NAMA : ..... TING:.....

PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA
SEKOLAH MENENGAH
NEGERI KEDAH DARULAMAN

PEPERIKSAAN PERCUBAAN SPM 2009 4551/1

BIOLOGY
Kertas 1
Ogos
1 $\frac{1}{4}$ jam

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.*

Kertas soalan ini mengandungi 31 halaman

1 Diagram 1 shows an organelle in an animal cell.
Rajah 1 menunjukkan satu organel dalam sel haiwan.

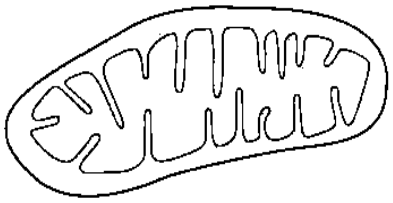
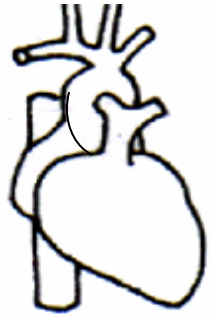


Diagram 1
Rajah 1

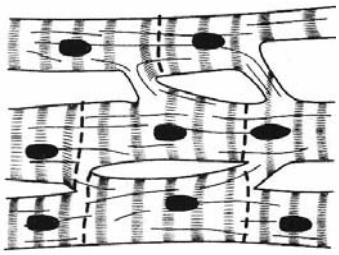
Which of the following process takes place in this organelle?
Di antara proses yang berikut, yang manakah berlaku dalam organel tersebut?

A Respiration
Respirasi
B Photosynthesis
Fotosintesis
C Lipid synthesis
Sintesis lipid
D Protein synthesis
Sintesis protein

2 Diagram 2 shows the different structures P, Q and R in a cell organisation.
Rajah 2 menunjukkan pelbagai struktur P,Q dan R dalam organisasi



P



Q

R

Diagram 2
Rajah 2

Which of the following is the correct level of cell organization
Yang manakah antara berikut adalah aras organisasi sel yang betul?

A P → Q → R
B R → Q → P
C P → R → Q
D Q → R → P

3 Diagram 3 shows the intake of K into a root cell.
Rajah 3 menunjukkan pengambilan K ke dalam sel akar.

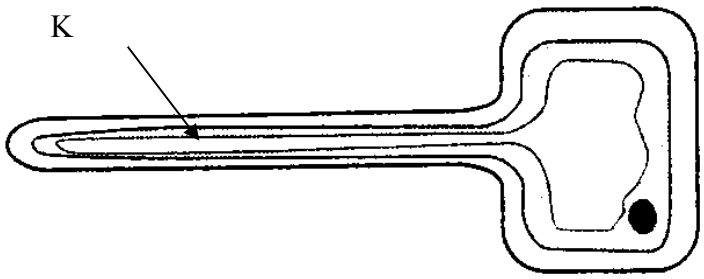


Diagram 3
Rajah 3

The process requires energy. Which of the following is K?
Proses ini memerlukan tenaga. Yang manakah K?

A Water
Air

B Nitrate ion
Ion nitrat

C Oxygen
Oksigen

D Glucose
Glukosa

4 Diagram 4 shows gaseous exchange in an alveolus.
Rajah 4 menunjukkan pertukaran gas dalam alveolus.

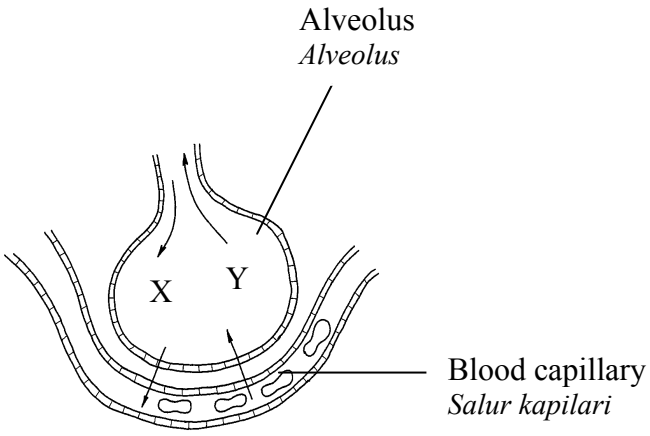


Diagram 4
Rajah 4

Which of the following process occur in the exchange of gases X and Y.
Yang manakah antara proses berikut berlaku dalami pertukaran gas X dan gas Y.

A Osmosis
Osmosis

B Simple diffusion
Resapan ringkas

C Active transport
Pengangkutan aktif

D Facilitated diffusion
Resapan berbantu

5 Diagram 5 shows two substances P and R passing through the plasma membrane of a cell.
Rajah 5 menunjukkan dua bahan P dan R merentasi plasma membrane suatu sel

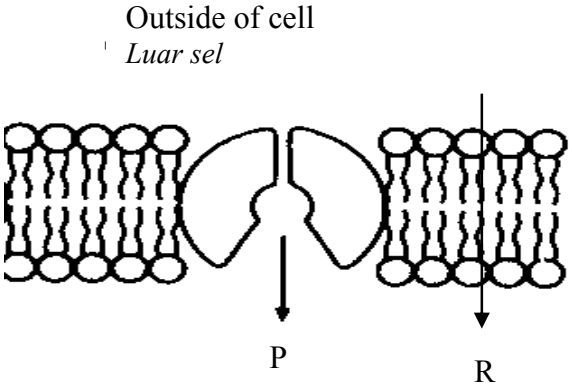


Diagram 5
Rajah 5

What are substances P and R ?
Apakah bahan P dan R?

	P	R
A	Amino acid *Asid amino*	Glucose *Glukosa*
B	Oxygen *Oksigen*	Calcium ion *Ion Kalsium*
C	Glucose *Glukosa*	Amino acid *Asid amino*
D	Calcium ion *Ion Kalsium*	Oxygen *Oksigen*

6 Diagram 6(a) shows diffusion through a semi-permeable membrane.
Diagram 6(b) shows the result of diffusion after one hour

Rajah 6(a) menunjukkan resapan melalui membranj separa telap.
Rajah 6(b) menunjukkan keputusan resapan selepas satu jam.

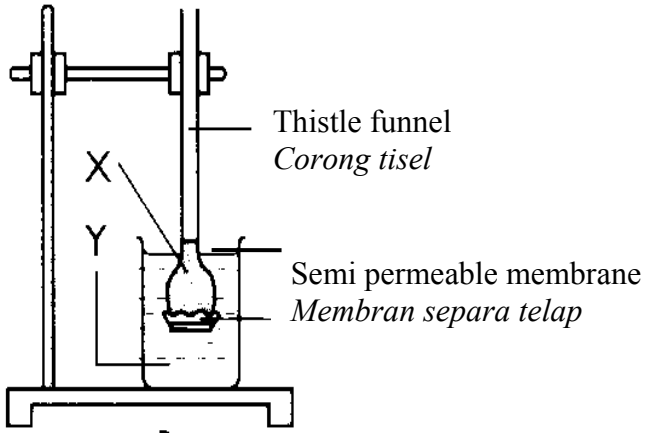


Diagram 6(a)
Rajah 6(a)

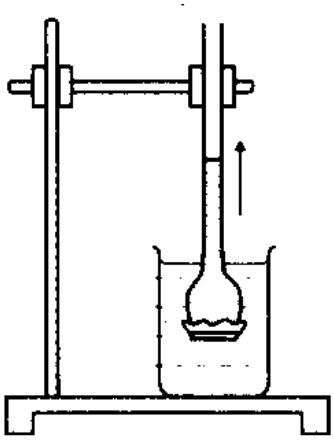


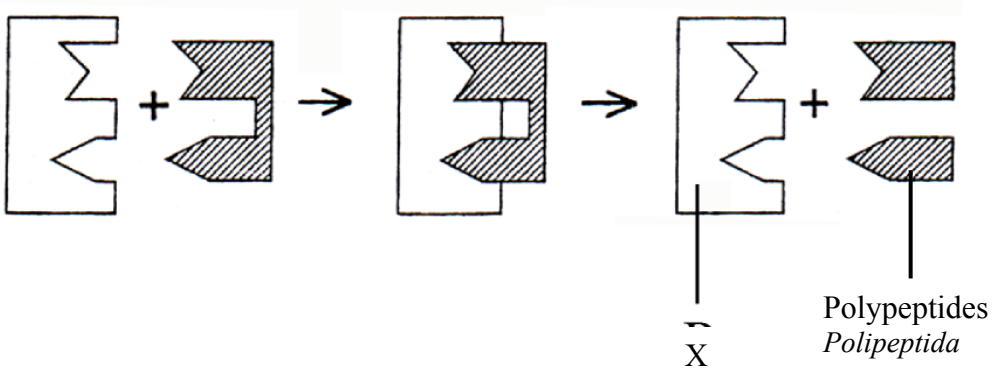
Diagram 6(b)
Rajah 6(b)

After one hour
Selepas satu jam

Which of the following represent X and Y?
Yang manakah antara berikut mewakili X dan Y?

	X	Y
A	Distilled water *Air suling*	20% sucrose solution *20% larutan sukrosa*
B	20% sucrose solution *20% larutan sukrosa*	Distilled water *Air suling*
C	20% sucrose solution *20% larutan sukrosa*	20% sucrose solution *20% larutan sukrosa*
D	Distilled water *Air suling*	Distilled water *Air suling*

7 Diagram 7 shows the action of an enzyme on a substrate.
Rajah 7 menunjukkan tindakan enzim ke atas suatu substrat

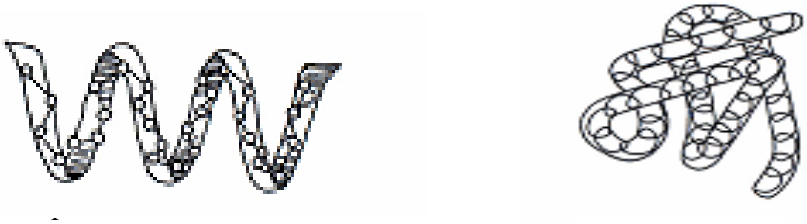


Rajah 7

Name substance X.
Namakan bahan X

A Starch
Kanji
B Protein
Protein
C Amylase
Amilase
D Pepsin
Pepsin

8 Diagram 8 shows two different types of protein molecules.
Rajah 8 menunujukkan dua jenis molekul protein.



Alpha helix
Heliks alpha

Beta pleated
Lipatan beta

Diagram 8
Rajah 8

Which protein structure does these two types of molecules belong to?
Apakah stuktur protein yang ditunjukkan oleh kedua-dua molekul protein itu?

A Primary structure
Struktur primer
B Secondary structure
Struktur sekunder
C Tertiary structure
Struktur tertier
D Quarternary structure
Struktur kuartener

9 Diagram 9 shows the molecule of an enzyme.
Rajah 9 menunjukkan satu molekul enzim

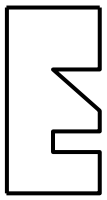
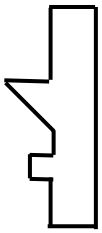
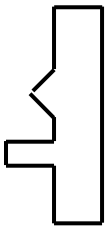
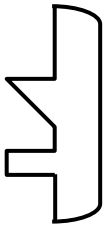


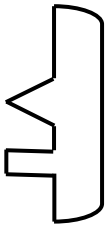
Diagram *9*
Rajah 9

Which of the following is the substrate for this enzyme?
Manakah berikut adalah substrat untuk enzim tersebut?

A 

C 

B 

D 

10 Diagram 10 shows a chart of the cell cycle.
Rajah 10 menunjukkan carta kitar sel

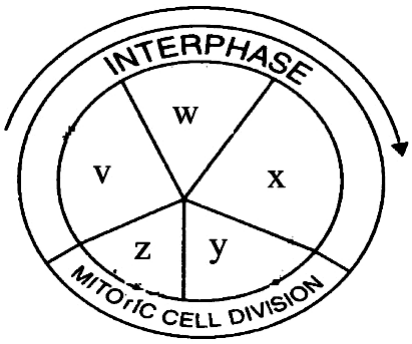


Diagram 10
Rajah 10

In which phase does the cytokinesis takes place?
Di fasa manakah sitokinesis berlaku?

A V
B W
C Y
D Z

11 Diagram 11 shows an animal cell undergoing meiosis I.
Rajah 11 menunjukkan satu sel haiwan sedang mengalami meiosis I

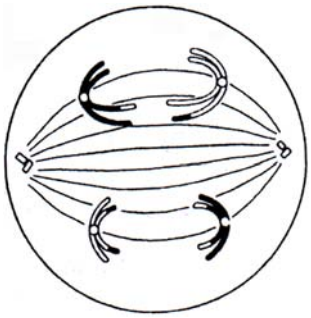


Diagram 11
Rajah 11

How many chromosomes are there in the gamete of this animal?
Berapakah bilangan kromosom dalam gamet haiwan ini?

A 2
B 4
C 6
D 8

12 Table 1 shows the chromosomal behaviour during Prophase I .
Jadual 1 menunjukkan tindakan kromosom dalam profasa I.

S – The homologous chromosomes come together to form bivalents *Kromosom homolog berdekatan membentuk bivalen*
T - The chromosomes begin to condense *Kromosom mula menjadi pendek dan tebal*
U – Crossing over occurs *Pindah silang berlaku*

Table 1
Jadual 1

Which of the following shows the correct sequence of the chromosomal behavior?
Yang manakah antara berikut menujukkan urutan tindakan kromosom yang betul

A S, U, T
B U, T, S
C T, S, U
D S, T, U

13 Diagram 12 shows the structure of a chloroplast seen under an electron microscope.
Rajah 12 menunjukkan struktur kloroplas yang dilihat di bawah mikroskop electron

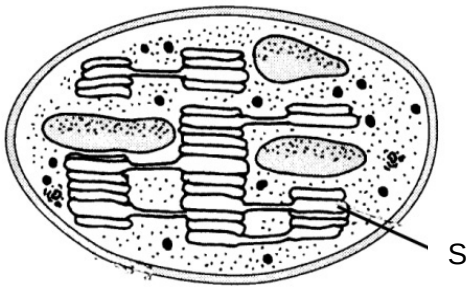


Diagram 12
Rajah 12

Name the process that occurs in S
Namakan proses yang berlaku di S.

A Reduction of carbon dioxide
Penurunan karbon dioksida

B Synthesis of glucose
Sintesis glukose

C Photolysis of water
Fotolisis air

D Synthesis of starch
Sintesis kanji

14 Diagram 13 shows the structure of a villus in the ileum
Rajah 13 menunjukkan struktur vili dalam ileum.

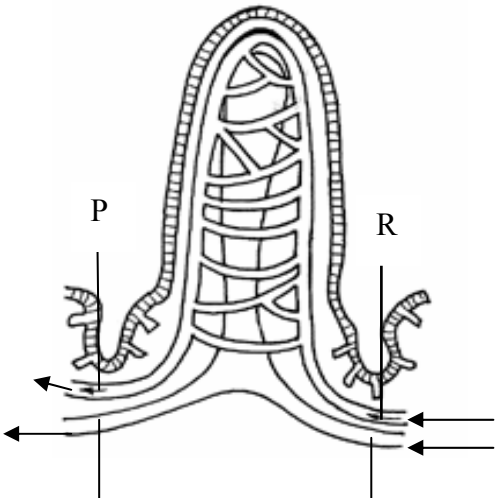


Diagram 13
Rajah 13

Which of the following carry large amounts of glucose and fat-soluble vitamins?
Salur yang manakah membawa banyak glukosa dan vitamin larut dalam lemak?

	Glucose *Glukosa*	Fat soluble vitamins *Vitamin larut dalam lemak*
A	P	S
B	Q	P
C	R	S
D	S	Q

15 Table 2 shows the results of an experiment to determine the amount of vitamin C in lime juice.
Jadual 2 menunjukkan satu eksperimen untuk menentukan kandungan vitamin C dalam jus limau.

Sample *Sampel*	Volume required to decolourise 1.0 cm^3 of 0.1% DCPIP solution *Isipadu yang diperlukan untuk melunturkan 1.0 cm^3 larutan 0.1% DCPIP*
0.1% Ascorbic acid *0.1 % asid askorbik*	0.4 ml
Lime juice *Jus limau*	2.0 ml

Table 2
Jadual 2

What is the amount of vitamin C in lime juice?
Berapakah kandungan vitamin C dalam juice limau?

A 0.2 mg/cm^3
B 0.3 mg/cm^3
C 0.5 mg/cm^3
D 5.0 mg/cm^3

16 Table 3 shows the observations made when food test is carried out on a food sample P.
Jadual 3 menunjukkan pemerhatian apabila ujian makanan dijalankan terhadap sample makanan P

Test *Ujian*	Observation *Pemerhatian*
Millon's Test *Ujian Millon*	A brick red precipitate *Mendakan merah bata*
Benedict's Test *Ujian Benedict*	Blue mixture *Campuran biru*
Sudan III Test *Ujian Sudan III*	The upper layer is red *Lapisan atas menjadi merah*
DCPIP Test *Ujian DCPIP*	Blue colour disappears *Warna biru dilunturkan*

Table 3
Jadual 3

A Protein, starch, vitamin C.
Protein, kanji, vitamin C
B Reducing sugar, starch, protein.
Gula menurun, kanji, protein
C Fats, protein, vitamin C.
Lemak, protein, vitamin C
D Reducing sugar, fats, protein.
Gula menurun, lemak, protein

17 Diagram 14 shows the process that occurs between the body cells and the tracheole of an insect.
Rajah 14 menunjukkan proses yang berlaku antara sel-sel badan dan trakea di dalam badan serangga.

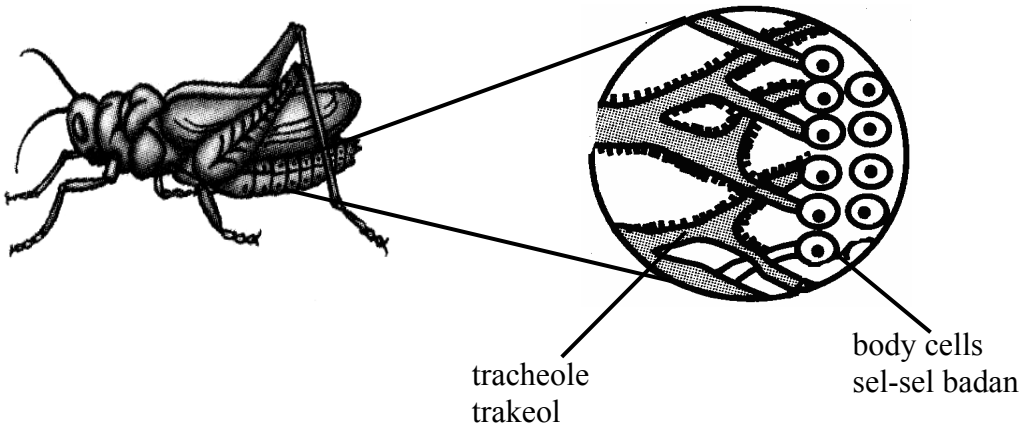


Diagram 14
Rajah 14

Name the process.
Namakan proses tersebut.

A Osmosis
Osmosis
B Facilitated diffusion
Resapan berbantu
C Diffusion
Resapan
D Active transport
Pengangkutan aktif

18 Diagram 15 shows the characteristics of both aerobic respiration and anaerobic respiration.
Rajah 15 menunjukkan ciri-ciri untuk kedua-dua respirasi aerobik dan respirasi anaerob.

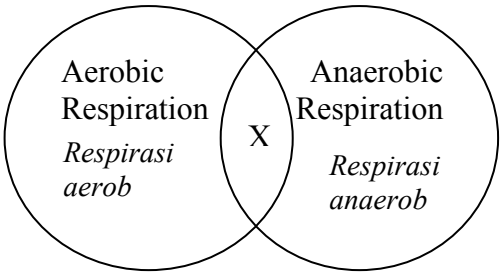


Diagram 15
Rajah 15

Which of the following is true about X?
Yang manakah antara berikut benar tentang X?

A ATP is released
ATP dihasilkan
B Lactic acid is formed
Asid laktik dihasilkan
C Water is formed
Air dihasilkan
D Glucose is formed
Glukosa dihasilkan

19 Diagram 16 shows the arrangement of apparatus to measure the percentage of certain gas in the air.
Rajah 16 menunjukkan radas untuk pengukuran peratus gas tertentu di dalam udara

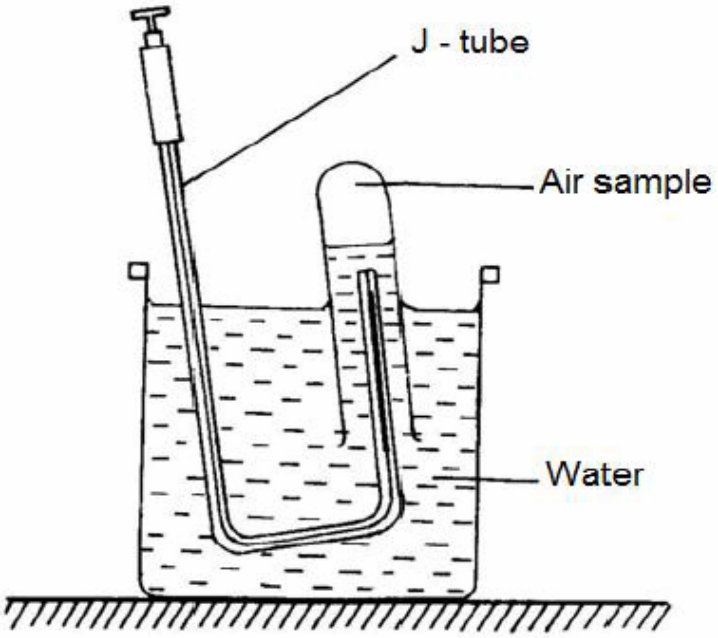


Diagram 16
Rajah 16

Initial length of the air column ……10.00cm
Panjang awal kolum udara ……10.00cm

Length of air column after using potassium hydroxide solution ……9.8cm
Panjang kolum udara setelah larutan kalium hidroksida digunakan ….9.8cm

Length of air column after using alkaline potassium pyrogallate ……7.8cm
Panjang kolum udara setelah alkali kalium pirogalol digunakan ……..7.8cm

Calculate the percentage of oxygen content in the inhaled air.
Kirakan peratus oksigen di dalam udara yang disedut.

A 12%

B 16%

C 18%

D 20%

20 Diagram 17 is a graph which shows the changes of pressure in the lungs of a person.
Rajah 17 ialah graf yang menunjukkan perubahan tekanan dalam peparu seseorang.

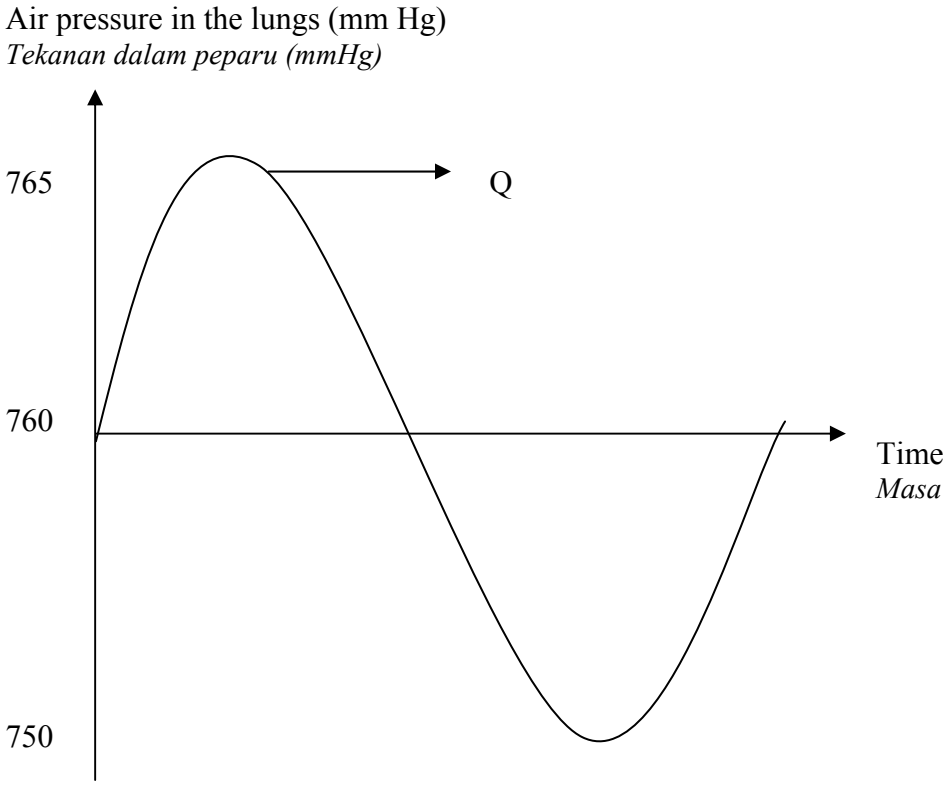


Diagram 17
Rajah 17

Which of the following occurs at Q?
Yang manakah antara berikut berlaku di Q?

A The ribs move upwards and the diaphragm downwards
Sangkar rusuk bergerak ke atas dan diafragma ke bawah

B The ribs move upwards and the diaphragm flattens
Sangkar rusuk bergerak ke atas dan diafragma mendatar

C The ribs move downwards and the diaphragm curves upwards
Sangkar rusuk bergerak ke bawah dan diafragma melengkung ke atas

D The ribss move downwards and the diaphragm flattens
Sangkar rusuk bergerak ke bawah dan diafragma melengkung ke atas

21 Diagram 18 shows two organism living together.
Rajah 18 menunjukkan dua organisma yang hidup bersama.

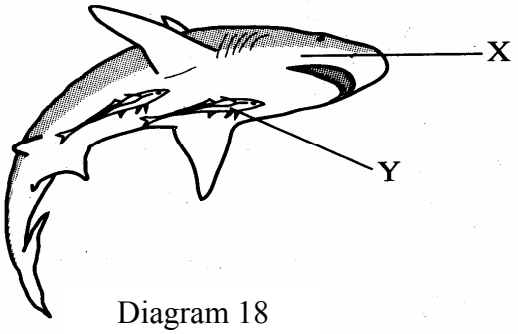


Diagram 18
Rajah 18

Which of the following describe the relationship between a remora fish (Y) and a shark (X)?
Manakah antara berikut menerangkan perhubungan antara ikan remora (Y) dan jerung(X)?

	Shark (X)	**Remora fish (Y)**
A	Host *Perumah*	Endoparasites *Endoparasit*
B	Epiziote *Epizoit*	Host *Perumah*
C	Host *Perumah*	Commensal *Komensal*
D	Ectoparasite *Ektoparasit*	Host *PerumaH*

22 Diagram 19 shows a type of plant in the mangrove swamp.
Rajah 19 menunjukkan sejenis tumbuhna bakau.

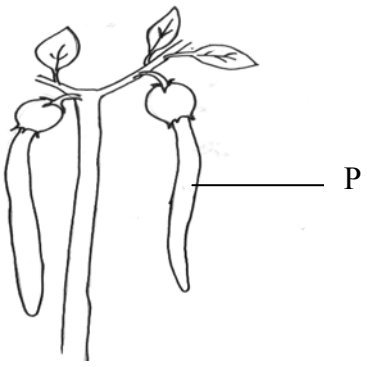


Diagram 19
Rajah 19

What is structure P ?
Apakah struktur P?

A Prop roots
Akar jangkang

B Vivipary seeds
Biji benih vivipari

C Pneumatophore
Pneumatofor

D Succulent leaves
Daun sukulen

23 Table 4 shows the result of a field study to estimate the population of garden snails in a vegetable farm
Jadual 4 menunjukkan keputusan kajian lapangan untuk menganggar saiz populasi siput babi di dalam sebuah ladang sayur.

Sample	Number of garden snails captured *Bilangan siput babi yang ditangkap*	
First *Pertama*	280	
Second *Kedua*	70 marked *70 bertanda*	80 unmarked *80 tidak bertanda*

Table 4
Jadual 4

What is the estimated population size of the snail ?
Berapakah anggaran saiz populasi siput babi berkenaan?

A 6 C 225
B 37 D 600

24 Diagram 20 shows parts of nitrogen cycle in the atmosphere.
Rajah 20 menunjukkan sebahagian kitar nitrogen di atmosfera.

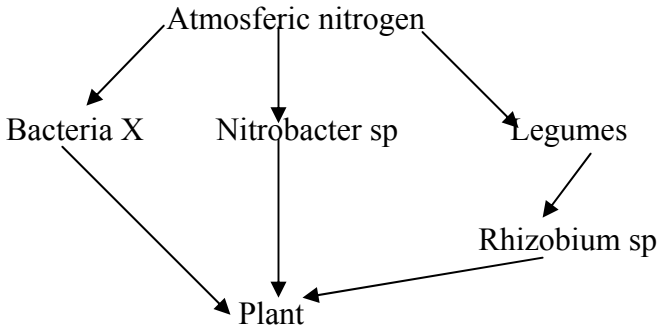


Diagram 20
Rajah 20

What is bacteria X?
Apakah bakteria X?

A Nitrogen- fixing bacteria
Bakteria pengikat nitrogen
B Denitrifying bacteria
Bakteria pendenitratan
C Purifying bacteria
Bakteria pengurai
D Nitrifying bacteria
Bakteria penitritan

25 Table 5 shows the time taken for methylene blue solution to decolourise in three water samples of P, Q and R.
Jadual 5 menunjukkan masa yang diambil untuk larutan biru metilena menjadi tidak berwarna bagi tiga sampel air iaitu P, Q dan R

Water sample *Sampel air*	P	Q	R
Time taken for methylene blue solution to decolourise *Masa untuk metilena biru menjadi tidak berwarna*	8 hours *8 jam*	3 hours *3 jam*	5 hours *5 jam*

Table 5
Jadual 5

Which of the following is the sample water for P, Q and R ?
Manakah yang berikut mungkin adalah sampel air P, Q dan R ?

	P	Q	R
A	Pond water *Air kolam*	Drain water *Air longkang*	Tap water *Air paip*
B	Drain water *Air longkang*	Tap water *Air paip*	Pond water *Air kolam*
C	Drain water *Air longkang*	Pond water *Air kolam*	Tap water *Air paip*
D	Tap water *Air paip*	Drain water *Air longkang*	Pond water *Air kolam*

26 The CFCs in the air condition and refrigerator have been replaced by HCFC.
Which of the following statement explains the reason for the replacement?

Kandungan CFC di dalam penghawa dingin dan peti sejuk telah digantikan penggunaannya dengan HCFC.
Di antara pernyataan berikut yang manakah menerangkan sebab penggantian bahan tersebut?

A HCFC cost is cheaper compare to CFC
Kos HCFC lebih murah berbanding dengan CFC

B HCFC is not easily broken by the UV compare to CFC
HCFC tidak dapat diuraikan dengan mudah oleh sinaran UV berbanding CFC

C HCFC is a lot cooler gas compared to CFC
HCFC lebih menyejukkan berbanding CFC

D HCFC is heavier gas so it does not rise to the atmosphere
HCFC adalah gas berat, oleh itu ia tidak boleh sampai ke atmosfera

27 Diagram 21 shows a type of pollution.
Rajah 21 menunjukkan sejenis pencemaran.

Diagram 21
Rajah 21

Which of the following is the effect of this type of pollution?
Manakah antara berikut adalah kesan daripada pencemaran ini?

A Photosynthesis in aquatic plants is increased
Fotosintesis pada tumbuhan akuatik meningkat

B Growth rate in aquatic organism is increased
Kadar pertumbuhan pada organisma akuatik bertambah

C Population of aquatic organism is reduced
Populasi organisma akuatik berkurangan

D Tropic level in the food chain is increased
Aras trofik dalam rantai makanan bertambah

28 Diagram 22 shows the cross-section of a stem.
Rajah 22 menunjukkan keratan rentas batang

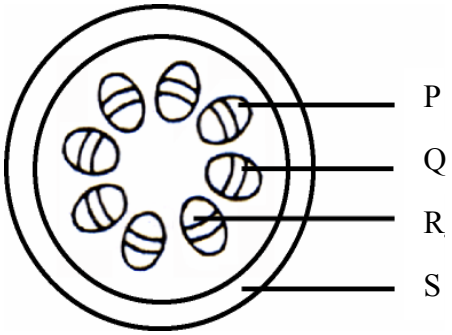


Diagram 22
Rajah 22

If the plant is exposed to radioactive carbon dioxide during the day, which tissue will be the first to become radioactive?
Sekiranya tumbuhan didedahkan kepada radioaktif karbon dioksida, tisu yang manakah pertama menjadi radioaktif?

A P C R
B Q D S

29 Diagram 23 shows a stage in the blood clotting mechanism.
Rajah 23 menunjukkan satu peringkat di dalam mekanisme pembekuan darah.

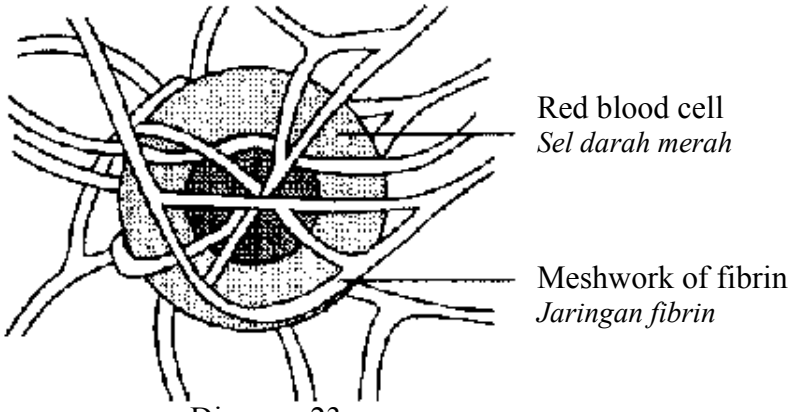


Diagram 23
Rajah 23

Which of the statement explains this stage?
Antara pernyataan berikut yang manakah menerangkan peringkat ini?

A Thromboplastin converts prothrombin to thrombin
Tromboplastin menukarkan protrombin kepada thrombin

B Platelets stimulate the formation meshwork of fibrin.
Platlet meransang pembentukan jaringan fibrin.

C Thrombin converts fibrinogen to meshwork of fibrin.
Trombin menukarkan fibrinogen kepada jaringan fibrin

D Platelets release the thromboplastin to form meshwork of fibrin
Platlet membebaskan trombop!astin untuk membentuk jaringan fibrin

30 Diagram 24 shows the blood circulatory system in human.
Diagram 24 menunjukkan sistem peredaran darah dalam manusia

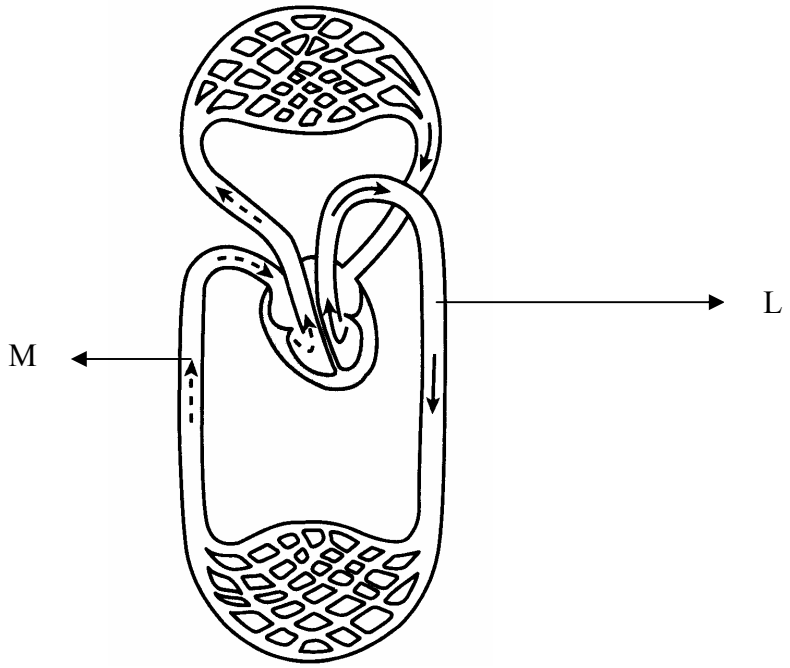


Diagram 24
Rajah 24

Which of the following is TRUE about the blood flow and the blood pressure at L and M?
Antara berikut manakah yang benar tentang peredaran darah dan tekanan, darah pada L dan M

	L		M	
	Blood flow *Pengaliran darah*	Blood pressure *Tekanan darah*	Blood flow *Pengaliran darah*	Blood pressure *Tekanan darah*
A	Fast *Cepat*	High *Tinggi*	Slow *Perlahan*	Low *Rendah*
B	Fast *Cepat*	Low *Rendah*	Slow *Perlahan*	Low *Rendah*
C	Slow *Perlahan*	High *Tinggi*	Fast *Cepat*	High *Tinggi*
D	Slow *Perlahan*	Low *Rendah*	Fast *Cepat*	High *Tinggi*

31 Which antibody causes the bacteria to clump together?
Apakah jenis antibodi yang menyebabkan bakteria untuk menggumpal bersama?

A Antitoxin
Anti toksin

B Opsonin
Opsonin

C Agglutinin
Aglutinin

D Lysin
Lisin

32 Diagram 25 shows that during transpiration, water molecules escape from the surface of the leaves will draw other water molecules from the mesophyll cells.
Rajah 25 menunjukkan semasa transpirasi , molekul air keluar daripada permukaan daun akan menyebabkan molekul air yang lain masuk ke dalam mesofil sel

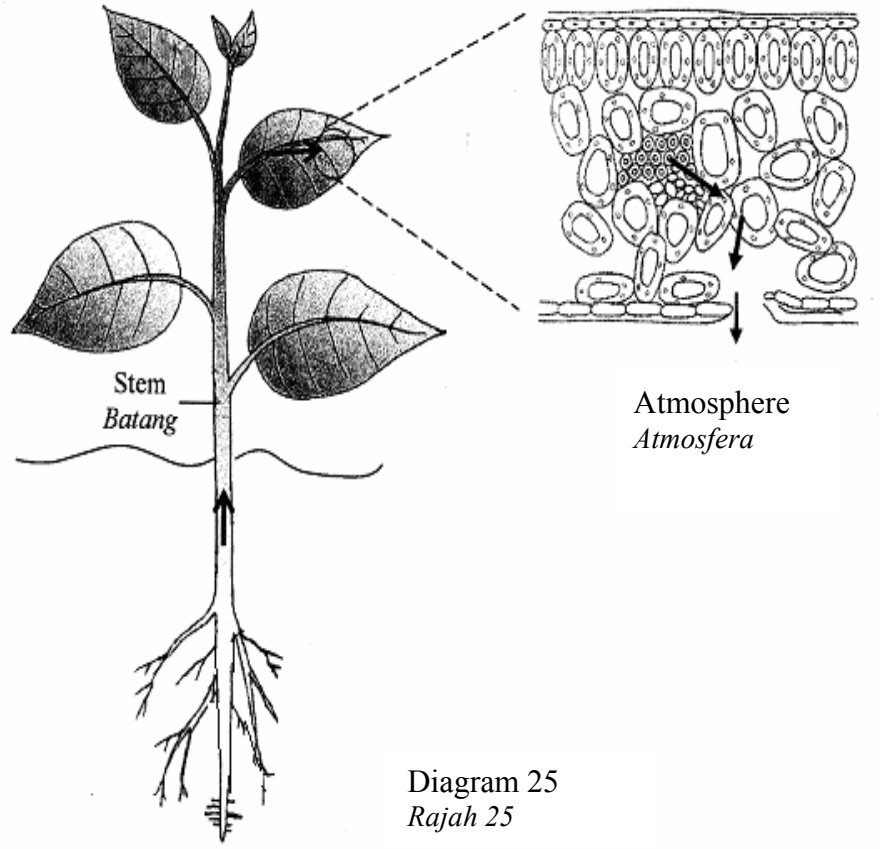


Diagram 25
Rajah 25

Which phenomenon best describes this process?
Apakah fenomena yang menerangkan proses ini?

A Capillary action
Tindakan kapilari

B Transpirational pull
Tarikan transpirasi

C Cohesive force
Daya lekatan

D Adhesion force
Daya lekitan

33 Diagram 26 shows the structure of a human arm with muscle P and Q.
Rajah 26 menunjukkan otot P dan Q pada struktur lengan manusia .

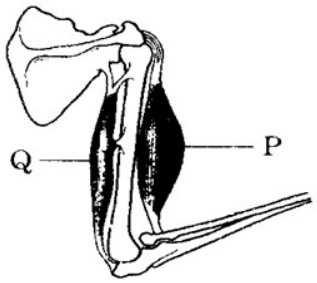


Diagram 26
Rajah 26

Which of the following pair of muscles action is true ?
Antara tindakan pasangan otot berikut yang manakah benar?

	P	Q
A	Contracts *Mengecut*	Relaxes *Relax*
B	Relaxes *Relax*	Contracts *Mengecut*
C	Contracts *Mengecut*	Expands *Memanjang*
D	Expands *Memanjang*	Contracts *Mengecut*

34 Diagram 27 shows a structure of a human cervical vertebra.
Rajah 27 menunjukkan struktur vertebra serviks yang terdapat pada manusia.

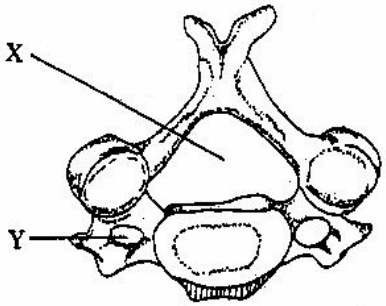


Diagram 27
Rajah 27

What are the structures located in the parts labelled X and Y ?
Apakah struktur yang terdapat pada bahagian yang belabel X dan Y?

	X	Y
A	Neurone *Neuron*	Blood vessel *Salur darah*
B	Blood vessel *Salur darah*	Spinal cord *Saraf tunjang*
C	Spinal cord *Saraf tunjang*	Blood vessel *Salur darah*
D	Blood vessel *Salur darah*	Neuron *Neuron*

35 Diagram 28 shows a joint in human skeletal system.
Rajah 28 menunjukkan sendi yang terdapat sistem rangka manusia.

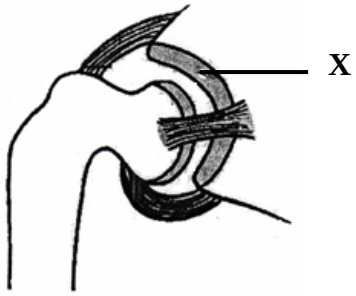


Diagram 28
Rajah 28

What is the function of X ?
Apakah fungsi X?

A Attach bone to the bone.
Menghubungkan tulang dengan tulang

B Secretes fluid to lubricate the joint.
Merembeskan cecair untuk melicin pergerakan sendi.

C Reduces friction between the bones
Mengurangkan geseran antara tulang

D Prevents the bones from being dislocated.
Mencegah tulang daripada berganjak

36 Which of the following tissues is responsible for support in aquatic plant?
Tisu manakah di antara berikut memberi sokongan kepada tumbahan air?

A Parenchyma tissue
Tisu parenkima

B Aerenchyma tissue
Tisu aerenkima

C Schlerenchyma tissue
Tisu Sklerenkima

D Collenchyma tissue
Tisu kolenkima

37 Diagram 29 shows a knee jerk action.
Rajah 29 menunjukkan tindakan sentakan lutut.

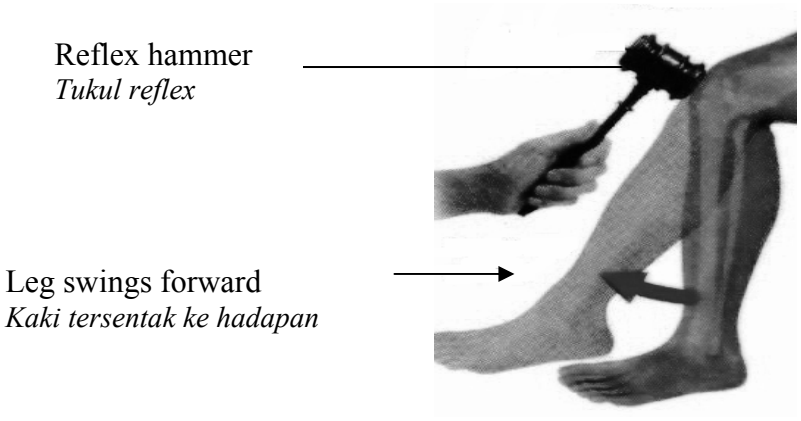


Diagram 29
Rajah 29

Which of the following is the correct direction of impulse when the knee jerk test has been done ?
Antara berikut yang manakah benar mengenai laluan impuls apabila ujian sentakan lutut dijalankan..

A Receptor → afferent neurone → interneuron → efferent neurone → effector.
Reseptor → neuron aferen → interneuron → neuron eferen → efektor.

B Receptor → afferent neurone → efferent neurone → effector.
Reseptor → neuron aferen → neuron eferen → efektor.

C Effector → afferent neurone → efferent neurone → receptor.
Efektor → neuron aferen → neuron eferen → reseptor.

D Receptor → efferent neurone → interneuron → afferent neurone → effector.
Reseptor → neuron eferen → interneuron → neuron aferen → efektor.

38 Which of the following situation is regulated by both hormones and nerves in the human body ?
Manakah situasi yang berikut dikawalatur oleh kedua-dua hormon dan sistem saraf badan manusia?

A While having a favourite food
Semasa menikmati makanan kegemaran

B Accidentally touches something hot
Menyentuh objek yang panas secara tidak sengaja

C While being chased by a dog
Semasa dikejar seekor anjing

D While listening to sentimental music.
Semasa menikmati muzik sentimental

39 Diagram 30 shows the structure of a nephron
Rajah 30 menunjukkan struktur nefron

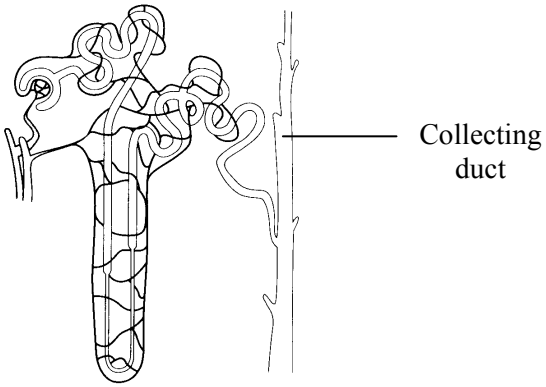


Diagram 30
Rajah 30

Which of the following may occur if collecting duct is more permeable to water?
Manakah antara berikut yang mungkin berlaku jika ketelapan duktus pengumpul terhadap air meningkat ?

A The urine produced is more but in a dilute form
Urin yang dihasilkan lebih banyak dan dalam keadaan cair

B The urine produced is little but concentrated
Urine yang dihasilkan sedikit dan pekat

C Concentration and the amount of urine decrease
Kepekatan dan kuantiti urin berkurangan

D Concentration and the amount of urine increase
Kepekatan dan kuantiti urin meningkat.

40 Why does a farmer place a few unripe fruits together with ripe fruits?
Mengapakah petani meletakkkan beberapa biji buah yang tidak masak dengan buah yang masak ranum?

A This can make the unripe fruits sweeter and juicer
Ini membolehkan buah yang tidak masak menjadi lebih manis dan berjus

B This can quicken the ripening of the unripe fruits.
Ini membolehkan buah yang tidak masak menjadi lebih cepat masak
.

C This can make the colour of ripe fruits more attractive.
Ini membolehkan warna buah yang masak menjadi lebih menarik
.

D This can make the ripe fruits keep longer
Ini membolehkan warna buah yang masak menjadi lebih menarik

41 Diagram 31 is a graph which shows two hormones released by human's ovary.

Rajah 31 menunjukkan hormon yang dihasilkan oleh ovari manusia.

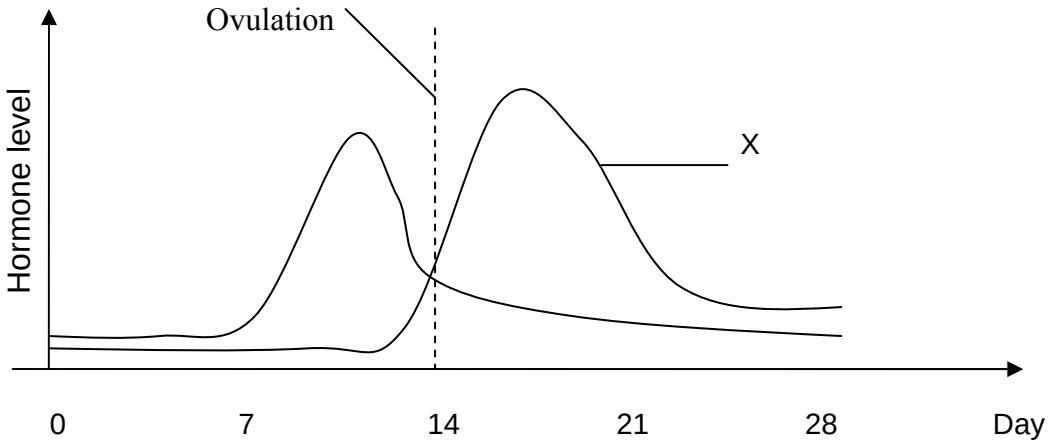


Diagram 31
Rajah 31

What is hormone X?
Apakah hormon X?

A Follicle - stimulating hormone
Hormon perangsang folikel

B Leuteinising hormone
Hormon Pelutinan

C Oesterogen
Estrogen

D Progesteron
Progesteron

42 Diagram 32 shows a method of birth control use by a mother.
Rajah 32 menunjukkan kaedah mencegah kehamilan digunakan oleh seorang ibu

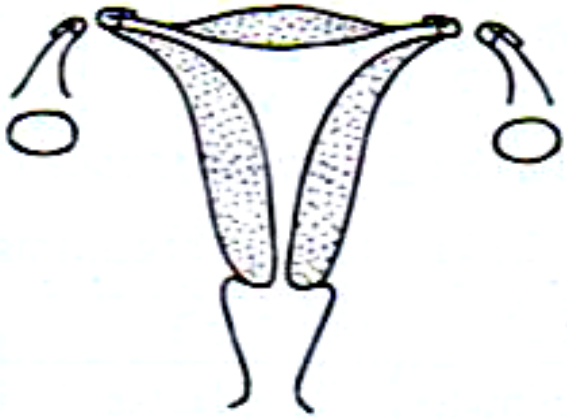


Diagram 32
Rajah 32

What is the consequences of this type of birth control ?
Apakah kesan ekoran dari pencegahan kehamilan jenis ini.

A Ovum cannot be produced.
Ovum tidak dapat dihasilkan

B The female sex hormones cannot be secreted .
Hormon seks perempuan tidak dapat dirembeskan

C Sperm cells would be unable to enter the uterus.
Sel sperma tidak dapat memasuki uterus

D Sperm cells would be unable to reach the ovum
Sel sperma tidak dapat mendekati ovum

43 Diagram 33 shows the longitudinal section of the reproductive part of a flower
Rajah 33 menunjukkan keratan membujur bahagian pembiakan bunga.

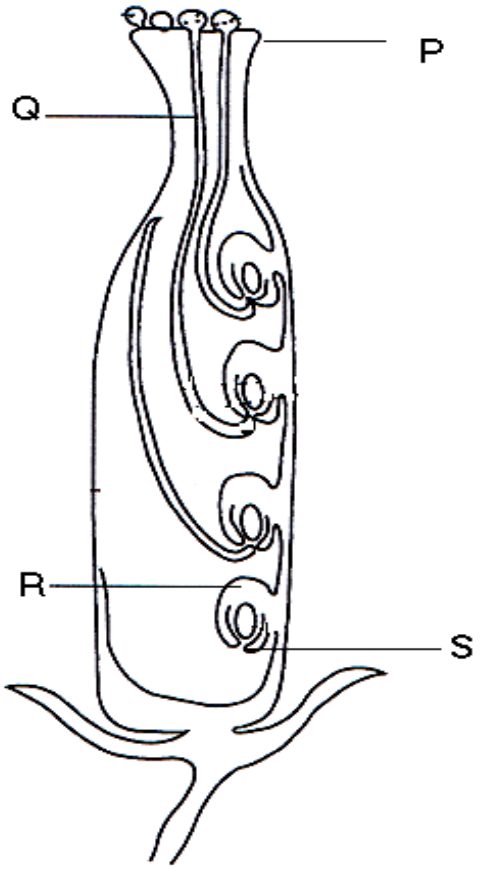


Diagram 33
Rajah 33

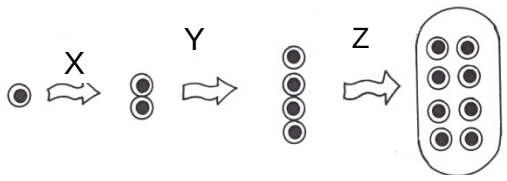
Where do pollination and fertilization occur?
Di manakah pendebungaan dan persenyawaan berlaku?

	Pollination *Pendebungaan*	Fertilisation *Persenyawaan*
A	P	R
B	Q	S
C	R	P
D	S	Q

44 Choose the correct sequence that shows development of a zygote before implantation.
Pilih urutan yang sesuai yang menunjukkan perkembangan zigot sebelum penempelan.

A	morula	→	blastocyst	→	embryo
	morula	→	*blastosista*	→	*embrio*
B	embryo	→	morula	→	blastocyst
	embrio	→	*morula*	→	*blastosista*
C	blastocyst	→	morula	→	embryo
	blastosista	→	*morula*	→	*embrio*
D	blastocyst	→	embryo	→	morula
	blastosista	→	*embrio*	→	*morula*

45 Diagram 34 shows the stages in the development of an embryo sac.
Rajah 34 menunjukkan peringkat perkembangan pundi embrio.



Embryo sac with eight nuclei
Pundi embrio dengan lapan nukleus

Diagram 34
Rajah 34

What type of cell division occurs at stages X, Y and Z?
Apakah jenis pembahagian sel berlaku pada peringkat X, Y dan Z ?

	X	Y	Z
A	Meiosis I	Mitosis	Meiosis II
B	Mitosis	Mitosis	Meiosis I
C	Mitosis	Meiosis I	Meiosis II
D	Meiosis I	Meiosis II	Mitosis

46 Diagram 35 shows the structure of nucleotide in DNA molecule.
Rajah 35 menunjukkan struktur nukleotida dalam molekul DNA.

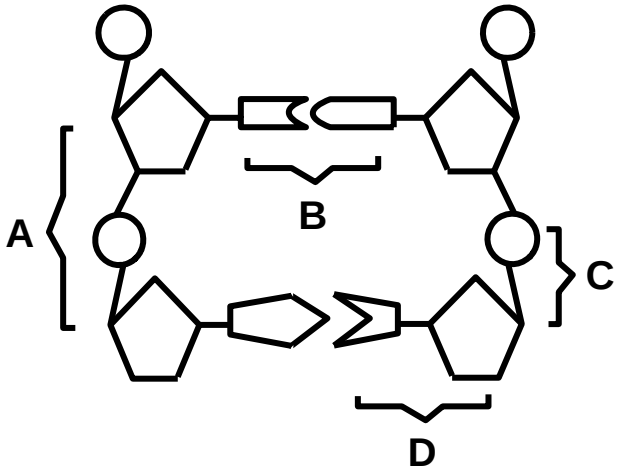


Diagram 35
Rajah 35

Which combination in the molecule carries the genetic information?
Kombinasi yang manakah dalam molekul membawa maklumat genetik?

47 Diagram 36 shows the alleles in a pair of homologous chromosome.
Rajah 36 menunjukkan alel-alel dalam satu pasang kromosom homolog.

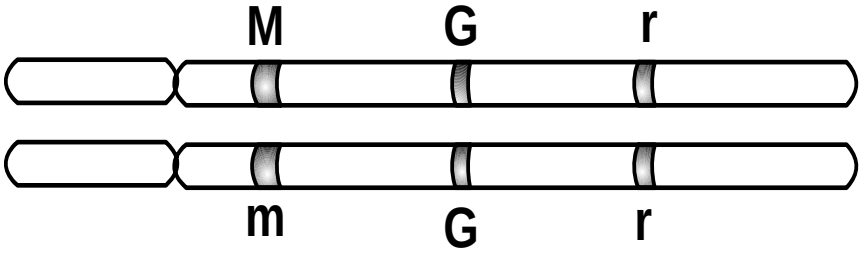


Diagram 36
Rajah 36

Based on diagram 19, which of the following describe gene and allele correctly?
Berdasarkan rajah 19, yang manakah berikut menghuraikan gen dan alel dengan betul

A An allele has two genes.
Alel mempunyai dua gen

B Gr is heterozygous.
Gr adalah heterozigot

C Mm is homozygous.
Mm adalah homozigot

D The trait of an organism is controlled by a pair of alleles.
Trait pada organisma dikawal oleh sepasang gen

48 Diagram 37 shows a sex-linked gene in haemophilia.
Rajah 37 menunjukkan gen pewarisan seks bagi haemofilia

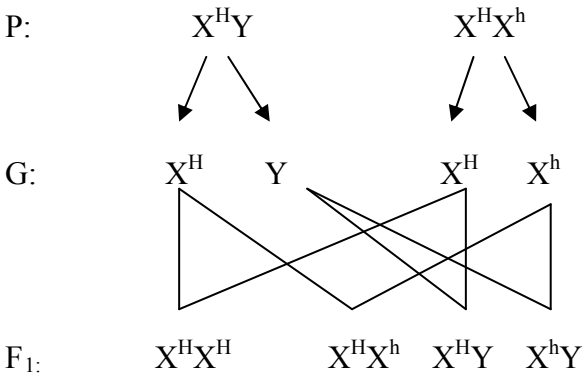


Diagram 37
Rajah 37

What is the percentage of normal offspring in the F_1 generation ?
Berapakah peratus mendapat anak yang normal dalam generasi F_1 ?

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

49 A woman with blood group AB married to a man with blood group O.
Which of the following is true about the blood group of their offspring?
Seorang wanita dengan kumpulan darah AB berkahwin dengan seorang lelaki dengan kumpulan darah O. Yang manakah berikut adalah benar tentang kumpulan darah anak-anak mereka

A All the offspring have blood group AB
Semua anak mempunyai kumpulan darah AB

B None of the offspring has blood group O.
Tiada seorang anak mempunyai kumpulan darah O

C All the daughter will have blood group B.
Semua anak mempunyai kumpulan darah B

D The probability of getting a son with blood group A is 50%.
Kebarangkalian mendapat anak lelaki dengan kumpulan darah A ialah 50%

50 Diagram 38 show the karyotypes of two individuals P and Q.
Rajah 38 menunjukkan kariotip bagi dua individu P dan Q.

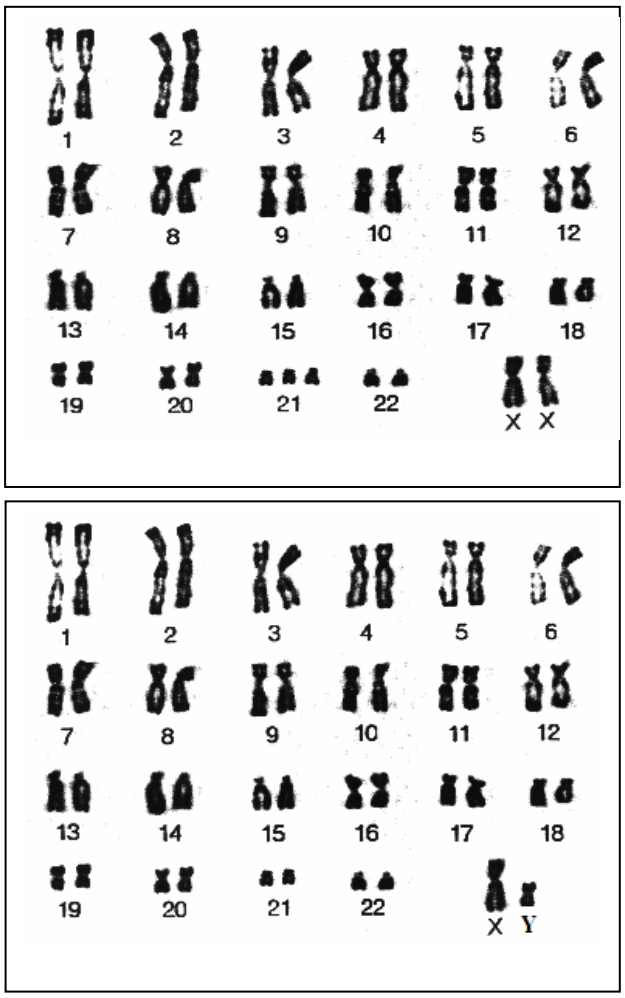


Diagram 38
Rajah 38

Which of the following represents individual P and Q?
Manakah yang berikut mewakili individu P dan Q ?

	Individual P	Individual Q
A	Klinefelter's syndrome male *Lelaki dengan sindrom Klinefelter*	Down's syndrome female *Perempuan dengan sindrom Down*
B	Down's syndrome female *Perempuan dengan sindrom Down*	Haemophilia male *Lelaki hemofilia*
C	Down's syndrome female *Perempuan sindrom down*	Normal male *Lelaki Normal*
D	Haemophilia male *Lelaki hemofilia*	Normal female *Perempuan Normal*

END OF QUESTIONS

SULIT

Name:……. Form : ……..

4551/2
Biology
Paper 2
Sept
2009

$2\frac{1}{2}$ hours

PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA
SEKOLAH MENENGAH
NEGERI KEDAH DARUL AMAN

PEPERIKSAAN PERCUBAAN SPM 2009

BIOLOGY

PAPER 2

Two hours and thirty minutes

DO NOT OPEN THE TEST PAPER UNTIL YOU ARE TOLD TO DO SO

1. This paper consists of two sections. **Section A**, **Section B**. Answer all the questions in Section A, any two questions in Section B.
2. Write your answers in the spaces provided for Section A. Important steps in calculations must be shown .
3. Write your answers on the separate answer sheets provided for Section B.
4. Answer Section B in details. You may use equation, diagram, table, graph and other suitable methods to explain your answers.
5. Show your working, it may help you to get marks.
6. If you wish to change your answer, neatly cross out the answer that you have done. Then write down the new answer
7. The diagrams in the questions are not drawn to scale unless stated.
8. Marks allocated for each question or part of the questions are shown in brackets.
9. The time suggested to answer Section A is 90 minutes, Section B is 60 minutes.
10. The use of a non programmable calculator is permitted.

For Examiner's Use			
Section	Question	Full Marks	Marks Obtained
A Answer all questions	1	12	
	2	12	
	3	12	
	4	12	
	5	12	
B Any Two	6	20	
	7	20	
	8	20	
	9	20	
Total		100	

This Question Paper Consists of 22 Printed Pages

Section A
Bahagian A

[60 marks]
[60 markah]

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

1 Table 1 shows the result of an experiment in which three similar towels have the same fat stains. The towels were washed by using enzyme-containing washing powder at three different temperatures.

Jadual 1 menunjukkan keputusan eksperimen di mana tiga tuala yang mempunyai kotoran yang sama. Semua tuala ini dibasuh menggunakan bahan pencuci yang mengandungi enzim pada tiga suhu yang berlainan.

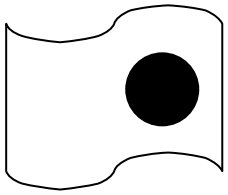
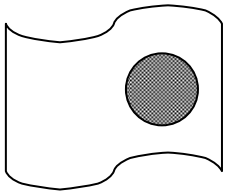
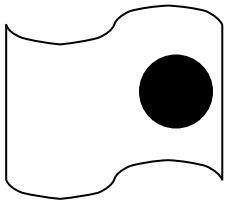
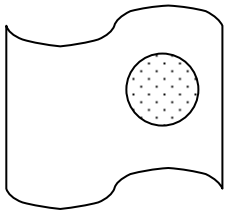
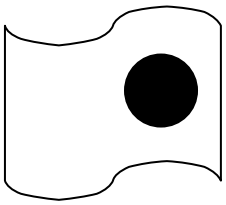
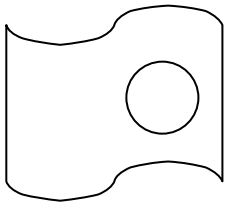
Before washing ***Sebelum dibasuh***	**After Washing** ***Selepas dibasuh***	**Washing Temperature** ***Suhu basuhan***
		
		
		

Table 1
Jadual 1

(a) (i) Based on the results in Table 1, choose a suitable temperature 10°C, 40°C or 60°C to fill into Table 1.

Berdasarkan jadual 1, pilih suhu yang sesuai 10℃, 40℃ atau 60℃ untuk diisikan dalam jadual 1

[3 marks]
[3 markah]

(ii) Explain the result of washing the towels at :
Terangkan hasil keputusan basuhan tuala pada :

i. 10°C

…….....

…….....

…….....

[2 marks]
[2 markah]

ii. 40°C

…….....

…….....

…….....

[2 marks]
[2 markah]

(b) Name one enzyme used in the washing powder
Namakan satu enzim yang digunakan dalam serbuk pencuci itu.

…….....

[1 mark]
[1 markah]

(c)

Besides being used in the manufacturing of detergents, enzymes are widely used in our daily life as well as in various industries.

Selain digunakan dalam penghasilan detergen, enzim juga banyak digunakan dalam kehidupan seharian begitu juga dalam kebanyakan industri.

Explain two examples of the uses of enzymes.
Terangkan dua contoh kegunaan enzim.

…….....

…….....

…….....

…….....

…….....

[4 marks]
[4 markah]

2 Diagram 2 (a) shows the cross-section of dicotyledonous leaf. Diagram 2(b) shows the structure of organelle P found in the cells of green leaves.

Rajah 2 (a) menunjukkan keratan rentas daun dikotiledon. Rajah 2 (b) menunjukkan struktur organel P yang terdapat dalam sel daun hijau.

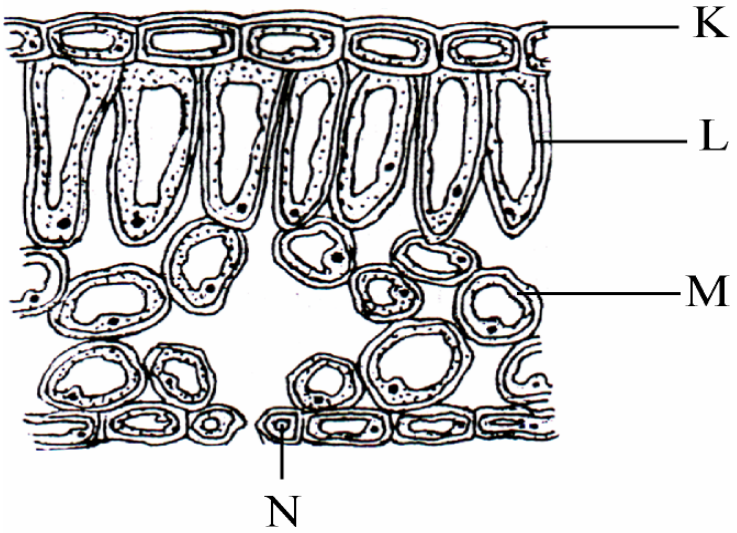


Diagram 2 (a)
Rajah 2 (a)

Organelle P
Organel P

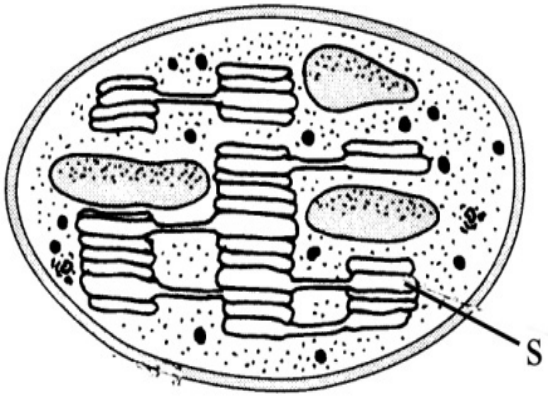


Diagram 2 (b)
Rajah 2 (b)

(a) Name the cells labelled L and N in diagram 2(a).
Namakan sel-sel yang berlabel L dan N di rajah 2 (a)

L : .....

N : .....

[2 marks]
[2 markah]

(b) Which cell in diagram 2(a) has the highest density of organelle P ?
Di rajah 2 (a), sel yang manakah mempunyai ketumpatan organel P paling tinggi ?

……...

[1 mark]
[1 markah]

(c) (i) Describe the process that occurs in X of organelle P.
Perihalkan proses yang berlaku di X dalam organel P.

…….....

…….....

…….....

…….....

…….....

[3 marks]
[3 markah]

(ii) Name two factors that affect the rate of the process in c (i)
Namakan dua faktor yang mempengaruhi kadar proses di c (i).

…….....

…….....

…….....

…….....

[2 marks]
[2 markah]

(iii) Explain how the factors in c (ii) affect the rate of the process in c(i)
Terangkan bagaimana faktor-faktor di c (ii) mempengaruhi kadar proses di c (i)

Factor 1:
Faktor 1:

…….....

…….....

…….....

Factor 2:
Faktor 2:

…….....

…….....

…….....

[4 marks]
[4 markah]

3 Diagram 3.1 shows the structure of a human arm

Rajah 3.1 menunjukkan struktur bahagian tangan manusia.

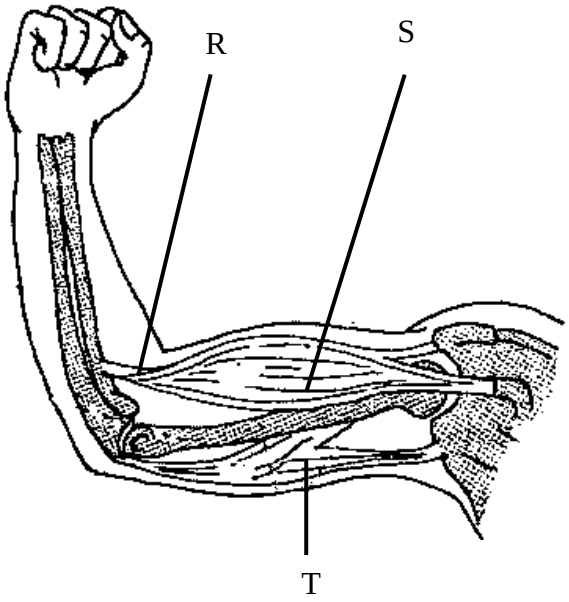


Diagram 3.1
Rajah 3.1

(a) Name the parts labelled S and T.

Namakan bahagian berlabel S dan T

S : .....

T : .....

[2 marks]
[2 markah]

(b) (i) Explain the role of S and T to straighten the arm.
Terangkan peranan S dan T untuk meluruskan tangan.

…….....

…….....

…….....

…….....

…….....

[2 marks]
[2 markah]

(ii) S and T will need sufficient blood supply to function efficiently. Explain why?

S dan T memerlukan bekalan darah yang cukup untuk berfungsi dengan baik . Terangkan mengapa?

…….....

…….....

…….....

…….....

…….....

[2 marks]
[2 markah]

(c) (i) State the function of R.
Nyatakan fungsi R.

…….....

…….....

[1 mark]
[1 markah]

(ii) State two physical characteristics of tissue R that enable it to carry out it's function efficiently.
Nyatakan dua sifat fizikal R untuk membolehkannya berfungsi dengan baik.

…….....

…….....

…….....

…….....

…….....

[2 marks]
[2 markah]

(iii) What will happen if tissue R is torn off?
Apakah yang akan berlaku jika tisu R mengalami kecederaan (terkoyak)?

…….....

…….....

[1 mark]
[1 markah]

(e) Diagram 3.2 shows one of the diseases caused by impaired musculoskeletal system. The disease cause the joints to become swollen, stiff and painful.

Rajah 3.2 menunjukkan sejenis penyakit yang disebabkan oleh sistem otot rangka yang tidak berfungsi dengan baik. Penyakit ini menyebabkan sendi menjadi bengkak, kaku dan sakit.

Diagram 3.2
Rajah 3.2

(i) Name the disease shown in diagram 3.2.

Namakan penyakit seperti yang ditunjukkan dalam rajah 3.2.

…….....

…….....

[1 mark]
[1 markah]

(ii) What is the cause of the disease?

Apakah penyebab penyakit tersebut?

…….....

…….....

[1 mark]
[1 markah]

4 (a) Figures 4.1 (a) and 4.1 (b) show different types of fingerprint and a group of form five students with various body height.

Rajah 4.2 (a) dan 4.2 (b) menunjukkan berbagai jenis cap ibu jari dan berbagai ketinggian sekumpulan pelajar tingkatan lima.

Diagram 4.1 (a)
Rajah 4.1 (a)

Diagram 4.1 (b)
Rajah 4.1 (b)

(i) State the types of variation shown by the two diagrams above.

Nyatakan jenis variasi yang ditunjukkan dalam dua rajah di atas.

Diagram 4.1 (a) : ……..……
Rajah 4.1 (a)

Diagram 4.1 (b) : …….
Rajah 4.1 (b)

[2 marks]
[2 markah]

(b) State two differences between the two types of variation in (a) (i).
Nyatakan dua perbezaan antara dua jenis variasi dalam (a) (i)

1 …….....

……

…….....

…….....

2 ……

…….....

…….....

…….....

[4 marks]
[4 markah]

(c) Explain the importance of variation.
Terangkan kepentingn variasi

…….....

…….....

…….....

[2 marks]
[2 markah]

(d) Mutation is one of the factor that cause variation. Diagram 4.2 shows two types of chromosomal mutation.
Mutasi adalah salah satu factor yang menyebabkan variasi. Rajah 4.2 menunjukkan dua jenis mutasi kromosom.

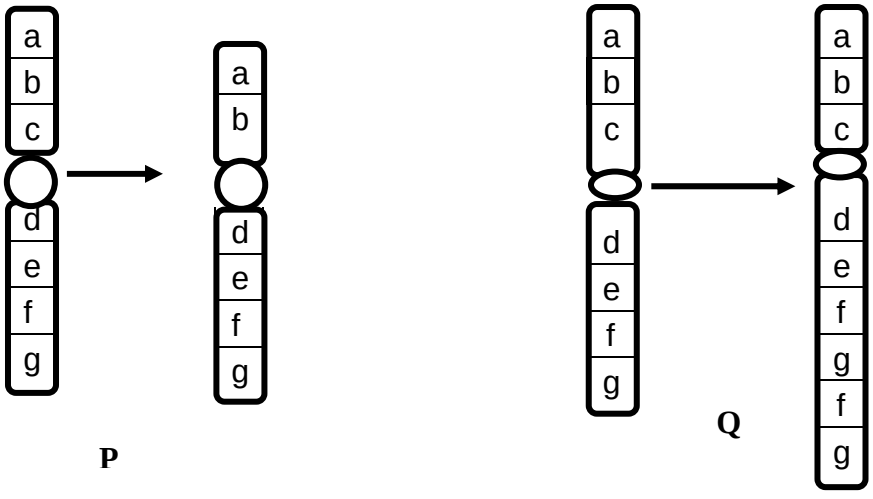


Diagram 4.2
Rajah 4.2

(i) Name the processes involved in the mutation of P and Q.

Namakan proses-proses yang berlaku dalam mutasi P dan Q.

P: ……..

Q: …….

[2 marks]
[2 markah]

(ii) Explain one bad effect cause by mutation.

Terangkan satu kesan buruk yang disebabkan oleh mutasi.

…….....

…….....

…….....

…….....

[2 marks]
[2 markah]

5 Diagram 5 shows a foetus in the mother's uterus.

Diagram 5 menunjukkan fetus di dalam uterus ibunya.

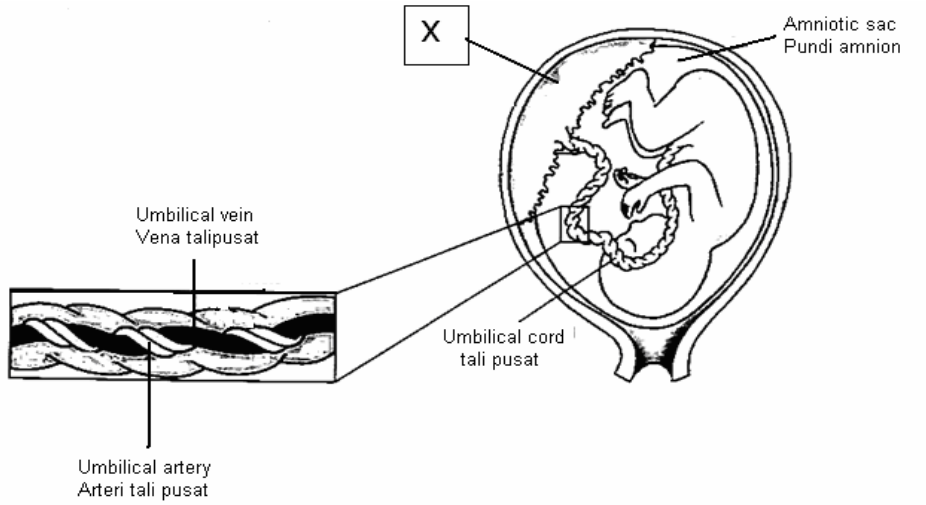


Diagram 5
Rajah 5

(a) Structure X is connected to the foetus via the umbilical cord.
Struktur X dihubungkan kepada fetus melalui tali pusat.

(i) Name structure X.
Namakan struktur X.

…….....

[1 marks]
[1 markah]

(ii) Explain two functions of structure X.
Terangkan dua fungsi struktur X

1 …….....

…….

…….....

…….....

2 …….

…….....

…….....

…….....

[4 marks]
[4 markah]

(b) State the difference between the content of the blood in umbilical artery and umbilical vein.

Nyatakan perbezaan di antara kandungan darah dalam arteri tali pusat dengan vena tali pusat.

…….....

…….....

…….....

…….....

…….....

[2 marks]
[2 markah]

(c) Puan Lisa who is Rhesus negative is pregnant. During her first pregnancy, she carries a foetus which is Rhesus positive . The development of the first foetus was not affected. However during her second pregnancy , if the foetus is Rhesus positive, the foetus will be harmed. Puan Lisa should seek medical advice to prevent this condition .

Puan Lisa mempunyai Rhesus negatif telah hamil. Semasa kehamilan pertama , dia mempunyai fetus Rhesus positif. Perkembangan fetus pertamanya tidak terjejas. Walaubagaimanapun, untuk kehamilan kedua, jika fetus mempunyai Rhesus positif, kesan yang membahayakan akan berlaku keatas fetus. Puan Lisa harus mendapatkan nasihat perubatan untuk mencegah keadaan tersebut berlaku.

(i) Explain the condition that occur during Puan Lisa's second pregnancy.
Terangkan keadaan yang berlaku semasa kehamilan kali kedua Puan Lisa.

…….....

…….....

…….....

…….....

…….....

[2 marks]
[2 markah]

(ii) How can this problem be avoided ?.
Bagaimanakah masalah ini dapat dielak dari berlaku?

…….....

…….....

[1 marks]
[1 markah]

(d) A woman who is a heavy smoker is pregnant. Explain why she should stop smoking.

Seorang perempuan yang kuat merokok disahkan hamil. Terangkan mengapa beliau mesti berhenti merokok.

…….....

…….....

…….....

…….....

…….....

[2 marks]
[2 markah]

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 part of the regulatory mechanism of oxygen and carbon dioxide contents in the body.
Rajah 6.1 menunjukkan bahagian mekanisma pengawalatur kandungan oksigen dan karbon dioksida di dalam badan manusia

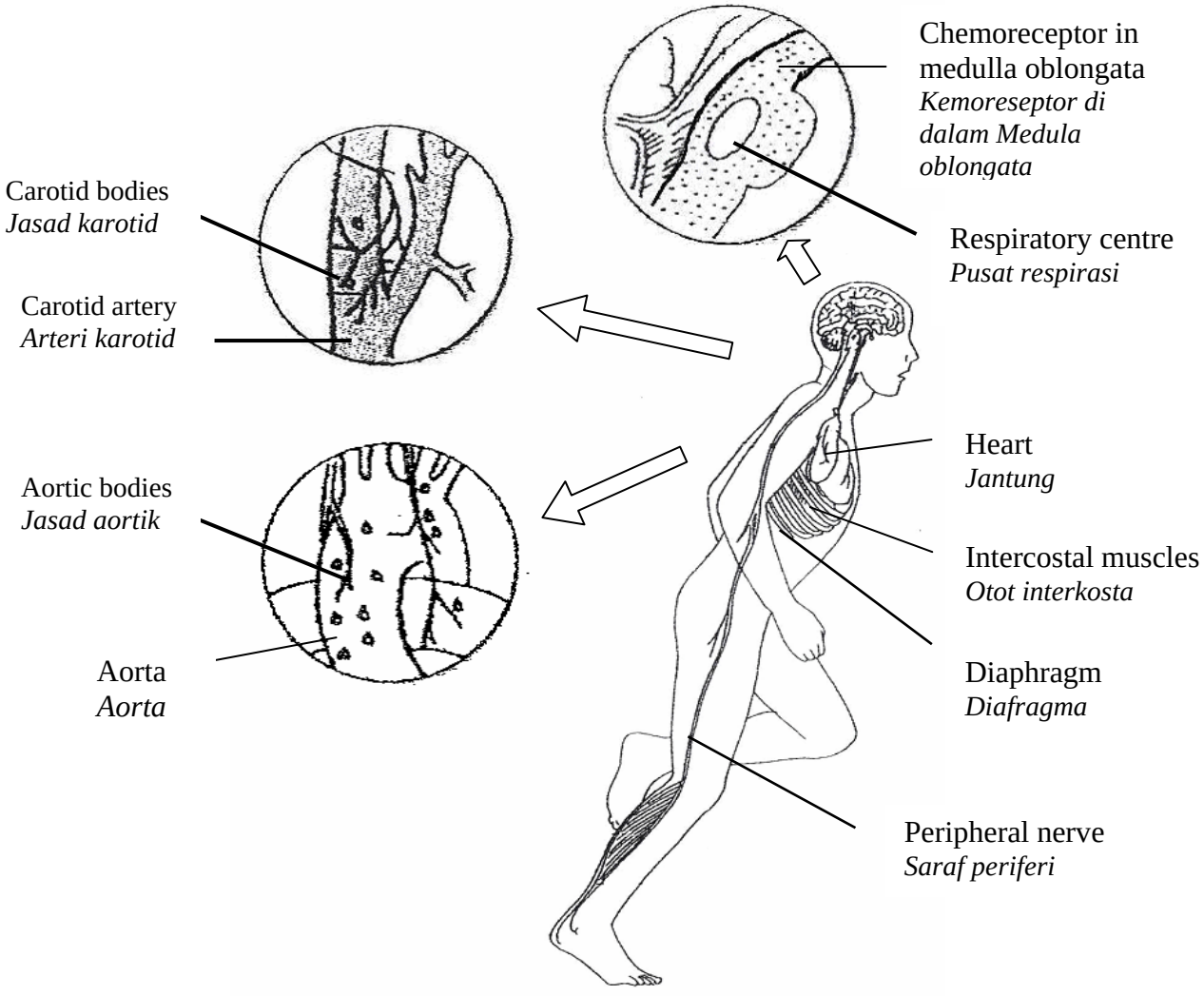


Diagram 6.1
Rajah 6.1

(i) Based on the diagram, explain how the concentration of carbon dioxide in the blood is regulated during a vigorous activity.
Berdasarkan rajah tersebut, terangkan bagaimana kepekatan karbon dioksida di dalam darah dikawalatur semasa melakukan aktiviti cergas.

[8 marks]
[8 markah]

(ii) Explain why the pulse rate takes several minutes to return to normal after a vigorous activity.
Terangkan kenapa kadar denyutan nadi seseorang itu mengambil masa beberapa minit untuk kembali normal selepas melakukan aktiviti cergas.

[4 marks]
[4 markah]

(b) Diagram 6.2(a) and 6.3(a) show paddy seedlings and terrestrial plant growing in a waterlogged condition soil.
Rajah 6.2(a) dan 6.3(a) menunjukkan anak benih pokok padi dan tumbuhan darat yang tumbuh dalam keadaan tanah berair.

Diagram 6.2 (b) and 6.3 (b) show the growth of the plants after four months.
Rajah 6.2(b) dan 6.3(b) menunjukkan pertumbuhan kedua-dua tumbuhan selepas empat bulan

After one month / *selepas satu bulan*	After four months / *selepas empat bulan*
 Diagram 6.2(a) *Rajah 6.2(a)*	 Diagram 6.2(b) *Rajah 6.2(b)*
 Diagram 6.3(a) *Rajah 6.3(a)*	 Diagram 6.3(b) *Rajah 6.3 (b)*

Explain the process that occurs in the roots of both plants which result in the condition shown in diagram 6.2(b) and 6.3(b).
Terangkan proses yang berlaku dalam kedua-dua akar tumbuhan yang menyebabkan keadaan seperti ditunjukkan dalam rajah 6.2(b) dan 6.3 (b).

[8 marks]
[8 markah]

7. Diagram 7.1 shows a type of fungi.
Rajah 7.1 menunjukkan sejenis fungi.

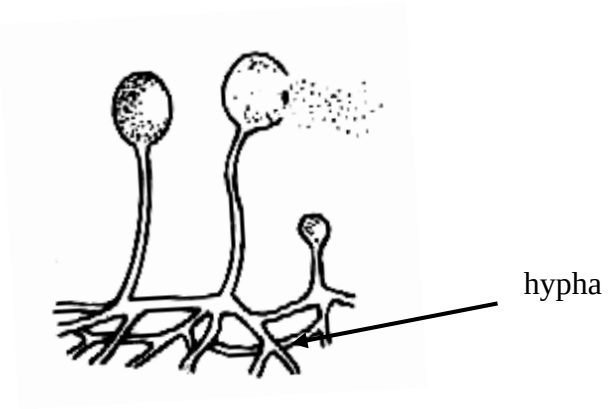
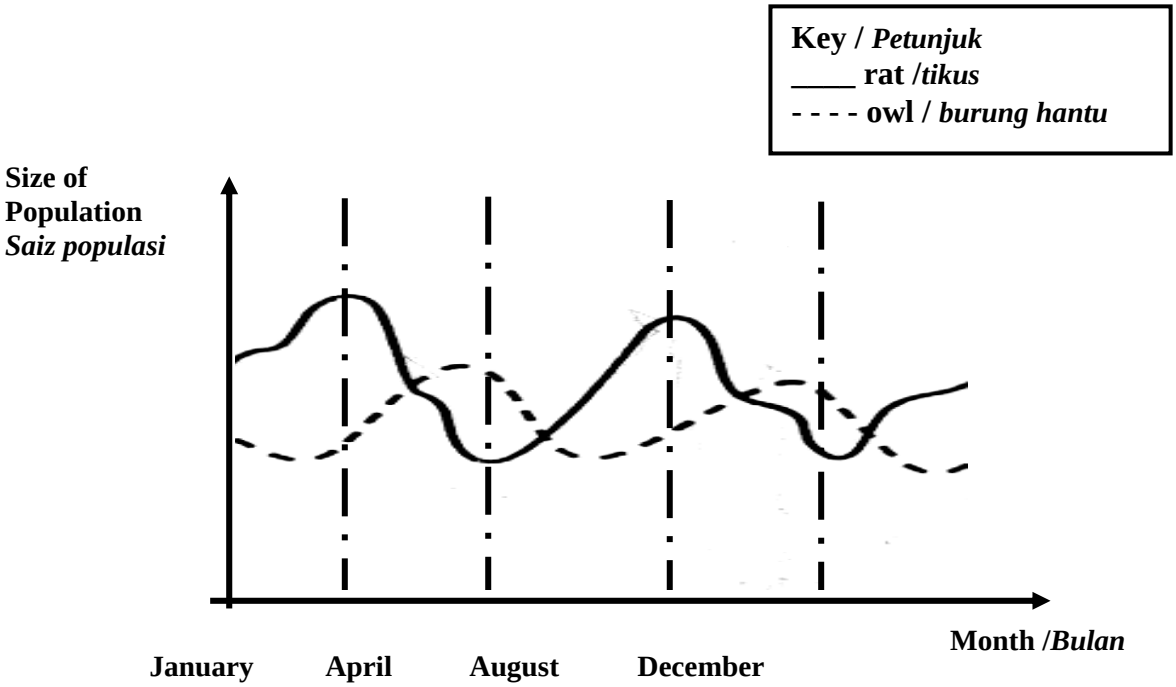


Diagram 7.1
Rajah 7.1

(a) Explain how this organism obtained the nutrient.
Terangkan bagaimana organisma ini memperolehi makanan..

[4 marks]
[4 markah]

(b) Graph 7.1 below shows the population size of rats and owls in an oil palm estate change throughout the year.
Graf di bawah menunjukkan perubahan saiz populasi tikus dan burung hantu dalam sebuah ladang kelapa sawit sepanjang tahun.



Graph 7.1
Graf 7.1

Based on graph 7.1, explain the changes in the size of population of the owls and the rats throughout the year.
Berdasarkan kepada graf di atas,huraikan perubahan saiz populasi bagi burung hantu dan tikus sepanjang tahun.

[6 marks]
[6 markah]

(c)

Diagram 7.2 shows the nitrogen cycle which plays an important role in the formation of protein. Plants and animals need nitrate to form protein. Explain the role of plants, animals and microorganism A, B, C, and D in this cycle.

Rajah 7.2 menunjukkan kitar nitrogen yang memainkan peranan penting dalam pembentukan protein. Tumbuhan dan haiwan memerlukan nitrat untuk membentuk protein.
Huraikan peranan tumbuhan, haiwan dan microorganisma A, B, C, dan D dalam kitar ini.

[10 marks]
[10 markah]

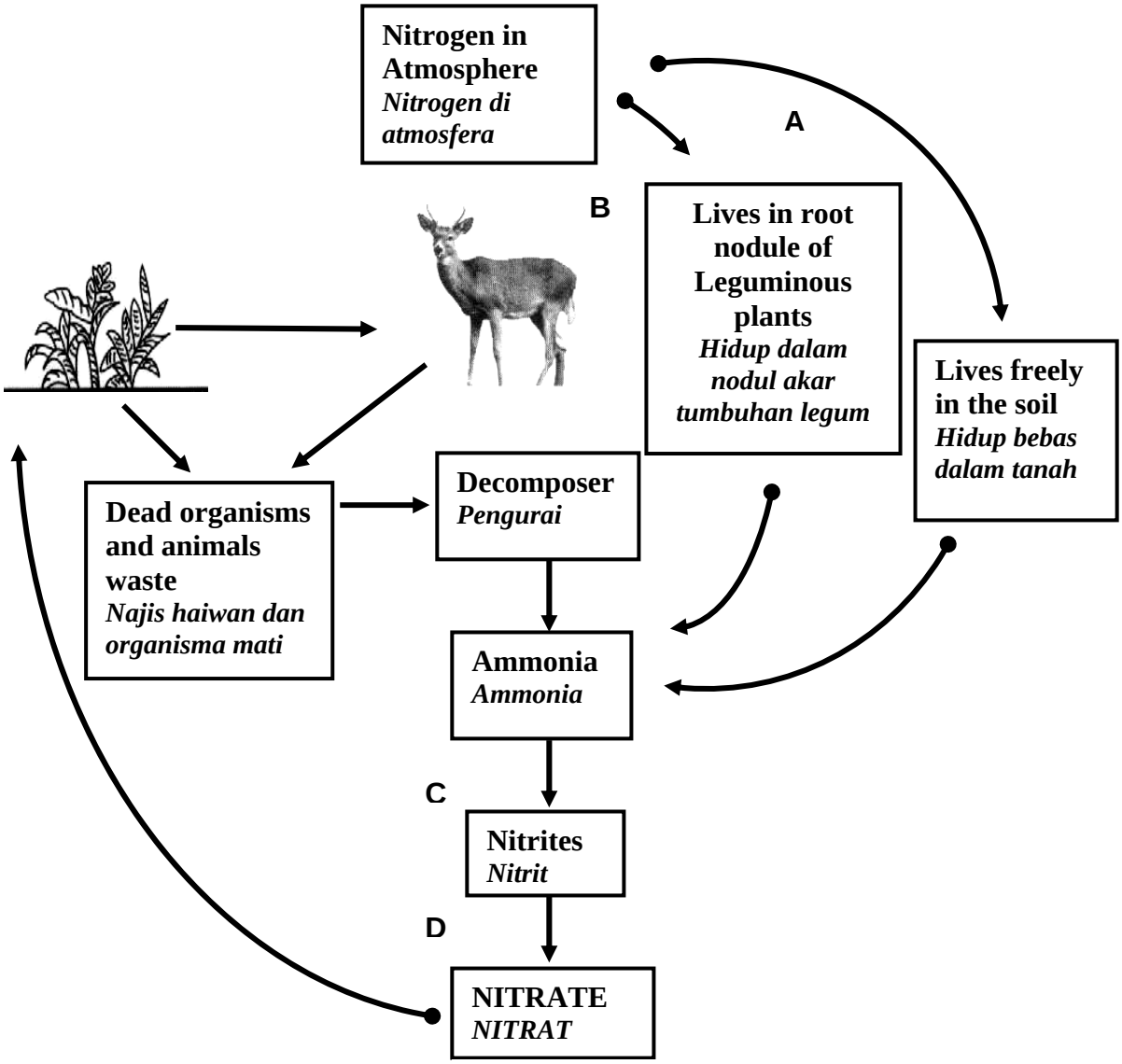


Diagram 7.2
Rajah 7.2

8 Diagram 8.1 shows the structure of nephron in the human kidney.
Rajah 8.1 menunjukkan struktur nefron dalam ginjal manusia.

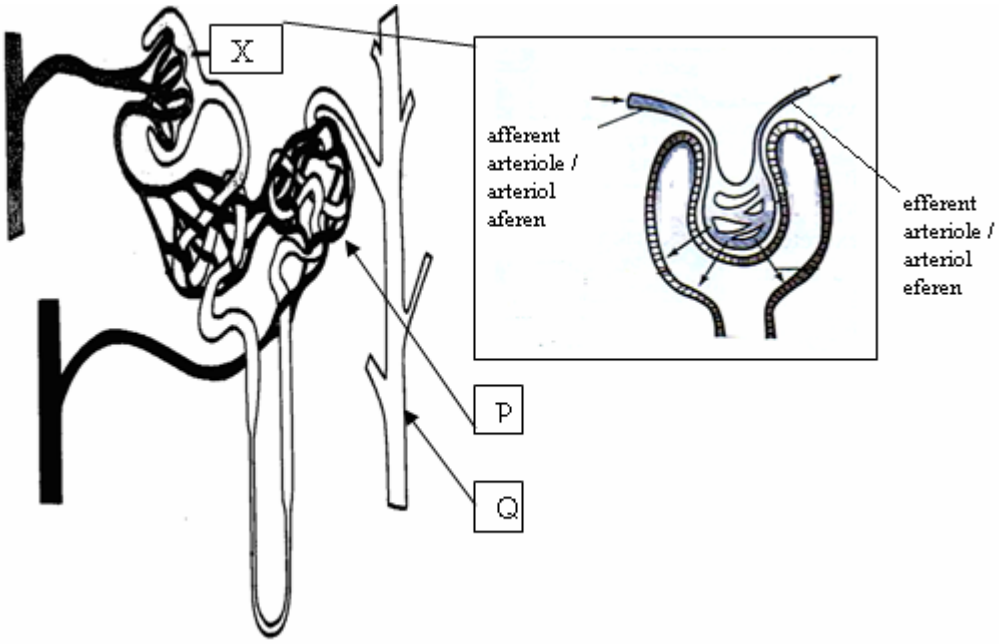


Diagram 8.1
Rajah 8.1

(a) Explain the process that occurs in the region labelled X.
Terangkan proses yang berlaku pada bahagian yang berlabel X.

[4 marks]
[4 markah]

(b) Explain the process that occurs in P and Q in osmoregulation of blood osmotic pressure.
Terangkan proses yang berlaku di P dan Q dalam pengosmokawalaturan tekanan osmosis darah.

[6 marks]
[6 markah]

(c) (i) Homeostasis occurs through a negative feedback mechanism. State the importance of homeostasis.
Homeostasis berlaku melalui mekanisma suapbalik negative. Nyatakan kepentingan homeostasis.

[2 marks]
[2 markah]

(ii) Diagram 8.2 shows the negative feedback mechanism involved in regulation of blood glucose concentration in human.

Rajah 8.2 menunjukkan mekanisme suap balik negative yang terlibat dalam pengawalaturan kepekatan glukosa darah manusia.

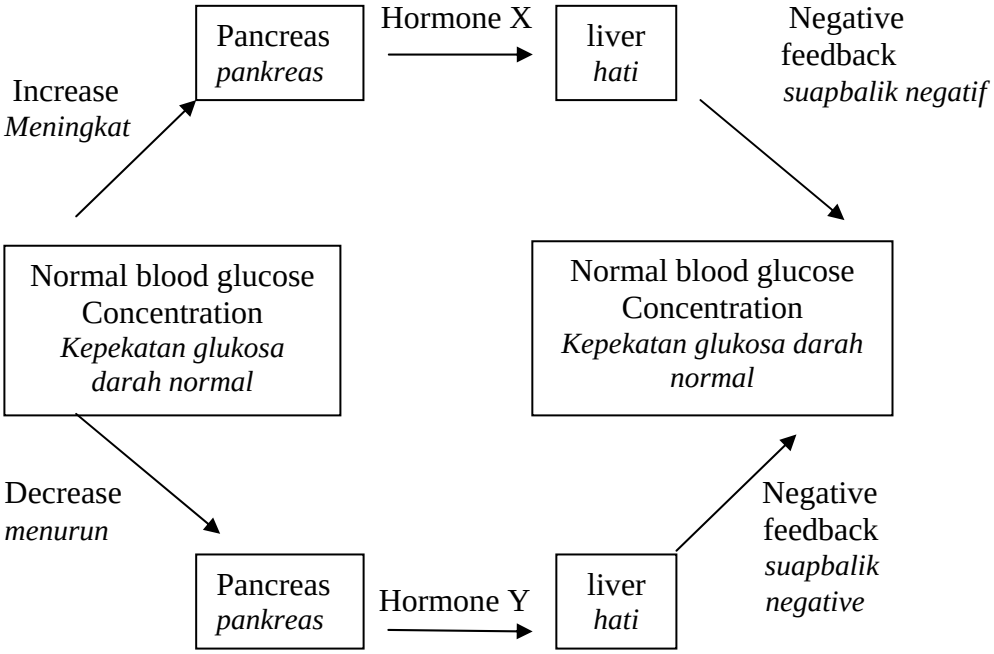


Diagram 8.2
Rajah 8.2

Explain how hormone X and Y regulate the blood glucose level in human.

Terangkan bagaimana hormone X dan Y mengawalatur aras glukosa darah dalam manusia.

[8 marks]
[8 markah]

9. Diagram 9.1 shows the blood group of a married couple and their offspring. The couple has three boys and one girl but all of them have different types of blood group.

Rajah 9.1 menunjukkan jenis kumpulan darah bagi satu keluarga. Pasangan tersebut mempunyai tiga anak lelaki dan seorang anak perempuan dengan kumpulan darah yang berbeza.

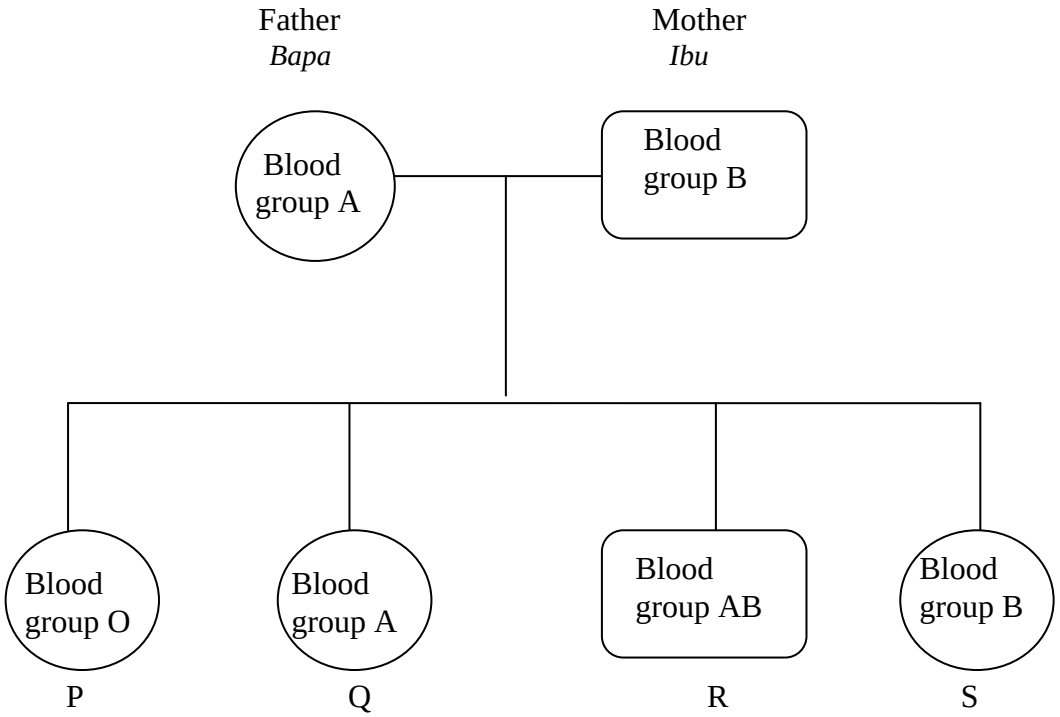


Diagram 9.1
Rajah 9.1

a) Based on Mendel's First Law , with the help of Punnet square schematic diagram , explain why the blood of each member in the family is different.

Berdasarkan Hukum Mendel yang pertama dan dengan bantuan rajah segiempat Punnet, terangkan kenapa setiap ahli dalam keluarga tersebut mempunyai jenis darah yang berbeza.

[8 marks]
[8 markah]

(b) Hereditary diseases are diseases that can be transmitted from parents to their offspring. Haemophilia is a hereditary sex-linked disease . Diagram 9.2 below shows the pedigree of a family in three generation.
Penyakit genetik adalah penyakit yang diwarisi daripada ibubapa. Hemofilia adalah sejenis penyakit terangkai seks. Rajah 9.2 di bawah menunjukkan gambarajah pokok satu keluarga bagi tiga generasi.
.

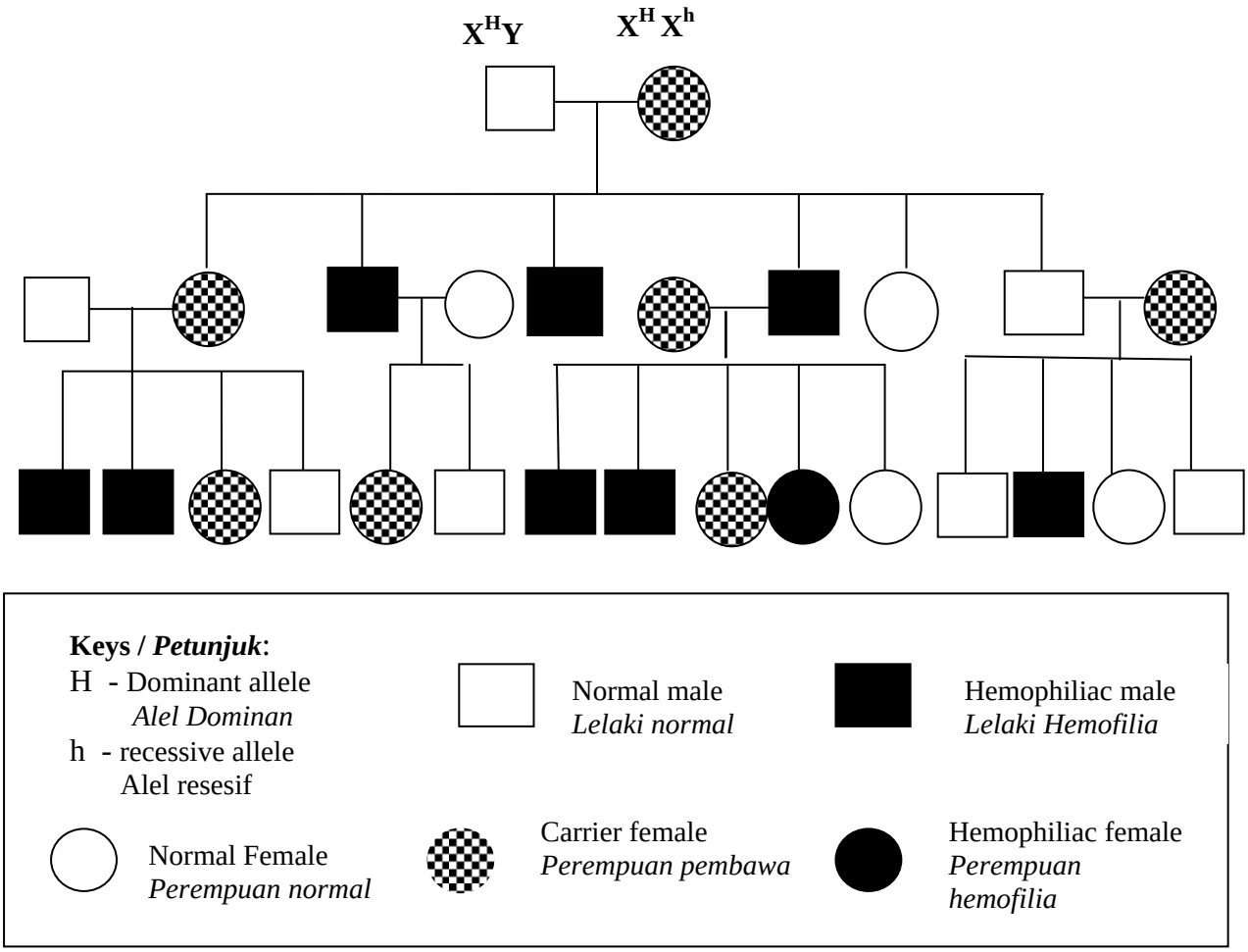


Diagram 9.2
Rajah 9.2

(i) What is the sex-linked disease ? [2 marks]
Apakah penyakit terangkai seks? *[2 markah]*

(ii) From the diagram given, more males are affected with the disease compared to females. Explain why it usually affects males more than females
Berdasarkan rajah yang diberi, lebih ramai lelaki yang mendapat penyakit hemofilia berbanding perempuan. Terangkan kenapa penyakit ini selalunya terdapat pada lelaki lebih daripada perempuan .

[8 marks]
[8 markah]

(iii) Explain how the inheritance of the disease can be avoided.
Terangkan bagaimana untuk mengelakkan penyakit ini daripada diwarisi.

[2 marks]
[2 markah]

Name:……. Form : ……..

PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA
SEKOLAH MENENGAH
NEGERI KEDAH DARUL AMAN

PEPERIKSAAN PERCUBAAN SPM 2009 4551/3

BIOLOGY
Kertas 3
September
1 ½ jam **Satu jam tiga puluh minit**

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Tuliskan* **nama** *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 arahan di halaman 2*

Soalan	Markah Penuh	Markah Diperoleh
1	33	
2	Respons 17	
Jumlah		

MAKLUMAT UNTUK CALON

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

2. Answer all questions. Write your answers for **Question 1** in the spaces provided in this question paper.
Jawab semua soalan .Tulis jawapan anda bagi ***Soalan 1*** *pada ruangyang disediakan dalam kertas soalan ini.*

3. Write your answer for **Question 2** on the answer sheets provided.You may used equations, diagrams, tables, graphs, and other suitable methods to explain your answers
Tuliskan jawapan bagi ***Soalan 2*** *pada kertas jawapan yang disediakan. Anda boleh menggunakan persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda.*

4. Show your working, it may help you to get marks.
Tunjukkan kerja mengira, ini membantu anda mendapatkan markah.

5. If you wish to change your answers, cross out the answers that you have done. Then write down the new answers
Sekiranya anda hendak membatalkan sesuatu jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.

6. You are advised to spend 45 minutes to answer **Question 1** and 45 minutes for **Question 2**
Masa yang dicadangkan untuk menjawab **Soalan 1** *ialah* 45 *minit dan* **Soalan 2** *ialah* 45 *minit.*

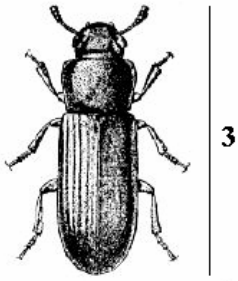
Pemberian markah :

Skor	**Penerangan**
3	**Cemerlang :** Respons yang paling baik
2	**Memuaskan :** Respons yang sederhana
1	**Lemah :** Respons yang kurang tepat
0	Respons salah atau tiada memberi respons

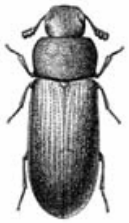
Answer **all** questions
*Jawab **semua** soalan*

1. Flour beetles are the most abundant and injurious insect pest in flour industry. Badly infested flour is characterized by a sharp odour and moldy flavour.
Tribolium confusum and *Tribolium castaneum* are two different species of flour beetle.
An experiment was carried out to investigate the effect of interspecific competition on the size of the population of *Tribolium confusum*

Bubuk tepung adalah serangga perosak yang paling banyak mendatangkan kerugian dalam industri tepung. Tepung yang terjejas selalunya berbau hapak .
Tribolium confusum dan Tribolium castaneum adalah dua jenis bubuk tepung yang berlainan spesies. Satu eksperimen telah dijalankan untuk menyiasat kesan persaingan interspesifik terhadap saiz populasi Tribolium confusum



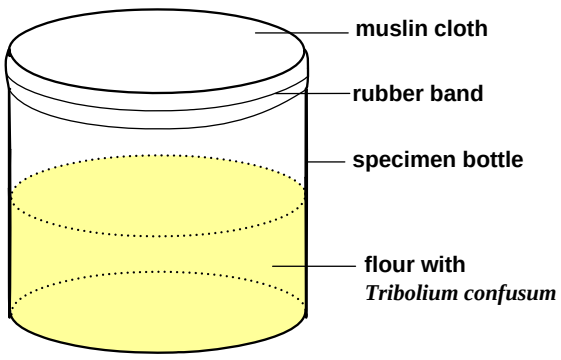
Tribolium confusum



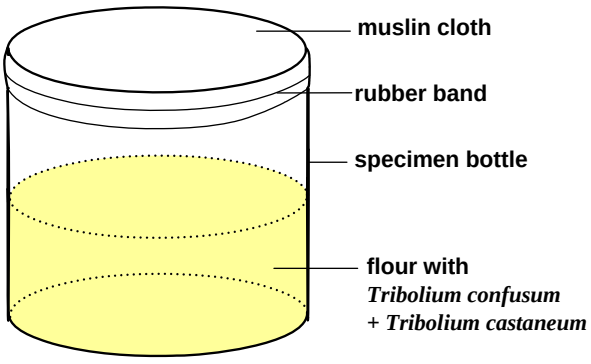
Tribolium castaneum

In the investigation, two set of experiments has been set up.
Set A used a specimen bottle, filled in with 200 ml of flour and 10 beetles (*Tribolium confusum*).
Set B used a specimen bottle, filled in with 200 ml of flour and 10 beetles of each species. (*Tribolium confusum* and *Tribolium castaneum*)
The number of male and female beetles in the two bottles are the same.

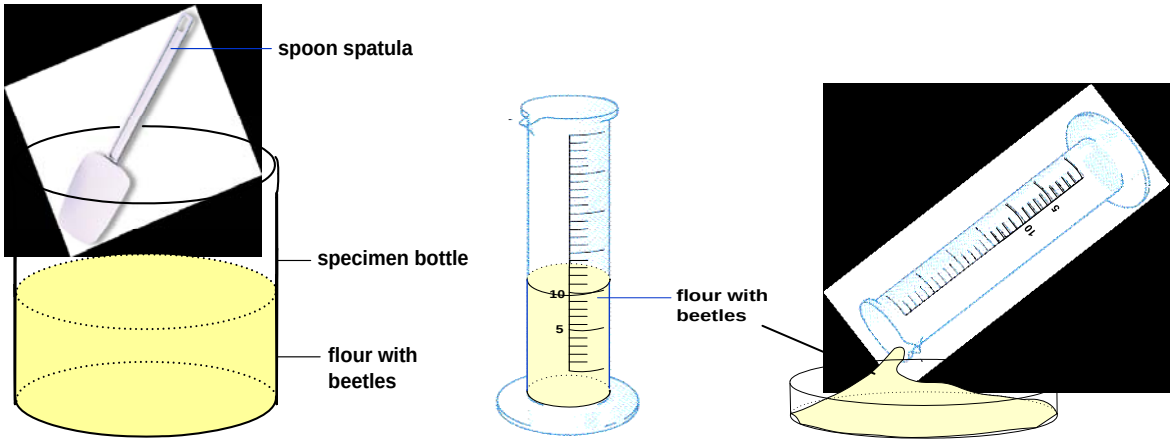
Dalam penyiasatan itu, dua set eksperimen telah disediakan.
Set A menggunakan satu botol spesimen, diisi dengan 200 ml tepung dan 10 bubuk tepung (Tribolium confuusm)
Set B menggunakan satu botol spesimen, diisi dengan 200 ml tepung dan 10 bubuk tepung dari setiap spesies (Tribolium confusum dan Tribolium castaneum)
Bilangan bubuk tepung jantan dan betina adalah sama dalam kedua-dua botol spesimen



Set A



Set B



The bottles was left at room temperature for two weeks. After two weeks, the number of each species of beetle was determined by the following procedure;

i. Scoop 10 ml of the flour with beetles using a spoon spatula into a measuring cylinder.
ii. Pour the flour with beetles from the measuring cylinder into a petri dish.
iii. Count the number of each species of the beetles in the flour.
iv. Use the following formula to estimate the size of the population of each species of the beetle in the bottle.

$$\text{size of the population} = \frac{\text{200 x number of beetles in the flour}}{\text{10}}$$

v. Pour the flour and the beetles from the petri dish back to the bottle and tie it closely.
vi. The bottles was kept at room temperature for another 2 weeks.
vii. Step (i – vi) is repeated for 10 weeks.
ix. The result are recorded in Table 1.

Botol spesimen disimpan dalam suhu bilik selama dua minggu. Selepas dua minggu, bilangan bubuk tepung bagi setiap spesies ditentukan dengan menggunakan prosedur berikut;

i. Ceduk 10 ml tepung yang mengandungi bubuk dengan menggunakan spatula dan masukkannya ke dalam satu selinder penyukat
ii. Tuangkan tepung yang mengandungi bubuk ke dalam satu piring peti.
iii. Hitung bilangan bubuk bagi setiap jenis spesies yang terdapat dalam tepung.
iv. Gunakan formula berikut untuk menganggarkan jumlah populasi bagi setiap jenis spesies bubuk.

$$\text{saiz populasi} = \frac{\text{200 x bilangan bubuk dalam tepung}}{\text{10}}$$

v. Tuangkan kembali semua bubuk bersamaan tepung ke dalam botol spesimen.
vi. Botol itu disimpan dalam suhu bilik selama 2 minggu.
vii. Langkah (i – vi) diulang dalam tempoh 10 minggu
viii. Catatkan keputusan dalam Jadual 1.

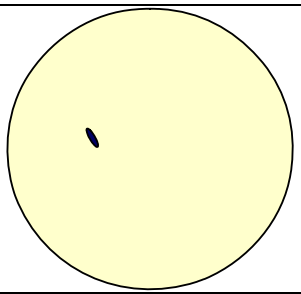
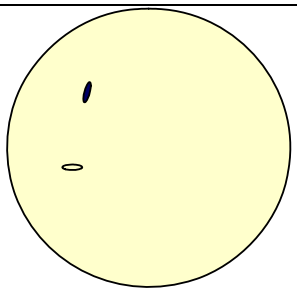
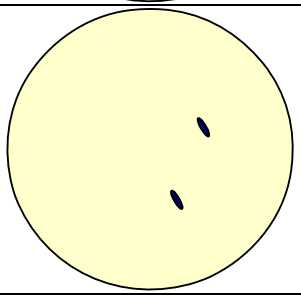
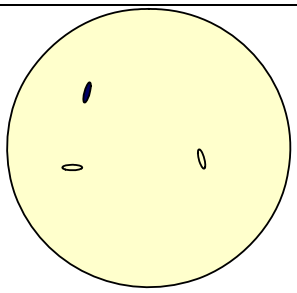
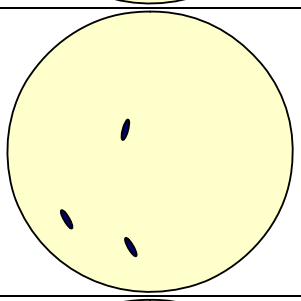
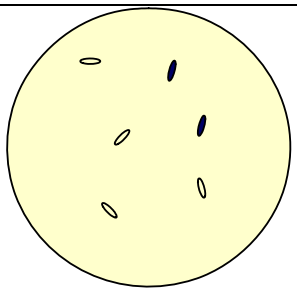
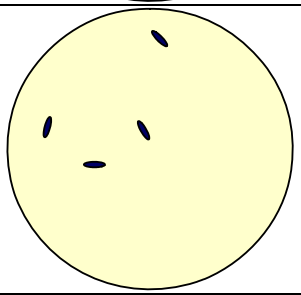
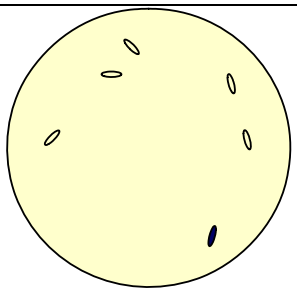
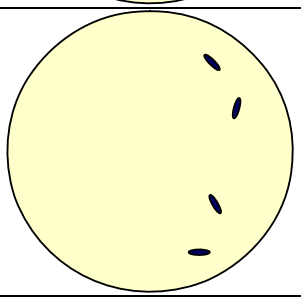
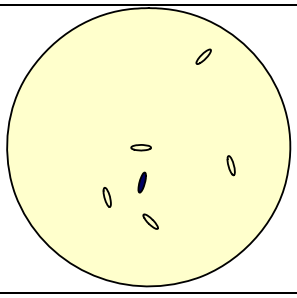
	Set A		Set B		
Week	Petri Dish	Number of *Tribolium confusum* in Petri dish	Petri Dish	Number of *Tribolium confusum* in Petri dish	Number of *Tribolium castaneum* in Petri dish
2		.....		.....	.....
4		.....		.....	.....
6		.....		.....	.....
8		.....		.....	.....
10		.....		.....	.....

Table 1 / *Jadual 1*

Keys : *Tribolium confusum*
Tribolium castaneum

(a) Record the number of each species of the beetle in Table 1.
Catatkan bilangan bubuk bagi setiap spesies dalam Jadual 1.

[3 marks / *markah*]

(b) (i) State two different observations on the number of *Tribolium confusum* made from Table 1.
Nyatakan dua pemerhatian yang berbeza ke atas bilangan Tribolium confusum yang dibuat daripada Jadual 1.

Observation 1 / *Pemerhatian 1 :*

……

……..……..

……

Observation 2 / *Pemerhatian 2 :*

……

……

……

[3 marks / *markah*]

(ii) State the inference from the observations in 1(b)(i).
Nyatakan inferens daripada pemerhatian di 1(b)(i).

Inference 1 / *Inferens 1 :*

.....

.....

.....

Inference 2 / *Inferens 2 :*

.....

.....

.....

[3 marks / *markah*]

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

Variable *Pembolehubah*	Method to handle the variable *Cara mengendalikan pembolehubah*
Manipulated Variable *Pembolehubah dimanipulasikan* ……. ……. …….	 …… …… ……
Responding variable *Pembolehubah bergerak balas* ……. ……. …….	 …… …… ……
Constant variable *Pembolehubah dimalarkan* ……. ……. …….	 …… …… ……

Table 2 / *Jadual 2*

[3 marks / *markah*]

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

…….

…….

…….

[3 marks / *markah*]

(e) (i) Construct a table and record all the data collected in this experiment.
Bina satu jadual dan rekodkan semua data yang dikumpul dalam eksperimen ini.

Your table should have the following aspects :
Jadual anda hendaklah mengandungi aspek-aspek berikut:

- Week of the experiment
  Minggu eksperimen
- Number of each species of the beetles in the Petri dish of Set A and Set B.
  Bilangan bubuk tepung bagi setiap spesies dalam piring Petri Set A dan Set B.
- The population of each species of the beetles in Set A and Set B
  Jumlah populasi bagi setiap spesies dalam Set A dan Set B.

[3 marks / *markah*]

(ii) Use the data in 1(e)(i) and on the same piece of graph paper, plot the graphs to show the changes of the population of each species of beetles in 10 weeks.
Gunakan data dalam 1(e)(i) dan di atas kertas graf yang yang sama, plotkan graf bagi menunjukkan perubahan populasi bagi setiap spesies bubuk dalam masa 10 minggu.

[3 marks / *markah*]

(f) Based on the graphs in 1(e)(ii), explain the relationship between the presence of *Tribolium castaneum* and the changes of population of *Tribolium confusum* in Set A and Set B.
Berdasarkan graf di 1(e)(ii), terangkan hubungan antara kehadiran Tribolium castaneum dengan perubahan populasi Tribolium confusum dalam Set A dan Set B.

……

……

……
[3 marks / *markah*]

(g) Based on the results of this experiment, what can be deduced about interspecific competition?
Berdasarkan keputusan eksperimen ini, apa yang dapat dirumuskan tentang persaingan interspesifik?

……

……

……
[3 marks / *markah*]

(h) The experiment is repeated by a group of students in rainy season, based on the results of this experiment, predict the changes of the population of *Tribolium confusum* in Set A
Explain your prediction.

Eksperimen ini diulangi oleh sekumpulan pelajar dalam musim hujan, berdasarkan keputusan eksperimen ini, ramalkan perubahan populasi Tribolium confusum dalam Set A.
Terangkan ramalan anda.

……

……

……

……
[3 marks / *markah*]

(i) The following are the factors affecting the growth rate of *Tribolium confusum.*
Berikut ialah faktor-faktor yang dapat mempengaruhi kadar pertumbuhan Tribolium confusum.

poor ventilation, good ventilation, low temperature, high temperature, low light intensity, strong light intensity. *pengudaraan lemah, pengudaraan baik, suhu rendah, suhu tinggi, keamatan cahaya rendah, keamatan cahaya kuat.*

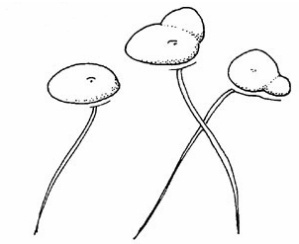
Classify these factors in Table 3.
Klasifikasikan faktor-faktor ini dalam Jadual 3.

Increase the growth rate of flour beetle. *Meningkatkan kadar pertumbuhan bubuk tepung*	Decrease the growth rate of flour beetle. *Mengurangkan kadar pertumbuhan bubuk tepung*

[3 marks / *markah*]

2 The population distribution of an organism is influenced by the changes in the abiotic factors. Abiotic factors refer to the non-living components of an ecosystem which include pH, temperature, light intensity, humidity, topography and climate.
Penyebaran populasi organism dipengaruhi oleh perubahan faktor-faktor abiotik. Faktor abiotik merujuk kepada komponen bukan benda hidup seperti pH, suhu, keamatan cahaya, kelembapan, topografi dan cuaca.

Lemna minor float freely on the surface of the water , receive sunlight directly and grow best in a neutral environment, so it reproduce rapidly by vegetative propagation and spread to cover a large area of the water surface.
Lemna minor terapung bebas di atas permukaan air, menerima cahaya matahari secara terus dan hidup subur dalam persekitaran yang neutral, maka ia membiak cepat melalui pembiakan vegetatif dan tersebar luas di atas permukaan air.



Based on the above information, design an experiment to study the effect of pH on the population growth rate of *Lemna minor* in the laboratory.
Your experimental planning should include the following aspects.
Berdasarkan maklumat di atas, rancangkan satu eksperimen untuk mengkaji kesan perubahan pH ke atas kadar populasi tumbesaran Lemna minor di dalam makmal. Perancangan eksperimen anda hendaklah merangkumi aspek-aspek berikut.

- Problem statement
  Penyataan masalah
- Aim
  Tujuan
- Hypothesis
  Hipotesis
- Variables
  Pembolehubah
- Lists of material and apparatus
  Senarai alat dan radas
- Technique
  Teknik
- Procedure
  Prosedur
- Presentation of data
  Persembahan data
- Conclusion
  Kesimpulan

END OF QUESTION PAPER

Biology
Paper 1
Sept
2009
1¼ jam

PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA
SEKOLAH MENENGAH
NEGERI KEDAH DARUL AMAN

PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2009

BIOLOGY
PAPER 1 / 2 / 3

SKEMA JAWAPAN

Marking Scheme **Peperiksaan Percubaan SPM (PKPSM - Kedah) 2009**

Biology 1

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

	BIOLOGY SECTION A PAPER 2 [4551/2]		
No.	Marking Scheme	Mark	
1(a) (i)	10°C , 60°C, 40°C	1+1+1	3
(ii)	At 10°C: (The amount of stain left is the most) F: The rate of enzymatic activity is low / lowest P: enzyme is not active at low temperature. At 40°C: (The amount of stain left is zero / no more stain left) F: The rate of enzymatic activity is the highest P: 40°C is the optimum temperature for enzymatic activity.	 1 1 1 1	 2 2
(b)	Lipase	1	1
(c)	***Able to list name and the uses of enzymes*** Sample answers: Name of enzyme :Protease The uses : to tenderize skin and remove hair in the leather – making industries Name of enzymes : Lipase The uses : to break down milk fat in cheese-making Or other enzymes that suitable.	 1 1 1 1	 2 2
		Total	12

No.	Marking Scheme	Mark	
2(a)	Mesophyll palisade Guard cell	1 1	 2
(b)	L//mesophyll palisade	1	1
(c) (i)	F1 – Light reaction P1 – chlorophyll absorbs/traps sungliht/light energy to produce ATP and electrons P2 – Photolysis of water produce H and OH ions P3 – Hydrogen ion combines with electron to form hydrogen atom	1 1 1 1 Any 3	 Max 3
(ii)	Light intensity Temperature	1 1	 2
(iii)	Factor 1 - At constant temperature, - Rate of photosynthesis/light reaction increases when the light intensity increases (up to a point) - Further increase in light intensity, the rate of photosynthesis does not increase/is constant - Temperturature becomes the limiting factor	 1 1 1 1 Any 2	 Max 2
	Factor 2 - At constant concentration of light intensity - An increase in temperature increases the rate of photosynthesis - With further increase in temperature after 40^0 C, the rate of photosynthesis decreases - This is because the enzymes are denatured	 1 1 1 1 Any 2	 Max 2
		Total	12

No.	Marking Scheme	Mark	
3 (a)	***Able to name muscle S and T***		
	S – Biceps	1	
	T - Triceps	1	2
(b)(i)	***Able to explain the role of S and T to strainghten the arm.***	1	
	Triceps contract	1	2
	Biceps relax		
(ii)	***Able to explain why S and T need blood supply to function efficiently.***		
	Muscle contraction require energy.	1	
	blood supply oxygen and glucose to the muscle cells to produce energy.	1	2
(c) (i)	***Able to state the function of R***		
	Connect muscle to bone	1	
	Able to state the physical caracteristic of R.		
	strong	1	
	inelastic	1	
	Able to state what will happend if R torn of?		
	the person cannot bend his or her arm	1	4
(d) (i)	***Able to name the disease.***		
	Arthritis	1	1
(ii)	***Able to state the cause of the disease.***		
	degeneration of the synovial membrane,the bones and cartilage at the joints because of excessive wear and tear.	1	
	ageing factor	1 Any 1	1
		Total	12

No.	Marking Scheme	Mark	
4 (a)(i)	Discontinuous variation Continuous variation	1 1	2
(b)	Differences in body height are not clear / distinctive but differences in fingerprints are clear and distinctive Body height is controlled by environmental and genetic factors but finger prints are controlled by genetic factors only Graph for body height shows normal distribution but graph for finger prints shows discrete distribution Body height shows intermediate characters but type of finger prints do not show intermediate characters Body height is controlled by many pairs of alleles but finger prints is controlled by a pair of alleles Body height is a quantitative character (can be measured and graded from one extreme to the other) but type of finger prints is a qualitative character (they cannot be measured or graded from one extreme to the other)	2 2 2 2 2 2 **Any 2**	Max 4
(c)	Some individuals adapt better to environment condition These individuals are better adapted for survival//they can transmit the advantageous genes to their offspring//camouflage from their predator	1 1	2
(d) (i) (ii)	P: Deletion Q: Duplication Mutation that occurs in a somatic cell (e.g. bone marrow of liver) may damage the cells This makes the cell cancerous// kill the cell	1 1 1 1	2 2
		Total	12

No.	Marking Scheme	Mark	
5 (a) (i)	***Able to name structure x*** Placenta	1	1
(ii)	***Able to explain two functions of structure x*** F1 : Forms a selective barrier between the mother's blood and the foetal blood. P1 : Allows exchange of some substances between the mother's blood and the foetal blood for example oxygen and nutrients/amino acids/ glucose/ lipids / vitamins. P2: Help to remove waste products / carbon dioxide, nitrogenous waste products/ urea,of the foetus [1F + P1/P2] F2 : The bloods of the mother and the foetus do not mix/ are separated P1 : protect the foetus from the higher pressure of the mother's blood, which could damage the delicate foetal blood vessels. P2: prevent certain toxic substances/ pathogen in the mother's blood from entering the foetal blood. [1F + P1/P2] F3 : The placenta secretes hormones that are essential in pregnancy P1 : secretes hormones progesterone and oestrogen for maintaining the thickness of the endometrium. [1F + P1] F4 : Give protection to the foetus P1 : Antibodies are passed from the mother to the foetus P2 : Allows embryo to attach to the uterine wall [1F + P1/P2]	1 1 1 1 1 1 1 1 1 1 1	Max 2

No.	Marking Scheme	Mark	
5(b)	• Umbilical artery carry deoxygenated blood/ carbon dioxide/ nitrogenous waste product/urea from the foetus to the placenta • Umbilical vein carry oxygenated blood/ oxygen/ nutrients/ mineral salts, glucose/ amino acids/lipids/ vitamin from placenta to the foetus	1 1	2
(c) (i) (ii)	• This condition is known as erythroblastosis fetalis. • The foetus may suffer from severe anaemia/ jaundice/ damage to the heart/ liver /brain /may die. • A mother will be given an injection of anti-Rhesus antibodies after the first child is born • to destroy and prevent the formation of the anti-Rh antibodies in her future pregnancies.	1 1 1 1 Any 1	2 Max 1 **Total 10**
(d)	***Able to explain why she should not smoking*** F1 : chemical such as nicotine from cigarette smoke can diffuse through placenta to the foetus P1 : the growth of foetus will be retarded/ decrease F2 : Carbon dioxide can diffuse through placenta. P2 : body tissue will lack of oxygen and reduce its growth / miscarriage. [any 1F + 1P]	 1 1 1 1	 Max 2
		Total	12

		BIOLOGY SECTION B PAPER 2 [4551/2]		
No	Section	Description/explanation	Marks	
6	a. i.	***Student is able to explain how during vigorous activity the body regulates the content of carbon dioxide in the blood*** **Sample answer:** P1- During vigorous activity, the concentration / the partial pressure of carbon dioxide increases as a result of active cellular respiration P2- the carbon dioxide react with water to form carbonic acid which results in a drop in the pH level of the blood and tissue fluid that bathing the brain P3- The drop in pH is detected by the central chemoreceptors in the medulla oblongata P4- and detected by peripheral chemoreceptors (carotid bodies and aortic bodies) P5-The central chemoreceptors and pheripheral receptors send nerve impulses to the respiratory centre in the medulla oblongata P6- The respiratory centre sends nerve impulses to the diaphragm and the intercostal muscles, causing the respiratory muscle to contract and relax faster P7- As a result, the breathing and ventilation rate increase causes more oxygen inhaled and the oxygen concentration return to the normal level P8- As excess carbon dioxide is eliminated from the body, the carbon dioxide concentration and pH value of the blood return to normal level	1 1 1 1 1 1 1 1	8
		Students are able to explain why the pulse rate takes several minute to return normal **Sample answer:** P1- After vigorous activity, the pulse rate takes several minutes to return to normal because during the activity the oxygen intake is not able to meet the oxygen demand of the body. P2- Respiration has to take place anaerobically /anaerobic respiration occur P3- As a result, lactic acid accumulates in the muscle. P4- So more oxygen is needed to oxidize the lactic acid and to provide the energy for the recovery of the Muscle	1 1 1 1	4

		Students are able to explain the aerobic and anaerobic respiration F1-Anaerobic respiration process involves the breaks down of glucose in the absence of oxygen or in a limited supply of oxygen to release energy P1-Oxidation of glucose is incomplete which 2 molecules of ATP are produced P2-The by-products are ethanol and energy P3-Take place in the cytoplasm F2-Teresterial Plant respires aerobically. P4- Aerobic respiration process involves the oxidation of glucose in the presence of oxygen to release energy P5- In situation of waterlogged condition // less amount of dissolve oxygen P6- The root of terrestrial plant respires anaerobically P7-Terrestrial plant unable to carry out anaerobic respiration for a long term which result the plant die / wilt.	1 1 1 1 1 1 1 1 1	8
		Total		20

7	a	The diagram shows a saprophytic fungus. It obtain its nutrient by secreting digestive enzymes onto the substrate The enzymes digest the complex substances into simple forms. The simple forms are then absorbed by hypha.	1 1 1 1	4
	b	F1- In the month of January until April, the increase in the prey's is followed by an increase in predator population P1 - due to abundance of food F2 - However from April to August, when the number of predator increases the number of preys will then decrease P1 - This is because the high number of predators will easily consume the prey. P2 - When the prey reduces, the predators will have less to eat. P3 - There is intraspesific competition. F3 - The number of predators also reduces in the following months from August to December. P1 - The prey - predator relationship takes place in cycle. F4 - This keeps the population of both organisms in a dynamic equilibrium	1 1 1 1 1 1 1 1 1	Max 6

	c.	F1 – To build proteins, plants need the element nitrogen. P1 - The nitrogen gas in the atmosphere is about 78% P2 - but plants are not able to utilize this nitrogen P3 - The nitrogen has to be fixed before it can be absorbed by the plants. F2 - Nitrogen fixing bacteria / *Noctoc sp* / *Azotobacter* / bacteria A which lives freely in the soil and *Rhizobium sp* / bacteria B which lives in the root nodule of Leguminous plant P1 - can convert nitrogen in the atmosphere into ammonia F3 - *Nitrosomonas* / bacteria C oxidizes/ converted ammonia into nitrites. F4 - *Nitrobacter* oxidizes / converted nitrites into nitrates P1 - Nitrites and Nitrate can be absorbed by plants as their nitrogen source. P2 - The plants protein is transferred to the animals when consumed by the animals. F5 - The animals and plants proteins are transferred to human when consumed.	1 1 1 1 1 1 1 1 1 1 1	Max 10
			Total	20

8	a.	P1 - Blood from the renal artery enters the glomerulus through the afferent arteriole and out through the efferent arteriole. P2 - The diameter of afferent arteriole is bigger than the diameter of the efferent arteriole causing a high hydrostatic pressure in the glomerulus. P3 - The fluid and solute in the glomerulus is filtered out through the capillary wall into the lumen of the Bowman's capsule. P4 - The glomerular filtrate has the same composition as the plasma except that it does not contain any of the larger component such as red blood cell and plasma proteins. P5 - The process of filtration produced as a result of this pressure is known as ultrafiltration.	1 1 1 1 1	Max 4
	b.	P1- When the osmotic pressure of blood is lower than usual, the osmoreceptor cells in the hypothalamus are less stimulated/ the pituitary gland is less stimulated, less ADH is secreted. P2- (A lower level of ADH) causes the structure P/ distal convoluted tubule and structure Q/ collecting duct to become impermeable to water . P3 - Less water is reabsorbed(from the filtrate into the blood). P4 - The blood osmotic pressure rises / return to normal range.	1 1 1 1	Max 3
		P5 - When the osmotic pressure of blood is higher than usual the osmoreceptor cells in the hypothalamus are stimulated /the pituitary gland is stimulated, more ADH is secreted. P6 - (A higher level of ADH) causes the distal convoluted tubule and collecting duct to become more permeable to water . P7 - More water is reabsorbed(from the filtrate into the blood). P8 - The blood osmotic pressure drops / return to normal range.	1 1 1 1	Max 3

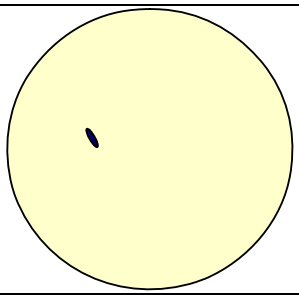
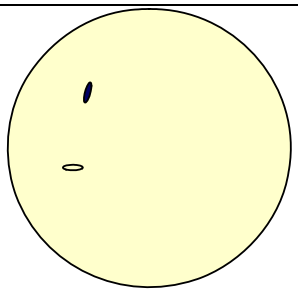
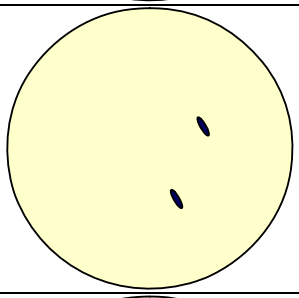
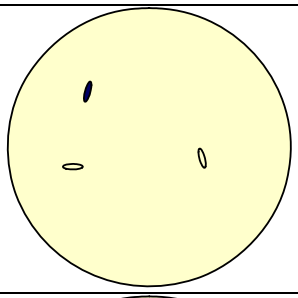
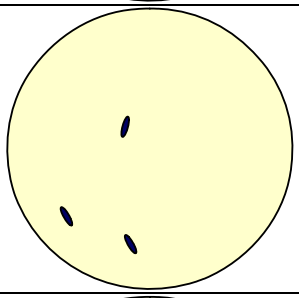
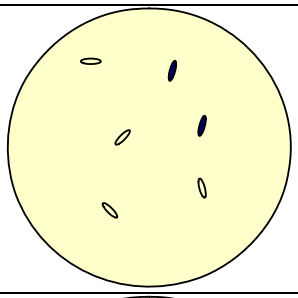
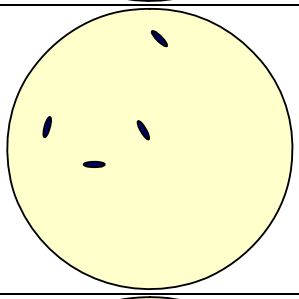
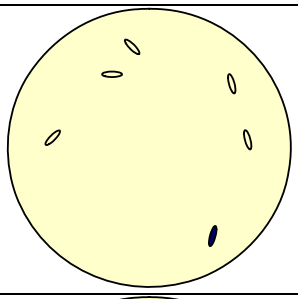
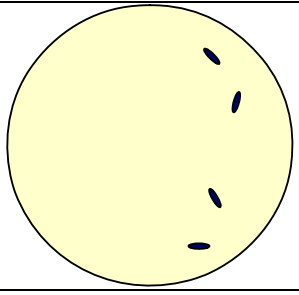
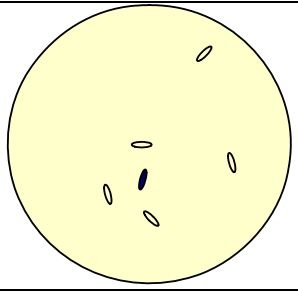
	c. i.	The regulation of the physical and chemical factors in the internal environment to maintain a constant internal environment for the survival of human.	1	1
		Physiological processes in the body can proceed at optimum rates in order to promote harmonious growth and development Enzymatic and other metabolic processes and reactions in the body will not be able to function normally without homeostasis.	1 1	Any 1
	ii	P1 - When the level of glucose in blood increases, beta cell from islet of langerhans/ langerhans cells in the pancrease are stimulated. P2 - Insulin / Hormone X is produced and secreted into the bloodstream. P3 - Hormone X is carried in the blood by hepatic portal vein to the liver. P4 - In the liver, hormone X /insulin converts the excess glucose in the blood to glycogen. P5 - In liver cells, the excess glucose in the blood will be converted to lipids P6 - This causes the level of glucose to decrease and return to normal.	1 1 1 1 1 1	Max 4
	iii.	P1 – When the level of glucose in blood decreases, alpha cell from islet of langerhans/ langerhans cells in the pancrease are stimulated. P2 – Glucagon/ Hormone Y is produced and secreted into the bloodstream. P3 – Hormone Y is carried in the blood by hepatic portal vein to the liver. P4 – In the liver, hormone Y / glucagon converts the stored glycogen in the liver to glucose. P5 - Glucagon also increases the conversion of amino acids and fatty acids in the liver cells to glucose P6 - This causes the level of glucose to rise and return to normal.	1 1 1 1 1 1	Max 4
			Total	20

9	a.	***Able to state alleles that determine the ABO blood group*** **Sample answer** 1. The ABO blood is controlled by three alleles $I^{A,}$ I^{B} and I^{O} 2. Allele I^{A} and I^{B} are dominant to allele I^{O} which is recessive. 3. Allele I^{A} and I^{B} are codominant and can be expressed equally in the phenotype of the heterozygous offspring.	 1 1 1	 Any 2
		Able to state the genotype of the parents ***Able to show the formation of gamete during meiosis using a schematic diagram.*** ***Able to explain why the blood group type is different for each member in the family*** **Sample answer** Parents Father X Mother Phenotype Blood Group A Blood group B Genotype $I^{A}I^{O}$ $I^{B}I^{O}$ Meiosis Gamete I^{A} I^{O} I^{B} I^{O} Random fertilization Offspring Genotype $I^{A}I^{B}$ $I^{A}I^{O}$ $I^{O}I^{B}$ $I^{O}I^{O}$ Phenotype: blood AB: blood B : blood A : blood O Phenotype ratio : 1: 1 : 1 : 1 Every children in this family has 25% chances of getting different blood group.	 1 1 1 1 1 1 1	 Max 6
	b. i.	***Able to give the meaning of sex-linked diseases.*** **Sample answer** 1. Sex linked disease is a hereditary disease transmitted from parents to the offspring. 2. Caused by recessive allele found on sex chromosome X	 1 1	 2

		Able to explain why the disease usually affected male than female **Sample answer** 1. Hemophilia is caused by recessive allele carried by X chromosome only. 2. Normal dominant gene on X chromosome represent by X^H // Recessive gene on X chromosome represent by X^h 3. Male is homozygous, receiving only one X chromosome from their mother. 4. Female receives X chromosomes both from their parents. 5. Male has only one allele to control the production of clotting factor but female has a pair of allele for the gene that control the production of clotting factor. 6. Female maybe homozygous dominant / $X^H X^H$ or heterozygous / $X^H X^h$ for blood clotting 7. Female with heterozygous/ $X^H X^h$ for blood clotting is a carrier for the disease. 8. A carrier does not show the symptom nor do suffer the disease but can transmits the disease to the next generation. 9. A female can only have the disease if she is homozygous recessive / $X^h X^h$ 10. Male with dominant allele on X chromosome / $X^H Y$ is a normal person. 11. Male with recessive allele on X chromosome / X^h Y will get the disease. 12. Therefore male is more likely to get the disease compared to female 13. Because male has only one X chromosome and the recessive allele for hemophilia is linked to the sex chromosome X.	1 1 1 1 1 1 1 1 1 1 1 1 1	Max 8
	b. ii	***Able to give state how the diseases can be avoided*** 1. Inheritance of hemophilia can be prevented by avoiding marriage of the cousin / close relatives who are carriers through a few generation. 2. Inheritance of hemophilia also can be prevented by avoiding mariage with the carrier female. 3. Inheritance of hemophilia also can be prevented by avoiding mariage with the person that has the disease. 2. So that the recessive gene will disappear	1 1 1 1	Max 2
			Total	20

j2kk

1 (a)

	Set A		Set B		
Week	Petri Dish	Number of *Tribolium confusum* in Petri dish	Petri Dish	Number of *Tribolium confusum* in Petri dish	Number of *Tribolium castaneum* in Petri dish
2		1		1	1
4		2		1	2
6		3		2	4
8		4		1	5
10		4		1	5

Score 3 : 15 ticks
Score 2 : 10 – 14 ticks
Score 1 : 5 – 9 ticks
Score 0 : 0 – 4 ticks

j2kk

QUESTION	SCORE	MARK SCHEME	NOTE
1 (b) (i)		**KB0601 – Observation**	
	3	Able to state two different observations correctly [Observations must have values for Set A and Set B] Sample Answers : *Horizontal:* 1. In Week 4, the number of *Tribolium* confusum in the Petri dish of Set A is 2, the number of *Tribolium confusum* in the Petri dish of Set B is 1. 2. In Week 8, the number of *Tribolium* confusum in the Petri dish of Set A is 4, the number of *Tribolium confusum* in the Petri dish of Set B is 1. *Vertical:* 3. In Week 8, the number of *Tribolium* confusum in the Petri dish of Set A is more than the number of *Tribolium confusum* in the Petri dish of Set B.	
	2	Able to state two different observations inaccurately. [State the value for Set A or Set B only] Sample Answers : 1. In Week 4, the number of *Tribolium* confusum in the Petri dish of Set A is 2. 2. In Week 8, the number of *Tribolium* confusum in the Petri dish of Set B is 1.	
	1	Able to state two different observations at idea level. Sample Answers : 1. The number of *Tribolium confusum* is affected by the presence of *Tribolium castaneum.* 2. The number of *Tribolium confusum* in Set A increase, number of *Tribolium confusum in* Set B decrease.	
	0	None of the above OR No response	

Scoring

Correct	Inaccurate	Idea	Wrong	Score
2	-	-	-	3
1	1	-	-	2
-	2	-	-	
1	-	1	-	1
-	-	2	-	
1	-	-	1	
-	1	1	-	
-	1	-	1	0
		1	1	

j2kk

QUESTION	SCORE	MARK SCHEME	NOTE
		KB0604 – Making inference	
1 (b) (ii)	3	Able to state two inferences correctly Sample answers : 1. *Tribolium confusum* in Set A only facing intraspecific competition, whereas *Tribolium confusum* in Set B have to face both intraspecific competition and interspecific **competition.** 2. In Set B, growth rate of *Tribolium confusum* declined seriously because couldn't **compete** with *Tribolium castaneum* for food and space. 3. In Set B, the growth rate of *Tribolium castaneum* is higher than the growth rate of *Tribolium confusum* because *Tribolium castaneum* is stronger / more dominant than *Tribolium confusum* in the **competition**.	Must state the **competition** between the two different species of beetles.
	2	Able to state two inferences inaccurately Sample answers : 1. The growth rate of *Tribolium confusum* is higher in Set B compare to Set A. 2. The growth rate of *Tribolium confusum* is lower compare to *Tribolium castaneum*.	Does not deliver the concept of **competition**
	1	Able to state two inferences at idea level Sample answers : 1. *Tribolium castaneum* is stronger / more dominant than *Tribolium confusum*.	
	0	None of the above OR No response	

Scoring

Correct	Inaccurate	Idea	Wrong	Score
2	-	-	-	3
1	1	-	-	2
-	2	-	-	
1	-	1	-	1
-	-	2	-	
1	-	-	1	
-	1	1	-	
-	1	-	1	0
		1	1	

j2kk

<table>
<tr><th>QUESTION</th><th>SCORE</th><th>MARK SCHEME</th><th>NOTE</th></tr>
<tr><td rowspan="5">1 (c)</td><td></td><td>KB0610 – Controlling variables</td><td rowspan="5"></td></tr>
<tr><td>3</td><td>Able to state all 3 variables and the methods to handle the variable.

Sample answer :

<table>
<tr><th>Variables</th><th>Method to handle the variable</th></tr>
<tr><td><u>Manipulated variable</u>

The presence of Tribolium castaneum</td><td>Add the same number of Tribolium castaneum to the population of Tribolium confusum</td></tr>
<tr><td><u>Responding variable</u>

The population of Tribolium confusum</td><td>Estimate the population of Tribolium confusum using the number of Tribolium confusum counted in Petri dish.</td></tr>
<tr><td><u>Constant variable</u>

1. Amount of flour.

2. The size of the Petri dish.

3. Surrounding temperature</td><td>1. Measure the amount flour using measuring cylinder.
2. Use the same size of Petri dish.

3. Place the Petri dish at the same place.</td></tr>
</table>
All 6 ticks</td></tr>
<tr><td>2</td><td>4 to 5 ticks</td></tr>
<tr><td>1</td><td>2 to 3 ticks</td></tr>
<tr><td>0</td><td>None of the above OR No response</td></tr>
</table>

j2kk

QUESTION	SCORE	MARK SCHEME	NOTE
1 (d)		**KB0611 – State hypothesis**	
	3	Able to state a hypothesis relating the manipulated variable and the responding variable correctly with the following aspects : P1 = manipulated variable (the presence of *Tribolium castaneum*) P2 = Responding variable (The population size of *Tribolium confusum*) H = relationship (Higher/increases or inversely) Sample answers : 1. Without the presence the *Tribolium castaneum*, the population size of *Tribolium confusum* increase rapidly. 2. In the presence of *Tribolium castaneum*, the population size of *Tribolium confusum* increase slowly.	
	2	Able to state a hypothesis relating the manipulated variable and the responding variable inaccurately Sample answers : 1. The number of *Tribolium confusum* decrease when the number of *Tribolium castaneum* increase. 2. As the number of *Tribolium castaneum* increase, the number of *Tribolium confusum* decrease.	
	1	Able to state a hypothesis relating the manipulated variable and the responding variable at idea level Sample answer : 1. The number of *Tribolium confusum* is affected by the number of *Tribolium castaneum*.	
	0	None of the above OR No response	

j2kk

1(e)(i)

Able to construct a table correctly with the following aspects :

1. Able to construct the table with 7 column.
2. Able to record all the data correctly from week 0.
3. Able to calculate the population correctly

Week	Set A		Set B			
	Number of *Tribolium confusum*	Population of *Tribolium confusum*	Number of *Tribolium confusum*	Population of *Tribolium confusum*	Number of *Tribolium castaneum*	Population of *Tribolium castateum*
0	***-***	***10***	***-***	***10***	***-***	***10***
2	***1***	***20***	***1***	***20***	***1***	***20***
4	***2***	***40***	***1***	***20***	***2***	***40***
6	***3***	***60***	***2***	***40***	***4***	***80***
8	***4***	***80***	***1***	***20***	***5***	***100***
10	***4***	***80***	***1***	***20***	***5***	***100***

Score 3 : All the 3 aspects correct

Score 2 : Any 2 aspects correct

Score 1 : Any 1 aspect correct

Score 0 : None of the above OR no response.

j2kk

QUESTION	SCORE	MARK SCHEME	NOTE
1 (e)(ii)		**KB0607 –Correlating time and space**	
	3	Able to draw the graph correctly with the following aspects: P (paksi) : Correct title with unit on both horizontal, vertical axis and uniform scale on the axis. T(titik) : All points plotted/transferred correctly. B(bentuk): Able to join ***at least 5 points*** to form the graph All three aspects correct.	
	2	Any two correct.	
	1	Any one correct.	
	0	None of the above OR No response	

j2kk

QUESTION	SCORE	MARK SCHEME	NOTE
1 (f)		**KB0608 – Interpretating data**	
	3	Able to interpret data correctly and explain with the following aspects ; **Relationship :** P1 = Able to state <u>the relationship between the manipulated variable and responding variable</u>. **Explanation :** P2 = Able to state the competition between *Tribolium confusum* and *Tribolium castaneum* P3 = Able to state *Tribolium castaneum* is stronger / more dominant than *Tribolium confusum* Sample answer : 1. In the presence of *Tribolium castaneum*, the growth rate of *Tribolium confusum* is slow and declining, this is because *Tribolium castaneum* is stronger than *Tribolium confusum* in competition for food and space.	
	2	Able to interpret data correctly with two aspects correctly.	
	1	Able to interpret data correctly with the only one aspect correctly.	
	0	None of the above OR No response	

j2kk

QUESTION	SCORE	MARK SCHEME	NOTE
1 (g)		**KB0609 – Defining by operation**	
	3	Able to deduce about interspecific competition based on the results of the experiment with the following aspects. P1 : Competition between two different species of organism / *Tribolium confusum* and *Tribolium castaneum* P2 : Compete for the same source of food and space on the same habitat. P3 : The population size of stronger species will increase rapidly whereas the population size of weaker species increase slowly and then declining. Sample answer : 1. Interspecific competition is the competition between *Tribolium confusum* and *Tribolium castaneum* for food and space in the same habitat. *Tribolium castaneum* is more dominant and it caused the population size of Tribolium confusum increased slowly and then declining.	
	2	Able to define operationally based on the result of the experiment with two aspects correctly.	
	1	Able to define operationally based on the result of the experiment with only one aspect correctly.	
	0	None of the above OR No response	

j2kk

QUESTION	SCORE	MARK SCHEME	NOTE
1 (h)		**KB0605 – Predicting**	
	3	Able to predict and explain the outcome of the experiment correctly with the following aspects : **Prediction :** P1 : Able to <u>predict the population size</u> of *Tribolium confusum in Set A will increase.* **Explanation :** P2 : Able to relate the rainy day to the increasing of air humidity P3 : Able to state that high humidity of air will cause the growth rate of Tribolium confusum increase. Sample answer : 2. The population of *Tribolium confusum* in Set A will increase because in rainy day, the humidity of air increase, this is favour for the growth / increase the growth rate of Tribolium confusum.	
	2	Able to predict and explain the outcome of the experiment correctly with the **two aspects correctly**.	
	1	Able to predict and explain the outcome of the experiment correctly with **one aspect correctly**.	
	0	None of the above OR No response	

j2kk

1 (i)

Able to classify the factors in Table 3 correctly.

Increase the growth rate of flour beetle. *Meningkatkan kadar pertumbuhan bubuk tepung*	Decrease the growth rate of flour beetle. *Mengurangkan kadar pertumbuhan bubuk tepung*
poor ventilation low light intensity	good ventilation low temperature high temperature strong light intensity

Score 3 : 5 – 6 ticks
Score 2 : 3 – 4 ticks
Score 1 : 1 – 2 ticks
Score 0 : 0 ticks

j2kk

Question 2

	Explanation	Score
01	**Able to state problem statement by relating P1, P2 and P3 in a question form correctly.** **P1- manipulated variable** The changes in pH **P2-responding variable** The number of *Lemna minor* / the growth rate of *Lemna minor* **P3-question form** (How/does …?) *Sample answer*: **How / Does** the changes in pH (P1) affects the growth rate / the number of Lemna minor (P2) **?** (P3)	3 P1+P2+P3
	Able to state problem statement inaccurately *Sample answer*: 1. What is the effect of pH on plants ? (P1+P3) 2. The number / growth rate of plant is affected by the changes in pH (no P3)	2 P1+P2/ P1+P3/ P2+P3
	Able to state the idea *Sample answer* : 1. The changes in pH affects the growth of plants (no P2 + P3)	1 P1/P2/P3
	No response or wrong response	0

	Explanation	Score
02	**Able to state the hypothesis by relating two variables correctly (P1+P2+H)** **P1- manipulated variable** The changes in pH **P2-responding variable** The growth rate of plants / the number of *Lemna minor* **H-relationship** *Sample answer*: 1. The population of growth rate / the number of *Lemna minor* (P2) is fastest/ highest (H) in a neutral medium (P1) 2. In neutral medium(P1), the growth rate/ the number of *Lemna minor*(P2) is fastest/highest (H)	3 P1+P2+H
	Able to state any two criteria correctly or inaccurate hypothesis *Sample answer*: 1. The changes in pH (P1) affect the growth rate of plants/ *Lemna minor* (P2). (no H) 2. The growth rate of plants/ *Lemna minor* is higher(no P1)	2 P1+P2/ P1+H/ P2+H
	Able to draw the idea of hypothesis *Sample answer*: 1. The changes in pH affect the plants/ *Lemna minor* (noP2+H)	1 P1/P2/H
	No response or wrong response	0

j2kk

KB061204	Explanation	Score
04	**Able to state K1, K2, K3, K4 and K5 (5K) correctly** **K1**: The set up of apparatus (S1/ S2/S3/S4/S5) (any 3) **K2**: How to manipulate the variable (S3) **K3**: How to operate the responding variable (S6 / S7) (any 1) **K4**: How to fix the constant variable(S1/S4/ S5/S6) (any 1) **K5**: Precautions (S5) S1- Three beakers/ containers are prepared and filled with 500ml of pond water in each beaker / container S2- The beakers are labeled as A, B and C with waterproof paint . S3- By using measuring cylinder, 10 ml of 0.1M hydrochloric acid is poured into beaker A, 10 ml of 0.1M sodium hydroxide solution is poured into beaker B and 10 ml of distilled water is poured into beaker C. S4- 20 numbers of *Lemna minor* are put into each beaker S5- Each beaker is placed in an area of the same distributed light and temperature S6- After 5 days, the number of *Lemna minor* in each beaker is counted. S7- The growth rate of *Lemna minor* is calculated by using formula = the number of *Lemna minor* / time taken / day S8- The result are recorded in a table.	3 **K1+K2+ K3+ K4+K5 (5K)**
	Able to state any 3K – 4K correctly	2
	Able to state any 1K – 2K correctly	1
	Wrong response or no response	0

j2kk

<table>
<tr><td>KB061205</td><td>Explanation</td><td>Score</td></tr>
<tr><td>05</td><td>Able to list 3 materials and 3 apparatus correctly to make a functional experiment and able to get the data
MATERIALS (M)
Lemna minor
Pond water
0.1M Hydrochloric acid
0.1M Sodium hydroxide
Distilled Water
APPARATUS (A)
Beaker / Basin / Container
Waterproof paint /marker pen
Measuring cylinder
Dropper
Notes :
<table>
<tr><td>Score</td><td>Material (M)</td><td>Apparatus (A)</td></tr>
<tr><td>3</td><td>3M</td><td>2A</td></tr>
<tr><td>2</td><td>3M
2M</td><td>1A
2A</td></tr>
<tr><td>1</td><td>2M
1M</td><td>1A
1A</td></tr>
</table></td><td>3</td></tr>
<tr><td></td><td>Able to list any 2 materials and any 2 apparatus related to the experiment (2M + 2A / 2M + 1A)</td><td>2</td></tr>
<tr><td></td><td>Able to list any 1 material and any 1 apparatus related to the experiment (1M + 1A)</td><td>1</td></tr>
<tr><td></td><td>Wrong response or no response</td><td>0</td></tr>
</table>

<table>
<tr><td></td><td>Explanation</td><td>Score</td></tr>
<tr><td></td><td>Able to construct a table to record data with the following aspects
- Titles with corrects units
- Data is not required
<table>
<tr><td rowspan="2">Beaker</td><td rowspan="2">Condition/ medium of pH</td><td colspan="2">Number of Lemna minor</td><td rowspan="2">The growth rate of Lemna minor /day</td></tr>
<tr><td>Beginning of experiment</td><td>End of experiment</td></tr>
<tr><td>A</td><td>0.1M Hydrochloric Acid (Acidic)</td><td></td><td></td><td></td></tr>
<tr><td>B</td><td>0.1M Sodium Hydroxide (Alkaline)</td><td></td><td></td><td></td></tr>
<tr><td>C</td><td>Distilled water (Neutral)</td><td></td><td></td><td></td></tr>
</table></td><td>B2 = 1 mark</td></tr>
<tr><td>Construct</td><td>Explanation</td><td>Score</td></tr>
<tr><td></td><td>Able to state the correct technique with the following aspects
Sample answer
1. Count the number of Lemna minor OR
2. Calculate the growth rate of Lemna minor by using formula
= The number of Lemna minor counted
Time taken/ day</td><td>B1 = 1 mark</td></tr>
</table>

j2kk

	Explanation	Score
03	**Able to state 7-9 aspects of experimental planning correctly** : √Statement of problem √Objective √Hypothesis √Variables (The three variables are correct) √List of materials and apparatus √Technique used √Procedure √Presentation of data √Conclusion Note: 7-9 √- 3 marks 4-6 √- 2 marks 1-3 √- 1 mark	3
	Able to state any 4 - 6 items/aspects in the experimental planning correctly	2
	Able to state any 1 - 3 items correctly	1
	Wrong response or no response Example: The report is in the form of explanation without planning item	0

j2kk

Sample Answer :

√**Problem Statement**
Does the changes in pH affects the growth rate of plants/ *Lemna minor*? **01=3**

√**Aim of experiment**
To study the effects of pH on the growth rate of plants/ *Lemna minor*

√**Hypothesis**
The growth rate of plants/ *Lemna minor* is higher/ faster/grow better in neutral medium **02=3**

√**Variables**
Manipulated variable : The changes in pH
Responding variable : The number of / the growth rate of plants/ *Lemna minor*
Constant variable : Number of plants/ *Lemna minor* at the beginning of experiment / same sources of pond water / the volume of pond water / the volume of substances / light intensity / time taken

√**Materials**
Lemna minor/ hydrilla / pleurococcus
Pond Water
0.1M Hydrochloric acid
0.1M Sodium hydroxide
Distilled Water **05=3**

Apparatus
Beaker / Basin / Container
Waterproof paint /marker pen
Measuring cylinder
Dropper

√**Techniques**
Count the number of plants / *Lemna minor* **OR** **B1=1**
Calculate the growth rate of plants/ *Lemna minor* by using formula

$$= \frac{\text{The number of } \textit{Lemna minor} \text{ counted}}{\text{Time taken/ day}}$$

√**Procedure**
1. Three beakers/ containers/ basins are prepared and filled with 500ml of pond water in each beaker /container **04=3**
2. The beaker are labeled as A, B and C with waterproof paint .
3. By using measuring cylinder, 10 ml of 0.1M hydrochloric acid is measured and poured into beaker A, 10 ml of 0.1M sodium hyroxide solution is measured and poured into beaker B and 10 ml of distilled water is measured and poured into beaker C.
4. 20 numbers of *Lemna minor* are put into each beaker
5. Each beaker is placed in an area of distributed light and temperature
6. After 5 days, the number of *Lemna minor* in each beaker is counted.
7. The growth rate of *Lemna minor* is calculated by using formula

$$= \frac{\text{the number of } \textit{Lemna minor}}{\text{time taken / day}}$$

8. The result are recorded in a table

j2kk

√**Results**

B2= 1

Beaker	Condition/ medium of pH	Number of *Lemna minor*		The growth rate of *Lemna minor* /day
		Beginning of experiment	End of experiment	
A	0.1M Hydrochloric Acid (Acidic)			
B	0.1M Sodium Hydroxide (Alkaline)			
C	Distilled water (Neutral)			

√**Conclusion**

The growth rate of plants/ *Lemna minor* is higher/ faster/grow better in neutral medium .
Hypothesis is accepted.

Note:
7-9√ - 3 marks
4-6√ - 2 marks
1-3√ - 1 mark

03=3

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