

Sains ~~BIOLOGI~~
Ogos/Sept
2010



**JABATAN PELAJARAN KELANTAN
DENGAN KERJASAMA
PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA
SEKOLAH MENENGAH MALAYSIA
CAWANGAN KELANTAN**

**PEPERIKSAAN PERCUBAAN SPM
TINGKATAN 5 (2010)**

BIOLOGI

UNTUK KEGUNAAN PEMERIKSA SAHAJA

**SKEMA
PEMARKAHAN**

TRIAL 2010 KELANTAN [PKBS 3]

SCHEME BIOLOGY PAPER 1

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

Section A

[60 marks]

Answer *all* questions.

The time suggested to complete this section is 90 minutes

1 Diagram 1 shows the process which glucose is accumulated at Q while molecule R assist the process.

Rajah 1 menunjukkan suatu proses di mana glukosa sedang dikumpulkan di Q manakala molekul R membantu dalam proses ini.

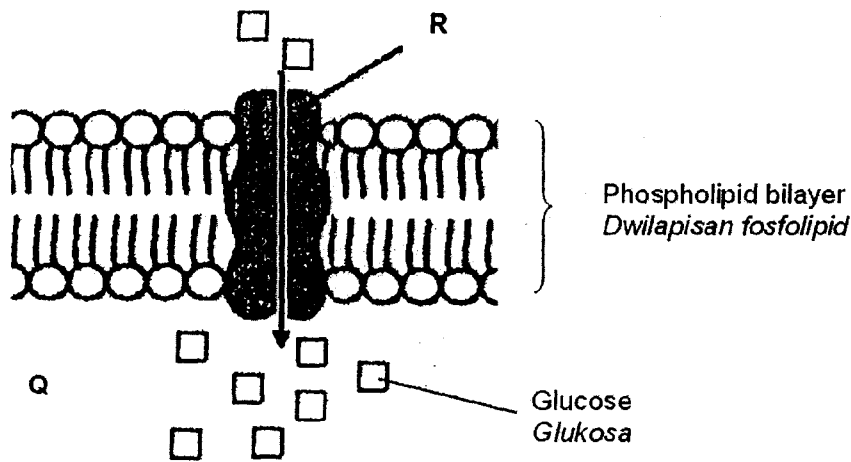


Diagram 1
Rajah 1

(a) (i) Name the structure R.
Namakan molekul R.

Carrier protein / protein pembawa

(ii) Name the process in Diagram 1.
Namakan proses dalam Rajah 1.

Active transport / pengangkutan aktif

[2 marks]
[2 markah]

(b) What is the importance of the process in (a)(ii) to an organism?
Apakah kepentingan proses dalam (a)(ii) kepada organisma?

It helps the organism to take in / accumulate glucose/amino acid/ions.

[1 mark]
[1 markah]

1(a)

2

1(b)

1

Sodium ions is found to be higher in concentration outside a human cell while potassium ions is found to be higher inside the cell.

Ion natrium didapati tinggi kepekataannya di luar sel manusia manakala ion kalium didapati tinggi kepekataannya di dalam sel.

- (c) Describe the process that leads to the occurrence of the above situation.
Huraikan bagaimana proses itu berlaku sehingga membawa kepada terjadinya situasi di atas.

P1 – The carrier protein's opening end has active sites, which are filled by sodium ions.

P2 – An ATP molecule then attaches on the protein and releases energy.

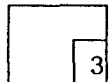
P3 – The carrier protein change shape (and opens to the other end, where) it releases the sodium ion to the outside.

P4 – Carrier protein is then filled by potassium ions.

P5 – The protein returns to its original shape and releases the potassium ions. (Any 3)

[3 marks]
[3 markah]

1(c)

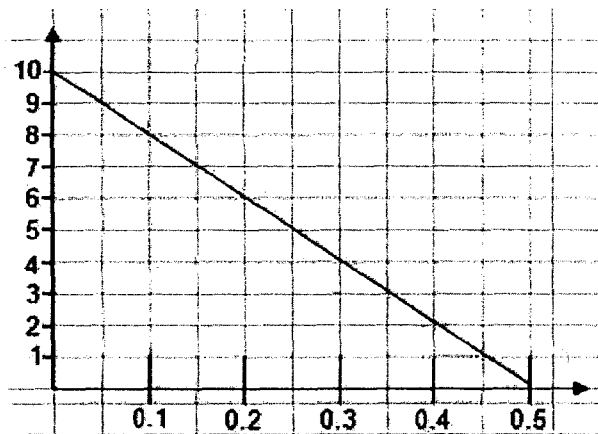


- (d) Graph 1 shows the number of contraction of contractile vacuole Paramecium when placed in different concentration of sucrose solution.

Graf 1 menunjukkan bilangan pengecutan vakuol mengecut bagi Paramecium P apabila diletakkan dalam larutan sukrosa yang berlainan kepekatan.

Number of contraction by contractile vacuole

Bilangan pengecutan vakuol



Sucrose solution concentration (%)
Kepekatan larutan sukrosa (%)

Graph 1
Graf 1

(i) How many times the contractile vacuole has to pump when placed in 0.25% sucrose solution?

Berapa kalikah vakuol mengecut perlu mengecut jika ia berada dalam larutan sukrosa 0.25%?

5 times

[1 mark]
[1 markah]

1(d)(i)

1

(ii) Explain the need of paramecium P to carry out the process in (d)(i).

Terangkan mengapa paramesium perlu melakukan proses seperti dalam (d)(i).

P1 – 0.25% Sucrose solution is hypotonic to cytoplasm.

P2 – Water diffuses into/enters the paramecium through osmosis.

P3 – Excess water has to be expelled, otherwise the paramecium will burst.

[2 marks]

[2 markah]

1(d)(ii)

2

(e)

Paramecium will burst and die when placed in the 0.25% sucrose solution added with respiratory poison.

Paramesium akan meletus dan mati apabila dimasukkan dalam larutan sukrosa 0.25% yang ditambah racun respirasi.

Explain the statement above.

Terangkan pernyataan di atas.

P1 – The poison will inhibit cellular respiration

P2 – No energy is produced.

P3 – Contractile vacuole will not work / pump

P4 – Excess water cannot be expelled.

Any 3.

[3 marks]
[3 markah]

1(e)

3

2 Diagram 2 shows the organelle involved during the synthesis and secretion of extracellular enzymes in pancreatic cell.

Rajah 2 menunjukkan organel yang terlibat semasa sintesis dan rembesan enzim luar sel di pankreas.

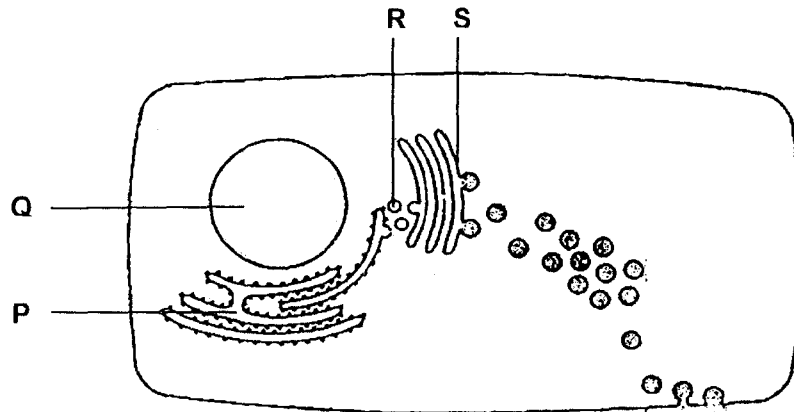


Diagram 2
Rajah 2

(a) (i) Name the organelles labeled Q and S.
Namakan organel berlabel Q dan S.

Q : Nucleus,

S : Golgi apparatus

[2 marks]
[2 markah]

2(a)(i)

2

(ii) State the function of organelles P.
Nyatakan fungsi organel P.

Transport protein synthesised by ribosome to Golgi apparatus.

[1 mark]
[1 markah]

2(a)(ii)

1

(b) (i) Name the extracellular enzyme produced.
Namakan enzim luar sel yang dihasilkan.

Lipase/(Pancreatic) amylase/Trypsin

[1 mark]
[1 markah]

2(b)(i)

1

(ii) State the meaning of extracellular enzyme.
Nyatakan maksud enzim luar sel.

P1 – Enzyme which is synthesised in the cell

P2 – secreted out of the cell to work externally.

[2 marks]
[2 markah]

2(b)(ii)

2

(c) A patient's pancreatic cells have been found to be unable to produce the enzymes in (b)(i). Explain the effect of this to his digestion process.

Sel pancreas pesakit didapati tidak dapat menghasilkan enzim di (b)(i).

Terangkan kesannya terhadap pencernaan beliau.

Lipids/starch/ polypeptides cannot be digested completely

[1 mark]

[1 markah]

2(c)

1

(d) Based on the organelles shown in Diagram 2, explain how extracellular enzymes are produced starting at the ribosome.

Berdasarkan organel yang ditunjukkan pada Rajah 2, terangkan bagaimana enzim luar sel dihasilkan bermula di ribosom.

P1 – Proteins are synthesised in the ribosome

P2 – Rough endoplasmic reticulum transports the protein to the Golgi apparatus (by transport vesicle)

P3 – Golgi apparatus modifies/repackage/transport proteins to become enzymes

P4 – which are secreted out from the cell Max 3

[3 marks]

[3 markah]

2(d)

3

(e) Explain the rate of enzyme reaction at low temperature and at the optimum temperature.

Terangkan kadar tindakbalas enzim pada suhu rendah dan suhu optimum.

P1 – At low temperature, the enzyme is inactive and the rate of reaction is low.

P2 – At optimum temperature, the enzyme is very active and the rate of reaction is at maximum.

Max 2 [2 marks]

[2 markah]

2(e)

2

- 3 Diagram 3(a) shows two human axial skeletal bones P and Q. Q is attached to P.
Rajah 3(a) menunjukkan dua tulang rangka paksi manusia P dan Q. Q bersambung pada P.

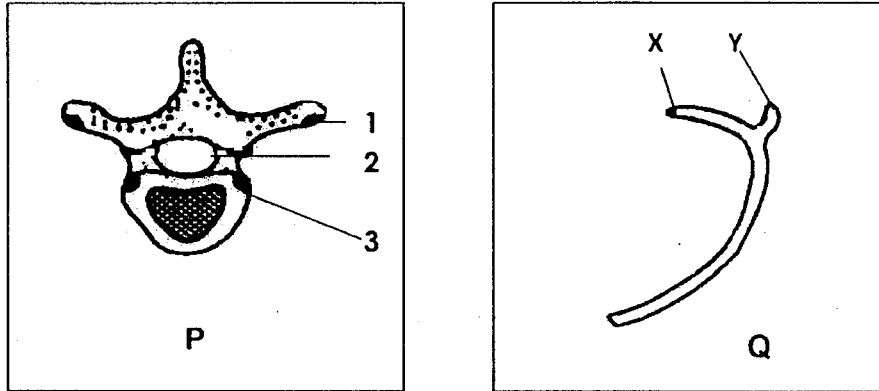


Diagram 3(a)
 Rajah 3(a)

- (a) (i) Name the bones P and Q.
Namakan tulang P dan Q.

P : thoracic vertebrae
Q : rib

[2 marks]
 [2 markah]

3(a)(i)

	2
--	---

- (ii) State **two** main characteristics of P.
*Nyatakan **dua** ciri utama P.*

1. Have long spinous process
2. Have two facet/zygophysis.

[2 marks]
 [2 markah]

3(a)(ii)

	2
--	---

- (b) (i) Pair X and Y of Q with the suitable number in P.
Padankan X dan Y pada Q dengan nombor yang sesuai pada P.

X : 3 Y : 1

[1 mark]
 [1 markah]

3(b)(i)

	1
--	---

- (ii) State **one** function of Q in respiration.
*Nyatakan **satu** fungsi Q dalam respirasi.*

Protect the lungs in the thoracic cavity// move upward and downward/ to change the volume/pressure of thoracic cavity.

[1 mark]
 [1 markah]

3(b)(ii)

	1
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- (c) Diagram 3(b) shows a joint in a human pelvic girdle.
Rajah 3(b) menunjukkan sendi lengkungan pelvis manusia.

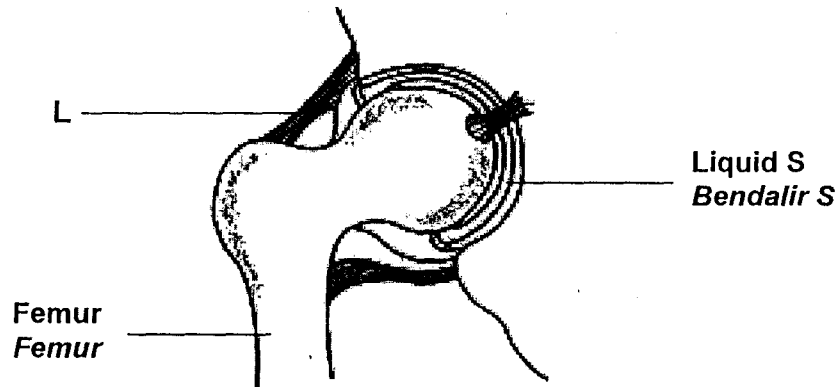


Diagram 3(b) *Rajah 3(b)*

- (i) Name the structure that produces liquid S.
Namakan struktur yang menghasilkan bendalir S.

Synovial membrane

[1 mark]
 [1 markah]

3(c)(i)

	1
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- (ii) Describe briefly the importance of L for movement.
Huraikan secara ringkas kepentingan L dalam pergerakan.

1. L / ligament is elastic / tough
2. connect between pelvic girdle and femur.
3. prevent dislocation (of the joint during movement.)

[3 marks]
 [3 markah]

3(c)(ii)

	3
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- (d) A boy has broken his femur during a sport practice. The doctor suggest to take plenty of dairy product and vitamin . Explain why.

Seorang budak lelaki patah tulang femur semasa latihan sukan. Doktor mencadangkan dia mengambil banyak hasil tenusu dan vitamin. Terangkan mengapa.

F1 - contains more calcium

E1 - for bone formation.

F2 - Vitamin D

E2 - for the absorption of calcium and phosphorus

F1/F2 + E1/E2 = 1 mark [2 marks]

[2 markah]

3(d)(i)

	2
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4 Diagram 4.1 shows the formation of a mature embryo sac of an angiosperm.
Rajah 4.1 menunjukkan proses pembentukan pundi embrio matang dalam angiosperma.

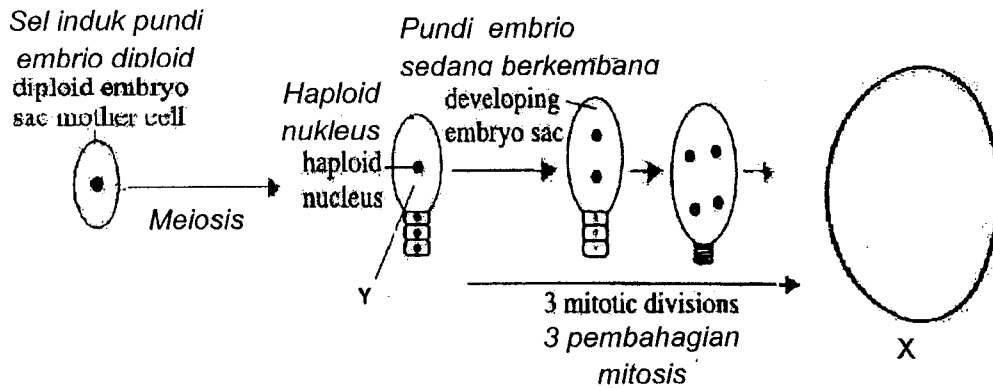


Diagram 4.1
Rajah 4.1

(a) Name structure Y.

Namakan struktur Y.

Megaspore / Embryo sac

[1 mark]
 [1 markah]

4(a)

	1
--	---

(b) (i) In Diagram 4.1, complete and label the mature embryo sac.

Dalam Rajah 4.1, lukis dan labelkan pundi embrio yang matang tersebut.

[2 marks]
 [2 markah]

4(b)(i)

	2
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(ii) Based on Diagram 4.1, explain the formation of a mature embryo sac.

Berdasarkan Rajah 4.1, terangkan proses pembentukan pundi embryo.

P1 - Embryo sac mother cell divides by meiosis to form 4 haploid cells

P2 - (Three (3) haploid cells degenerate, while one haploid cell develops into a haploid megaspore.

P3 - The nucleus in the megaspore (divides 3 times mitotically) to produce 8 haploid cells.

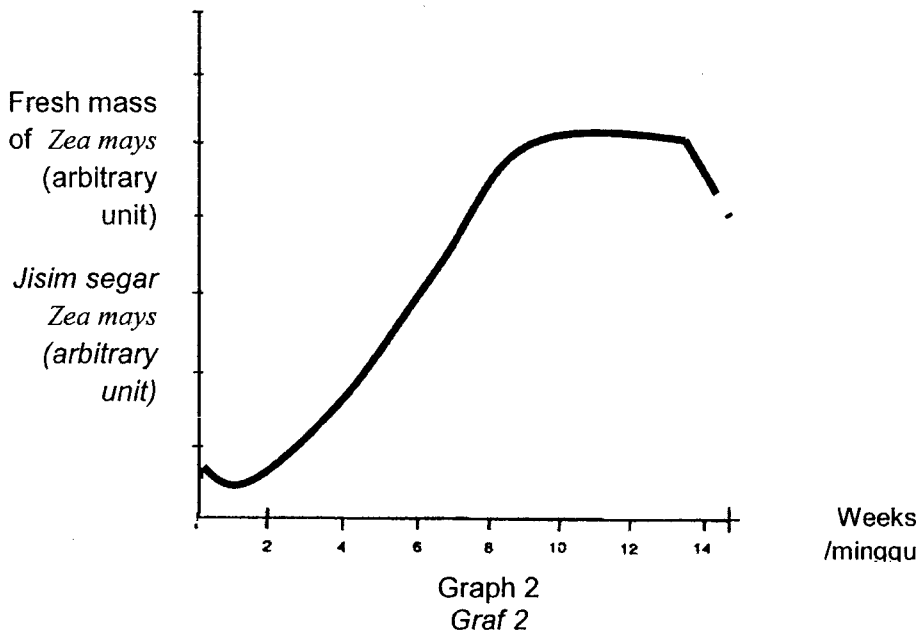
P4 - One cell forms the egg cell, 2 cells form the polar nuclei, 3 cells form the antipodal cells and 2 cells form the synergid cells

[4 marks]
 [4 markah]

4(b)(ii)

	4
--	---

(c) Graph shows fresh mass of *Zea mays* plotted against time.
 Graf menunjukkan jisim segar *Zea mays* melawan masa.



(i) Based on the graph, which period shows the fastest growth rate?
 Berdasarkan graf, tempoh manakah menunjukkan kadar pertumbuhan paling pantas?

Week 4 – 8

[1 mark / 1 markah]

4(c)(i)

	1
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(ii) Explain the growth rates as shown by the graph from start to week 8.

Terangkan kadar pertumbuhan yang ditunjukkan oleh graf dari permulaan sehingga minggu ke-8.

P1 - Negative growth / Growth rate is negative from beginning to week 1, because germinating seeds use the food stored in the endosperm.

P2 - From week 2 – week 4, the growth rate is slow because the leaves are starting to grow (and photosynthesis has just begun)

P3 - Week 4 – week 8 shows fastest growth rate because plant is actively making food (through photosynthesis)

[3 marks]
[3 markah]

4(c)(ii)

	3
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(iii) Name the phase of the plant growth after week 8.

Namakan fasa pertumbuhan tumbuhan tersebut selepas minggu ke-8.

Mature phase / Maturity

[1 mark]
[1 markah]

4(c)(iii)

	1
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- 5 Diagram 5 shows the cross section structure of kidney and nephron which involves in homeostasis in human.

Rajah 5 menunjukkan struktur keratan rentas ginjal dan nefron yang terlibat dalam homeostasis manusia.

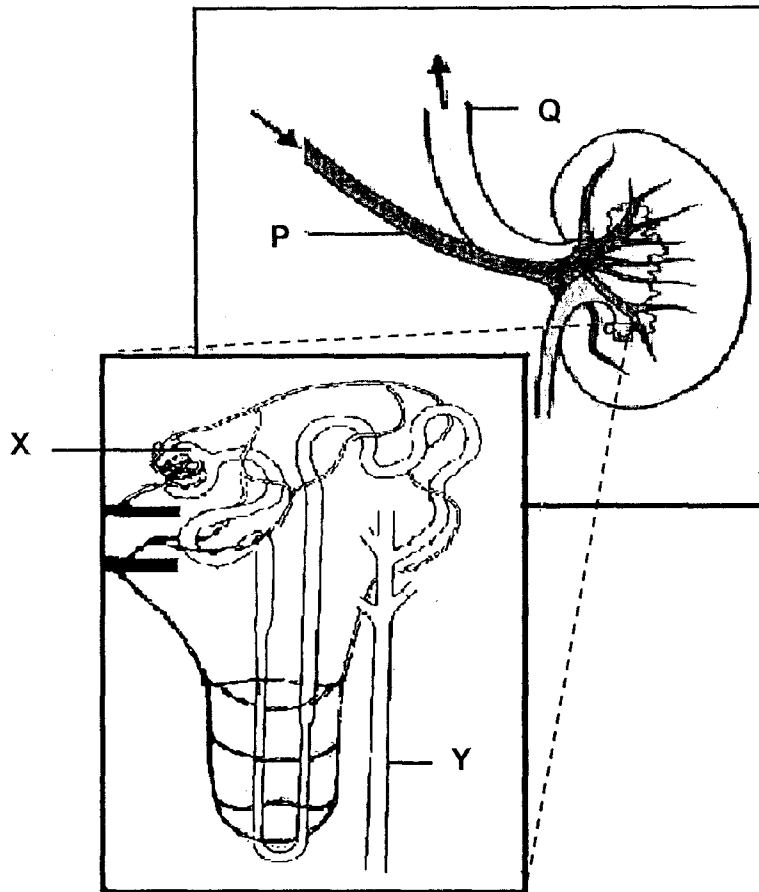


Diagram 5
Rajah 5

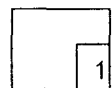
- (a) (i) Name blood vessel P and Q.
Namakan salur darah P dan Q.

P : Renal artery

Q : Renal vein

[1 mark]
[1 markah]

5(a)(i)

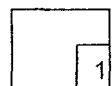


- (ii) State **one** difference in the content of P and Q in excretion.
*Nyatakan **satu** perbezaan antara kandungan P dan Q dalam perkumuhan.*

P has more nitrogenous waste product / urea / uric acid / salt than Q.

[1 mark]/[1 markah]

5(1)(ii)



<p>(b) The fluid in X is known as glomerular filtrate. Explain how it is formed. <i>Bendalir dalam X dikenali sebagai hasil turas glomerular. Terangkan bagaimana ianya terbentuk.</i></p> <p>F - The diameter of the efferent arteriole is smaller than the diameter of afferent arteriole</p> <p>P1 - cause high hydrostatic pressure in the glomerulus</p> <p>P2 - forces some constituents / example ; small molecule of the blood to be filtered out from the Glomerulus into the Bowman's capsule</p> <p style="text-align: right;">[3 marks] [3 markah]</p>	<p>5(b)</p> <div style="border: 1px solid black; width: 60px; height: 40px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> 3 </div>
<p>(c) State why glucose is not found in Y in a healthy person. <i>Nyatakan mengapa glukosa tidak ditemui dalam Y dalam seseorang yang sihat.</i></p> <p>All glucose is reabsorb from Proximal convoluted tubule into blood capillary (by active transport)</p> <p style="text-align: right;">[1 mark] / [1 markah]</p>	<p>5(c)</p> <div style="border: 1px solid black; width: 60px; height: 40px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> 1 </div>
<p>(d) Explain the consequences of kidney failure. <i>Terangkan akibat kegagalan buah pinggang.</i></p> <p>P1 - The blood osmotic pressure and blood volume cannot be maintained.</p> <p>P2 - leads to the accumulation of toxic wastes and excess minerals in the body.</p> <p style="text-align: right;">[2 marks]/[2 markah]</p>	<p>5(d)</p> <div style="border: 1px solid black; width: 60px; height: 40px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> 2 </div>
<p>(e) A man takes too much salty food during lunch. His urine becomes less and concentrated. Explain why. <i>Seorang lelaki mengambil terlalu banyak garam dalam makanan tengaharinya. Air kencing lelaki tersebut menjadi kurang dan pekat. Terangkan mengapa.</i></p> <p>F – Blood osmotic pressure increase</p> <p>P1 – detected by osmoreceptor in hypothalamus</p> <p>P2 – impulse is sent to adrenal gland and pituitary gland</p> <p>P3 – adrenal gland secrete less aldosterone and pituitary gland secrete more ADH</p> <p>P4 – cell lining of distal convoluted tubule and cd less permeable to salt and more permeable to water</p> <p>P5 – less reabsorption of salt and more reabsorption of water into blood vessel</p> <p style="text-align: right;">[4 marks]/[4 markah]</p>	<p>5(e)</p> <div style="border: 1px solid black; width: 60px; height: 40px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> 4 </div>

Section B

[40 marks]

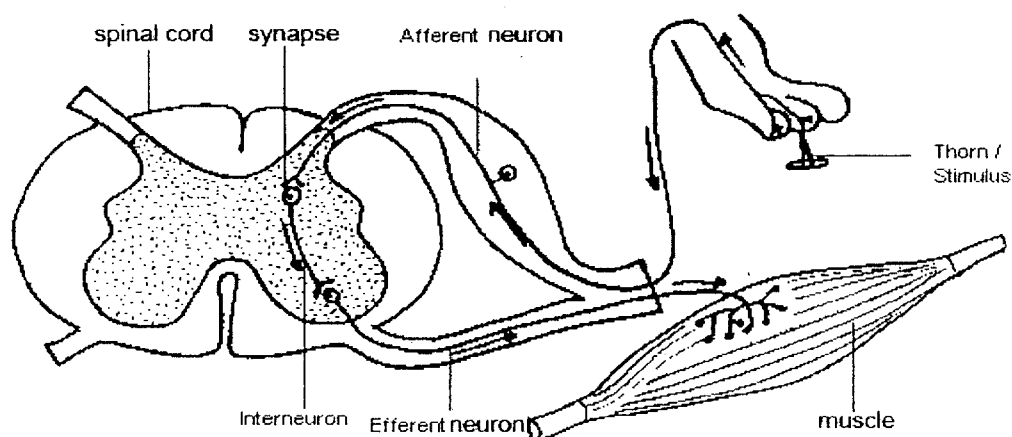
Answer **any two** questions.

The time suggested to complete this section is 60 minutes

6. (a)(i) A boy steps on a thorn when running in a field, he retracts his leg immediately. Draw and label the reflex arc to show the impulse pathway involved in the boy's reaction.

Seorang budak terpijak duri semasa berlari di padang lalu menarik kakinya dengan serta-merta. Lukis dan labelkan arka refleks untuk menunjukkan laluan impuls yang terlibat dalam gerakbalas budak itu.

[4marks]
[4 markah]



Criteria	Mark
Functional diagram (D) –3 neurones, receptor and effector	1
Labeling (L)	
5 - 6	2
3 - 4	1
arrow(direction of impulse) (A)	1
Total	4

(a)(ii)

A mother and her young child were involved in an accident. The child was pinned under their car. Upon seeing her child under the car, the mother unconsciously lifted the car to free her child.

Seorang ibu dan anaknya yang masih kecil terlibat dalam satu kemalangan. Anaknya tersepit di bawah kereta mereka. Apabila melihat keadaan itu, si ibu tanpa sedar telah mengangkat kereta tersebut untuk mengeluarkan anaknya.

Using your biology knowledge, explain how the endocrine and nervous systems coordinate the mother's response in such situation.

Dengan menggunakan pengetahuan biologi anda, terangkan bagaimana sistem endokrin dan sistem saraf mengkoordinasikan gerakbalas si ibu dalam situasi tersebut.

[10marks] / [10 markah]

No6(a)(ii)	Marking scheme	Marks
	.Answer:	
	When the mother sees her child under the car	
	P1 – the receptor in the eyes / retina detect the stimulus	1
	P2 - and triggers a nerve / stimulus impulse	1
	P3 - a nerve impulse is sent / transmitted to the Central Nervous System(CNS) / spinal cord /brain / interneurone	1
	P4 - through afferent neurone	1
	P5 – across a synapse	1
	P6 – the CNS / spinal cord / brain / interneurone sends a nerve / response impulse to the adrenal glands	1
	P7 – through efferent neurone (across a synapse)	1
	P8 – Adrenal glands are stimulated to produce / secrete adrenaline	1
	P9– Adrenaline causes the heart to beat faster // ventilation / breathing rate increase // blood pressure increase// glycogen converts to glucose	1
	P10 - and cellular respiration rate to be higher	1
	P11 – more energy is produced	1
	P12 – for muscle contractions (hence, the mother is able to lift the car to free her child)	1
	Total Max	10 marks

(b)

Both Alzheimer's and Parkinson's disease afflict around 500,000 individuals annually with their eroding and life-sapping effects.

Penyakit Alzheimer dan Parkinson menyerang dan mengakibatkan kemerosotan kualiti hidup kira-kira 500,000 individu setiap tahun.

Source: jonty79, Streetdirectory.com editorials

Compare Alzheimer's and Parkinson's diseases.
Bandingkan penyakit Alzheimer dan Parkinson.

[6marks] / [6 markah]

Alzheimer's	Parkinson's	Mark
<i>Similarities</i>		
A neurological disease	A neurological disease	1
Usually affects the elderly	Usually affect the elderly	1
<i>Differences</i>		
Leading to deterioration / damage of the nervous system functions	Causing tremors / weakness of the muscles	1
Caused by the shrinkage of brain tissues /and lack of neurotransmitters / Acetylcholine	Caused by reduced level of neurotransmitters in the brain / dopamine	1
Symptoms are: loss of intelligence / loss of memory / mild confusions / poor concentration	Symptoms are: the muscles cannot function smoothly / muscles become stiff and jerky in their actions	1
Can be inherited	Not inherited	1
Total		6 marks

7. (a) Diagram 7.1 shows the profile of a mangrove swamp area (P – Q) where the process of colonisation and succession occurs.

Rajah 7.1 menunjukkan suatu profil kawasan paya bakau (P - Q) di mana berlakunya proses pengkolonian dan penyesaran.

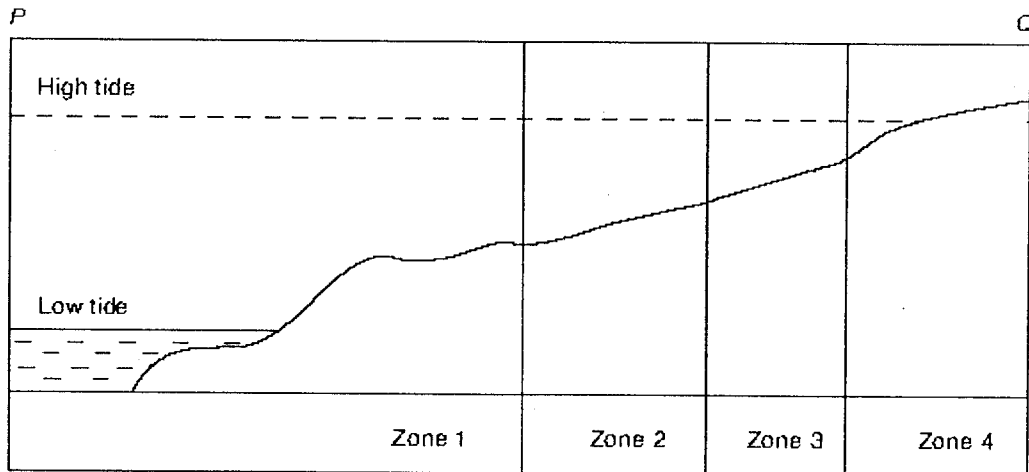


Diagram 7.1 / Rajah 7.1

Based on Diagram 7.1 , explain how colonisation and succession take place in zones 1, 2, 3 and 4.

Berdasarkan Rajah 7.1 , terangkan bagaimana pengkolonian dan penyesaran berlaku di zon 1,2,3 dan 4.

[10 marks]
[10 markah]

- (b) Diagram 7.2 shows a phenomenon X which caused by air pollution.
Rajah 7.2 menunjukkan satu fenomena X yang disebabkan oleh pencemaran udara.

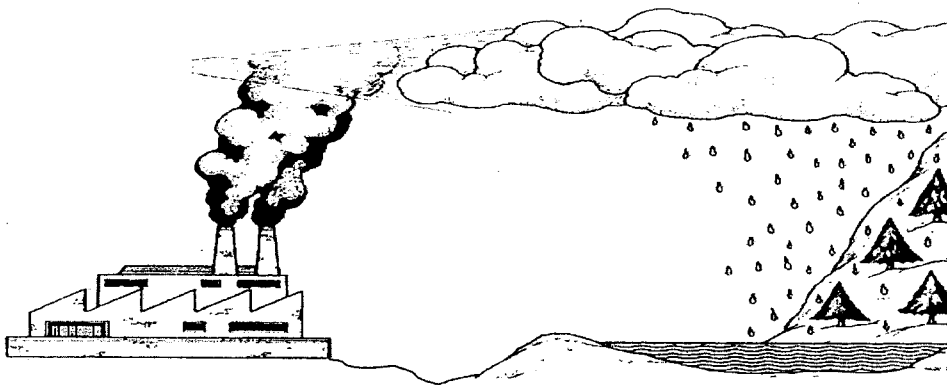


Diagram 7.2
Rajah 7.2

- (i) Based on Diagram 7.2 , name the phenomenon and explain how it occurs.
Berdasarkan Rajah 7.2. namakan fenomena dan terangkan bagaimana ia berlaku
 [4 marks]
 [4 markah]
- (ii) Describe the effects of the phenomenon on agriculture and aquatic ecosystem and suggest ways to prevent this phenomenon.
Huraikan kesan fenomena tersebut ke atas pertanian dan ekosistem akuatik serta langkah-langkah yang diambil untuk mencegah fenomena tersebut.
 [6 marks] / [6 markah]

No 7	Marking scheme	Marks	
7(a)	<p>Zone 1</p> <p>P1 – the environmental conditions in the mangrove swamp / new habitat which make it unsuitable for habitation are Soft muddy soil// Waterlogged conditions of the soil/ Very little oxygen for root respiration//</p> <p>P2 – The high content of salt/salinity makes the water in the soil hypertonic compared to the cell sap of the root cells/The Water diffuse out from plant/ the root cells by osmosis// dehydration//Excessive exposure to sunlight/ intense heat// High rate of transpiration</p> <p style="text-align: right;">Either one characteristic</p> <p>P3 – the pioneer species in a mangrove swamp are <i>Avicennia</i> sp.faces the sea and // <i>Sonneratia</i> sp grows at the mouth at the river</p> <p>P4 – The adaption of <i>Avicennia</i> sp and <i>Sonneratia</i> sp are highly branched root system to support themselves.// Eg.: <i>Avicennia</i> have long/underground/horizontals cable/ roots //(<i>Avicennia</i> and <i>Sonneratia</i> sp) have breathing roots /pneumatophores with lenticels for gaseous exchange</p> <p style="text-align: right;">Either one adaption</p> <p>P5 – The extensive branching root system traps the silt and mud and sand particles and organic sediments</p> <p>P6 – As more and more mud accumulate, causes a change in the environment /habitat // the bank is slowly raised and contained less</p>	1	
		1	
		1	1
		1	
		1	1

	water //The soil become more compact and firm	1	
	Zone 2		2
	P7 – this make it suitable for other spesies which is <i>Rhizophora sp</i> // <i>this favours the growth of Rhizophora sp.</i>	1	
	P8 – The spesies is known as successor //Gradually the successor spesies replaces the pioneer spesies	1	
	P9 – The adaptations of <i>Rhizophora sp</i> are have prop roots to anchor themselves in the muddy soil// Have viviparous seedling // the seeds are able to germinate while still attached to the mother plant.	1	
	P10 – The prop roots of <i>Rhizophora sp</i> traps more muds and silt and sand particles // The Pioneer spesies and // the <i>Rhizophora sp</i> die/ <i>decayed bodies adding humus to the soil.</i>	1	
	P11 – The banks are raised up even higher // The soil becomes drier, more solid/ compact, more fertile ang less saline		
	Zone 3		
	P12 – Lead to favours the growth of <i>Bruguiera sp</i> // <i>Bruguiera sp</i> grow well in hard clay soil	1	5
	P13 – The adaptations of <i>Bruguiera sp</i> have <i>buttress roots for support</i> // <i>knee shaped pneumatophores for gaseous exchange</i>	1	
	P14 – The extensive branching root system traps more the silt and sand particles// organic sediments are more deposited // The successor causes further changes to the habitat// new mud banks are being built up seawards // the old banks move further inland	1	3
	Zone 4		
	P15 – Finally the environmental have been changed // the dry land is formed // the soil has become more compact, thicker and drier.// the area become more shady	1	
	P16 – This would enable the seeds of Nypa sp and Pandanus sp to germinate and grow in the area // <i>.Bruguiera sp</i> are replaced by land terrestrial Nypa and Pandanus community		
	Max	1	2
			10

7(b)(i)	Able to name o the phenomom X: F: Acid rain	1	1
	<u>The formation of acid rain</u>		
	E1- Burning of fossil fuels // coal and oil in factories/ power generator stations / vehicles.	1	
	E2- produces sulphur dioxide/ nitrogen dioxide / carbon dioxide	1	
	E3-Sulphur dioxide /nitrogen dioxide/ carbon dioxide dissolve in the water vapour	1	
	E4- to form sulphuric acid/ nitric acid/ carbonic acid.	1	
	E5- Fall to the earth with pH less than 5.0. (This called acid rain)	1	
	Any 3 E		3
7(b)(ii)	<u>Effect: acid rain:</u> <u>On agriculture</u>		
	E1- Acid rain will increase the acidity of the earth //Soil become acidic // leaching of minerals	1	
	E2- Not suitable for cultivation/ grow of crops	1	
	E3- Cause some minerals to become insoluble and cannot be absorbed by the plants.	1	
	Any 2E		2
	<u>On aquatic ecosystem</u>		
	E1- Accumulation of insoluble aluminium ion/ions in water sources// will increase the acidity of water// reduce the water pH //	1	
	E2- Kill aquatic organism // threatens aquatic life	1	
	<u>The ways that can be taken :</u>		
	S1- Reduce the burning of fossil fuel (which contains sulphur)	1	
	S2- Use alternative power source which is nature friendly instead of using the fossil fuel// use solar energy/ wave energy	1	
			10
	TOTAL		20

- 8 (a) Diagram 8.1 shows karyotype of individual M who has experienced mutation.
Rajah 8.1 menunjukkan karyotip individu M yang telah mengalami mutasi.

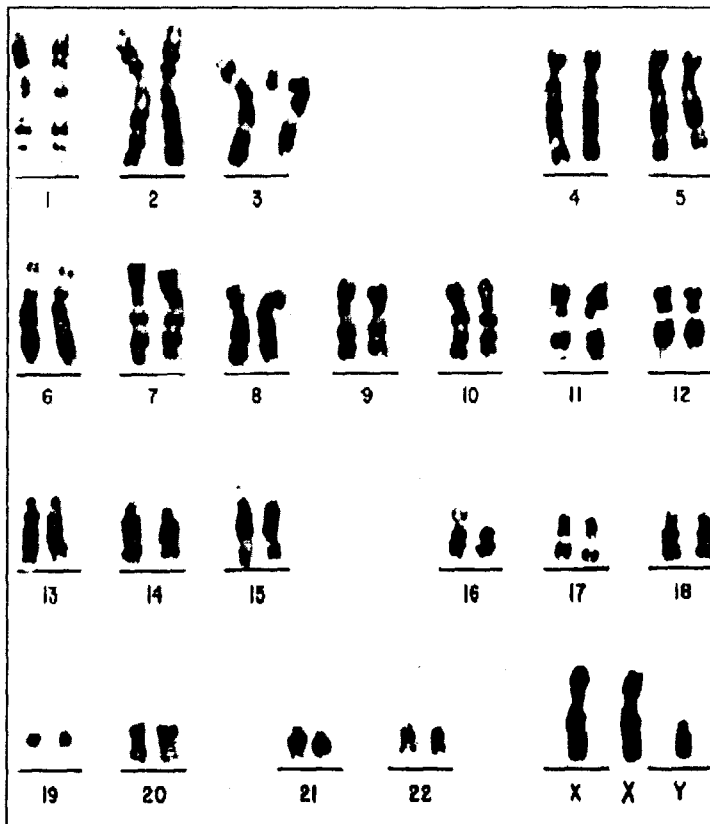


Diagram 8.1
Rajah 8.1

- (i) Based on Diagram 8.1, state the meaning of mutation.
Berdasarkan Rajah 8.1, nyatakan maksud mutasi.

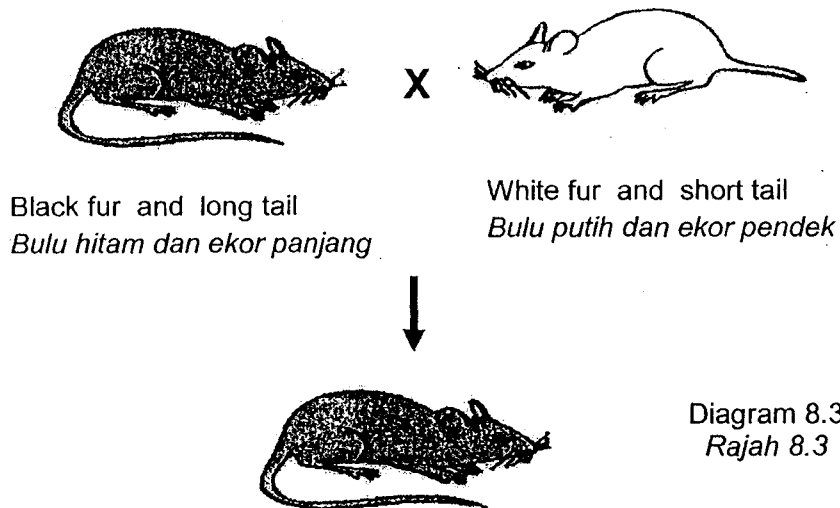
[3 marks]
 [3 markah]

- (ii) Explain the cause of mutation in Diagram 8.1.
Terangkan sebab berlakunya mutasi pada Rajah 8.1

[7 marks][7 markah]

- (b) Diagram 8.2 shows the crossbreed between pure breeding mice for black fur and long tail with mice for white fur and short tail.

Rajah 8.3 menunjukkan kacukan baka tulen antara tikus berbulu hitam dan ekor panjang dengan tikus berbulu putih dan berekor pendek.



Explain the crossbreed in Diagram 8.3 by using a schematic diagram,
Terangkan kacukan dalam Rajah 8.3 dengan menggunakan rajah skema.

[10 marks] / [10 markah]

No	Marking scheme	Marks	
8 (a)(i)	Able to explain the mutation		
	P1 - Mutation is a sudden random change	1	
	P2 - due to the addition of the number of chromosome 23// extra X chromosome// XXY	1	
	P3 - that cause Klinefelter's syndrome	1	3
8(a)(ii)	Able to explain the cause of mutation.		
	P1 - exposure to mutagen/ carcinogenic substances (any suitable examples)	1	
	P2 - Sex chromosomes /chromosome no. 23 fails to separate	1	
	P3 - during meiosis I / anaphase I	1	
	P4 - producing abnormal chromosomal number of sperm or ovum	1	
	P5 - example: sperm carry XY sex chromosome fertilise with normal ovum // sperm carry Y sex chromosome fertilise with abnormal ovum (carry XX sex chromosome) // (diagram accepted)	1	
	P6 - fertilization (between sperm and ovum) produce zygote which has XXY / 47 chromosomes	1	
	P7 - He has extra one chromosome X at chromosome 23	1	
8 (b)	Able to draw and explain the crossbreed.		7
	Explanation:		
	E1 - Two characteristic involves in the crossbreed // dihybrid inheritance.	1	
	E2 - The first characteristic is fur colour // The traits are black and	1	

white			
E3 - The second characteristic is length of tail // The traits are long and short.	1		
E4 - The black and long tail is homozygous dominant / BBLL	1		
E5 - The white and short tail is homozygous recessive / bbl	1		
E6 - involve meiosis	1		
E7 - The black and long tail produce gametes BL// The white and short tail produce gamete bl	1		
E8 - Fertilisation of the gametes occurs randomly	1		
E9 - F1 produce BbLl	1		
E10 - Phenotype ratio is all black fur long tail	1	Max 6	
<u>Schematic diagram</u>			
Parent			
Phenotype	Black fur, long tail	X	White fur, short tail
Genotype	BBLL		bbl
	↓		↓
	-----Meiosis		
Gamete:	BL		bl
	↘		↙
	-----fertilization		
Genotype F1	BbLl		
Phenotype F1	Black fur long tail		
Phenotypic ratio	All black fur, long tail		
Key:			
B – Dominant allele for black fur			
b – Recessive allele for white fur			
L – Dominant allele for long tail			
l – Recessive allele for short tail			
			Max 4
	1		

9. (a)

Cultivation of crops always faces a number of uncertainties in the forms of pest, bad weather and to some extent, natural disasters. The production, hence, decreases and the number of population it can support is getting smaller.

Penanaman pokok sentiasa meghadapi beberapa masalah luar jangkaan dalam bentuk serangga perosak, cuaca buruk dan kemusnahan semulajadi. Oleh itu produk berkurang dan populasi yang boleh ditanggung semakin mengecil

The above statement is one of the many agricultural problems that have been hurting the farmers and the economy of a country. It has been widely mentioned that genetic engineering in crops can help overcoming these problems. Explain this statement.

Pernyataan di atas adalah salah satu daripada masalah pertanian yang menjejaskan petani dan ekonomi negara. Kejuruteraan genetik dalam pertanian dapat membantu mengatasi masalah ini. Terangkan pernyataan ini.

[10 marks] / [10 markah]

(b)

The increase in world population has been rapid since the last decade. In contrary, falling short in production of food to feed this vast population is increasingly alarming.

Penambahan penduduk dunia adalah cepat kebelakangan ini. Sebaliknya, pengurangan pengeluaran makanan untuk menampung populasi besar dunia ini semakin serius.

The above statement is a global problem which is faced by all the countries in this world. Many country heads are placing great emphasis on how to overcome it. Explain how a developing country like Malaysia can solve this problem in terms of improving the quality and quantity of food production.

Pernyataan di atas merupakan suatu masalah global yang dihadapi semua Negara. Ramai ketua Negara dunia sedang menumpukan perhatian akan cara mengatasinya. Terangkan bagaimana sebuah Negara sedang membangun seperti Malaysia boleh mengatasi masalah ini dari segi kualiti dan kuantiti pengeluaran makanan.

[10 marks] [10 markah]

No.9(a)	Mark scheme	Marks
	Answer: P1: Genetic engineering involves the changing of genetic composition	1

	of a crop / organism so as to alter its characteristics.	
	E1: The change in characteristics makes the crop / organism produces better quality / quantity products.	1
	P2: The crop becomes pest tolerant – not destroyed by pests.	1
	E1: The change in the genes makes the crop not eaten up (not interested) by certain pest so the production can be maintained / increased.	1
	P3: The crop is herbicide tolerant – not affected by herbicides.	1
	E1: The farmer can spray the herbicide once, but with higher concentration can kill all the weeds.	1
	E2: The (higher concentrated) herbicide kills the weeds but does not affect the crop.	1
	E3: The danger of herbicide run-off is reduced.	1
	E4: The cost of multiple spraying of herbicides is reduced.	1
	P4: The crop becomes disease resistance.	1
	P5: The crop becomes cold tolerant – not affected by cold	1
	E1: The cold tolerant gene enables the planting of the crop in cold climates which before this cannot be done.	1
	E2: More planting of the crop can be done.	1
	P6: The crop becomes drought tolerant – not affected by drought.	
	E1: This allows the crop be planted in dry countries and increases food production.	1
	P7: The crop can be made to produce the desired minerals or vitamins.	1
	E1: Higher contents of mineral / vitamin can help ease the problem of malnutrition.	1
	P8: The modified crop can be used to produce medicine.	1
	Max	10
		marks

No.9(b)	Marking scheme	Marks
	.Answer:	
	P1: <u>Direct seeding for rice</u> – planting of rice by sowing the seeds directly	1
	E1: The rice grows faster – yield increases.	1
	P2: <u>Hydroponics // aeroponics</u> – planting of crops without using soil.	1
	E1: The nutrients supplied to the plant is controlled, so maximum yield and minimum wastage.	1
	E2: Can be carried out in a small available space.	1
	P3: <u>Selective breeding</u> – production of crops / animals with better (selected) quality.	1
	E1: Breeding only good quality crops / animals will ensure high productivity / good quality products are produced	1
	P4: <u>Tissue culture</u> – propagating / cultivating of plants through the growth of a plant's tissue.	1
	E1: Ensure the good quality of the parent plants is preserved.	1
	E2: Can be cultivated in a very large scale so that the quantity of crop produced is increased.	1
	P5: <u>Genetic engineering</u> – transferring / manipulating of genes in the DNA of a plant	1
	E1: so that good quality crops can be produced	1
	E2: speeds up the breeding process of plants and livestock (faster than cross-breeding) so that larger quantity of food is produced.	1
	P6: <u>Soil management</u> – proper management of soil to ensure it is always fertile.'	1
	E1: Crop rotation, cultivation of different crops at different seasons so the minerals in the soil will be used and replenished.	1
	E2: The top soil is always covered with crop to prevent soil erosion.	1
	Total	Max 10 marks

END OF MARKING SCHEME

MM SMSTMFP 2010

Question 1

Aspects	Mark Scheme	Marks																			
1(a)	<p>Able to record all the readings accurately</p> <p>Sample Answer</p> <table border="1" data-bbox="427 409 1217 663"> <thead> <tr> <th data-bbox="427 409 657 555" rowspan="2">Temperature <i>Suhu</i> °C</th> <th colspan="3" data-bbox="657 409 1217 488">Time taken for air bubble to move a distance of 10 cm (min)</th> </tr> <tr> <th data-bbox="657 488 834 555">First Reading</th> <th data-bbox="834 488 1011 555">Second Reading</th> <th data-bbox="1011 488 1217 555">Average reading</th> </tr> </thead> <tbody> <tr> <td data-bbox="427 555 657 589">20</td> <td data-bbox="657 555 834 589">39</td> <td data-bbox="834 555 1011 589">41</td> <td data-bbox="1011 555 1217 589">40.0</td> </tr> <tr> <td data-bbox="427 589 657 622">25</td> <td data-bbox="657 589 834 622">28</td> <td data-bbox="834 589 1011 622">32</td> <td data-bbox="1011 589 1217 622">30.0</td> </tr> <tr> <td data-bbox="427 622 657 656">30</td> <td data-bbox="657 622 834 656">20</td> <td data-bbox="834 622 1011 656">20</td> <td data-bbox="1011 622 1217 656">20.0</td> </tr> </tbody> </table>	Temperature <i>Suhu</i> °C	Time taken for air bubble to move a distance of 10 cm (min)			First Reading	Second Reading	Average reading	20	39	41	40.0	25	28	32	30.0	30	20	20	20.0	3
	Temperature <i>Suhu</i> °C		Time taken for air bubble to move a distance of 10 cm (min)																		
		First Reading	Second Reading	Average reading																	
20	39	41	40.0																		
25	28	32	30.0																		
30	20	20	20.0																		
Able to record 8 -11 readings accurately	2																				
Able to record 4 -7 readings accurately	1																				
1(b)(i)	<p>Able to state two different observations correctly</p> <p>Sample Answer</p> <ol style="list-style-type: none"> 1. When temperature is <u>20°C</u>, the average time taken for air bubble to move a distance of 10 cm is <u>40 minutes</u> 2. When temperature is <u>35°C</u> , the average time taken for air bubble to move a distance of 10 cm is <u>10 minutes.</u> 3. When temperature is <u>20°C</u> ,the average time taken for air bubble to move a distance of 10 cm is longer than the average time taken when temperature is <u>35°C</u> 	3																			
	<p>Able to state one correct observation and one less accurate observation or able to state two inaccurate observations</p> <p>Sample Answer</p> <ol style="list-style-type: none"> 1. When temperature is <u>20°C</u>, the average time taken for air bubble to move a distance of 10 cm is short 2. When temperature is <u>35°C</u> , the average time taken for air bubble to move a distance of 10 cm is long. 		2																		
	<p>Able to state only one correct observation or Able to state two observations at idea level</p> <p>Sample Answer</p> <ol style="list-style-type: none"> 1. The average time taken for air bubble to move a distance of 10 cm is different. 		1																		

Aspects	Mark Scheme	Marks								
1(b)(ii)	<p>Able to make two correct inferences P1- amount of water lost P2- rate of transpiration</p> <p>Sample Answer 1. (When temperature is low) , the amount of water lost from the leaf is low(P1). So the rate of transpiration is low (P2)</p> <p>2. (When temperature is high) , the amount of water lost from the leaf is high(p1). So the rate of transpiration is high (P2)</p> <p>3. When the temperature is higher/lower, the amount of water lost from the leaf is higher/lower. So the rate of transpiration is higher/lower when the temperature is higher/lower</p> <p>Able to state one correct inference and one less accurate inference or Able to state two inaccurate inferences</p> <p>Sample Answer 1. (When temperature is low) , the amount of water lost from the leaf is low(p1) 2. (When temperature is high) , the rate of transpiration is high (P2)</p> <p>Able to state only one correct inference or Able to state two inferences at idea level</p> <p>Sample Answer 1. Plant carry out transpiration. 2. Rate of transpiration increase</p>	3								
1(c)	<p>Able to state all 3 variables and the methods to handle variable correctly</p> <p>Sample Answer</p> <table border="1" data-bbox="384 1413 1230 2051"> <thead> <tr> <th data-bbox="384 1413 759 1451">Variable</th> <th data-bbox="759 1413 1230 1451">Method to handle the variable</th> </tr> </thead> <tbody> <tr> <td data-bbox="384 1451 759 1630"> Manipulated Variable Temperature </td> <td data-bbox="759 1451 1230 1630"> Place the apparatus/potometer at <u>different temperature</u> / 20 °C, 25 °C, 30 °C and 35 °C </td> </tr> <tr> <td data-bbox="384 1630 759 1984"> Responding Variable 1. Rate of transpiration 2. Time taken for air bubble to move a distance of 10 cm </td> <td data-bbox="759 1630 1230 1984"> 1. Calculate and record the rate of transpiration by using formula : Distance / time 2. <u>Record</u> the time taken for air bubble to move a distance of 10 cm by using <u>stopwatch</u> </td> </tr> <tr> <td data-bbox="384 1984 759 2051">Constant Variable</td> <td data-bbox="759 1984 1230 2051"></td> </tr> </tbody> </table>	Variable	Method to handle the variable	Manipulated Variable Temperature	Place the apparatus/potometer at <u>different temperature</u> / 20 °C, 25 °C, 30 °C and 35 °C	Responding Variable 1. Rate of transpiration 2. Time taken for air bubble to move a distance of 10 cm	1. Calculate and record the rate of transpiration by using formula : Distance / time 2. <u>Record</u> the time taken for air bubble to move a distance of 10 cm by using <u>stopwatch</u>	Constant Variable		3 6 ticks
Variable	Method to handle the variable									
Manipulated Variable Temperature	Place the apparatus/potometer at <u>different temperature</u> / 20 °C, 25 °C, 30 °C and 35 °C									
Responding Variable 1. Rate of transpiration 2. Time taken for air bubble to move a distance of 10 cm	1. Calculate and record the rate of transpiration by using formula : Distance / time 2. <u>Record</u> the time taken for air bubble to move a distance of 10 cm by using <u>stopwatch</u>									
Constant Variable										

Aspects	Mark Scheme		Marks															
	Constant Variable 1.Type of plant 2.Distance travelled by air bubble	1.Use the <u>same</u> plant 2.Fix the distance travelled by air bubble at <u>10cm</u>																
	4 – 5 ticks		2															
	2 – 3 ticks		1															
1(d)	<p>Able to make a hypothesis based on the following aspects P1 : MV- Temperature P2 : RV – rate of transpiration H : Relationship (Higher.... Higher)</p> <p>Sample Answer 1. The higher the temperature, the higher the rate of transpiration//vice versa</p>		3															
	<p>Able to make a hypothesis relating the manipulated variable and the responding variable less accurately. Sample Answer As the temperature increase, transpiration increase</p>		2															
	<p>Able to make a hypothesis at idea level Sample Answer Temperature influence transpiration</p>		1															
1(e)(i)	<p>Able to construct a table based on the following aspects 1. Title with correct unit - 1 mark 2. Data - 1 mark 3. Rate of transpiration - 1 mark Sample Answer</p> <table border="1"> <thead> <tr> <th>Temperature <i>Suhu °C</i></th> <th>Average time taken for air by air bubble to move a distance of 10 cm (min)</th> <th>Rate of transpiration cm/min</th> </tr> </thead> <tbody> <tr> <td>20</td> <td>40.0</td> <td>0.25</td> </tr> <tr> <td>25</td> <td>30.0</td> <td>0.33</td> </tr> <tr> <td>30</td> <td>20.0</td> <td>0.5</td> </tr> <tr> <td>35</td> <td>10.0</td> <td>1.0</td> </tr> </tbody> </table>		Temperature <i>Suhu °C</i>	Average time taken for air by air bubble to move a distance of 10 cm (min)	Rate of transpiration cm/min	20	40.0	0.25	25	30.0	0.33	30	20.0	0.5	35	10.0	1.0	3
Temperature <i>Suhu °C</i>	Average time taken for air by air bubble to move a distance of 10 cm (min)	Rate of transpiration cm/min																
20	40.0	0.25																
25	30.0	0.33																
30	20.0	0.5																
35	10.0	1.0																
	Any two aspects correct		2															
	Any one aspect correct		1															

Aspects	Mark Scheme	Marks
1(e)(ii)	Able to draw the graph correctly Axes : Uniform scales on both horizontal and vertical axis with correct unit – 1 mark Points : All points plotted correctly - 1 mark Curve : smooth without touching the axes - 1 mark	3
	Any two correct	2
	Any one correct	1
1(f)	Able to explain the relationship between the rate of transpiration and temperature based on the following aspects. P1 – State the relationship P2 – kinetic energy of water P3 – evaporation Sample Answer When the temperature increases, the rate of transpiration increases. When the temperature increases, kinetic energy of water molecules (in the leaf) increases, causes the rate of evaporation increase.	3
	Able to interpret the relationship less accurately Only two P	2
	Able to interpret the relationship at idea level Only one P	1
1(g)	Able to define operationally the process of transpiration based on the following aspects: P1 – water loss from plant at different places P2 – Air bubble in capillary tube move at 10 cm P3 – The rate of transpiration is influenced by temperature Sample Answer Transpiration is a process where water is lost from the plant when it is placed at different temperature which causes the air bubble in capillary tube move a distance of 10 cm. The rate of transpiration is influenced by the temperature.	3
	Any two aspects correct	2
	Any one aspects correct	1

Aspects	Mark Scheme	Marks
1(h)	<p>Able to predict the outcome of the experiment based on the following aspects</p> <p>P1 : Correct prediction P2 : Effect P3 : Reason</p> <p>Sample Answer Time taken for air to move a distance of 10 cm is more than 10 minutes. Rate of transpiration decreases because vaselin covered the stomata/stomata closed</p>	3
	Any two correct P1 and P2 or P1 and P3	2
	Only P1 is correct	1

Aspects	Mark Scheme	Marks								
1(i)	<p>Able to classify all the environmental factor and morphology factors correctly.</p> <p>Sample Answer</p> <table border="1" data-bbox="391 1120 1228 1344"> <thead> <tr> <th>Environmental factor</th> <th>Morphology factors</th> </tr> </thead> <tbody> <tr> <td>1. Relative humidity</td> <td>1. Cuticle</td> </tr> <tr> <td>2. Air movement</td> <td>2. Stomata</td> </tr> <tr> <td>3. Light intensity</td> <td></td> </tr> </tbody> </table>	Environmental factor	Morphology factors	1. Relative humidity	1. Cuticle	2. Air movement	2. Stomata	3. Light intensity		3
Environmental factor	Morphology factors									
1. Relative humidity	1. Cuticle									
2. Air movement	2. Stomata									
3. Light intensity										
	4 items correct	2								
	3 items correct	1								

Question 2

Aspects	Mark Scheme	Marks
1. Objective	<p>Able to state the objective of the investigation correctly</p> <p>Sample Answer</p> <p>To determine the concentration of vitamin C in fresh guava juice and exposed guava juice.</p>	<p>√ Tick</p> <p>NOTE: Accept oxidized / exposed / old guava juice</p>
<p>2. Problem Statement</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px 0;">01</div>	<p>Able to state a problem statement relating the manipulated variable to the responding variable correctly</p> <p>P1 - MV : types of fruit juice /fresh guava juice and exposed guava juice .</p> <p>P2 – RV : Concentration of vitamin C //Volume of fruit juice needed to decolourise 1 ml of DCPIP solution</p> <p>H : Question form.....?</p> <p>Sample Answer</p> <p>Does fresh guava juice contain higher concentration of vitamin C than exposed guava juice?</p>	<p>3</p> <p>√ Tick</p>
	<p>Able to state problem statement less accurately</p> <p>Sample Answers</p> <ol style="list-style-type: none"> 1. Does fresh guava juice contain higher concentration of vitamin C than exposed guava juice .(No " ?") 2. Does fresh guava juice contain higher concentration of vitamin C ? (No P1) 3. Does fresh guava juice contain higher vitamin C than exposed guava juice? (No P2) 	<p>2</p>
	<p>Able to state problem statement at idea level</p> <p>Sample Answer</p> <ol style="list-style-type: none"> 1. Fresh guava juice contain higher vitamin C than exposed guava juice (No P2 and H) 	<p>1</p>

Aspects	Mark Scheme	Marks
3. Hypothesis <div style="border: 1px solid black; padding: 5px; display: inline-block; margin: 10px 0;">02</div>	<p>Able to state a hypothesis based on the following aspects</p> <p>P1 - MV : Types of fruit juice/ Fresh guava juice and exposed guava juice</p> <p>P2 - RV : Concentration of vitamin C // Volume of fruit juice needed to decolourise 1 ml of DCPIP solution</p> <p>H : Relationship</p> <p>Sample Answers</p> <ol style="list-style-type: none"> 1. Fresh guava juice contains a higher concentration of vitamin C compared to exposed guava juice. 2. More volume of fresh guava juice needed to decolourise 1 ml of DCPIP solution compared to exposed guava juice. 	3 ✓ Tick
	<p>Able to state a hypothesis less accurately</p> <p>Sample Answer</p> <ol style="list-style-type: none"> 1. Types of fruit juice affects the concentration of vitamin C 	2
	<p>Able to state a hypothesis at idea level</p> <p>Sample Answer</p> <ol style="list-style-type: none"> 1. Concentration of vitamin C is different. 	1
4. Variables	<p>Able to state all three variables correctly</p> <p>Sample Answers</p> <p>Manipulated variable :</p> <p>Types of guava juice / fresh guava and oxidised / exposed guava juice</p> <p>Responding variable :</p> <ol style="list-style-type: none"> 1. Concentration of vitamin C 2. Volume of fruit juice needed to decolourise 1 ml of DCPIP Solution <p>Fixed variable :</p> <p>Volume of DCPIP solution</p>	All three Variables correct ✓ Tick

<p>2. Apparatus and Materials</p> <p style="text-align: center; border: 1px solid black; width: 40px; margin: 10px auto;">05</p>	<p>Able to list all the important apparatus and materials correctly</p> <p>Sample Answers</p> <p>Apparatus (A):</p> <ol style="list-style-type: none"> 1. Specimen tubes / test tubes 2. Beaker 3. Syringe with needles 4. Stopwatch <p>Materials(M):</p> <ol style="list-style-type: none"> 1. 0.1% ascorbic acid solution 2. DCPIP solution 3. fresh guava juice 4. guava juice that exposed to air for 2 hour/exposed guava juice 	<p style="text-align: center;">3</p> <p style="text-align: center;">√ Tick</p>
	<p>Able to list at least 3 apparatus and 3 materials correctly</p>	<p style="text-align: center;">2</p>
	<p>Able to list at least 2 apparatus and 2 materials correctly</p>	<p style="text-align: center;">1</p>
<p>6. Technique</p> <p style="text-align: center; border: 1px solid black; width: 40px; margin: 10px auto;">B1</p>	<p>Able to state a technique correctly</p> <p>Sample Answers</p> <ol style="list-style-type: none"> 1. Calculate the concentration of vitamin C in each guava juice by using the formula: Concentration of vitamin C = $x/y \text{ mgcm}^{-3}$ <p style="margin-left: 40px;">Where, x = volume of 0.1% ascorbic acid y = volume guava juice</p> <ol style="list-style-type: none"> 3. Measure and <u>record</u> the volume of guava juices which are needed to decolourise 1 ml of DCPIP by using <u>syringe</u> 	<p style="text-align: center;">1</p> <p style="text-align: center;">√ Tick</p>

<p>7. Procedure</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">04</div>	<p>Able to describe the steps of the experiment correctly</p> <p>Sample Answers</p> <ol style="list-style-type: none"> 1. Fill a specimen tube/test tube with 1 ml of DCPIP solution using a 1 ml syringe. 2. Fill a 5 ml syringe with 0.1% ascorbic acid solution. 3. Place the needle of the syringe into the DCPIP solution. 4. Add the ascorbic acid solution to the DCPIP drop by drop, stirring gently with the syringe needle until the DCPIP solution becomes colourless. 5. Record the volume of ascorbic acid solution used. 6. Repeat step 1 to 5 using fresh guava juice and exposed guava juice. 7. Tabulate the result. Calculate the concentration of vitamin C in each guava juice using the formula: Concentration of vitamin C in fruit juice = $\frac{\text{volume of 0.1\% ascorbic acid}}{\text{volume of fruit juice}} \times 1.0 \text{ mgcm}^{-3}$ <p>Note:</p> <p>K1: Preparation of materials and apparatus (any 3) <i>(Step 1, 2, 3, 4)</i></p> <p>K2: Operating the constant variable <i>(Step 1, 2)</i></p> <p>K3: Operating the responding variable <i>(Step 4, 5, 7)</i></p> <p>K4: Operating the manipulated variable <i>(Step 6)</i></p> <p>K5: Steps to increase the reliability of results accurately <i>(Step 4), Repeat experiment to get average reading</i></p>	<p>√ Tick</p> <p>K1 = (Step 1, 2, 3, 4)</p> <p>K2 = (Step 1, 2)</p> <p>K3 = (Step 4, 5, 7)</p> <p>K4 = (Step 6)</p> <p>K5 = (Step 4)</p>
	<p>All the 'K'</p>	<p>3</p>
	<p>Any 3-4 K</p>	<p>2</p>
	<p>Any 2 K</p>	<p>1</p>

<p>8. Record Data</p> <div style="border: 1px solid black; width: 40px; height: 40px; margin: 10px auto; text-align: center; line-height: 40px;">B2</div>	<p>Able to construct a table to record all data</p> <p>Sample Answer</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">Solution/ Fruit juice</th> <th style="width: 33%;">Volume of solution needed to decolourise 1 ml of DCPIP solution(ml)</th> <th style="width: 33%;">Concentration of vitamin C in guava juice (mg/cm³)</th> </tr> </thead> <tbody> <tr> <td>Ascorbic acid solution</td> <td></td> <td></td> </tr> <tr> <td>Fresh guava juices</td> <td></td> <td></td> </tr> <tr> <td>Exposed guava juice</td> <td></td> <td></td> </tr> </tbody> </table>	Solution/ Fruit juice	Volume of solution needed to decolourise 1 ml of DCPIP solution(ml)	Concentration of vitamin C in guava juice (mg/cm ³)	Ascorbic acid solution			Fresh guava juices			Exposed guava juice			<p style="text-align: center;">1</p> <p style="text-align: center;">√ Tick</p>
Solution/ Fruit juice	Volume of solution needed to decolourise 1 ml of DCPIP solution(ml)	Concentration of vitamin C in guava juice (mg/cm ³)												
Ascorbic acid solution														
Fresh guava juices														
Exposed guava juice														
<p>9. Conclusion</p>	<p>Able to state the right conclusion</p> <p>Sample Answers</p> <p>Fresh guava juice contains a higher concentration of vitamin C compared to exposed guava juice.</p>	<p style="text-align: center;">√ Tick</p>												
<p>Planning experiment</p> <div style="border: 1px solid black; width: 40px; height: 40px; margin: 10px auto; text-align: center; line-height: 40px;">03</div>	<p>7 – 9 ticks =3m</p> <p>4 – 6 ticks =2m</p> <p>2 – 3 ticks =1m</p>	<p style="text-align: center;">TOTAL</p> <p style="text-align: center;">17marks</p>												