek-aspek berikut:

- Problem statement
  Pernyataan masalah
- Hypothesis
  Hipotesis
- Variables
  Pembolehubah
- 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

JPS

PERATURAN PEMARKAHAN
PROGRAM PENINGKATAN PRESTASI AKADEMIK
PEPERIKSAAN PERCUBAAN
SPM 2011

BIOLOGI KERTAS 1

1	B	26	C
2	B	27	D
3	A	28	B
4	C	29	B
5	D	30	D
6	B	31	A
7	C	32	B
8	B	33	A
9	C	34	A
10	A	35	D
11	B	36	A
12	A	37	D
13	D	38	B
14	C	39	B
15	B	40	C
16	D	41	D
17	A/C	42	B
18	A	43	B
19	D	44	C
20	A	45	A
21	B	46	A
22	C	47	C Bonus
23	D	48	A
24	B	49	D
25	D	50	C

PERATURAN PEMARKAHAN
PROGRAM PENINGKATAN PRESTASI AKADEMIK
PEPERIKSAAN PERCUBAAN
SPM 2011

BIOLOGI KERTAS 2

No	Criteria	Mark	
1.(a)	Able to name P and Q. Answer: P : Red Blood Cell / Erythrocyte Q : Stomach	 1 1	2
(b)	Able to match structure P and Q to the level of cell organization. Answer: Structure P ⟶ Cell Structure Q ⟶ Organ	 1 1	2
(c)	Able to state the function of structure P and Q. Answer: P : transport oxygen/ carbon dioxide//any suitable substances Q : site for digestion / /secretes gastric juice // peristalsis	 1 1	2
(d)(i)	Able to state the main tissue that builds up the structure Q. Answer: Smooth muscle tissue //epithelium tissue	 1	1
(d)(ii)	Able to explain how the main tissue does its function Answer: E1 : Smooth muscles contract/ relax E2 : to move / push food downwards E3 : during peristalsis E4 : prevents the food to be pushed upwards / anti peristalsis or E1 : Epithelium tissues which build the gaster gland E2 : produce / secretes gastric juice E3 : contain enzyme / pepsin E4: to digest / breakdown / hydrolyzed proteins Any two	 1 1 1 1 1 1 1 1	2
(e)	Able to explain the effect of the condition to a person's health. Sample answer F: Anaemia E1 : less oxygen transported E2 : lower rate of cellular respiration E2 : tiredness/weakness/insufficient energy E3 : breathlessness //difficulty in breathing E4 : fatique Any three	 1 1 1 1 1 1	3
	Total		12

No	Criteria	Mark	
2.(a)(i)	Able to state the characteristic of solution X and Y correctly. Answer: Solution X : hypotonic solution Solution Y : hypertonic solution	 1 1	2
(a)(ii)	Able to state the condition of plant cell after being immersed in solution X and Y. Answer: Plant cell in solution X : Turgid Plant cell in solution Y : Flaccid/Plasmolysed	 1 1	2
(b)	Able to explain the process occurs in Diagram 2.2(a) and 2.2(b). Sample Answer: Diagram 2.2 (a) E1 : Solute concentration in Y is lower than the cell sap //Solution Y is hypertonic to plant cell E2 : water diffuse out from the cell E3 : by osmosis E4 : plasma membrane is pulled away / detach from the cell wall E5 : vacuole shrinks/ smaller Any four	 1 1 1 1 1	4
(c)	Able to explain how this condition in Diagram 2.2(a) is important to herbaceous plant. Sample Answer: E1 : Turgidity / Cell turgid E2 : Turgor pressure exist in the cell / vacuole E3 : gives support to the plant Any two	 1 1 1	2
(d)	Able to explain how the method is able to preserve the fishes. Sample Answers E1: Evaporation of water (in the hot sun) E2 : the (fish's) cell become dehydrated/ dry / less water E4 : Bacteria/Fungi/ microorganism unable to grow/ reproduced. E5 : Fishes last longer / not decayed Any two	 1 1 1 1	2
	Total		12

No	Criteria	Mark	
3(a)	Able to name structures X and Y Answer Structure X : Alveolus Structure Y : Blood capillary	 1 1	2
3(b)	Able to explain how exchange of oxygen occurs between X and Z Sample answer P1: Higher concentration of oxygen in alveolus / X (compare to in blood capillary / Z) P2 : oxygen diffused out (into blood capillary / Z) P3 : oxygen binds with haemoglobin P4 : forms oxyhaemoglobin Any two	 1 1 1 1 1	2
3(c)	Able to explain one feature which the human respiratory and the fish respiratory system have in common Sample answer F1: have dense network of blood capillary E1 : to transport the respiratory gases F2 : have numerous structures/ alveolus / filaments E2 : larger total surface area F3 : very thin cell wall / membrane E4 : efficiency for gases exchange Any two	 1 1 1 1 1 1	2
3(d)	Able to explain the effect of the harmful gases to the fishes population Sample answer F : population of fishes decreases // fishes die E1: pH in the water decreases E2: due to acid rain E3 : the harmful gases / name of gases dissolve in rain water E4 : leads to water pollution Any three	 1 1 1 1 1 1	3
3(e)	Able to explain the importance of the hydrilla plant in the food chain Sample Answer P1 : (Hydrilla plants) is a producer P2 : produces organic food / glucose P3 : during photosynthesis P4 : for consumers P5 : energy transferred to consumers Any three	 1 1 1 1 1	3
	Total		12

No	Criteria	Mark	
4(a)(i)	Able to identify M and N Answer M : Ovule N : Ovary	 1 1	2
4 (a)(ii)	Able to state the function of X and Y Answer X : forms (two) male gametes Y : forms pollen tube	 1 1	2
4(b)	Able to explain double fertilization Sample answer P1: the pollen tube grows down (the style towards the micropyle) P2: the tube nucleus is placed in front and the generative nucleus behind (in the pollen tube) P3 : reaching micropyle , the tube nucleus degenerates P4 : one of the male gametes fused with the ovum to form zygote P5 : another one of the male gametes fused with two polar nuclei to form triploid nucleus P6 : the fertilization process occurs two times Any four	 1 1 1 1 1 1	4
(c)	Able to explain one importance of double fertilization Sample answer P1 : to produce plants with variation P2 : survival of the plants P3 : prevents extinction P4 : endosperm as food storage for development of seed P5: produce fruits Any two	 1 1 1 1 1	2
(d)	Able to describe one advantage of guava fruits with no seed Sample answer P1: no new offspring / plant will be produced P2 : leads to extinction P3: no varieties Any two	 1 1 1	2
	Total		12

No	Criteria	Mark	
5(a)	Able to state the possible genotypes of [redacted] and the offspring Answer (i) [redacted] genotype: $I^A I^O$ (ii) Offspring's genotype : $I^O I^O$	 1 1	2
5(b)	Able to fill in the circle with allele of Ahmad's gamete and Fatimah's gamete Answer [redacted] gamete : I^A Fatimah's gamete : I^O	 1 1	2
5(c)	Able to explain how the offspring inherits blood group O Sample answer P1 : [redacted] genotype is $I^A I^O$ and Fatimah's genotype is $I^O I^O$ P2 : During meiosis P3 : the male gametes with allele I^O, I^A and female gametes with allele I^O and I^O P4 : During fertilization P5 : the male gamete fused with the female gametes P6 : produced offspring with genotype $I^O I^O$ (blood group O) Or genetic diagram accepted Any three	 1 1 1 1 1 1	3
5(d)	Able to state the type of variation and state a reason Answer Type of variation : Discontinuous variation Reason : The differences in blood group is distinct // no intermediate trait	 1 1	2
5(e)	Able to explain why Ahmad is not a compatible donor to Fatimah Sample answer P1: (Ahmad's blood group is A), the erythrocyte has antigen A and the blood plasma has antibody b P2: (Fatimah's blood group is O) erythrocyte has no antigen A or B but blood plasma has antibody a and antibody b P3: Agglutination of Fatimah's blood occurs because P4: Antibody a acts on antigen A (from Ahmad's blood) Any three	 1 1 1 1	3
	Total		12

No	Criteria	Marks	
6 (a)(i)	Able to the role of the plant and frog in the food chain Sample answer: P1: Plants as a producer P2 : able to absorbed light energy from the sun P3 : to carry out photosynthesis P4: produce oxygen for respiration of the organism P5: produce organic food / glucose for the consumer P6: Frog as secondary consumer P7: food source for snake P8: maintaining the population of grasshopper P9 : thus the population of the plant is maintained P10: prey-predator relationship with grasshopper and snake P11: contributes to a balanced ecosystem Any six	 1 1 1 1 1 1 1 1 1 1 1	6
(ii)	Able to explain the energy transfer in the food chain Sample answer: P1: Plants convert solar energy into chemical energy P2: energy stored in food during photosynthesis P3: when primary consumer feeds on/consume the producer P4: the energy in the plant is transferred on to the primary consumer P5: the energy is then transferred to the secondary consumer P6 : not all energy is transferred in the food to the consumers P7 : some energy is lost by during respiration/defecation /reproduction P8 : the last consumer receives the least energy P9 : the plant receives the most energy Any four	 1 1 1 1 1 1 1 1 1	4
(b)(i)	Able to explain methods of preventing widespread of the disease by vaccination. Sample answer: P1: weakened/killed pathogen injected into the bloodstream P2: stimulates lymphocytes to produce antibodies P3 : kill pathogen P4: vaccination is active artificial immunity Any two	 1 1 1 1	2
(ii)	Able to explain methods of preventing widespread of the disease by taking antibiotics. Sample answer: P1: Antibiotics are chemicals P2 :produced by microorganisms P3: Inhibit growth/kill other microorganism/bacteria in the body Any two	 1 1 1	2

No	Criteria	Marks	
(iii)	Able to explain methods of preventing widespread of the disease by applying antiseptics. Sample answer: P1: Chemicals /acriflavin/iodine solution P2: Used on cuts/wounds/externally P3: Kill/inhibit growth of microorganisms Any two	 1 1 1	2
(c)	Able to explain the interaction that brings benefit to the farmers in the paddy field and the environment. Sample answer: P1: Owl and rat shows prey-predator interaction P2: Owl is predator and rat is prey P3: Prey-predator relationship help to control the population of organism in the ecosystem P4: maintain balance in the paddy field P5: When the population of owl/predator increases, the population of rat/prey decreases//When rat is eaten/fed by owl, the population of rat decreases P6: Production of crop increases P7 : A Biological Control Method P8: Evironmental friendly/ no harmful substances/pesticides /chemical released P9 : Contributes to biodiversity Any four	 1 1 1 1 1 1 1 1 1	4
	Total		20

<table>
<tr><th>No</th><th>Criteria</th><th>Marks</th></tr>
<tr><td>7(a)(i)</td><td>Able to name an organism which has growth curve 7.1(a) and 7.1 (b) respectively
Sample answer

Growth curve 7.1 (a) –Any example of organism except organism with exoskeleton //plants
Growth curve 7.1 (b)-Any example of organism with exoskeleton</td><td>

1

1</td><td>2</td></tr>
<tr><td>7(a)(ii)</td><td>Able to state two differences between growth curve 7.1 (a) and 7.1 (b)
Sample answer

<table><tr><th>Growth curve 7.1(a)</th><th>Growth curve 7.1 (b)</th></tr><tr><td>Sigmoid curve//S-shaped curve</td><td>Stair-case curve//steps</td></tr><tr><td>The growth is gradual and uninterrupted</td><td>The growth is hindered//intermittent growth</td></tr><tr><td>Shows continuous increase in length</td><td>Increase in length only after each ecdysis / after the organism sheds its excoskeleton</td></tr><tr><td>Ecdysis does not occur</td><td>Ecdysis occur</td></tr></table>Any two</td><td>

1

1

1

1</td><td>2</td></tr>
<tr><td>7(a) (iii)</td><td>Able to describe growth curve 7.1(b)
Sample answer

F : shows stair case curve //steps
E1 ; for grasshopper // any insects / animals with exoskeleton
E2 : represented by a horizontal line and a vertical line
E3 : horizontal line shows no increase in body length//instar
E4 : as the body is still covered by exoskeleton
E5 : the vertical line shows a drastic increase in body length
E6 : as the organism sheds its exoskeleton/ ecdysis / the exoskeleton has not hardened
E7 : the insect breath in much air to expand its body
E8 : until new exoskeleton hardened
E9 : takes 4 times ecdysis to reach adult
Any six</td><td>

1
1
1
1
1
1
1
1
1
1</td><td>6</td></tr>
</table>

No	Criteria	Marks	
7(b)(i)	Able to explain the importance of process X and Y Sample answer F1 : Process X is fertilization E1: fusion of nucleus of the sperm and nucleus of the ovum E2 : to form zygote/offspring E3 : for survival of species//: to increase population of the species Any two F2: Process Y is implantation E1: for the development of the embryo E2 : to hold the embryo on the uterus wall E3: to get nutrients from the mothers blood vessels/ /to excrete waste products of the foetus E4: through the placenta Any two	 1 1 1 1 1 1 1 1 1 1	4
7(b)(ii)	Able to describe the effectiveness of the family planning methods Sample answer <u>Condom</u> F: rubber shield E1 : worn by the male on the penis E2: prevents sperms to pass through E3 : so no fertilization occur E4 : 90-95 % effectiveness Any two <u>Spermicide</u> F: Chemical / jelly / cream/foam E1 : apply on the vagina E2 : to kill sperms so no fusion with ovum E2 : 90-95 % effectiveness Any two <u>Vasectomy</u> F : the sperm duct is tied /cut E1 : permanently E2: no sperms are able to swim to fallopian tube E3: no fertilization E4 : 100% effectiveness Any two	 1 1 1 1 1 1 1 1 1 1 1 1 1 1	6
	Total		20

No	Criteria	Marks	
8(a)	Able to explain how the heat lost from human body is reduced when the surrounding temperature dropped (based on Diagram 8.1). Sample answer <u>Surrounding condition : Cold</u> P1 : Thermoreceptor detects the change in the surrounding / cold P2 : Nerve impulse is transmitted to (the smooth muscles in the wall of) blood vessels P3 : Blood vessels constrict//vasoconstriction P4 : Lumen / diameter of blood vessels smaller P5 : Less blood flows in the blood vessels P6 :Less heat transported in the blood P7: less heat loss (to the environment) by radiation/conduction <u>Surrounding condition : Hot</u> P8 : Thermoreceptor detects the change in the surrounding / hot P9 : Nerve impulse is transmitted to (the smooth muscles in the wall of) blood vessels P10 : Blood vessels dilate // vasodilation P11 : Lumen / diameter of blood vessels bigger P12 : More blood flows in the blood vessels P13 : More heat transported in the blood P14: More heat loss (to the environment) by radiation / conduction Any ten	1 1 1 1 1 1 1 1 1 1 1 1 1 1	10
(b)	Able to describe the regulation of blood glucose level Sample answer P1 : Receptor detects the change in the blood glucose level / high blood glucose level P2 : Corrective mechanisme by negative feedback P3 : Nerve impulse is transmitted to the hypothalamus P4 : (Hypothalamus) instructs pancreas P5 : to secrete more insulin P6 : converts excess glucose to glycogen P7 : glucose level decrease to normal level/range Any five	1 1 1 1 1 1 1	5

No	Criteria	Marks	
(c)	Able to explain how a dialysis works Sample answer P1: A dialysis machine is used to remove metabolic waste /excess water/ urea / (mineral)salts (from the blood) P2 : (Haemodialysis machine) has a coiled tubing P3 : with a semi permeable wall (bath in a sterile dialysis fluid) P4 : (Haemodialysis machine) contains (dialysis) fluid which is isotonic to the normal / healthy blood plasma. P5: During haemodialysis , the blood from the artery in the patient's arm passes into the machine and then flows out into the vein in the same arm P6 : urea / (minera) salts which are higher in concentration in the blood P7: diffused across the tubing walls (into the dialysis fluid) P8 : (excess) urea / (mineral salts) can be removed from the blood P9 : blood osmotic pressure is maintained at normal level// blood content normal .Any five	1 1 1 1 1 1 1 1 1	5
	Total		20

No	Criteria	Mark	
9(a)	Able to explain the effect of human activity on the environment. Sample Answer: P1: The phenomena is greenhouse effect P2: Much carbon dioxide released (from the factories / car / burning of fossil fuel) P3: Increase the concentration of carbon dioxide in the atmosphere P4: forms a layer of carbon dioxide P5 : traps more heat P6 : prevents more of the heat escaping from the earth P7 : cause arise in the Earth's temperature P8 : Leads to global warming P9: Leads to melting of polar ice / rise in the sea level P10 : Leads to floods / drought/change in climate Any five	1 1 1 1 1 1 1 1 1 1	5
(b)(i)	Able to explain the effect of the emission gasses on the ecosystem. Sample Answer: P1: The release of nitrogen oxides / sulphur dioxides leads to the formation of acid rain P2 : the gases dissolve in the rain water P3 : Acid rain causes damage on the leaves / chloroplast P3 : Lower rate of photosynthesis P4 : Leads to stunted growth / death of plants//population reduced P5 : Acid rain lowers pH of the pond// more acidic P6 : causes death to aquatic organisms /fishes P7 : pH of soil lower//more acidic Any 5	1 1 1 1 1 1 1 1	5

No	Criteria	Mark	
(b)(ii)	Able to explain the role of the trees in maintaining a balance ecosystem. Sample answer: P1 : Producer (trees) carry out photosynthesis P2 : produce glucose / organic food for the consumer P3 : in food chain/food web P4 : produce oxygen for respiration of organism P5 : ensure a balanced in the carbon cycle P6 : The roots of the trees hold the soil structure P7 : avoid soil erosion/any suitable disaster P8 : Trees is a natural water catchment area P9 : Provides habitat // breeding places for organisms P10 Contributes to biodiversity of flora / fauna P11: Source of major sources of food / traditional herbs / medicinal plants. P12: Trees carry out transpiration/water loss to the environment P13 : Ensure a balance water cycle P14- Trees provide canopy for the forest which provide shades to prevent direct sunlight Any 10	1 1 1 1 1 1 1 1 1 1 1 1 1 1	10
	Total	20	

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BIOLOGI KERTAS 3

<table>
<tr><th>No</th><th>Mark Scheme</th><th>Score</th></tr>
<tr><td rowspan="4">1(a)</td><td>Able to record all three readings for final temperature of water correctly
Sample answer:
<table><tr><td>Food sample</td><td>Final temperature (□ C)</td></tr><tr><td>Copra</td><td>75</td></tr><tr><td>Dried bread</td><td>55</td></tr><tr><td>Dried fish</td><td>35</td></tr></table></td><td>3</td></tr>
<tr><td>Able to list 2 readings correctly</td><td>2</td></tr>
<tr><td>Able to give 1 reading correctly</td><td>1</td></tr>
<tr><td>No response or incorrect response</td><td>0</td></tr>
<tr><td rowspan="4">1(b)(i)</td><td>Able to state two different observations correctly based on two criteria:
• Manipulated variable – copra/dried bread/dried
• Responding variable - the final temperature /increment of temperature

Sample answers:
1. When copra/dried bread/dried fish is completely burnt/used; the final temperature of water is 75/35/55□ C
2. When copra/dried bread/dried fish is burnt/used; the temperature of water increase by 50/10/30□ C
3. Copra has highest increment of temperature compare to dried fish and dried bread // vice verse when completely burnt.</td><td>3</td></tr>
<tr><td>Able to state one observation correctly and one inaccurate observation//two inaccurate observations.

Sample answer:
1. When copra/dried bread/dried fish is burnt/used; the final temperature of water is highest/lowest
2. When copra/dried bread/dried fish is burnt/used; the temperature of water increase more/less
3. Copra has/produce highest increment of temperature // vice verse when burnt</td><td>2</td></tr>
<tr><td>Able to state one observation correctly or one observation / inaccurate observation and one idea observation //two idea observations.
Sample answer:
1. Different food has different temperature
2. When food is burnt heat is produce
3. Temperature increase when food is burnt</td><td>1</td></tr>
<tr><td>No response or wrong response</td><td>0</td></tr>
<tr><td>1(b)(ii)</td><td>Able to make two inferences correctly,
Note: Inference must match observation
based on the following criteria:
• More//less heat produce/release by burning food
• More // less heat absorb by water</td><td>3</td></tr>
</table>

	Sample answer: 1. The burning copra /dried bread/dried fish contain/produce/release more//less heat; more//less heat is absorb by the water 2. More heat is absorb by the water produce/release by burning copra/dried bread/dried fish 3. The burning copra/ dried bread/dried fish release more/less heat than copra/dried bread/dried fish; more/less absorb by water	
	Able to state one inference correctly and one inaccurate inference //two inaccurate inferences. *Sample answer:* 1. The burning copra /dried bread/dried fish produce/release more//less heat. 2. More/less heat is absorb by the water after the food is burnt. 3. The burning copra/ dried bread/dried fish has more/less heat than copra/dried bread/dried fish; more/less absorb by water	2
	Able to state one inference correctly or one inference / inaccurate inference and one idea inference //two idea inference *Sample answer:* 1. The burning copra /dried bread/dried fish has more//less heat. 2. Heat is absorb by water 3. Different food has different heat// produce different amount of heat	1
	No response or wrong response	0
1(c)	Able to state all 3 variables and the method to handle the variable *Sample answer:* Variable / Method to handle variable *Manipulated variable* Type of food: Burn//use different food // copra, dried bread, dried fish *Responding variable* Final temperature// increment of temperature//energy value: Record final temperature using thermometer// calculate increment of temperature using formula : temp increment = final temperature – initial temperature // calculate energy value using formula : energy = water mass X specific heat capacity X water temp / value Mass of food *Constant variable* Volume of water// mass of food: Use 20 ml of water for all experiment// use 2g of each food sample.	3
	Able to state 4-5 answer correctly	2
	Able to state 2-3 answer correctly	1
	Able to state 1 answer correctly or no response or wrong response	0

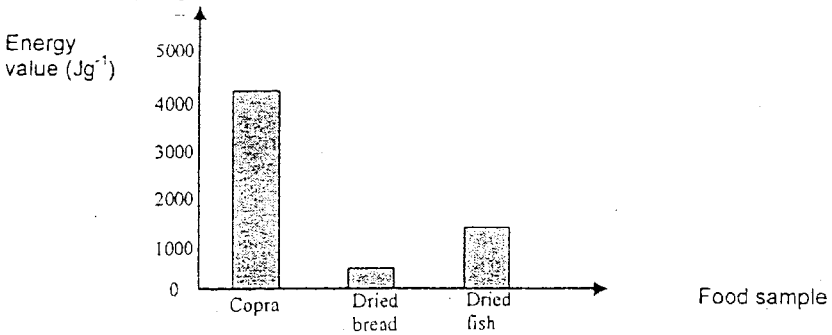
<table>
<tr><td>1(d)</td><td>Able to state hypothesis correctly following all criteria:
P1: manipulated variable – food sample
P2: responding variable – energy value//final temperature//increment of temperature
R: relationship

<u>Sample answer:</u>

1. <u>Copra</u> has highest <u>energy value</u> compare to dried <u>fish and dried bread</u>
2. Copra has higher final temperature/increment of temperature than dried fish and dried bread.
Note: wrong conclusion can be accepted.</td><td>3</td></tr>
<tr><td></td><td>Able to state inaccurate hypothesis following two criteria</td><td>2</td></tr>
<tr><td></td><td>Able to state hypothesis at idea level // one criterion</td><td>1</td></tr>
<tr><td></td><td>No response or wrong response</td><td>0</td></tr>
<tr><td>1(e)(i)</td><td>Able to construct a table and record all the data correctly base on :
• Row and column label with units (T)
• Transfer data correctly (D)
• Calculate energy value correctly (C)

<u>Sample answer:</u>

<table>
<tr><th>Food sample</th><th>Initial temperature (□ C)</th><th>Final temperature (□ C)</th><th>Increase in water temperature (□ C)</th><th>Energy Value (Jg^{-1})</th></tr>
<tr><td>Copra</td><td>25</td><td>75</td><td>50</td><td>4200</td></tr>
<tr><td>Dried bread</td><td>25</td><td>35</td><td>10</td><td>420</td></tr>
<tr><td>Dried fish</td><td>25</td><td>55</td><td>30</td><td>1260</td></tr>
</table></td><td>3</td></tr>
<tr><td></td><td>Any two correct</td><td>2</td></tr>
<tr><td></td><td>Any one correct</td><td>1</td></tr>
<tr><td></td><td>No response or wrong response</td><td>0</td></tr>
<tr><td>1(e)(ii)</td><td>Able to draw bar chart correctly

• Axes has uniform scale and label
• Transfer data to the bar
• Draw the bar
<u>Sample answer:</u>
 
</td><td>3</td></tr>
<tr><td></td><td>Any two criteria correctly</td><td>2</td></tr>
<tr><td></td><td>Axes has uniform scale and label</td><td>1</td></tr>
<tr><td></td><td>No response or wrong response</td><td>0</td></tr>
</table>

1(f)	Able to explain the relationship between the type of food and the amount of energy correctly based on three criteria: R: Copra has highest energy value compare to fish and bread. E1: copra has fat E2: fat has more calories compare to protein and carbohydrate. *Sample answer:* Copra has highest energy value compare to dried fish and dried bread. The energy is from the fat/oil in the copra which has more calories compare to protein in fish and carbohydrate.	3
	Able to interpret the relationship incompletely: R with E1 or R with E2.	2
	Able to interpret relationship only	1
	No response or wrong response	0
1(g)	Able to define energy value operationally based on three criteria: P1: increment of water temperature P2: by (1 g of) food when burn P3: affected by type of food *Sample answer:* Energy value is the increment of water temperature when the 1g of food is burnt; the increment of water temperature is affected by type of food used.	3
	Able to define incompletely with any two criteria	2
	Able to state the idea with any one criteria	1
	No response or wrong response	0
1(h)	Able to predict the outcome of experiment correctly P1: correct prediction (any value between 1260- 4000 Jg^{-1}) P2: contain fat and protein P3: fat produce more energy than protein *Sample answer:* Cashew nut will produce 3000 Jg^{-1} cashew nut contain more fat and has protein so the energy in cashew nut higher than dried fish but less than copra which contain more fat.	3
	Able to give P1 and P2 or P1 and P3	2
	Able to give P1 only	1
	No response or wrong response	0

<table>
<tr><td>1(i)</td><td>Able to classify all 6 foods into high calories food and low calories food

<u>Sample answer:</u>
<table><tr><th>High calories food</th><th>Low calories food</th></tr><tr><td>Q
R
S</td><td>P
T
V</td></tr></table></td><td>3</td></tr>
<tr><td></td><td>Able to classify 4-5 foods correctly</td><td>2</td></tr>
<tr><td></td><td>Able to classify 2-3 foods correctly</td><td>1</td></tr>
<tr><td></td><td>No response or wrong response</td><td>0</td></tr>
<tr><td colspan="3">Question 2</td></tr>
<tr><td>2 (i)
PS
01</td><td>Able to state problem statement relating the manipulated variable with the responding variables correctly based on three criteria.

P1: Manipulated variable: number of leaves
P2: Responding variable: rate of transpiration
R: Relation in question form

<u>Sample answer:</u>

1. Does the number of leaves affect the rate of transpiration?
2. What is the effect of leaves number on the rate of transpiration?
3. Does different number of leaves cause different rate of transpiration?</td><td>3</td></tr>
<tr><td></td><td>Able to state problem statement relating the manipulated variable with the responding variables inaccurately based on any two criteria.

<u>Sample answer:</u>
1. Does leaves number affect the transpiration process?
2. What factor affects the rate of transpiration?
3. What is the effect of leaves number on the rate of transpiration.</td><td>2</td></tr>
<tr><td></td><td>Able to state problem statement at idea level

Sample answer:
1. Does transpiration process occurs in leaves?
2. Does transpiration occurs?</td><td>1</td></tr>
<tr><td></td><td>No response or wrong response</td><td>0</td></tr>
<tr><td>2(ii)
HY
02</td><td>Able to state hypothesis relating the manipulated variable with the responding variables correctly based on three criteria

P1: manipulated variable
P2: responding variable
R: relationship

<u>Sample answer:</u>
1. The higher the number of leaves; the higher the rate of transpiration
//vice verse
2. The rate of transpiration increases as the number of leaves increases.
//vice verse</td><td>3</td></tr>
</table>

	Able to state hypothesis relating the manipulated variable with the responding variables inaccurately based on any two criteria *Sample answer:* 1. Different number of leaves cause different rate of transpiration 2. Leaves number affects the rate of transpiration. 3. Rate of transpiration increase linearly with number of leaves.	2
	Able to state hypothesis at idea level. *Sample answer:* 1. Transpiration occurs in leaves	1
	No response or wrong response	0
2(iii) VAR 03	Able to state three variables correctly: Manipulated variables: number of leaves Responding variables: rate of transpiration// time taken for air bubbles to move in 10 cm distance. Fix variables: temperature/air movement/light intensity/humidity	3
	Able to state any two variables correctly	2
	Able to state any one variables correctly	1
	No response or wrong response	0
2(iv) AM 04	Able to list all 5 apparatus and 3 materials correctly : Apparatus: photometer// (capillary tube, rubber tubing), beaker, ruler, stopwatch, retort stand. Materials: plant shoot, water, Vaseline	3
	Able to list any 2 apparatus and any 2 materials correctly	2
	Able to list any 1 apparatus and any 1 materials correctly	1
	No response or wrong response	0
2(v) Pro 05	Able to write the procedures of experiment based on : K1 : set up apparatus (at least 3K1) K2: operate fix variable K3: operate responding variable K4: operate the manipulated variable K5: Precaution or procedure to get accurate result	

Sample answer:

1	Cut a freshly leafy shoot of a hibiscus plant with 10 leaves in a basin of water.	K1
2	Place a potometer inside the basin of water.	K1
3	Fit the shoot into the rubber tube of the potometer tightly to make sure its air tight.	K1 K5
4	Hold the shoot and the potometer upright using a retort stand	K1
5	Dry the leaves and the stem of the shoot with a piece of cloth	K5
6	Apply Vaseline to all the connections to prevent any leakage	K5
7	Allow an air bubble to enter the capillary tube of potometer and trapped it.	K1
8	Mark the initial position of air bubble as X. Mark another point, Y, which distance of 10 cm from X.	K1
9	Place the potometer under the fan with fan speed 3	K2
10	Record the time taken for the air bubble to move from X to Y using stopwatch in the table	K3
11	Remove the air bubble from the capillary tube and repeat the experiment to obtain another reading, average data is recorded.	K5
12	Repeat step 2 to 11, by using the same plant shoot but reduce the leaves number to 6 and then with 4 and no leaf.	K4
13	Record all the readings obtained from the experiment in a table and calculate the rate of transpiration.	K1
		All 5Ks

3

	Able to write 3-4 Ks	2
	Able to write 2 K	1
	Able to write only 1K or no response or wrong answer.	0
2(vi) D 06	Able to construct a table for recording data based on: T : Table with correct title and units MV: manipulated variables is written *Sample answer:*	2

Number of leaves	Time taken for air bubbles to move in 10 cm distance / min.	Rate of transpiration cm/min
10		
6		
4		
0		

	Able to give T or MV in a table.	1
	No response or wrong answer.	0

PERATURAN PERMARKAHAN TAMAT