SULIT
4551/1
Biologi
Kertas 1
Ogos
2011
1 1/4 jam

JABATAN PELAJARAN NEGERI TERENGGANU

PEPERIKSAAN PERCUBAAN SPM 2011
TINGKATAN LIMA
SIJIL PELAJARAN MALAYSIA

BIOLOGI

Kertas 1

Satu jam lima belas minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini mengandungi 50 soalan.*
2. *Kertas soalan ini disediakan dalam dwibahasa.*
3. *Jawab semua soalan.*
4. *Jawab dengan menghitamkan ruangan yang betul pada kertas jawapan yang disediakan.*
5. *Sekiranya anda hendak menukarkan jawapan, padamkan tanda yang telah dibuat. Kemudian hitamkan jawapan yang baru.*
6. *Rajah yang mengiringi soalan dimaksudkan untuk memberi maklumat yang berguna bagi menjawab soalan. Rajah tidak dilukis mengikut skala kecuali dinyatakan.*
7. *Anda dibenarkan menggunakan kalkulatur saintifik yang tidak boleh diprogram.*

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Guru AKRAM Terengganu

Dengan kerjasama:
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Dibiayai oleh:
Kerajaan Negeri Terengganu

TERENGGANU NEGERI ANJUNG ILMU

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Kertas soalan ini mengandungi 25 halaman bercetak tidak termasuk kulit.

1 Diagram 1 shows an organelle of a cell.
Rajah 1 menunjukkan organel yang terdapat di dalam suatu sel.

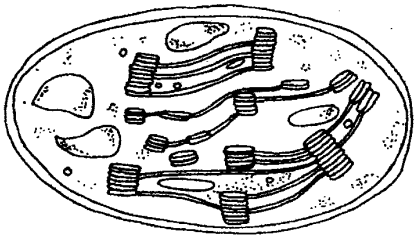


Diagram 1
Rajah 1

Which of the following processes occurs in this organelle?
Antara proses-proses berikut, yang manakah berlaku dalam organel ini?

A Photosynthesis
Fotosintesis

B Synthesis of protein
Sintesis protein

C Synthesis of enzyme
Sintesis enzim

D Generation of energy
Penjanaan tenaga

2 The following information refers to organelle R.
Maklumat berikut merujuk kepada organel R.

- Has double layer of membrane
  Mempunyai dua lapisan membran
- Function as site of cellular respiration
  Berfungsi sebagai tapak respirasi sel

What is organelle R?
Apakah organel R?

A Nucleus
Nukleus

B Mitochondrion
Mitokondria

C Golgi apparatus
Jasad Golgi

D Endoplasmic reticulum
Retikulum endoplasma

3 Diagram 2 shows the model of plasma membrane
Rajah 2 menunjukkan model membran plasma

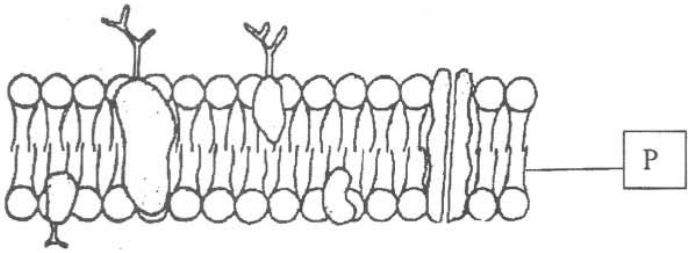


Diagram 2
Rajah 2

What is the part labelled P?
Apakah bahagian yang berlabel P?

A Carrier protein
Protein pembawa

B Pore protein
Protein liang

C Hydrophilic head
Kepala hidrofilik

D Phospholipid
Fosfolipid

4 Which of the following process involves simple diffusion?
Antara proses berikut, yang manakah melibatkan resapan ringkas?

A absorption of water by the root hair of plant
penyerapan air oleh rerambut akar tumbuhan

B absorption of glucose through the villi in the small intestine
penyerapan glukosa melalui vilus di dalam usus kecil

C movement of sodium ions into the cells lining of the kidney tubules
pergerakan ion natrium ke dalam dinding sel tubul ginjal

D gaseous exchange between the body cell and blood capillaries
pertukaran gas di antara sel badan dan kapilari darah

5 Diagram 3 shows the 'lock and key' hypothesis of enzyme reaction.
Rajah 3 menunjukkan hipotesis 'kunci dan mangga' bagi tindakan enzim.

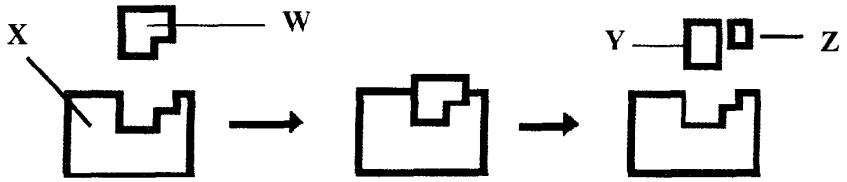


Diagram 3
Rajah 3

Which of the following is represented by X, Y and Z if W is lactose
Antara berikut yang manakah diwakili oleh X, Y dan Z jika W ialah laktosa

	X	Y	Z
A	Maltase *Maltase*	Glucose *Glukosa*	Glucose *Glukosa*
B	Lactose *Laktosa*	Glucose *Glukosa*	Galactose *Galaktosa*
C	Lactase *Laktase*	Galactose *Galaktosa*	Glucose *Glukosa*
D	Sucrase *Sukrase*	Fructose *Fruktosa*	Glucose *Glukosa*

6 Diagram 4 shows a type of molecular structure of carbohydrate
Rajah 4 menunjukkan satu jenis struktur molekul carbohydrate

Diagram 4
Rajah 4

What is the name of the carbohydrate?
Apakah nama karbohidrat tersebut?

A Glucose / *Glukosa*
B Glycogen / *Glikogen*
C Starch / Kanji
D Cellulose /*Selulosa*

7 Diagram 5 shows one type of protein structure. Which of the following is an example of the structure?
Rajah 5 menunjukkan satu jenis struktur protein. Yang manakah antara berikut adalah contoh untuk struktur itu.

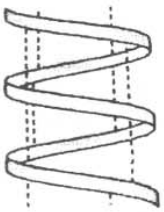


Diagram 5
Rajah 5

A Ceratine
Keratin

C Enzyme
Enzim

B Silk
Sutera

D Haemoglobin
Haemoglobin

8 Diagram 6 shows the cell cycle.
Rajah 6 menunjukkan kitar sel.

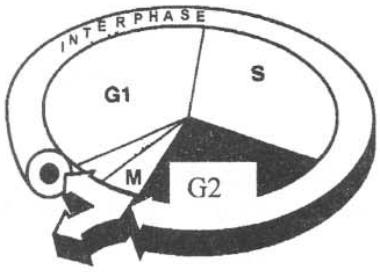


Diagram 6
Rajah 6

At which stage a formation of new organelles occur?
Pada peringkat manakah berlakunya pembentukan organel-organel baru ?

A G1

C S

B G2

D M

9 Diagram 7 shows a stage of cell division process. Which of the following human cells is a product of this cell division?
Rajah 7 menunjukkan satu peringkat dalam proses pembahagian sel. Yang manakah di antara sel berikut adalah hasil daripada pembahagian sel ini.

Diagram 7
Rajah 7

A Muscle cell
Sel otot

B Nerves cell
Sel saraf

C Sperm cell
Sel sperma

D Epithelial cell
Sel epitelium

10 Diagram 8 shows part of the human digestive system.
Rajah 8 menunjukkan sebahagian sistem pencernaan manusia.

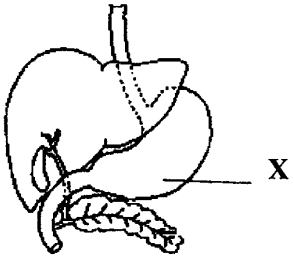


Diagram 8
Rajah 8

Which of the following enzymes is secreted by organ X?
Antara enzim berikut yang manakah dirembeskan oleh organ X?

A Erepsin / *Erepsin*

B Rennin / *Renin*

C Amylase / *Amylase*

D Trypsin / *Tripsin*

11 Which of the following process occur in a liver?
Yang manakah antara proses berikut berlaku dalam hati

A Absorption / *penyerapan*
B Digestion / *pencernaan*
C Defeacation / *penyahtinjaan*
D Assimilation / *Asimilasi*

12 Which digestive organ in rodent contain symbiotic microorganism?
Organ pencernaan yang manakah dalam rodensia yang mengandungi bacteria simbiotik.

A Stomach / *perut*
B Caecum / *sekum*
C Duodenum / *duodenum*
D Colon / *kolon*

13 Which of the following is the correct equation for the respiration of yeast?
Manakah yang berikut menunjukkan persamaan yang betul bagi respirasi yis?

A Glucose → lactic acid + energy
Glukosa → asid laktik + tenaga

B Glucose → carbon dioxide + ethanol + energy
Glukosa → karbon dioksida + etanol + tenaga

C Glucose + oxygen → carbon dioxide + ethanol + energy
Glukosa + oksigen → karbon dioksida + etanol + tenaga

D Glucose + oxygen → carbon dioxide + water + ethanol + energy
Glukosa + oksigen → karbon dioksida + air + etanol + tenaga

14 Diagram 9 shows the respiratory system of an insect.
Raj*ah 9 menunjukkan sistem resprasi bagi sejenis serangga*

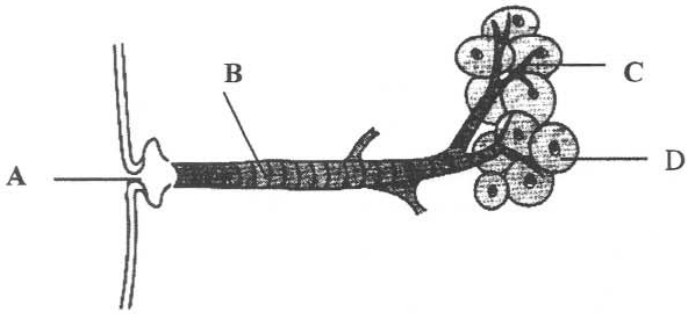
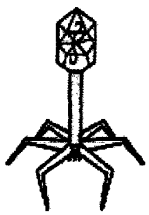


Diagram 9
Rajah 9

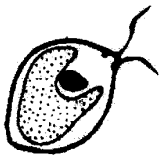
Which part, A, B, C and D is a tracheole?
Antara bahagian A, B, C dan D ialah trakeol?

15 Which of the following microorganisms is a virus?
Y ang manakah antara mikroorganisma berikut adalah virus?

A

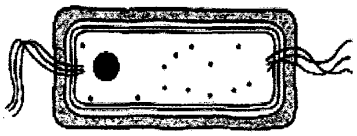


C



B

D



16 Diagram 10 shows part of a nitrogen cycle. P and Q are microorganisms which which involved in the cycle.
Rajah 10 menunjukkan sebahagian daripada kitaran nitrogen. P dan Q adalah mikroorganisma yang terlibat dalam kitar.

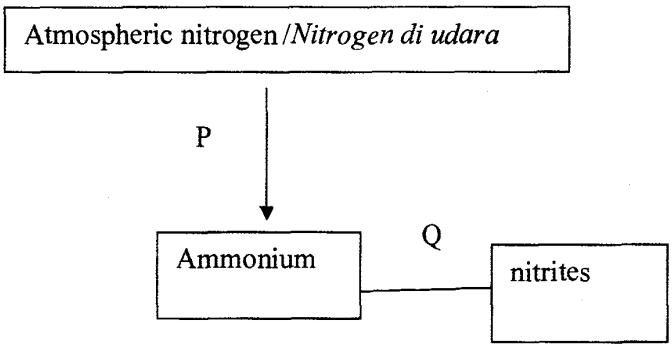


Diagram 10
Rajah 10

Which of the following represent P and Q?
Antara berikut yang manakah menunjukkan P dan Q ?

	P	Q
A	*Nitrobacter* sp	*Nitrosomonas* sp
B	*Nostoc* sp	*Nitrosomonas* sp
C	*Nostoc* sp	*Nitrobacter* sp
D	*Nitrobacter* sp	*Rhizobium sp*

17 Diagram 11 shows the root system of a mangrove plant.
Rajah 11 menunjukkan sistem akar tumbuhan bakau.

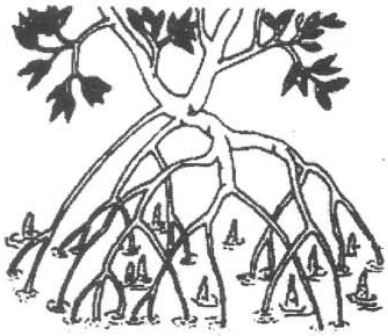


Diagram 11
Rajah 11

Which species has this type of root?
Spesies yang manakah mempunyai akar jenis ini?

A *Aviccennia* sp
B *Sonneratia* sp
C *Brugueira* sp
D *Rhizophora* sp

18 Which of the following gases can cause the depletion of ozone layer?
Antara berikut, gas yang manakah boleh menyebabkan penipisan lapisan ozon?

A Chlorofluorocarbon / *Kloroflorokarbon*
B Nitrogen dioxide / *Nitrogen dioxide*
C Carbon monoxide / *Karbon monoksida*
D Carbon dioxide / *Karbon dioksida*

19 Excess fertilisers from paddy field flow into nearby river. What is the effect to the river?
Baja berlebihan dari sawah padi mengalir ke dalam sungai yang berdekatan. Apakah kesan ke atas sungai?

A Soil erosion / *Hakisan tanah*
B Air pollution / *Pencemaran udara*
C Eutrophication / *Eutrofikasi*
D Thinning of ozone layer / *Penipisan lapisan ozon*

20 Diagram 12 shows part of the systemic circulatory system.
Rajah 12 menunjukan sebahagian daripada sistem peredaran sistemik.

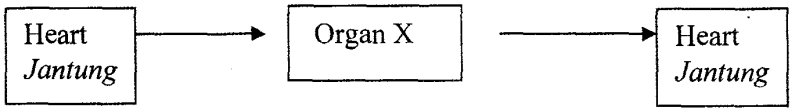


Diagram 12
Rajah 12

Which of the following is the type of blood and correct blood vessel for blood that flow from organ X to the heart?
Yang manakah antara berikut merupakan jenis darah dan salur darah yang betul bagi pengaliran darah dari organ X ke jantung?

	Type of blood	Blood vessel
A	Deoxygenated / *tanpa oksigen*	Pulmonary vein / *vena pulmonari*
B	Deoxygenated / *tidak oksigen*	Pulmonary artery / *arteri pulmonari*
C	Oxygenated / *beroksigen*	Pulmonary vein / *vena pulmonary*
D	Oxygenated / *beroksigen*	Pulmonary artery / *arteri pulmonari*

21 Diagram 13 shows the cross section of dicotyledonous root.
Rajah 13 menunjukkan keratan rentas akar tumbuhan dikotiledon.

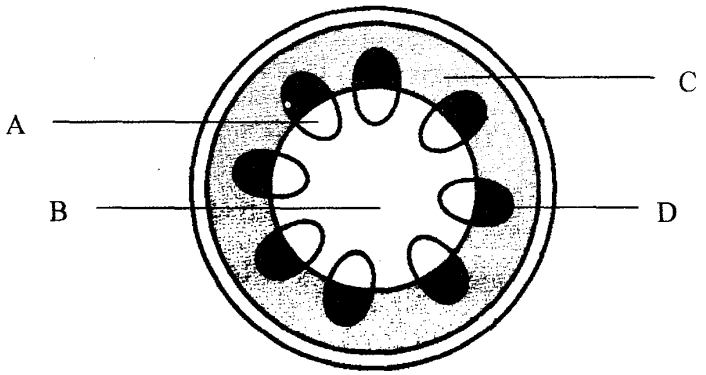


Diagram 13
Rajah 13

Which of the labelled parts A, B, C or D transport water and mineral?
Bahagian berlabel yang manakah A, B, C atau D berfungsi mengangkut air dan mineral?

22 Diagram 14 shows a structure of the heart and its associated blood vessels.
Rajah 14 menunjukkan struktur jantung dan salur darah yang berkaitan.

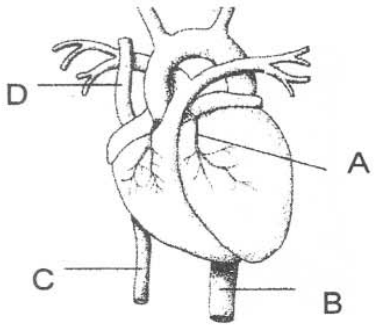


Diagram 14
Rajah 14

Which of the following A,B,C and D supply nutrients to the heart?
Yang manakah dari berikut A, B, C dan D membekalkan nutrient ke jantung?

23 The following statements are the characteristics of blood transported by a blood vessel in the human body.
Pernyataan berikut adalah ciri-ciri darah yang diangkut oleh suatu salur darah dalam badan manusia.

- High concentration of oxygen
  Kepekatan oksigen yang tinggi
- Low concentration of carbon dioxide
  Kepekatan karbon dioksida yang rendah
- High blood pressure
  Tekanan darah tinggi

What is the blood vessel?
Apakah salur darah itu?

A Aorta
Aorta

B Vena cava
Vena cava

C Pulmonary artery
Arteri pulmonary

D Pulmonary vein
Pulmonary vein

24 Diagram 15 shows a vascular tissue in tree trunk.
Rajah 15 menunjukkan tisu vascular dalam batang tumbuhan.

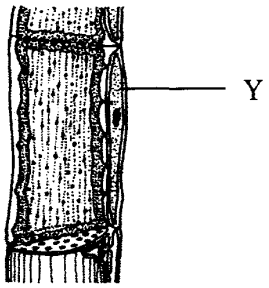


Diagram 15
Rajah 15

What is Y?
Apakah Y?

A Tracheid
Trakeid

B Sieve tube
Tiub tapis

C Companion cell
Sel rakan

D Parenchyma cell
Sel parenkima

25 Diagram 16 shows part of human forelimb.
Rajah 16 menunjukkan bahagian lengan manusia.

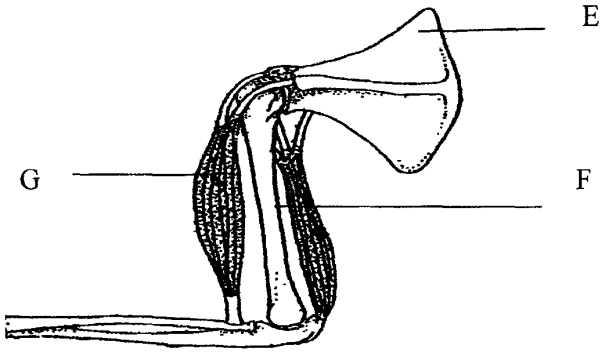


Diagram 16
Rajah 16

Name structure E, F and G.
Namakan struktur E, F and G.

	E	F	G
A	Scapula *skapula*	Humerus *humerus*	triceps *trisep*
B	Scapula *skapula*	Humerus *humerus*	Biceps *bisep*
C	Clavicle *klavikel*	Radius *radius*	Triceps *trisep*
D	Clavicle *klavikel*	Radius *radius*	Triceps *trisep*

26 Which process in the leaves helps to form the dew during a cool and humid night?
Apakah proses dalam daun yang membantu dalam pembentukan embun pada malam yang sejuk dan lembap?

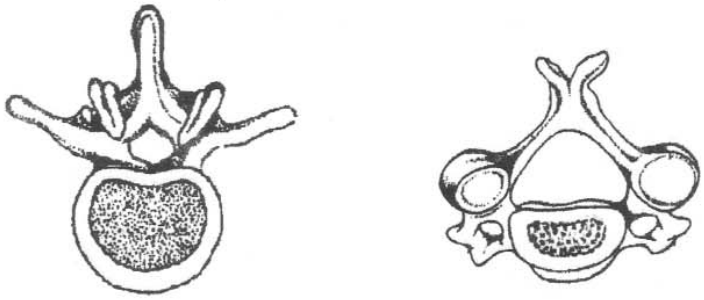
A Transpiration
Transpirasi

B Translocation
Translokasi

C Evaporation
Sejatan

D Guttation
Gutasi

27 Diagram 17 shows two type of human vertebrae X and Y.
Rajah 17 menunjukkan dua jenis vertebra, X dan Y pada manusia.



X Y

Diagram 17
Rajah 17

Which of the following is correct for X and Y?
Yang manakah antara berikut betul untuk X dan Y.

	X	Y
A	Lumbar	Thoracic
B	Lumbar	Cervical
C	Cervical	Thoracic
D	Thoracic	Lumbar

28 Diagram 18 shows the side view of the brain.
Rajah 18 menunjukkan pandangan sisi otak manusia.

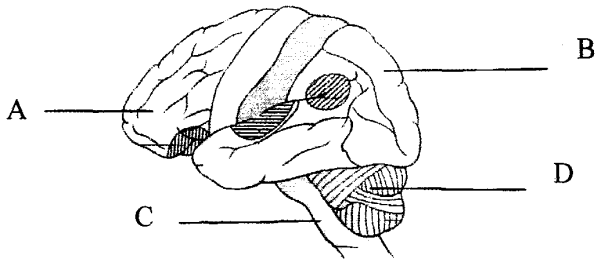


Diagram 18
Rajah 18

Which part, A, B, C and D controlled involuntary action?
Antara bahagian A, B, C dan D, yang manakah mengawal tindakan luarkawal?

29 What is the function of synapse in nervous system?
Apakah fungsi sinap dalam sistem saraf?

A Transmit impulse in two direction
Mengalirkan impuls dalam dua arah

B Transmit impulse from one neurone to another neurone
Mengalirkan impuls dari satu neuron ke neuron yang lain

C Carry impulse from axon to dendrone
Membawa impuls dari akson ke dendron

D Carry impulse from dendrone to axon
Membawa impuls dari dendron ke akson

30 Which hormone is correctly match to its function?
Hormon manakah yang dipadankan dengan betul kepada fungsinya?

	Hormone *Hormon*	Function *Fungsi*
A	Aldosterone *Aldosteron*	Stimulate the absorption of salts in the kidney *Merangsang penyerapan garam dalam ginjal*
B	Insulin *Insulin*	Stimulate the conversion of glycogen to glucose *Merangsang penukaraan glikogen kepada glukosa*
C	Thyroxine *Tiroksina*	Stimulate growth process *Merangsang proses tembesaran*
D	Oestrogen *Estrogen*	Stimulate follicle development *Merangsang perkembangan folikel*

31 Which of the following is the correct difference between the endocrine system and the nervous system?
Yang manakah antara berikut adalah perbezaan yang betul di antara sistem endokrin dan sistem saraf?

	Endocrine system / sistem endokrin	**Nervous system / sistem saraf**
A	Consist of exocrine glands *Terdiri dari kelenjar eksokrin*	Consist of neurons *Terdiri dari neuron*
B	Information is passed as hormones *Maklumat dihantar dalam bentuk hormon*	Information is passed as electrical signal *Maklumat dihantar dalam bentuk signal elektrik*
C	The responses is initiated rapidly *Gerak balas dimulakan sangat perlahan cepat*	The responses is initiated slowly *Gerak balas dimulakan sangat perlahan*
D	The response occur in a short period of time *Gerak balas berlaku dalam tempoh masa yang cepat*	The response occur in a long time *Gerak balas berlaku dalam tempoh yang lama*

32 Diagram 19 shows stages of an ovarian cycle in ovary.
Rajah 19 menunjukkan peringkat perkembangan folikel di dalam ovari.

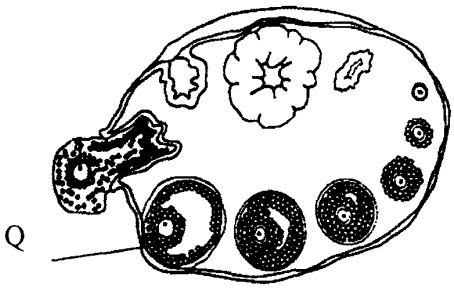


Diagram 19
Rajah 19

What is structure Q ?
Apakah struktur Q?

A Primary follicle
Folikel primer

B Primary oocyte
Oosit primer

C Corpus luteum
Korpus luteum

D Graafian follicle
Folikel Graaf

33 The end product of oogenesis process are

A Two secondary oocyte, one polar body
Dua oosit sekunder, satu jasad kutub

B One secondary oocyte, two polar body
Satu oosit sekunder, dua jasad kutub

C One secondary oocyte, three polar body
Satu oosit sekunder, tiga jasad kutub

D Two secondary oocyte, two polar body
Dua oosit sekunder, dua jasad kutub

34 Diagram 20 shows germinating of pollen tube.
Rajah 20 menunjukkan percambahan tiub debunga.

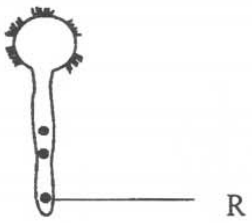


Diagram 20
Rajah 20

What is structure of R ?
Apakah struktur R ?

A Generative nucleus
Nukleus penjana

B Tube nucleus
Nukleus tiub

C Male nucleus
Nukleus jantan

D Pollen nucleus
Nukleus debunga

35 Which statement is true about parthenocarpy?
Pernyataan yang manakah benar tentang partenokarpi?

A Formation of fruit without fertilisation process
Pembentukan buah tanpa proses persenyawaan

B Formation of seed without fertilisation process
Pembentukan biji tanpa proses persenyawaan

C Development of zygote into embryo in plant
Perkembangan zigot kepada embrio dalam tumbuhan

D Development of embryo into seed in plant
Perkembangan embrio kepada biji dalam tumbuhan

36 Diagram 21 shows the effect of auxin on the shoot of maize.
Rajah 21 menunjukkan kesan auksin ke atas pucuk pokok jagung.

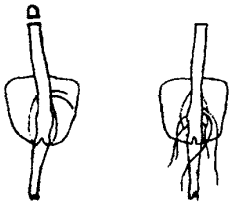


Diagram 21
Rajah 21

Based on diagram, which statement is true about the auxin?
Berdasarkan rajah, pernyataan yang manakah benar tentang auksin?

A Auxin stop the elongation of cell
Auksin menghalang pemanjangan sel

B Auxin move along the shoot uniformly
Auksin bergerak sepanjang pucuk dengan sekata

C Auxin is produced at the bottom of coleoptiles of shoot
Auksin dihasilkan pada bahagian bawah koleoptil pucuk

D Auxin is produced at the tip of coleoptiles of shoot
Auksin dihasilkan pada bahagian hujung koleoptil pucuk

37 Diagram 22 shows a bunch of unripe banana with two ripe mangoes in a closed container.
Rajah 22 menunjukkan sesikat pisang belum masak dengan dua biji mangga masak dalam bekas tertutup.

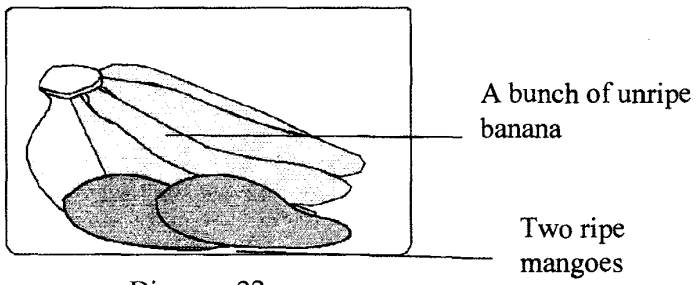


Diagram 22
Rajah 22

Which of the following is correct statement of function of ripe mangoes in inducing ripening of unripe bananas.
Pernyataan yang manakah betul untuk fungsi mangga masak ke atas aruhan pemasakan pisang yang belum masak.

A Ripe mangoes produced auxin to induce the ripening of bananas
Mangga masak mengeluarkan auksin untuk mengaruh pemasakan pisang

B Ripe mangoes produced methylene to induce the ripening of bananas
Mangga masak mengeluarkan metilena untuk mengaruh pemasakan pisang

C Ripe mangoes produced ethylene to induce the ripening of bananas
Mangga masak mengeluarkan ethilena untuk mengaruh pemasakan pisang

D Ripe mangoes produced giberelline to induce the ripening of bananas
Mangga masak mengeluarkan giberelin untuk mengaruh pemasakan pisang

38 Diagram 23 shows a pair of homologous chromosomes in a somatic cell of the plant at the prophase I.
Rajah 23 menunjukkan sepasang kromosom homolog dalam sel soma suatu tumbuhan pada peringkat profasa I.

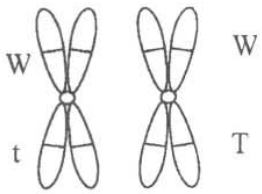


Diagram 23
Rajah 23

What is the genotype of the cell?
Apakah genotip sel tersebut?

A WWTt C WWTT

B WtWT D TWtW

39 The genotype of a person blood group is $I^B I^O$. What is his blood group.
Genotip kumpulan darah seorang individu ialah $I^B I^O$. Apakah kumpulan darah orang itu.

A O C B

B A D AB

40 What is the genotype of offspring in F1 Generation in a monohybrid cross between Rr x rr?
Apakah genotip anak dalam generasi F1 hasil kacukan monohibrid antara RR x rr*?*

A 100% are RR
100% *ialah* RR

B 50% RR and 50% rr
50% RR *dan* 50% rr

C 50% Rr and 50% Rr
50% Rr *dan* 50% Rr

D 50% Rr and 50% rr
50% Rr *dan* 50% rr

41 Which of the following is an example of discontinuous variation?
Antara yang berikut, yang manakah contoh bagi variasi tak selanjar?

A Height / *Ketinggian*

B Eye colour / *Warna mata*

C Skin colour / *Warna kulit*

D Body weight / *Berat badan*

42 Which of the following caused by gene mutation?
Antara yang berikut yang manakah disebabkan oleh mutasi gen?

A Sickle-cell anaemia
Anemia sel sabit

B Turner Syndrome
Sindrom Turner

C Down's syndrome
Sindrom Down

D Klinefelter's syndrome
Sindrom Klinefelter

43 Four different types of food samples with the same mass were burnt. The temperature of water in the boiling tube is taken before and after the experiment.
Empat sampel makanan berbeza dengan jisim yang sama dibakar. Suhu air di dalam tabung didih di ambil sebelum dan selepas eksperimen.

Which of the following food samples labeled P, Q, R and S contains the lowest amount of lipids?
Yang manakah dari sampel makanan berlabel P, Q, R dan S mengandungi jumlah lipid yang paling sedikit?

	Food sample *Sampel makanan*	Initial temperature of water *Suhu awal air* $/^{0}C$	Final temperature of water *Suhu akhir air* $/^{0}C$
A	P	18	90
B	Q	17	94
C	R	17	86
D	S	18	88

44 Diagram 24 shows mutation occurs in a chromosome.
Rajah 24 menunjukkan mutasi berlaku dalam satu kromosom.

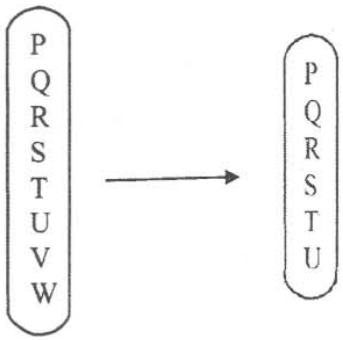


Diagram 24
Rajah 24

What type of chromosome mutation is shown?
Apakah jenis mutasi kromosom ditunjukkan?

A Deletion / *Pelenyapan*
B Inversion / *Penyongsangan*
C Duplication / *Penggandaan*
D Translocation / *Translokasi*

45 The table shows the results of an experiment to study the population of garden snails in a vegetable farm.
Jadual menunjukkan keputusan kajian populasi siput kebun di dalam ladang sayuran.

Sequence of Capture / *Turutan tangkapan*	Number of garden snails captured / *Bilangan siput kebun yang ditangkap*	
First / *Pertama*	300 marked / *bertanda*	
Second / *Kedua*	50 marked / *bertanda*	60 unmarked / *Tidak bertanda*

What is the approximate population of the snails in the farm?
Berapakah anggaran populasi siput kebun?

A 125 C 330

B 460 D 660

46 Diagram 25 shows a type of variation in humans.
Rajah 25 menunjukkan sejenis variasi pada manusia.

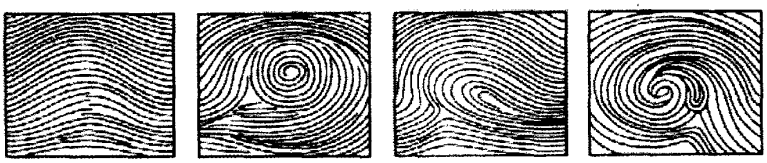


Diagram 25
Rajah 25

Which statement is true about diagram 25
Pernyataan yang manakah benar tentang rajah 25

	Factor influenced *Faktor yang mempengaruhi*	Type of variation *Jenis variasi*
A	Environmental *Persekitaran*	Continous *Selanjar*
B	Genetic *Genetik*	Discontinous *Tidak selanjar*
C	Environmental and genetic *Persekitaran dan genetik*	Continous *Selanjar*
D	Environmental and genetic *Persekitaran dan genetik*	Discontinous *Tidak selanjar*

47 Diagram 26 shows the pathway of an impulse in a reflex arc.
Rajah 26 menunjukkan laluan dalam arka refleks.

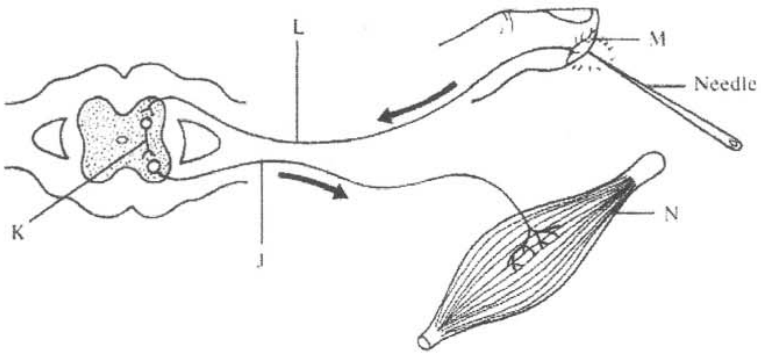


Diagram 26
Rajah 26

Which statement is true?
Pernyataan yang manakah betul?

A N relaxes when received impulse from J
N mengendur bila menerima impuls daripada J

B The rate of impulse transmission through K increases
Kadar pemindahan impuls melalui K bertambah

C J receives an impulse from K and carries it to N
J menerima impuls dan membawanya kepada N

D L transmits the impulse to M from the central nervous system
L memindahkan impuls kepada N daripada sistem saraf pusat

48 Alleles P is dominant to allele p for a characteristic. Alleles T is dominant to allele t for another characteristic.
A male heterozygous of both characteristic (PpTt) is crossed with a female homozygous recessive for both characteristic (pptt).
Alel P adalah dominan terhadap alel p. Alel T adalah dominan terhadap alel t.
Seorang lelaki heterozigot untuk kedua-dua ciri (PpTt)l dikacukkan dengan seorang perempuan homozigot resesif untuk kedua-dua ciri (pptt).

Which of the following are the probable alleles of the offspring?
Antara berikut yang manakah kemungkinan alel bagi anak-anak pasangan tersebut?

	Alleles of the offspring *Alel anak*			
A	PPTT	PPtt	ppTT	PpTT
B	PpTt	Pptt	ppTt	pptt
C	pPtt	pptt	PPTt	PpTT
D	PPTT	pptt	pPtT	Pptt

49 Which of the following occurrence does not cause variation?
Antara kejadian yang berikut, manakah tidak menyebabkan variasi?

A Crossing over
Pindah silang

B Random fertilization
Persenyawaan rawak

C Separation of sister chromatid
Pemisahan kromatid beradik

D Independent assortment of chromosomes
Penyusunan kromosom secara bebas

50 A normal person has 46 chromosome. A person with Down's syndrome has 47 chromosomes in his cells.
Individu normal mempunyai 46 kromosom. Individu yang menghidap Sindrom Down mempunyai 47 kromosom dalam selnya.

Which of the following occurrence cause this abnormality?
Antara kejadian berikut, yang manakah menyebabkan keadaan ini?

A Chromosomal mutation happened during the production of the egg cell or sperm
Mutasi kromosom berlaku semasa penghasilan sel telur atau sperma

B More than one sperm fused with one egg during fertilization
Lebih daripada satu sperma telah mensenyawakan satu telur semasa persenyawaan

C Radiation caused a change in the structure of the sperm
Radiasi telah menyebabkan perubahan struktur sperma

D The mother was exposed to harmful chemicals during pregnancy
Ibu telah terdedah kepada bahan kimia berbahaya semasa mengandung

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

NAMA : ..... *TINGKATAN :* .....

SULIT
4551/2
Biologi
KERTAS 2
Ogos 2011

2 ½ jam

JABATAN PELAJARAN NEGERI TERENGGANU

PEPERIKSAAN PERCUBAAN TAHUN 2011
SIJIL PELAJARAN MALAYSIA

BIOLOGI
Kertas 2

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini mengandungi tiga bahagian :* **Bahagian A,** ***Bahagian B*** *dan* **Bahagian C**.
2. *Jawab* **semua** *soalan dalam* **Bahagian A.** *Jawapan kepada* **Bahagian A** *hendaklah ditulis dalam ruang jawapan yang disediakan.*
3. *Jawab* **dua** *soalan dari* **Bahagian B** *dan jawapan kepada* **Bahagian B** *hendaklah ditulis dalam ruang bergaris yang disediakan dibahagian akhir kertas soalan. Anda diminta menjawab dengan lebih terperinci untuk* **Bahagian B**, *Jawapan mestilah jelas dan logik. Dalam jawapan anda, persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda boleh digunakan.*
4. *Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.*
5. *Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.*
6. *Sekiranya anda hendak membatalkan sesuatu jawapan, buat garisan di atas jawapan itu.*
7. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram. Walau bagaimanapun, langkah mengira perlu ditunjukkan.*
8. *Masa yang dicadangkan untuk menjawab* **Bahagian A** *ialah 90 minit,* **Bahagian B** *60 minit.*
9. *Semua kertas jawapan hendaklah diserahkan di akhir peperiksaan.*

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

Disediakan oleh: **Guru AKRAM Terengganu**

Dengan kerjasama: **MPSM Negeri Terengganu**

Dibiayai oleh: **Kerajaan Negeri Terengganu**

TERENGGANU NEGERI ANJUNG ILMU

Dicetak oleh:
Percetakan Yayasan Islam Terengganu Sdn. Bhd.
Telefon: 609-666 8611/6652/8601 Faks: 609-666 0611/0063

Kertas soalan ini mengandungi 18 halaman bercetak.

For Examiner's Use

SECTION A
Answer **all** the questions
*Jawab **semua** soalan*

1. Diagram 1.1 shows the 'lock and key' hypothesis in mechanism of enzyme reaction.
Rajah 1 menunjukkan hipotesis 'mangga dan kunci' di dalam mekanisme tindak balas enzim.

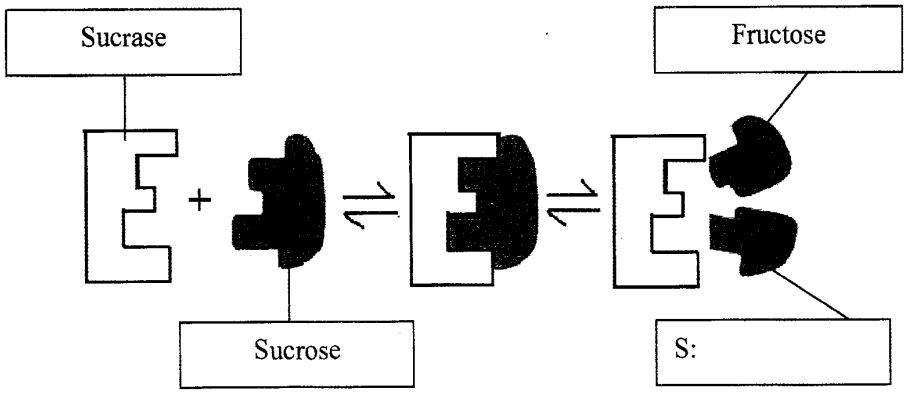


Diagram 1
Rajah 1

1(a)

(a) Label S in Diagram 1
Labelkan S di dalam Rajah 1 [1 *mark*]

1(b)

(b) Based on the Diagram 1, State **two** characteristics of the enzyme explained by this hypothesis.
Berdasarkan Rajah 1, *Nyatakan **dua** ciri enzim yang dijelaskan oleh hipotesis ini.*

1. .....

2. .....

[2 *marks*]

(c) Based on the Diagram 1, explain the sucrase reaction if
Berdasarkan Rajah 1 terangkan tindakbalas sukrase jika

(i) Medium temperature is 60^0C
Suhu medium ialah 60^0C

1(c)(i)

.....

.....

.....

[3 *marks*]

(ii) pH medium value is 3
Nilai pH medium ialah 3

.....

.....

[2 *marks*]

For Examiner's Use

1(c)(ii)

2

(d)

Enzymes are widely used in our daily life and industries
Enzim banyak digunakan dalam kehidupan seharian dan dalam industri

Explain examples of the applications of enzymes in :
Terangkan contoh aplikasi enzim dalam :

(i) Dairy products industry
Industri hasilan tenusu

1(d)(i)

.....

.....

[2 *marks*]

2

(ii) Cereal grains products industry
Industri hasilan makanan bijirin

1(d)(ii)

.....

.....

[2 *marks*]

2

For Examiner's Use

2. Diagram 2.1 shows two strips of mustard green stem after 20 minutes immersed into two different solutions P and Q.
Rajah 2.1 menunjukkan dua jalur batang sawi selepas 20 minutes direndam di dalam dua larutan yang berbeza, iaitu P dan Q.

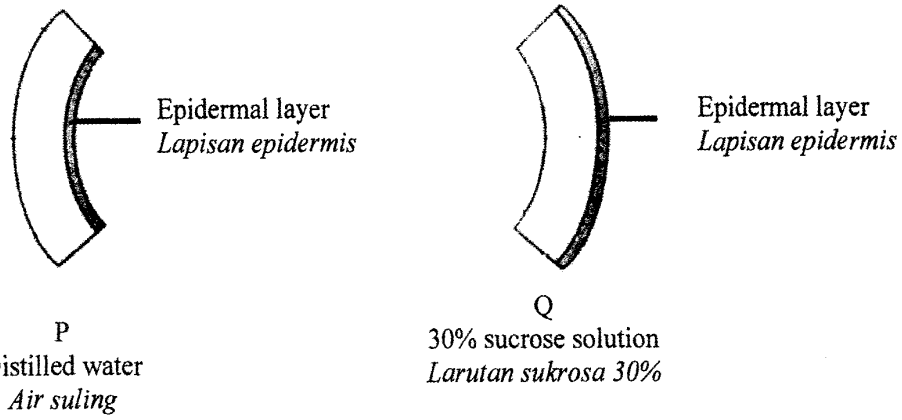


Diagram 2.1
Rajah 2.1

(a) Based on the Diagram 2.1
Berdasarkan Rajah 2.1

2(a)(i)

(i) State the type of solution Q.
Nyatakan jenis larutan Q.

.....

[1 *mark*]

2(a)(ii)

(ii) Explain how the solution Q affects the condition of the cells in the strip that have been immersed.
Terangkan bagaimana larutan Q mempengaruhi keadaan sel di dalam jalur sawi yang telah direndamkan.

.....

.....

.....

.....

[2 *marks*]

(iii)If strip from the solution Q is transferred into solution P, explain what will happen to the cells in the strip after 20 minutes.
Jika jalur dari solution Q dipindahkan ke dalam solution P, terangkan apa yang akan berlaku kepada sel dalam jalur tersebut selepas 20 minit.

For Examiner's Use

.....

.....

.....

.....

[3 *marks*]

2(a)(iii)

3

(b) Diagram 2.2 shows the red blood cells in different concentrations of solutions.
Rajah 2.2 menunjukkan sel darah merah di dalam larutan yang berlainan kepekatan.

Red blood cells **X** in 3% sodium chloride solution after 30 minutes
*Sel darah merah **X** dalam larutan natrium klorida 3% selepas 30 minit*

Red blood cells **Y** in 0.1% sodium chloride solution after 30 minutes
*Sel darah merah **Y** dalam larutan natrium klorida 0.1% selepas 30 minit*

Diagram 2.2
Rajah 2.2

Explain the differences between the process experienced by the red blood cell X and Y after being immersed for half an hour.
Terangkan perbezaan di antara proses yang dialami oleh sel darah merah X dan Y setelah direndam 30 minit.

.....

.....

.....

.....

[3 *marks*]

2(b)

3

For Examiner's Use

(c) Vinegar is natural preservative that can be used to preserve fruits and vegetables to last longer. Explain how the preservative is effective in the preservation of mangoes.
Cuka adalah pengawet semulajadi yang boleh digunakan untuk mengawet buah-buahan dan sayur-sayuran. Terangkan bagaimana pengawet tersebut berkesan dalam pengawetan buah mangga.

2(c)

3

.....

.....

.....

.....

[3 *marks*]

3. Diagram 3 shows the structure of plant reproduction organ.
Rajah 3 menunjukkan struktur organ pembiakan tumbuhan.

For Examiner's Use

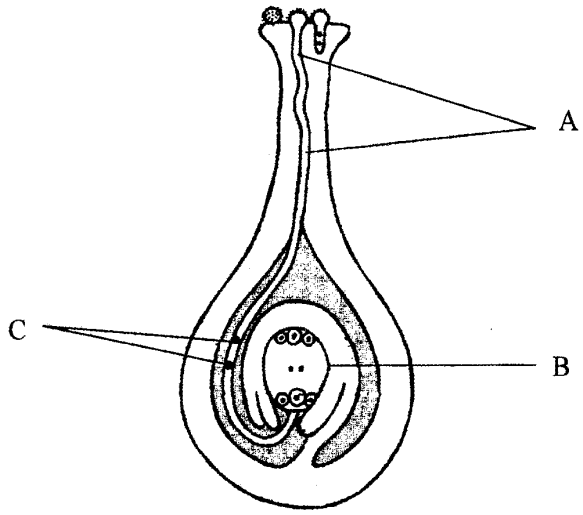


Diagram 3
Rajah 3

(a) Based on the Diagram 3, name the structures labelled.
Berdasarkan pada Rajah 3, namakan struktur yang berlabel.

A: .....

B: .....

C: .....

[2 *marks*]

3(a)

2

(b) (i) Explain the function of structure A.
Terangkan fungsi struktur A.

.....

.....

[2 *marks*]

3(b)(i)

2

(ii) Explain the process occur when the structure A reaches the structure B.
Terangkan proses yang berlaku bila struktur A sampai ke struktur B.

.....

.....

.....

.....

[3 *marks*]

3(b)(ii)

3

For Examiner's Use

(c) Explain how the development of fruits and seeds after process in (b)(ii) occur.
Terangkan bagaimana perkembangan biji dan buah selepas proses dalam (b)(ii) berlaku.

3(c)

3

.....

.....

.....

.....

.....

[3 *marks*]

(d) Suggest how to prevent the germination of structure A.
Cadangkan bagaimana menghalang percambahan struktur A

3(d)

2

.....

.....

.....

[2 *marks*]

4. Diagram 4.1 shows the exchange of respiratory gases X and Y between the alveolus, blood capillary and the body cells and the transport of the gaseous.
Rajah 4.1 menunjukkan pertukaran gas respirasi X dan Y di antara alveolus, salur darah dan sel badan serta pengangkutan gas-gas tersebut.

For Examiner's Use

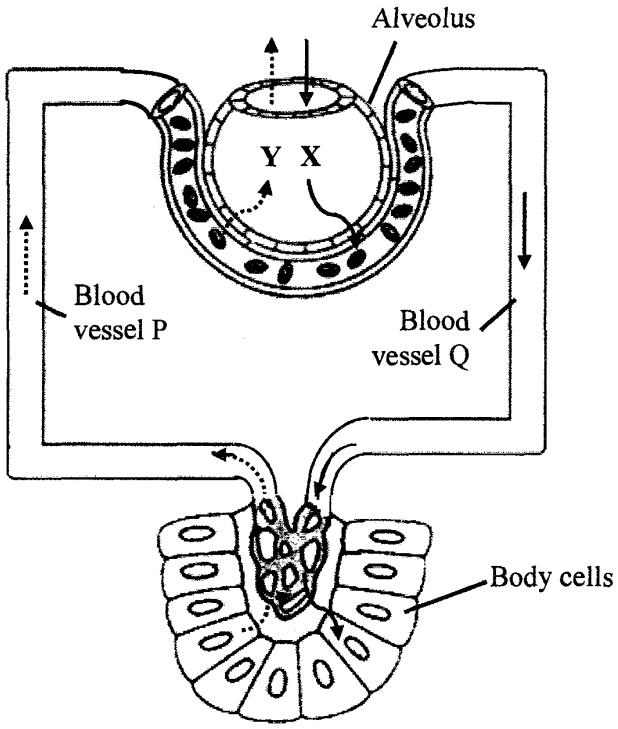


Diagram 4.1
Rajah 4.1

(a) (i) Name gas X and Y.
Namakan gas X dan Y.

X : .....

Y : .....

[2 *marks*]

4(a)(i) 2

(ii) State the difference between blood content in P and Q.
Nyatakan perbezaan antara kandungan darah dalam P dan Q.

.....

[1 *mark*]

4(a)(ii) 1

(iii) State **one** characteristic of alveoli are adapted for efficient gas exchange.
*Nyatakan **satu** ciri alveolus diadaptasikan untuk pertukaran gas yang efisien.*

.....

[1 *mark*]

4(a)(iii) 1

For Examiner's Use

4(b)

3

(b) Describe how gaseous exchange occurs between alveolus and blood capillaries.
Huraikan bagaimana pertukaran gas berlaku antara alveolus dan kapilari darah.

.....

.....

.....

[3 *marks*]

4(c)

3

(c) Explain the **main** way how gas Y is transported from body cells to the alveolus.
*Terangkan cara **utama** bagaimana gas Y diangkut dari sel-sel badan ke alveolus.*

.....

.....

.....

.....

[3 *marks*]

(d) Diagram 4.2 shows the use and production of ATP in human body cells.
Rajah 4.2 menunjukkan penggunaan dan penghasilan ATP di dalam sel badan manusia.

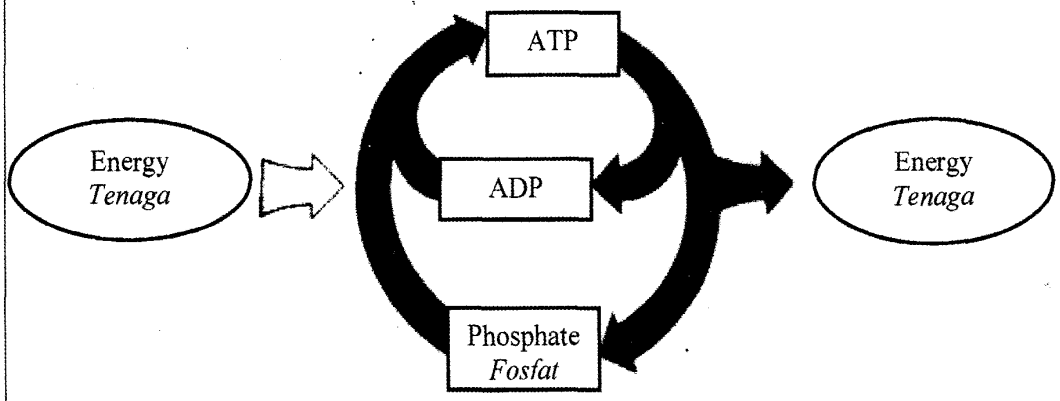


Diagram 4.2
Rajah 4.2

Based on Diagram 4.2, explain how energy from respiration is used for cells activity.
Berdasarkan Rajah 4.2, terangkan bagaimana tenaga dari respirasi digunakan untuk aktiviti sel.

4(d)

2

.....

.....

[2 *marks*]

5. A pure breeding pea plant with green pod and round seeds was crossed with a pure breeding pea plants with yellow pod and wrinkled seeds.
Baka tulen tumbuhan kacang pea buah hijau dan biji licin telah dikacukkan dengan baka tulen tumbuhan kacang pea buah kuning dan biji berkedut.

For Examiner's Use

Parent (P) **Induk (I)**	**A**		**B**
Phenotype *Fenotip*	Green pod, round seed *Buah hijau, biji bulat*	X	Yellow pod, wrinkled seed *Buah kuning, biji berkedut*
Genotype *Genotip*	.....		.....

Gametes *Gamet*: GR gr

Fertilisation *Persenyawaan*

F1 generation **Generasi F1**: **C**

Genotype *Genotip*	.....
Phenotype *Fenotip*	Green pod, round seed *Buah hijau, biji bulat*

Diagram 5
Diagram 5

5(a)

(a) State the genotype of plant A, B and C in Diagram 5.
Nyatakan genotip tumbuhan A, B dan C dalam Diagram 5.

[2 *marks*]

2

For Examiner's Use

(b) Explain why the plant C is green pod and round seed.
Terangkan mengapa tumbuhan C adalah buah hijau dan biji bulat.

5(b)

2

.....

.....

.....

.....

[2 *marks*]

(c) The F1 generation plants were allowed to self-pollinate.
Tumbuhan generasi F1 dibenarkan mengalami persenyawaan sendiri.

5(c)(i)

1

(i) State the gamete produced from F1.
Nyatakan gamet yang dihasilkan dari F1.

.....

[1 *mark*]

(ii) Draw a Punnett Square to show F2 generation.
Lukis segiempat Punnett untuk menunjukkan generasi F2.

5(c)(ii)

3

[3 *marks*]

(d) Based on the Punnett Square in (c), calculate the phenotype ratio of F2 generation produced from the cross.
Berdasarkan segiempat Punnett dalam (c), kira nisbah fenotip generasi F2 yang terhasil dari kacukan.

[2 *marks*]

For Examiner's Use

5(d)

2

(e) Explain why two phenotype of the F2 generation is different compared to parent A and B?
Terangkan mengapa dua fenotip dari generasi F2 berbeza daripada induk A dan B?

.....

.....

.....

.....

[2 *marks*]

5(e)

2

SECTION B
[40 *marks*]
Answer **any** two questions from this section
*Jawab mana-mana **dua** soalan daripada bahagian ini*

(6) (a) Diagram 6.1 shows the connection between a part of blood circulatory system, lymphatic circulatory system and body cells.
Rajah 6.1 menunjukkan perhubungan sebahagian daripada sistem peredaran darah, sistem peredaran limfa dan sel-sel badan.

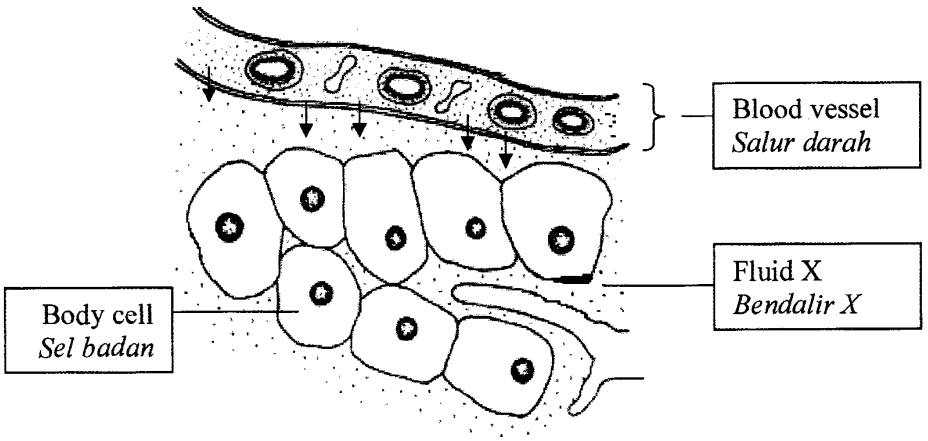


Diagram 6.1
Rajah 6.1

(i) Describe the formation of fluid X.
Huraikan pembentukan bendalir X.

[6 *marks*]

(ii) Explain the function of fluid X.
Terangkan fungsi bendalir X.

[4 *marks*]

The role of lymphatic system is complimentary to the transport system. It is also produce leucocytes.
Peranan sistem limfa adalah pelengkap kepada sistem pengangkutan. Ia juga menghasilkan sel darah putih.

(b) State **two** types of leucocytes produced and explain their role in the body defence mechanism.
*Nyatakan **dua** jenis sel darah putih yang dihasilkan dan terangkan peranannya terhadap mekanisma pertahanan badan.*

[10 *marks*]

7. Diagram 7.1 shows the human growth curve and Diagram 7.2 shows insect growth curve.
Rajah 7.1 menunjukkan graf lengkung pertumbuhan manusia dan Rajah 7.2 menunjukkan lengkung pertumbuhan serangga.

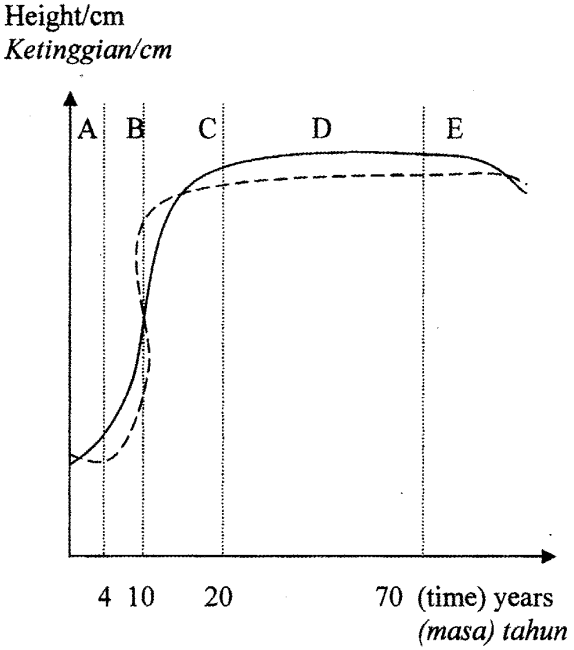


Diagram 7.1
Rajah 7.1

(a) (i) Based on Diagram 7.1, explain the growth curve of boys and girls in phase A, B, C, D and E.
Berdasarkan Rajah 7.1, terangkan lengkung pertumbuhan lelaki dan perempuan pada fasa A, B, C, D dan E.

[8 *marks*]

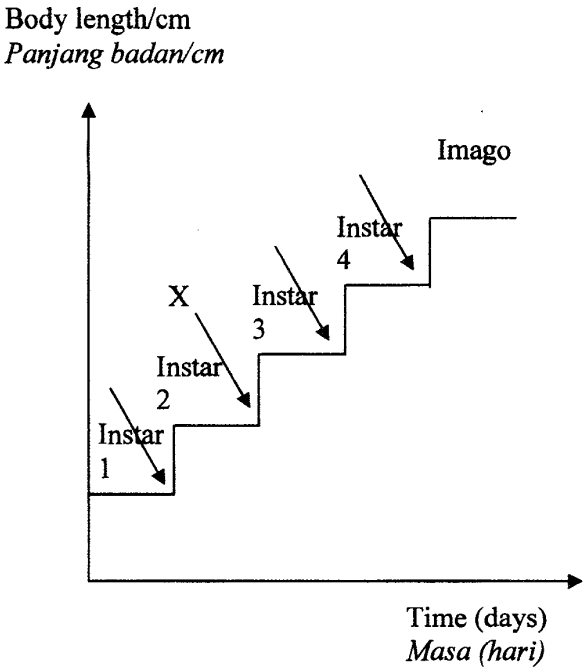


Diagram 7.2
Rajah 7.2

(ii) Based on Diagram 7.2, explain the role of X in the development of insect.
Berdasarkan Rajah 7.2, terangkan peranan X dalam perkembangan serangga.

[6 *marks*]

(b) Explain the contribution of science and technology in male contraception.
Terangkan sumbangan sains dan teknologi dalam pencegahan kehamilan lelaki.

[6 *marks*]

8 (a) Diagram 8.1 shows activity carries by a construction company in forest areas.
Rajah 8.1 menunjukkan aktiviti yang dilakukan oleh sebuah syarikat pemaju di kawasan hutan.

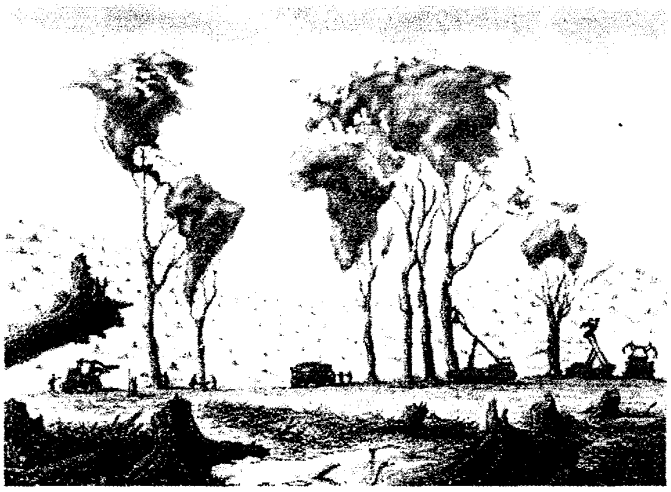


Diagram 8.1
Rajah 8.1

Based on your biological knowledge, justify why does this activity has to be stopped.
Berdasarkan pengetahuan biologi anda, justifikasi mengapa aktiviti ini harus dihentikan.

[10 *marks*]

(b) The thinning of the ozone layer as shown in Diagram 8.2 is one of the environmental issues that always being discussed.
Penipisan lapisan ozon seperti ditunjukkan dalam Rajah 8.2 merupakan satu daripada isu alam sekitar yang sering dibincangkan.

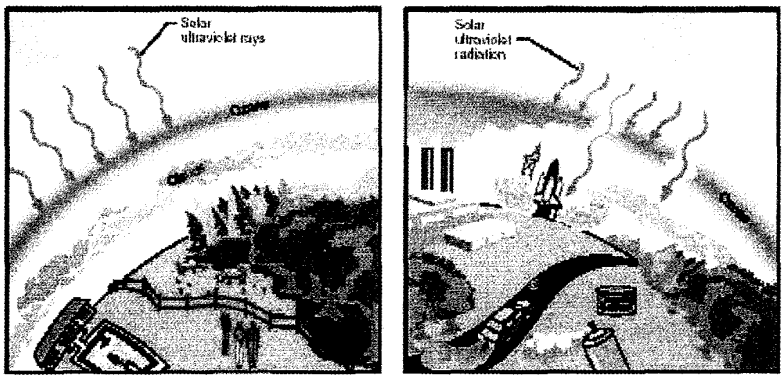


Diagram 8.2
Rajah 8.2

Describe how the ozone layer becomes thinner and its effects on humans and the environment.
Huraikan bagaimana kejadian penipisan lapisan ozon dan kesannya kepada manusia serta alam sekitar.

[10 *marks*]

9. Diagram 9 shows the structure of nephron in the human kidney.
Rajah 9 menunjukkan struktur nefron dalam ginjal manusia.

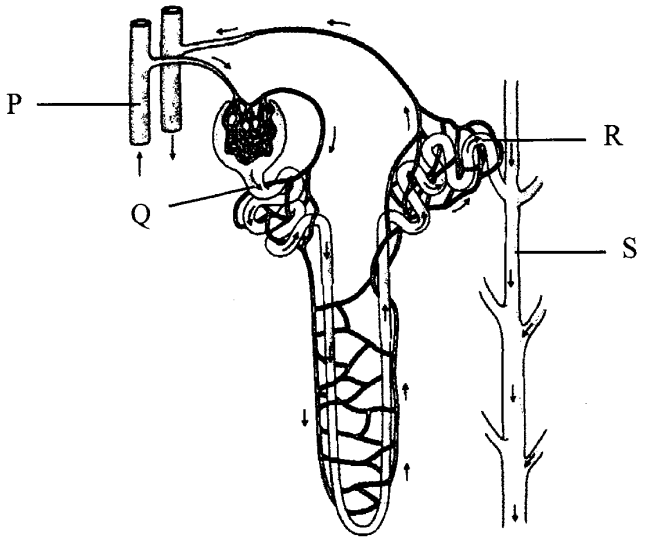


Diagram 9
Rajah 9

(a) Describe the process that occurs at Q and R in regulation of blood osmotic pressure when a boy done vigorous activity.
Huraikan proses yang berlaku di Q dan R dalam kawalaturan tekanan osmosis darah bila seorang budak lelaki melakukan aktiviti cergas.

[10 *marks*]

(b) Table 1 shows the concentration of solutes in the P, Q and S of an adult.
Jadual 1 menunjukkan kepekatan bahan larut di dalam P, Q dan S pada seorang dewasa.

Solute	Concentration of solutes (g/dm³)		
	P	Q	S
Glucose	1.0	1.0	0.0
Amino acid	1.5	1.5	0.0
Protein	80.0	0.0	0.0
Urea	0.3	0.3	20.0
Sodium ion, Na^+	3.2	3.2	1.6

Table 1
Jadual 1

Based on Table 1, explain why the concentration of solutes in the P, Q and S of the adult differ.
Berdasarkan Jadual 1, terangkan mengapa kepekatan bahan larut dalam P, Q dan S adalah berbeza pada seorang dewasa.

[10 *marks*]

END OF THE QUESTIONS

NAMA : .....TINGKATAN : .....

4551/3
Biologi
KERTAS 3
Mei 2011
1 ½ jam

JABATAN PELAJARAN NEGERI TERENGGANU

PEPERIKSAAN PERTENGAHAN TAHUN OTI 1
SIJIL PELAJARAN MALAYSIA 2011

BIOLOGI

Kertas 3

Satu jam tiga puluh minitt

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Tuliskan nama dan tingkatan anda pada ruang yang disediakan*
2. *Jawab **semua** soalan*
3. *Jawapan anda hendaklah ditulis dalam ruang yang disediakan dalam kertas soalan*
4. *Rajah yang mengiringi soalan dimaksudkan untuk memberi maklumat yang berguna bagi menjawab soalan. Rajah tidak dilukis mengikut skala kecuali dinyatakan.*
5. *Markah yang diperuntukkan bagi setiap soalan dan ceraian soalan ditunjukkan dalam kurungan*
6. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.*

Kod Pemeriksa		
Soalan	Markah Penuh	Markah Diperolehi
1	33	
2	Respons dan Data 17	
TOTAL		

Disediakan oleh:
GURU AKRAM NEGERI TERENGGANU

Dibiayai oleh:
KERAJAAN NEGERI TERENGGANU

TERENGGANU ANJUNG ILMU

Dicetak Oleh:
Percetakan Yayasan Islam Terengganu Sdn. Bhd.
Tel: 609-666 8611/6652/8601 Faks: 609-666 0611/0063

Kertas soalan ini mengandungi 16 halaman bercetak

MAKLUMAT UNTUK SOALAN

1. Jawab semua soalan.

2. Jawapan anda hendaklah ditulis dalam ruang yang disediakan dalam kertas soalan.

3. Sekiranya anda hendak menukarkan jawapan, batalkan jawapan yang telah dibuat. Kemudian tuliskan jawapan yang baru.

4. Rajah yang mengiringi soalan dimaksudkan untuk memberi maklumat yang berguna bagi menjawab soalan. Rajah tidak dilukis mengikut skala kecuali dinyatakan.

5. Markah yang diperuntukkan bagi setiap soalan dan ceraian soalan ditunjukkan dalam kurungan.

6. Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan.

7. Kertas soalan ini hendaklah diserahkan di akhir peperiksaan.

Pemberian markah:

Markah	Penerangan
3	**Cemerlang** : Respons yang paling baik
2	**Memuaskan** : Respons yang sederhana
1	**Lemah** : Respons yang kurang tepat.
0	Tiada respons **atau** respons salah

Answer all questions

Question 1
Soalan 1

A group of student carried out an experiment to study on the transpiration rate of a plant shoot. The factors that cause water loss from the leaves are light intensity, temperature, air movement and humidity.
Sekumpulan pelajar menjalankan eksperimen untuk mengkaji kadar transpirasi pucuk tumbuhan. Faktor-faktor yang menyebabkan kehilangan air daripada daun-daun adalah keamatan cahaya, suhu, pergerakan udara dan kelembapan udara.

Diagram 1.1 shows the apparatus set-up used in this experiment. The apparatus are prepared and kept in laboratory to study the effect of different temperature on the transpiration rate of plant shoot
Rajah 1.1 menunjukkan susunan radas yang digunakan dalam eksperimen ini. Radas disediakan dan disimpan di dalam makmal untuk mengkaji kesan suhu berlainan ke atas kadar transpirasi pucuk tumbuhan.

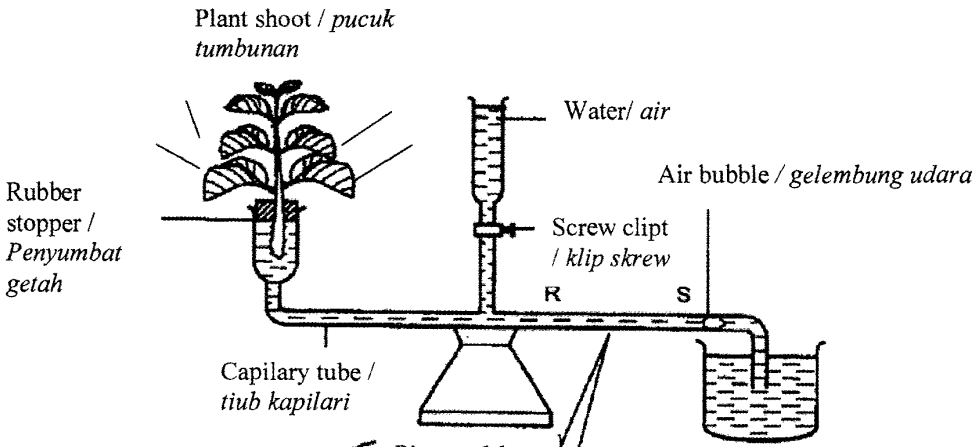


Diagram 1.1
/Rajah 1.1

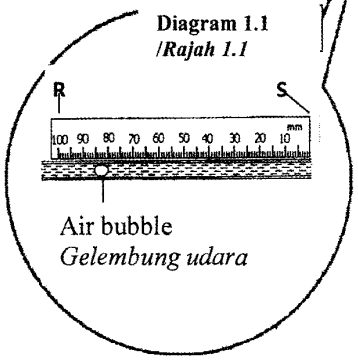
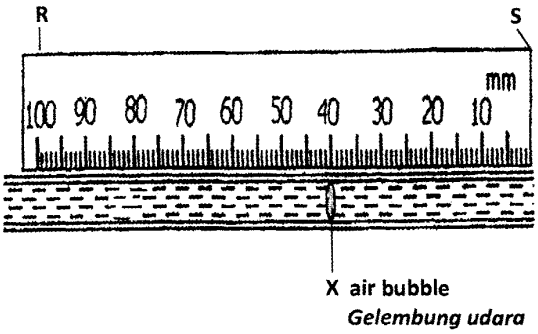
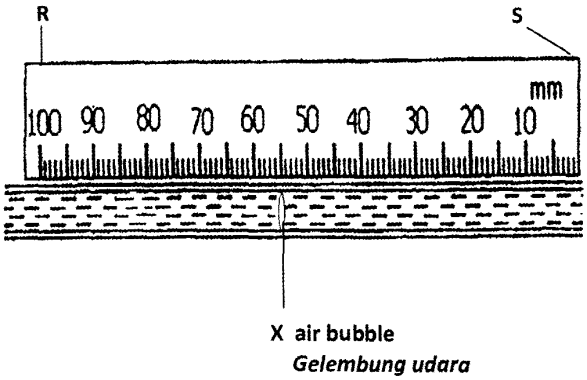


Diagram 1.2
/Rajah 1.2

Diagram 1.2 shows the position of the distance travelled by air bubble in 5 minutes. Two points, R and S are marked with 100 mm distance at the Potometer's tube.

Rajah 1.2 menunjukkan kedudukan jarak pergerakan gelembung udara. Dua titik R dan S ditanda dengan jarak 100 mm pada tiub potometer.

Table 1.3 shows the temperature and the final distance travelled by air bubble at the potometer after 5 minutes.
Jadual 1.3 menunjukkan suhu dan jarak akhir pergerakan gelembung udara pada potometer selepas 5 minit.

Temperature / *suhu* ^{0}C	The final distance travelled by air bubble after 5 minutes / mm *Jarak akhir pergerakan gelembung udara selepas 5 minit /mm*
20	
30	

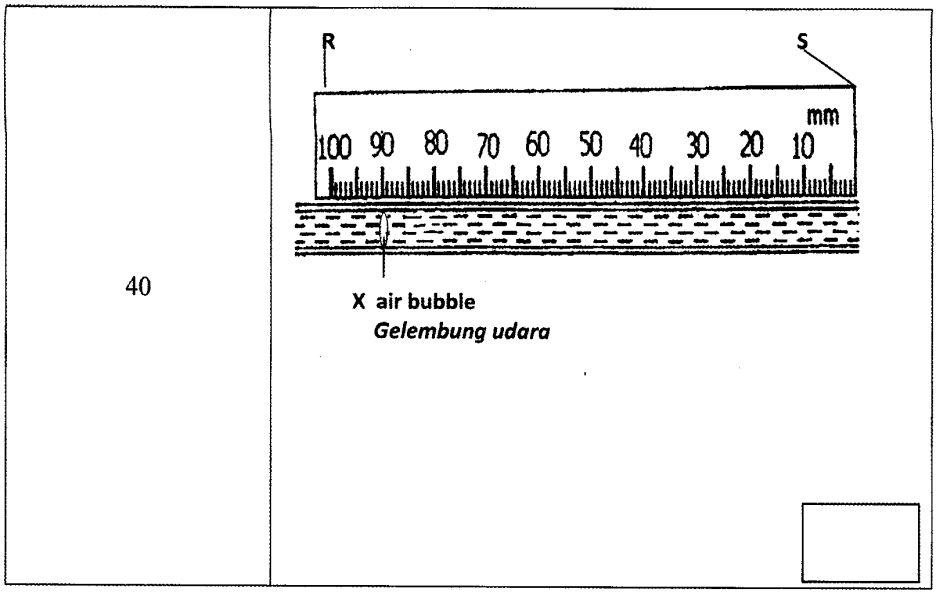


Table 1.3
Jadual 1.3

(a) Complete the Table 1.3 by recording the final distance travelled by air bubble after 5 minutes

Lengkapkan Jadual 1.3 dengan merekodkan kedudukan akhir jarak pergerakan gelembung udara selepas 5 minit.

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

For Examiner's Use

1(a)

(b)(i) Based on table 1.3 state **two** observations on this experiment.
Berdasarkan Jadual 1.3, nyatakan dua pemerhatian ke atas eksperimen ini.

Observation1/ *Pemerhatian* 1:

.....

.....

.....

Observation 2/ *Pemerhatian 2*:

.....

.....

.....

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

1(b)(i)

For Examiner's Use

(ii) State the inference which corresponds to the observations in 1 (b)(i)
Nyatakan inferens yang sepadan dengan pemerhatian di 1(b)(i)

Inference from observation 1:
Inferens daripada pemerhatian 1:

.....

.....

.....

1(b)(ii)

Inference from observation 2:
Inferens daripada pemerhatian 2:

.....

.....

.....

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

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

Variable *Pembolehubah*	Method to handle the variable *Cara mengendali pembolehubah*
Manipulated variable: *Pembolehubah dimanipulasikan:*	....
Responding variable: *Pembolehubah bergerakbalas:*	....

For Examiner's Use

Constant variable: *Pembolehubah dimalarkan:*	.....
.....	.....
.....	.....
.....	

1(c)

Table 2
Jadual 2

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

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

.....

.....

.....

.....

1(d)

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

(e)(i) Based on the Table 1.2, construct a table and record the results of this experiment which includes the following aspects:

Berdasarkan Jadual 1.2, bina satu jadual dan rekodkan keputusan eksperimen ini dimana termasuk aspek-aspek berikut:

- Temperature
  Suhu
- The final distance travelled by air bubble
  Jarak akhir pergerakan gelembung udara
- Rate of transpiration
  Kadar transpirasi

  Use the formula:
  [Rate of transpiration = $\frac{\text{final distance travelled by air bubble}}{\text{Time}}$]

  Gunakan formula:
  [Kadar transpirasi = $\frac{\text{Jarak akhir pergerakan gelembung gas}}{\text{Masa}}$]

For Examiner's Use

1(e)(i)

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

(e)(ii) Use the graph paper provided on page 11 to answer this question.
Using the data in 1(e)(i), draw a graph on rate of transpiration against the temperature.
Guna kertas graf yang disediakan di halaman 11 untuk menjawab soalan ini. Menggunakan data di 1(e)(i), lukis graf ke atas kadar transpirasi melawan suhu.

1(e)(ii)

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

(f) Based on the graph in 1(e)(ii), explain the relationship between the rate of transpiration and temperature.
Berdasarkan graf di 1(e)(ii). Terangkan hubungan di antara kadar transpirasi dengan suhu.

.....

.....

.....

.....

.....

1(f)

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

(g) This experiment is repeated by using the same set of apparatus but a transparent polythene beg was used to cover the plant shoot with anhydrous sodium chloride. Predict the final distance travelled by air bubble at temperature of 40^0C. Explain your prediction.

Eksperimen ini diulangi dengan menggunakan susunan radas yang sama tetapi menggunakan beg politena yang lutsinar untuk menutup pucuk tumbuhan bersama natrium klorida kontang.
Ramalkan jarak akhir pergerakan gelembung udara pada suhu 40^0C.

Terangkan ramalan anda.

.....

.....

.....

.....

.....

.....

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

For Examiner's Use

1(g)

(h) Based on this experiment , deduce operationally for transpiration.
Berdasarkan eksperimen ini, definisi secara operasi bagi transpirasi.

.....

.....

.....

.....

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

1(h)

(i) These students found that, the rate of transpiration depends on the factors of transpiration. They list out several factors that affect the rate of transpiration as follows:
Pelajar-pelajar ini mendapati bahawa kadar transpirasi bergantung kepada faktor transpirasi. Mereka telah menyenaraikan beberapa faktor yang mempengaruhi kadar transpirasi seperti berikut :

For Examiner's Use

Light intensity, number of leaves, place for stoma, air movement
keamatan cahaya, bilangan daun, kedudukan stoma, tiupan angin,

wax cuticle, size of leaf, air humidity, curld leaf
kutikel berlilin, saiz daun, kelembapan udara, daun bergulung

Categorised the above factors based on the morphological factor or environmental factor.
Kategorikan faktor-faktor di atas berdasarkan sama ada faktor morfologi atau faktor persekitaran.

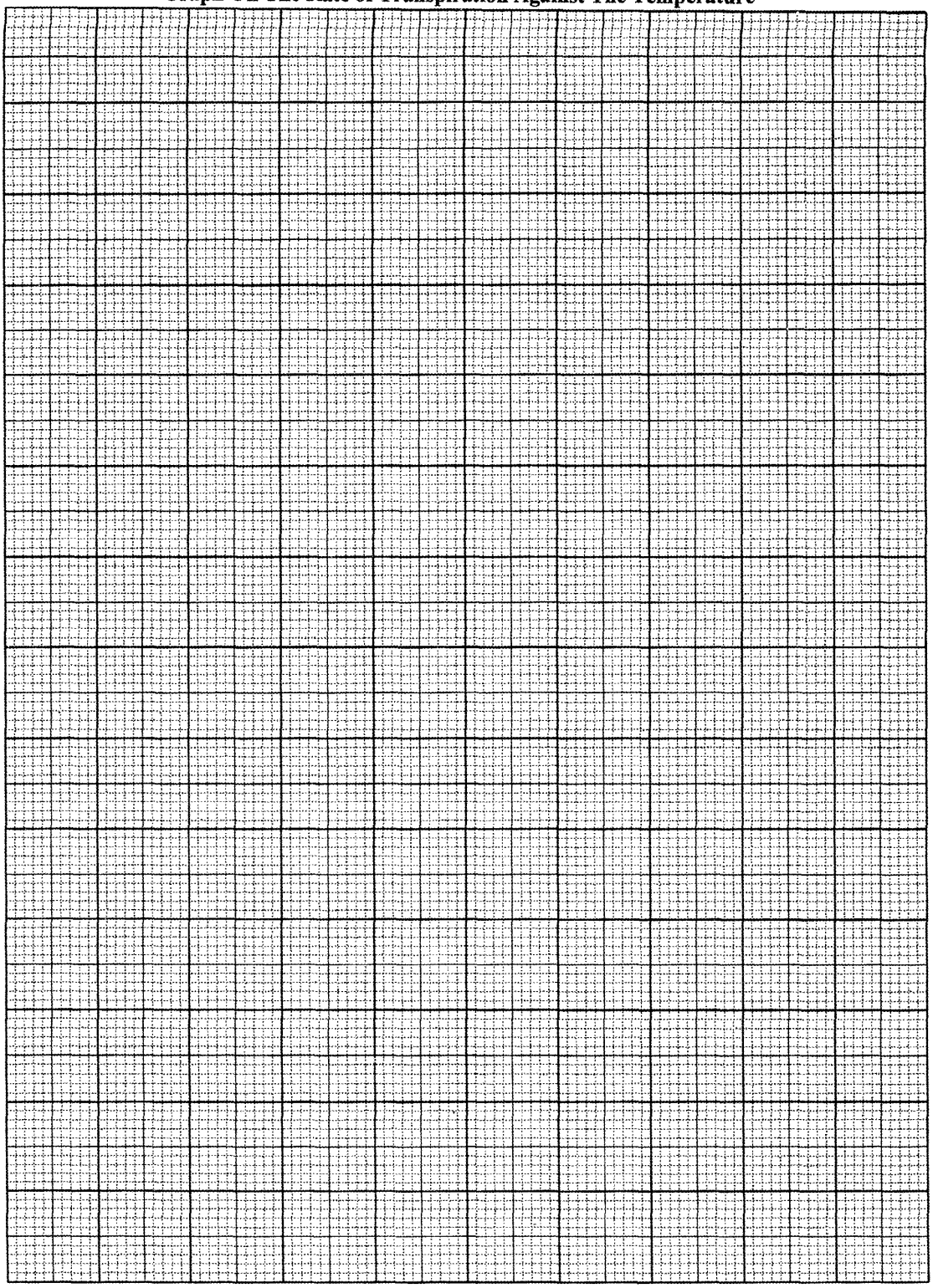
Morphological Factor *Faktor morfologi*	Environmental Factor *Faktor persekitaran*

1(i)

Table 3
Jadual 3

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

Graph On The Rate of Transpiration Against The Temperature



Question 2.
Soalan 2

Blood osmotic pressure changes after a person drinks excess water. This situation affects the quantity of urine output.
Tekanan osmosis darah berubah selepas seseorang individu meminum banyak air. Situasi ini mempengaruhi kuantiti air kencing yang dikeluarkan

Based on the above situation, plan a laboratory experiment to study the effect of water intake onto urine formation.
Berdasarkan situasi di atas, rancangkan satu eksperimen makmal untuk mengkaji kesan pengambilan air ke atas pembentukan air kencing

Your experiment planning must include the following aspects:
Perancangan eksperimen anda mestilah merangkumi aspek-aspek berikut :

- Problem Statement
  Pernyataan masalah
- Variables
  Pembolehubah
- Hypothesis
  Hipotesis
- List of apparatus and materials.
  Senarai radas dan bahan
- Experimental procedure or method
  Prosedur eksperimen atau kaedah
- Presentation of data
  Persembahan data

[17 marks]

[17 *markah*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

SPACE FOR THE ANSWER

Part ..... **Question Number.....**

JABATAN PELAJARAN TERENGGANU

PEPERIKSAAN PERCUBAAN 2011
SIJIL PELAJARAN MALAYSIA

SKEMA JAWAPAN

BIOLOGI
4551

Kertas jawapan ini mengandungi 21 halaman bercetak

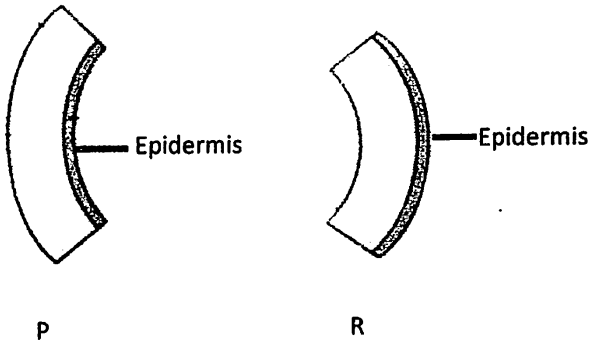
PERATURAN PEMARKAHAN
PEPERIKSAAN PERCUBAAN SPM TAHUN 2011

MATAPELAJARAN : BIOLOGI KERTAS 1

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

PAPER2: Section A

Num	SCORING CRITERIA	MARK	
1(a)	**Able to label S in Diagram 1** *Answer:* Glucose	 1	
1(b)	**Able to state two characteristics of the enzyme explained by the hypothesis** *Answer:* P1 : Enzyme are highly specific P2 : Enzyme are not destroy at the end of reaction P3 : Enzyme catalysed reaction are reversible	 1 1 1	 Max 2 marks
1(c)(i)	**Able to explain the reaction of sucrase if the temperature meium is 60^0C** *Suggested Answer:* P1 : 60^0C is high temperature P2 : At very high temperature the chemical bond that hold enzyme molecules together begin to break P3 : thus altering the three dimensional shape of enzyme P4 : destroying active site of enzyme/enzyme denatured	 1 1 1 1	 Max 3 marks
1(c)(ii)	**Able to explain the reaction of sucrase if pH value medium is 3** *Suggested Answer* P1 : At low pH value excess hydrogen ions attach to the active site of enzyme P2 : Cause ionic charges on the activity site are altered P3 : Substrate is unable to bind to the enzyme/ reaction cannot take place	 1 1 1	 Max 2 mark
1(d)(i)	**Able to explain examples of the applications of enzymes in dairy products industry** *Answer:* P1 : Lipase E1 : Ripening cheese or P2 : Rennin E2 : Solidify milk protein	 1 1 1 1	 Max 2 marks
1(d)(ii)	**Able to explain examples of the applications of enzymes in cereal grains products industry** *Answer:* P1 : Cellulose E1 : Breakdown cellulose and removes seed coat from cereal grains	 1 1	 Max 2 marks
		Total	**12 marks**

NUM	SCORING CRITERIA	MARKS	
2(a)	**Able to draw the shape of each strip after 20 minutes and label the epidermis.** *Answer:*  P R	P=1 R=1	2
2(b)(i)	**Able state the type of solution in beaker Q.** *Answer:* Isotonic solution		1
2(b)(ii)	**Able to explain how the solution in the beaker R affects the condition of the cells in the strip that have been immersed** *Suggested Answer:* P1: 30% sucrose solution / solution in beaker R is hypertonic compare to the cell sap P2: water molecules diffuse out of the large central vacuole by osmosis P3: both vacuole and cytoplasm shrink // the plasma membrane pulls away from the rigid cell wall // the cells becomes flaccid, plasmolysis occurs. **Any 2**	1 1 1	Max 2
2(b)(iii)	**Able to describe what will happen to the cells in the strip if strip from the beaker R is transferred into beaker P** *Suggested Answer:* P1: distilled water / solution in beaker P is hypotonic compare to the cell sap P2: water molecules diffuse into the large central vacuole /cell sap by osmosis P3: central vacuole expand and swell up // plasma membrane pushes against the rigid cell wall P4: flaccid cell becomes fully turgid again P5: the cells is said to have undergone deplasmolysis **Any 3**	1 1 1 1 1	Max 3

2(c)	**Able to explain how the preservative is effective in the preservation of the fruit** *Suggested Answer:* P1: Fruit / mangoes are immersed in vinegar which is has a low pH / acidic P2: Vinegar diffuses into the tisues of the mangoes / fruit P3: The tissues of mangoes / fruits becomes acidic P4: The low pH prevent bacterial growth in the tissues / mangoes / fruits P5: This prevents decay of the fruits/mangoes // the mangoes / fruit can be preserved to last longer **Any 4**	1 1 1 1 1 **Total**	Max 4 **12**

Item Num	Mark Scheme	Mark	
3(a)	Able to name the label *Answer*: A: pollen tube B:embryo sac C:male gametes	/3- 2 /2-1 /1-0	2
3(b)(i)	Able to explain the function of structure A *Answer*: F: it grows down the style into ovary /enters the ovule E: by secretes enzymes to digest the surrounding tissues as it grows downwards	1 1	2
3 (b)(ii)	Able to explain the process occur *Answer*: E1: One of the male gamete/structure C fuse with the egg cells to form a diploid zygote . E2: and the other gamete/structure C fuses with the two polar nuclei, forming a triploid nucleus. E3: this process known Double fertilization	1 1 1	3
3 (c)	Able to explain the formation of fruit and seed, *Suggested Answer:* E1: After fertilization, the ovary becomes a fruit, E2: the ovule become a seed. E3: the triploid nucleus becomes the endosperm E4: integuments become the seed coat.	1 1 1 1 *Any 3*	3
3(d)	Able to suggest to prevent germination of A Answer; -Place it in dry -Keep in air tight container	1 1	2
	Total	12 M	

NUM.	MARK SCHEME	MARKS	
4(a)(i)	*Able to name gas X and Y correctly* *Answer* X : Oxygen Y : Carbon dioxide	 1 1	
4(a)(ii)	*Able to state the difference between blood content in P and Q.* *Answer* P rich in oxygen compare to Q // Q rich in carbon dioxide compare to P	 1	3
4(a)(iii)	*Able to state **one** characteristic of alveoli are adapted for efficient gas exchange* *Answer:* E1 Thin wall / One cell thick E2 Moist surface E3 Numerous alveolus provide large surface area	 1 1 1	1
4(b)	*Able to explain how gaseous exchange between alveolus and blood capillaries.* *Answer* E1- Partial pressure / concentration of oxygen in alveolus higher than in blood capillaries E2- oxygen diffuses from alveolus to blood capillaries E3 - by simple diffusion or E4- Partial pressure / concentration of carbon dioxide in blood capillaries is higher than in alveolus E5- carbon dioxide diffuses from blood capillaries to alveolus E6- by simple diffusion	 1 1 1 1 1 1	3
4(c)	*Able to explain the main way how gas Y is transported from body cells to the alveolus.* *Answer* E1 : Carbon dioxide (released by body cells) diffuses into the blood plasma E2 : carbon dioxide (in red blood cells) reacts with water to form carbonic acid E3 : Red blood cells contain the enzyme carbonic anhydrase E4 : Carbonic acid dissociates to form hydrogen ion and bicarbonate ion E5 : Bicarbonate ions diffuse (from the red blood cell) into blood plasma E6 : Bicarbonate ion carried by the blood plasma to the lung Any 3	 1 1 1 1 1 1	3

4(d)	*Able to explain how energy from respiration is use for cells activity* *Suggested answer:* E1 (Energy is released by respiration) to synthesis ATP from ADP and Phosphate E2 ATP broken down into ADP and Phosphate to release energy (for cells activity)	 1 1	 2
	TOTAL	**12M**	

NUM	SCORING CRITERIA	MARK	
5(a)	**Able to state the genotype of plant A, B and C** **Sample answer:** Plant A: GGRR Plant B: ggrr Plant C: GgRr *2-3 correct answer = 2m* *1 correct answer = 1m*		2
(b)	**Able to explain why the plant C is green pod and round seed** **Sample answer:** F: genotype of plant C is GgRr P1: C receive (gamete contain) dominant G allele that controlled green pod P2: and receive (gamete contain) dominant R allele that controlled round seed *Any 2*	1 1 1	2
(c)(i)	**Able to state the gamete produced from F1** **Sample answer:** Gametes GR Gr gR gr *All gamete must correct*	1	
(ii)	<table><tr><td>Gametes</td><td>GR</td><td>Gr</td><td>gR</td><td>gr</td></tr><tr><td>GR</td><td>GGRR</td><td>GGRr</td><td>GgRR</td><td>GgRr</td></tr><tr><td>Gr</td><td>GGRr</td><td>GGrr</td><td>GgRr</td><td>Ggrr</td></tr><tr><td>gR</td><td>GgRR</td><td>GgRr</td><td>ggRR</td><td>ggRr</td></tr><tr><td>gr</td><td>GgRr</td><td>Ggrr</td><td>ggRr</td><td>ggrr</td></tr></table> *12 – 16 genotype = 3 marks* *7 - 11 genotype = 2 marks* *2- 6 genotype = 1 marks*	3	4
(d)	**Able to calculate the phenotype ratio of F2 generation produced from the cross.** Phenotype : Green pod, round seed Green pod, wrinkled seed Yellow pod, round seed Yellow pod, wrinkled seed	1	

	No of each phenotype 9/16 3/16 3/16 1/16 Phenotype ratio 9 : 3 : 3 : 1 *any two*	1 1	2
(e)	**Able to explain why two phenotype of the F2 generation is different compared to parent A and B** F: (according to Mandel Second Law/ Law of Independent Assortment) the production of gametes with **different allele combination/ recombination** P1: the alleles (for pod colour and seed shape) **segregate independently** because they are located on **different chromosome** P2: causes green pod and wrinkled seed and yellow pod and round seed (is different from parent A and B) *Any two*	1 1 1	2
		TOTAL	**12**

Section B

NO.ITEM	CRITERIA	MARK	
6(a)(i)	*Able to describe the formation of fluid X.* *Sample answer*: P1: fluid X is interstitial fluid P2: the diameter of artery / arteriole bigger than blood capillaries P3: causes high hydrostatic pressure in the artery / arterioles P4: (higher pressure) <u>forces</u> water and dissolved substances / dissolve nutrient // <u>forces</u> some fluid P5: diffuse out into interstitial space / space between cell P6: fluid X not contain plasma protein / erythrocytes / platelets P7: because their size too large (to pass through the capillary walls)	1 1 1 1 1 1 1	Any 6 6m
6(a)(ii)	*Able to explain the function of fluid X* *Sample answer*: F1: fluid X allow the exchange of nutrient / glucose / amino acid / glycerol / fatty acid / oxygen P1: diffuse from the blood to the body cell F2: fluid X allow the exchange of carbon dioxide / urea / waste product P2: diffuse from the body cell to the blood F3: maintain the optimum internal environment P3: to maintain chemical factors / physical factors for the cell function optimally.	1 1 1 1 1 1	Any 4 4m
6(b)	*Able to state two type of leucocytes* *Sample answer:* - monocyte cell/ phagocyte cell/ neutrophyll cell - lymphocytes *Able to explain the role in the body defense mechanism* *Sample answer:* <u>monocyte cell/ phagocyte cell/ neutrophyll cell</u> F1: by phagocytosis process P1: the phagocyte cell extends its pseudopodium towards the pathogen / bacteria P2: (phagocyte) engulf and ingest pathogen by forming a vacuole / phagocytic vesicle	1 1 1 1 1	2m

	P3: Lysosome release lysozyme / enzyme (into the phagocytic vesicle) to hydrolyse / digest / kill the pathogen	1	
	P4: phagocyte release the digested product from the cell	1	Any 4P 4m
	P5: diagram to show phagocytosis	1	
			
	lymphocyte cell		
	F2: to produce antibodies	1	
	P6: antibodies only react with specific antigen	1	
	P9: antibodies destroy/ react with antigen by agglutination / neutralisation / opsonisation / lysis	1	Any 4P 4m
	P10: antibodies will remain in the body to give / acquire immunity (against the disease)	1	
	P11: lymphocytes have memory to against the same type of pathogens	1	
		Total	**20**

ITEM NUM.	MARK SCHEME	MARKS	
7(a) (i)	Able to explain the growth curve of boys and girls in phase A, B, C, D and E.		
	Answer:		
	F1: A is infant phase	1	
	E1: Growth rate is very rapid for both boys and girls.	1	
	F2: B is childhood phase	1	
	E2: From age four, it is slightly higher for boys when compared to girls.	1	
	F3: C is adolescent phase	1	
	E3: In the earlier part of this phase, girls have a more rapid growth rate than boys.	1	
	E4: At the later part of this phase, boys grow faster than girls (because girls attain puberty earlier)	1	
	F4: D is adult phase	1	
	E5: Growth rate is zero/Maturity is reached.	1	
	F5: E ia ageing phase	1	
	E6: Growth rate is negative/ size will start to decrease.	1	Max
	E7: because the muscles and cartilage of the body start to degenerate	1	
		Any 8	8 marks

7(a) (ii)	Able to role of X in the development of insect *Answer:* F: X is ecdysis P1; (During ecdysis), the insect breathes in a lot of air to expand its body. P2: This causes the old skeleton to break and the insect then comes out of it. P3: it expands its body again by sucking in more air P4: before the new skeleton hardens. P5: This process is repeated periodically P6: until the insect achieves its maximum size. P7: The vertical portion of the step represents the time when ecdysis takes place P8: while the 'steps' represent the period in between ecdysis and is known as the instar	 1 1 1 1 1 1 1 1 Any six	Max 6 marks
7(b)	Able to state the constributian of science and technology in male contraception *Answer:* F1: Using condom P1: Prevent sperms from entering the vagina during ejaculation P2: Protect against sexually transmitted disease F2: Vasectomy P3: Sperm ducts (vas deference) are tied and cut in a surgical operation P4: Sperm not present in semen cause fertilisation will not take place	 1 1 1 1 1 Any six	Max 6 marks

Num	Scoring Criteria	Marks	
8(a)	Able to give justification why does this activity has to be stopped *Suggested Answer:* F1: extinction of fauna and flora P1: disrupt food chain / food web / natural habitat F2: increase temperature P2: less absorption of carbon dioxide F3: soil erosion / landslides P3: soil structure unstable / absence of plant root systems to hold soil F4: flash floods P4: reduce water catchment areas F5: loss of biodiversity P5: loss of habitat F6: climatic changes P6: disrupt normal weather patterns / hotter / drier weather / releases more carbon dioxide F7: Infertile soil / not suitable for cultivation / reduce soil's organic content P7: soil exposed to the sun directly *Any 10*	 1 1 1 1 1 1 1 1 1 1 1 1 1 1 *Max*	 10
8(b)	Able to describe how the ozone layer becomes thinner and its effects on humans and the environment. *Suggested Answer:* P1: Due to the widespread use of CFC P2: in aerosol, industrial solvents, electronics and Freon in air conditioners P3: Ultraviolet radiation strikes a CFC molecule P4: Cause the chlorine atom to break away P5: Then the chlorine atom collides with an ozone molecule and combines with an oxygen atom to form chlorine monoxide and oxygen P6: Then the free atom of oxygen collides with the chlorine monoxide, the two oxygen atoms form a molecule of oxygen P7: The chlorine atom is released and free to destroy more ozone molecules P8: The chlorine produced re-enters the cycle P9: When the ozone layer becomes thinner, more ultraviolet radiation reaches the Earth The effect of excessive ultraviolet radiation on human and environment E1: reduction of the body's immune system / skin cancer / cataract of the eye E2: reduction of the rate of growth therefore reducing crop yields E3: death of plankton / reduce food supply to aquatic organism *Any 7P and 3E* *Max* **Total**	 1 1 1 1 1 1 1 1 1 1 1 1 *Max* **Total**	 10 **20**

NUM	SCORING CRITERIA	MARKS	
9(a)	**Able to describe the reabsorption of water / salts in regulation of blood osmotic pressure at structure R and S.** Sample answer: P1- Vigorous activity causes loss a lot of water / sweat P2 – Blood osmotic pressure increase above the normal level P3 – The osmoreceptors cells in the hypothalamus are detect the change P4 – Osmoreceptor stimulate the pituitary gland P5 – The pituitary gland realese more ADH (into the blood) P6 – causes the structure R / distal tubule and S / collecting duct to become permeable to water P7 – more water reabsorb from the filtrate into the blood at R and S P8 – (At a same time) Adrenal gland is not stimulated to release aldosterone P9 – the R / distal tubule and S / collecting duct become impermeable to mineral salts P10 – less salt is reabsorbed into the blood P11 – (the result is) blood pressure decrease and return to the normal range P12 – Urine become more concentration // water content of urine decrease // less volume of urine produced *Any 10 point*	1 1 1 1 1 1 1 1 1 1 1	10 Mark
9(b)	**Able to explain why the different concentration of solutes in the blood plasma, glomerular filtrate and urine of the adult** Sample answer: F1 - Concentration of glucose / amino acid / urea / sodium ions in P / the blood plasma and Q / glomerular filtrate are the same. E1- All glucose / amino acid / urea / sodium ions enter the Bowman's capsule / nephron / are in the Q / glomerular filtrate through ultrafiltration. E2- Able to pass through the wall of blood capillaries / Bowman's capsule. F2 - No glucose / amino acid in the S / urine. E3- All glucose / and amino acid are reabsorbed from the proximal convoluted tubule / nephron by facilitated diffusion / active transport. F3 - Less sodium ions in the S / urine than in the P / blood plasma / Q / glomerular filtrate. E4 - Some have been reabsorbed from the nephron / tubule E5 - Reabsorption depends on the need / osmotic pressure of the blood / aldosterone secretion. F4 - No protein in the Q / glomerular filtrate / S / urine. E6 - Large molecules. E7 - unable to pass through the wall of blood capillaries / Bowman's capsule **Total**	1 1 1 1 1 1 1 1 1 1 1	Max 10 **20**

Suggested answer question 1

(a)[KB0603-measuring using number]

<table>
<tr><th></th><th>Criteria</th></tr>
<tr><td>3</td><td>Able to record ALL correct final mass in Table 2
<u>Correct answers:</u>
(a)
<table>
<tr><th>Concentration of sucrose solution (%)</th><th>Final mass of water spinach after 30 minutes (g)</th></tr>
<tr><td>2</td><td>50</td></tr>
<tr><td>4</td><td>40</td></tr>
<tr><td>6</td><td>38</td></tr>
<tr><td>8</td><td>40</td></tr>
<tr><td>10</td><td>30</td></tr>
</table></td></tr>
<tr><td>2</td><td>Able to state any 3-4 final mass correctly</td></tr>
<tr><td>1</td><td>Able to state any 1-2 final mass correctly</td></tr>
<tr><td>0</td><td>Not able to respond or wrong response.</td></tr>
</table>

(b) (i) [KB0601 - Observation]

Score	Criteria
3	Able to state the correct observations based on the following criteria: **K1:** Concentration of sucrose solution **K2:** Final mass of water spinach after 30 minutes 1. When 2% concentration of sucrose solution is used, the final mass of water spinach after 30 minutes is 50g. 2. When 10% concentration of sucrose solution is used, the final mass of water spinach after 30 minutes is 30g.
2	Able to state **any one** observation correctly with *or* Able to state **any two incomplete** observations. 1. When 2% concentration of sucrose solution is used, the final mass of water spinach after 30 minutes is high. 2. When 10% concentration of sucrose solution is used, the final mass of water spinach after 30 minutes is low.
1	Able to state **any one idea** of observation 1. Concentration of sucrose solution used is affected by the final mass of water spinach after 30 minutes
0	Not able to respond *or* wrong response

1

(b) (ii) [KB0602- Making Inference]

Score	Criteria
3	Able to state one reasonable inference for each observation **Sample answer:** Inference 1: 2% concentration of sucrose solution, more water molecules **diffuse into** water spinach **by osmosis** because the size of molecules are small//causing the water spinach strips to curve outward Inference 2: 10% concentration of sucrose solution, more water molecules **diffuse out** from water spinach **by osmosis** because the size of water molecules is small// causing the water spinach strips curve inward
2	Able to state **any one** inference correctly with *or* Able to state **any two incomplete** inferences 1. More water molecules **diffuse into** water spinach by **osmosis** // the water spinach curve outward 2. More water molecules **diffuse out** from water spinach **by osmosis** // the water spinach curve inward
1	Able to state **any one idea** of inference 1. Water molecules diffuse into water spinach 2. Water molecules diffuse out from water spinach
0	Not able to respond *or* wrong response

(c) [KB0610 – controlling variable]

Score	Criteria
3	Able to state all the **three** variables and **three** ways of handling the variables correctly. [6 items]

Variable	Ways of handling the variables
Manipulated variable ; Concentration of sucrose solution	*How to alter the manipulated variable* **Use** different concentration of sucrose solution

	Responding variable : The final mass of water spinach after 30 minutes // The percentage change in mass	*How to determine responding variable* Record the final mass of water spinach after 30 minutes // calculate the percentage change in mass by using formula : = final mass – initial mass / Initial mass x 100%
	Fixed variable : Volume of sucrose solution// time immersed for water spinach	*How to maintain the fix variable* Use 20ml volume of sucrose solution **for all experiment//used** the same time immersing for water spinach at 30 minutes
2	Able to state any **4 – 5 correctly**	
1	Able to state any **2 – 3 correctly**	
0	Able to give only one response / not able to respond *or* wrong response	

(d) [KB0611 – Making hypothesis]

Score	Criteria
3	Able to state **all three** criteria correctly **Criteria** **C1** : state the manipulated variable (concentration of sucrose solution). **C2** : state the responding variable (final mass of water spinach) **R** : relationship between C1 and C2 (increases .... decreases) *Sample answer*: When the concentration of sucrose solution increases, the final mass of water spinach after 30 minutes decreases . **Note:** accept wrong hypothesis
2	Able to state **three criteria** incorrectly **or any two** criteria correctly Sample answer : The different the concentration of sucrose solution, the different the final mass of water spinach after 30 minutes
1	Able to state at idea level only Sample answer : The final mass of water spinach is affected by sucrose solution
0	Not able to respond *or* wrong response

(e)(i) [KB 0606 – Communicating skill]

Score	Criteria
3	Able to complete the table H Concentration of sucrose solution (%) / Mass of water spinach (g): Initial / final / percentage change in mass (%) 2 / 30 / 50 / 66.7 4 / 30 / 40 / 33.3 6 / 42 / 38 / -9.5 8 / 46 / 40 / -13.0 10 / 40 / 30 / -25.0 C D
2	Any two criterias
1	Any 1 criteria
0	Not able to respond *or* wrong response

(e) (ii) [KB0607 – Using spatial and time relationship]

Score	Criteria
3	Able to draw a graph base on the criteria below: P - label x-axis and y-axis with correct unit/ constant scale T - all point have been transferred correctly B - smooth graph shape
2	Any two criterias
1	Any 1 criteria
0	Not able to respond *or* wrong response

(f) [KB0608- Interpreting data]

Score	Criteria
3	Able to state the concentration of the sucrose solution which is remain unchanged the mass of water spinach strips and explain the relationship based on the criteria below: **Criteria** **P1** : State the concentration of sucrose solution that is isotonic to the water spinach **P2 : because water molecules diffuse into and out are at the same rate** **P3 : causing no more percentage change in mass of water spinach// the water spinach strip is normal**

	Sample answer Concentration of sucrose solution is 5.4 % because water molecules diffuse into and out are at the same rate causing no more percentage change in mass of water spinach// the water spinach strips is normal.
2	Able to state two criterias P1 AND P2 @ P1 AND P3
1	Able to state one criteria P1
0	Not able to respond *or* wrong response

(g) [KB0609 – Definition operationally]

Score	Criteria
3	Able to state the definition of osmosis operationally correctly based on the following criteria: **C1: movement of water molecules which diffuse into or out from water spinach through plasma membrane** **C2: determined by the final mass of water spinach after 30 minutes** **C3: percentage change in mass of water spinach is affected by the concentration of sucrose solution** *Sample answer* Osmosis is the **movement of water molecules which diffuse into or out from water spinach through plasma membrane and determined by the final mass of water spinach after 30 minutes. Percentage change in mass of water spinach is affected by the concentration of sucrose solution**
2	Able to state any two criteria
1	Able to state any one criteria / at idea level / theory definition only
0	Not able to respond *or* wrong response

(h) [KB0605 – Prediction]

score	Criteria
3	Able to predict the mass of water spinach and give the reason based on the following criteria: **C1: mass of water spinach increase** **C2: more than 30 gram** **C3 : because distilled water is hypotonic solution, causing more water to diffuse into the water spinach by osmosis** *Sample answer* **Mass of water spinach increases more than 30 gram because distilled water is hypotonic solution, causing more water to diffuse into the water spinach**

	by osmosis
2	Able to predict the mass of water spinach(C1) and any C2/C3
1	Able to predict the mass of water spinach(C1)
0	Not able to respond *or* wrong response

(i) [KB0602 – Classifying]

Score	Criteria
3	Able to classify the concentration of sodium chloride solutions which are hypotonic, isotonic and hypertonic onto red blood cell correctly

Solution concentration *Kepekatan larutan (%)*	Types of solution compared to the osmotic concentration of red blood cell *Jenis larutan dibandingkan dengan kepekatan osmotik sel darah merah.*
0.10% sodium chloride solution	Hypotonic solution
0.89% sodium chloride solution	Isotonic solution
3.0% sodium chloride solution	Hypertonic solution

2	Able to classify 2 pairs correctly
1	Able to classify 1 pair correctly
0	Not able to respond or wrong response

Suggested answer for Question 2

Aspect	Criteria	Score
Problem Statement ***Kod : 01***	Able to write a problem statement correctly based on 3 criterias: • Manipulated variables- (water samples from different sources) • Responding variables- (time taken for decolourisation of methylene blue solution/ BOD / level of pollution) • Relationship H in question form	3

	Sample Answer 1. What is the effect of water samples from different sources to the time taken for decolourisation of methylene blue solution / BOD / level of pollution? 2. How do the water samples from different sources affect the time taken for decolourisation of methylene blue solution / BOD / level of pollution? 3. Do water samples from factories takes the shortest time taken for decolourisation of methylene blue solution compare to drain area, well area and tap water?	
	Able to write a problem statement but less correctly base on 2 criteria. Sample answer: 1. Which station of water samples from different sources affects the time taken for decolourisation of methylene blue solution / BOD / level of water pollution. 2. What is the effect of different water sample to the level of water pollution / BOD/ time taken for decolourisation of methylene blue solution? 3. How does the water samples from factories area affects methylene blue solution?	2
	Able to give an idea about the problem statement base on 1 criterion. Sample answer: 1. Factories are the most polluted water. 2. Tap water is the least polluted water	1
	Wrong or no response	0
Variables ***Kod : 02***	Able to identify **all** the three variables correctly *Sample Answer* • Manipulated variable : water samples from different sources/ factories area, drain area, well area and tap water. • • Responding variable : time taken for decolourisation of methylene blue solution. • Fixed variable : same volume of water samples from different sources	3
	Able to identify any 2 variables correctly.	2
	Able to identify any one variable correctly	1

	Not able to give a response or wrong response	0

Aspect	Criteria	Score
Making hypothesis **Kod : 03**	Able to write a suitable hypothesis correctly base on the 3 criteria: • Manipulated variable (water samples from different sources/ factories area, drain area, well area, tap water) • Responding variable (/ time taken for decolourisation of methylene blue solution) • Relationship = H *Sample Answer* 1. Water sample at factories area has the shortest time taken for decolourisation of methylene blue solution compare to drain area, well area and tap water // vice versa. 2. Water sample sources at factories area is the most polluted water compare to water samples sources at drain area, well area and tap water// vice versa. **[note: wrong hypothesis is accepted]**	3
	Able to write a hypothesis but less correctly based on the 2 criteria. 1. The different the water samples from different sources, the different the time taken for decolorisation of methylene blue solution.	2
	Able to give an idea about the problem statement base on 1 criteria 1. Water sample at factories area the most polluted water. 2. Tap water is the least polluted water.	1
	Not able to give response or wrong response	0

Aspect	Criteria	Score
Materials and Apparatus **Kod : 04**	Able to list **all** materials and apparatus needed to carry out the experiment successfully. *Sample Answer* **Materials** : water samples at different sources, methylene blue solution, (M)	3

	Apparatus : reagent bottles, beaker , measuring cylinder, syringe, glass cover, cupboard, stopwatch, (A) **7A + 2M**	
	Able to list materials and apparatus needed to carry out the experiment successfully. **5-6A + 2M**	2
	3-4A + 2M	1
	Incomplete list or wrong response or no response	0

Aspect	Criteria	Score
Procedure **Kod: 05**	Able to write **all** the steps in carrying out the experiment successfully. **K1** : Steps to set up the apparatus **K2** : Steps to handle the fixed variable **K3** : Steps to handle the manipulated variable **K4** : Steps to handle the responding variable **K5** : Precautionary steps / steps taken to get accurate results / readings	
	Scoring Rubric All K1-K5 present	3
	Any 3 – 4K present	2
	Any 2K present	1
	1K or wrong response	0
	Sample answer:	
K1 K2	1. 200 ml of water sample from the source of drain area were collected and placed in a reagent bottle A.	
K1 K3	2. Repeat step 1 with water sample from the source of drain area and placed in a reagent bottle B Water sample from the source of well area is placed in a reagent bottle C . Tap water sample is placed in a reagent bottle D.	

K1 K2	3. By using a syringe, 1 ml of methylene blue solution is added to the bottom of each water sample from different sources	
K1 K5	4. The reagent bottles were closed with its glass cover quickly.	
K5 K1	5. The reagent bottles are placed in a dark cupboard and not to shake them.	
K1	6. The stopwatch is started	
K1 K1	7. At interval of 1 hour for a period of 4 hours each reagent bottle is examined to see the colour change of methylene blue solution	
K4	8. The time taken for decolourisation of methylene blue solution is recorded by using a stopwatch	
K1	9. All the results are recorded in a table.	

<table>
<tr><th>Aspect</th><th>Criteria</th><th>Score</th></tr>
<tr><td rowspan="3">Communi-cating data

Kod: 06</td><td>Able to draw a complete table to record the relevant data based on the 2 criterias:
• Tittle with correct units.
• Correct samples

Sample Answer
<table>
<tr><th>Water sample from different sources</th><th>Time taken (hour)</th><th>Level of water pollution / BOD (unit)</th></tr>
<tr><td>Drain area
Factories area
Well area
Tap water</td><td></td><td></td></tr>
</table></td><td>2</td></tr>
<tr><td>Able to draw a complete table to record the relevant data with 1 criteria</td><td>1</td></tr>
<tr><td>Wrong or no response</td><td>0</td></tr>
</table>

END OF MARKING SCHEME