SULIT

4551/2
Biologi
Kertas 2
September

2 ½ jam

Nama

Tingkatan

JABATAN PELAJARAN MELAKA

Dengan Kerjasama

PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA SEKOLAH MENENGAH MALAYSIA (PKPSM) CAWANGAN MELAKA

PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2008

BIOLOGI

Kertas 2

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini mengandungi tiga bahagian* **Bahagian A, Bahagian B dan Bahagian C**. *Jawab* **semua** *soalan dalam* **Bahagian A, satu** *soalan daripada***Bahagian B** *dan* **satu** *soalan daripada* **Bahagian** *C.*

2. *Jawapan kepada* **Bahagian A** *hendaklah ditulis dalam ruang jawapan yang disediakan dalam kertas soalan. Langkah penting dalam kerja mengira hendaklah ditunjukkan.*

3. *Jawapan kepada* **Bahagian B** *dan* **Bahagian C** *hendaklah ditulis dalam kertas jawapan yang disediakan . Anda diminta menjawab dengan lebih panjang tetapi jawapan mestilah jelas dan logik. Dalam jawapan anda, persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda boleh digunakan.*

4. *Jawapan kepada ketiga-tiga bahagian ini hendaklah diserahkan bersama-sama. Anda hendaklah menyerahkan kertas tulis dan kertas graf tambahan, jika digunakan, bersama-sama dengan kertas soalan.*

5. *Rajah yang mengiringi soalan dimaksudkan untuk memberi maklumat yang berguna bagi menjawab soalan. Rajah tidak dilukiskan mengikut skala* **kecuali** *dinyatakan sebaliknya.*

6. *Penggunaan kalkulator saintifik yang* **tidak** *boleh diprogramkan adalah dibenarkan*.

7. *Masa yang dicadangkan untuk menjawab* **Bahagian A** *ialah 90 minit ,* **Bahagian B** *30 minit dan* **Bahagian C** *30 minit.*

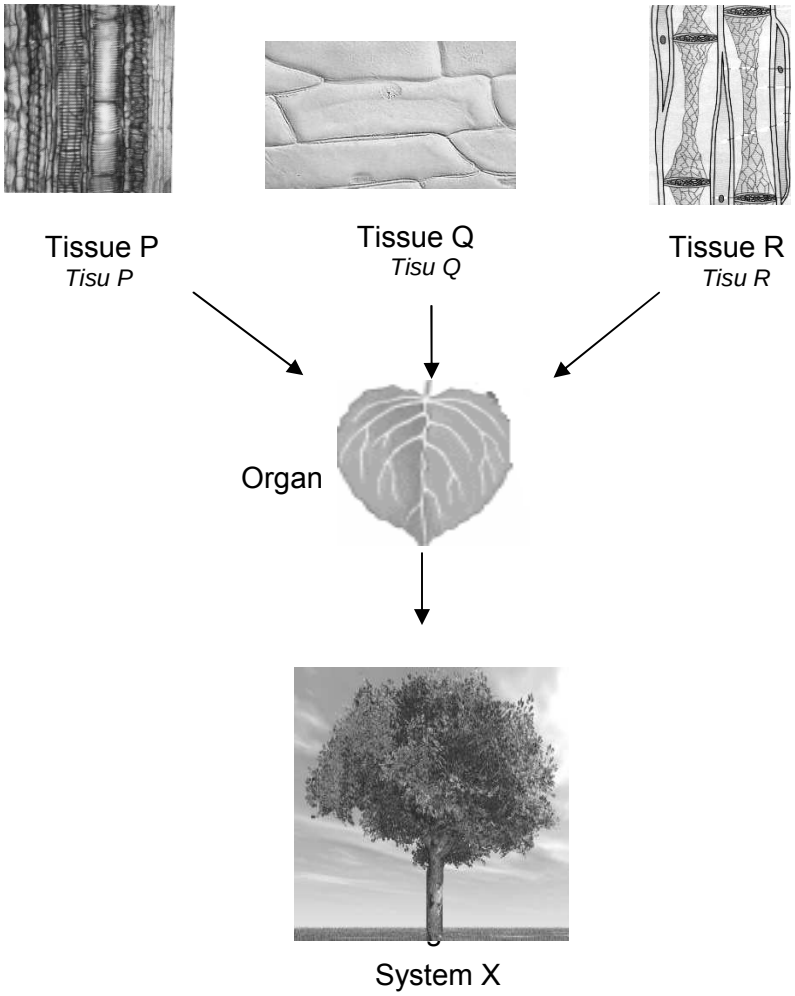
Untuk kegunaan pemeriksa		
Bahagian	No.	Markah
A	1	
	2	
	3	
	4	
	5	
Jumlah		
B	6	
	7	
	8	
	9	
Jumlah		
Jumlah Besar		

Kertas soalan ini mengandungi 24 halaman bercetak termasuk kulit

For Examiner's Use

SECTION A
[60 *marks*]
Answer **all** questions
The time suggested to complete this section is 90 minutes.

1. Diagram 1 shows a cell organization of a plant.
Rajah 1 menunjukkan organisasi sel satu tumbuhan



(a) (i) Name tissues P, Q and R
Namakan tisu P, Q,dan R

1(a)(i)

P : …….....

Q : ……

R : …….

[3 marks]

For Examiner's Use

1(a)(ii)

(ii) State **one** function of tissues P and R
*Nyatakan **satu** fungsi tisu P dan R.*

P : ……..

……

R: ……..

……..

[2 marks]

1(a)(iii)

(iii) State a structural feature of tissue P and R which enable them to function effieciently
Nyatakan satu struktur pada tisu P dan R yang membolehkan tisu-tisu ini berfungsi dengan lebih efisien.

……

……

……

[2 marks]

1(b)

(b) State two other organs which form system X
Nyatakan dua lagi organ yang membentuk system X

……..

[2 marks]

For Examiner's Use

(c) Some of the Q cells carry out cell specialization to produce cell Y.
Terdapat beberapa cell Q yang menjalani pembezaan sel untuk menghasilkan sel Y.

(i) In the box provided, draw cell Y.
Di dalam kotak yang disediakan, lakarkan sel Y.

1(c)(i)

[1 mark]

(ii) Explain the role of cell Y in increasing the rate of photosynthesis.
Terangkan peranan sel Y di dalam meningkatkan kadar fotosintesis.

……

……

……

1(c)(ii)

[2 marks]

TOTAL

For Examiner's Use

2. Diagram 2.1 shows two different structures of compound X.
Rajah 2.1 menunjukkan dua struktur yang berlainan bagi sebatian X.

S: T:

Diagram 2.1
Rajah 2.1

2(a)(i)

(a) (i) Label structure S and T
Label struktur S dan T

[1 mark]

2(a)(ii)

(ii) State what compound X is .
Nyatakan apakah sebatian X.

.....

[1 mark]

2(a)(iii)

(iii) State the monomer of the structures shown in diagram 2.1.
Nyatkan monomer bagi struktur di dalam Rajah 2.1

.....

[1 mark]

For Examiner's Use

(b) A patient's pancreatic cells have been found to be unable to produce a compound X that has structure T. Explain the effect of this to his digestive system.
Sel pankreas seorang pesakit didapati gagal untuk menghasilkan sebatian X yang mempunyai struktur S. Terangkan kesannya kepada system penghadaman pesakit ini.

2(b)

……

……

……

[3 marks]

(c) Diagram 2.2 shows how the amounts of an enzyme's substrate and product change during seed germination.
Rajah 2.2 menunjukkan perubahan kandungan substrat and hasilnya sewaktu percambahan biji benih.

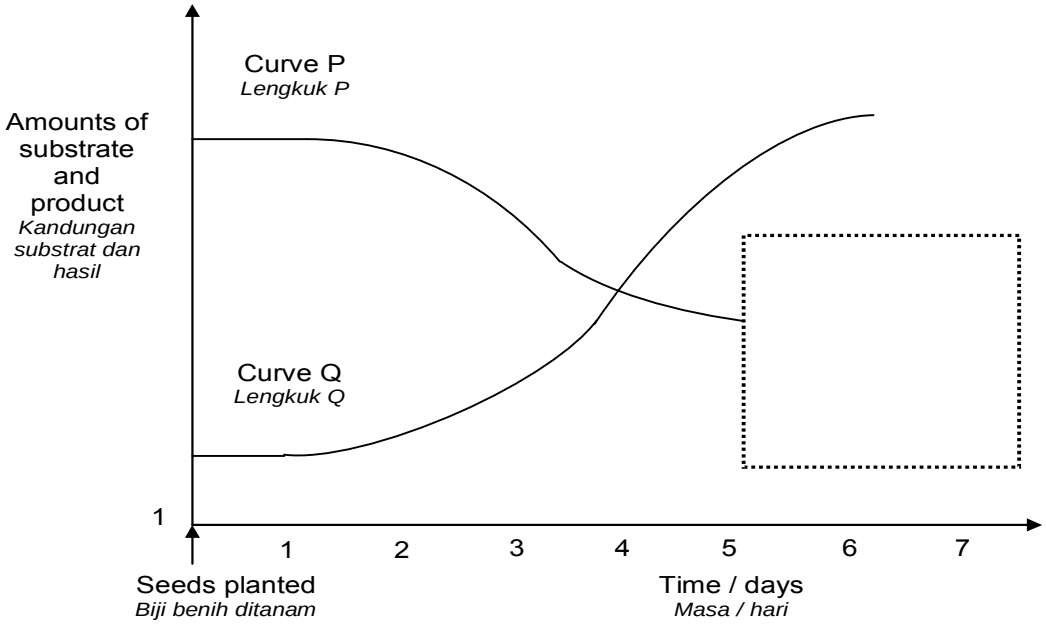


Diagram 2.2
Rajah 2.2

(i) State which curve represents the amount of substrate.
Nyatakan lengkuk yang diwakili oleh kandungan substrat.

2(c)(i)

…..…….....

[1 mark]

For Examiner's Use

(ii) Explain you answer in (c) (i)
Jelaskan jawapan anda di (c) (i)

2(c)(ii)

……

……

……

[2 marks]

(iii) If the enzyme involved in the reaction is amylase, continue curve P in the box in diagram 2.2 to show what would happen when photosynthesis begins.
Jika enzim yang terlibat di dalam tindakbalas ini ialah amylase, sambungkan lengkuk P pada rajah 2.2 untuk menunjukkan apa yang akan berlaku apabila fotosintesis bermula

2(c)(iii)

[1 mark]

(iv) Explain the shape of the curve that you have drawn.
Terangkan bentuk lengkuk yang telah anda lukiskan.

2(c)(iv)

……

……

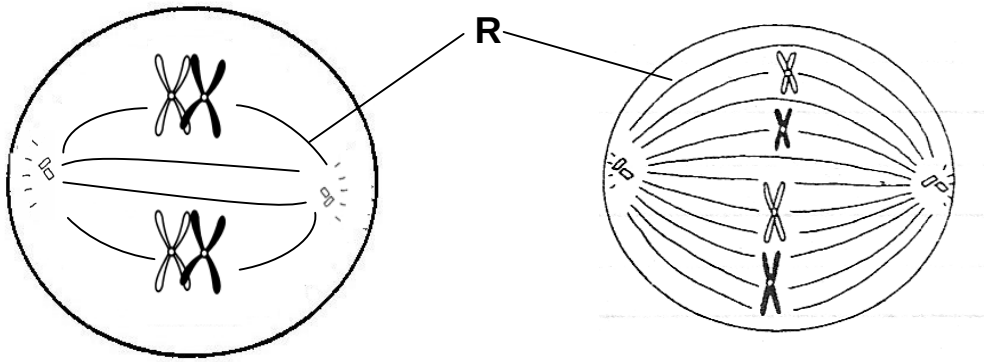
……

[2 marks]

TOTAL

For Examiner's Use

3. Diagram 3.1 shows cell P and cell Q undergoes one of the stages for two types of cell division.
Rajah 3.1 menunjukkan sel P dan Q yang sedang menjalani salah satu peringkat di dalam dua pembahagian sel yang berbeza.



Cell P
Sel P

Cell Q
Sel Q

Diagram 3.1
Diagram 3.1

(a) (i) State the type of cell division shown in diagram 3.1
Namakan jenis pembahagian sel seperti yang ditunjukkan dalam rajah 3.1

3(a)(i)

P : …….

Q : ……..

[2 marks]

(ii) State a function of the two cell divisions mentioned in (a)(i).
Nyatakan satu fungsi bagi setiap pembahagian sel yang dinyatakan di (a)(i)

3(a)(ii)

P : …….

Q : ……..

[2 marks]

For Examiner's Use

b. Diagram 3.2 shows a cell cycle. On the cell cycle, label the stage shown by cell Q with a letter Y
Rajah 3.2 menunjukkan satu kitar sel. Pada kitar sel tersebut, labelkan peringkat yang ditunjukkan oleh sel P dengan menngunakan huruf Y.

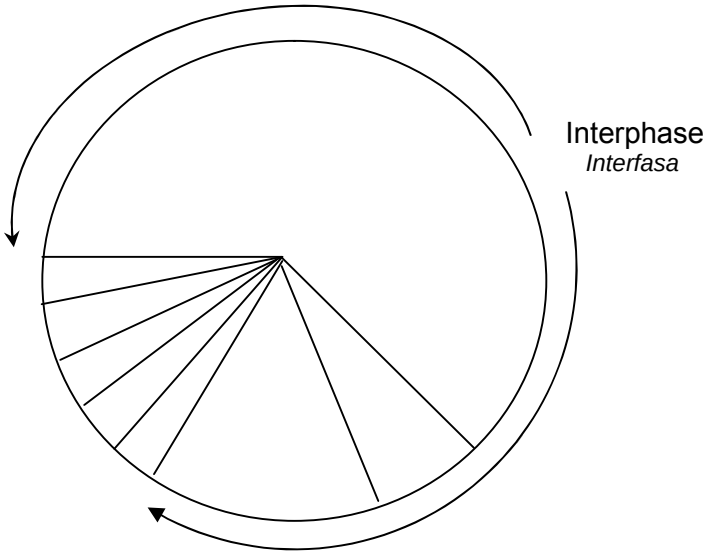


Diagram 3.2
Rajah 3.2

3(b)

[1 mark]

c. Draw a daughter cell of cell P and Q after both cells have completed the cell division. in the boxes provided below.
Lakarkan sel anak bagi sel P dan Q selepas kedua-dua sel selesai menjalani proses pembahagian sel di dalam kotak yang telah disediakan.

Cell P
Sel P

Cell Q
Sel Q

3(c)

[4 marks]

For Examiner's Use

d. Ahmad has been exposed to gamma rays which results in the failure of structure R to be formed.
Explain the effects of this to the formation of the daughter cells of cell P.
Ahmad telah terdedah kepada sinaran gamma yang menyebabkan struktur R gagal dihasilkan. Terangkan kesannya keatas penghasilan sel-sel anak bagi sel P

……

……

……

……

[3 marks]

3(d)

TOTAL

For Examiner's Use

4. Diagram 4.1 shows the endocrine system in the body of a human.
Rajah 4.1 menunjukkan sistem endokrin manusia

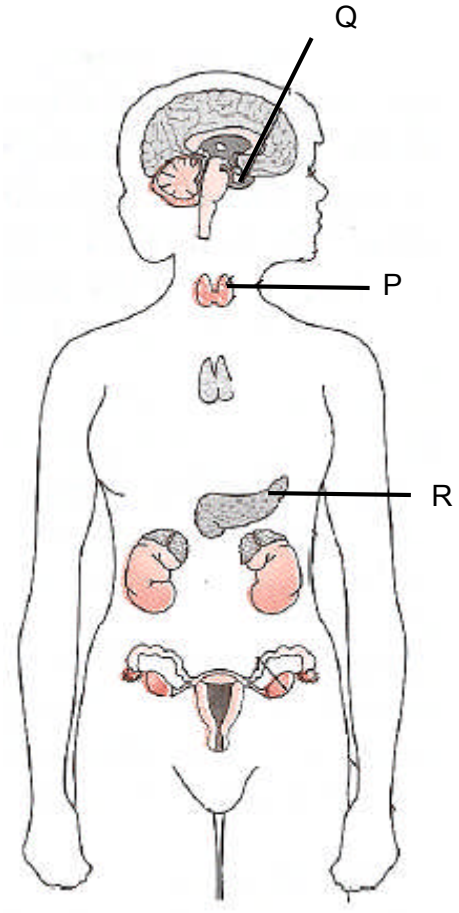


Diagram 4.1
Rajah 4.1

(a) (i) Name the hormones secreted by gland P and Q
Namakan hormone yang dirembeskan oleh kelenjar P dan Q

4(a)(i)

P : …….....

Q : ……..

[2 marks]

4(a)(ii)

(ii) In diagram 4.1, label the adrenal gland with letter S
Di dalam rajah 4.1, labelkan kelenjar pituitary dengan huruf S

[1 mark]

For Examiner's Use

4(b)(i)

4(b)(ii)

(a) Some people have their gland P grows two or three times its size.
Terdapat manusia yang mempunyai kelenjar P yang membesar sehingga dua atau tiga kali saiz sebenar.

(i) Name the condition mentioned above
Namakan keadaan yang dinyatakan di atas.

……
[1 mark]

(ii) Suggest how to overcome the above problem.
Cadangkan bagaimana untuk mengatasi masalah diatas

……
[1 mark]

(c) In a study carried out, an individual X drinks a glass of glucose solution. Table 4.2 shows the changes in the concentration of blood glucose in individual X .
Di dalam satu kajian yang dijalankan, seorang individu telah meminum segelas larutan glukosa. Jadual 4.2 menunjukkan perubahan didalam kepekatan kandungan gula di dalam darah individu tersebut.

Time / min *Masa / min*	The concentration of blood glucose / g dm $^{-1}$ *Kepekatan gula dalam darah*
0	90
30	130
60	162
90	90
120	84
150	74
180	88

Table 4.2
Jadual 4.2

Based on table 4.2 , explain the role of gland R in regulating the person blood glucose concentration from 0 minute to 90 minutes.
Berdasarkan jadual 4.2, jelaskan tugas kelenjar R di dalam mengawalatur kepekatan gula dalam darah dari minit 0 hingga minit ke 90

4(c)

…….....
……..
……..
……
[3 marks]

For Examiner's Use

(d) Diagram 4.3 shows a person who is sweating under a hot sun
Rajah 4.3 menunjukkan seorang lelaki yang sedang berpeluh ketika berada di bawah panas matahari

Diagram 4.3
Rajah 4.3

(i) State what will happen to his blood osmotic pressure in the person's body.
Nyatakan apakah yang akan berlaku kepada tekanan osmosis darah lelaki tersebut.

4(d)(i)

……
[1 mark]

(ii) Explain how gland Q involves in returning the osmotic pressure of the blood to normal levels.
Terangkan bagaimana kelenjar Q terlibat didalam mengembalikan tekanan osmosis darah kepada normal.

4(d)(ii)

……
……
……
……
……
[3 marks]

TOTAL

For Examiner's Use

5. Diagram 5 .1 shows a structure of a human placenta and its connection to the fetus.
Rajah 5.1 menunjukkan struktur plasenta manusia dan hubungannya dengan fetus.

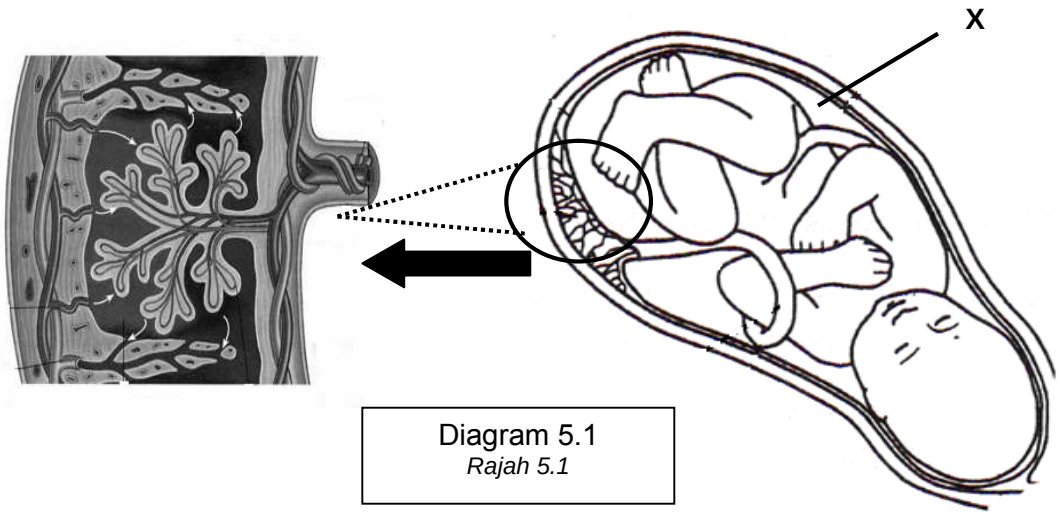


Diagram 5.1
Rajah 5.1

5(a)(i)

(a) (i) Name X.
Namakan X

X : ……..

[1 mark]

5(a)(ii)

(ii) State two importance of X
Nyatakan dua kepentingan X

…….....

……

[2 marks]

For Examiner's Use

5(b)

(b) State two substances which are carried by the blood in Y, in the direction of the arrow.
Nyatakan dua bahan yang diangkut oleh darah di dalam Y mengikut arah anak panah.

……
[2 marks]

(c)

A pregnant woman of blood group A is having a foetus of blood group B.
Seorang perempuan hamil yang mempunyai darah kumpulan A mempunyai fetus yang berdarah dari kumpulan B.

Based on diagram 5.1 and the statement above , state whether agglutination will occur in the foetal blood or not. Explain your answer.
Berdasarkan rajah 5.1 dan pernyataan di atas, nyatakan samada penggumpalan akan berlaku atau tidak. Jelaskan jawapan anda.

5(c)

…….....
……
……
……
[2 marks]

(d) Diagram 5.2 shows a negative habit of a pregnant mother. .
Rajah 5.2 menunjukkan perlakuan t negatif seorang ibu yang sedang mengandung

Diagram 5.2
Rajah 5.2

Explain the effect of this habit to the foetus
Terangkan kesan perlakuan ini keatas fetus beliau

…….....

……..

……..

……..

……..

[3 marks]

5(d)

For Examiner's Use

(e) Diagram 5.3 shows the level of hormone progesterone and the thickness of the uterus lining.
Rajah 5.3 menunjukkan perubahan keatas aras hormon progesterone dan ketebalan dinding uterus.

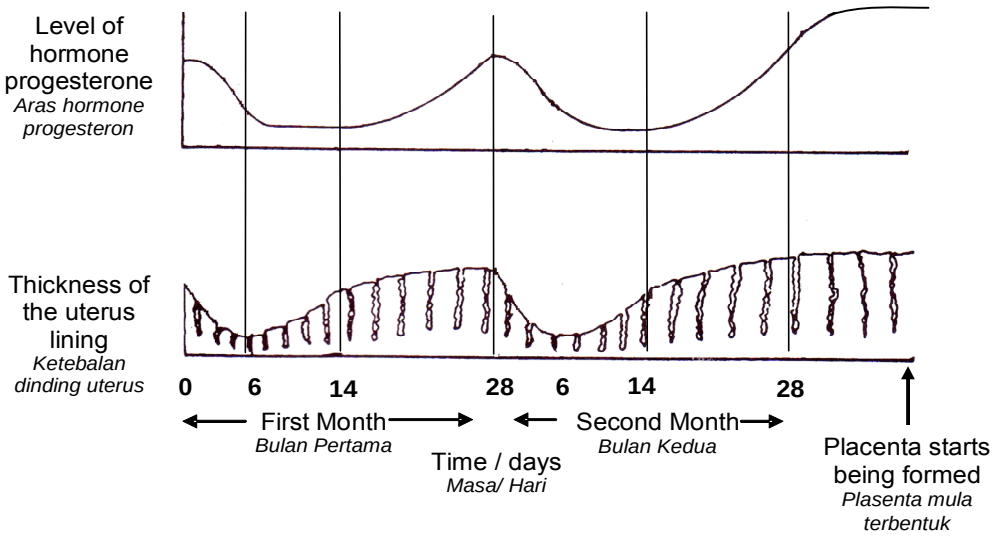


Diagram 5.3
Rajah 5.3

Based on diagram 5.3, explain the role of placenta as an endocrine gland.
Berdasarkan rajah 5.3, jelaskan peranan plasenta sebagai kelenjar endokrin

……

……

……

……

[3 marks]

5(e)

TOTAL

SECTION B
[40 marks]

Answer only **two** *question from this section*

6. (a) Diagram 6 shows movement of molecule P through a plasma membrane.
Rajah 6 menunjukkan pergerakkan molekul P melalui membran plasma.

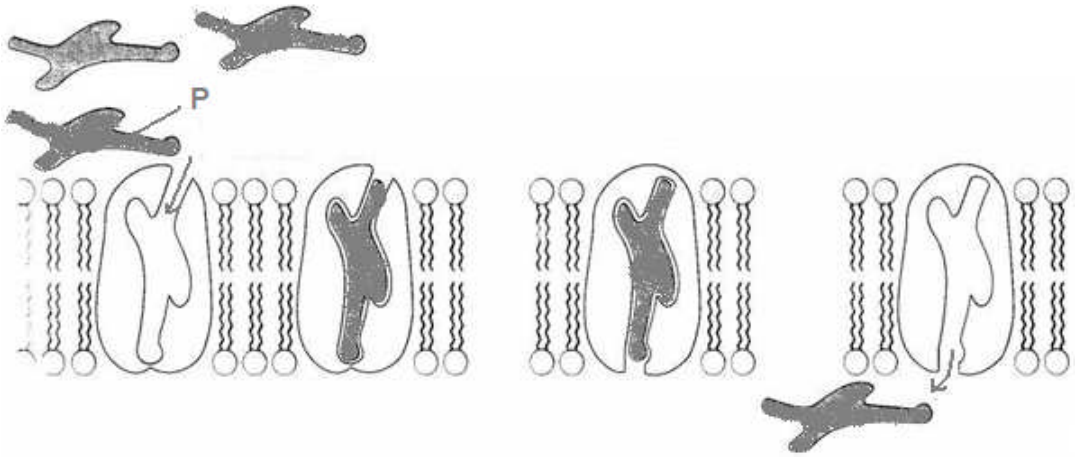


Diagram 6.1

Explain the movement of molecule P through the plasma membrane.
Terangkan pergerakkan molekul P melalui membran plasma.

[4 marks]

(b) Diagram 6.2 shows a bottle of food which has been preserved.
Rajah 6.2 menunjukkan sebotol makanan yang telah diawet.

Diagram 6.2

Explain the concepts applied in the preservation of the food.
Terangkan konsep yang digunakan dalam pengawetan makanan itu.

[6 marks]

(c) Small molecules such as carbon dioxide and oxygen can pass through the cell membrane easily.

Molekul kecil seperti karbon dioksida dan oksigen boleh melalui membran sel dengan mudah.

Based on the statement explain how gaseous exchange occurs in the alveoli and blood capillaries?
Berdasarkan pernyataan di atas terangkan bagaimana pertukaran gas berlaku di alveolus dan di kapilari darah.

[10 marks]

7. (a) Diagram 7.1 shows the diverse sources of food.



Diagram 7.1
Rajah 7.1

Explain how to achieve a balanced diet by consuming food from diverse source.
Terangkan bagaimana makanan yang yang seimbang boleh dicapai dengan mengambil makanan dari pelbagai sumber.

[4 marks]

(b) Diagram 7.1 shows a method in vegetable cultivation which does not involve the use of soil.
Rajah 7.1 menunjukkan kaedah penanam sayuran tanpa menggunakan tanah.

Diagram 7.1

Explain the technique .

Terangkan teknik itu

[6 marks]

(c) Diagram 7.2 shows the various processed food found on the market shelf.

Rajah 7.2 menunjukkan pelbagai jenis makanan yang telah diproses terdapat di pasaraya

Diagram 7.2

Explain the food processing methods which are related to the factors that cause food spoilage.
Terangkan kaedah pemprosesan makanan yang berkait dengan faktor yang menyebabkan makanan menjadi rosak.

[10 marks]

8. (a)(i) Diagram 8.1 shows how the required gene can be removed from a chromosome of a donor DNA and cloned in a bacterium using a genetic engineering technique.

Rajah 8.1 menunjukkan bagaimana gen yang dikehendaki di keluarkan dari DNA kromosom penderma dan diklonkan ke dalam bakteria menggunakan teknik kejuruteraan genetik.

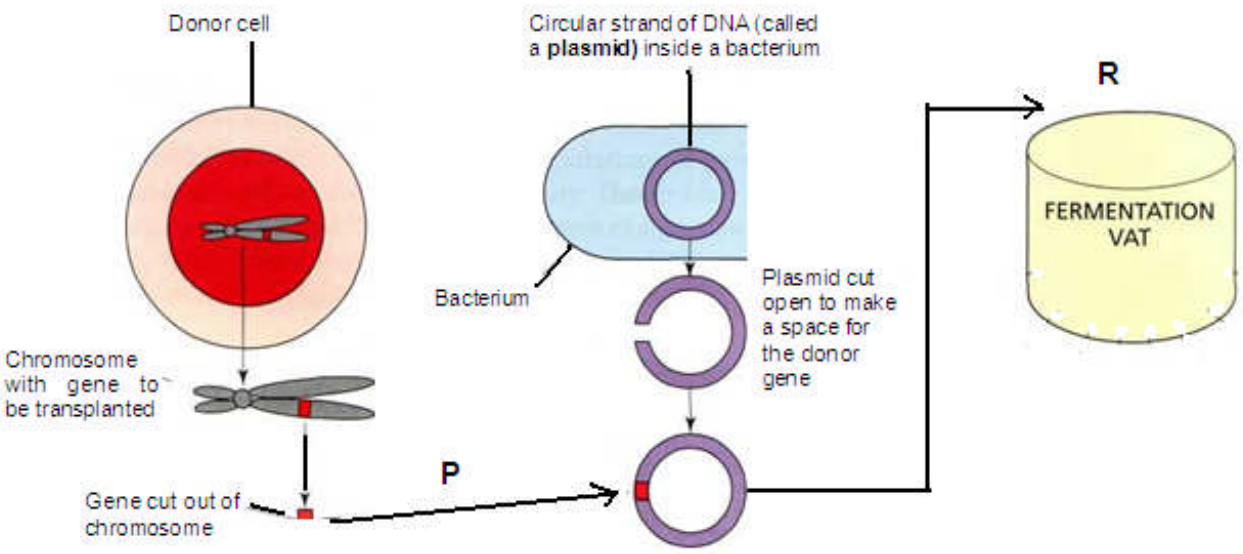


Diagram 8.1

Based on Diagram 8.1, define the concept of genetic engineering.

Berdasarkan Rajah 8.1 definasikan konsep kejuruteraan genetik

[4marks]

(ii) Diagram 8.2 shows two tomato plants which have been exposed to caterpillars. The normal plant has been completely eaten while the genetically engineered plant shows practically no signs of damage.

Rajah 8.2 menunjukkan dua pokok tomato yang telah didedahkan kepada beluncas. Pokok biasa telah dimakan habis oleh beluncas manakala pokok yang telah mengalami pengubahsuaian kandungan genetiknya tidak dimakan oleh beluncas.

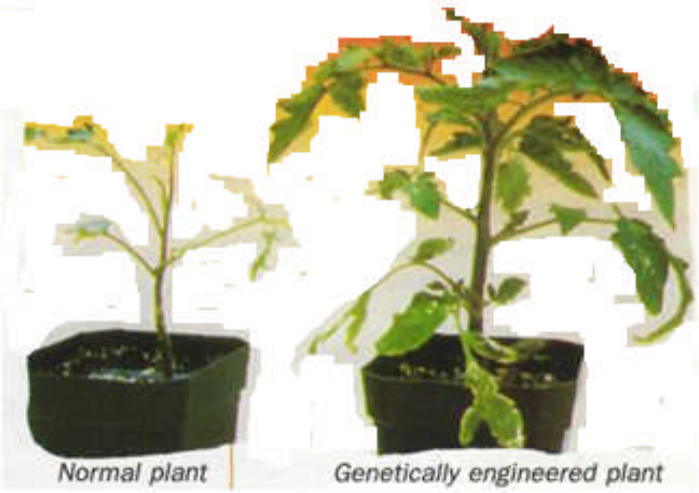


Diagram 8.2

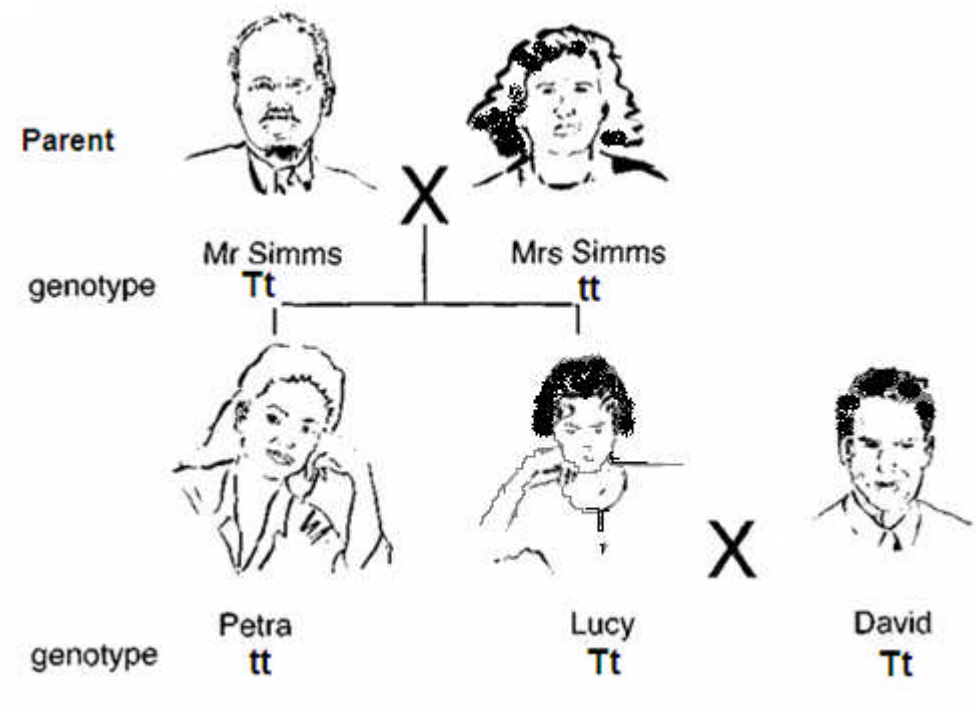
Discuss the benefits and the risks of using the genetically engineered organisms in agriculture and food production .

Bincangkan faedah dan risiko menggunakan organisma yang terubahsuai kandungan genetiknya dalam pertanian dan penghasilan makanan.

[10 marks]

(b) Thalassaemia is a disease passed on genetically by a recessive allele.
The allele for the normal condition is T.
The allele for. thalassaemia is t

Thalassaemia ialah sejenis penyakit yang diturunkan secara genetik oleh alel resesif.
Alel untuk keadaan normal ialah T
Alel untuk thalassaemia ialah t



Explain what thalassaemia is .
Draw the schematic diagram to show the possible genotype of the offsprings if Lucy and David have children.

Terangkan apakah thalassaemia .
Lukiskan rajah skema untuk menunjukkan genotip yang mungkin jika Lucy dan David mempunyai anak.

[6 marks]

9. (a)

When blood flows through a vessel, it exerts pressure against the walls of the blood vessel. This pressure is called blood pressure.

Apabila darah mengalir dalan salur darah , tekanan dihasilkan terhadap dinding salur darah itu. Tekanan itu dipanggil sebagai tekanan darah.

Explain how blood pressure is maintain at normal level.

Terangkan bagaimana tekanan darah ditetapkan pada aras normal.

[10 marks]

(b) Explain how a healthy lifestyle leads to a healthy cardiovascular system

Terangkan bagaimana cara hidup yang sihat membawa kepada sistem kardiovaskular yang sihat.

[10 marks]

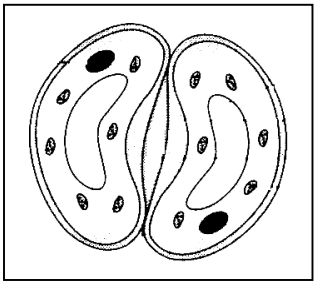
END OF QUESTION PAPER

JABATAN PELAJARAN NEGERI MELAKA
MARKING SCHEME
BIOLOGY PAPER 2
TRIAL EXAMINATION SPM 2008

SECTION A

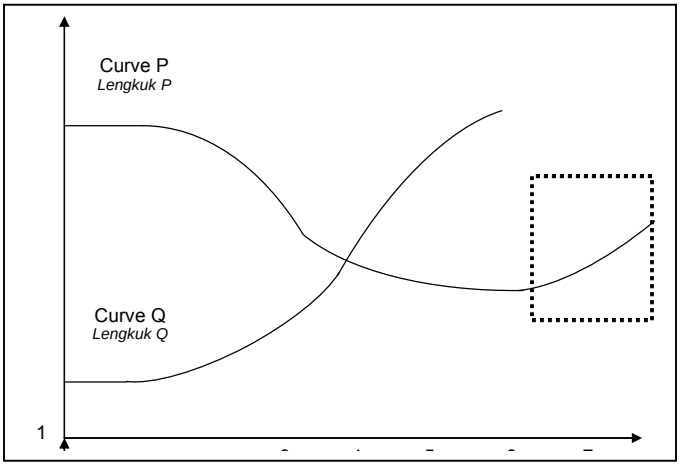
QUESTION 1

Question	Marking criteria	Marks	
1(a)(i)	Able to name tissues P,Q and R **correctly** Answer P: Xylem tissue Q: Epidermal tissue R: Phloem tissue	 1 1 1	 3
(ii)	Able to state the function of P and R **correctly** Sample answer P : To transport water and dissolved minerals from the roots to other parts of a plant /the leaf // To provide mechanical support R : To transport organic compounds from the leaf to other parts of the plant.	 1 1	 2
(iii)	Able to state a structural feature of tissue P and R to enable them to function efficiently. Sample answer: P : 1. P consists of xylem vessels joined together end to end 2. Cell P does not have any cytoplasma 3. The cell walls are thickened with lignin R : 1. P consists of sieve tubes arranged end to end 2. Sieve tubes have sieve plates to allow continous flow of organic compound. NOTE: CHOOSE ANY **ONE** STRUCTURAL FEATURE OF P AND Q.	 1 1 1 1 1	 1 1

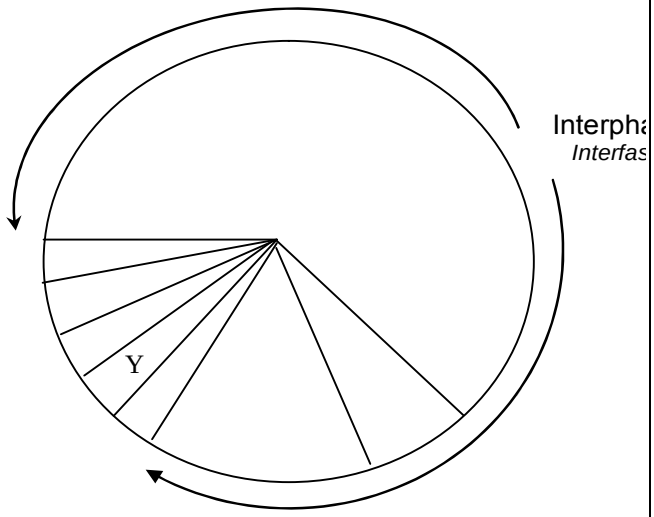
			2
1 (b)	Able to state another one organ which forms system X <u>Suggested answers:</u> 1. Stems 2. Buds 3. Flowers 4. Fruits NOTE : CHOOSE ANY TWO ORGANS	 1 1 1 1	 2
(c)(i)	Able to draw cell Y 	1	1
(c) (ii)	Able to role of cell Y in increasing the rate of photosynthesis <u>Sample answer.</u> P1 : When the light intensity is high, the guard cells bend outwards P2 : This causes the stomata to open and allow more carbon dioxide to enter the leaf	 1 1	 2
	TOTAL MARKS		12

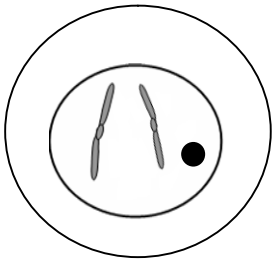
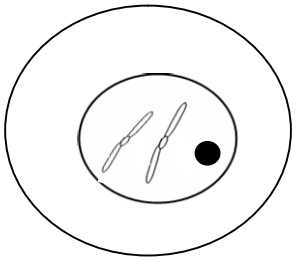
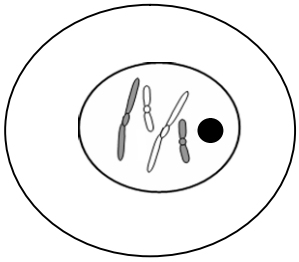
<u>QUESTION 2</u>

Question	Marking criteria	Marks	
2(a)(i)	Able to label S and T **correctly** <u>Answers</u> S : Primary structure T : Tertiary structure	 1 1	 Max 1
(ii)	Able to state compound X **correctly** <u>Answer</u> Protein	 1	 1
(iii)	Able to state the monomer of the structures in diagram 2.1 **correctly** <u>Answer</u> Amino acid	 1	 1
(b)	Able to explain the effect on the **digestive** system <u>Sample answer:</u> F1 : The compound X is the pancreatic juices // enzymes // lipase // tripsin // protease // pancreatic amylase P2 : Lipids cannot be digested completely P3 : Starch cannot be digested completely P4 : Polypeptides cannot be digested Completely Note : F1 + any 2 Ps	 1 1 1 1	 1 Max 2 3

(c) (i)	Able to state the curve which represents the amount of substrate <u>Answer</u> Curve P	 1	 1
(ii)	Able to explain why curve P is taken to represent the amount of substrate <u>Sample answer</u> P.1 Curve P is plotted downwards P2. This shows the amount of substrate is decreasing P3. This is due to the substrate being hydrolyzed by the enzyme.	 1 1 1	 Max 2
(iii)	Able to plot curve P correctly  	1	1
(iv)	Able to explain the shape of curve P in (c)(iii) <u>Sample answer</u> P.1 When photosynthesis occurs, shoots will start to produce sugars which is later stored as starch P2. This causes an increase in the amount of substrate	 1 1	 2
	TOTAL MARKS		12

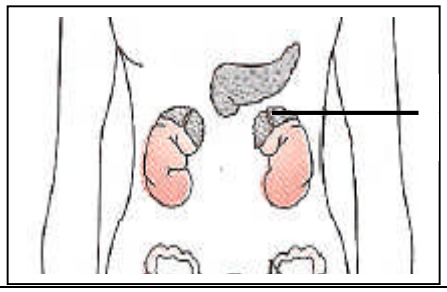
QUESTION 3

Question	Marking criteria	Marks	
3 (a)(i)	Able to state the type of cell division **correctly** Answer P : Meiosis Q : Mitosis	 1 1	 2
(ii)	Able to state one functional difference between the two cell divisions mentioned in (a)(i) Sample answer P : Meiosis is important in producing gametes Q : Mitosis is important in replacing dead // damaged cells // asexual reproduction // increasing the number of cells (growth)	 1 1	 2
(b)	Able to label the stage shown by cell Q with a letter Y Answer  	1	1

(c)	Able to draw a daughter cell of P and Q correctly <u>Answer</u>  Or  Cell P NOTE : Number of chromosome ,n = 2. The type (colour) of chromosomes	1 1	2
	 Cell Q NOTE : Number of chromosome ,2n = 4. The type (colour) of chromosomes	1 1	2

(d)	Able to explain the effect if structure X fails to be formed F1 : Structure X is the spindle fibre P2 : If structure X fails to be formed, chromosomes cannot be pulled to the opposite poles. P3 : This causes the reproductive cells to have either extra or less number of chromosomes.	 1 1 1	 3
	TOTAL MARKS		12

QUESTION 4

4 (a) (i)	Able to name the hormone secreted by gland P Answer P : Thyroxine Q : ADH // FSH // LH	 1 1	 2
(a) (ii)	Able to state the condition caused by the growth of gland P Answer Goiter	 1	 1
(a) (iii)	Able to suggest how to overcome the problem in (a)(ii) Taking enough iodine in our diet	 1	 1
(b)	Able to label adrenal gland with letter S correctly. Answer 	 1	 1

(c)	Able to explain the role of gland R in regulating the person blood glucose concentration from 0 minute to 90 minutes <u>Sample Answer</u> P1 : From 0 to 60 minutes, the blood glucose level increases more than the normal level P2 : Islet cells in gland R is stimulated to secrete insulin P3 : Insulin stimulates the conversion of excess glucose to glycogen (in the liver) P4 : This causethe glucose level to return to the normal level at the 90th minute	1 1 1 1	Max 3
(d) (i)	Able to state the person's blood osmotic pressue based on the situation given <u>Answer</u> The blood osmotic pressure increases	1	1
(d) (ii)	Able to explain how gland Q involves in returning the osmotic pressure of the blood to normal levels. <u>Sample answer</u> P1 : The osmoreceptor detects the increase in the osmotic blood pressure P2 : Gland P is stimulated to release more ADH P3: ADH is transported by blood to the kidneys P4 : ADH increases the permeability of the wall of distal convoluted tubule and collecting ducts P5 : More water is reabsorbed from the filtrate into the blood	1 1 1 1 1	Max 3
	TOTAL MARKS		12

QUESTION 5

5 (a) (i)	Able to label X correctly Answer Amniotic fluid	 1	 1
(a)(ii)	Able to state two importance of X Answer 1. To protect the fetus by absorbing shock 2. To cushion the fetus from physical damage	 1 1	 2
(b)	Able to state two substances which are carried by the blood in Y, in the direction of the arrow. Answer 1. Carbon dioxide 2. Nitrogenous waste products	 1 1	 2
(c)	Able to state whether agglutination will occur in the foetal blood or not Answer No Able to explain the answer given Sample answer The foetal circulatory system and the maternal circulatory system are separated // not directly connected (due to the presence of the placenta)	 1 1	 2
(d)	Able to explain the effect of **smoking** to the foetus Sample answer: P1 : Cigarette contain nicotine / DDT / lead particles.	 1	

	P2 : Nicotine are small in sizes so it can diffuse from maternal blood capillaries to foetal blood capillaries through the placenta P3 : The substances are carried by umbilical vein to the foetus. P4 : The substances can cause miscarriage // birth defect // illness in the resulting baby	1 1 1 Max	3
(e)	Able explain the role of placenta as an endocrine gland. <u>Sample answer</u> P1 : After the placenta is formed, it secretes progesterone P2 : The level of progesterone continues to increase P3: The hormone maintains the thickness of the uterus lining	1 1 1	3
	TOTAL MARKS		12

<u>QUESTION 6</u>

6.	Able to explain the movement of molecule P through the plasma membrane. <u>Sample Answer</u> F: Facilitated diffusion P1: P molecule binds to the active site of the carrier protein P2: then changes it shape P3: to allows the molecule to pass through the other side of the plasma membrane P4: down the concentration gradient Any four	 1 1 1 1 1	4

(b)	Able to explain the concepts applied in the preservation of food. <u>Sample Answer</u> P1: excess sugar make the solution outside the mango cells / tissues more <u>hypertonic</u> compare to the mango cells P2: causes <u>water molecules</u> to diffuse out of the cell through <u>plasma membrane</u> P3: by osmosis P4: the mango cells become <u>dehydrated</u> P5: (at the same time) microorganisms <u>lose water by osmosis</u> P6: the acid (vinegar) <u>lower the pH medium</u> P7: which is <u>unfavourable for growth</u> of microorganisms (and eventually die) Any six	1 1 1 1 1 1 1 1	6
(c)	Able to explain explain how gaseous exchange occurs in the alveoli and blood capillaries <u>Sample answer:</u> P1: Gas exchange is driven by diffusion // Diffusion of a gas depends on differences in partial pressure between the two regions P2: thus does not require energy (for exchange). P3: The molecules move down a concentration gradient. P4: Oxygen moves from the alveoli which is high oxygen concentration P5: to the blood which has lower oxygen concentration P6: due to the continuous consumption of oxygen in the body. P7: Conversely, carbon dioxide is produced by metabolism P8: has a higher concentration in the blood than in the air of alveoli P9: carbon dioxide diffuses out of the blood capillaries into the alveoli P10: Oxygen in the lungs first diffuses through the alveolar wall and dissolves in the blood plasma. P11: then diffuse into red blood cells P12 (Oxygen) bind to hemoglobin. P13: allows a greater amount of oxygen to be transported in the blood		

	Any ten points		10
	TOTAL MARKS		20

QUESTION 7

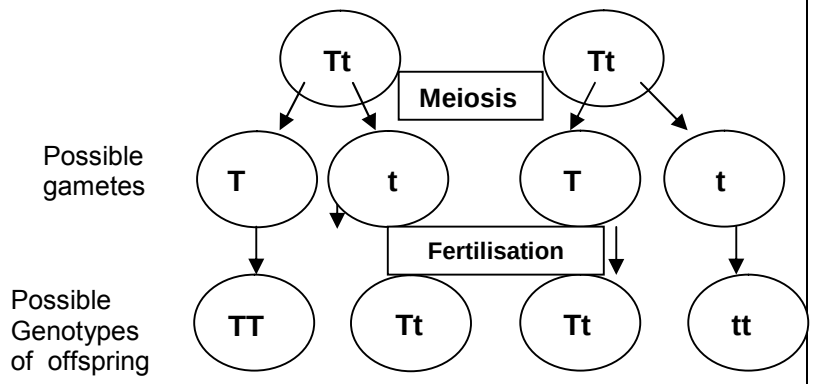
7.(a)	Able to explain how to achieved a balanced diet by consuming food from diverse source. Sample Answer P1: Ulam type of salad include fresh leaves/fruits/other plant parts which are eaten raw P2: rich in mineral ions, vitamins and fibre P3: other sources of protein rabbit meat/quail meat/ostrich meat/freshwater fish / prawn P4: rabbit meat is rich in protein but low in fat and cholesterol / the meat has soft texture // ostrich meat is nutritious // fresh water fish low in cholesterol, the protein is easily digestable P5: mushrooms have high nutrient content Any four	1 1 1 1 1	4
(b)	Able to explain the technique use to cultivate vegetable Sample Answer F: Hydroponic (Name of the technique) P1: grow plants in culture solutions P2: the root of the plants are immersed in solution P3: which contains all the macronutrient P4 and micronutrient in the correct proportion P5: the culture solution is aerated P6: to provide suffient oxygen for respiration Any six	1 1 1 1 1 1	6

(c)	Able to explain the food processing methods which is related to the factors that cause food spoilage. <u>Sample answer:</u> Concept : Food can be preserved by destroying the microorganism present in the food // by stopping the activities of the microorganism F1: Cooking-.high temperature kill the microorganisms P1: denature the enzyme that cause the breadown of food F2: Treating food with sugar/salt P2: causes the microoganism to lose water due to osmosis F3: Adding vinegar will reduced the pH P3 that prevent microorganism from growing F4: Fermentation of fruit juices and other food by adding yeast P4: high concentration of alcohol prevent the microorganism from growing F5: Dry under hot sun (meat/fish/fruits) P5: removes water from food – dehydrated F6: Ultravoilets rays P6: kills microorganism F7: Pasteurisation – destroy bacteria which cause tuberculosis and typhoid P7: (technique) -Food is heated to 63^0C for 30 minutes / 72^0C for 15 seconds followed by rapid cooling to -10 ^{0}C P7.1: (Pasteurisation) retains the natural flavour and nutrients F8: Canning – uses heat sterilization to kill microorganisms and their spores P8 (technique) -.Food is packed in cans, steamed at high temperature and pressure to drive out air P8.1: the vaccum created within the cans prevent growth of microorganism F9: Refrigeration P9: food stored at temperature below 0^0C prevent growth/germination of microorganism P9.1: food remain fresh for a long period of time Any ten : F + P correctly	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	10
	TOTAL MARKS		20

QUESTION 8

8. (a) (i)	Able to explain the concept of genetic engineering Sample Answer P1: the technique used to extract, P2: to separate P3: to transfer / insert P4: gene from other organism / donor P5: to another organism Any four	 1 1 1 1 1	4
(b)	Able to discuss the benefits and the risks of using the genetically engineered organisms in agriculture and food production Sample Answer The benefits F1: Genetic engineering used to produce disease resistant/ pest resistant plants e.g legumes, peas , maize and beans P1.1: Less pesticides are used P1.2: less pollution to the environment // better health for consumers. F2: Increase yield of crops / profitability P2.1: better livelihood for farmers. P2.2: help to solve problems of insufficient food F3: Increase resistance to herbicide eg. soya bean P3: which allows weeds to be killed without affecting the crop plant F4: Able to survive on poorer quality grassland P4: can resist drought //climatic changes . F5 : create crops with better nutrition value e.g tomatoes P5.1: with higher vitamin A content P5.2: help to solve problems of malnutrition. F6: create crops with longer shelf lives e.g tomato P6: less food wastage	 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	

	F7 : genetically modified livestock e. g cows P7: produce meat with less fat / more milk. Any six points (F/ P)	1 1 6	
	<u>The risks</u> F8: Pest resistant genes may be transferred to weeds P8: may be difficult to control growth of weeds. F9: Some transgenic crops may have animal genes P9 : this may not be acceptable to certain groups for religious reasons. F10: Genetically modified foods may be harmful to health P10: may activate human genes to cause cancer. F11: Transgenic organisms may affect the survival of other organisms in the ecosystem. P11: may cause the imbalance of nature / ecosystem Any four points (F/P)	1 1 1 1 1 1 1 1 4	10
(c)	Able to explain what thalassaemia is . <u>Suggested Answer</u> P1: Thalassemia is an inherited blood disorder that causes the body to produce less <u>hemoglobin</u>. P2: <u>Hemoglobin</u> helps red blood cells spread oxygen all through the body. P3: Low levels of hemoglobin may cause anemia, / feel weak and tired. / may damage organs and result in death. Any two	1 1 1	2

	Able to draw the schematic diagram to show the possible genotype of the offspring if Lucy and David have children. <u>Sample answer:</u> Parent Lucy **X** David  Possible gametes Possible Genotypes of offspring Ratio : 3 normal : 1 thalassemia Any four	1 1 1 1 1 4	6
	TOTAL MARKS		20

QUESTION 9

9.(a)	Able to explain how blood pressure is maintain at normal level. **Criteria:** C1: Definition of blood pressure C2: Name of the mechanism C3: Cardiovascular centre C4 : The responses - if increases / decreases <u>Sample Answer</u> **F1: Blood pressure is the force that drives blood through arteries and capillaries** P1.1: higher pressure in the systole / contraction stage P1.2: lower pressure in diastole / relaxation stage **F2: Regulated by negative feedback mechanism.** P2.1: Baroreceptors or pressure receptors located in the arch of aorta and arteries P2.2: carotid arteries, detect blood pressure flowing through them P2.3: to the cardiovascular centre in the medulla oblongata **F3: If blood pressure increases** P3.1: baroreceptors send impulses to the cardiovascular centre at a faster rate P3.2 sends nerve impulses to the heart P3.3 results in a weaker cardiac muscle contraction P3.4 the smooth muscles of the arteries will relax P3.5 this decreases the resistance of blood flow in the blood vessels P3.6 by widening of blood vessels / vasodilation P3.7 lower the blood pressure / back to the normal value. **F4: If blood pressure falls /decreases** P4.1 baroreceptors are less stimulated P4.2 send nerve impulses at a slower rate to the cardiovascular centre P4.3 cardiovascular centre sends nerve impulses to the heart P4.4 that results in a stronger cardiac muscle contraction. P4.5 The smooth muscles of the arteries contract		

	P4.6 increases the resistance of blood flow in the blood vessels P4.7 narrowing of blood vessels / vasoconstriction P4.8 increase the blood pressure / back to the normal value Any ten points		10
(b)	Able to explain how a healthy lifestyle leads to a healthy cardiovascular system. Criteria: C1 What are cardiovascular diseases C2 Factors contribute to cardiovascular disease C2 Ways to ensure a healthy cardiovascular system <u>Sample answer:</u> <u>(F1: What are cardiovascular diseases)</u> P1.1 Cardiovascular diseases are disorders of the heart / the blood circulatory system P1.2: Examples - coronary thrombosis/atherosclerosis / heart attack/hypertension/embolism / angina <u>(F2: Factors – due to)</u> P2: genetic / family history /age P2.1: the type of food we eat / bad eating habits P2.2: diet high in fats/ cholesterol and low in fibre P2.3: deficiencies in antioxidant vitamins and minerals P2.4: sedentary lifestyle / lack of exercise P2.5: stress / cigarette smoking P2.6: obesity / diabetes <u>(F3: Ways to ensure a healthy cardiovascular system)</u> P3.1: A healthy lifestyle - regular exercise and a proper balanced diet P3.2: Avoid / minimize-excess sugar - high in calories P3.3 Avoid / minimize processed foods - harmful artificial substances P3.4: Avoid /r minimize foods that contain hydrogenated or	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	

	partially hydrogenated fats and trans fatty acids		
	P3.5: Consumption of such foods will cause cardiovascular diseases	1	
	P3.6: Do not cook meat or fat at high temperatures	1	
	P3.7: (Such practice will) avoid fat and cholesterol oxidation	1	
	P3.8 (responsible for) build up of arterial plaque / injury to arterial cells	1	
	P3.9: Eat less - only when hungry / do not overeat	1	
	P3.10: Adequate fiber intake help prevent cardiovascular diseases (heart and stroke)	1	
	Any ten points		10
	TOTAL MARKS		20