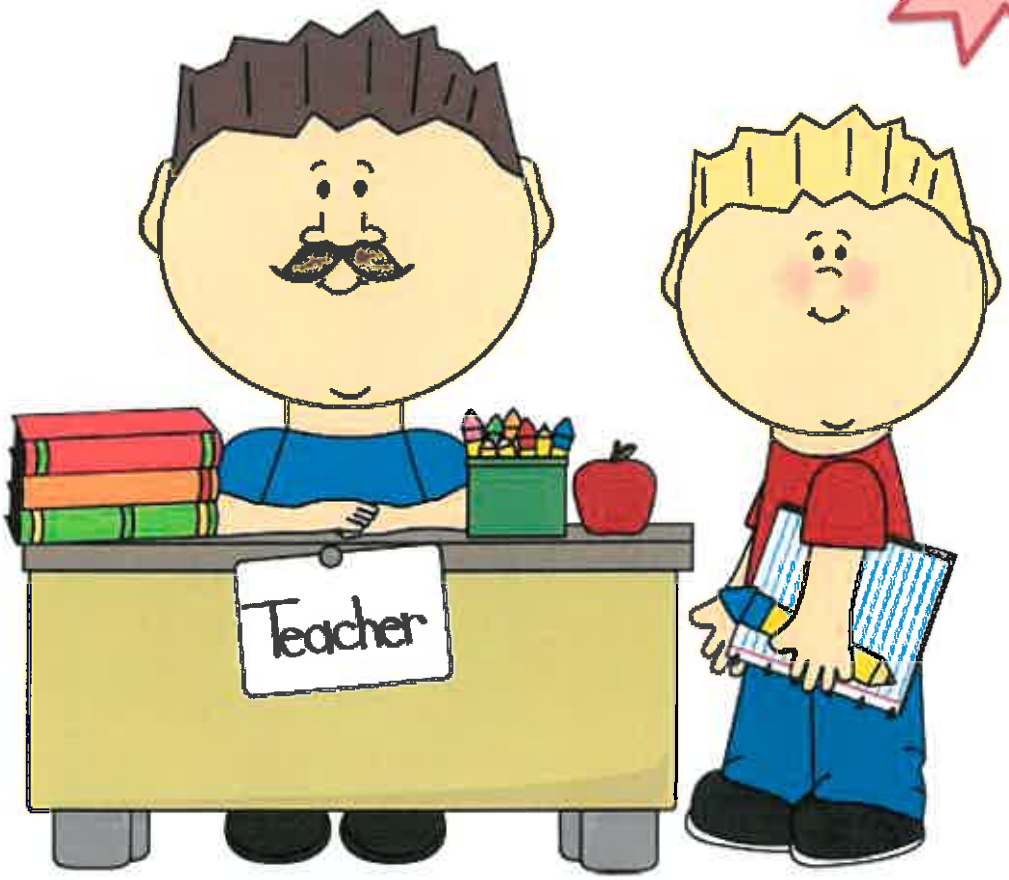
SPM BIOLOGY

EXCEL ESSAY MODULE

FORM 4



NAME : _____

FORM : _____

https://wickedbiology.wordpress.com

6 (a) Diagram 6.1 show the asexual reproduction carried out by *Amoeba* sp.
Rajah 6.1 *menunjukkan pembiakan aseks yang dijalankan oleh Amoeba sp.*

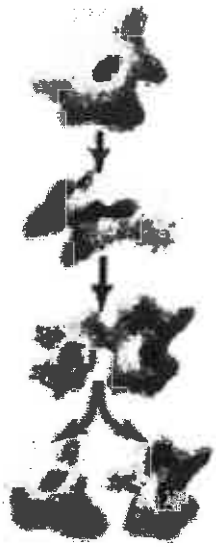


Diagram 6.1
Rajah 6.1

Describe the process shown in Diagram 6.1.
Huraikan proses yang ditunjukkan dalam Rajah 6.1.

[4 marks]

(b)

Amoeba sp. is a unicellular organism which lives in fresh water environment. Although *Amoeba* sp. is made up of only a single cell, it can perform all living processes.
Amoeba sp. *adalah satu organisma unisel yang hidup dalam persekitaran air tawar. Walau pun Amoeba* sp. *dibentuk oleh hanya satu sel, ia boleh melakukan semua proses kehidupan.*

Explain the living process that enable *Amoeba* sp. to survive in fresh water which is hypotonic to the cytoplasmic fluid of *Amoeba* sp.
Terangkan proses kehidupan yang membolehkan Amoeba sp. *untuk terus hidup dalam air tawar yang hipotonik kepada cecair sitoplasma Amoeba* sp.

[6 marks]
[6 *markah*]

(c) Diagram 6.2 shows a human organ which is involved in regulating body temperature.
Rajah 6.2 menunjukkan satu organ manusia yang terlibat dalam pengawalan suhu badan.

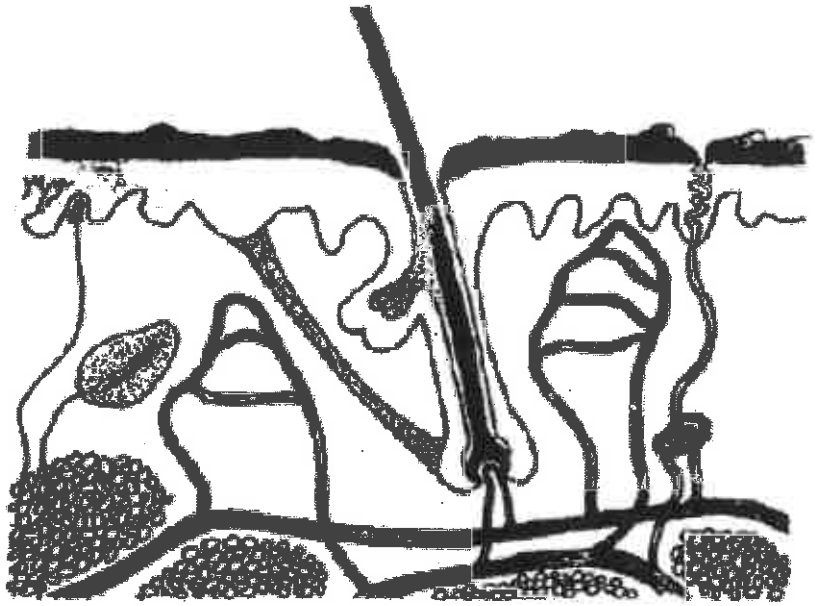


Diagram 6.2
Rajah 6.2

Based on Diagram 6.2, explain how the animal tissues are organised to form the organ in Diagram 6.2 and their roles in regulating body temperature during a hot day.
Berdasarkan Rajah 6.2, terangkan bagaimana tisu haiwan diorganisasi untuk membentuk organ dalam Rajah 6.2 dan peranan mereka dalam mengawal suhu badan dalam satu hari yang panas.

[10 marks]
[*10 markah*]

Question			Marking Criteria	Marks	
6	(a)		Able to describe the process shown in Diagram 6.1. Sample answer P1 – The process is binary fission P2 – When *Amoeba* sp. has grown to certain size P3 – The nucleus divide by mitosis P4 – Then the cytoplasm divides // Cytokinesis occurs P5 – Form 2 genetically identical *Amoeba* sp. [Any 4]	 1 1 1 1 1	4
	(b)		Able to explain the living process that enable *Amoeba* sp. to survive in fresh water which is hypotonic to the cytoplasmic fluid of *Amoeba* sp. Sample answer P1 – The living process is osmoregulation P2 – Osmoregulation in *Amoeba* sp. involved contractile vacuole P3 – Fresh water is hypotonic to *Amoeba* sp. P4 – Water diffuses into *Amoeba* sp. by osmosis. P5 – Water fills the contractile vacuole to its maximum size	 1 1 1 1 1	
			P6 – Contractile vacuole contract P7 – Expel the water out of the *Amoeba* sp. P8 – Thus, *Amoeba* sp. does not burst [Any 6]	1 1 1	6
	(c)		Able to explain how the animal tissues are organised to form the organ in Diagram 6.2 and their roles in regulating body temperature during a hot day. Sample answer P1 – This organ is skin P2 – Skin consists of epithelial tissues, nerve tissues, muscle tissues and connective tissues(at least two types of tissues) P3 – Epithelial tissues specialised to form sweat gland P4 – Sweat gland secrete sweat during hot day P5 – Epithelial tissues specialised to form hair follicle/produce hair P6 – Muscle tissues found in skin is erector muscle P7 – (During hot day), erector muscle relax, hair lies flat P8 – Muscle tissues (found at wall of arteriole) is smooth muscle P9 – Smooth muscle relax during hot day P10 – Connective tissues found in the skin is blood tissues P11 – When smooth muscle of arteriole relax, more blood flow to the skin P12 – more heat is lost P13 – Nerve tissues is the receptor P14 – Receptor detect the increase of the temperature P15 – The function of the skin is to lower the body temperature to normal [Any 10]	 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	10

6 (a) Diagram 6.1 shows three types of transport process P, Q and R across a plasma membrane
Rajah 6.1 menunjukkan tiga jenis proses pengangkutan merentasi membran plasma.

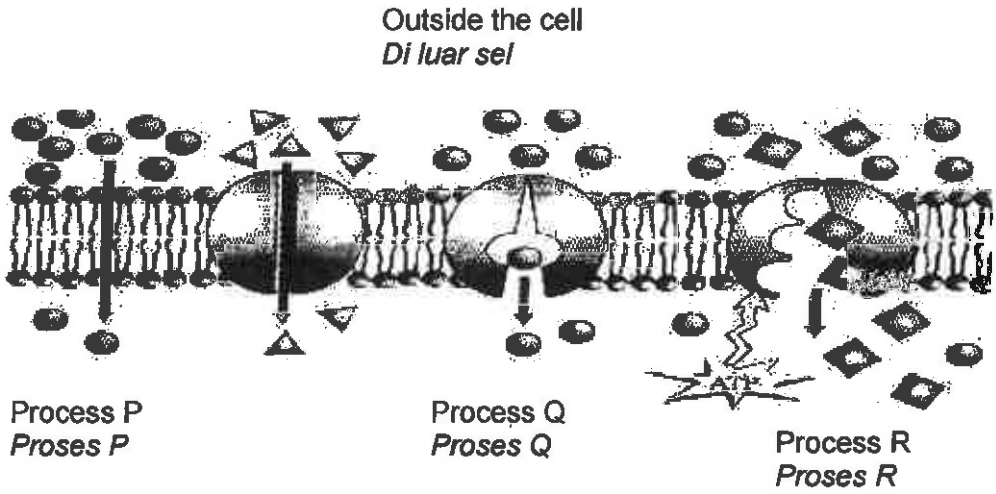


Diagram 6.1
Rajah 6.1

Explain process P, Q and R with suitable examples.
Terangkan proses P, Q dan R dengan contoh-contoh yang sesuai.

[10 marks]
[*10 markah*]

6 (b) Diagram 6.2 shows the changes of red blood cells in solution A and B.
Rajah 6.2 menunjukkan perubahan sel-sel darah merah dalam larutan A dan B.

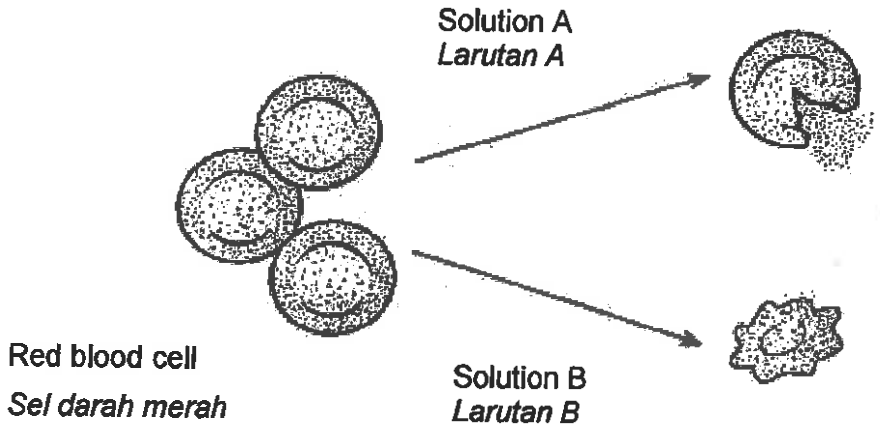


Diagram 6.2
Rajah 6.2

Explain what happen to red blood cells in solution A and B.
Terangkan apa yang berlaku kepada sel darah merah dalam larutan A dan B.

[6 marks]
[6 markah]

6 (c) Diagram 6.3 shows leeches which is an ectoparasitic organism which feed on animals blood.
Rajah 6.3 menunjukkan beberapa ekor lintah iaitu organism ektoparasit di mana menghisap darah haiwan.

Diagram 6.3
Rajah 6.3

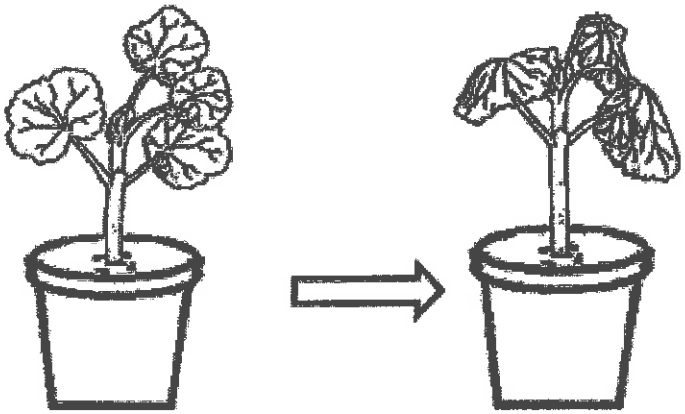
Explain how does table salt can be used to detach leeches from the human skin or to kill the leeches
Terangkan bagaimana garam boleh digunakan untuk memisahkan lintah daripada kulit manusia atau membunuh lintah.

[4 marks]
[4 markah]

No			Marking Criteria	Marks	Total Marks
6	(a)		**Process P** F1 Process P is simple diffusion through phospholipid bilayer P1 Examples of substances involved are small uncharged molecules such as oxygen / carbon dioxide / water. P2 Lipid soluble molecules such as glycerol / fatty acids / vitamin A, D, E, and K	 1 1 1	
		(ii)	**Process Q** F2 Process Q is facilitated diffusion through carrier protein P1 Examples of substances are large water-soluble Molecules such as glucose / amino acids. P2 The molecules bind to specific carrier protein P3 Carrier protein changes it shape and allow the molecules to pass through it P4 Process Q does not need energy P5 Process Q occur follow the concentration gradient	 1 1 1 1 1	
			Process R F3 Process R is active transport through carrier protein P1 Examples of substances involved small water-soluble molecules or ions such as K^+ and Na^+. P2 The molecules or ions bind to specific carrier proteins P3 that use energy from ATP (to transport the molecules or ions) P4 Process Q occurs against a concentration gradient Any 10	1 1 1 1 1	Max: 10
	(b)		**In Solution A** P1 Solution A is hypotonic to the red blood cell /cytoplasmic fluid / osmotic concentration of red blood cell. P2 Water diffuses into the cell P3 by osmosis P4 causing the cell to swell up / burst P5 The cell undergone haemolysis	 1 1 1 1	

No			Marking Criteria	Marks	Total Marks
			In Solution B P6 Solution B is hypertonic to red blood cell / cytoplasmic fluid / osmotic concentration of red blood cell. P7 Water diffuses out of the cell P8 By osmosis P9 Causing the cells to shrink and crenate P10 The cell / Red blood cell undergone creanation Any 6	1 1 1 1 1	6 Marks
	(c)		P1 Table salts gives the hypertonic condition to the surrounding / body fluid of leeches. P2 Water diffuses out of leeches P3 by osmosis P4 Leeches becomes dehydrated P5 and make it released from human skin and eventually die.		4 Marks
			TOTAL	20 MARKS	

6. Diagram 6.1 shows the condition of a pot of plant after being treated with too much fertiliser.
Rajah 6.1 menunjukkan keadaan tumbuhan pasu apabila dirawat dengan baja yang berlebihan.



Condition A / *Keadaan A* Condition B / *Keadaan B*

Diagram 6.1 / *Rajah 6.1*

(a) (i) Draw a labelled plant cell to show each of the condition in A and B.
Lukiskan gambar rajah sel tumbuhan yang berlabel untuk menunjukkan keadaan dalam A dan B.

[4 marks] / *[4 markah]*

(ii) Explain the phenomenon that occurs in diagram 6.1 above.
Terangkan fenomena yang berlaku dalam rajah 6.1 di atas.

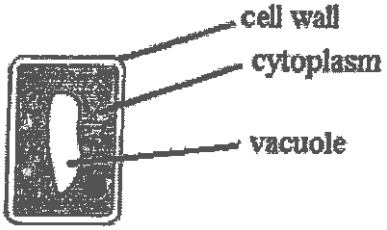
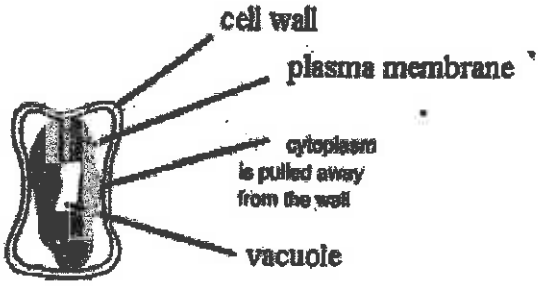
[5 marks] / *[5 markah]*

(b) Explain a suitable method by which mango can be preserved for a long period of time.
Terangkan kaedah pengawetan yang sesuai supaya mangga dapat disimpan bagi tempoh masa yang lama.

[5 marks] / *[5 markah]*

(c) Describe the structure of the plasma membrane using the fluid mosaic model.
Terangkan struktur membran plasma dengan menggunakan model bendalir mozek.

[6 marks] / *[6 markah]*

Question	Marking Scheme	Sub Mark	Total Mark
6(a)(i)	**Able to draw a labelled plant cell to show each of the condition A and condition B**  Condition A / *Keadaan A* Drawing / *Lukisan* Label */label*	 1 1	 2
	 Condition B / *Keadaan B* Drawing / *Lukisan* Label */label*	 1 1	 2
(a)(ii)	**Able to explain the phenomenon that occursin diagram 6.1** **P1 : Excessive fertiliser increases the solute concentration in soil (around the roots) compared to the cell sap(of the root)** ***lebihan baja akan meningkatkan kepekatan zat terlarut dalam tanah*** **P2 : The cell sap now has a higher concentration of water / hypotonic to the soil water** ***Sel sap mempunyai kepekatan air yang lebih tinggi/ hipotonik terhadap air tanah*** **P3 : This results in water molecules diffusing from the cell sap into the soil by osmosis** ***ini menyebabkan molekul air akan meresap keluar daripada sap sel ke tanah secara osmosis,*** **P4 : Plasmolysis occurs** ***plasmolisis berlaku*** **P5 : Vacuole / cytoplasm shrink** ***Vakuol / sitoplasma mengecut*** **P6 : Plasma membrane pulls away from the cell wall** ***Membran plasma tertarik menjauhi dinding sel***		

	P7 : (plasmolysed cell lose turgidity and support) causing the whole plant to wilt *(plasmolysis sel akan menyebabkan sel kehilangan kesegahan dan sokongan), menyebabkan pokok layu* Any 5P / *mana-mana 5P*	5 X 1	5
6(b)	**Able to explain a suitable method by which mango can be preserved for a long period of time.** P1 : Pickling *Penjerukan* P2 : A high concentration of salt / sugar solution is used *Larutan garam atau gula yang pekat digunakan* P3 : Concentrated salt / sugar solution is hypertonic compared to the cell sap (of the mango) *Larutan garam / gula yang pekat adalah hipertonik terhadap sel sap (buah mangga)* P4 : Water molecules (within the food cells) difuse out by osmosis *Molekul air meresap keluar (dari buah mangga) secara osmosis* P5 : Water molecules also difuse out from the microorganism *Molekul air juga meresap keluar dari mikroorganisma* P6 : Food become dehydrated *Makanan mengalami penyahidratan* P7 : Without water, bacteria and fungus cannot survive *Tanpa air, bakteria dan kulat tidak dapat membiak*		
(c)	**Able to describe the structure of plasma membrane using the fluid mosaic model** P1 : Plasma membrane is composed of phospholipid and protein *Membran plasma terbina daripada fosfolipid dan protein* P2 : Various types of proteins are dispersed throughout and inserted into the phospholipid bilayer. *Pelbagai jenis protein tersebar dan terbenam dalam dwilapisan fosfolipid* P3 : Phospholipid bilayer are not rigid / static but form a dynamic / flexible structure *Dwilapisan fosfolipid tidak tegarstatik tetapi membentuk struktur yang fleksibel / dinamik* P4 : Phospholipid molecule has a polar head (hydrophilic) and a non polar tail (hydrophobic) *Molekul fosfolipid mempunyai kepala hidrofilik dan ekor yang hidrofobik* P5 : Contains cholesterol which links the fatty acids together and *Mengandungi kelesterol untuk menghubung asid lemak bersama dan*		

	P6 : Helps to stabilise / strengthen the plasma membrane (and make it more flexible.) *Membantu memberi kestabilan / kekuatan terhadap membran plasma(dan menyebabkanya membran lebih fleksibel)*		
	P7 : Has various type of proteins (eg: pore protein and carrier protein) either partially attached or wholly embedded in the membrane. *Mempunyai pelbagai protein (protein pembawa dan protein liang) terbenam secara separa atau secara menyeluruh di dalam membran* P8 : The protein molecules float about in the phospholipid bilayer to form a mosaic pattern that is always changing / fluid /dynamic *Molekul protein terapung di dalam dwilapisan fosfolipid untuk membentuk corak mozek yang sentiasa berubah /ciri bendalir/ dinamik* Any 6P / *mana-mana 6P*	6 X 1	6
			20

7 (a) (i)

Movement of substances across the plasma membrane in the cell is important for the continuity in life of organisms. The process helps to maintain a constant internal environment.
Pergerakan bahan merentasi membran plasma di dalam sel adalah penting untuk kemandirian hidup organisma. Proses ini mengekalkan persekitaran dalaman organism.

Explain the importance of plasma membrane for the survival of living organism.
Terangkan kepentingan membran plasma untuk kemandirian organism hidup.

[4 marks]
[4 markah]

(ii) Diagram 7.1 shows two types of transport of substances through plasma membrane.
Rajah .1 menunjukkan dua jenis pengangkutan bahan melalui membran plasma.

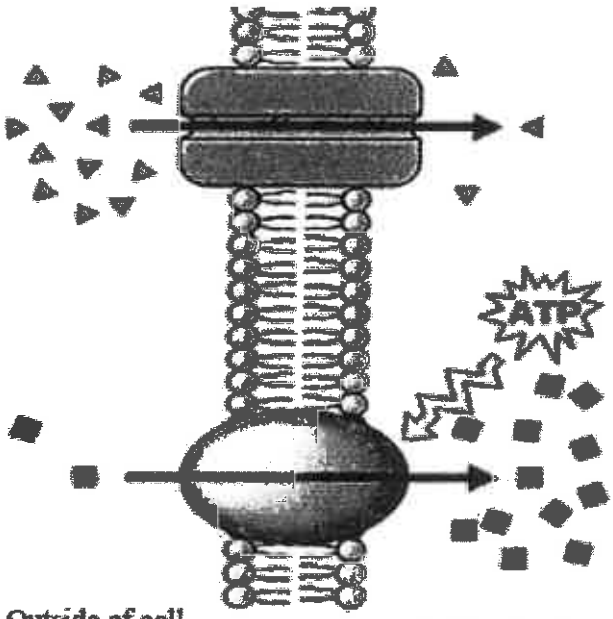


Diagram 7.1
Rajah 7.1

Explain the two types of transport of substances through plasma membrane shown in Diagram 7.
Terangkan kedua-dua jenis pengangkutan bahan melalui membran plasma yang ditunjukkan dalam Rajah 7.

[6 marks]
[6 markah]

(b) A student carry out the experiment to determine the concentration of an external solution which is isotonic to the cell sap. The student immersed the potato strips in a different concentration of sugar in 30 minutes time.
Diagram 7.2 shows graph plotted to show the change in mass against concentration of solution.
Seorang pelajar menjalankan eksperimen untuk mengetahui kepekatan larutan di luar sel yang isotonik dengan kepekatan sap sel. Pelajar itu merendam jalur ubi kentang di dalam kepekatan larutan gula yang berbeza.
Rajah 7.2 menunjukkan graf yang diplot untuk menunjukkan perubahan dalam jisim melawan kepekatan larutan

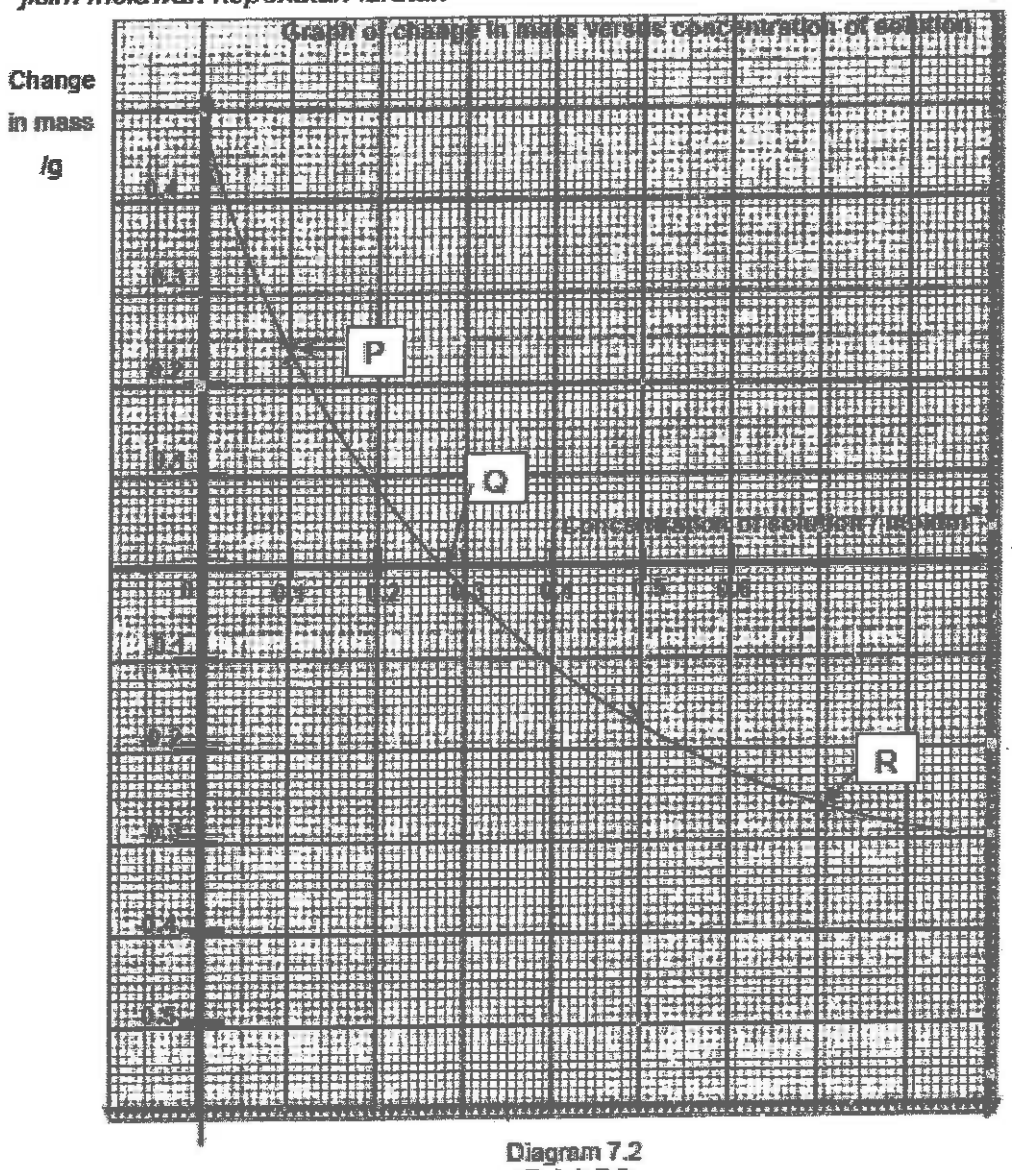


Diagram 7.2
Rajah 7.2

(i) Based on the graph in Diagram 7.2 , state the concentration of the solution that is isotonic to cell sap.
Berdasar graf pada Rajah 7.2 , nyatakan kepekatan larutan yang isotonik kepada sel sap.

[1mark]

(ii) Explain what happen to the cell at point P , Q and R.
Terangkan apa yang berlaku terhadap sel di titik P, Q dan R.

[9 marks]
[9 markah]

No	Mark Scheme	Sub mark	Total Mark
7 (a)(i)	Able to explain the importance of plasma membrane for the survival of living organism. Sample answer F : living organism need nutrients / oxygen / glucose / mineral / any suitable example to continue their life`s processes E1 : ions inside cells must be kept at different concentration to outside the cells. E2 : to maintain a constant internal environment/ (homeostasis) E3 : The substances across the plasma membrane from the external environment E4 : cells produce waste products which exit through the plasma membrane E5 : The movement / types / amount of substances in and out of the cells is regulated by plasma membrane. E6 : the cells need to maintain suitable pH of the cells for enzyme activity E7 : so that cell can secretes useful substances / hormones / enzymes Any four	Max 4	4
(a)(ii)	Able to explain active transport and facilitated diffusion of substances through plasma membrane Sample answer Type 1 F1 : facilitated diffusion occur E1 : diffusion of small molecules / ions E2 : move from higher concentration to the higher concentration of solute E3 : through pore protein E4: does no need energy Any three Type 2 F : Active transport occur E1 : The molecules such as sodium ions / potassium ions / glucose / amino acid E2 : move against concentration gradient / from lower concentration to the higher concentration E3 : through carrier protein E4 : have active site with bind with particular molecule	3+3 3	
	E5 : need energy / ATP Any three	3	6

(b)	Able to explain what happen to the cell at point P, Q and R. Sample answer Isotonic to the sap cell : 0.27 moldm^{-3}/ 0.28 moldm^{-3} /0.29 moldm^{-3} **Point P** F1 : The mass of potato increase E1 : (This occur because) the solution concentration is hypotonic to the sap cell of the potato E2 : The water molecule diffuse out from lower concentration/ hypotonic region to the higher concentration/ hypertonic region E3 : by osmosis E4 : cell becomes turgid (so the mass increased) **Point Q** F2 : The potato does not lose or gain mass E1 : This occur because the concentration o the solution is isotonic to the cell sap E2 : Diffusion of water molecule is at equilibrium / equal rate E3 : no net gain or loss of water molecule (so the mass is matained) **Point R** F3 : The mass of potato decrease E1 : (This occur because) the solution is hypertonic to the cell sap E2 : The water molecule diffuse out from cells / from higher concentration to the lower concentration / solution at surrounding E3 : by osmosis E4 : cell becomes flaccid (so the mass decreased) Any 10	Max 10	10
	TOTAL		20

6 (a) Enzymes is produced by living cells. There are two types of enzyme which are intracellular enzyme and extracellular enzyme.
Diagram 6.1 shows the organelles involved in the synthesis and secretion of extracellular enzymes in an animal cell.

Enzim dihasilkan oleh sel hidup. Terdapat dua jenis dua jenis iaitu enzim intrasel dan enzim luar sel.
Diagram 6.1 menunjukkan organel-organel yang terlibat dalam sintesis dan rembesan enzim-enzim luar sel di dalam sel haiwan.

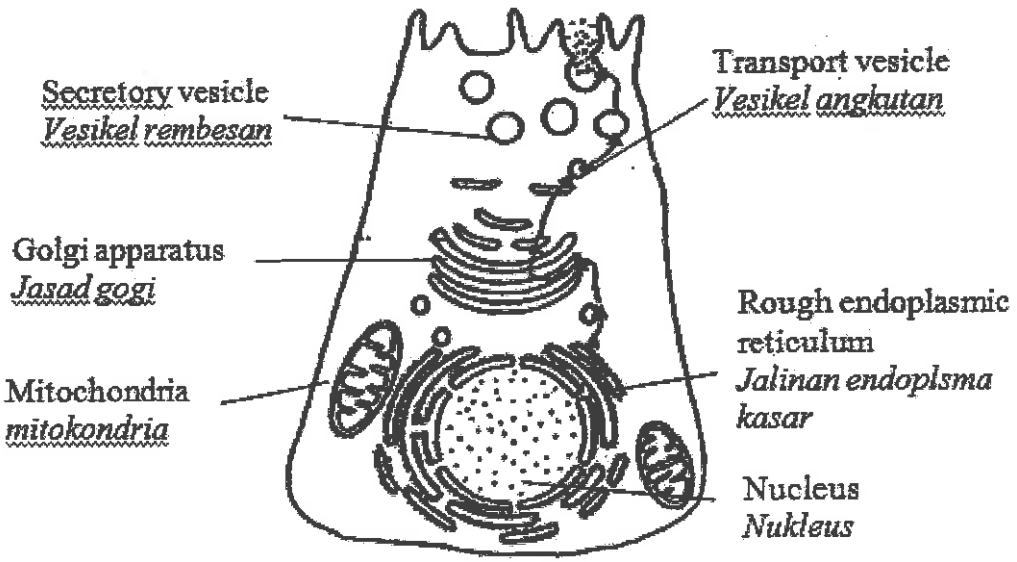


Diagram 6.1
Rajah 6.1

(i) Explain the differences between intracellular enzymes and extracellular enzymes.
Terangkan perbezaan di antara enzim intrasel dan enzim luar sel.

[4 marks]
[4 markah]

(ii) Describe the involvement of the organelles in the production of extracellular enzymes.
Huraikan penglibatan organel-organel di dalam penghasilan enzim-enzim luar sel.

[8 marks]
[8 markah]

6 (b) Diagram 6.2 shows three stages in an enzyme reaction.
Rajah 6.2 menunjukkan tiga peringkat di dalam suatu tindakan enzim.

Diagram 6.2
Rajah 6.2

(i) Based on diagram above, explain the lock and key hypothesis in the mechanism of enzyme reaction.
Berdasarkan gambarajah di atas, terangkan hipotesis kunci dan manga di dalam mekanisma tindak balas enzim.

[8 marks]
[8 markah]

No			Marking Criteria	Marks	Total Marks
6	(a)	(i)	P1: Intracellular enzymes are produced and retained in the cell P2: For the use of the cell itself P3: Extracellular enzymes are produced in the cell but secreted from the cell P4: To function externally	1 1 1 1	4 marks
		(ii)	P1: The nucleus contain DNA which carries the information for the synthesis of enzymes P2: The genetic information is transcribed from DNA to RNA in the nucleus P3:The RNA leaves the nucleus and attaches to ribosomes on the rough endoplasmic reticulum P4: Proteins that are synthesized at the ribosomes are transported through the space within RER P5: Proteins depart from RER wrapped in vesicles that bud off from the membrane of the RER P6:The transport vesicles fuse with the Golgi Apparatus and empty their content into the membranous space P7:The protein are further modified during their transport in Golgi Apparatus P8: Secretory vesicles containing enzymes bud off from Golgi Apparatus and travel to plasma membrane P9:These vesicles fuse with plasma membrane and release the extracellular enzymes	1 1 1 1 1 1 1 1 1 Any 8	8 marks
	(b)		P1 : Enzyme / P is represent the lock P2 : Substrate / Q is represent the 'key' P3: Enzyme / P is specific P4: Enzyme / P only can combined with substrate / Q P5: Enzyme/ P has specific active site which can fit into specific substrate / Q	1 1 1 1 1	8 marks

			P6: The substrate / Q binds with the active site/ enzyme to form an enzyme-substrate complex	1	
			P7: Enzyme / P convert / hydrolysed / breakdown substrate /Q into products/R	1	
			P8: The products/R are released from the enzymes	1	
			P9: The enzyme/P remain unchanged at the end of the reaction	1	
			P10 : Enzyme P can be reused	1	
			P11: The enzyme/P is now free to bind with another molecule of substrate/Q	1	
				Any 8	
					20 marks

6 Diagram 6.1 shows the organelles involved in the synthesis and secretion of an extracellular enzyme in an animal cell.

Rajah 6.1 menunjukkan organel-organel yang terlibat dalam sintesis dan rembesan enzim luar sel di dalam sel haiwan.

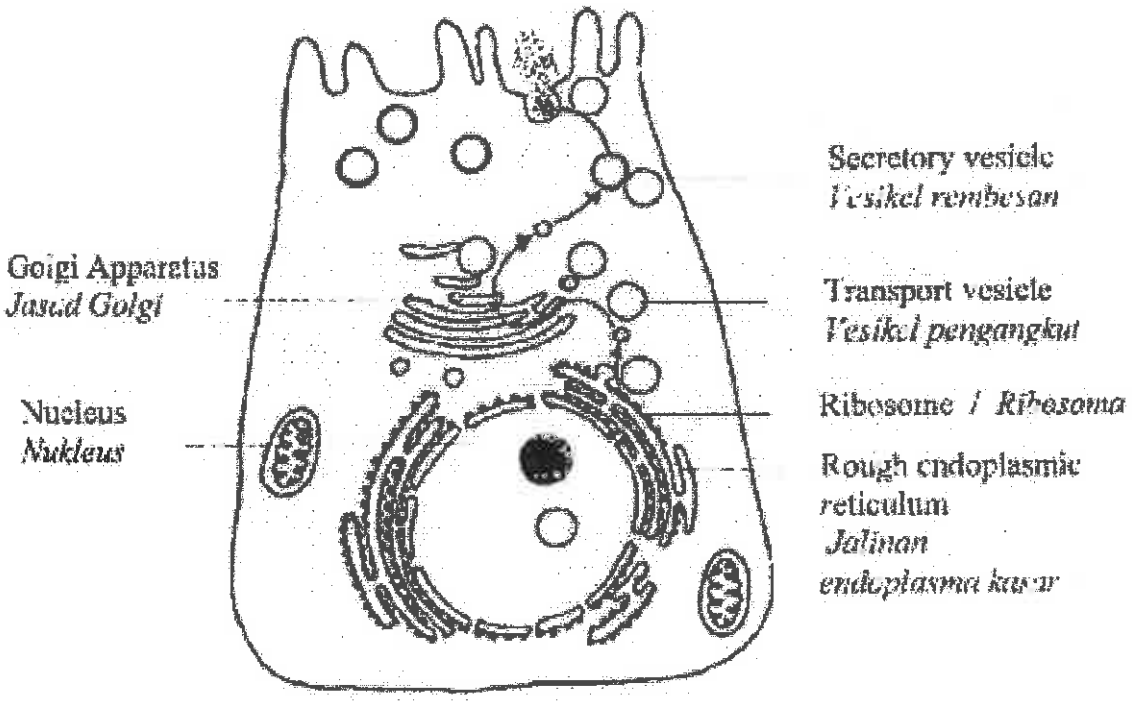


Diagram 6.1 / *Rajah 6.1*

(a) Based on Diagram 6.1, explain the processes involved in the production of extracellular enzymes.

Berdasarkan Rajah 6.1, terangkan proses-proses yang terlibat dalam penghasilan enzim luar sel.

[6 marks / *markah*]

(b) Diagram 6.2 shows two types of complex molecules.
Rajah 6.2 menunjukkan dua jenis molekul kompleks.

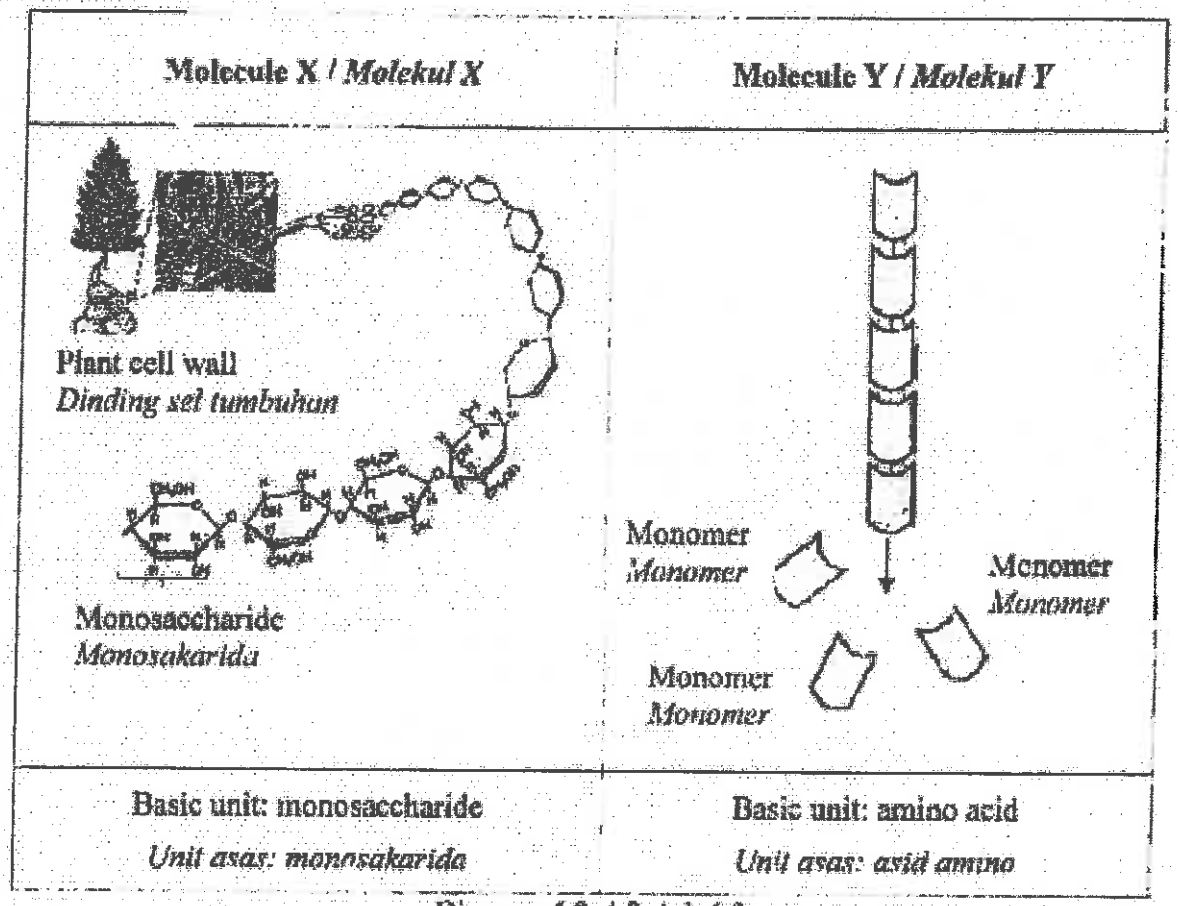


Diagram 6.2 / *Rajah 6.2*

Based on Diagram 6.2, explain
Berdasarkan Rajah 6.2, terangkan

(i) the formation of molecules X / *pembentukan molekul X*

(ii) the breakdown of molecule Y / *penguraian molekul Y*

[4 marks / *markah*]

(c) Starch, protein and lipid can be hydrolysed by the enzymes X, Y and Z respectively. Diagram 6.3 is a graph which shows the effect of pH on the rate of enzyme activity.

Kanji, protein dan lipid masing-masing dapat dihidrolisis oleh enzim X, Y dan Z. Rajah 6.3 ialah graf yang menunjukkan kesan pH ke atas kadar aktiviti enzim.

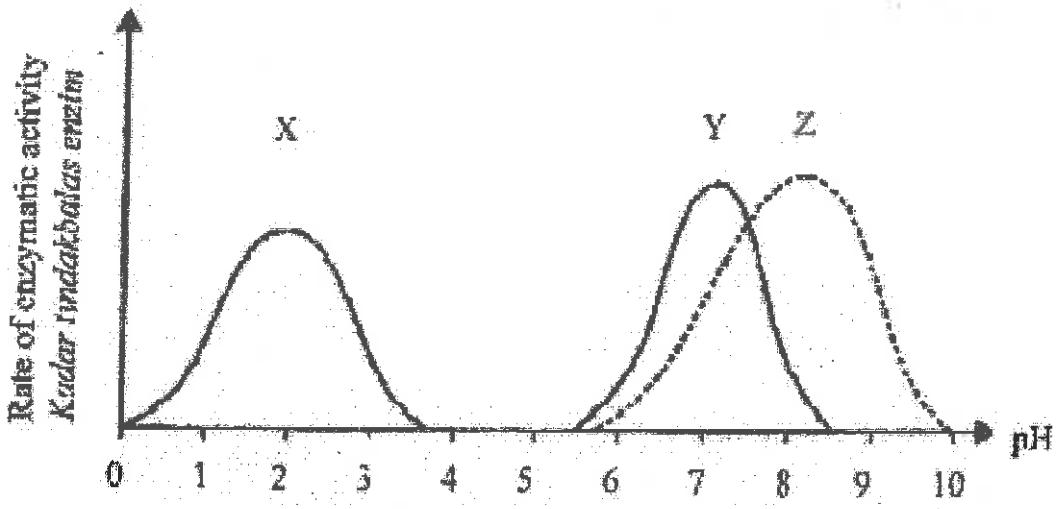


Diagram 6.3 / *Rajah 6.3*

Based on the Diagram 6.3, name X, Y, Z and explain how the changes in pH affects enzyme activity.

Berdasarkan Rajah 6.3, namakan X, Y, Z dan terangkan bagaimana perubahan pH menjejaskan aktiviti enzim.

[10 marks / *markah*]

ITEM NO	SCORING CRITERIA	MARKS		REMARKS
6(a)	• DNA in the nucleus contains genetic information to synyhesize enzymes /protein. • RNA copies the information from the DNA for use in enzyme/ protein synthesis • Ribosomes synthesise proteins / polypeptides • The synthesized proteins are transported through the spaces in the RER • Proteins are transported by transport vesicles to the Golgi apparatus • Here the proteins are modified into enzymes. • The enzymes are transported to the plasma membrane by secretory vesicles to be released outside the cell.	1 1 1 1 1 1 1	6 max	Any 6
(b)	• Molecule X is a polysaccharide /cellulose which consist of many monosaccharides /glucose • The monosaccharides /glucose are joined together by condensation to form long chains of polymers • Molecule Y is a polypeptide (which consist of many amino acids) • Molecule Y is broken down by hydrolysis	1 1 1 1	4	Reject starch /glycogen
(c)	• X-pepsin , Y- saliyary amylase , Z- trypsin • Each enzyme functions actively at its optimum pH • The enzyme saliyary amylase functions optimally at pH 7 neutral • The optimum pH for pepsin is pH 2 acidic • trypsin is pH 8.5 / alkaline • The changes in pH will cause changes to the concentration of hydrogen ions(H+) and hydroxyl ions(OH-) • The excess hydrogen ions or hydroxyl ions destabilise enzymes by changing the charges of the active site. • Charges on the substrate (surface area) are also changed • Hence the enzyme-substrate complex cannot be formed / the substrate cannot enter / fit into the active site • The effects of pH changes on enzyme activity are reversible • An enzyme which is inactive in high pH medium will become active again when it is at its optimum pH	1 1 1 1 1 1 1 1 1 1	max 10	
	TOTAL	20		

6. (a)

Enzymes which are isolated from cells can function outside the cells. Enzymes can be used as catalysts in industries. The use of enzymes in industrial processes is known as **enzyme technology.**
Enzim yang diasingkan daripada sel boleh berfungsi di luar sel. Enzim boleh digunakan sebagai pemangkin di dalam industri.Penggunaan enzim di dalam perindustrian dikenali sebagai teknologi enzim.

Based on the statement:
Berdasarkan penyataan di atas:

(i) list the general characteristic of enzymes .
senaraikan ciri-ciri umum enzim [4 *marks*]

(ii) Using suitable examples, discuss the uses of enzymes in industrial processes and our daily life. [6 *marks*]
Dengan menggunakan contoh-contoh yang sesuai. bincangkan kegunaan enzim di dalam proses industri dan kehidupan harian.

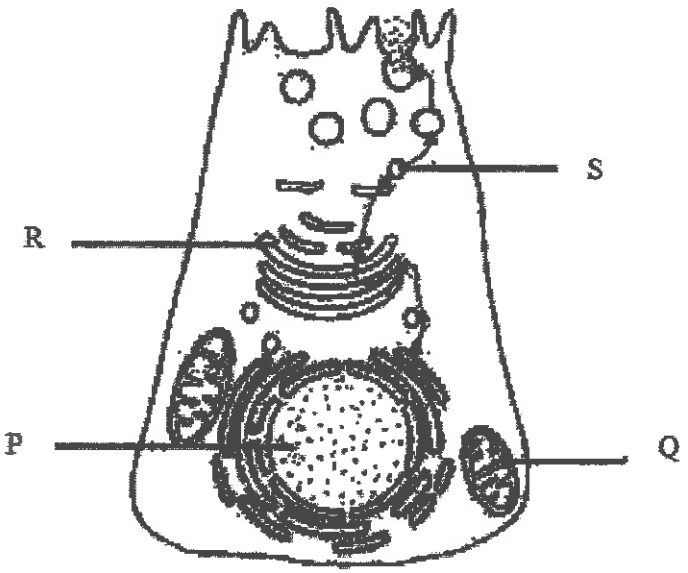


FIGURE 6

(b) Figure 6 shows the organelles involved during the synthesis and secretion of an enzyme in an animal cell.

Based on Figure 6, explain how extracellular enzyme are produced by emphasizing on the role of P, Q, R and S.
Rajah 6 menunjukkan organel-organel yang terlibat semasa penghasilan dan perembesan enzim di dalam sel haiwan.
Berdasarkan Rajah 6, terangkan bagaimana enzim luar sel dihasilkan dengan menekankan peranan P, Q, R dan S.

[10 Marks]

ITEM NO.	SCORING CRITERIA	MARK	REMARK
6 (a)(i)	**Able to list the general characteristics of enzymes** *Sample answer* P1 – Enzymes are proteins which are synthesised by living organisms. P2 – Enzymes bind to their substrates and convert them to product in the enzymatic reaction P3 – Enzymes have specific sites called active sites to bind to specific substrates // enzymes are highly specific in their reaction // each enzyme can only catalyse one kind of substrate / specific substrate P4 – Enzymes speed up the rates of chemical reactions but remain unchanged (at the end of the reaction) // They are not destroyed by the reactions they catalyse. P5 – Enzymes are needed in small quantities because they are not used up (but released at the end of a reaction) P6 – Most enzyme-catalysed reactions are reversible // enzymes can catalyse the reaction in either direction. P7 – The activity of an enzyme can be slowed down or completely stopped by inhibitors // In order to function well , many enzymes require helper molecules,called cofactors.	1 1 1 1 1 1 1	Max: 4 m
6(a)(ii)	**Able to discuss the uses of enzymes in industrial processes and our daily life, using suitable examples** *Sample answer*		

Type of industry/ Application (T)	Enzymes used (E)	Uses (U)	
1. Food processing industry (a)Dairy products	Rennin	•Solidifies milk proteins	
	Lipase	•Ripening of cheese	
	Lactase	•Hydrolyses lactose to glucose in the making of ice-cream	1 1
(b)Bread and other bakery products (baking industry)	Amylase Protease	•amylase convert starch flour into sugar in the making of the bread •protease convert protein in the making of biscuit	1
(c)Alchoholic drinks	Amylase	•amylase convert starch in	1

	(beer / wine making industry)		malt into glucose for the fermentation of yeast (in wine and beer production.)	1	
		Zymase	•Converts sugars into ethanol during fermentation of yeast (in wine and beer production.)	1	
	(d)Fish products	Protease	•Protease removes the skin of fish	1	
	(e)Meat products	Protease	•Tenderises meat	1	
	(f)Cereal grain products	Cellulase	•Breaks down cellulose and removes seed coats from cereal grain	1	Max: 7m
	(g)Seaweed products	Cellulose	•Digest cell wall and extracts agar from seaweed	1	
	(h)Starch products	Amylase	•Change starch to sugar in the making of syrup	1	
		Glucose isomerase	•Convert glucose into fructose // Production of high fructose syrup	1	
	2. Leather products	Trypsin / Protease	•Removal of hair from animal hides	1	
	3. Medical / phartimaceutical product	(Pancreatic) tripsin (Microbial) trypsin	• Treats inflammation	1	
			• Dissolves blood clots	1	
	4 .Biological washing powder or detergent	Protease and amylase	•Dissolve protein and starch stains in clothes	1	
	Grant marks : All the three corresponding (T + E + U) should be correct			1	*10 marks*
6(b)	**Able to explain how extracellular enzyme is produced by emphasising on the role of P, Q, R and S** *Sample answer* P1– P : nucleus, store genetic information / gene (for the synthesis of enzymes) in chromosome / DNA / is carried by the DNA P2– The messenger RNA/ mRNA is synthesised according to the instruction on the DNA // The genetic information to synthesis the enzyme in DNA is transfered to RNA in code form // mentioning of the transcription process briefly. P3– Q : mitochondrion, produce energy by cellular respiration (used in the production of extracellular enzyme			1 1	

	P4 –The messenger RNA / mRNA / RNA then leaves the nucleus and moves to the ribosome (which is the site of protein synthesis) P5– The messenger RNA / mRNA /RNA attaches itself to the ribosome P6– Protein that are synthesised at the ribosome are transported through the spaces within the rough endoplasmic reticulum P7– Proteins depart from the rough endoplasmic reticulum wrapped in vesicle that bud off from the sides of the rough endoplasmic reticulum / from the membranes of the rough endoplasmic reticulum P8 – These transport vesicles fuse with the membrane of the R, Golgi apparatus / body and empty their contents into the membranous space P9– These proteins are modified during their transport in the Golgi apparatus, R . P10– For example, sugar to make glycoproteins/ carbohydrate are added to protein P11– S, secretory vesicle containing these modified proteins bud off from the Golgi membrane and travel to plasma membrane P12– These vesicle will then fuse with the plasma membrane before releasing the proteins outside the cell as extacellular enzymes. **Grant marks:** If student mention the names of P,Q, R and S before or after explaining the process.	1 1 1 1 1 1 1 1 1 1	Max: 10m **Total:** ***20 marks***

6 (a) According to the stages metaphase, anaphase and telophase in cell division, differentiate the events happening during mitosis and meiosis.

Berdasarkan kepada peringkat metafasa, anafasa dan telofasa dalam pembahagian sel, bezakan peristiwa yang berlaku semasa mitosis dan meiosis.

[4 marks]

(b)

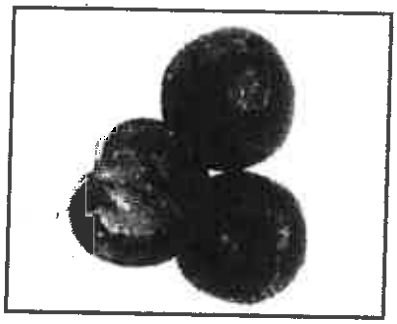


Diagram 6.1

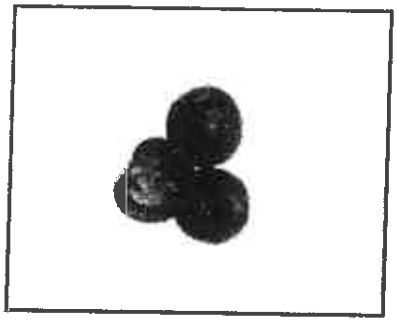


Diagram 6.2

Diagram 6.1 is a new variety of a vegetable which has a great commercial value.

Diagram 6.2 is the original parent of the plant.

Based on above Diagram and with your biological knowledge, explain how a farmer can propagate this variety to give a large scale of yield and at the same time maintains its quality.

Rajah 6.1 adalah satu variati sayuran di mana mempunyai nilai komersial.

Rajah 6.2 adalah induk tempatan pokok tersebut.

Berdasarkan Rajah di atas dan pengetahuan biologi anda, terangkan bagaimana seorang petani dapat memperbanyakkan variati ini supaya hasil ladang dapat meningkat dan pada masa yang sama, kualiti dapat dipelihara.

[6 marks]

c) Discuss how mutation can lead to the formation of tumour

Bincangkan bagaimana mutasi dapat menyebabkan pembentukan tumor.

[10 marks]

SUGGESTED ANSWER :

No.	ACCEPTED POINTS / DESCRIPTION / EXPLANATION	M		Sum
6(a)	○ Able to differentiate the events happening during mitosis and meiosis.	4		

Stages	Mitosis	Meiosis
1. Metaphase	- homologous chromosome are arranged **In linear sequence /randomly** at the metaphase plate	- homologous chromosome line up **side by side** at the metaphase plate
2. Anaphase	- separation of **sister chromatids** to the opposite pole// the centromere of each chromosome divides into two and allows sister chromatid to move to opposite pole.	- separation of the **homologous chromosome** to the opposite pole // sister chromatids still remain attached to each other during movement to the opposite pole
3. Telophase	- two daughter nuclei are formed - diploid (2n) number of chromosome is remained - daughter cells are genetically identical to each other and to the parent cell.	- four daughter nuclei are formed - diploid (2n) number of chromosome is reduced to haploid (n) - daughter cells are differ from the parent and from each other// variation occurs among daughter cells. **1m each = max 4 marks**

No.	ACCEPTED POINTS / DESCRIPTION / EXPLANATION	M	Sum
6(b)	Able to explain how a farmer can propagate this variety to give a large scale of yield and at the same time maintains its quality.		
	• The technique used is tissue culture technique	1	
	• A piece of tissue/explant is taken from the young part of the parent plant eg. Shoot/ root and cut into smaller pieces	1	
	• The tissues are sterilized (with dilute sodium hypochlorite solution) to prevent the growth of pathogens / bacteria /fungus.	1	
	• Each pieces of sterilised tissue is placed onto a growth medium/ gel containing nutrients (eg. Glucose, amino acid, minerals etc.) and hormone/auxin with optimum pH level	1	
	• The apparatus and culture medium used must be in sterile conditions and kept under the suitable temperature/ 30-35°C.	1	***1 point - 1 mark*** ***10 point - 10 marks*** **Max: 6 marks**
	• The tissue cells then divide repeatedly by mitosis to produce a mass of undifferentiated cells/ callus	1	
	• After several weeks, callus differentiated to produce shoots and roots /organogenesis.	1	Max 6
	• Once the roots grow, the plantlets/little plant are removed and transferred to the soil for growth into the adult plant.	1	
	• All the plantlets produced this way are genetically identical and known as clones.	1	
	• Therefore, all adults plants that develop from them share the same traits, for example has large fruits.	1	

No.	ACCEPTED POINTS / DESCRIPTION / EXPLANATION	M	Sum
6(b)	Discuss how **mutation** can lead to the formation of • certain substance/carcinogen such as benzo - A - pyrene etc... 1 • can cause the change in DNA structure (that control the cell cycle) 1 • an abnormal cell is formed/ cancer cell / mutant cell 1 • this change disrupts the coded DNA genetic instruction for mitosis control 1 • this leads to uncontrolled mitosis (which is non-stop division of the cell) producing a mass of new daughter cells called tumour 1 • tumour cells have no function, but instead compete with surrounding normal cells to obtain nutrients and energy for their own growth 1 • some tumours remain inactive and are relatively harmless (not cancerous) and called benign tumour 1 • Benign tumour cells remain at its original site and do not spread to other part of the body. It can be removed by surgery. 1 • Other tumour, called malignant tumours are very active (cancerous), spread locally and some cancer cell migrates through bloodstream to invade other organ. 1 • when this happens, secondary tumous develop in other body tissue, then lead to the malfunction of the tissue and ultimately death 1 • An individual with a malignant tumour is said to have cancer. 1	Max 10	

7. (a)(i) What is meant by *cloning*?
Apakah yang dimaksudkan dengan pengklonan?

[2 marks]
[2 markah]

(a)(ii) Describe **one** cloning technique to produce a commercial plant of desirable characteristics
Jelaskan satu contoh teknik pengklonan yang boleh digunakan untuk menghasilkan tumbuhan komersial yang mempunyai ciri-ciri yang dikehendaki.

[6 marks]
[6 markah]

(b)

The hormone insulin used by present day diabetics is the result of genetic engineering technology. This hormone which was used to treat diabetics since 1982 is the first technological product approved for the market.
Hormone insulin yang digunakan oleh pesakit diabetis adalah hasil dari teknologi kejuruteraan genetik. Hormon yang telah digunakan sejak 1982 adalah produk teknologi pertama yang dibenarkan yang dibenarkan untuk pasaran.

Based on above information, discuss the benefits of genetic engineering method in producing products for the society.
Berdasarkan maklumat di atas, bincangkan kebaikan teknik kejuruteraan genetik dalam menghasilkan keperluan masyarakat.

[6 marks]
[6 markah]

(c) Diagram 7.1 shows a group of cells that is exposed to ultraviolet ray.
Rajah 7.1 menunjukkan sekumpulan sel yang terdedah kepada sinar ultraviolet.

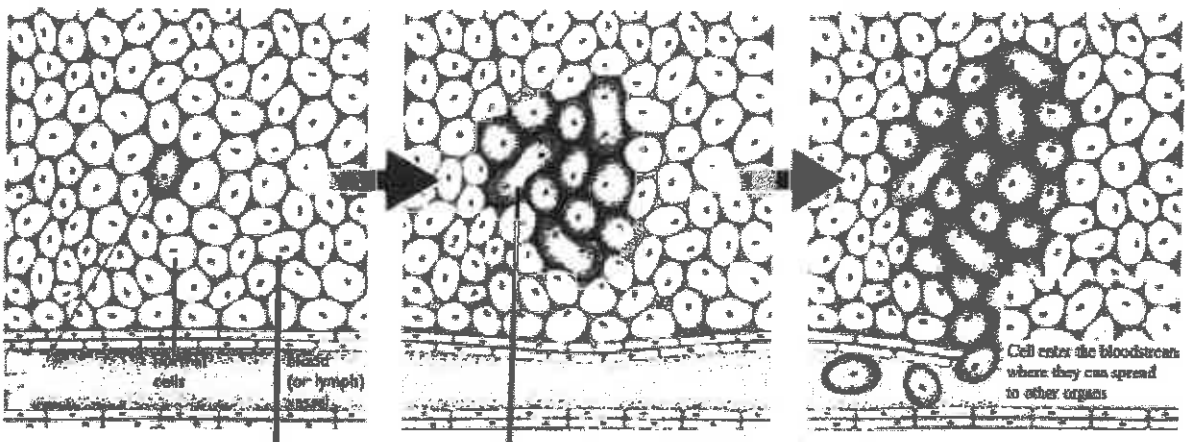


Diagram 7.1
Rajah 7.1

The exposure drives the cell cycle malfunctions. Based on the Diagram 7.1 describe effect of cell cycle malfunctions to the body.
Pendedahan kepada sinar radioaktif menyebabkan kitar sel tidak berfungsi. Berdasarkan Rajah 7.1, huraikan kesan kitar sel yang tidak berfungsi ke atas badan.

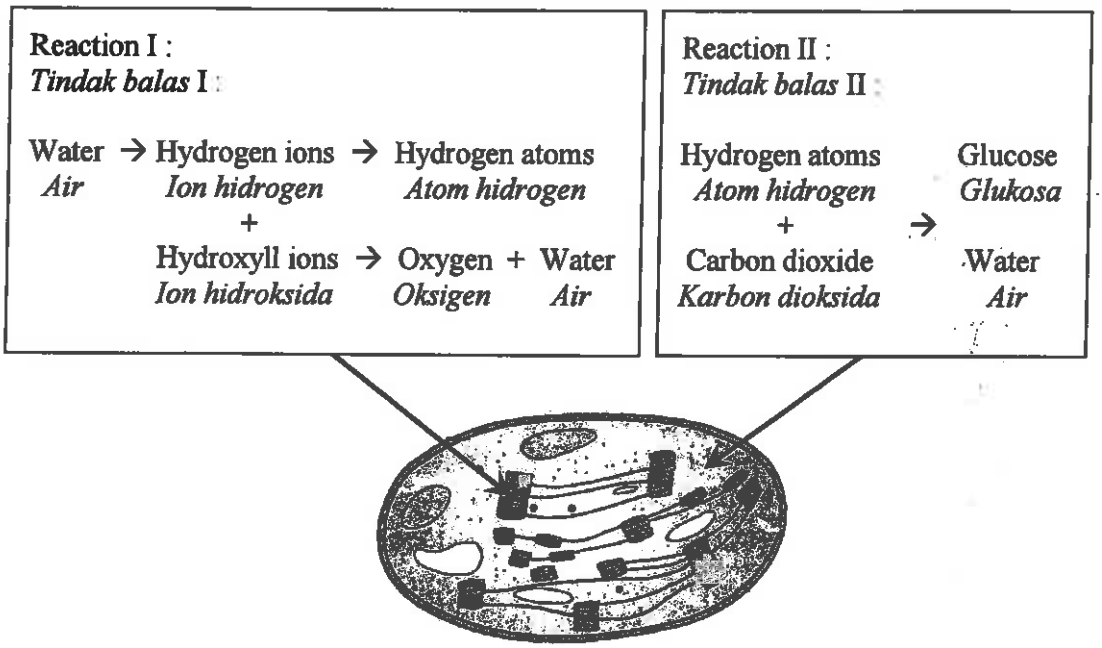
[6 marks]

Question 7

No	Marking Criteria	Marks	
(a)	Able to explain what cloning is : **Sample answer** : P1 : Cloning is an asexual reproductive process of producing clones//does not involve gamete P2 : A clone is a group of cells//organism//a population of organisms produced from a single ancestral cell. P3 : A clones genetically identical P4 : The technique can be used to produce high quality of organism / orchids/ oil palm / cocoa plants. *Any 2 P*	1 1 1 1	2
(b)	Able to describe tissue culture technique. **Sample answer:** P1 : Tissue culture technique P2 : Tissue culture technique is used to produce (high quality of seedling)oil palm seedlings in vitro/any suitable example. P3 : The leaves/shoot/stem/root tissues are cut out.(These cut out plant tissues are called explants). P4 :The pieces of meristematic tissue (explants) are cultured in sterile nutrient medium, in suitable pH and with addition of plant growth substances.(at least 2 factors)	1 1 1 1	
	P5 :The flasks containing the tissue are stored in an incubator at 37°C for 2/3 weeks. P6 : The cell divide by mitosis to produce callus. P7 : The callus is then cut into small pieces. P8 : The small pieces of callus tissues are then cultured in sterile nutrient medium. P9 : When it has grown to a suitable size, the clone is transferred to the nursery. **Any 6 P**	1 1 1 1 1	**6**

(c)	Able to describe the effect of cycle malfunctions to the body. **Sample answer** P1: The exposure **damage the DNA** of the cell P2: A cell divides through mitosis **repeatedly.** P3: Produces **cancerous** cell P4: Due to (severe) **distruption** to the mechanism that controls the **cell cycle** P5: Cancerous cells divide freely / uncontrollably heeding the cell cycle control P6: (these cells) compete with surrounding normal cells to obtain nutrient / energy (for growth) P7: Invade / destroy neighbouring cells P8: (they can spread to other organ and) initiate cancers there . **Any 6 P**	1 1 1 1 1 1 1 1	6
	TOTAL	**20**	

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



Chloroplast
Kloroplas

Diagram 8.1
Rajah 8.1

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

[10 marks]
[10 *markah*]

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

Breakfast / *Sarapan Pagi*

A plate of fried rice
Sepinggan nasi goreng

A cup of fresh milk
Satu cawan susu segar

Lunch / *Makan Tengahari*

A bowl of chicken rice
Semangkuk nasi ayam

A piece of roasted chicken
Seketul ayam panggang

A bowl of chicken soup
Semangkuk sup ayam

A glass of carbonated drink
Segelas minuman bergas

Dinner / *Makan Malam*

A plate of fried noodle
Sepinggan mee goreng

A banana
Sebiji pisang

A cup of coffee
secawan kopi

Diagram 8.2
Rajah 8.2

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

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

[10 marks]
[10 *markah*]

No	Criteria	Marks	
(a)	Able to describe mechanism of photosynthesis. Sample answer: ▪ (Reaction I) : Light reaction ▪ Occurs in granum / grana ▪ That contains chlorophyll ▪ Water molecules are broken down by light ▪ Into hydrogen ions and hydroxyl ions ▪ Called photolysis of water ▪ Electrons from chlorophyll ▪ Discharged hydrogen ions into hydrogen atoms ▪ Hydroxyl ions release electrons (to the chlorophyll) ▪ Form oxygen gas and water ▪ (Reaction II) : Dark reaction ▪ Occurs in stroma (of chloroplast) ▪ Contains enzymes ▪ Receives ATP from light reation ▪ Hydrogen from light reaction react with carbon dioxide ▪ Reduction of carbon dioxide ▪ Forms glucose (and water) (Any 10)	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	10
(b)	Able to discuss the menu whether it provides a balanced diet for the pregnant woman or not. Sample answers: ▪ No ▪ Contains too much fat ▪ In fried rice / chicken rice / fried noodle ▪ Increase cholesterol level ▪ Cause excess body weight / hypertension / cardiovascular problems ▪ Carbonated drink contains excess sugar ▪ Cause diabetics ▪ Contains colouring / preservatives / chemicals / acids ▪ Cause cancer / gastritis ▪ Coffee contains caffeine / drugs / chemicals ▪ Acting on the nerves ▪ Less / no vegetables ▪ Cause contipation ▪ Less vitamin / minerals / ferum // other examples ▪ for good health / make blood // other examples (10 marks) OR ▪ Yes ▪ Rice provides carbohydrates ▪ For energy ▪ Fresh milk provides proteins ▪ For growth of foetus ▪ Calcium for bone formation ▪ Roasted chicken provides proteins	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	10
	▪ less fats so less risk of cardiovascular problems ▪ chicken soup provides minerals // examples ▪ for good health // other examples ▪ Banana provides fibres ▪ Avoid contipation (Any 10)	1 1 1 1 1	
	TOTAL		**20**

8 (a) Diagram 8.1 shows the relationship between light intensity and the processes of photosynthesis and respiration in plants.

Diagram 8.2 the involvement of two organelles in photosynthesis and respiration at the compensation point.

Rajah 8.1 *menunjukkan hubungan antara keamatan cahaya dengan kadar fotosintesis dan kadar respirasi dalam tumbuhan.*

Rajah 8.2 *menunjukkan penglibatan dua organel di dalam satu sel tumbuhan berkaitan proses fotosintesis dan respirasi pada titik pampasan.*

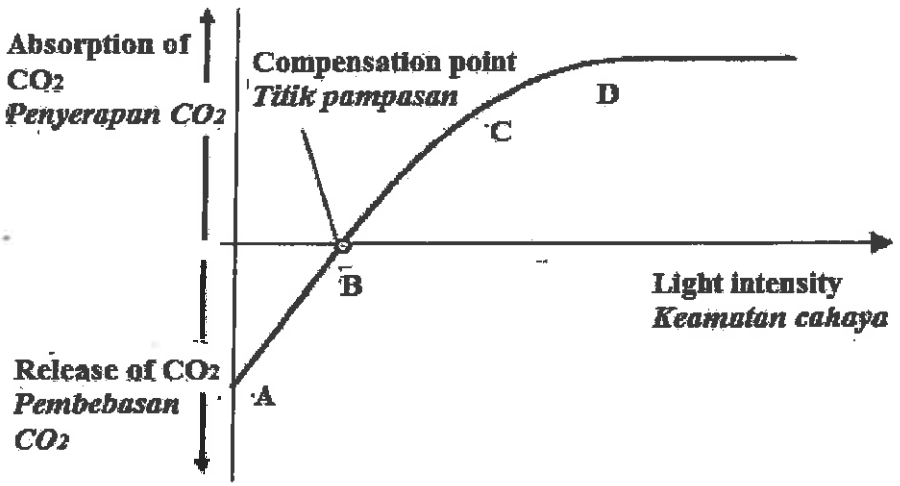


Diagram 8.1
Rajah 8.1

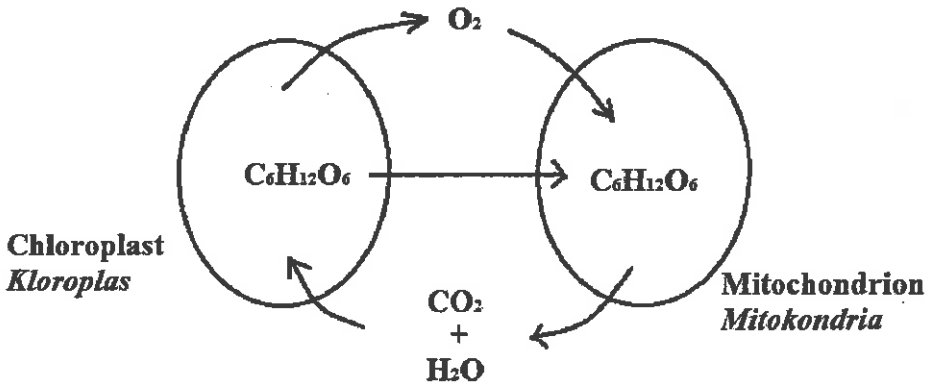


Diagram 8.2
Rajah 8.2

Analyse the graph in Diagram 8.1 and show the relationship between light intensity and the production of crop yield at points A, B, C, and D.

Analisis graf dalam Rajah 8.1 *dan tunjukkan perhubungan antara keamatan cahaya dan hasil tanaman pada titik-titik* A, B, C, *dan* D.

[10 marks]
[10 *markah*]

(b) Diagram 8.3 shows the balanced diet proportion for pregnant woman.
Table 8.4 shows the food intake by a pregnant woman for her dinner.

Rajah 8.3 *menunjukkan nisbah gizi seimbang untuk wanita hamil.*
Jadual 8.4 *menunjukkan makanan yang diambil oleh seorang perempuan hamil untuk makan malam.*

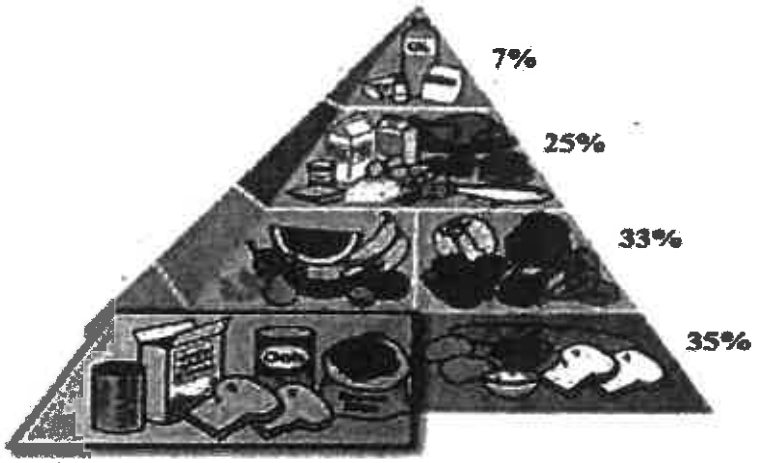


Diagram 8.3
Rajah 8.3

Types of food *Jenis makanan*	Quantity taken / g *Kuantiti yang diambil /g*
Rice *Nasi*	100
Potato chips *Kentang goreng*	70
Chicken curry *Kari ayam*	70
Fried egg *Telur goreng*	30
Butter *Mentega*	50
Milk *susu*	70
Carbonated drink *minuman berkarbonat*	180
Sausage *Sosej*	80
Sardine *Sardin*	80

Table 8.4
Jadual 8.4

State whether the menu is suitable for the pregnant woman.
Use related biological concepts to support your opinion.

Nyatakan samada menu tersebut sesuai untuk perempuan mengandung itu.
Gunakan konsep biologi yang berkaitan untuk menyokong pendapat anda.

[10 marks]
[10 *markah*]

No	Criteria	Marks	
(a)	Able to explain how light intensity affects the production of crop yield the relationship between the rate of photosynthesis and the rate of respiration at points A, B, C and D to the growth of crop. Sample answer: **At A :** P1 In the dark / low light (intensity), only respiration occurs / large quantity of CO_2 is produced/released P2 As light (intensity) increases the quantity of CO_2 produce decreases P3 Because part of CO_2 produced during respiration is used for photosynthesis P4 Sugar is used in respiration more rapidly than it is produced in photosynthesis P5 No/less growth P6 No production of crop	1 1 1 1 1 1	10
	At B: P7 (At this point of light inensity) all the CO_2 release from respiration is absorbed for photosynthesis // no net gain or loss in CO_2 P8 sugar produced P9 rate of photosynthesis is equal to the rate of respiration (this point is called compensation point) P10 No growth // no production of crop **At C:** P11 as light intensity increases, the rate of photosynthesis become faster than / exceed the rate of respiration P12 (at the same time) excess O_2 is releases (into the atmosphere) P13 Growth occurs P14 Production of crop increases **At D:** P15 is the light saturation point P16 an increase in light intensity does not increase the rate of photosynthesis // maximum rate of photosynthesis P17 Growth rate is maximum P18 production of crop is maximum (Any 10)	1 1 1 1 1 1 1 1 1 1 1 1 1	

(b)	Able to state whether the menu provides a balanced diet for the pregnant woman or not and able to discuss. Sample answers: F No/ It is not suitable	1	10
	<u>Reasons</u> P1 Contains too much fat	1	
	P2 In fried egg / chicken curry / butter	1	
	P3 Increase cholesterol level	1	
	P4 Cause excess body weight / hypertension / cardiovascular problems	1	
	P5 Carbonated drink contains excess sugar	1	
	P6 Cause diabetics	1	
	P7 Contains coloring / preservatives / chemicals / acids	1	
	P8 Cause cancer / gastritis/ allergy	1	
	P9 Coffee contains caffeine / drugs / chemicals	1	
	P10 Acting on the nerves	1	
	P11 Less / no vegetables and fibre	1	
	P12 Cause constipation	1	
	P13 Less vitamin / minerals / ferum // other examples	1	
	P14 for good health / make blood // other examples (Any 10)	1	
	OR		
	F –Yes/ It is suitable	1	
	<u>Reasons :</u> P1 Rice/potato chips contain s carbohydrate	1	
	P2 for energy	1	
	P3 use for activities / body metabolism	1	
	P4 chicken curry/fried egg contains protein	1	
	P5 for building new cells/ growth/ replace old cells	1	
	P6 butter contains lipid/fat	1	
	P7 for formation of plasma membrane/ new cells	1	
	P8 as a stored energy	1	
	P9 for the production of (steroid) hormone/ testosterone/ progesterone/oestrogen	1	
	P10 Milk contains calcium/ phosphorus	1	
	P11 for the formation of teeth and bones of foetus	1	
	P12 Egg (yolk) contains iron/ferum	1	
	P13 for the formation of blood cells	1	
	P14 to prevent anemia. (Any 10)	1	
	TOTAL		**20**

6. (a) The energy requirement of a girl aged 15 is 9000 kJ daily. Table below shows the types of food, quantity and energy content of her daily menu.
Keperluan tenaga remaja perempuan berumur 15 tahun ialah 9000kJ sehari. Jadual di bawah menunjukkan jenis makanan, kuantiti dan kandungan tenaga dan menu hariannya.

Types of food *Jenis makanan*	Quantity taken *Kuantiti diambil* (g)	Energy content *Kandungan tenaga* (kJ/ 100g)
Rice/ *Nasi*	350	1500
Chips/ *Kerepek*	150	1000
Roasted chicken / *Ayam panggang*	300	800
Grilled mutton/ *Kambing panggang*	200	1200
Boiled potatoes/ *Kentang rebus*	150	500
Chocolate/ *Coklat*	100	2500
Yoghurt/ *Dadih*	200	200
Eggs/ *Telur*	100	600

Table 1/ *Jadual 1*

(i) Calculate the daily total energy value taken by the girl.
Hitungkan jumlah nilai tenaga harian yang diambil oleh remaja itu.

[2 marks] / [2 *markah*]

(ii) Is her daily menu a balanced diet? Explain.
Adakah menu hariannya gizi seimbang? Terangkan.

[2 marks] / [2 *markah*]

(iii) If she continues to take the menu every day, for a long time, explain the consequences to her health.
Jika dia terus mengambil menu tersebut setiap hari untuk tempoh yang lama, terangkan kesan ke atas kesihatannya.

[6 marks] / [6 *markah*]

(b)

Photosynthesis is a process whereby a green plant produces organic food substances from carbon dioxide and water in the presence of chlorophyll and sunlight.

Fotosintesis ialah proses di mana tumbuhan hijau menghasilkan bahan makanan organik daripada karbon dioksida dan air dengan kehadiran klorofil dan cahaya matahari.

(i) Based on your understanding of the above statement, describe how a molecule of carbon dioxide in the air and water absorbed from the roots becomes part of a carbohydrate molecule stored in a leaf of a plant.
Berdasarkan kefahaman anda terhadap pernyataan di atas, terangkan bagaimana suatu molekul karbon dioksida di udara dan air yang diserap di akar menjadi sebahagian daripada molekul karbohidrat yang disimpan pada daun tumbuhan.

[8 marks] / [8 *markah]*

(ii) Describe how a carbohydrate molecule stored in a leaf of a plant can become a starch molecule stored in the root.
Terangkan bagaimana suatu molekul karbohidrat yang disimpan pada daun tumbuhan boleh menjadi suatu molekul kanji yang disimpan dalam akar. [2 marks] / [2 *markah*]

Question	Marking Scheme	Sub Mark	Total Mark
6(a)(i)	**Able to calculate the daily total energy value taken by the girl** Total energy value is *Jumlah nilai tenaga ialah* 5250 + 1500 + 2400 + 2400 + 750 + 2500 + 400 + 600 = 15800 kJ	2	2
(ii)	**Able to explain is her daily menu a balanced diet** P1: No/ The menu is not a balanced diet *Tidak/ menu itu bukan gizi yang seimbang*	1	
	E1: The menu does not contain the seven classes of food in the appropriate ratio// The menu is highly rich in carbohydrates and fats// No vegetables and lack of vitamins//Higher energy intake compared to energy requirement for a girl aged 15. *Menu itu tidak mengandungi ketujuh-tujuh kelas makanan dalam kadar yang berpatutan.// Menu itu kaya dengan karbohidrat dan lemak.// Tiada sayuran dan kekurangan vitamin.// Pengambilan tenaga lebih tinggi daripada apa yang diperlukan oleh seorang budak perempuan berumur 15 tahun.*	1	2
(iii)	**Able to explain the consequences to her health.** F1: Constipation // *Sembelit* E1: Her menu lacks fibre/ roughage so her faeces moves too slowly through her colon. *Menu remaja itu kekurangan fiber / serat, oleh itu tinjanya bergerak dengan perlahan melalui kolonnya.* F2: Scurvy // *skurvi* E2: Lack of vitamin C // any other vitamin deficiency with explanation *Kekurangan vitamin C// sebarang penyakit kekurangan vitamin yang lain dengan penerangan* F3: Obesity // *obesiti* E3: High intake of roast chicken/ grilled mutton/ chocolate/ chips increases the amount of fats stored in the body *Memakan ayam panggang / kambing panggang/ coklat/ kentang meningkatkan amaun lemak yang tersimpan dalam badan.* F4: Diabetes mellitus // *Diabetes mellitus* E4: Excess of carbohydrates in rice/ chips/ potatoes/ chocolates increases the amount of glucose in the blood when digested. *Karbohidrat berlebihan dalam nasi/ kentang/ coklat menambahkan amaun glukosa darah apabila dihadamkan / dicernakan.* F5: Arteriosclerosis / Artherosclerosis *Arteriosklerosis / Artherosklerosis* E5: Roasted chicken/ grilled mutton/ chips contains cholesterol which is deposited in the (lumen of) blood vessels/ arteries. *Ayam panggang / kambing panggang/ coklat/ kentang yang mengandungi kolesterol terkumpul pada (lumen) arteri/ salur darah*		

	F6: Heart attack/ angina *Serangan jantung/ angina* E6: Roasted chicken/ grilled mutton/ chips contains cholesterol which is deposited in the coronary artery// cause blockage in the coronary artery. *Ayam panggang / kambing panggang/ coklat/ kentang yang mengandungi kolesterol terkumpul pada arteri koronari// menyekat arteri koronari* **[Any 6 (F+E)] // *[Mana-mana 6 (F+E)]***	6 X 1	6
(b)(i)	**Able to describe how a molecule of carbon dioxide in the air and water absorbed from the roots becomes part of a carbohydrate molecule stored in a leaf of a plant.** **P1:** Light reaction occurs in the grana. *Tindakbalas cahaya berlaku dalam grana* **P2:** During the light reaction, chlorophyll absorbs light energy to produce ATP/ electrons. *Semasa tindakbalas cahaya, klorofil menyerap tenaga cahaya untuk menghasilakan ATP/ electron.* **P3:** Photolysis of water produces hydrogen ions and hydroxyl ions. *Fotolisis air menghasilkan ion hidrogen dan ion hidroksil* **P4:** The hydrogen ions (H^+) combine with electrons to form hydrogen atoms. *Ion hidrogen (H^+) bergabung dengan electron untuk membentuk atom hidrogen* **P5:** The hydrogen atoms/ ATP will be used in the dark reaction. *Atom hidrogen/ ATP akan digunakan dalam tindak balas gelap* **P6:** The dark reaction takes place in the absence of light. *Tindakbalas gelap berlaku tanpa cahaya* **P7:** It occurs in the stroma. *Ia berlaku dalam stroma* **P8:** Carbon dioxide combines with hydrogen to form glucose and water. *Karbon dioksida bergabung dengan hidrogen untuk membentuk glukosa dan air.* **P9:** Glucose undergoes condensation and is converted to starch for storage in the leaf. *Glukosa melalui kondensasi dan ditukar kepada kanji untuk disimpan pada daun.* **P10:** Glucose may also be transformed into sucrose to be transported to other parts of the plant. *Glukosa boleh ditukar juga kepada sukrosa untuk diangkut ke bahagian lain tumbuhan* **(any 8 P) / *(mana-mana 8P)***	8 X 1	8
(ii)	**Able to describe how a carbohydrate molecule stored in a leaf of a plant can become a starch molecule stored in the root.** **P11:** Starch stored in a leaf is converted to sucrose. *Kanji disimpan dalam daun ditukar kepada sukrosa* **P12:** Sucrose is then transported by phloem tissues (sieve tubes) to the roots. *Sukrosa diangkut ke tisu floem (tiub penapis) ke akar* **P13:** In the roots, sucrose is converted to starch molecule to be stored. *Dalam akar, akar ditukar ke molekul kanji untuk disimpan.* **(any 2P) / *(mana-mana 2P)***	2 X 1	2 20

8.

Pengawetan makanan melibatkan kaedah penyediaan untuk memanjangkan tempoh hayat dan mengelakkan pembaziran makanan.

Food preservation involves methods of preparing food to extend the lifespan and to avoid wastage of food.

(a) Berdasarkan pernyataan di atas, terangkan kepentingan memproses makanan.

Based on the above statement, explain the necessity for food processing.

[10 markah]

[*10 marks*]

Rajah 8

Diagram 8

(b) Rajah 8 menunjukkan beberapa kaedah pengawetan yang digunakan dalam pemprosesan makanan. Jelaskan bagaimana kaedah itu boleh mengawet makanan untuk satu jangka masa yang panjang.

Diagram 8 shows several methods of food preservation that being used in food processing. Describe how the method can preserve food for a long period of time.

[10 markah]

[*10 marks*]

8 (a)	**Terangkan keperluan pemprosesan makanan.** Contoh jawapan		
	F1 –Untuk menghalang kerosakan makanan	1	
	E1 –dengan membunuh mikroorganisma dalam makanan	1	
	E2 – menjadikan makanan tahan lama	1	
	F2 – Menghalang pengoksidaan makanan dengan udara	1	
	E1 – oksigen bertindakbalas dengan enzim/bahan kimia yang dihasilkan oleh sel/ makanan	1	
	E2 – menghilangkan rupa asal makanan	1	
	F3 - meningkatkan nilai komersial	1	
	E1 – bahan pengawet/ pewarna/ perisa ditambah untuk menambah rasa makanan/mengawet bahan makanan /memberi warna	1	

NO	KRITERIA PEMARKAHAN	MARKAH	JUMLAH
	F4 - meningkatkan kepelbagaian penggunaan bahan makanan	1	
	E1 – mempelbagaikan produk makanan	1	
	E2 – menghasilkan produk makanan baru	1	10MAX
(b)	**Jelaskan bagaimana kaedah itu boleh mengawet makanan untuk satu jangka masa yang panjang.**		
	Contoh jawapan		
	Pempasteuran		
	▪ Susu dipanaskan pada suhu 63oC selama 30 minit//72oC selama 15 saat	1	
	▪ Penyejukan segera dibawah suhu 10 oC	1	
	▪ Membunuh bacteria tetapi tidak memusnahkan spora	1	
	▪ Mengekalkan nutrient/rasa/vitamin B susu	1	
	▪ Disimpan di dalam peti sejuk untuk mencegah keaktifan bacteria	1	
	Pengetinan	1	
	▪ Menggunakan haba pensterilan	1	
	▪ Membunuh mikroorganisma dan spora	1	
	▪ Dipanaskan menggunakan stim di bawah tekanan dan suhu tinggi	1	
	▪ Dibungkus di dalam bungkusan kedap udara	1	
	▪ Mencegah pertumbuhan mikroorganisma	1	
	Penyejukan	1	
	▪ Disimpan pada suhu bawah 4 oC	1	
	▪ Menghalang pertumbuhan mikroorganisma/percambahan spora	1	10MAX
	JUMLAH		20

6 Diagram 6.1 shows the movement of water and carbon dioxide in plant.

Rajah 6.1 menunjukkan pergerakan air dan karbon dioksida dalam tumbuhan.

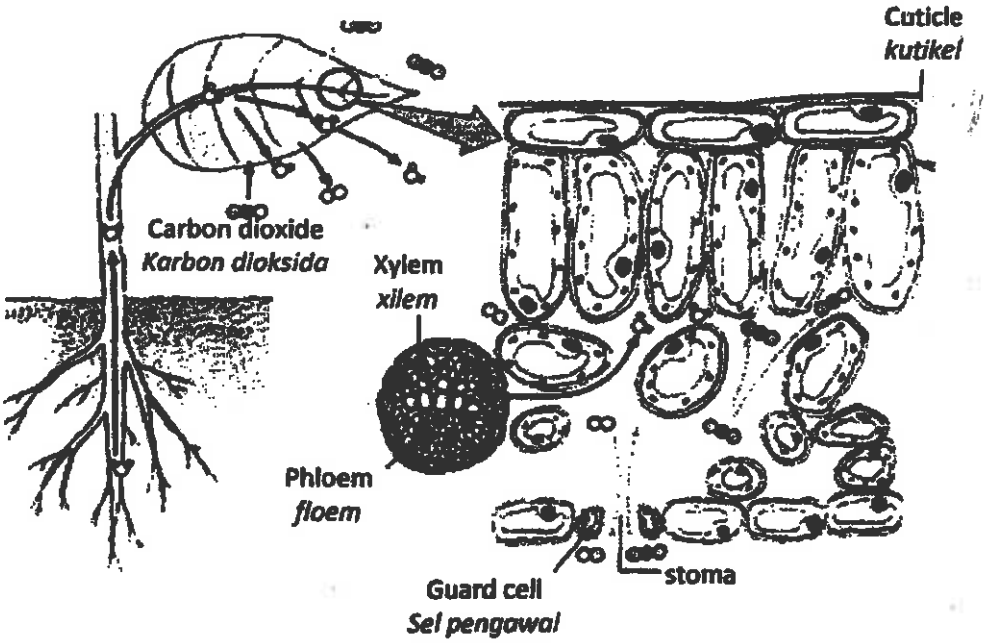


Diagram 6.1
Rajah 6.1

(a) Based of the structure above, explain the adaptation of the leaf to carry out photosynthesis efficiently

[10 marks]

Berdasarkan struktur di atas, terangkan penyesuaian pada daun untuk menjalankan proses fotosintesis dengan cekap.

[10 markah]

(b) Diagram 6. 2 shows a method of plant cultivation without use of soil .

Rajah 6.2 menunjukkan satu kaedah penanaman tanpa menggunakan tanah.

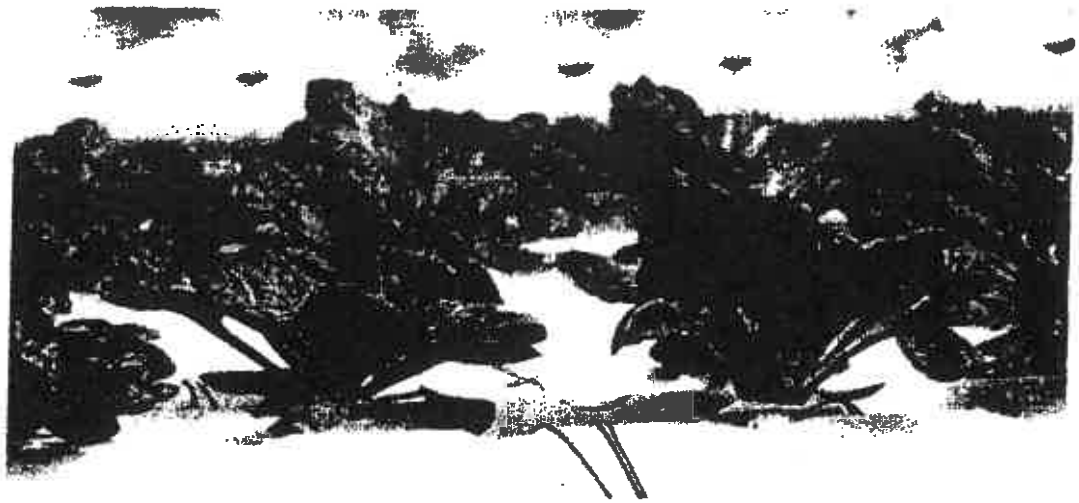


Diagram 6.2
Rajah 6.2

Describe the method used.

[4 marks]

Terangkan kaedah yang digunakan.

[4 markah]

(c)

Genetically Modified Organisms (GMO) are organisms which carry the genetic information or beneficial genes from other organisms.
Nowadays, the crops such as wheat, soya bean, paddy and tomatoes are widely to be cultivated commercially as genetically modified plant.

Organisma yang diubahsuai secara genetik (GMO) adalah satu organisma yang membawa maklumat genetik atau gen manfaat daripada organisma lain.
Pada masa sekarang, tanaman seperti gandum, kacang soya, padi dan tomato secara meluas ditanam sebagai tumbuhan yang diubahsuai secara genetik.

Based on the information above, discuss the advantages and the disadvantages of producing genetically modified organisms in food production .

[6 marks]

Berdasarkan maklumat di atas, bincangkan kebaikan dan keburukan menghasilkan organisma yang terubahsuai kandungan genetiknya dalam penghasilan makanan.

[6 markah]

Skema Soalan Essei Biologi 2012

QUESTION NO		MARKING CRITERIA	SUB MARKS	TOTAL MARKS
6(a)	P1	Epidermis with layer of cuticle/ coated with a wax	1	
	P2	Prevent excess transpiration/loss of water	1	
		OR		
	P1	// Epidermis are transparent	1	
	P2	Allow light easily penetrate the leaf (and reach the chloroplast)	1	2 m
	P3	Stoma is flanked by (two) guard cells	1	
	P4	which regulate the size of the stoma.	1	
	P5	Stoma allow the exchange of gases/ carbon dioxide from atmosphere diffuse into the leaf/ water vapour /oxygen diffuses out of the air.	1	
	P6	Palisade mesophyll cells are packed tightly	1	
	P7	to receive maximum amount of sunlight	1	
	P8	contains high density of chloroplasts	1	
	P9	Spongy mesophyll cells are irregular shape/ loosely arranged	1	
	P10	Increase the internal surface area for gaseous exchange/	1	
		to form a lot of air spaces /Allow easy diffusion of water and carbon dioxide	1	
	P11	Vascular bundle/veins contains xylem and floem	1	
	P12	Xylem transport water/minerals salt// give mechanicals support	1	
	P13	Floem transport organic products of photosynthesis /glucose (away from the leaf)	1	
		[any 8 P]		8 m
		Total marks		**10 m**

QUESTION NO		MARKING CRITERIA	SUB MARKS	TOTAL MARKS
6(b)	P1	Hydroponic (Name of the technique)	1	
	P2	grow plants in culture solutions	1	
	P3	the root of the plants are immersed in solution	1	
	P4	which contains all the macronutrient and micronutrient in the correct proportion	1	
	P5	the culture solution is aerated	1	
	P6	to provide suffient oxygen for respiration [Any 4 P]	1	4 m
		Advantages :		
6(c)	P1	Used to produce disease resistant/pest resistant plants	1	
	P2	Less pesticides are used	1	
	P3	Less pollution to the environment // better health for consumers.	1	
	P4	Increase yield of crops / profitability	1	
	P5	Help to solve problems of insufficient food	1	
	P6	Increase resistance in plant to herbicide eg. soya bean plantation	1	
	P7	Higher vitamin A / beta carotene content in rice / tomato /accept suitable example of crops	1	
	P8	Help to solve problems of malnutrition.	1	
	P9	Produce crop with longer shelf lifes	1	
	P10	Prevent food wastage [any 4 P]	1	4 m
		Disadvantages		
	P11	Pest resistant genes may be transferred to weeds cause difficult to control growth of weeds.	1	
	P12	Some genetic modified crops may have animal genes	1	
	P13	Genetic modified organisms may affect the survival of other organisms in the ecosystem.	1	
	P14	Cause the imbalance of nature / ecosystem [any 2 P]	1	2 m
		Total marks		**10 m**

8 (a) Photosynthesis occurs in two stages which are the light reaction and dark reaction. Describe the differences between the light reaction and dark reaction.
Fotosintesis berlaku dalam dua peringkat tindak balas cahaya dan tindak balas gelap. Huraikan perbezaan antara tindak balas cahaya dan tindak balas gelap.

[4 marks/ markah]

(b) In countries with four seasons, plants are grown in greenhouses.
Diagram 8.1 shows plants grown in a greenhouse.
Dalam negara empat musim, tanaman ditanam di dalam rumah kaca.
Rajah 8.1 menunjukkan tanaman yang ditanam dalam rumah hijau

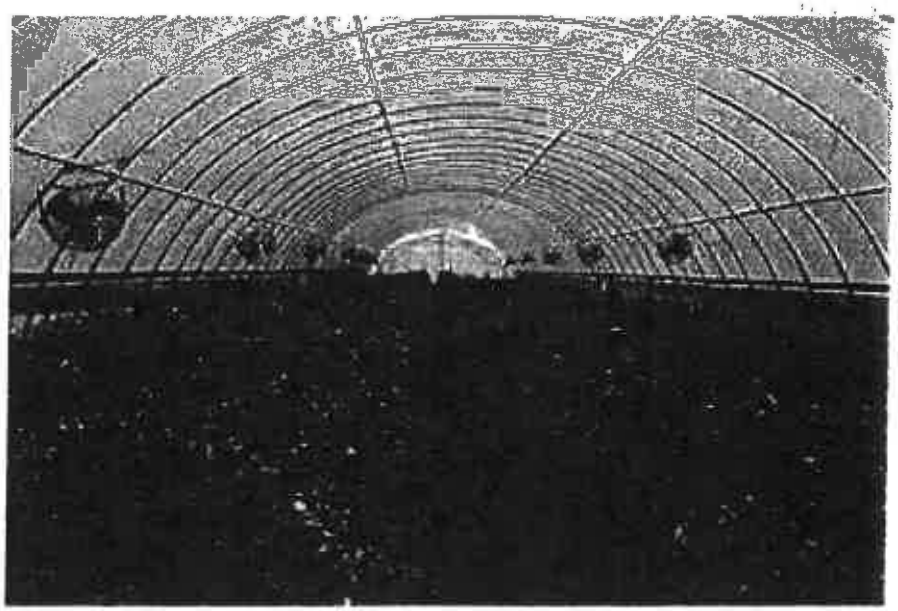


Diagram / Rajah 8.1

Based on the statement, explain how this method enable the continuous production of crops throughout the year.
Berdasarkan pernyataan ini, terangkan bagaimana kaedah ini membolehkan pengeluaran hasil tanaman yang berterusan sepanjang tahun.

[6 marks/ markah]

(c) Diagram 8.2 shows a few examples of processed food.

Rajah 8.2 menunjukkan beberapa contoh makanan diproses.

Diagram / Rajah 8.2

Discuss the good effects and bad effects of processed food in our daily life.

Bincangkan kesan-kesan baik dan buruk makanan diproses dalam kehidupan harian kita.

[10 marks/ markah]

<table>
<tr><th colspan="2">QUESTION NO</th><th>MARKING CRITERIA</th><th>SUB MARKS</th><th>TOTAL MARKS</th></tr>
<tr><td>8</td><td>(a)</td><td>
<table>
<tr><th>Light reaction</th><th>Dark reaction</th></tr>
<tr><td>D1. Occurs in granum</td><td>Occurs in stroma</td></tr>
<tr><td>D2. Requires light</td><td>Does not require light</td></tr>
<tr><td>D3. Involves photolysis of water</td><td>Involves reduction/ fixation of carbon dioxide</td></tr>
<tr><td>D4. Materials required is water/ chlorophyll</td><td>Materials required is carbon dioxide/ hydrogen atoms/ ATP</td></tr>
<tr><td>D5. Produces oxygen and water</td><td>Produces glucose</td></tr>
</table>
Any 4 pairs
</td><td>4</td><td>4</td></tr>
<tr><td></td><td>(b)</td><td>F: In temperate countries, light intensity/ temperature changes throughout the year.
P1: During winter, temperature is very low.</td><td>1
1</td><td></td></tr>
</table>

		P2: During autumn, the plants shed their leaves // light intensity // temperature is low	1	
		P3: Rate of photosynthesis is very low	1	
		P4: During spring and summer, the light intensity/ temperature are optimum for photosynthesis.	1	
		P5: So the rate of photosynthesis is maximum/ highest	1	
		P6: In the greenhouse, light intensity/ concentration of carbon dioxide/ temperature can be controlled/maintained at optimum level	1	
		P7 : Plant can carry out photosynthesis throughout the year	1	
		P8: at maximum rate (regardless of changes in light intensity or temperature).	1	
		P9: The plants are able to increase yields/ increase the crops production throughout the years.	1	
		Any 6		6
	(c)	**Good effect: By producing processed food**		
		G1: Food can be preserved/ kept longer.	1	
		G2: to prevent food poisoning/ wasting of food.	1	
		G3: Crops can be planted/ livestock/ poultry can be reared in big scale.	1	
		G4: to prevent food shortage.	1	
		G5: (Food are packaged) to increase the commercial value/ easier to be transported.	1	
		G6: More types/ varieties of food can be produced.	1	
		Bad effect: By regular consuming of processed food		
		B1: Loss a lot of nutrition value (under high temperature during the process).	1	
		B2: (Contain) preservative/ colouring/ dye/ flavour which is carcinogenic.	1	
		B3: lead to mutation/ cancer/ health problem/ suitable example.	1	
		B4: Contain excessive salt/ sugar.	1	
		B5: lead to high blood pressure/ diabetes/ obesity.	1	
		Any 10		Max 10
		Total		20

6 (a) Diagram 6.1 shows the structure of chloroplast.
Rajah 6.1 menunjukkan struktur kloroplas.

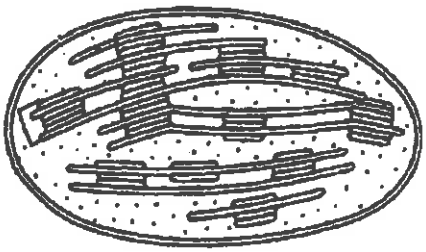


Diagram 6.1
Rajah 6.1

Based on Diagram 6.1, describe the structure of chloroplast. [2 marks]
Berdasarkan Rajah 6.1, huraikan struktur kloroplas. *[2 markah]*

(b) Diagram 6.2 shows a process that occurs in a leaf.
Rajah 6.2 menunjukkan satu proses yang berlaku di dalam daun.

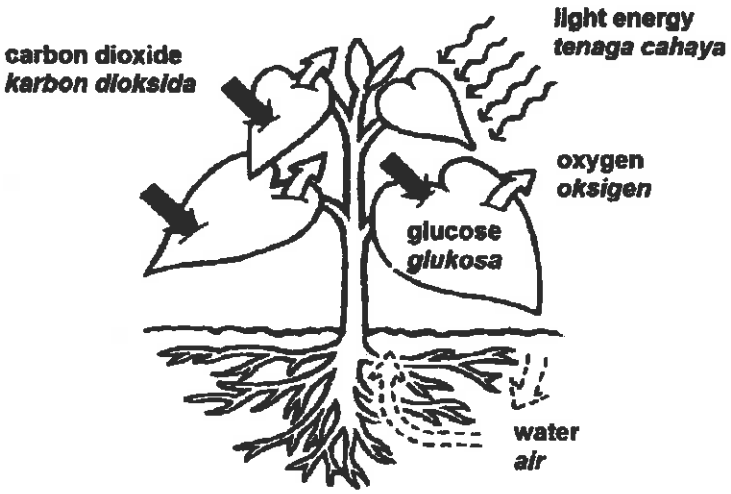


Diagram 6.2
Rajah 6.2

Describe the process that occurs in the leaves as shown in Diagram 6.2. [8 marks]
Huraikan proses yang berlaku di daun seperti yang ditunjukkan di dalam Rajah 6.2 *[8 markah]*

(c) Explain the leaf adaptations to optimise the process shown in Diagram 6.2. [10 marks]
Terangkan penyesuaian pada daun untuk mengoptimumkan proses yang ditunjukkan dalam Rajah 6.2. *[10 markah]*

Question No.	Answer	Submarks	Total Marks
6 a	P1 Bounded by double layer of membrane P2 Fill with stroma (the jelly like matrix) P3 Contain grana (ie stacks of membranous structure) P4 Grana contain chlorophyll	1 1 1 1 Max 2	2
6 b (i)	F Photosynthesis P1 Consist of 2 stages ie light reaction & dark reaction P2 Light reaction occur in grana P3 Chlorophyll captures/trap light energy to excite electron to higher level P4 Energy released by the excited electron is used to form ATP P5 Light energy split the water molecules into hydroxyl ion and hydrogen ion // photolysis of water P6 Hydrogen ion combines with electron (released by chlorophyll) to form hydrogen atom P7 Hydroxyl group combine each other to form water and oxygen P8 Dark reaction occur in stroma P9 Hydrogen atom uses ATP to fix/reduce carbon dioxide to form glucose and water P10 Six unit of glucose combines to form one molecule of glucose P11 Glucose condenses to produce starch	1 1 1 1 1 1 1 1 1 1 1 1 Max 8	8
6 c	F1 Leaves consist of flat, thin lamina, hold by petiole E1 To increase TSA to receive maximum amount of sunlight F2 Lamina is thin E2 Allow gases exchange to occur efficiently F3 Have leaves vein // have xylem and phloem E3 Allow transport of water and organic substances // xylem transports water from root to the shoot// phloem transports organic substances from leaves to all part of plants	1 1 1 1 1 1	10

	F4 Upper epidermal layer is transparent // water proof layer of cuticle	1	
	E4 Allow penetration of sunlight // prevent excessive loss of water	1	
	F5 Palisade mesophyll tissue contain more chloroplast // arrange pack tightly together & upright	1	
	E5 Trap more sunlight for photosynthesis // more palisade cells can be placed to carry photosynthesis efficiently	1	
	F6 Spongy mesophyll cell has irregular shape // loosely arrange to form air spaces	1	
	E6 Increase TSA for gases exchange // maximise the diffusion of oxygen and carbon dioxide	1	
	F7 Presence of stomata at the lower epidermis	1	
	E7 Allowing gases exchange between the internal part of leaf and the environment	1	
		Max 10	

6. Green plants are autotrophic which is synthesizes their own food through the process of photosynthesis by using light. Diagram 6 shows the schematic diagram summarising some reaction in the process of photosynthesis.

Tumbuhan hijau adalah autotrofik dimana boleh mensintesis makanan sendiri melalui proses fotosintesis menggunakan cahaya. Rajah 6 menunjukkan rajah skema ringkasan suatu tindakbalas dalam proses fotosintesis.

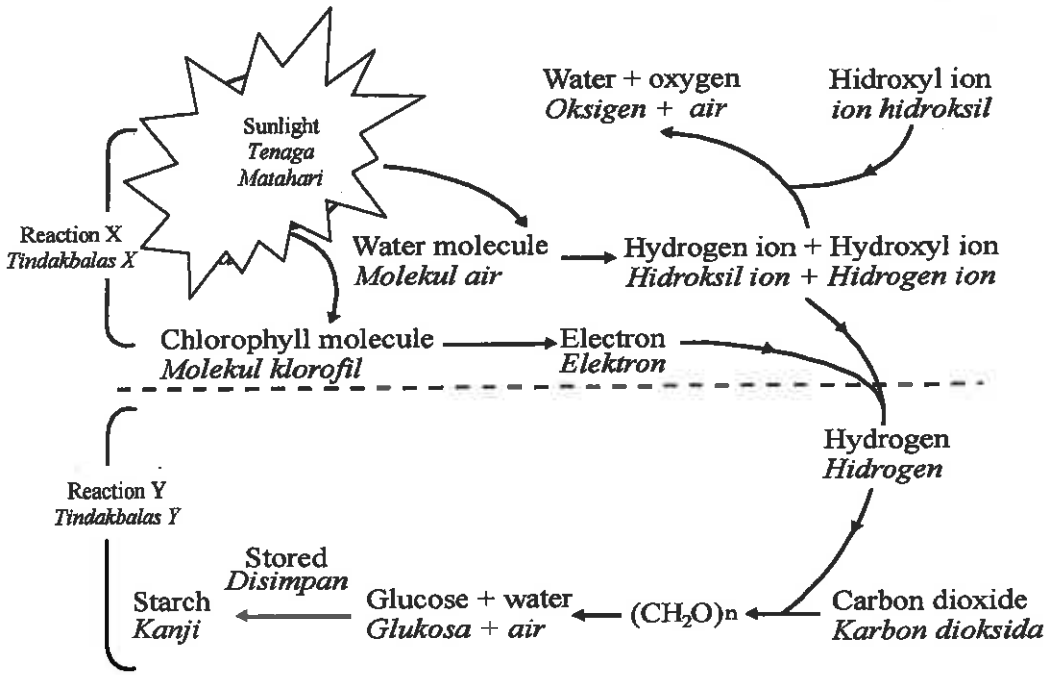


Diagram 6 / *Rajah 6*

(a) By using a raw materials, water and carbon dioxide, describe reaction X and reaction Y until the starch is produced.
Dengan menggunakan bahan mentah air dan karbon dioksida, terangkan tindakbalas X dan tindakbalas Y sehingga kanji dihasilkan. [10 markah]

(b) Diagram 6.1 shows the plants are grown in greenhouses in countries with four seasons.
Rajah 6.1 menunjukkan tanaman ditanam di dalam rumah kaca dalam negara dengan empat musim.

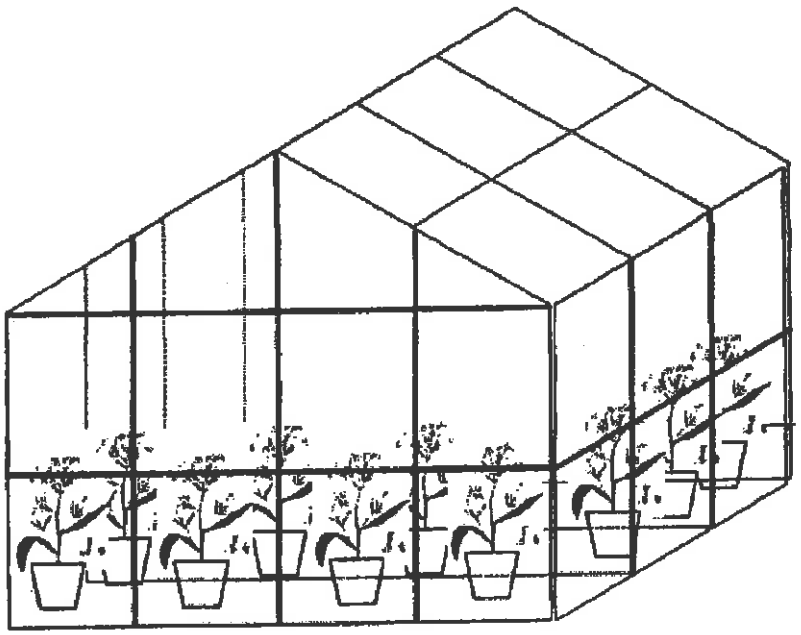


Diagram 6.1 / *Rajah 6.1*

Based on the diagram, explain why this method is carried out to ensure production of crops throughout the year.
Berdasarkan rajah di atas, terangkan mengapa kaedah ini dijalankan untuk memastikan pengeluaran hasil tanaman berlaku sepanjang tahun.
[6 markah]

(c) Diagram 6.2 show the activities that cause the air pollution

Rajah 6.2 menunjukkan aktiviti-aktiviti yang menyebabkan pencemaran udara

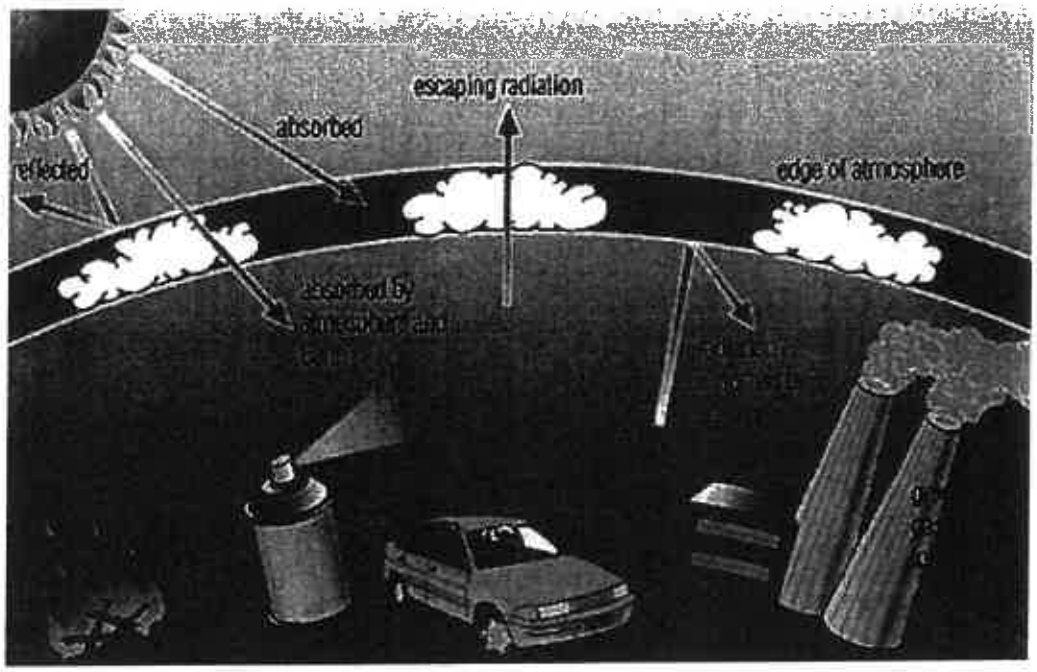


Diagram 6.2 / *Rajah 6.2*

Explain how air pollution may have an effect on photosynthesis

Terangkan bagaimana pencemaran udara memberi kesan ke atas fotosintesis

[4 markah]

	TOTAL	12 m	
6 (a)	*Boleh menerangkan tindakbalas X dan tindakbalas Y sehingga kanji dihasilkan :*		
	1. Klorofil menyerap tenaga cahaya menyebabkan klorofil teruja	1	
	2. Dalam keadaan teruja electron boleh meninggalkan molekul klorofil	1	
	3. Tenaga cahaya juga digunakan untuk memecahkan molekul air kepada ion hidrogen dan ion hidroksil melalui preses fotolisis air	1	
	4. ion hydrogen bergabung dengan electron yang dibebaskan oleh klorofil untu membentuk atom hydrogen	1	
	5. manakala ion hidroksil kehilangan electron dan didermakan kepada klorofil untuk membentuk kumpulan hidroksil	1	
	6. Kumpulan hidroksil akan bergabung sesama sendiri untuk membentuk air dan gas oksigen	1	
	7. Tindakbalas X dikenali tindakbalas cahaya	1	Max 6m
	8. Tidak memerlukan cahaya	1	
	9. Atom hidrogen dari tindakbalas cahaya digunakan untuk mengikat karbon dioksida	1	
	10. Menyebabkan penurunan karbon dioksida kepada glukosa berlaku	1	
	11. Glukosa yang terhasil kemudian dikondensasikan untuk membentuk kanji serta merta	1	
	12. Tindakbalas Y dikenali tindakbalas gelap	1	Max 4m
	TOTAL	10	
(b)	*Boleh menerangkan mengapa kaedah tanaman rumah hijau dijalankan untuk memastikan pengeluaran hasil tanaman berlaku sepanjang tahun.* :		
	1. Di negara 4 musim, keamatan cahaya/suhu berubah sepanjang tahun	1	

	2. Pada musim sejuk, suhu adalah sangat rendah	1	
	3. Pada musim luruh, daun tumbuhan gugur // keamatan cahaya/suhu adalah rendah	1	
	4. Kadar fotosintesis adalah sangat rendah	1	
	5. Pada musim bunga dan musim panas, keamatan cahaya/kepekatan karbon dioksida/suhu kekal pada tahap optimum untuk fotosintesis.	1	
	6. Jadi kadar fotosintesis adalah maksimum/paling tinggi pada masa ini	1	
	7. Dalam rumah kaca, keamatan cahaya/kepekatan karbon dioksida/suhu dikekalkan pada tahap optimum sepanjang tahun	1	
	8. Menyebabkan kadar fotosintesis dikekalkan pada tahap maksimum sepanjang tahun	1	
	9. Tumbuhan berupaya meningkatkan hasil tanaman/keluaran sepanjang tahun	1	Max 6m
	TOTAL	6	
(c)	Boleh menerangkan bagaimana pencemaran udara memberi kesan ke atas fotosintesis :		
	1. Pencemaran udara daripada kilang/kenderaan/pembakaran membebaskan asap/jerebu tebal	1	
	2. Asap/jerebu yang tebal menyebabkan keamatan cahaya yang diterima oleh tumbuhan kurang // kurang keamatan cahaya diserap oleh klorofil	1	
	3. Pencemaran udara daripada aktiviti kuari/pembakaran membebaskan debu yang banyak	1	Max 4m
	4. Debu melekat pada permukaan daun menyebabkan keamatan cahaya kurang diserap oleh klorofil/tumbuhan	1	
	5. Debu juga menutup bukaan liang stoma tumbuhan	1	
	6. Menyebabkan kadar fotosintesis rendah/kurang	1	
	TOTAL	4	
JUMLAH		20	

6

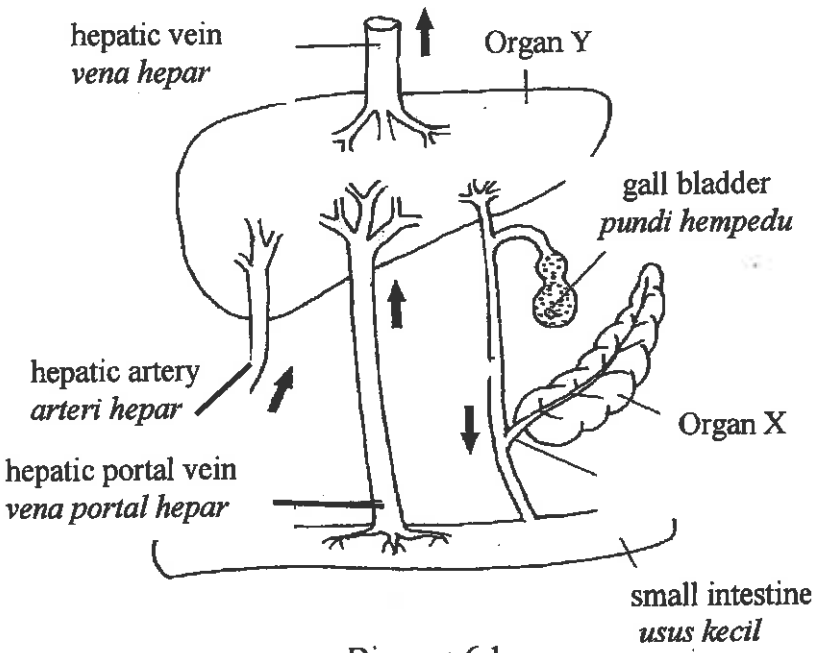


Diagram 6.1
Rajah 6.1

(a) Organ Y plays an important role in digestive system. Explain the relationship between organ X and organ Y in digestion of lipid.

Organ Y memainkan peranan yang penting dalam sistem pencernaan. Terangkan hubungan antara organ X dan organ Y dalam pencernaan lipid.

[4 marks]
[4 markah]

(b) Digested nutrients such as glucose and amino acid will be absorbed by ileum and transported to organ Y. In organ Y, nutrients are used to form complex compounds or structural components. By using examples, describe the process that take place in organ Y.

Makanan tercerna seperti glukosa dan asid amino akan diserap oleh ileum dan sebahagiannya akan diangkut ke organ Y. Di organ Y, nutrient tersebut digunakan dalam pembentukan sebatian kompleks atau komponen struktur sel. Dengan menggunakan contoh, huraikan proses yang berlaku di organ Y.

[6 marks]
[6 markah]

(c) Explain what will happen if organ X is removed.
Terangkan apakah yang akan berlaku jika organ X dikeluarkan.

[4 marks]
[4 markah]

(d) Diagram 6.2 below shows the stomach of a herbivorous animal.
Rajah 6.2 menunjukkan perut haiwan herbivor.

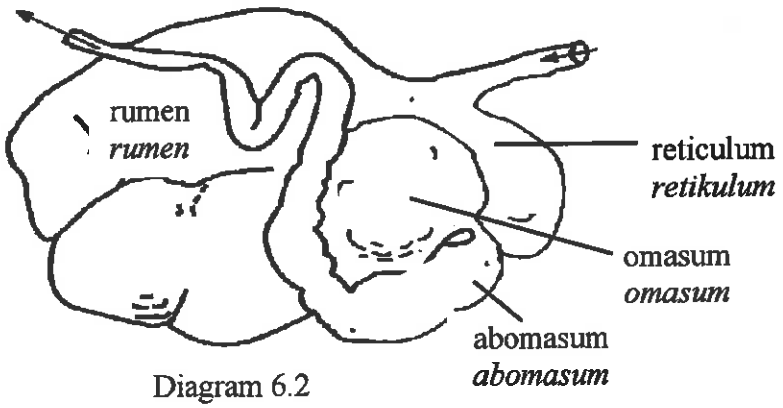


Diagram 6.2
Rajah 6.2

Based on above diagram, describe the digestion of cellulose in the herbivorous animal.

Berdasarkan rajah di atas, terangkan pencernaan selulosa di dalam haiwan herbivor tersebut.

[6 marks]
[6 markah]

BAHAGIAN B

No	Skema	Markah
6a	**Boleh menerangkan hubungan antara organ X dan organ Y dalam pencernaan lipid** **Contoh jawapan** P1 – organ Y ialah hati P2 – hati / organ Y mensintesis / menghasilkan hempedu P3 – (hempedu) mengemulsi lipid kepada titisan yang kecil P4 – organ X ialah pankreas P5 – pankreas / organ X merembes lipase P6 – (lipase) menghidrolisis / mencerna lipid kepada asid lemak dan gliserol **Mana-mana empat**	4
b	**Boleh menerangkan proses yang berlaku di organ Y** **Contoh jawapan** P1 – Assimilasi P2 – glukosa digunakan sebagai substrat utama respirasi / membebaskan tenaga P3 – glukosa yang berlebihan ditukarkan kepada glikogen dan disimpan di dalam hati / organ Y P4 – glukosa yang masih berlebihan ditukarkan kepada lipid P5 – bila aras glukosa dalam darah berkurangan berbanding aras normal, glikogen ditukarkan semula kepada glukosa P6 – asid amino diangkut ke sel-sel P7 – untuk sintesis protein P8 – protein tersebut untuk pembentukan protoplasma baru / pertumbuhan / penggantian tisu rosak P9 – asid amino juga terlibat dalam pembentukan enzim / hormon / hemoglobin P10 – asid amino mengalami deaminasi untuk membentuk urea P11 – dikumuhkan dalam urin / air kencing **Mana-mana enam**	6
c	**Dapat menerangkan kemungkinan yang berlaku jika organ X dikueluarkan** **Contoh jawapan** P1 – aras glukosa darah tidak boleh dikawalatur // glukosa meningkat/menurun P2 – kerana insulin/glukagon tidak dirembeskan P3 – pencernaan kanji kepada maltosa tidak berlaku//amilase pancreas tidak dirembeskan P4 – pencernaan polipeptida kepada peptida tidak berlaku // tripsin tidak dirembeskan P5 – (titisan) lipid tidak dicernakan kepada asid lemak dan gliserol // lipase tidak dirembeskan **Mana-mana empat**	4

6. Diagram 6.1 shows the digestive system and organs associated with digestion.
Rajah 6.1 menunjukkan sistem pencernaan dan organ-organ berkaitan pencernaan.

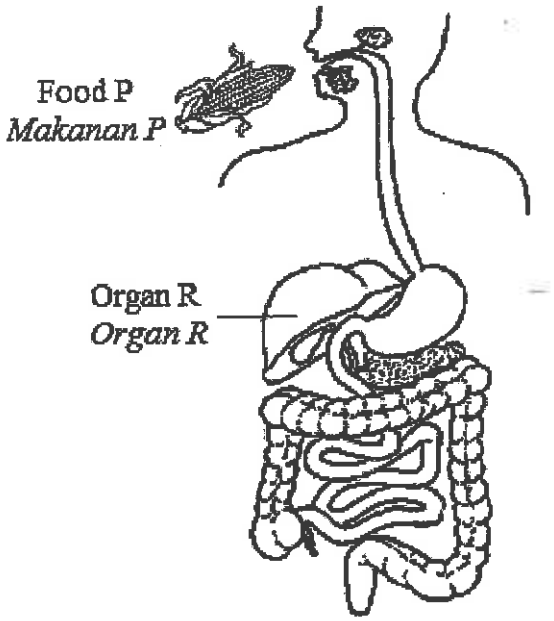


Diagram 6.1
Rajah 6.1

a) Based on Diagram 6.1,
Berdasarkan Rajah 6.1,

(i) Name the organs that are involved in the processing of food P
Namakan organ-organ yang terlibat dalam memproses makanan P

[3 *marks*]

(ii) Explain the processes which occur to the food P until it can be used by body cells.
Terangkan proses-proses yang berlaku kepada makanan P sehingga boleh digunakan oleh sel-sel badan.

[7 *marks*]

b)

Organ R acts as a checkpoint which controls the amount of nutrients released into the blood circulatory system
Organ R merupakan pusat kawalan yang mengawal kuantiti nutrien yang masuk ke dalam sistem peredaran darah

Based on the above statement, explain the role of organ R in assimilation of nutrients in foods P.
Berdasarkan pernyataan di atas, terangkan peranan organ R dalam asimilasi nutrien dalam makanan P.

[5 *marks*]

c) Diagram 6.2 shows a gastric bypass surgery is used to treat severe obesity.
Rajah 6.2 menunjukkan satu pembedahan pintasan gastrik yang digunakan untuk merawat kes obesiti yang teruk.

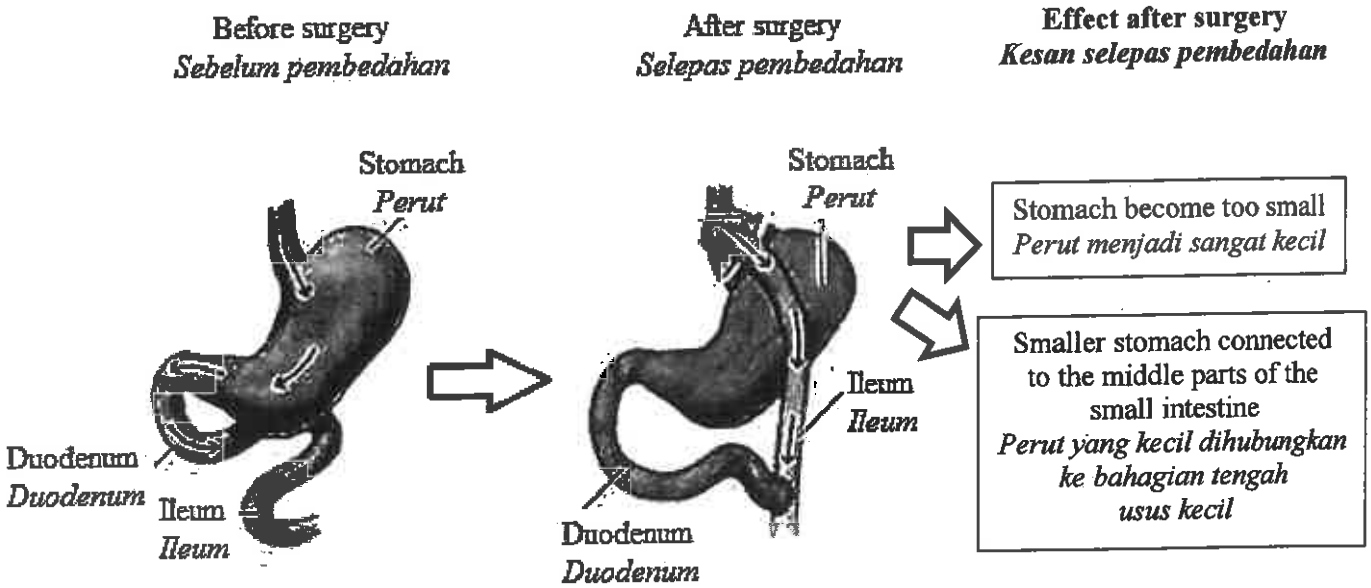


Diagram 6.2
Rajah 6.2

Explain how the above operation can reduce excessive weight problems.
Terangkan bagaimana pembedahan di atas dapat mengurangkan masalah berat badan yang berlebihan.

[5 *marks*]

NUM.	MARK SCHEME	MARKS	
6(a)(i)	*Able to name the organs that are involved in the processing of food P correctly.* *Answer:* Mouth / Oral cavity Duodenum Ileum / Small intestine	 1 1 1	3
6(a)(ii)	*Able to explain the processes which occur to the food P until it can be used by body cells.* *Sample answer:* P1 Food P rich in starch P2 (In oral cavity) saliva contains enzyme salivary amylase P3 To hydrolysis starch to maltose // Salivary amylase Starch + (Water) ⟶ Maltose P4 Duodenum receive pancreatic amylase from pancreas P6 Pancreatic amylase completes the digestion of starch to maltose // Pancreatic amylase Starch + (Water) ⟶ Maltose P7 (In ileum) intestinal juice contains maltase (erepsin, sucrase, lactase) P8 (Maltase) hydrolysis maltose to glucose // Maltase Maltose + Water ⟶ Glucose P9 Glucose diffuse into the epithelial cells and absorbed into the capillaries (villus) P10 Capillaries drain glucose into hepatic portal vein, which leads to the liver P11 Glucose is distributed throughout the body by the circulatory system P12 (When the glucose molecules reach the cells) glucose are oxidised to release energy (during cellular respiration)	 1 1 1 1 1 1 1 1 1 1 1	Max 7

6(b)	*Able to explain the role of organ R in assimilation of nutrients in foods P.* *Answer:* F (At the end of the digestive process) Food P are hydrolysed / digested into glucose (at ileum) P1 Excess glucose is converted into glycogen P2 stored in the liver P3 (When the blood sugar level falls) the stored glycogen is converted back to glucose P4 (When the glycogen stored in the liver is full) excess glucose is converted into lipid (by liver)	1 1 1 1 1	5
6(c)	*Able to explain how the gastric bypass surgery can reduce excessive weight problems* *Sample answers:* F: (Due to the stomach becomes too small) the patient has less appetite P1: reduce food intake P2: reducing the absorption of nutrients (from digested food) P3: causing the system in body takes energy from fat (in the body as a substitute for food that is often taken) P4: leading to weight loss	1 1 1 1 1	Max 5
	TOTAL MARKS	20	

8 (a) (i) Erythrocyte is the cellular component of blood.
Explain **two** adaptive characteristic for efficient transport in human.
Eritrosit adalah komponen sel dalam darah.
*Terangkan **dua** ciri penyesuaian untuk kecekapan pengangkutan pada manusia.*

[4 marks]
[*4 markah*]

(b) (ii) A blood test shows that a man's erythrocyte count is below normal.
Explain the possible consequences of this condition on his health.
State the type of food should he include in his diet to improve this condition.
Suatu ujian darah menunjukkan bahawa bilangan eritrosit darah seorang lelaki adalah kurang daripada biasa.
Terangkan kesan-kesan yang mungkin berlaku atas kesihatannya akibat daripada keadaan ini.
Nyatakan jenis makanan yang perlu diambil untuk pulih daripada keadaan ini.

[6 marks]
[*6 markah*]

(c) Diagram 8 shows three billboards of campaign to educate people avoid cardiovascular disease.
Rajah 8 menunjukkan tiga papan iklan kempen untuk mendidik orang ramai mengelakkan penyakit kardiovaskular.

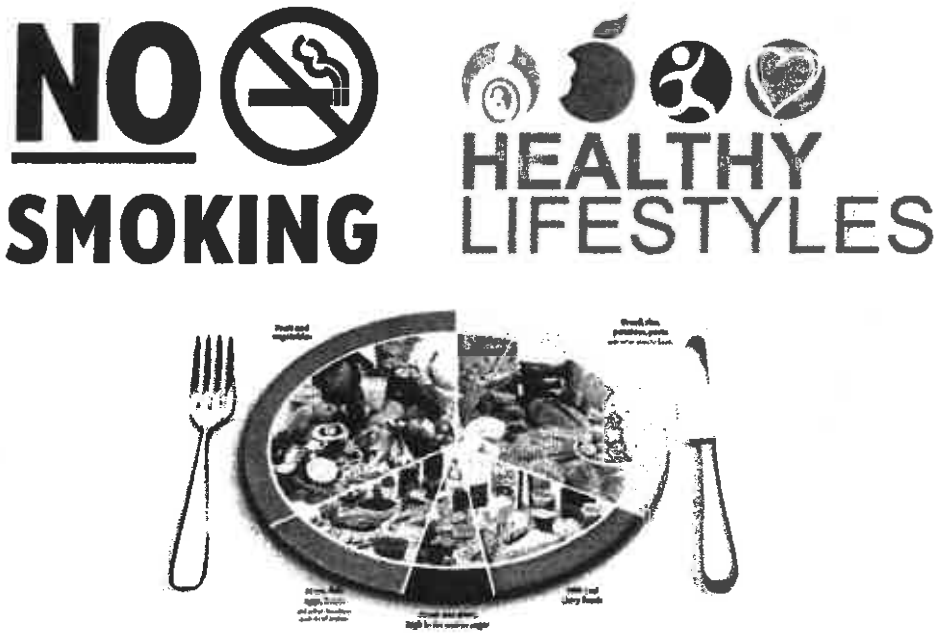


Diagram 8
Rajah 8

Based on Diagram 8, discuss how these campaign can educate people to avoid cardiovascular disease
Berdasarkan Rajah 8 bincangkan bagaimana kempen tersebut dapat mendidik orang ramai mengelakkan penyakit kardiovaskular.

[10 marks]
[*10 markah*]

Question 8

No	Mark Scheme	Sub total	Total
8(a)(i)	**Able to explain two adaptive characteristic for efficient transport in human** Sample answer **F1 : Biconcave disc //thinner at the centre than at its edges** P1 : to increase total surface area P2 : for efficient gaseous exchange **F2 : No nucleus** P3 : to contain more heamoglobin P4 : to bind with oxygen/carbon dioxide/respiratory gases/to form oxyhaemoglobin/carbaminohaemoglobin **F3 Elastic membrane** P5 : Can squeeze into (tiniest) capillaries *Any four*	Max 4 1 1 1 1 1 1 1 1	4
(a)(ii)	**Able to explain the possible consequences of this condition on the health and state the type of food he should take** Sample answer F : Anaemia P1 : Less red blood cells/erythrocyte / haemoglobin to combine with oxygen P2 : to form oxyhaemoglobin P3 : less oxygen is transported to body tissues P4 : for cellular respiration P5 : less energy is produced P6 : resulting in tiredness / breathlessness / weakness / fatigue P7 : pale looking appearance *Any 4* Type of food P8 : Food rich in iron / ferum P9 : cockles / liver / spinach / folic acid // any suitable example	Max 6 (4+2) 1 1 1 1 1 1 1 1 1 1	6

(b)	**Able to discuss about the statement.**	Max 10	
	Sample answer		
	F : People should consume balanced diet, not smoking and practice healthy lifestyle	1	
	Balance diet		
	B1: Balance intake of fats / lipids / carbohydrate / sugar / cholesterol // follow the food guide pyramid	1	
	B2: Avoid the accumulation / deposition of cholesterol in the lumen of blood vessel / avoid obesity	1	
	B3: Maintain blood flow / circulation		
	B4: Prevent artherosclerosis / stroke / thrombosis / embolism	1	
	B5: Correct amount intake of salt in diet	1	
	B6: Avoid raises the blood osmotic pressure / increase the blood pressure / hypertension	1 1	
	B7 : Prevent heart attack/ cardiac arrest / myocardial infarction	1	
	Smoking		
	C1: No nicotine , blood vessel not constrict // not addicted		
	C2: Normal / maintain blood pressure		
	C3: Prevent accumulation of plaque	1	
	C4: Prevent thrombosis / artherosclerosis / arteriosclerosis	1	
	C5: No smokes which contain carbon monoxide	1	
	C6: No competition to bind with heamoglobin between carbon monoxide and oxygen	1 1	
	C7: Prevent inefficiency of transporting of oxygen // transporting of oxygen is efficient.	1	
	C8: Prevent difficulty in breathing / fatigue / stroke / chest pain / angina	1	
	C9 : Prevent heart attack / cardiac arrest / myocardial infarction.	1	
		1	
	Practicing unhealthy lifestyle		
	L1: Good of exercise / physical exercise // no sedentary lifestyle		
	L2: Prevent obesity // excess fat can be burnt	1	
	L3: Avoid stress / high blood pressure		
	L4 : Avoid heart attack / cardiac arrest / myocardial infarction.	1	
	Any 10	1	
	B7. C9, L4 : give mark once *At least 1 B, 1 C , 1 L*	1	10
	TOTAL		**20**

6 Diagram 6.1 shows two individuals, X and Y, in two different situations.
Rajah 6.1 menunjukkan dua individu, X dan Y dalam situasi yang berbeza.

Individu : X
Activity : 100 meter sprint
Energy produced : 2 ATP per mole glucose

Individu : X
Aktiviti : lari pecut 100 meter
Tenaga dihasilkan :
2 ATP per mol glukosa

Individu : Y
Activity : walking
Energy produced : 38 ATP per mole glucose

Individu : Y
Aktiviti : Berjalan
Tenaga dihasilkan :
38 ATP per mol glukosa

Diagram 6.1
Rajah 6.1

(a) (i) Based on information given in Diagram 6.1, explain the cellular respiration process that occurs in individual X and Y.
Berdasarkan maklumat yang diberi dalam Rajah 6.1,terangkan proses respirasi sel yang berlaku dalam individu X dan Y.

[6 marks]
[6 markah]

(ii) After completed the event, individual X experienced painful due to leg muscle fatigue. He then carries out the following actions :
- Wears a track suit
- Takes a few long deep breath
- Walks freely as a `cooling down` activity.

Explain why the individual X carries out these action.

Selepas menghabiskan acara tersebut, individu X mengalami kesakitan kerana otot kakinya lesu.Dia kemudian melakukan tindakan berikut :
- *Memakai sut trek*
- *Menghela nafas panjang dan dalam*
- *Berjalan-jalan secara bebas sebagai activiti penyejuk badan*

Terangkan mengapa dia melakukan tindakan tersebut.

[6 marks]
[6 markah]

(b) Diagram 6.2 shows parts of respiratory system in human and fish.
Rajah 6.2 menunjukkan bahagian-bahagian dalam sistem respirasi manusia dan ikan.

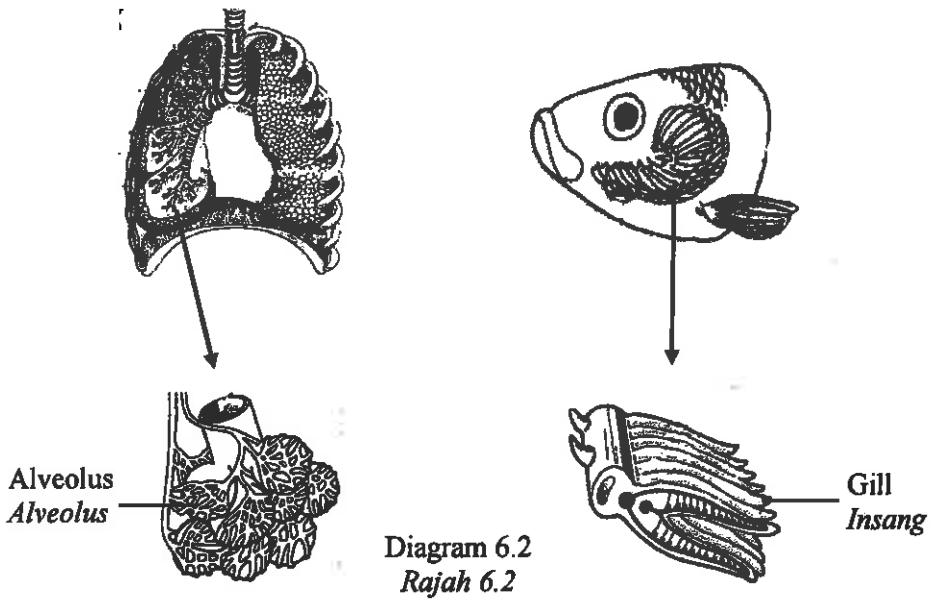


Diagram 6.2
Rajah 6.2

Human and fish respiratory systems are adapted to function in their respective habitats.

Explain the similarities and differences of both systems.

Sistem respirasi manusia dan ikan disesuaikan untuk berfungsi di dalam habitat masing- masing.

Terangkan persamaan dan perbezaan kedua-dua sistem tersebut.

[8 marks]

[*8 markah*]

SECTION B

Question 6

No	Mark Scheme	Sub total	Total
6(a)(i)	**Able to explain the cellular respiration process that occurs in individual X and Y correctly.** Sample answer: Individual X F1 : Anaerobic respiration / not required oxygen P1 : Occur in cytoplasm P2 : The glucose is partially/ not completely oxidised / broken down P3 : releases less energy / 150 kJ of energy (per mole of glucose) P4 : produce lactic acid Individual Y F2 : Aerobic respiration / required oxygen P5 : occurs in mitochondria (and cytoplasm) P6 : The glucose is completely oxidised / broken down P7 : releases much energy / 2898 kJ of energy (per mole of glucose) P8 : produce carbon dioxide and water ** *Reject ATP* *Any six*	Max 6 1 1 1 1 1 1 1 1	6

(ii)	**Able to explain why the individual X carries out the action.** Sample answer Wears a track suit : **F : To prevent lose of heat** P1 : Heat that traps by the track suit is used to maintain the body temperature P2 : Less oxygen is used to produce heat and the oxygen can be used to oxidise lactic acid Takes a few long deep breaths : **F : to obtain more oxygen** P3 : to pay the oxygen debt P4 : Oxygen is used to breakdown lactic acid Walks freely as a "cooling down" activity : **F : To maintain the blood circulation rate (to transport the lactic acid to the liver)** P5 : To ensure that oxygen is supplied continuously to the muscle cells *Any six involve all actions*	Max 6 1 1 1 1 1 1 1 1	6
(b)	**Able to explain the similarities and differences of both system.** Sample answer : Similarities : **F1 : Both have (large) surface area for gaseous exchange** P1 : Human has alveolus and fish has filaments/lamellae **F2 : Both have surface that increase the diffusion rate of gases** P2 : The wall of alveoli in human very thin / only 1 cell thick // The membrane of filaments/lamellae in fish very thin / only 1 cell thick **F3 : Both respiratory organs have blood capillaries network** P3 : To transport the respiratory gases rapidly / faster/ efficiently **F4 : Both have moist surface for gaseous exchange** P4 : to dissolve more respiratory gases	Max 8 1 1 1 1 1 1 1 1	

F5 : Both use muscles to change the pressure in the thoracic cavity — 1

P5 : Human has diaphragm muscle and intercostals muscles Fish has muscles at mouth and operculum — 1

F6 : Both have circulatory system to transport oxygen to body tissues in blood vessels — 1

P6 : Human and fish have closed circulatory systems

Differences

	Human (has)		Fish (has)	Explanation (P)	
F7	Cartilage rings at trachea prevent the trachea from being collapse	But	the water flow prevents the grills from being stick together (1 m)	**P7** To ensure the continuous and sufficient oxygen supply (1 m)	1,1
F8	Gaseous exchange surface in alveoli are always moist // Gaseous exchange surface in alveoli do not expose to the environment directly	But	Gaseous exchange surface is constantly moist by water (1 m)	**P8** Position of the organ to ensure that the gaseous exchange surfaces do not dry up // any explanation (1 m)	1,1 1,1

Any eight

At least 1 point of similarity and 1 point of differences.

TOTAL — **20**

8 (a) Diagram 8(a) shows how a frog carry out inhalation and exhalation.
Explain the processes.
Rajah 8(a) menunjukkan bagaimana seekor katak menjalankan inspirasi dan ekspirasi.
Terangkan proses-proses yang berlaku.

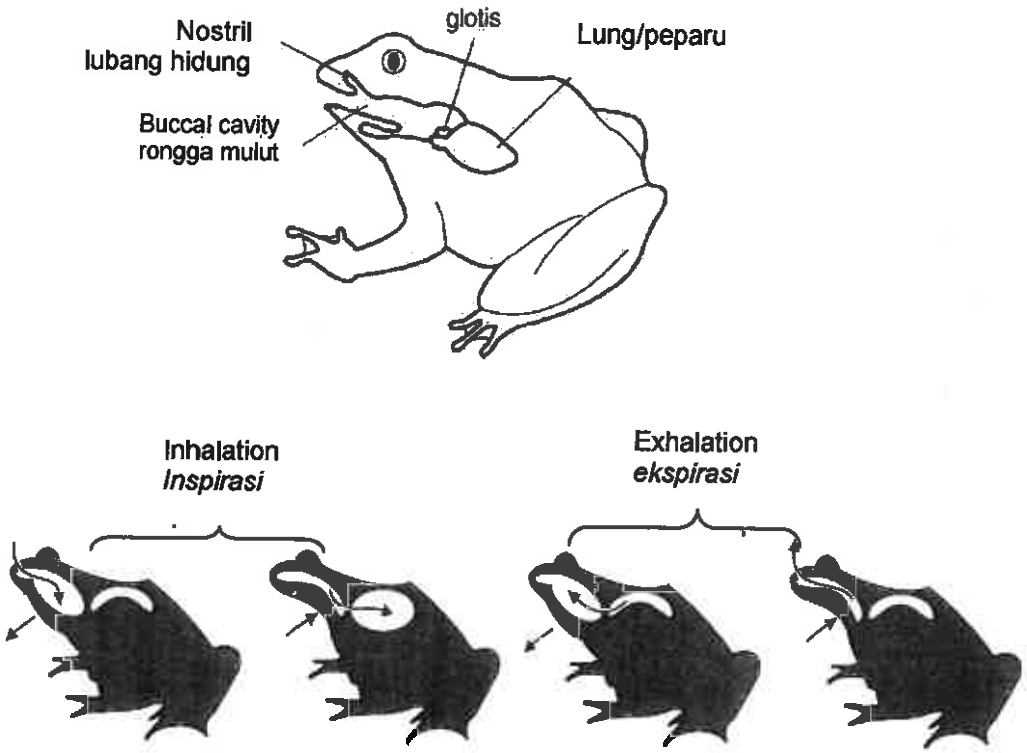


Diagram 8(a)
Rajah 8(a)

[6 marks]
[6 *markah*]

8 (b) Diagram 8(b) shows two athletes who have just completed the running, both of them suffer from muscle fatigue and lead to muscle pain.
Athlete A choose to sit down to wait for the pain to disappear while Athlete B choose to walk slowly.

Rajah 8(b) menunjukkan dua orang atlet yang baru tamat dari larian, kedua-duanya mengalami keletihan otot dan membawa kepada sakit otot.
Atlet A memilih duduk dan rehat untuk menunggu keletihan itu hilang manakala atlet B memilih berjalan perlahan-lahan bagi menghilangkan keletihan otot.

Diagram 8 (b)
Rajah 8 (b)

Explain which athlete will recover faster from the muscle fatigue ?
Terangkan atlet manakah akan terlebih dahulu pulih dari keletihan otot ?

[8 marks]
[8 *markah*]

8 (c) Diagram 8(c) shows the changes of atmospheric pressure with the altitude.
Diagram 8(d) shows the equipments wore by a mountain climber.
Rajah 8(c) menunjukkan perubahan tekanan atmosfera dengan altitude.
Rajah 8(d) menunjukkan kelengkapan yang dipakai oleh seorang pendaki gunung

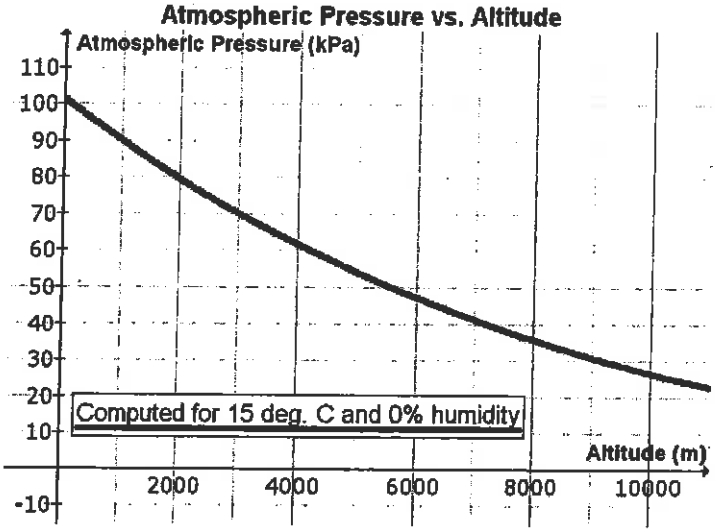


Diagram 8(c)
Rajah 8(c)

Diagram 8(d)
Rajah 8(d)

Explain why the mountain climber needs to wear such equipments?
Terangkan kenapa pendaki gunung perlu memakai kelengkapan yang sedemikian ?

[6 marks]
[6 *markah*]

No			Marking Criteria	Marks	Total Marks
8	(a)		Inhalation P1 : the frog lower the bottom level of the mouth and glottis close P2 : increase the volume of buccal cavity / lower the pressure in the buccal cavity. P3 : air is drawn in into the buccal cavity P4 : nostril closed, glottis opened and bottom level of mouth is raised. P5 :Air is push into the lungs. Exhalation P6 : lung muscles contract P7 : glottis opened // air is forced into the buccal cavity P8 : nostril opened, glottis closed and bottom of mouth is raised. P9 : air is forced out from the buccal cavity Any 6 Ps	1 1 1 1 1 1 1 1 1	6
8	(b)		P1 : (During the running), more energy is needed P2 : more oxygen is needed (to produce energy) P3 : oxygen demand/supply is not sufficient P4 : anaerobic respiration occur / takes place P5 : lactic acid is produced P6 : (accumulation of) acid lactic causes muscle pain P7 : (after the running), a lot oxygen is drawn in P8 : oxygen is used to oxidized lactic acid (into energy, CO_2 and water) P9 : Athlete B will recover faster from muscle pain P10 : (By walking slowly), blood flow is more smooth P11 : more oxygen is transported by the blood stream to the muscle Any 8 Ps	1 1 1 1 1 1 1 1 1 1 1	8

8	(c)		P1 : The mountain climber is carrying / wearing the oxygen supply equipments / respirator. P2 : As the altitude increase, the atmospheric pressure decrease P3 : the partial pressure / amount of oxygen decrease as well P4 : low atmospheric pressure cause less air is drawn into the lungs P5 : The mountain climber facing lack of oxygen (in the body) P6 : Oxygen supply equipment / respirator supply enough oxygen for the body P7 : (It also) assists in maintaining the pressure of the lungs P8 : The mountain climber also wearing thick clothes P9 : As the altitude increase, the temperature decrease P10 : Thick clothes help the climber to maintain the body temperature. Any 6 Ps	1 1 1 1 1 1 1 1 1 1	6
				20 marks	

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

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

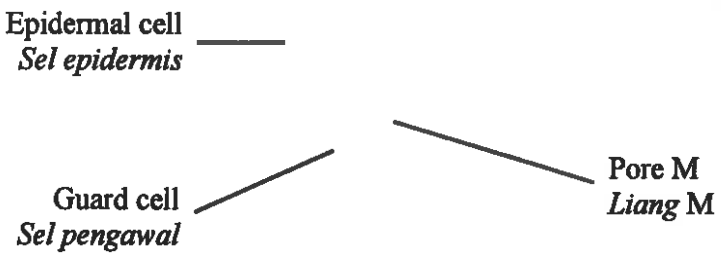


Diagram 6.1
Rajah 6.1

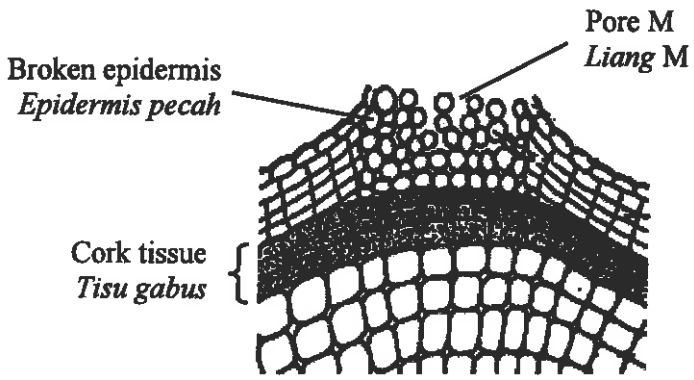


Diagram 6.2
Rajah 6.2

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

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

[6 marks]
[6 *markah*]

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

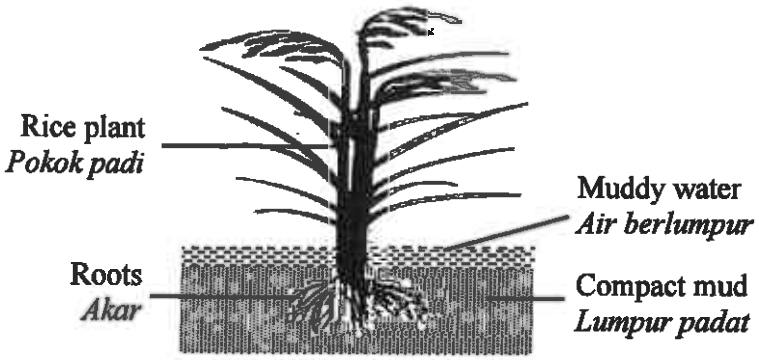


Diagram 6.3
Rajah 6.3

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

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

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

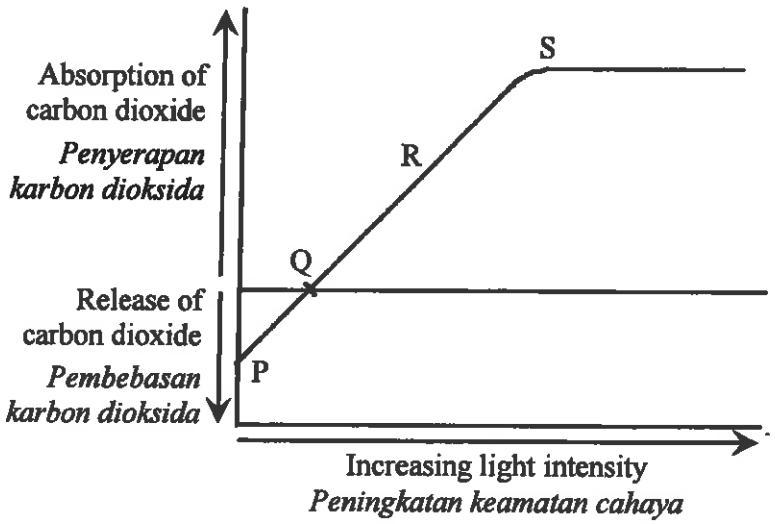


Diagram 6.4
Rajah 6.4

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

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

[8 marks]
[8 *markah*]

Question 6

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

(b)	Able to explain the respiration in the root cells of rice plant. Sample answer: ▪ The plant carry out anaerobic respiration ▪ glucose is broken down ▪ in the absence of oxygen to release energy ▪ produces ethanol, CO_2 (and energy) ▪ cells in the roots of rice plants are extremely tolerant of ethanol ▪ Many of the roots are very shallow ▪ the roots use the oxygen which diffuses into the water surface. ▪ Rice stem contain a large number of air spaces ▪ (the air space) allow oxygen to penetrate through to the cells of roots(growing in the absence of oxygen) (Any 6)	 1 1 1 1 1 1 1 1 1	6

(c)	Able to explain the relationship between the rate of photosynthesis and the rate of respiration at points P, Q, R and S. Sample answer: <u>At P :</u> ▪ In the dark / low light (intensity), only respiration occurs ▪ hence large quantity of CO2 is produced/released ▪ As light (intensity) increases the quantity of CO2 / produce decreases ▪ because part of CO2 produced during respiration is used for photosynthesis ▪ sugar used in respiration more rapidly than it is produced in photosynthesis <u>At Q:</u> ▪ (At this point of light inensity) all the CO2 release from respiration is reused / equivalent to CO2 used up during photosynthesis // no net gain or loss in CO2 / sugar produced ▪ rate of photosynthesis is equal to the rate of respiration ▪ this point is called compensation point ▪ net gaseous exchange is zero <u>At R:</u> ▪ as light intensity increases, the rate of photosynthesis become faster than / exceed the rate of respiration ▪ the CO2 needed is obtained from the atmosphere ▪ (at the same time) excess O2 is releases (into the atmosphere) <u>At S:</u> ▪ is the light saturation point ▪ an increase in light intensity does not increase the rate of photosynthesis // maximum rate of photosynthesis (Any 8)	1 1 1 1 1 1 1 1 1 1 1 1 1 1	8
	TOTAL		**20**

7(a) Diagram 7.1 shows the respiratory gaseous exchange and transportation.
Rajah 7.1 menunjukkan pertukaran gas respirasi dan pengangkutan

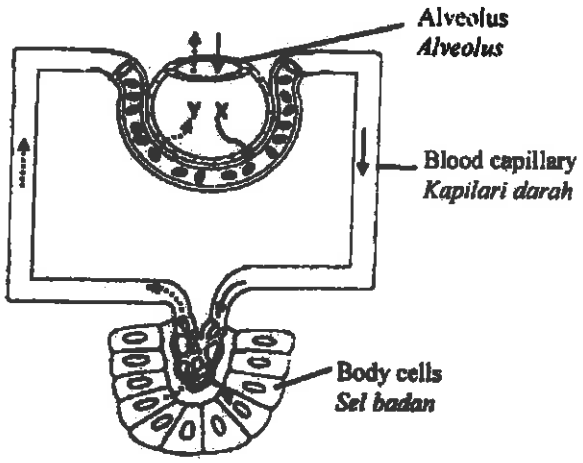


Diagram 7.1 // *Rajah 7.1*

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

[4 *marks*]

(ii) 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

[6 *marks*]

(b) Diagram 7.2 and 7.3 shows respiratory organs in an insect and human.
Rajah 7.2 dan 7.3 menunjukkan organ respirasi bagi serangga dan manusia.

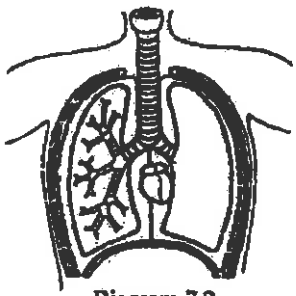


Diagram 7.2
Rajah 7.2

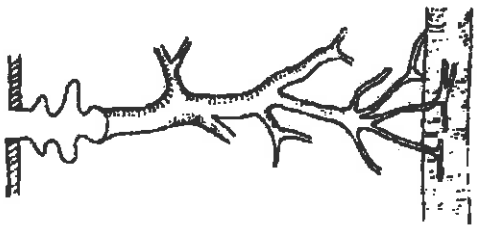


Diagram 7.3
Rajah 7.3

Explain **one** similarity and **four** differences between the respiratory organs of insect and human.
Terangkan satu persamaan dan empat perbezaan antara organ respirasi bagi serangga dan manusia.

[10 *marks*]

Num	Scoring Criteria	Marks	
7(a)(i)	Able to describe how gaseous exchange occurs between alveolus and blood capillaries *Suggested answer:* E1- **Partial pressure** of oxygen in alveolus higher than in blood capillaries E2- oxygen diffuses from alveolus to blood capillaries (by simple diffusion) E3- **Partial pressure** of carbon dioxide in blood capillaries is higher than in alveolus E4- carbon dioxide diffuses from blood capillaries to alveolus (by simple diffusion)	1 1 1 1	4

7(a)(ii)	**Able to explain the main way how gas Y is transported from body cells to the alveolus.** *Suggested 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	1 1 1 1 1 1	6

7(b)	Able to explain one similarity and four differences between the respiratory organs of insect and human. *Suggested answer:* Similarities: S1 : both of respiratory organs has thin wall one cell thick E1 : increase rate of diffusion of respiratory gaseous S2 : both of respiratory organs has respiratory surface such as alveolus in human and tracheole in an insect E2 : provide a large surface area for the diffusion of gases *Any 1S and 1E* Differences: D1 : Trachea in human is supported by cartilage but trachea in insect is supported by chitin E1 : To prevent them from collapsing D2 : The wall of the alveolus is moist surface but the tracheole has fluid E2 : To dissolve the respiratory gases D3 : Alveolus is covered by network of blood capillaries but not for tracheole E3 : To provides a large surface area for rapid diffusion of gases (to and from the alveoli) in human but tracheoles direct contact to the tissues (and organs) D4 : Haemoglobin is needed in transport of oxygen not but in insect E4 : Oxygen combine with haemoglobin (in erythrocyte) to form oxyhaemoglobin but not in insect D5 : (Larger) insects have air sacs but not in human E5 : To speed up the movement of gases to and from the insect's tissues D6 : In human air enters the lungs through the nostrils but spiracles in insects E6 : To allow gases in and out of the body	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	max 2 Max 8 10
		Total	**20**

9 (a) Microorganisms have been used to produce products for thousands of years. The use of microorganisms in biotechnology is continuously developing to contribute in our daily lives.

Diagram 9.1 shows some of the medicinal products manufactured by biotechnology.

Sudah beribu tahun mikroorganisma digunakan dalam penghasilan produk. Penggunaan mikroorganisma dalam bioteknologi telah berkembang secara berterusan untuk menyumbang kepada kehidupan harian kita.

Rajah 9.1 *menunjukkan beberapa produk perubatan yang dihasilkan secara bioteknologi.*

Antibiotic
Antibiotik

Antiserum
Antiserum

Vaccine
Vaksin

Insulin
Insulin

Diagram 9.1
Rajah 9.1

How microorganisms are used in producing the medicinal products shown in Diagram 9.1?

Bagaimanakah mikroorganisma digunakan dalam menghasilkan produk perubatan yang ditunjukkan dalam Rajah 9.1*?*

[10 marks]
[10 *markah*]

(b) **Introducing the first electric hybrid with electrifying performance**

Our engineers have invented the industry's most advanced hybrid vehicle. Unlike other hybrids on the market, ours uses a patented Lithium Polymer battery. It has 40% less volume, it's 25% lighter and 10% more efficient. The battery also has a longer life-span, it comes with a lifetime warranty guarantee. So you can feel good about preserving the environment for the life of your vehicle.

Memperkenalkan hibrid elektrik yang pertama dengan prestasi kuasa elektrik

Jurutera kami telah mencipta kenderaan hibrid yang paling maju. Tidak seperti hibrid di pasaran, kami menggunakan bateri Polimer Lithium yang dipatenkan. Ia mempunyai kurang 40% isipadu, 25% lebih ringan dan 10% lebih cekap. Baterinya tahan lebih lama, ada jaminan seumur hidup. Anda akan berpuashati apabila dapat memelihara alam sekitar dengan kereta anda.

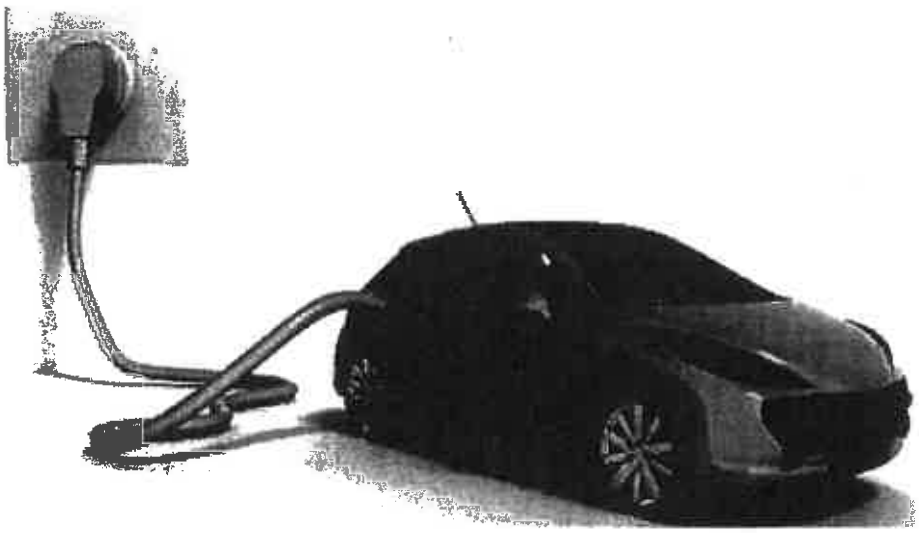


Diagram 9.2
Rajah 9.2

Based on the promotion, discuss the benefits of using an eco-friendly car.
Berdasarkan promosi ini, bincangkan faedah-faedah menggunakan kereta mesra alam.

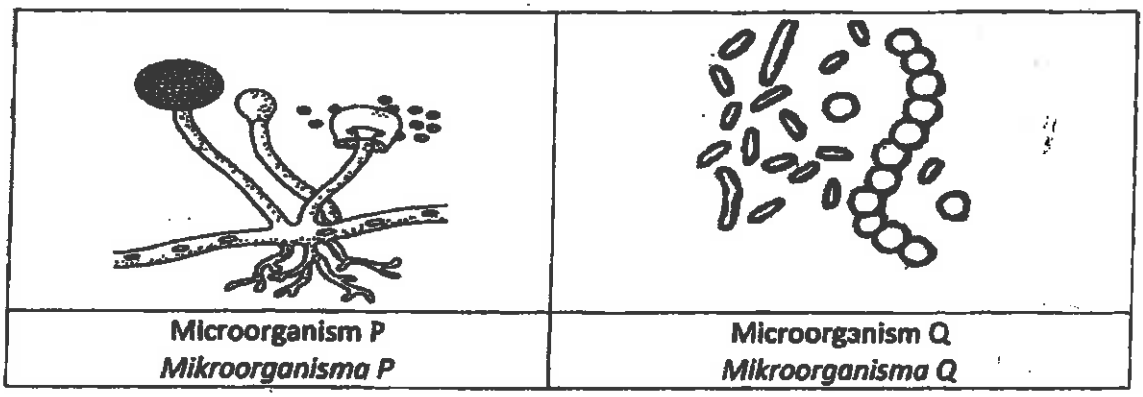
[10 marks]
[10 *markah*]

Question 9

No	Criteria	Marks	
(a)	Able to explain how microorganisms play role in producing chemicals such as vaccine, antibiotics, antiserum and insulin. Sample answers: Vaccine P1 (prepared) from a weakened or dead/ killed form microorganisms/ pathogen P2 (contains an) agent that resembles a disease-causing microorganism P3 it stimulates the body immune system P4 to recognize the agent as foreign / foreign proteins P5 and keep record/memory of it, so that the immune system can more easily recognize P6 and destroy these microorganisms P7 Improves immunity to a particular disease. Antibiotics P8 Chemicals produce by microorganisms/fungus/bacteria P9 can stop bacteria from reproducing P10 kill bacteria P11 Penicillin-related antibiotics are from fungus. P12 Streptomycin are from bacteria Antiserum P13 Prepared by injecting certain animal with (specific) pathogens/microorganisms P14 The animal responded and produce antibody P15 Blood serum containing antibody is extracted P16 The most common use in humans is antitoxin/antivenom P17 Antiserum is used to pass on passive immunity to many diseases. Insulin P13 technique use is DNA recombinant P14 Plasmid DNA of a bacterium is used / Escherichia coli is cut using restriction enzyme P15 Introduce/ insert recombinant DNA into a bacterium/ E.coli P16 (recombinant DNA) in bacterium multiply P17 – and produce human insulin (Any 10)	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	10

(b)	Able to discuss the benefits of an eco-friendly vehicle. Sample answers P1 Less the bad impact on the environment. P2 Electric cars don't burn fossil fuels/ used less fossil fuels P3 don't emit CO_2 into the atmosphere./ P4 Less Greenhouse gas Emissions P5 reduce global warming P6 many plant and animal species could be saved from extinct P7 reduce other air/gas emissions from gas engines, such as: ground level ozone/particulate / NO_2 /SO_2 P8 reduce air pollution P9 avoid formation of smog/\ P10 reduce acids rain P11 avoid respiratory problelms. P12 Power Efficiency P13 Materials used in eco-friendly cars weigh less than traditional ones P14 Fuel Costs -decrease in fuel costs./save money (Any 10)	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	10
	TOTAL		20

7 Diagram 7.1 shows two types of microorganisms.
Rajah 7.1 menunjukkan dua jenis mikroorganisma



Microorganism P *Mikroorganisma P*	Microorganism Q *Mikroorganisma Q*

Diagram 7.1
Rajah 7.1

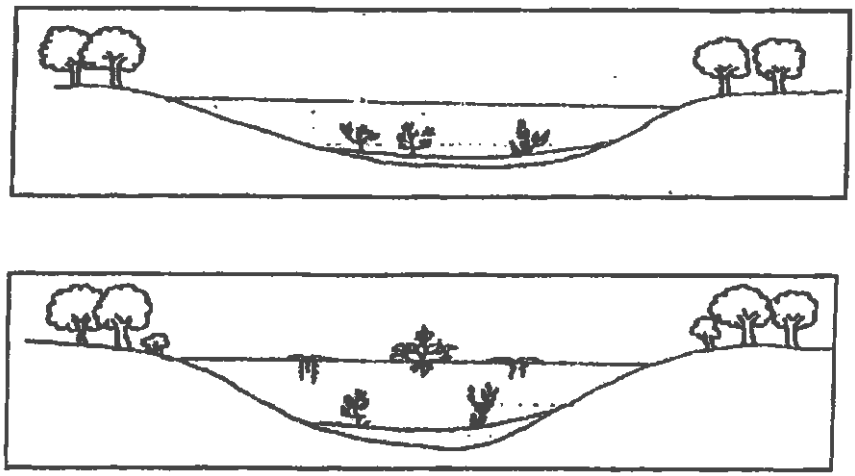
(a) Name microorganism P and microorganism Q.
Compare and contrast microorganisms P and Q with respect to their harmful and beneficial effects on humans.

[10 marks]

Namakan mikroorganisma P dan mikroorganisma Q.
Banding dan bezakan mikroorganisma P dan mikroorganisma Q berdasarkan kesan buruk dan kesan baiknya terhadap manusia.

[10 markah]

(b) Diagram 7.2 shows the process of colonisation and succession in a freshwater pond.
Rajah 7.2 menunjukkan proses pengkolonian dan penyesaran dalam kolam air tawar.



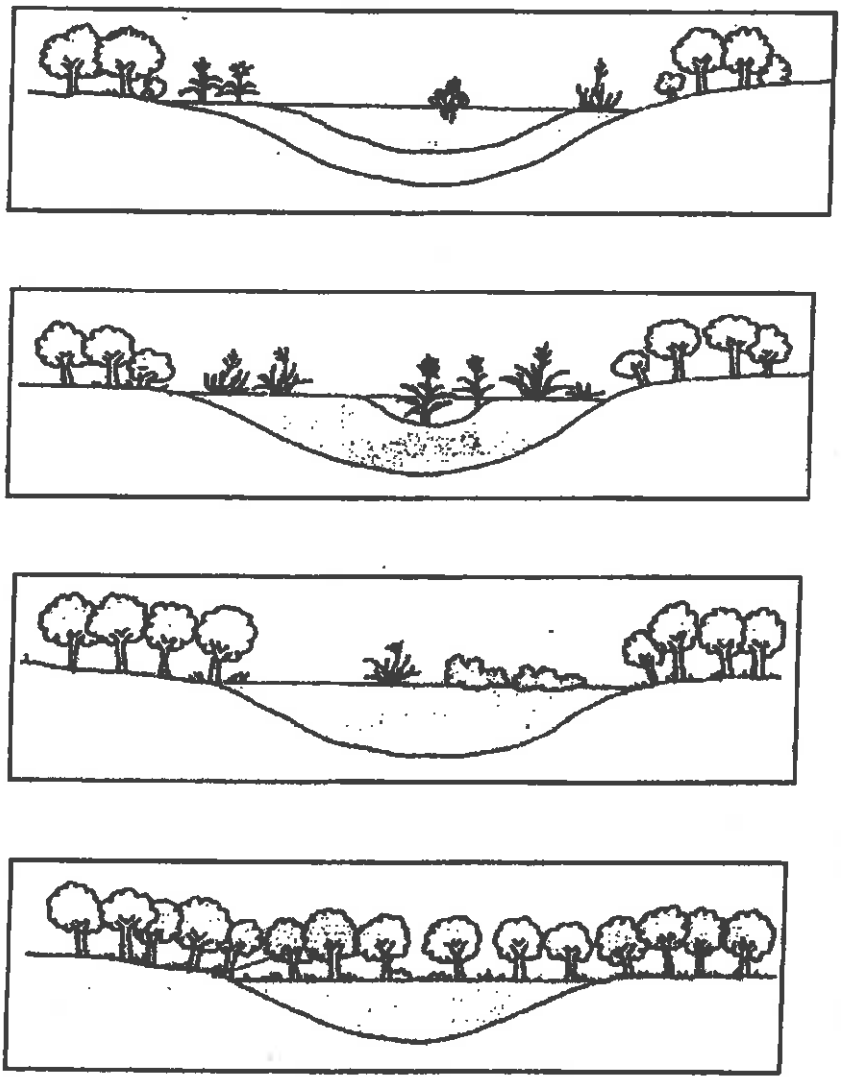


Diagram 7.2
Rajah 7.2

Based on Diagram 7.2 , explain what is meant by colonisation and succession and how the process bring about the formation of the primary forest in a habitat.

[10 marks]

Berdasarkan Rajah 7.2, terangkan apakah yang dimaksudkan dengan pengkolonian dan penyesaran dan bagaimana pengkolonian dan penyesaran membawa kepada pembentukan hutan primer dalam suatu habitat.

[10 markah]

QUESTION NO		MARKING CRITERIA	SUB MARKS	TOTAL MARKS
7(a)		- Microorganism P is fungi/ *Mucor sp.* and - microorganism Q is bacteria	1 1	2 m
		Similarities		
		Beneficial effects:		
	P1	- Microorganisms P and Q are used to make antibiotics .	1	
	P2	- Streptomycin is produced by *streptomycin sp(Q)* ; while penicillin is produced by *penicillium chrysogenum(P)*	1	
	P3	- Microorganisms P and Q are used in production of energy from biomass.	1	
	P4	- Microorganism Q can be used to produce biogas while Microorganism P is used in production of gasohol.	1	
	P5	- Microorganisms P and Q are decomposers	1	
	P6	- Breakdown the dead plants/animal/waste product of animal	1	
	P7	- And release nutrients into the soil	1	
		Harmful effects:		
	P8	- P and Q can cause sexual transmitted diseases [any 5 P]	1	5 m
		Differences		
		Beneficial effects :		
	P9	- Q is used in the manufacture of bio-plastics and insulin but not P	1	
	P10	- Q is used to clean oil spills at sea due to leakage of oil tankers whereas P cannot be used for this purpose	1	
	P11	- Q is used to treat sewage but not P	1	
		Harmful effects		
	P12	- Microorganism Q causes diseases like cholera/food poisoning /tuberculosis whereas	1	
	P13	- P causes diseases such as ringworm [Any 3 P]	1	3 m
		Total marks		**10 m**

QUESTION NO		MARKING CRITERIA	SUB MARKS	TOTAL MARKS
7(b)	-	Colonisation is a process whereby a species colonises in a newly formed area/pond	1 1	
	-	Succession is a process whereby one species of organism / a community changes the environment/habitat	1	
	-	which results in the species/organism being replaced by other species		2 m
	P1	Activities of pioneer species(submerge plants)/ examples causes a change in the environments/ habitat	1	
	P2	The remains of plants/ decayed bodies deposited to the pond bed	1	
	P3	Pond become shallower	1	
	P4	(also) add nutrients to pond water	1	
	P5	Promotes the growth of floating plants/examples to replace the pioneer species/submerged plants	1	
	P6	Floating plants covers water surface, preventing light from penetrating the water/causes less rate of plants photosynthesis in the pond	1	
	P7	Results in greater rate of plants death which sink to the bottom of pond	1	
	P8	Making the pond more shallower	1	
	P9	Floating plants are gradually replaced by amphibious plants/successor	1	
	P10	The successor causes further changes to the habitat/pond, make it unfavourable for the emergent/amphibian plants to grow	1	
	P11	Amphibious plants are replace by land/terrestrial community which dominates the area.	1	
		[maximum 8 marks]		8 m
		Total marks		**10 m**

9. a. Diagram 9.1 shows a type of interaction between organisms.

Rajah 9.1 menunjukkan sejenis interaksi antara organism.

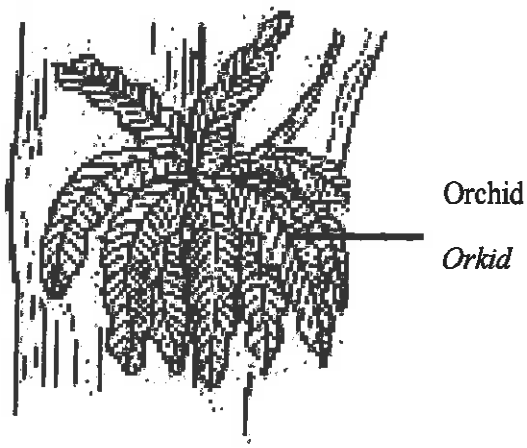


Diagram 9.1
Rajah 9.1

i. Name and describe the interaction shown in Diagram 9.1.

Nama dan huraikan interaksi yang ditunjukkan dalam Rajah 9.1

4 marks]
[4 markah]

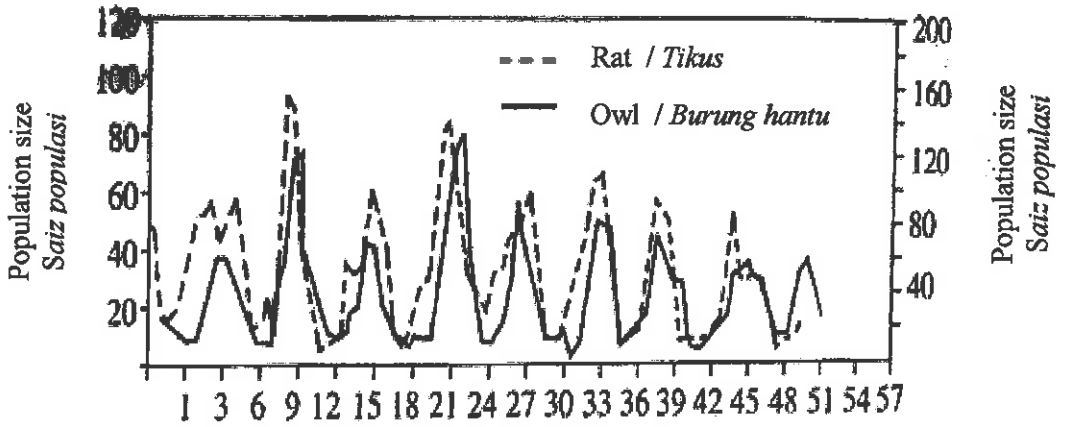


Diagram 9.2
Rajah 9.2

ii. Explain how the dynamic equilibrium in a prey – predator relationship is maintained.

Terangkan bagaimana keseimbangan dinamik dalam hubungan mangsa – pemangsa dikekalkan.

[6 marks]
[6 markah]

b. Diagram 9.3 shows an article from newspaper entitled "Addressing lost of biodiversity".

Rajah 9.3 menunjukkan artikel yang bertajuk "Ke arah lenyapnya biokepelbagaian".

Diagram 9.3

Rajah 9.3

i. Explain the importance of biodiversity.

Terangkan kepentingan biokepelbagaian.

[5 marks]

[5 markah]

ii. Based on your biological knowledge, suggest how to preserve and conserve our biodiversity.

Berdasarkan pengetahuan biologi anda, cadangkan bagaimana untuk memelihara dan memulihara biokepelbagaian kita.

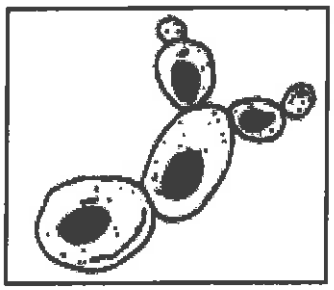
[5 marks]

[5 markah]

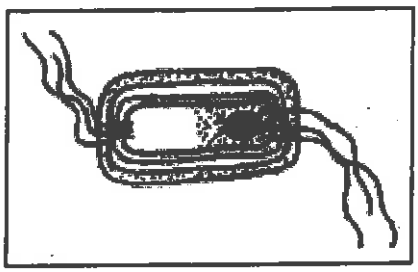
9 (a) (i)	**Boleh menamakan interaksi antara organisma dan menghuraikan interaksi tersebut.** **Contoh jawapan** F : Komensalisme P1 : Orkid ialah komensal / epifit manakala pokok ialah perumah P2 : Komensal / epifit mendapat keuntungan manakala perumah tidak mendapat keuntungan atau kerugian P3 : Orkid mendapat keuntungan // tidak mengancam perumah P4 : Dengan menumpang pokok lebih tinggi ,orkid mendapat lebih banyak cahaya untuk fotosintesis [F + mana-mana 3 P]	1 1 1 1 1	4
(ii)	**Boleh menerangkan bagaimana keseimbangan dinamik di dalam hubungan mangsa pemangsa dikekalkan .** **Contoh jawapan** P1: Burung hantu adalah pemangsa dan tikus adalah mangsa P2: Peningkatan mangsa menyebabkan peningkatan pemangsa P3: Ada makanan (mangsa) / / lebih banyak makanan (mangsa) dalam habitat P4: Apabila pemangsa memburu mangsa sebagai makanan , bilangan mangsa akan berkurangan. P5: Apabila populasi mangsa berkurangan , populasi pemangsa juga akan berkurangan. P6: Makanan tidak cukup (mangsa) / / makanan berkurang (mangsa) P7: Pengurangan pemangsa menyebabkan mangsa dapat terus hidup dan membiak. Oleh itu populasi mangsa akan meningkat kembali. P8: Kitaran populasi akan berulang dan dikatakan sebagai keseimbangan dinamik [Mana-mana 6 P]	1 1 1 1 1 1 1 1	6
b(i)	**Boleh menerangkan kepentingan biokepelbagaian** **Contoh jawapan** P1: Mengelakkan kepupusan organism / flora/ fauna P2: Mengekalkan populasi spesies /organisma P3 : Ekosistem/jaringan makanan /rantai makanan dikekalkan // ekosistem yang dinamik P3: Sebagai eko pelancongan P4: Mengekalkan suhu persekitaran / meminimumkan perubahan cuaca P5: Mengurangkan kesan rumah hijau / pemanasan global P6: dengan mengekalkan kandungan CO_2/ O_2 dalam atmosfera // mengurangkan CO_2 P7 : nilai perubatan / nilai ekonomi [Mana-mana 5P]	1 1 1 1 1 1 1 1	5

b(ii)	**Boleh mencadangkan bagaimana untuk memelihara dan memulihara biokepelbagaian .** **Contoh jawapan**		
	P1 : Pewartaan hutan simpan	1	
	P2 : Program tanam semula (*replanting*)	1	
	P3 : Pusat penyelidikan saintifik	1	
	P4 : Menguatkuasakan undang-undang / menggubal akta	1	
	P5 : Mengadakan kempen kesedaran tentang biodiversity / biokepelbagaian	1	
	P6 : dilaksanakan melalui media massa/sekolah	1	
	P7 : Pusat konservasi /pemeliharaan dan pemuliharaan haiwan terancam	1	5
	[Mana-mana 5P]		20

8. (a) Microorganisms S and T as shown in Diagram 8.1 are very useful and widely used in the field of biotechnology.
Mikroorganisma S dan T yang ditunjukkan dalam Rajah 8.1 sangat berguna dan digunakan secara meluas dalam bidang bioteknologi.



Microorganism S
Mikroorganisma S



Microorganism T
Mikroorganisma T

Diagram 8.1 // *Rajah 8.1*

Explain with suitable examples how both microorganisms are commercially used.
Dengan menggunakan contoh-contoh yang sesuai, terangkan bagaimana mikroorganisma tersebut digunakan secara komersial.

[4 *marks*]

(b) Diagram 8.2 shows a waste material from households is piped into a large settling tank in sewage treatment plant.
Rajah 8.2 menunjukkan bahan buangan dari perumahan disalurkan ke dalam tangki pemendapan di loji rawatan kumbahan.

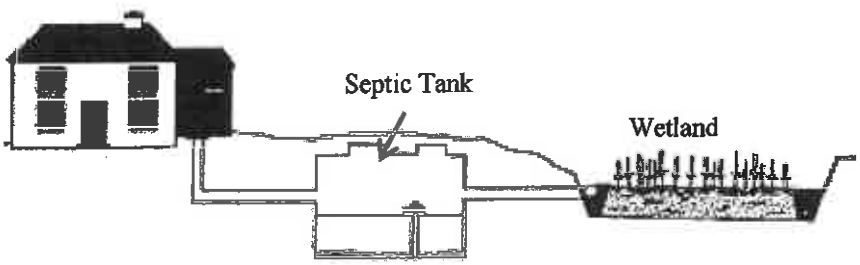


Diagram 8.2 // *Rajah 8.2*

Biotechnology are used in the waste treatment process at septic tank. Explain.
Penggunaan bioteknologi berlaku dalam proses rawatan kumbahan di tangki septik. Terangkan.

[6 *marks*]

<table>
<tr><th>NUM</th><th>SCORING CRITERIA</th><th colspan="2">MARKS</th></tr>
<tr><td>8(a)</td><td>
Able to explain the used of microorganism S and T in the field of biotechnology

Sampel answer:

Microorganism S – fungi / yeast
<table>
<tr><th></th><th>Uses</th><th>Explanation</th></tr>
<tr><td>E1</td><td>Producing wine</td><td>Fermentation of glucose (grape juice) by yeast produces etahanol</td></tr>
<tr><td>E2</td><td>Making of bread</td><td>Respiration of yeast produces carbon dioxide which causes bread dough to rise</td></tr>
<tr><td>E3</td><td>Producing beer</td><td>Yeast is added to maltose to produce alcohol</td></tr>
<tr><td>E4</td><td>Producing citric acid</td><td>Break down maize starch into citric acid</td></tr>
</table>
Any 2

Microorganism T – bacteria
<table>
<tr><th></th><th>Uses</th><th>Explanation</th></tr>
<tr><td>E5</td><td>Treatment of industrial wastes</td><td>Anaerobes bacteria are used to break down / converted industrial wastes into non-poisonous materials</td></tr>
<tr><td>E6</td><td>Making yogurt</td><td>Bacteria (Lactobacillius bulgaricus) used to break down lactose into lactic acid</td></tr>
<tr><td>E7</td><td>Producing vinegar from alcohol</td><td>Bacteria (Acetobacter sp) is used to change alcohol into acetic acid (vinegar)</td></tr>
</table>
Any 2
</td><td>1

1

1

1

1

1

1</td><td>2 m

2m</td></tr>
<tr><td>8(b)</td><td>
Able to explain the used of biotechnology in the waste treatment process

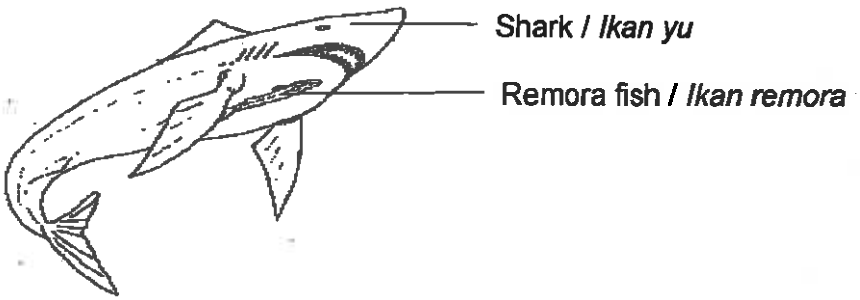
Sampel answer:

P1 - rich in organic matters, bacteria / microorganism
P2 - the sewage is decomposed by aerobic bacteria
P3 - in the presence of oxygen
P4 - (Decomposed sewage /sludge) settled to the bottom of the pond
P5 - Fermentation takes place (at sedimentation tanks)
P6 - Using anaerobic bacteria
P7 - Produce methane / carbon dioxide / minerals
P8 - Digested sludge used as fertilisers
Any 6
</td><td>1
1
1

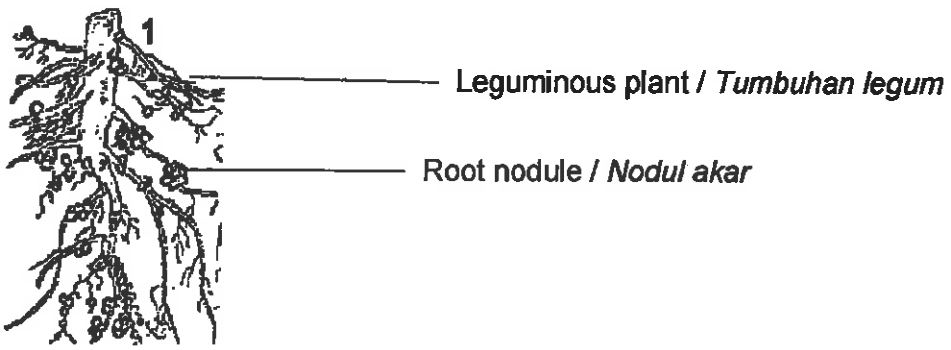
1
1
1
1
1</td><td>6 m</td></tr>
</table>

7 Diagram 7.1 show two type of symbiosis.

Rajah 7.1 menunjukkan dua jenis interaksi simbiosis.



Interaction X / *Interaksi X*



Interaction Y / *Interaksi Y*

Diagram 7.1 / *Rajah 7.1*

(a) Describe interactions X and interaction Y.

Huraikan interaksi X dan interaksi Y.

[10 markah]

b) Table 7.1 shows the facts of HIV in a country X , in the year of 2013
Jadual 7.1 menunjukkan fakta mengenai HIV di negara X , pada tahun 2013.

Populasi penduduk	28,859,154
Penghidap HIV	81,000
Kes terbaru HIV	3,479
Kematian akibat AIDS	5,800

Table 7.1 */Jadual 7.1*

(i) In your opinion, how are the transmissions of HIV ?
Pada pendapat anda, bagaimanakah cara jangkitan HIV ?

[5 markah]

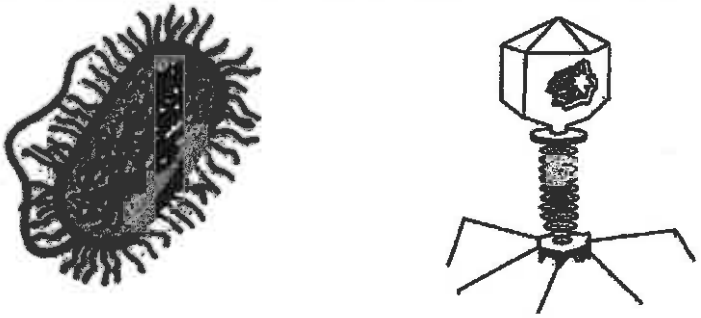
(ii) Suggest ways to prevent the transmission of HIV.
Cadangkan cara-cara untuk mengelakkkan jangkitan HIV.

[5 markah]

No soalan	Cadangan jawapan	Markah
7(a)	*Dapat menerangkan interaksi X dan intraksi Y* - P1' Simbiosis adalah interaksi antara dua spesies yang berbeza - Interaksi X : - P2 Interaksi X dikenali sebagai komensalisme - P3 Interaksi di mana komensal untung dan perumah tidak mendapat untung atau rugi - P4 ikan remora (komensal) mendapat manfaat / makanan/ pengangkutan - P5 ikan yu (perumah) tidak mendapat apa-apa manfaat - Interaksi Y - P6 Interaksi Y dikenali sebagai mutualisme - P7 iaitu interaksi di mana kedua-dua organisma mendapat manfaat / untung - P8 Nodul akar mengandungi Rhizobium sp - P9 Rhizobium menukarkan nitrogen kepada sebatian ammonia / nitrat - P10 Nitrat digunakan oleh pokok kacang / legume - P11 Pokok kacang membekalkan perlindungan / glukosa kepada Rhizobium	1 1 1 1 1 1 1 1 1 1 1 1 Max 10

7(b)(i)	*Dapat memberikan pendapat tentang cara-cara jangkitan HIV.* - P1 HIV menyebabkan penyakit AIDS - P2 HIV boleh dijangkiti melalui darah, semen dan bendalir vagina - P3 Jangkitan HIV berlaku melalui perkongsian jarum suntikan di kalangan penagih dadah - P4 Melalui perkongsian objek tajam seperti pemotong kuku/pencukur/berus gigi - P5 Hubungan seks secara rambang dengan pembawa HIV - P6 Pemindahan darah yang tidak melalui proses saringan - P7 Melalui plasenta daripada ibu hamil kepada fetusnya	1 1 1 1 1 1 Max 5
7(b)(ii)	*Dapat mencadangkan cara-cara mencegah jangkitan HIV.* - P1 Menjauhkan diri dari penyalahgunaan dadah - P2 Elakkan perkongsian jarum suntikan dalam kalangan pembawa HIV - P3 Elakkan perkongsian alatan peribadi yang tajam - P4 Menjauhi hubungan seks secara rambang - P5 Elakkan hubungan sejenis / homoseksual / lesbian - P6 Darah yang didermakan perlu dirawat untuk memusnahkan virus - P7 Pendidikan kesedaran kepada masyarakat tentang risiko jangkitan AIDS - P8 Menggunakan kondom untuk memgurangkan risiko jangkitan - P9 Pasangan yang ingin berkahwin diwajibkan menjalani ujian HIV	1 1 1 1 1 1 1 1 1 Max 5
Jumlah markah		20

6. (a) Diagram 6.1 shows two types of microorganisms, P and Q.
Rajah 6.1 menunjukkan dua jenis mikroorganisma, P dan Q.



P Q

Diagram 6.1
Rajah 6.1

State the differences between microorganisms P and Q.
Nyatakan perbezaan antara mikroorganisma P dan Q.

[4 *marks*]

(b) Diagram 6.2 shows the transmission and symptoms of diseases in human
Rajah 6.2 menunjukkan cara jangkitan dan simptom penyakit dalam manusia.

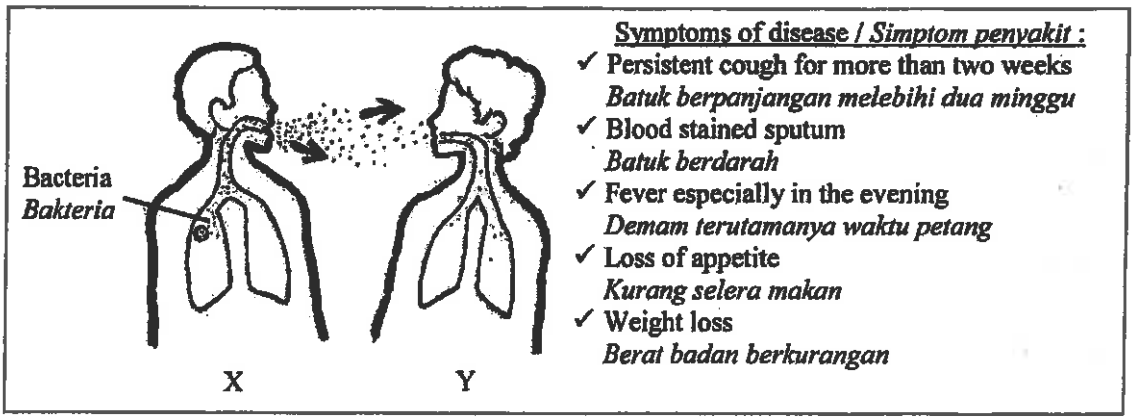


Diagram 6.2
Rajah 6.2

Based on Diagram 6.2,
Berdasarkan Rajah 6.2,

Name the disease faced by Y. Explain how this disease infected Y
Namakan penyakit yang akan dihadapi oleh Y. Terangkan bagaimana penyakit ini boleh menjangkiti Y.

[6 *marks*]

(c) Diagram 6.3 shows the nitrogen cycle which plays an important role in the formation of protein.
Rajah 6.3 menunjukkan kitar nitrogen yang memainkan peranan penting dalam pembentukan protein.

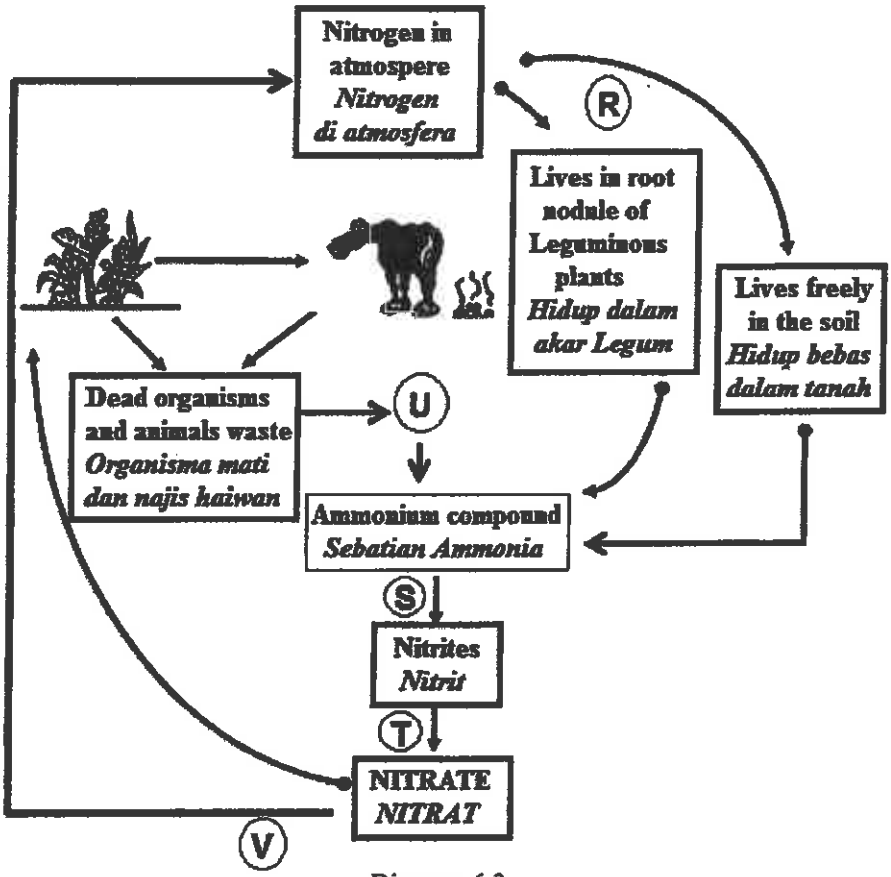


Diagram 6.3
Rajah 6.3

Explain the role of microorganisms R, S, T, U and V in this cycle.
Terangkan peranan mikroorganisma R, S, T, U dan V dalam kitar ini.

[10 *marks*]

Section B

<table>
<tr><th>NUM</th><th>SCORING CRITERIA</th><th colspan="2">MARKS</th></tr>
<tr><td>6(a)</td><td>Able to state the differences between microorganisms P and Q.
<table>
<tr><th></th><th>P</th><th>Q</th></tr>
<tr><td>N</td><td>P is Bacteria</td><td>Q is Virus</td></tr>
<tr><td>D1</td><td>Classified into kingdom of monera</td><td>Cannot be classified in any of the kingdom</td></tr>
<tr><td>D2</td><td>P is unicellular organisms (which have a basic cell structure)</td><td>Is not living cell (cannot survive/ reproduce on its own outside the host)</td></tr>
<tr><td>D3</td><td>Composed of DNA</td><td>Composed of DNA or RNA</td></tr>
<tr><td>D4</td><td>Exist in the form of spherical / rod-shaped / spiral</td><td>Exist as (chemical) crystals (outside the host cell)</td></tr>
</table></td><td>1
1
1
1
1</td><td>Max 4</td></tr>
<tr><td>6(b)</td><td>Able to name the disease faced by Y.
Answer: Tuberculosis / TB

Able to explain how this disease infected Y.
<u>Sample answers</u>:
F Through droplet transmission
E1 When X sneeze / cough / speak / spit
E2 the droplets from the mouth / nose
E3 are released and float in the air
E4 These droplets breathed in by Y
E5 If droplets contain (TB) bacteria cause Y to fall ill</td><td>1

1
1
1
1
1
1</td><td>1

Max 5</td></tr>
<tr><td>6(c)</td><td>Able to explain the role of microorganisms R, S, T, U, V and W in this cycle
<u>Sample answers</u>:
E1 R / <u>Nitrogen fixing bacteria</u> / Azotobacteria sp. / Nostoc sp. / Clostridium sp /Rhizobium sp.
E2 convert nitrogen into ammonium compound
E3 S / Nitrifying bacteria / Nitrosomonas sp convert ammonium compounds into nitrites
E4 T / Nitrifying bacteria / Nitrobacter sp. convert nitrites into nitrates
E5 (Nitrate) are absorbed by plants to make protein
E6 When animals eats the plants, the protein is transferred to the animals
E7 Waste material / faeces / urea / excretory nitrogenous plants
E8 When animals / plants die
E9 are decomposed by U / decaying bacteria / saprophytic bacteria / fungi
E10 Break them down to ammonium compound in the soil
E11 V / Denitrifying bacteria converts nitrates into nitrogen</td><td>1
1
1
1
1
1
1
1
1
1
1</td><td>Max 10</td></tr>
<tr><td></td><td>TOTAL</td><td colspan="2">20 M</td></tr>
</table>

7. (a) Diagram 6 shows a phenomenon in the ecosystem due to an unplanned development.
Rajah 6 menunjukkan satu fenomena dalam ekosistem yang disebabkan oleh pembangunan yang tidak terancang.

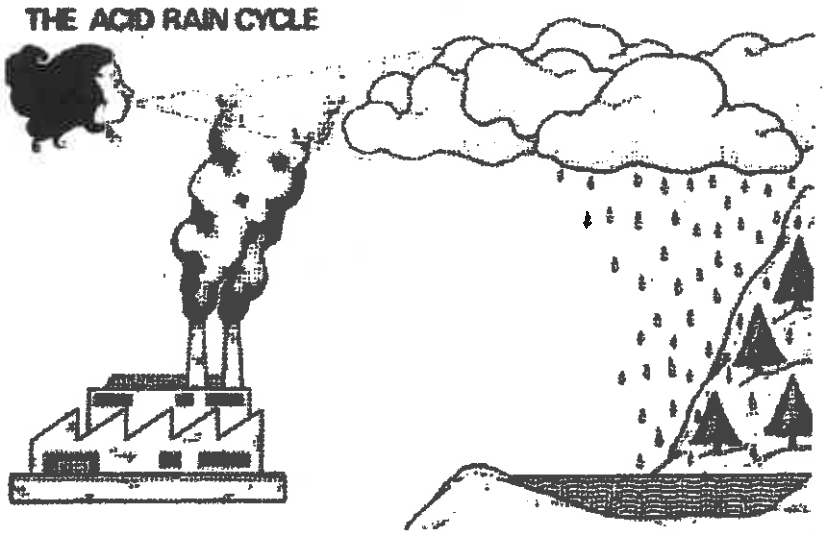


Diagram 6 / Rajah 6

Based on Diagram 6, explain the phenomenon and its effects to the environment.
Berdasarkan Rajah 6, terangkan fenomena ini dan kesan-kesannya terhadap alam sekitar.
[7 marks] / [7 *markah*]

(b) Diagram 7 shows a phenomenon which occurs in the earth's atmosphere.
Rajah 7 menunjukkan satu fenomena yang berlaku dalam atmosfera bumi.

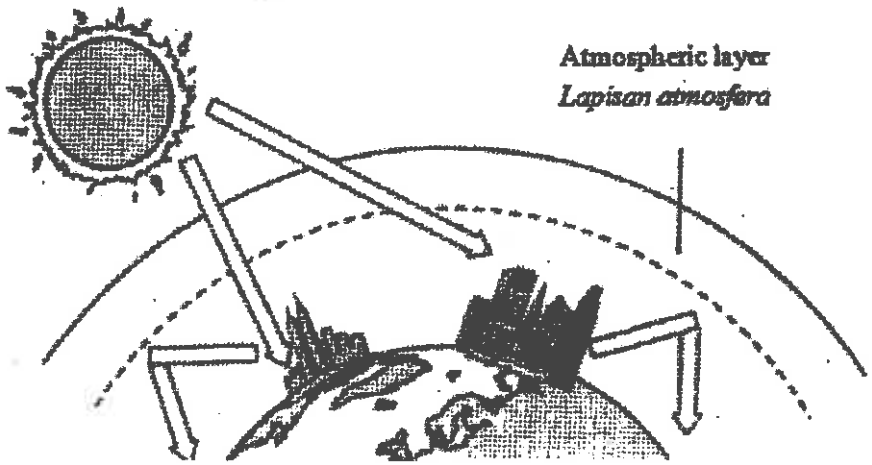


Diagram 7 / Rajah 7

Name this phenomenon and explain the effect of the phenomenon on the environment if the concentration levels of carbon dioxide, CO_2, are increasing.
Namakan fenomena ini dan terangkan kesan fenomena tersebut terhadap alam sekitar jika aras kepekatan karbon dioksida, CO_2, semakin meningkat.
[3 marks] / [3 *markah*]

(c) The world population is now growing drastically. In order to fulfill the needs of the increasing population, acres of lands have to be developed into housing areas, schools, factories and highways.
Populasi penduduk dunia sekarang meningkat dengan mendadak. Bagi memenuhi keperluan penambahan populasi ini, berekar-ekar tanah terpaksa dibangunkan untuk pembinaan kawasan perumahan, sekolah, kilang dan lebuh raya.

Give an evaluation on the above statement by considering the impacts on the environment.
Berikan satu penilaian tentang pernyataan di atas dengan mempertimbangkan impak ke atas alam sekitar.

[10 marks] / [10 *markah*]

Question	Marking Scheme	Sub Mark	Total Mark
7(a)	**Able to explain the phenomenon and its effects to the environment.** **P1 :** Factories releases large amount of oxides of nitrogen and sulphur dioxide to the atmosphere. *Kilang membebaskan nitrogen oksida dan sulfur dioksida yang banyak ke atmosfera.* **P2 :** Oxides of nitrogen combines with water vapour (in the atmosphere) to form nitric acid *Nitrogen oksida bergabung dengan wap air (dalam atmosfera) untuk membentuk asid nitrik* **P3 :** Sulphur dioxide combines with water vapour (in the atmosphere) to form sulphuric acid. *Sulfur dioksida bergabung dengan wap air (dalam atmosfera) untuk membentuk asid sulfurik.* **P4 :** The rain falls as acid rain. *Hujan turun sebagai hujan asid.* **P5 :** May corrode buildings *Boleh mengkakis bangunan* **P6 :** Aquatic lives may die due to acidic water / low pH *Hidupan akuatik mati kerana air yang berasid / pH rendah* **P7 :** Minerals in soil will be washed into rivers *Mineral di dalam tanah akan mengalir ke dalam sungai* **P8 :** Soil becomes infertile / not suitable for agriculture *Tanah menjadi tidak subur / tidak sesuai untuk pertanian* **P9 :** Plants may die due to infertile soil / acidic soil *Tumbuhan mati kerana tanah tidak subur / tanah berasid* **(any 7P) / (mana-mana 7P)**	7 X 1	7
(b)	**Able to explain the effect of the phenomenon on the environment if the concentration levels of carbon dioxide, CO_2, are increasing.** **P1 :** This phenomenon is called the greenhouse effect. *Fenomena ini dikenali sebagai kesan rumah hijau.* **P2 :** The increase in carbon dioxide concentration traps heat. *Peningkatan kepekatan karbon dioksida memerangkap haba.* **P3 :** Causes a rise in the earth's temperature. *Menyebabkan peningkatan suhu bumi.* **P4 :** The melting of polar ice raises the sea level. *Pencairan ais di kutub meningkatkan aras air laut.* **(any 3P) / (mana-mana 3P)**	3 X 1	3
(c)	**Able to give an evaluation on the above statement with impacts in environmental aspect.** **B1 :** Brings more bad impacts than good impacts to the environment *Membawa lebih impak buruk kepada alam sekitar* **B2 :** Deforestation will lead to flash flood / landslide *Penebangan hutan akan membawa kepada banjir kilat / tanah runtuh* **B3 :** Open burning will lead to air pollution / formation of haze *Pembakaran terbuka akan membawa kepada pencemaran udara / pembentukan jerebu*		

	B4 : More carbon dioxide (from open burning) will trap heat *Karbon dioksida (daripada pembakaran terbuka) memerangkap haba* B5 : Lead to greenhouse effect / global warming *Membawa kepada kesan rumah hijau / pemanasan global* B6 : Lead to changes in world climate *Membawa kepada perubahan cuaca dunia* B7 : Greenhouse effect / global warming increases the earth temperature *Kesan rumah hijau / pemanasan global meningkatkan suhu bumi* B8 : Destroying flora and fauna *Memusnahkan flora dan fauna* B9 : Migration of fauna /birds *Migrasi fauna / burung* B10 : Lead to loss of herbs for medical purposes / timber *Membawa kepada kehilangan herba untuk tujuan perubatan / kayu balak* B11 : Disruption / no more of water catchment area *Gangguan / Tiada lagi kawasan tadahan air* **(any 10B) / *(mana-mana 10B)***	10 X 1	10 X 1 20

9 (a)

Patient A
Pesakit A
- Experiences severe diarrhoea and vomitting
  Mengalami cirit-birit yang teruk dan muntah
- Dehydrated and experience weight loss
  Mengalami dehidrasi dan hilang berat badan

Patient B
Pesakit B
- Experiences high fever with rashes on skin
  Mengalami demam panas dan ruam pada kulit
- Palm and sole become red and swollen
  Tapak tangan dan tapak kaki menjadi merah dan membengkak
- Shows low platelet count
  Menunjukkan kiraan platelet yang rendah

As a doctor, explain to these patients about their condition. Your explanation should include these aspects:
Sebagai seorang doktor, terangkan kepada pesakit tentang keadaan mereka. Penerangan anda haruslah merangkumi aspek berikut:

(i) Name of the disease
Nama penyakit
(ii) Pathogen that caused the disease
Patogen yang menyebabkan penyakit ini
(iii) Method of transmission
Kaedah penyebaran
(iv) Ways to overcome the transmission of disease
Langkah-langkah untuk mengatasi cara penyebaran penyakit ini [10 marks]
[10 markah]

(b) Diagram 9 shows the human activities that may threaten the ecosystem.
Rajah 9 menunjukkan aktiviti manusia yang boleh mengancam ekosistem.

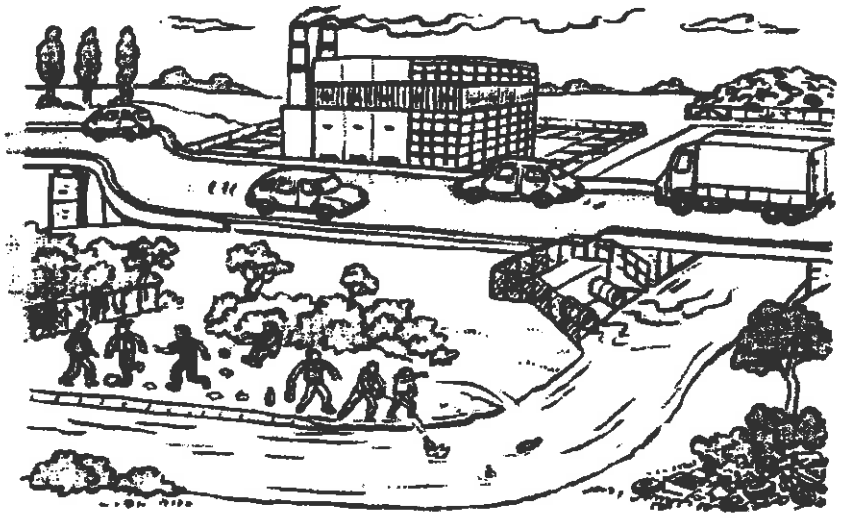


Diagram 9
Rajah 9

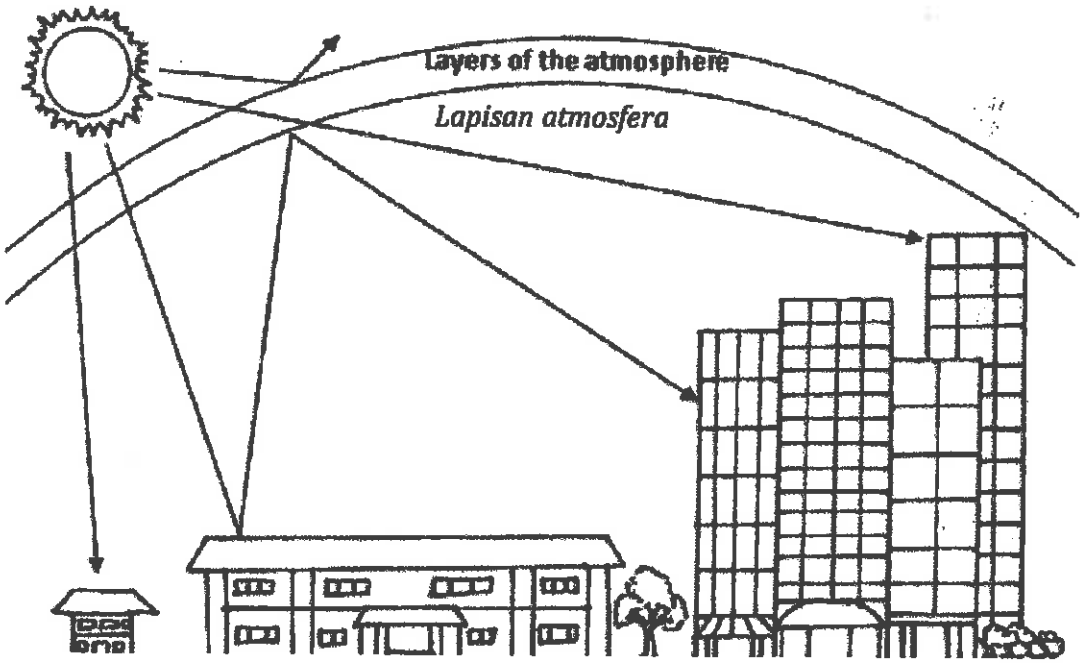
Explain the impact of these human activities on the ecosystem. [10 marks]
Terangkan kesan aktiviti-aktiviti manusia ini ke atas ekosistem. *[10 markah]*

9 a	Patient A i. cholera ii. *Vibrio cholerae* iii. Transmitted through contaminated water // waterborne disease // through vector/ houseflies that transmit the bacteria to the exposed food iv. Drink boiled water // filter drink water // any suitable example Eat cooked food // do not exposed the food // any suitable example Use proper toilet // any suitable example Patient B i. Dengue fever ii. Dengue virus iii. Transmitted by a vector/ mosquito ie *Aedes (aegypti)* iv. Protect ourselves from the bites of mosquitoes that act as vector // any suitable example Eliminating the habitat for mosquitoes // any suitable examples Health education/ campaign	1 1 1 1 1 1 1 1 1 1 1 1 Max 10	10
9 b	F1 Air pollution P1 Exhaust fume released by the vehicle contain carbon dioxide/ carbon monoxide/ sulphur dioxide P2 Smoke release by the factory contain dust / soot / lead P3 Gases released by the factory contain carbon dioxide/ carbon monoxide/ sulphur dioxide / nitrogen oxide P4 Nitrogen oxide and sulphur dioxide dissolve in water in the clouds P5 Forming nitric acid and sulphuric acid P6 Form acid rain P7 Destroy photosynthetic tissues in leaves P8 Reduce rate of photosynthesis P9 Increase carbon dioxide concentration P10 Heat is trapped by green house gases P11 Causes green house effect // lead to increase in temperature // global warming P12 Leads to climatic change// increase sea level// flash flood F2 Water pollution P13 Disposal of waste matter from industrial // domestic	1 1 1 1 1 1 1 1 1 1 1 1 1 Max 7 1	10

	source into the water P14 Causes eutrophication // increase BOD level P15 Aquatic organism die F3 Land pollution P16 Disposal of domestic waste on the ground P17 Increase the number of pest/ rat / cockroach / flies P18 Increase disease transmission	1 1 1 1 1 1 1 Max 3	

9 (a) Rajah 9.1 menunjukkan satu daripada fenomena alam sekitar yang menjadi isu perbincangan masa kini.

Diagram 9.1 shows one of the environmental phenomena which has become a current topic of discussion.



Rajah 9.1
Diagram 9.1

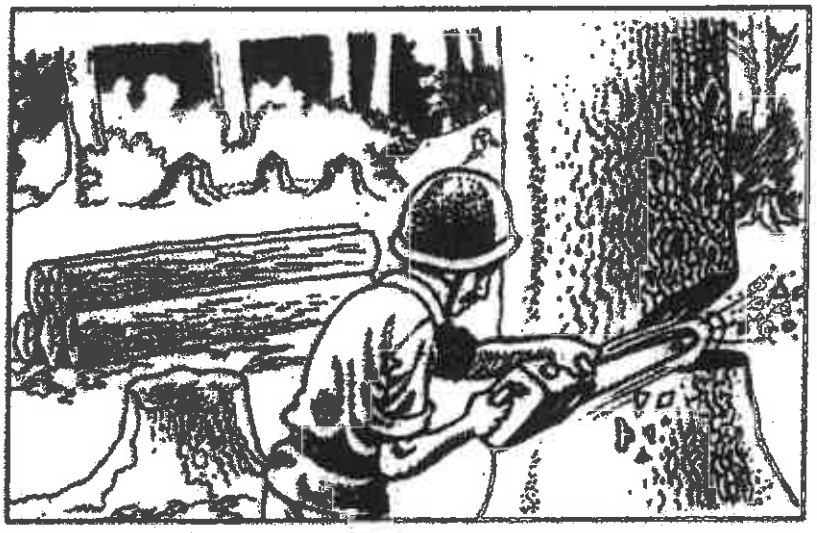
Namakan fenomena ini dan terangkan bagaimana fenomena ini berlaku.
Jika anda adalah seorang aktivis alam sekitar, cadangkan bagaimana anda akan menerangkan kepada orang ramai tentang langkah-langkah yang diperlukan untuk mengatasi fenomena ini.

Name this phenomenon and explain how it happens.
If you are an environmental activist, suggest how you would explain to society about the measures needed to overcome the phenomenon.

[10 markah]
[*10 marks*]

(b) Rajah 9.2 menunjukkan pemusnahan hutan. Hutan dimusnahkan untuk memenuhi keperluan peningkatan populasi manusia.

Diagram 9.2 shows deforestation. Forest is cleared to meet the demands of increasing human populations.



Rajah 9.2
Diagram 9.2

Berdasarkan Rajah 9.2, bincangkan kebaikan dan keburukan aktiviti manusia itu

Based on Diagram 9.2, discuss the good and bad effects of the human activity.

[10 markah]

[*10 marks*]

NO	KRITERIA PEMARKAHAN	MARKAH	JUMLAH
9 (a)	**Namakan fenomena ini dan terangkan bagaimana fenomena ini berlaku.**		
	▪ Fenomena : Kesan Rumah Hijau	1	1
	▪ Berpunca daripada pembebasan gas rumah hijau/ karbon dioksida dari aktiviti manusia seperti pembakaran api fosil, /penyahutanan / perindustrian	1	
	▪ Gas rumah hijau ini akan membentuk lapisan di permukaan atmosfera	1	
	▪ Pancaran solar dari matahari secara radiasi memasuki atmosfera Bumi	1	
	▪ Sebahagian radiasi itu diserap oleh bumi	1	
	▪ Sebahagian sinar inframerah diperangkap oleh gas rumah hijau	1	
	▪ Gas rumah hijau memantul semula haba sinar inframerah ke permukaan bumi	1	
	▪ Haba inframerah yang dipantul semula akan meningkatkan suhu bumi	1	
	▪ Menyebabkan pemanasan global	1	5MAX
	Jika anda adalah seorang aktivis alam sekitar, cadangkan bagaimana anda akan menerangkan kepada orang ramai tentang langkah-langkah yang diperlukan untuk mengatasi fenomena ini.		
	• Jangan lakukan pembalakan haram		
	• Tanam semula pokok yang telah ditebang		
	• Jangan lakukan pembakaran terbuka		4MAX
	• Gunakan petrol tanpa plumbum sebagan bahan bakar alternatif		
	Mana-mana jawapan yang sesuai		10

NO	KRITERIA PEMARKAHAN	MARKAH	JUMLAH
(b)	**Bincangkan kebaikan dan keburukan aktiviti manusia itu** Contoh jawapan Kebaikan ▪ Membina tempat kediaman untuk meningkat taraf hidup manusia ▪ Membina kilang untuk mengurangkan pengangguran/ memberi peluang pekerjaan ▪ Membina hospital untuk meningkatkan tahap kesihatan ▪ Membina sekolah untuk meningkatkan tahap pendidikan ▪ Membina kawasan pertanian sebagai sumber makanan ▪ Membina empangan/stesen jana kuasa elektrik ▪ Membina jalanraya untuk kemudahan pengangkutan ▪ Menghasilkan barangan keperluan seperti perabut / hasil balak untuk meningkat ekonomi negara Keburukan ▪ Kemusnahan habitat flora dan fauna ▪ Kepupusan flora dan fauna ▪ Hakisan tanah /Tanah runtuh kerana tiada akar memegang/ mencengkam tanah ▪ Mendapan tanah terkumpul di sungai/ sungai menjadi cetek menyebabkan banjir kilat ▪ Pengurangan jumlah air hujan kerana kurang kawasan tadahan hujan ▪ Peningkatan gas karbon dioksida kerana tiada pokok berfotosintesis ▪ Kesan rumah hijau akibat peningkatan karbon dioksida	1 1 1 1 1 1 1 1 1 1 1 1 1	5MAX 5MAX 10
	JUMLAH		20

9. Diagram 9.1 shows a condition of an area.

Rajah 9.1 menunjukkan keadaan suatu kawasan.

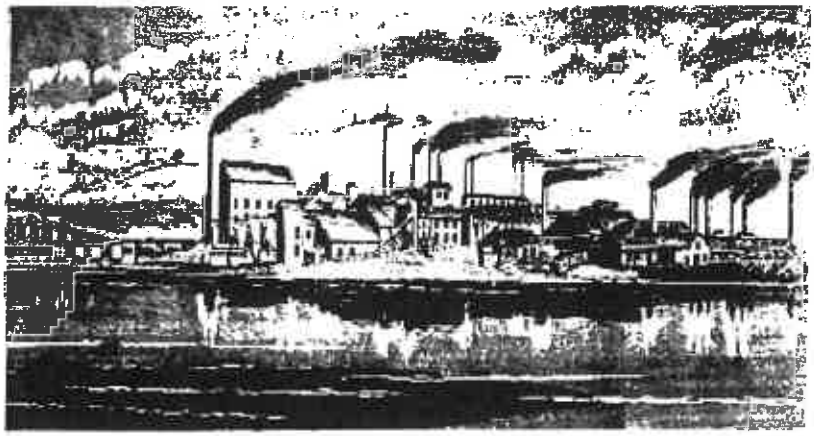


Diagram 9.1
Rajah 9.1

(a) Many new factories are built in new area and nearby housing area. Explain the effects of the presence of factories to the areas.

Banyak kilang baharu yang didirikan di kawasan baharu dan berdekatan dengan kawasan perumahan. Terangkan kesan kewujudan kilang-kilang tersebut terhadap kedua - dua kawasan itu.

[10 marks]
[10 markah]

(b) Explain the importance of maintaining the good quality of air to our ecosystem.

Terangkan kepentingan mengekalkan kualiti udara yang baik ke atas ekosistem.

[4 marks]
[4 markah]

(c) Describe ways to improve the quality of air for a better survival of all organisms.

Huraikan cara-cara untuk menambahbaik kualiti udara untuk kemandirian semua organism.

[6 marks]
[6 markah]

	Jumlah	20
9a	**Dapat menerangkan kesan kewujudan kilang – kilang tersebut terhadap kedua-dua kawasan tersebut (kawasan baharu & kawasan berdekatan perumahan)** **Contoh jawapan** A. Kesan buruk A1 – kemusnahan habitat semulajadi A2 – menyebabkan kepupusan organism / haiwan / tumbuhan A3 – pembebasan gas berbahaya / gas beracun / karbon dioksida / metana A4 - (menyebabkan) haba terperangkap A5 – meningkatkan suhu (persekitaran) A6 – menyebabkan kesan rumah hijau A7 – pembebasan sulfur dioksida / nitrogen dioksida A8 – terlarut dalam air hujan A9 – membentuk hujan asid A10 – menyebabkan pH tanah berkurangan A11 – tanah menjadi tidak subur A12 – cat bangunan terkakis / tumbuhan akuatik mati / radang kepada kulit manusia A13 – gangguan / kemusnahan rantai makanan A14 – membebaskan habuk / jelaga / asap A15 – menyebabkan jerebu / kabut / pencemaran udara A16 – menutup stoma daun A17 – mengurangkan kadar fotosintesis B. Kesan baik B1 – menambah peluang pekerjaan B2 – meningkatkan ekonomi / individu / negara B3 – meningkatkan kemudahan infrastruktur / kemudahan awam B4 – menyediakan persekitaran hidup yang baik seperti sistem sanitari / bekalan air bersih B5 – sistem pengangkutan yang selesa / cepat **Mana – mana sepuluh**	10
b	**Dapat menyatakan kepentingan mengekalkan kualiti udara yang baik ke atas ekosistem** **Contoh jawapan** P1 – untuk membekalkan oksigen kepada organism hidup P2 – mengekalkan ekosistem seimbang P3 – membolehkan tumbuhan menjalankan fotosintesis dengan cekap P4 – mencegah peningkatan suhu (persekitaran) P5 – mencegah kesan rumah hijau / pemanasan global P6 – mengurangkan stress/tekanan / menjalani gaya hidup sihat P7 – tarikan eko pelancongan P8 – sebarang jawapan yang relevan **Mana – mana empat**	4

c	**Dapat memberikan huraian tentang cara untuk menambahbaik kualiti udara untuk kemandirian semua organism** **Contoh jawapan** P1 – dengan memasang penapis dalam cerobong asap P2 – menghalang pembebasan lebih banyak bahan pencemar ke persekitaran P3 – larangan pembinaan kilang baharu berhampiran kawasan perumahan P4 – penguatkuasaan akta alam sekitar // mana-mana penerangan yang sesuai P5 – menanam / menanam semula (lebih) pokok P6 – untuk membekalkan banyak oksigen P7 – kempen kesedaran tentang persekitaran // mana-mana contoh yang sama P8 – dilaksanakan melalui sekolah / media P9 – sebarang jawapan yang relevan **Mana –mana enam**	6
	Jumlah	20

9 (a) A group of farmers planned to develop an agriculture farm nearby a lake. Besides obtaining a high agriculture yield, they suggested that the area can also be made into an eco-tourism centre. Details of their planning are listed as follow:

Sekumpulan peladang merancang membangunkan ladang pertanian berhampiran sebuah tasik. Selain mendapatkan hasil pertanian, mereka bercadang untuk membangunkan satu pusat eco- perlancongan. Butir – butir perancangan mereka adalah seperti di bawah:

Type of plants */Jenis Tanaman*	: Strawberry and rose plant */ Strawberi dan bunga ros.*
Location/ *Lokasi*	: Near a natural lake/ *Berhampiran tasik semulajadi.*
Type of fertilisers used: *Jenis baja yang digunakan:*	Compost, lead nitrate salt, potassium nitrate, magnesium nitrate and phosphate. *Baja kompos, garam nitrat, potasium nitrat, magnesium nitrat dan fosfat.*

Berdasarkan maklumat di atas, terangkan kesan ke atas tasik ini akibat pengurusan yang ***tidak terancang.***

[10 marks/ markah]

(b) Diagram 9 shows one phenomenon in the ecosystem due to an unplanned development.
Rajah 9 menunjukkan satu fenomena dalam ekosistem yang disebabkan oleh pembangunan yang tidak terancang

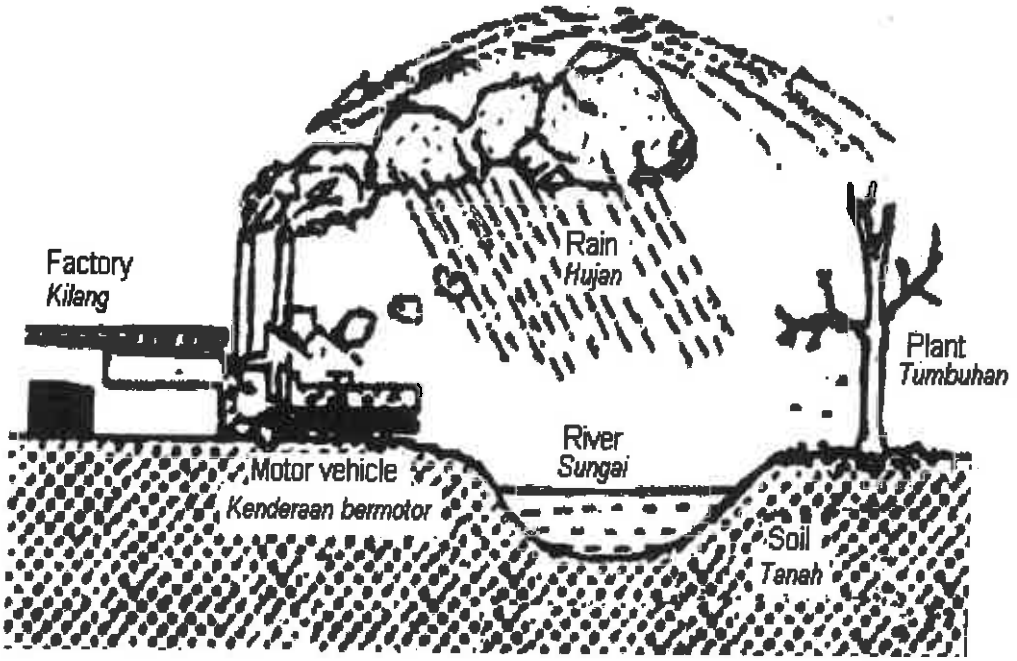


Diagram /Rajah 9

(i) Based on the Diagram 9, name the phenomenon and explain how it occurs.
Berdasarkan Rajah 9 ,namakan fenomena dan terangkan bagaimana ia berlaku.

[4 marks/markah]

(ii) Describe the effect s of the phenomenon on agriculture and aquatic ecosystem
Huraikan kesan fenomena tersebut ke atas pertanian dan ekosistem akuatik

[6 marks/markah]

QUESTION NO		MARKING CRITERIA	SUB MARKS	TOTAL MARKS
9	(a)	F - The leaching of chemical/fertiliser/phosphate/nitrate from the agriculture area to the lake	1	
		E1 – Increase the fertility / nutrient in the lake	1	
		E2 - Promotes rapid growth of algae/algae bloom	1	
		E3 - Algae cover up the surface of the lake	1	
		E4 – Eutrophication occur	1	
		E5 – Prevent penetrating of the sunlight reaching the base of the lake.	1	Any 10
		E6 – Reduce/prevent photosynthesis by aquatic plant	1	
		E7 – Aquatic plant die	1	
		E8 - Decomposed by bacteria/microorganism	1	
		E9 – The number of bacteria increase	1	
		E10 – Lead to the increase in Biochemical Oxigen Demand (BOD)	1	
		E11 – Depletion/decrease of dissolved oxygen in the lake	1	
		E 12- Result in the death of aquatic organism/animal	1	
	(b)	F – Acid rain	1	
		E1 - Motor vehicles/lorry/ factory released large amount of smoke	1	
		E2 – contain nitroden dioxide/ sulphur dioxside	1	
		E3 – Oxide of nitrogen/sulphur combine/ dissolve with water vapour/ rain water (in atmosphere)	1	Any 4
		E4 – to form nitric acid/ sulphuric acid	1	
		E5 - the rain fall as acid rain	1	
		Effect:		
		E1 - may corrode metal structure in bridges and the building	1	
		E2 - drop the water pH// water become acidic	1	
		E3 - cause aquatic animal die	1	
		E4 – destroyed the food chain in the lake/river	1	Any 6
		E5 - leach the mineral in the soil	1	
		E6 – Soil become infertile/ not suitable for plant to growth	1	
		E7 - Less yield produced	1	
		Total		20

9. Diagram 9.1 shows a common activity among our teenagers.
Rajah 9.1 menunjukkan aktiviti biasa yang dilakukan oleh para remaja.

Diagram 9.1/*Rajah 9.1*

(a) Suggest the effects of the activity on the health.
Cadangkan kesan aktiviti itu ke atas kesihatan.

[5 marks/*5 markah*]

(b) Diagram 9.2 shows a power plant that generates electricity in an area. The plant releases hot water into the nearby river.
Rajah 9.2 menunjukkan satu kilang tenaga yang menjana kuasa elektrik dalam suatu kawasan. Kilang tersebut melepaskan air panas ke dalam sungai yang berhampiran.

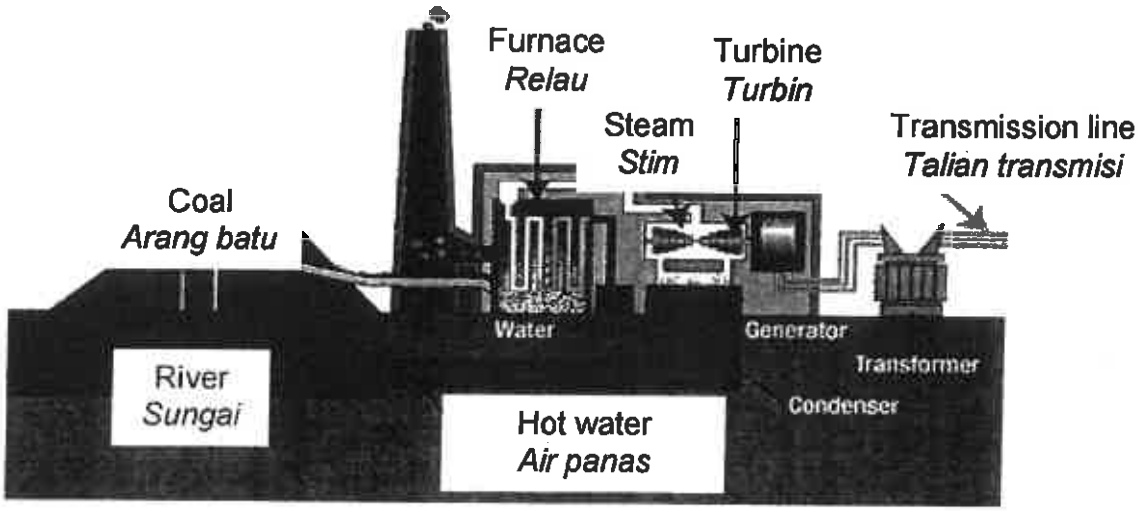


Diagram 9.2/*Rajah 9.2*

Based on the picture, suggest the impact of the power plant on the environment and precautionary measures that can be taken by all of us to ensure a green Earth for the future generations.
Berdasarkan gambar tersebut, cadangkan kesan kilang tenaga itu ke atas alam sekitar dan langkah-langkah pencegahan yang boleh diambil oleh semua orang bagi mengekalkan Bumi yang hijau untuk generasi akan datang.

[5 marks/*5 markah*]

(c) Diagram 9.3 shows how mangrove trees carry out a process to increase the survival rate.
Rajah 9.3 menunjukkan bagaimana pokok bakau menjalankan satu proses untuk meningkatkan kadar kehidupannya.

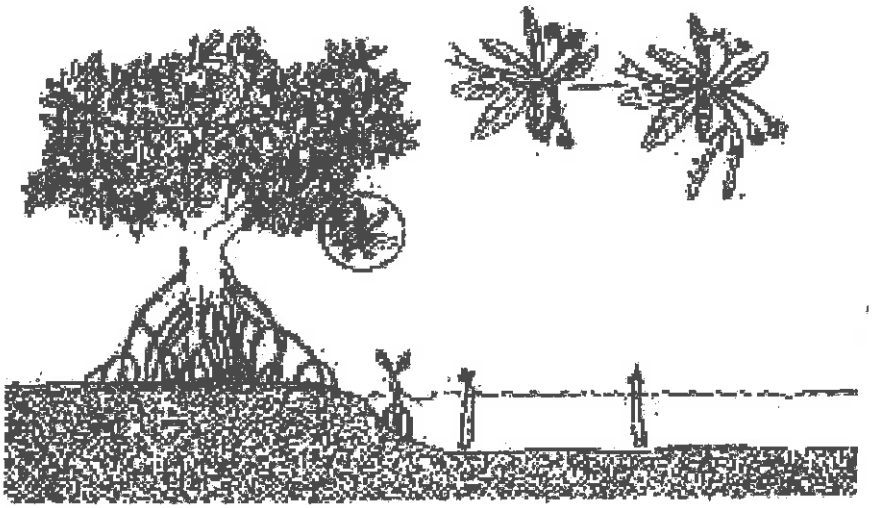


Diagram 9.3/*Rajah 9.3*

Suggest **other ways** for the mangrove tree to adapt in the harsh condition of the swamp. *Cadangkan **kaedah lain** bagi pokok bakau beradaptasi dalam keadaan yang teruk di kawasan paya.*

[10 marks/*10 markah*]

9 (a)	Able to suggest the effects of the activity on health. **Sample answer :** P1 : The activity cause noise pollution P2 : If the noise above 80 dB can cause deafness P3 : can leads to stress-related problems such as high blood pressure/headaches/ulcers P4 : also stimulate adrenaline secretions P5 : which also cause high blood pressure/increase in heart rate/respiration rate P6 : also cause muscle becomes tense Any five	1 1 1 1 1 1 1	5
(b)	Able to suggest the impact of the power plants on the environments and precautionary measures. **Sample answer :** **Impact :** P1 : Hot water released from the plant cause thermal pollution P2 : Increases the temperature of water in the river P3 : Can cause instant death to certain aquatic organisms P4 : Hot water also cause oxygen becomes less soluble in water P5 : Increase growth of algae P6 : leads to higher BOD	1 1 1 1 1 1	5
	Precautions : P1 : Treat/cool the water before released into the river P2 : Use cooling towers P3 : Use alternative energy/renewable energy/ solar energy to generate power P4 : Have campaign to educate the public on effects of pollution Any three answers from impact and precaution	1 1 1 1	
(c)	Able to suggest other ways for the mangrove to adapt to harsh environment of the swamp. **Sample answer :** F1 : Have cable root P1 : to give support in the soft muddy soil F2 : Have prop root P2 : to anchor in muddy soil F3 : Have pneumatophores P3 : for gaseous exchange to occurs F4 : The bark has lenticels P4 : for gaseous exchange F5 : Leaves are covered with thick layer of cuticle P5 : to reduce transpiration during hot days F6 : The leaves are thick and succulent P6 : to store water F7: the cell sap in the root cells have higher osmotic pressure P7 : to ensure the root cells do not loose water by osmosis F8 : the lower epidermis have hydathodes P8 : to excrete excess salt Any ten	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	10
	TOTAL		20

9 (a) *Keratan akhbar berikut adalah mengenai kegiatan pembalakan haram yang berlaku di Malaysia .*

PUTRAJAYA 30 Ogos - Kerajaan akan menguat kuasa undang-undang untuk mengenakan hukuman penjara mandatori setahun atau maksimum 20 tahun tanpa dikenakan kompaun bagi pesalah terlibat dalam aktiviti pembalakan haram.

Keputusan tegas itu dicapai pada Mesyuarat Majlis Perhutanan Negara (MPN) ke-19 dipengerusikan Timbalan Perdana Menteri, Datuk Seri Najib Tun Razak di sini hari ini.
Sehubungan itu, Peguam Negara akan membuat kajian dan penelitian mengenainya yang dijangka mengambil masa kira-kira enam bulan untuk memastikan penguatkuasaan undang-undang itu dapat dijalankan serta-merta kelak.

Tegas Najib, keputusan itu diambil memandangkan tindakan kompaun yang selama ini tidak mendatangkan kesan bagi membanteras pembalakan haram walaupun melibatkan nilai berjuta-juta ringgit.
Selain kerugian berjuta-juta ringgit, kegiatan pembalakan haram turut menjejaskan kesejahteraan rakyat dengan melibatkan masalah terhadap alam sekitar, udara dan air.

Pembalakan haram di negara ini masih berterusan yang dilakukan oleh kumpulan yang sama tetapi sindiket ini tidak banyak jumlahnya. Jadi sekarang ini MPN bersetuju bahawa kita tidak guna kompaun (untuk menanganinya) tetapi terus didakwa di mahkamah," kata beliau. Najib berkata demikian pada sidang akhbar selepas mempengerusikan mesyuarat itu di Bangunan Perdana Putra di sini hari ini.

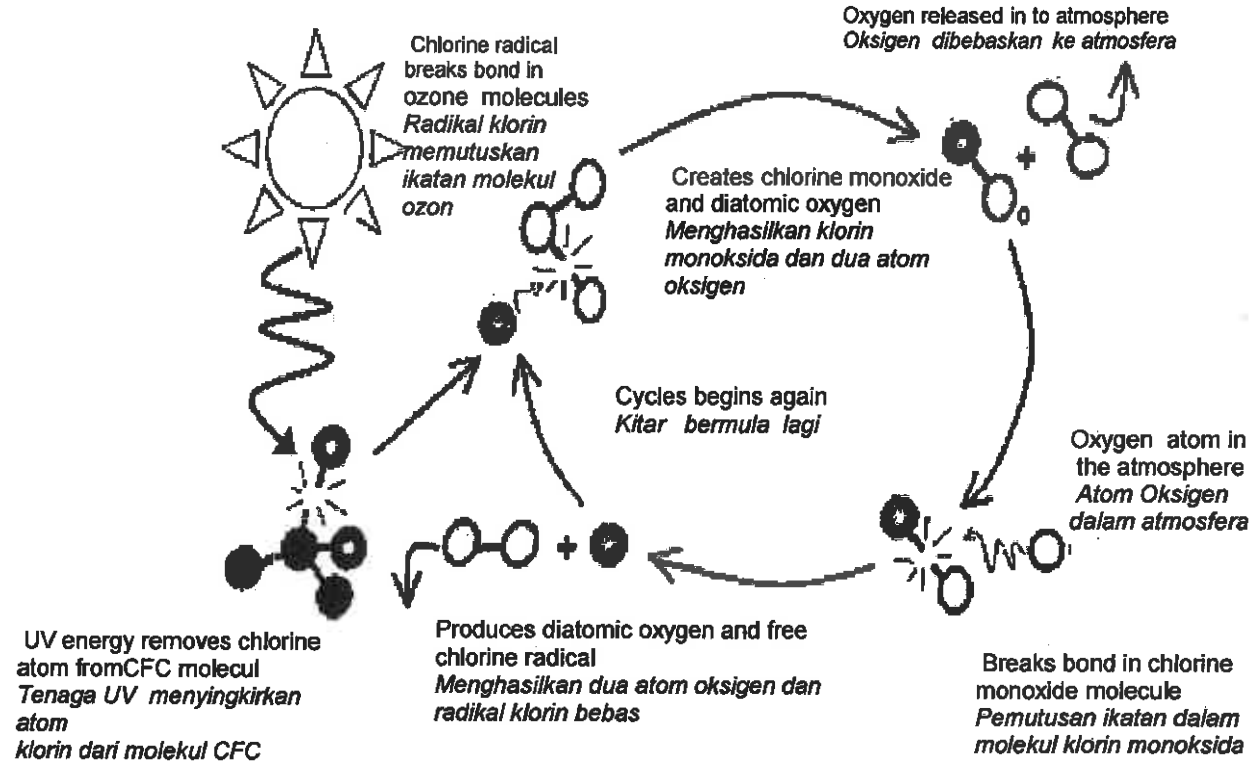
Mesyuarat yang melibatkan semua Menteri Besar dan Ketua Menteri itu turut dihadiri Menteri Sumber Asli dan Alam Sekitar, Datuk Seri Adenan Satem.
Menurut Najib, keputusan itu jauh lebih baik kerana melibatkan tindakan penjara terhadap pesalah yang lebih tegas berbanding penguatkuasaan yang ada sekarang.Tambah beliau, hukuman penjara akan dilaksanakan mengikut peruntukan undang-undang khas yang akan dibentuk di bawah Akta Perhutanan Negara 1984.
(Pindaan 1993).

Based on the above article describe how the activity affect the ecosystem.
Berdasarkan artikel di atas , jelaskan bagaimana aktiviti di atas memberi kesan ke atas ekosistem

[10 marks]
[10 markah]

9 (b) Ozone layer found in the second layer of the atmosphere, the stratosphere layer. Diagram 9 shows a reactions occurring in the ozone layer that has highly significant impact on life on Earth.

Lapisan ozon terdapat di lapisan kedua atmosfera, iaitu lapisan stratosfera. Gambarajah 9 menunjukkan tindakbalas yang berlaku dilapisan ozon dan memberi kesan yang sangat ketara kepada hidupan di bumi.



● Chlorine atom /*Atom Klorin*

○ Oxygen Atom/*Atom Oksigen*

Diagram 9
Rajah 9

(i) Explain the impact on the environment
Jelaskan kesan tersebut terhadap alam sekitar

[8 marks]
[8 markah]

(ii) Suggest ways to reduce the impact on the environment
Cadangkan cara untuk mengurangkan impak di atas terhadap alam sekitar.

[2 marks]
[2 markah]

No			Marking Criteria	Marks	Total Marks
9	(a)		F : The activity is illegal logging/deforestation	1	10 marks
			P1 : Soil erosion	1	
			P2 : Reduce Water catchment area	1	
			P3 : Plant roots system makes the soil stable	1	
			P4 : Leaves /branches acting as span to slow down water flow	1	
			P5 : Deforestation cause rain water flow very fast and erode the soil.	1	
			P6 : Landslides	1	
			P7 : Forest root system clutch the soil.	1	
			P8 : without roots system makes the soil unstable /lead to landslides	1	
			P9 : Flash floods	1	
			P10 : The eroded soil carried away by moving water deposited at the bottom of the rivers		
			P11 :Contribute to the sedimentation of the rivers becomes shallow causes flash flood during rainy seasons.	1	
			P12 : Loss of biodiversity	1	
			P13 : causes organism lose their habitat / extinction of animals	1	
			P14: Climatic changes	1	
			P15 : forest acting as ' Carbon sink' of the earth	1	
			P16 : absorbed vast amount of carbon dioxide during photosynthesis and released oxygen to atmosphere	1	
			P17 : Deforestation contribute to increase in the amount of carbon dioxide in the atmosphere	1	
			P18 : Lead to the global warming/green house effect	1	
			[any 10]		

	(b)	(i)	P1:The reaction causes the thinning of ozone layer P2 : Allowed the UV light penetrate to the earth P3: destroyed plankton in the food web P4 : Disturb the ecology balance in the water ecosystem P5: Decrease the number of stomata and chlorophyll on the leaves P6: Plant cannot carry out photosynthesis /biotic component threatened P7 : Many plant die// cause carbon dioxide increase P8 : Atmospheric temperature increase P9 : Lead to green house effect/global warming P10: Many organism which feed on plant die P11:Disturb the food web /ecosystem the any [Any 8]	1 1 1 1 1 1 1 1 1 1 1	10 marks
			F1 : Introduce new chemical substance HCFC to replace the used of CFC F3 : Enforce the laws to ban the use of material contains Chlorofluorocarbon [2 marks]	1 1	1

9 (a) Melting glaciers to be among the key issues discussed by scientists and environmental activists. Photo below shows the glacier Mac Carty found in Alaska. Photo taken in 1909 and 2004 showed a significant change on the glaciers.

Pencairan glasier menjadi antara isu penting yang dibincangkan oleh saintis dan aktivis alam sekitar.Gambar di bawah menunjukkan glasier Mac Carty yang terdapat di Alaska. Gambar diambil pada tahun 1909 dan 2004 menunjukkan perubahan yang ketara pada glasier tersebut.

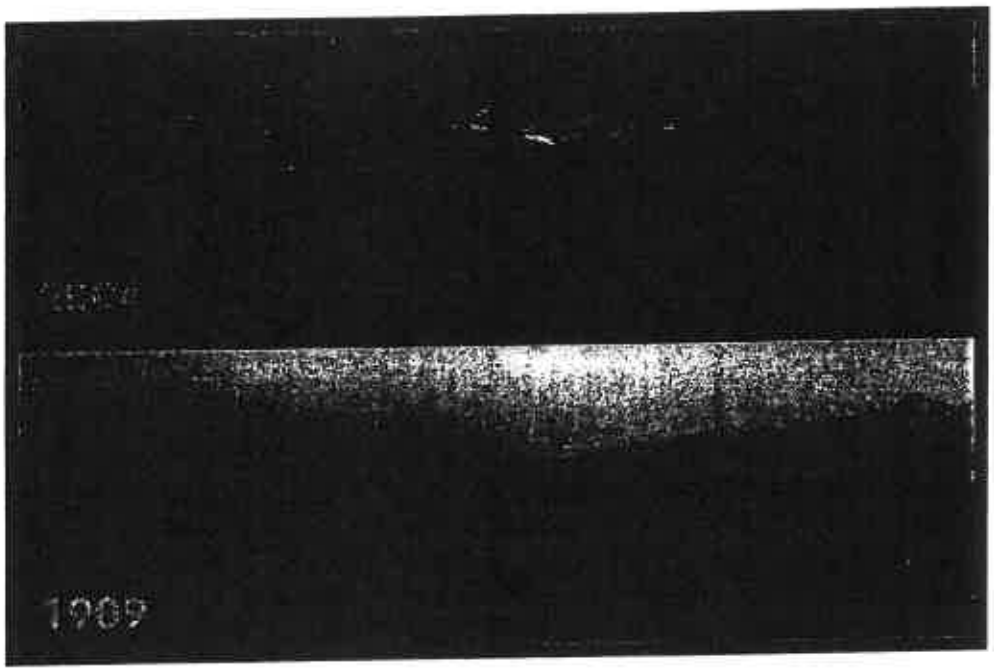


Diagram 9(a)
Rajah 9(a)

Most glaciers are found in the Antarctic and Arctic. Research shows melting has occurred at a faster rate than expected. Total of six glacial ice melt in Antarctica has increased by 77% between 1973 and 2013. Ice from six glaciers, contributing to 10% of the world's sea level rise between 2005 and 2010. The University of California, USA, conducted the study.

Kebanyakan glasier boleh ditemui di kawasan Antartika dan Artik. Kajian menunjukkan

pencairan glasier telah berlaku pada kadar yang lebih cepat dari yang dijangkakan. Jumlah pencairan ais dari enam glasier di Antartika telah meningkat sebanyak 77% diantara tahun 1973 hingga tahun 2013. Ais dari enam glasier ini menyumbang kepada 10% daripada peningkatan aras laut dunia antara tahun 2005 hingga tahun 2010 . Kajian ini telah dijalankan oleh University of California , USA.

Based on the above statement, explain the cause of the melting of glaciers and its impact on the environment, humans and habitats of organisms.
Berdasarkan pernyataan di atas, terangkan punca berlakunya pencairan glasier dan kesan nya kepada persekitaran , manusia dan habitat organisma.

[10 marks]
[10 markah]

Kedah 2014 Set 2

9 (b) Diagram 9(b) shows a corn farm that has been attack by a type of worm.
Gambar menunjukkan ladang jagung yang telah diserang oleh sejenis ulat.

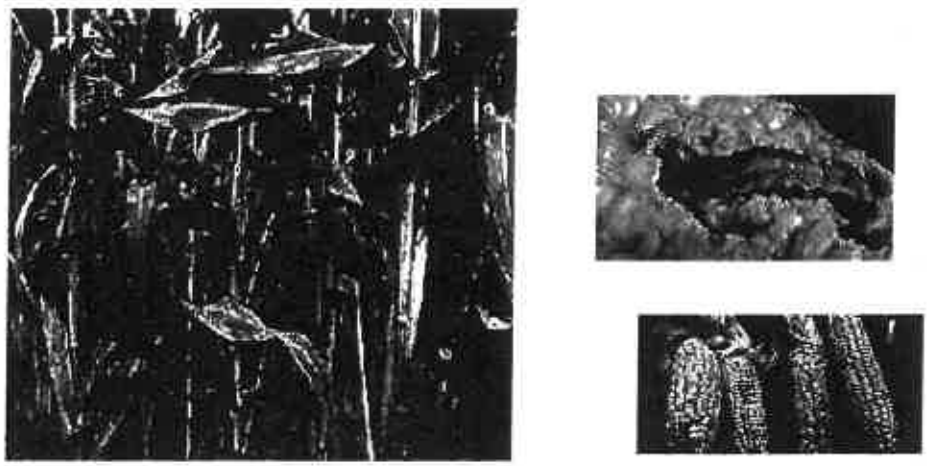


Diagram 9(b)
Rajah 9(b)

Farmers decide to apply higher and stronger doses of insecticides to control the population of worm.

Peladang membuat keputusan untuk menggunakan racun serangga yang lebih tinggi kepekatannya dan lebih kuat daripada racun serangga yang biasa digunakan bagi mengawal populasi ulat .

(i) Explain why the farmers decision is not a good idea.
Terangkan mengapa keputusan peladang tersebut adalah satu idea yang tidak baik.

[8 marks] / [*8 markah*]

(ii) Suggest a better alternative ways the farmers can overcome their problems.
Cadangkan satu cara alternatif yang lebih baik yang boleh digunakan oleh peladang bagi mengatasi masalah mereka.

[2 marks] / [*2 markah*]

No	Marking Criteria	Marks	Total Marks
(b)	ustifikasi untuk tidak menggunakan racun serangga.		
	P1 : Bukan hanya membunuh serangga perosak tetapi juga serangga serta haiwan lain yang berguna kepada manusia contoh serangga yang membantu proses pendebungaan.	1	
	P2: Menyebabkan pencemaran tanah apabila digunakan secara berlebihan	1	
	P3: Sebahagiannya akan dibawa oleh air hujan ke sungai/kolam	1	
	P4: Menyebabkan pencemaran air	1	
	P5: Menyebabkan hidupan akuatik mati	1	
	P6 : Bahan kimia dalam racun serangga adalah tidak biodegredasi menyebabkan ianya akan kekal dalam ekosistem pada jangka masa yang lama	1	
	P7 : Sebahagiaanya akan kekal dalam rantai makanan, berkumpul dalam tisu pengguna yang memakan serangga.	1	
	P8: Sisa toksik akan meningkat pada organisma dalam aras trof yang lebih tinggi	1	
	P9: Menyebabkan hidupan tersebut mati.	1	
	P10 : Menyebabkan mutasi	1	8 markah
	P11 : Daya ketahanan terhadap racun serangga tersebut meningkat. (Beberapa serangga mungkin selamat daripada racun serangga tersebut dan mewujudkan ketahanan diri yang lebih menyebabkan dos yang lebih tinggi diperlukan untuk memusnahkan serangga tersebut)	1	
	P12 : Sukar dihapuskan Mana-mana 8 P	1	

No			Marking Criteria	Marks	Total Marks
9	(a)		<u>Punca pencairan glasier (4 m)</u> P1 : Pemanasan global/kesan rumah hijau P2: Peningkatan dalam penggunaan bahan api fosil /pembakaran hutan /pembakaran terbuka P3 : Penebangan hutan/penerokaan hutan mengurangkan penggunaan karbon dioksida oleh tumbuhan untuk proses fotosintesis P4 : Menyebabkan peningkatan gas-gas rumah hijau seperti karbon dioksida dalam atmosfera P5: Gas Karbon dioksida menyerap haba/memerangkap haba P6 : meningkatkan suhu bumi [Mana-mana 4]	1 1 1 1 1 1	4 Markah
			<u>Kesan kepada Persekitaran, Manusia dan Habitat (6 m)</u> P7 : Peningkatan aras laut P8 : Kawasan tanah rendah akan ditenggelami air P9 : memusnahkan penempatan manusia / memusnahkan tanaman/habitat haiwan darat berhampiran pantai P10: Kepupusan haiwan// Pencairan glasier menyebabkan haiwan seperti beruang kutub akan pupus/ikan, burung yang bergantung kepada glasier untuk hidup akan pupus. P11: Perubahan cuaca akan berlaku P12 : menyebabkan banjir dan kemarau , P12 : tanaman akan rosak/mengurangkan hasil pertanian P13 : Krisis makanan dunia. P14 : Sesetengah kawasan seperti penduduk di pergunungan Himalaya akan mengalami kekurangan bekalan air bersih [Mana-mana 6]	1 1 1 1 1 1 1 1 1	6 Markah
					10 Markah

9 (a) The statement below describes the sustainable development.
Pernyataan di bawah menerangkan pembangunan mampan.

- Sustainable development is method to fulfill our demands for natural resources but it also balanced with the need to sustain the resources themselves.
  Pembangunan mampan adalah kaedah untuk memenuhi keperluan kita terhadap sumber-sumber semulajadi tetapi pada masa yang sama diseimbangkan dengan perlunya sumber-sumber itu dikekalkan

- Sustainable development can be achieved by using technology and non-technology approach.
  Pembangunan mampan boleh dicapai dengan pendekatan penggunaan teknologi dan bukan teknologi.

Based on statement above, explain what measures can be taken to ensure a balanced and stable ecosystem is maintained.
Berdasarkan penyataan di atas, terangkan langkah-langkah yang boleh diambil untuk memastikan keseimbangan dan kestabilan ekosistem dikekalkan.

[10 marks]
[*10 markah]*

(b) Diagram 9.1 shows an ecosystem in Malaysia
Rajah 9.1 menunjukkan ekosistem di Malaysia.

Diagram 9.1
Rajah 9.1

(c) Based on diagram 9.1, discuss why the ecosystem has to be maintained
Berdasarkan rajah 9.1, bincangkan mengapa ekosistem ini perlu dikekalkan.

[10 marks]
[*10 markah*]

Question 9

No	Mark Scheme	Sub total	Total
(a)	**Able to explain what measures can be taken to ensure a balanced and stable ecosystem is maintained** Sample answer: **Technological approach:** F1: Using unleaded petrol / hybrid car E1: Reduce the emission of lead/ plumbum into the Atmosphere F2: Use of catalytic converter E2: Convert hazardous gases into harmless substances F3 : Use of renewal energy E3 : Reduce emission of carbon dioxide into atmosphere F4 : Treatment of sewage E4 : Prevent from domestic waste/ industrial waste from polluted the sea **Non-Technological Approach** F1: Implementation of law E1: Fine the offender F2: Education/ campaign E2: To instill awareness of importance of nature to public F3: Practice of biological control E3: Reduce the usage of herbicide and pesticide *Any 10*	10 1 1 1 1 1 1 1 1 1 1 1 1 1 1	10
(b)	**Able to discuss why the ecosystem has to be maintained according to following criteria:** o F1 : Description of balanced ecosystem o F2 : Importance of maintaining the balanced ecosystem o F3 : Reason to maintain Sample answer **F1 : It is a balanced ecosystem // interaction between biotic and abiotic factors.**	Max 10 1	

	P1 : ensure conservation of biodiversity // preservation of flora and fauna	1	
	P2 : preventing extinction of flora and fauna	1	
	F2 : maintaining major soures of human food / examples // sources of medicinal resource	1	
	P3 : sustain food web / chain in the ecosystem	1	
	P4 : preventing disruption of natural cycle of water / carbon / balance between photosynthesis and respiration.	1	
	P5 : to provide natural water catchment area	1	
	P6 : to preserve natural resoures for outdoor / recreational activities / tourism / ecotourism	1	
	P7 : to reduce stress / promote healthy life style	1	
	F3 : the loss of plants / animals // destruction of flora and fauna in the ecosystem // lost of habitat / ecological niche / certain organisms	1	
	P8 : to prevent reduction in food resources / food chain / size of food web	1	
	P9 : to prevent soil erosion / land slide/ muddy flood / flash flood / natural disaster	1	
	P10 : to prevent extinction of a few animals / plant species which might be useful in the future. *Any 10*	1	10
	TOTAL		20

8 (a) Diagram 8 shows the impact of human activities to the quality of natural environment.
Rajah 8 menunjukkan impak aktiviti manusia ke atas kualiti alam semulajadi.

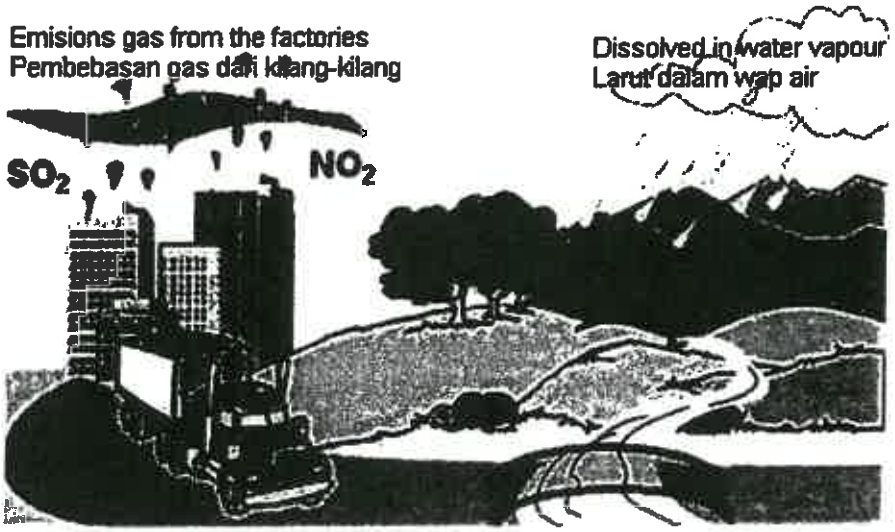


Diagram 8
Rajah 8

State the phenomena shown in Diagram 8. Discuss this phenomenon based on the following aspects:
- the sources
- the effects and
- the ways to overcome

Nyatakan fenomena yang ditunjukkan di Rajah 8. Bincangkan fenomena tersebut berdasarkan kepada aspek-aspek berikut:
- *punca*
- *kesan dan*
- *cara untuk mengatasi*

[10 *marks*]

(b) **Explain the concept of sustainable development and their importance in preservation and conservation of tropical rainforest in Malaysia.**
Terangkan konsep pembangunan berterusan dan kepentingannya dalam pemeliharaan dan pemuliharaan hutan hujan tropikal di Malaysia.

[10 *marks*]

No	Mark Scheme	Mark	Total
8(a)	**Able to explain the differences between the two human activities** Criteria 1. State the types of phenomena 2. C: the causes 3. E: the effects 4. S: ways to overcome		
	Sample answers F1: (The phenomenon is) acid rain	1	
	The causes: C1: Combustion/ Burning of fossil fuels in power stations/ factories/ motor vehicles	1	
	C2: release sulphur dioxide/ SO_2 and oxides of nitrogen/ NO and NO_2	1	
	C3: Form sulphuric acid and nitric acid when combine with water vapour	1	
	C4: Fall to Earth as acid rain/ snow/ hail/ fog/ frost/ dew	1	
	The effects *Agriculture:* E1: Leaching of minerals// the soil become acidic	1	
	Aquatic ecosystem: E2: Increase acidity in the aquatic ecosystem// kill phytoplankton// destroyed photosynthetic tissues// accumulate insoluble aluminium ions in lakes and rivers which kill aquatic organisms	1	
	Health: E3: Acidic soil releases ions of certain heavy metals/ contaminate the supply of drinking water// irritate the lungs/ make breathing difficult/ asthma/ bronchitis.	1	
	E4: Corrode metal railing/ bridges/ damage buildings/ statues/ automobiles/ structures made of stone/ metal/ historic buildings	1	
	The ways to overcome / solutions S1: Use scrubbers (to clean up emissions from power stations and industrial plants)	1 1	
	S2: Use catalytic converters (to clean up emissions from vehicle exhausts)		
	Must have F, C, E and S (at least one point) Any 10		10m

8(b)	**Able to explain the importance of sustainable management of tropical rainforest.**		
	Sample answers		
	F: (Sustainable development refers to) the measures undertaken to ensure that human activity optimally utilize Earth's natural resources such that they can be replenished naturally//suitable explanation	1	
	F1: Replanting trees in areas that have been logged// reforestation	1	
	E1: to keep the ecosystems in their natural state (which provides aesthetic values for humans) // preserve natural resources for outdoor/ recreational activities// eco-tourism // reduce stress// promote healthy life style	1	
	E2: to maintain soil fertility	1	
	E3: to prevent flood/ soil erosion / landslide/ (muddy) flood/ (flash) flood	1	
	E4: to avoid species extinction// to prevent extinction of flora and fauna/ organisms/ species	1	
	E5 : As an economic resource// source of raw materials for construction industry / piling / furniture / boats / houses/ production of charcoal / tannin / food / other suitable example // provide foods to human // resources for study / education / research	1	
	F2: Selective logging		
	E5: to maintain a balanced ecosystem// to allow maximum interaction among the living organisms/ biotic factors (in the ecosystem) and interaction between biotic and abiotic factors	1	
	E6: to maintain major sources of human food/ e.g: ulam/ ferns/ meats/ honey// sources of medicinal plant/ eg: herbs	1	
	E7: to sustain food web/ food chain in the ecosystem	1	
	E8: to prevent disruption of natural cycle of water/ carbon/ balance between photosynthesis and respiration// balance oxygen and CO_2 in the atmosphere // provide O_2 // reduce CO_2	1	
	E9: to decrease the carbon dioxide level in the atmosphere // to reduce the greenhouse effect/ global warming	1	
		1	

	E10: to maintain the biodiversity of the forest// maintaining / increasing biodiversity / complexity / variety of organisms / species / flora and fauna E11: to avoid lost of wildlife/ potential resources E12: to avoid loss of watershed areas // provide natural water catchment area E13: maintaining (normal) weather (patterns) by minimize climatic change / drought / harsh climate / maintain temperature E14 : As a site for breeding / feeding of flora and fauna / serving as valuable nursery area for organisms Must have F and any 10	1 1 1 1 1	10m
	TOTAL		**20M**

8. (a) Diagram 8.1 shows human activities that causes one of an environmental phenomenon.
Rajah 8.1 menunjukkan aktiviti manusia yang menyebabkan satu fenomena alam sekitar

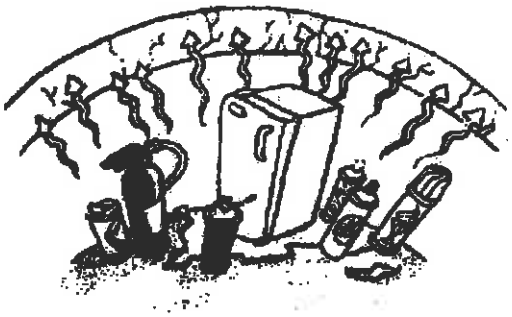


Diagram 8.1 // Rajah 8.1

Name phenomenon in the Diagram 8.1 and describe how the human activities that can cause the phenomenon. Explain the impacts of that phenomenon on the living things and environment.
Namakan fenomena dalam Rajah 8.1 dan huraikan bagaimana kegiatan menusia menyebabkan fenomena tersebut. Terangkan impak fenomena tersebut kepada benda hidup dan alam sekitar

[10 *marks*]

(b) Diagram 8.2 shows an activity carried out near a residental area with the intention to develop the area.
Rajah 8.2 menunjukkan satu aktiviti yang dilakukan berhampiran satu kawasan perumahan dengan hasrat untuk membangunkan kawasan itu.

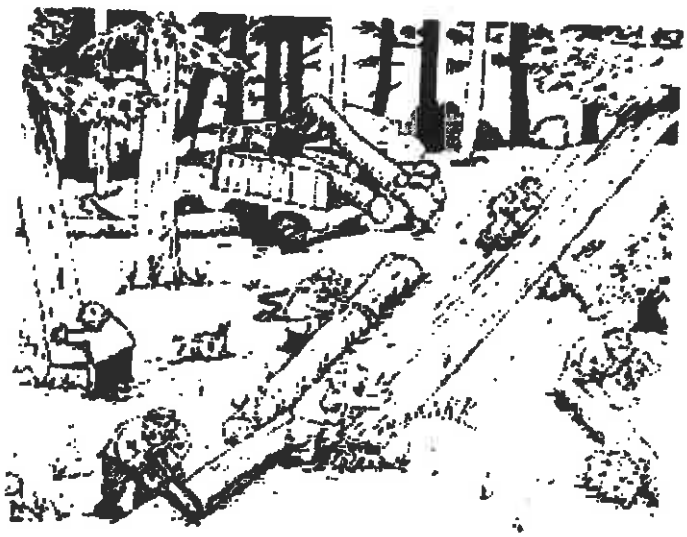


Diagram 8.2 // *Rajah 8.2*

If you were a resident of the area, discuss the good and bad effects of the activity on human and ecosystem
Jika anda penduduk di kawasan itu, bincangkan kesan baik dan buruk aktiviti tersebut terhadap manusia dan ekosistem

[10 *marks*]

Num	Scoring Criteria	Marks	
8(a)	**Able to name the phenomenon in the Diagram 8.1** *Suggested answer:* Depletion of ozone layer	1	1
	Able to describe how the human activities that causes the phenomenon *Suggested answer* P1: (The destruction of ozone layer is due to) CFC are used widely in daily activities//the increasing levels of chlorofluorocarbons (CFCs) in the atmosphere	1	
	P2: CFCs are used as coolants in air conditioners and /refrigerator	1	
	P3: CFCs are used as propellants in aerosol cans		
	P4: CFCs are used as foaming agents in the making of styrofoam packaging/in polystyrene food container	1 1	**Any 3**
	P5: CFCs used as foaming agents in making cushions/pillow	1	3marks
	Able to explain the impacts of that phenomenon on the living things and environment *Suggested answer* (The impact of ozone depletion are very severe). F1:Allows excessive ultraviolet radiation to reach the earth// Prolonged exposure to ultraviolet radiation can lead to higher risk of	1	1mark
	Environment P1: increase in surrounding/earth temperature P2: climate and weather patterns changes due to change in wind directions//rainfall	1 1	
	Plants P3: destruction/decreases of the stomata and chlorophyll (in the leaves) reduces photosynthesis rate.	1	
	P4: the yield of crop and livestock reduced/ damage of crops due to over exposure to UV	1	**Any 5**
	P5: damage of phytoplanktons/plankton in the food chain		5marks
	Human health P7: skin cancer,such as melanoma//sunburn	1	
	P8: causes cataract//irritation of eye//damages eyesight	1	
	P9: weakened the human immune system	1	
		1	**Max 10**

<table>
<tr>
<td>8(b)</td>
<td>
Able to discuss the good and bad effects of the activity on the human and ecosystem

Able to name the activity.
Sample answer:
N: Deforestation
Able to discuss the good effect of development
Sample answer:
P1: Build / Develop residence to accommodate the increase in population.
P2: Industrial / agriculture / factory to increase job opportunities / increase the income.
P3: Develop road system to shorten travelling time / reduce traffic jam.
P4: Restructuring of infrastructure facilities / upgrade the infrastructure./can give examples

Able to discuss the bad effect of development
Sample answer:
<table>
<tr><th>Fact</th><th>Explanation</th></tr>
<tr><td>F1: Causes land to be exposed to agents of erosion//the lost of nutrient resources//the lost of catchment area for the rain water</td><td>E1: Flash flood// landslides//shallowing of rivers//infertile soil// loosen soil structure//soil erosion</td></tr>
<tr><td>F2: Destroy natural habitats of organisms// destroy the ecosystem of organisms</td><td>E2: Extinction of organism //the lost of certain animal and plant species</td></tr>
<tr><td>F3: Causes the increasing of carbon dioxide content in atmosphere</td><td>E3: Green house effect// temperature increase// global warming</td></tr>
</table>
</td>
<td>1

1

1

1

1

2

2

2</td>
<td>Any 4 4marks

6

Max 10</td>
</tr>
<tr><td colspan="2"></td><td>Total</td><td>20</td></tr>
</table>

9 (a) Diagram 9.1 shows one benefit of bacteria to human life.
Rajah 9.1 *menunjukkan satu kebaikan bakteria kepada kehidupan manusia.*

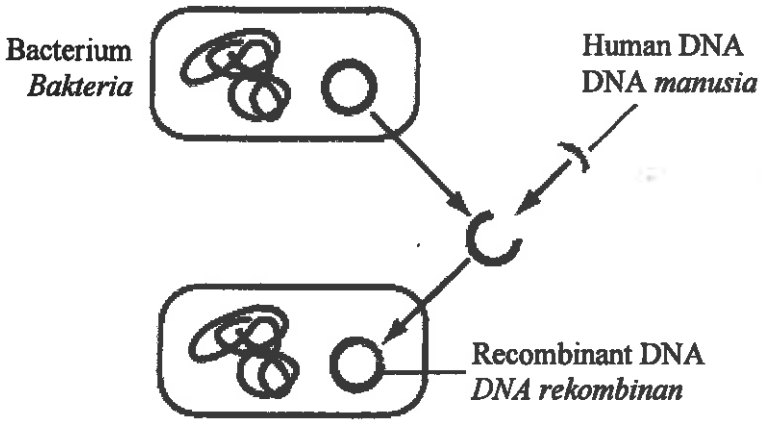


Diagram 9.1
Rajah 9.1

(i) Based on Diagram 9.1, describe the use bacteria in producing insulin.
Berdasarkan Rajah 9.1, *huraikan kegunaan bakteria dalam menghasilkan insulin.*

[5 marks]
[5 *markah*]

(ii) Explain how the following microorganisms are useful in medicinal field.
Terangkan bagaimana mikroorganisma berikut berguna dalam bidang perubatan.

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

[5 marks]
[5 *markah*]

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

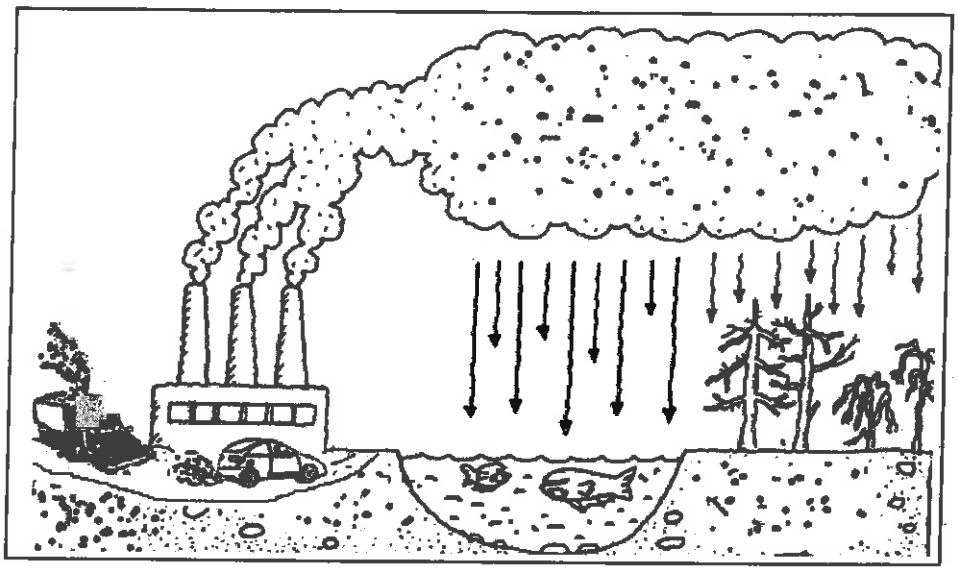


Diagram 9.2
Rajah 9.2

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

[10 marks]
[*10 markah*]

No	Criteria	Marks	
(a) (i)	Able to describe the use bacteria in producing insulin. Sample answer: ▪ Genetic engineering ▪ (Segment of) DNA / gene / gene code ▪ for insulin production ▪ taken from human cell / pancreas ▪ insert into bacteria ▪ form bacteria DNA recombinant ▪ Culture / mitosis / binary fission ▪ Forms more bacteria (DNA recombinant) ▪ Synthesis insulin ▪ Extraction of insulin ▪ Use to treat diabetics (Any 5)	 1 1 1 1 1 1 1 1 1 1 1 	5
(a)(ii)	Able to explain how the microorganisms are useful in medicinal field. Sample answer: ▪ *Penicillium notatum* is a fungus ▪ Produces antibiotics ▪ Kill / fight / prevent growth of other microorganisma ▪ Treat disease such as gonorhoea / syphilis / lungs infection (Any 2) ▪ Suspension of dead or weakened called vaccine ▪ Injected into human / blood ▪ Stimulates lymphocytes ▪ Produce antibody ▪ Kills / fights / neutralises toxins / chemicals ▪ Immune to chicken pox / rubella / tuberculosis (Any 3)	 1 1 1 1 1 1 1 1 1 1 	5
(b)	Able to discuss the good and bad effects of the human activity. Sample answer: Good effect: ▪ Produce goods / materials // any examples ▪ Use in daily life ▪ Motor vehicles for transport (Any 2) Bad effects: ▪ Releases sulphur dioxide / nitrogen dioxide ▪ Dissolve in atmospheric water vapour	 1 1 1 2 1 1	10
	▪ Forms sulphuric acid / nitric acid / acid ▪ Down pour as acid rain ▪ Dissolves minerals in soil ▪ Less fertile for plant growth ▪ Releases poisonous chemicals / aluminium // other examples ▪ Water in rivers / lakes lower pH ▪ Upsets ecological balance ▪ Death of planktons / flora / fauna ▪ Destruction of food chain / web ▪ Extinction of species ▪ Acid cause leaves turn purple / death ▪ Destroy marbles / buildings // other examples (Any 8)	1 1 1 1 1 1 1 1 1 1 1 1 8	
	TOTAL		**20**