SECTION A
Bahagian A

[60 marks]
[*60 markah*]

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

1 Diagram 1.1 shows the structure of a plant cell.
Rajah 1.1 menunjukkan struktur satu sel tumbuhan.

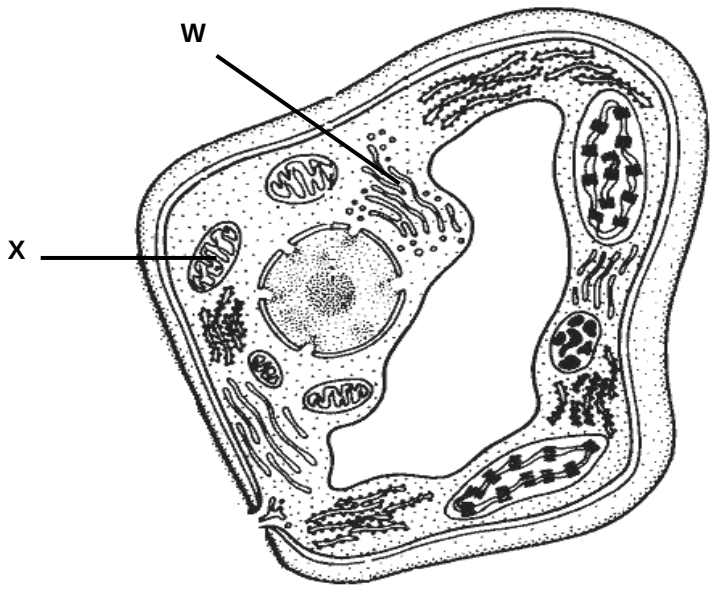


Diagram 1.1
Rajah 1.1

(a) (i) Based on Diagram 1.1, name organelle W and X.
Berdasarkan Rajah 1.1, namakan organel W dan X.

W:.....

X: .....

[2 marks / *markah*]

(ii) State two functions of organelle W.
Nyatakan dua fungsi organel W.

i) ……....

……

ii) ……

……

[2 marks / *markah*]

(b) Meristematic tissues and mesophyll tissues are two different tissues with different functions which are found in most plants.
Tisu meristem dan tisu mesofil adalah dua tisu berlainan dengan fungsi yang juga berbeza yang ditemui dalam kebanyakan tumbuhan.

(i) Name one organelle which is abundantly found in each tissue and state its function respectively in the box provided below.
Namakan satu organel yang ditemui dengan banyaknya di dalam setiap tisu tersebut serta nyatakan fungsi masing-masing di dalam kotak yang disediakan di bawah.

Tissue *Tisu*	Organelle *Organel*	Function of organelle *Fungsi organel*
Meristematic tissue *Tisu meristem*		
Mesophyll tissue *Tisu mesofil*		

[4 marks / *markah*]

(c) Diagram 1.2 shows the structure of *Paramecium* sp. which are found abundantly in freshwater ponds.
Rajah 1.2 menunjukkan struktur Paramecium sp. yang banyak ditemui di dalam kolam air tawar.

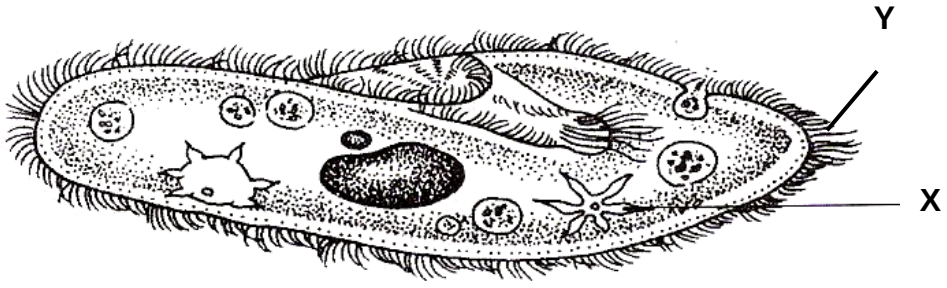


Diagram 1.2
Rajah 1.2

Explain the function of X and Y in enabling the organism to carry out its living processes.
Terangkan fungsi X dan Y yang membolehkan organisma meneruskan proses kehidupannya.

X :

……

……

[2 marks / *markah*]

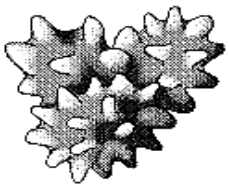
Y:

……

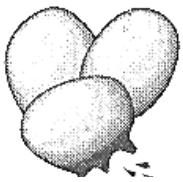
……

[2 marks / *markah*]

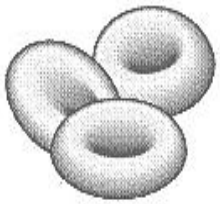
2 Diagram 2.1 shows the shape of red blood cells after being immersed for 30 minutes in three solutions with different concentration.
Rajah 2.1 menunjukkan bentuk sel darah merah selepas direndam selama 30 minit dalam tiga larutan yang berbeza kepekatannya.



Red blood cells in K solution
Sel darah merah dalam larutan K



Red blood cells in L solution
Sel darah merah dalam larutan L



Red blood cells in M solution
Sel darah merah dalam larutan M

Diagram 2.1
Rajah 2.1

(a) (i) State the condition of the red blood cells after being immersed in :
Nyatakan keadaan sel darah merah selepas direndam di dalam:

Solution K/*Larutan K*:.....

Solution L//*Larutan L*:.....

[2 marks/ *markah*]

(ii) Name the type of solution M in which the red blood cells are immersed.
Namakan jenis larutan M yang mana sel darah merah direndam.

.....

[1 mark/ *markah*]

(iii) Explain your answers given in a(ii)
Terangkan jawapan yang anda berikan di a(ii)

.....

.....

.....

[3 marks / *markah*]

(b)

Food such as mushrooms, fruits, vegetables and fish can be preserved longer by using natural preservatives such as salt, sugar and vinegar. *Makanan seperti cendawan, buah-buahan, sayur-sayuran dan ikan boleh diawet untuk tahan lama menggunakan bahan-bahan pengawet semulajadi seperti garam,gula dan cuka.*

Based on the statement, explain why vinegar is suitable to be used as the natural preservative for the preservation of petai.

Berdasarkan pernyataan di atas, terangkan mengapa cuka adalah sesuai digunakan sebagai pengawet semulajadi untuk petai.

.....

.....

.....

[3 marks / *markah*]

(c) Diagram 2.2 shows the condition of herbaceous plant due to water shortage in soil.
Rajah 2.2 menunjukkan keadaan pokok herba disebabkan oleh kekurangan air dalam tanah.

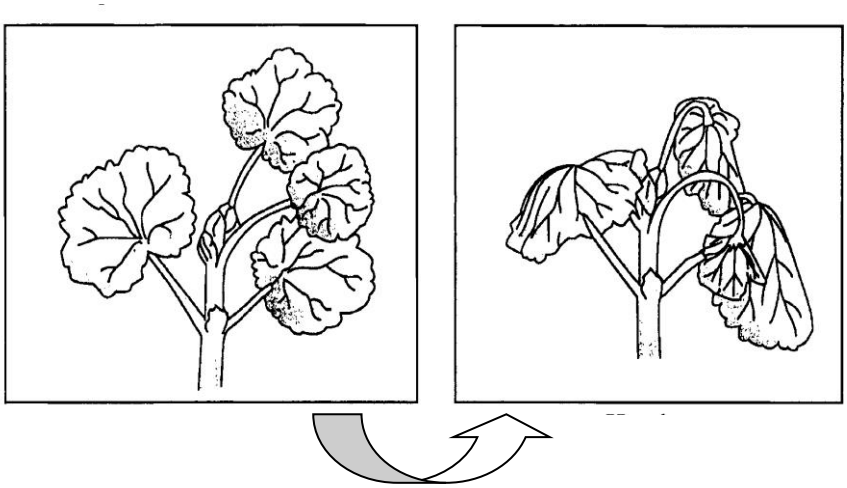


Diagram 2.2
Rajah 2.2

Explain the condition of the plant in Diagram 2.2 after seven days.
Terangkan keadaan pokok dalam Rajah 2.2 selepas tujuh hari.

.....

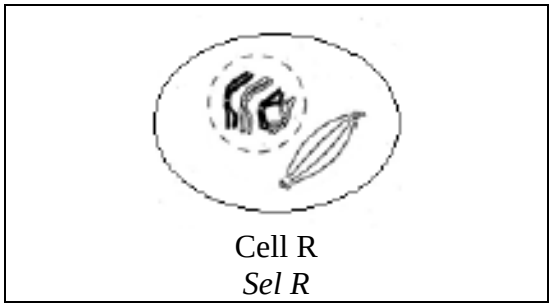
.....

.....

…….....

[3 marks/ *markah*]

3 Diagram 3.1.1 shows cell R in one stage of a type of cell division in the ovary of a woman.
Rajah 3.1.1 menunjukkan sel R yang berada dalam satu peringkat suatu pembahagian sel di dalam ovari seorang wanita.



Cell R
Sel R

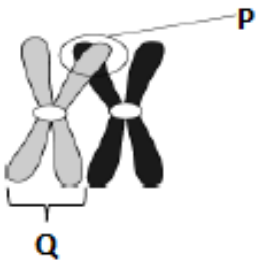
Diagram 3.1.1 / *Rajah 3.1.1*

(a) (i) Name the type of cell division in Diagram 3.1.1
Namakan jenis pembahagian sel dalam Rajah 3.1.1

…….....

[1 mark / *markah*]

(ii) Diagram 3.2.1 shows the behaviour of homologous chromosomes in cell R.
Rajah 3.2.1 menunjukkan perlakuan kromosom homolog dalam sel R.

 Early stage *Peringkat awal*	Late stage *Peringkat akhir*
Diagram 3.2.1/ *Rajah 3.2.1*	Diagram 3.2.2 / *Rajah 3.2.2*

Name part labeled P and Q.
Namakan bahagian berlabel P dan Q.

P : …….

Q : …….

[2 marks / *markah*]

(iii) Explain the process that has taken place at P.
Terangkan proses yang berlaku di bahagian P.

……

……

……

[2 marks/*markah]*

(iv) Draw the diagram of the chromosome behavior in the space provided in Diagram 3.2.2 after process at P has taken place.

Lukiskan rajah perlakuan kromosom pada ruang yang disediakan dalam Rajah 3.2.2 selepas proses di P selesai.

[1 mark/ *markah*]

(v) Draw the diagram of a daughter cell produced in the space provided below after the cell division in cell R completed.
Lukiskan rajah sel anak yang akan dihasilkan dalam ruang yang disediakan di bawah apabila pembahagian sel R itu selesai.

[1mark / *markah*]

(b) Diagram 3.3 shows a karyotype of an offspring produced when a pair of homologous chromosomes fail to separate during the cell division.
Rajah 3.3 menunjukkan kariotip bagi anak yang dihasilkan apabila sepasang kromosom homolog gagal berpisah semasa pembahagian sel.

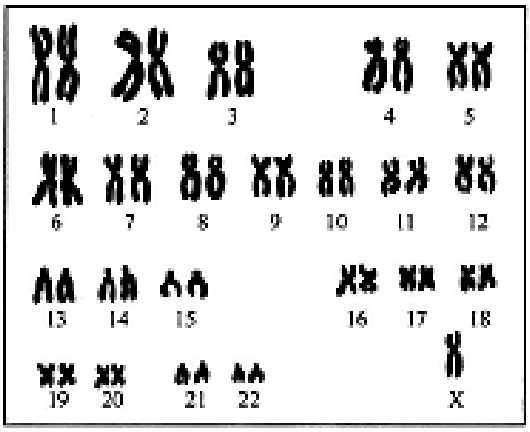


Diagram 3.3 / *Rajah 3.3*

(i) State the total number of chromosomes in the offspring.
Nyatakan jumlah bilangan kromosom dalam anak yang dihasilkan.

……

[1 mark / *markah*]

(ii) Explain the genetic disease suffered by the offspring.
Terangkan penyakit genetik yang dihadapi oleh anak tersebut.

……..

……..

[2 marks / *markah*]

(c) Diagram 3.4 shows a method that has been practiced by farmers to plant tapioca plant.

Rajah 3.4 menunjukkan satu kaedah yang diamalkan oleh para petani untuk menanam pokok ubi kayu.

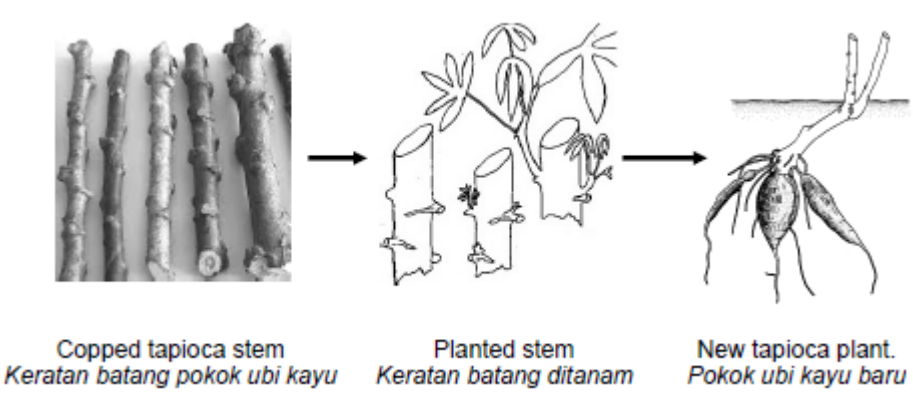


Diagram 3.4
Rajah 3.4

(i) Name the type of cell division involved in this vegetative reproduction.
Namakan jenis pembahagian sel yang terlibat dalam pembiakan vegetatif ini.

……

[1 mark / *markah*]

(ii) State one advantages of this method in agriculture.
Nyatakan satu kebaikan bagi kaedah ini dalam pertanian.

……

……

[1 mark / *markah*]

4 Diagram 4.1 shows the blood group in Encik Nabil family .
I^A and I^B are codominant alleles while I^O is the recessive allele in blood group inheritance.
Rajah 4.1 menunjukkan kumpulan darah dalam keluarga Encik Nabil.
Alel I^A dan I^B ialah alel kodominan manakala alel I^O ialah alel resesif dalam pewarisan kumpulan darah.

Encik Nabil (Husband) (*Suami*)  Blood group AB *Kumpulan darah AB*	Puan Nadia (Wife) (*Isteri*)  Blood group O *Kumpulan darah O*
Naufal (Son) (*Anak lelaki*)  Blood group B *Kumpulan darah B*	Natasha (Daughter) (*Anak perempuan*)  Blood group B *Kumpulan darah B*

Diagram 4.1
Rajah 4.1

(a) Why allele I^A and allel I^B is known as codominant allele?
Kenapa alel I^A dan alel I^B dikenali sebagai alel kodominan?

…….....

[1 mark / *markah*]

(b) Explain how Natasha inherits blood group B from her parent.
Terangkan bagaimana Natasha mewarisi kumpulan darah B daripada ibu bapanya.

…….....

…….....

…….....

…….....

[3 marks / *markah*]

(c) Puan Nadia is pregnant for her third child.
Predict the possible phenotypic ratio of her third child by completing the Punnet square below.
Puan Nadia sedang hamil anak ketiga.
Ramalkan nisbah fenotip yang mungkin untuk anak ketiga beliau dengan melengkapkan segiempat Punnet di bawah.

Punnet square
Segiempat Punnet

Male gamete / *Gamet jantan* Female gamete / *Gamet betina*		

Phenotypic ratio : …….
Nisbah fenotip :

[3 markah / *marks*]

(d) Encik Nabil lost a lot of blood due to a car accident. He needs to undergo blood transfusion.
Suggest the suitable blood donor among his family members in Diagram 4.1.
Explain your suggestion.

Encik Nabil telah kehilangan darah yang banyak akibat kemalangan kereta. Beliau perlu menjalani pemindahan darah.
Cadangkan penderma darah yang sesuai dalam kalangan ahli keluarganya dalam Rajah 4.1.
Terangkan cadangan anda.

…….....

……

……

[2 marks / *markah*]

(e) Diagram 4.2 shows the karyotypes of Naufal and Natasha.
Rajah 4.2 menunjukkan kariotip Naufal dan Natasha.

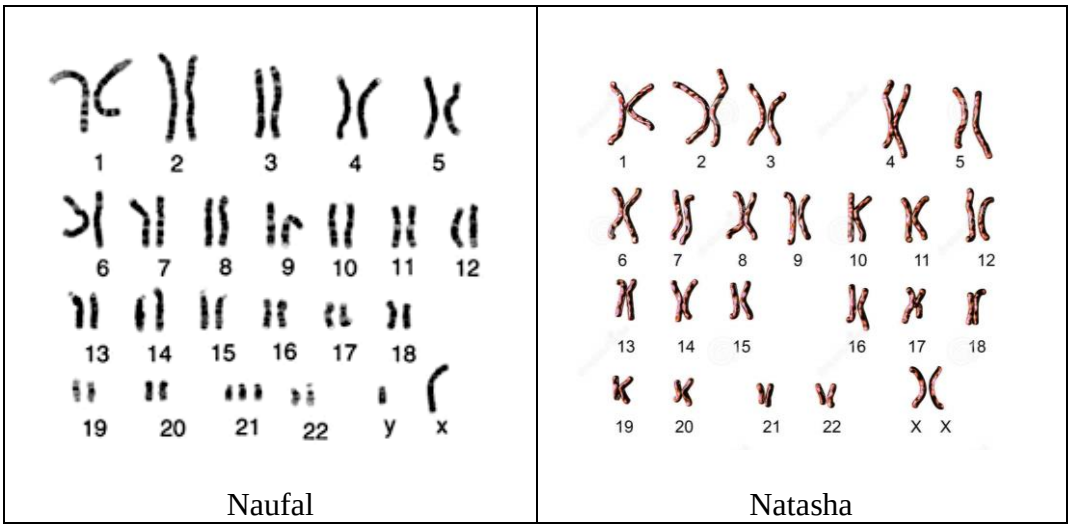


Diagram 4.2
Rajah 4.2

Based on Diagram 4.2, give three differences of the genetic characteristics of Naufal and Natasha.
Berdasarkan Rajah 4.2, berikan 3 perbezaan ciri genetik Naufal dan Natasha.

Naufal	Natasha

[3 marks / *markah*]

5 Diagram 5 shows a river ecosystem.
Rajah 5 menunjukkan satu ekosistem sungai.

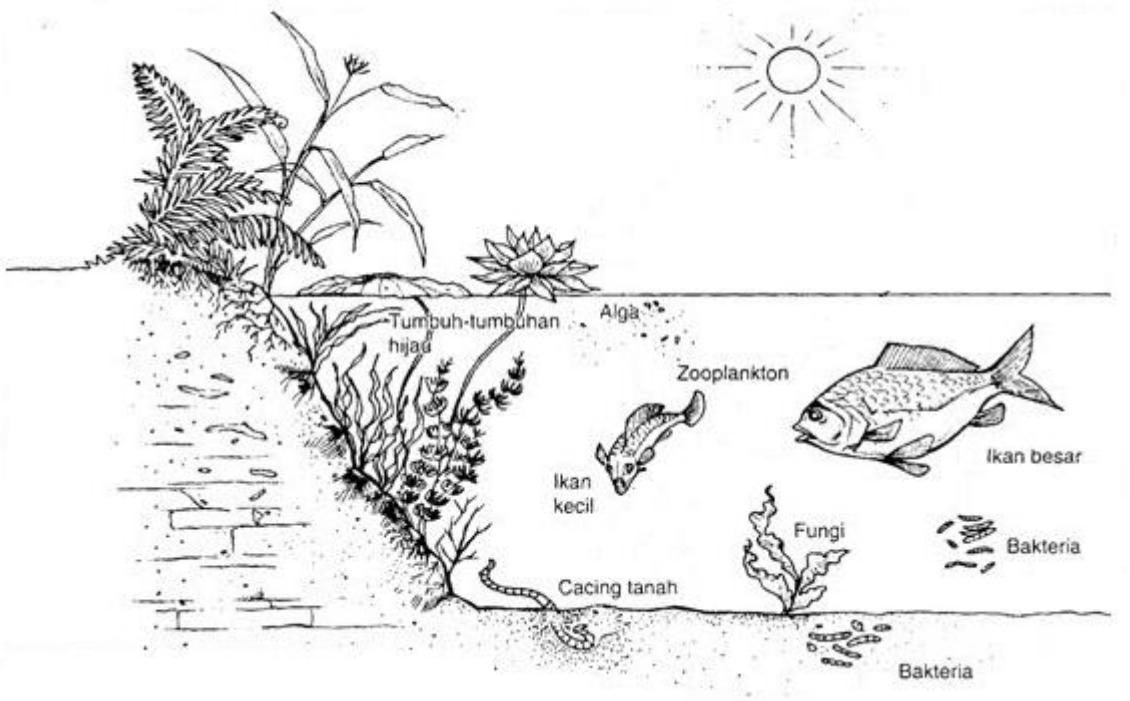


Diagram 5 /*Rajah 5*

(a) (i) Based on Diagram 5 name one biotic factor and one abiotic factor in the ecosystem.
Berdasarkan Rajah 5 namakan satu faktor biosis dan satu faktor abiosis dalam ekosistem di atas.

Biotic factor:
Faktor biosis :

……....

Abiotic factor:
Faktor abiosis :

……....
[2 marks / *markah*]

(ii) Explain the role of the green plant to the river ecosystem.
Terangkan peranan tumbuhan hijau kepada ekosistem sungai.

……....

……

……

[3 marks / *markah*]

(iii) A niche of an organism is its roles in the ecosystem.
Based on organisms in Diagram 5, state an example of niche.
Nic bagi organisma adalah peranannya dalam suatu ekosistem.
Berdasarkan organism dalam Rajah 5, nyatakan satu contoh nic.

……....

……

[1 mark / *markah*]

(b) (i) Based on Diagram 5, construct a food web showing the interaction of four organisms.
Berdasarkan Rajah 5, bina satu jaringan makanan menunjukkan interaksi empat organism.

[2 marks / *markah*]

(ii) Based on food web that you have constructed in (b) (i), construct a pyramid of numbers.
Berdasarkan jaringan makanan yang telah dibina di (b)(i), binakan piramid nombor.

[2 marks / *markah*]

(c) A factory has been set up nearby the river.
It draws water from this river to cool the machines and then release it back the to the river.
Predict the population of organisms in the river in the upcoming five years.
Sebuah kilang telah dibina berhampiran dengan sungai ini.
Kilang ini mengambil air dari sunga tersebuti untuk menyejukkan mesin-mesin dan mengalirkan semula air tersebut ke dalam sungai tersebut.
Ramalkan populasi organisma di dalam sungai ini dalam tempoh lima tahun yang akan datang.

…….....

……

……

……

[2 marks / *markah*]

SECTION B
Bahagian B

[40 marks]
[*40 markah*]

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

6 (a) Diagram 6.1 shows the development of follicles in ovarian cycle.
Rajah 6.1 menunjukkan perkembangan folikel dalam kitar ovari.

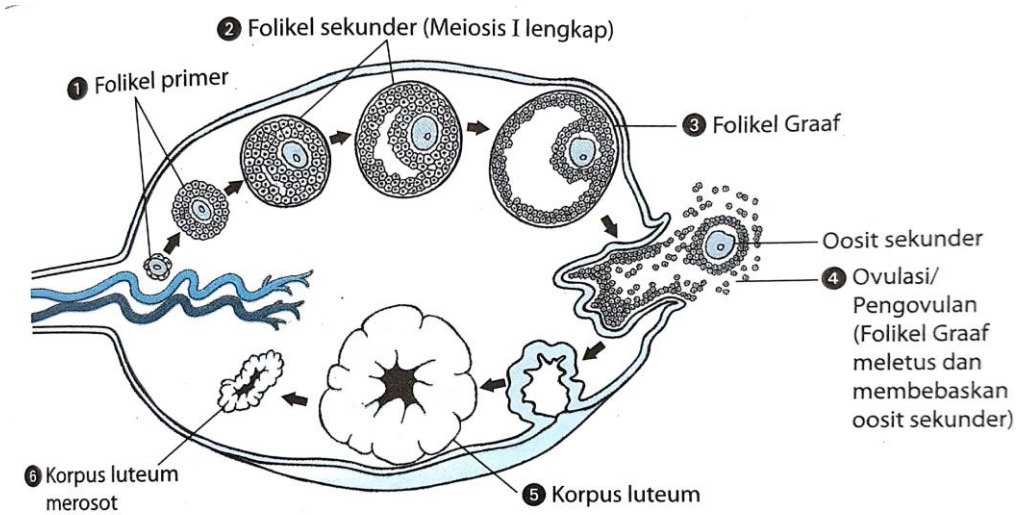


Diagram 6.1
Rajah 6.1

Based on Diagram 6.1 , describe the process of ovum formation
Berdasarkan Rajah 6.1 ,huraikan proses pembentukan ovum.

[4 marks / *markah*]

(b) Diagram 6.2 shows a method to overcome infertility in women which is known as in vitro fertilization(IVF).
Rajah 6.2 menunjukkan satu kaedah untuk mengatasi masalah kesuburan bagi seorang wanita iaitu persenyawaan in vitro (IVF).

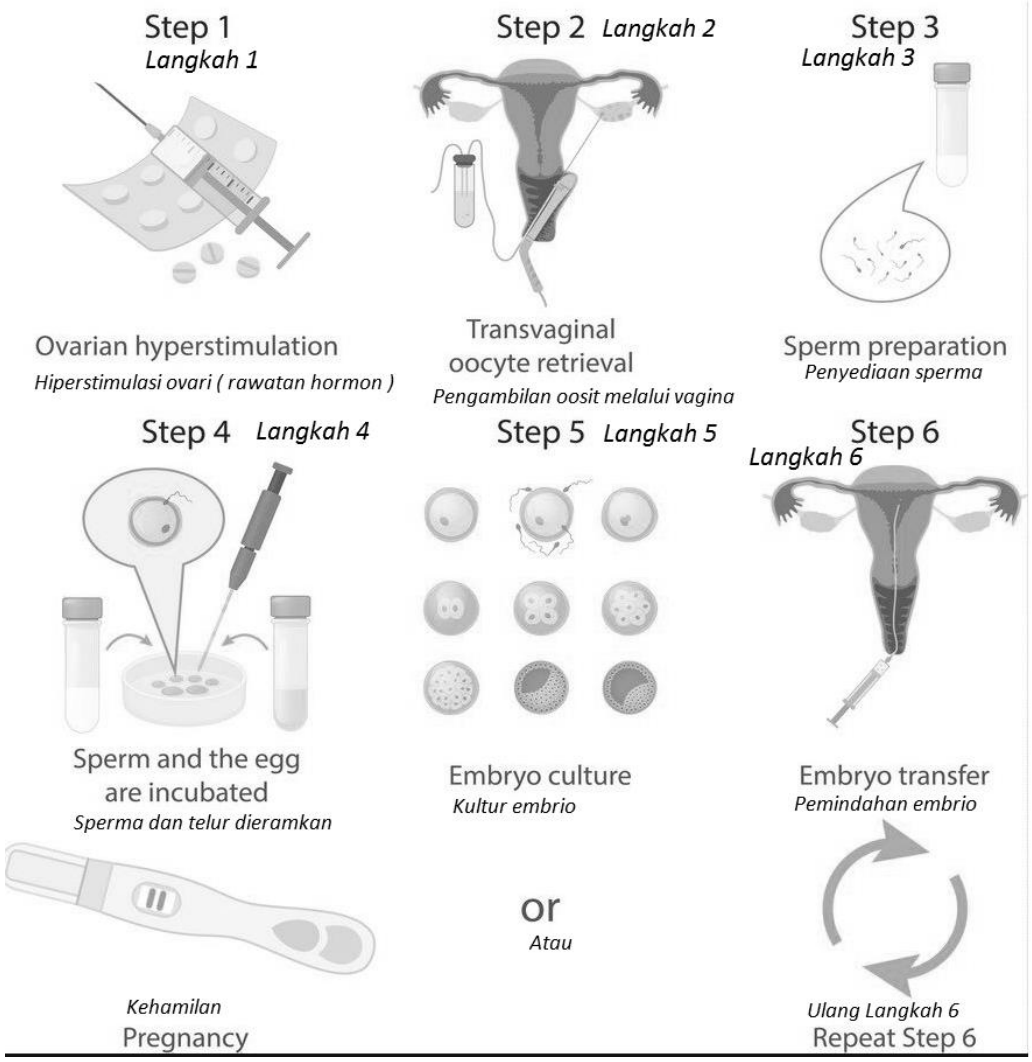


Diagram 6.2 / *Rajah 6.2*

Explain how ovarian hyperstimulation (hormone treatment) in step 1 produce a lot of oocytes.
Terangkan bagaimana hiperstimulasi ovari (rawatan hormon) dalam Langkah 1 menghasilkan banyak oosit .

[6 marks / *markah*]

(c) Step 2 is carried out after oogenesis is almost completed whereas Step 3 is carried out after spermatogenesis is completed.
Compare oogenesis with spermatogenesis.
Langkah 2 dijalankan selepas oogenesis hamper selesai manakala Langkah 3 dijalankan selepas spermatogenesis selesai.
Bandingkan proses oogenesis dan proses spermatogenesis.

[5 marks / *markah*]

(d) Diagram 6.3 shows the formation of two pairs of twins.
Rajah 6.3 menunjukkan pembentukan dua pasang anak kembar.

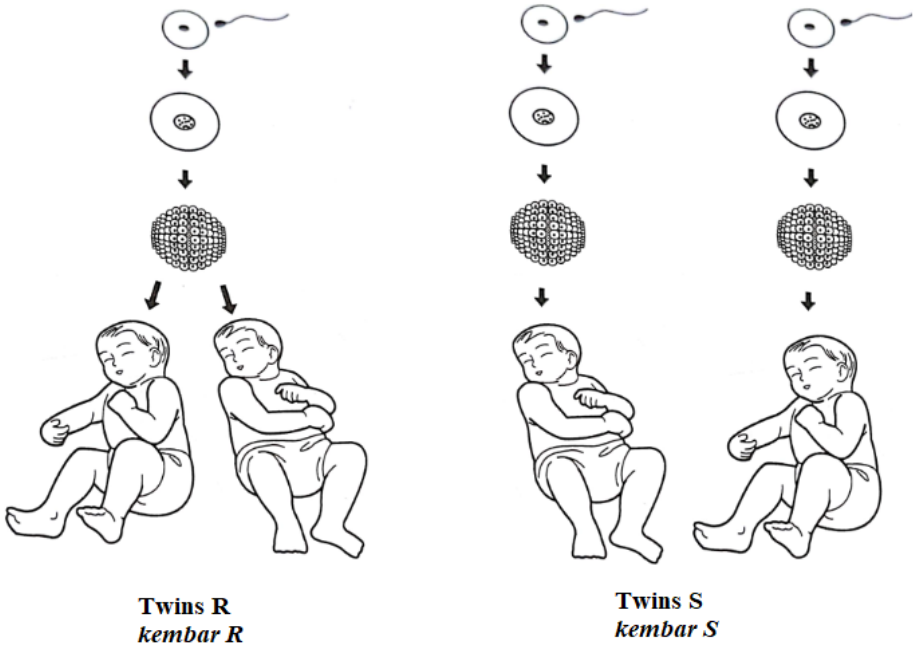
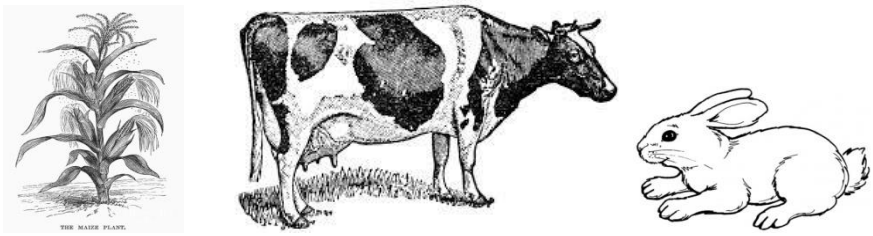


Diagram 6.3
Rajah 6.3

Explain the differences between the two pairs of twin
Terangkan perbezaan antara kedua-dua pasang kembar.

[5 marks / *markah*]

7. Diagram 7.1 show three organisms P, Q and R
Rajah 7.1 menunjukkan tiga organisma P,Q dan R



P Q R

Diagram 7.1
Rajah 7.1

(a) (i) Describe the nutritional habits of organism P and R.
Huraikan tabiat pemakanan organisma P dan R.

[4 marks /*markah*]

(ii) Compare the characteristics of digestive system in organism Q and R.
Bandingkan ciri sistem pencernaan organisma Q dengan R.

[10 marks / *markah*]

(b) Diagram 7.2 shows part of the digestive system and organs associated with digestion.
Rajah 7.2 menunjukkan sebahgian daripada sistem pencernaan dan organ-organ yang berkaitan dengan pencernaan.

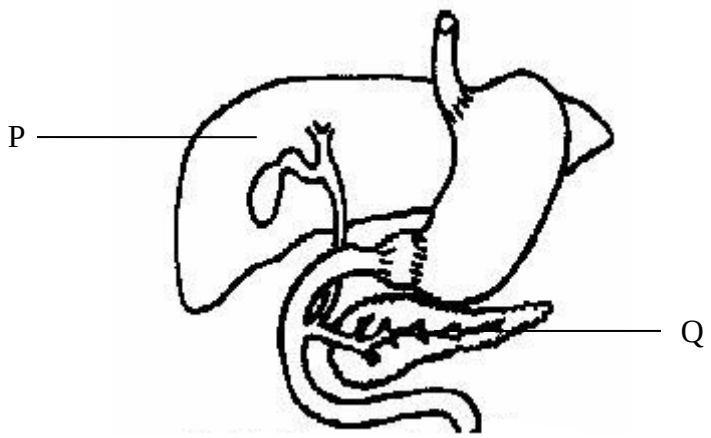


Diagram 7.2
Rajah 7.2

Explain the effects of non-functional organs P and Q on digestion of food
Terangkan kesan organ P dan Q yang tidak berfungsi terhadap pencernaan makanan.

[6 marks / *markah]*

8. (a) Table 8 shows the breathing rate of a student during resting and during vigorous activity.
Jadual 8 menunjukkan kadar pernafasan seorang pelajar semasa berehat dan semasa melakukan aktiviti cergas.

Breathing rate (Breath per minute) *Kadar pernafasan (Pernafasan per minit)*	During resting *Semasa rehat*	During vigorous activity *Semasa aktiviti cergas*
	16	30

Table 8 / *Jadual 8*

Explain why the breathing rate of the student is different during resting and during vigorous activity.
Terangkan mengapa kadar pernafasan pelajar itu berbeza semasa berehat dan semasa aktiviti cergas.

[10 marks / *markah*]

b) Mr.Sazali is a heavy smoker. He is suffering from cough lately. He always feel tired and his weight also decreased.Mr.Sazali is on treatment in a hospital and the doctor confirmed that he is suffering from emphysema. According to the doctor, emphysema is a respiratory disease that is associated with smoking practices.
Encik Sazali merupakan seorang perokok tegar. Kebelakangan ini beliau sering mengalami batuk-batuk yang berpanjangan .Beliau kerap berasa letih dan berat badannya semakin menurun. Encik Sazali telah mendapatkan rawatan di hospital dan doktor mengesahkan bahawa beliau menghidap penyakit emfisema. Menurut doktor,emfisema merupakan penyakit pernafasan yang sering dikaitkan dengan amalan merokok.

Diagram 8.1(a) shows alveoli of a healthy individual. Diagram 8.1(b) shows alveoli of Mr.Sazali.
Rajah 8.1(a) menunjukkan alveolus individu yang sihat.Rajah 8.1(b) menunjukkan alveolus En.Sazali.

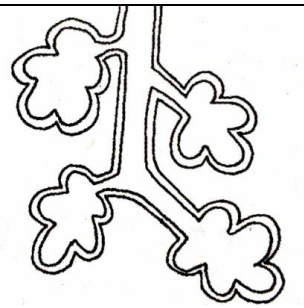


Diagram 8.1(a)
Rajah 8.1(a)

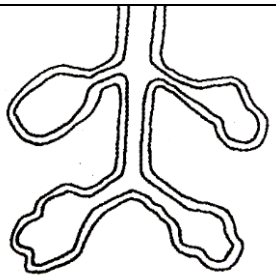


Diagram 8.1(b)
Rajah 8.1(b)

Explain the effects of emphysema to the health of Mr.Sazali.
Terangkan kesan penyakit emfisema tersebut kepada kesihatan Encik Sazali.

[10 marks / *markah*]

9 (a) Diagram 9.1 a shows the scenery at the one of the district in Malaysia 25 years ago. In order to fullfill the needs of the country development, the scenery has changed from Diagram 9.1a to Diagram 9.1b which is the current scenery.

Rajah 9.1a menunjukkan pemandangan sebuah daerah di Malaysia 25 tahun yang lalu. Untuk memenuhi pembangunan negara, pemandangan telah berubah daripada Rajah 9.1a kepada Rajah 9.1b yang menunjukkan pemandangan sekarang.

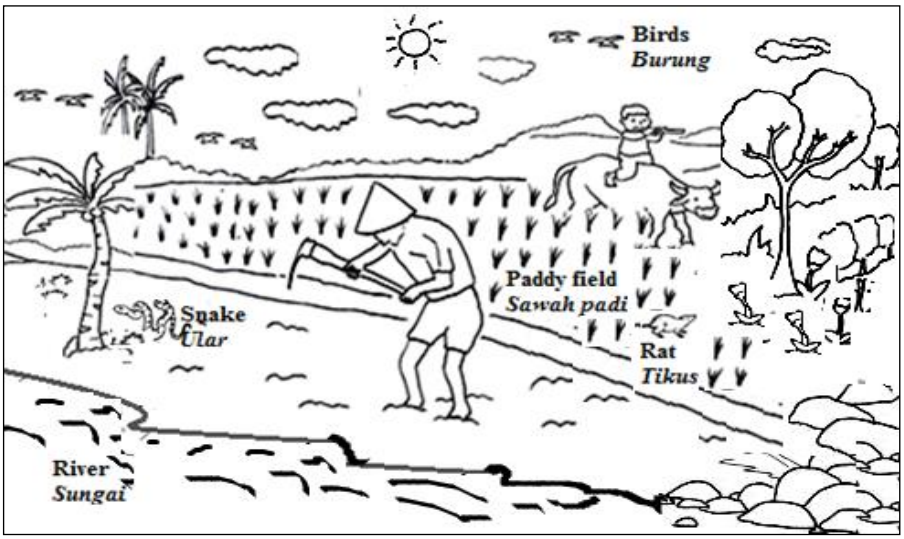


Diagram 9.1 a
Rajah 9.1a

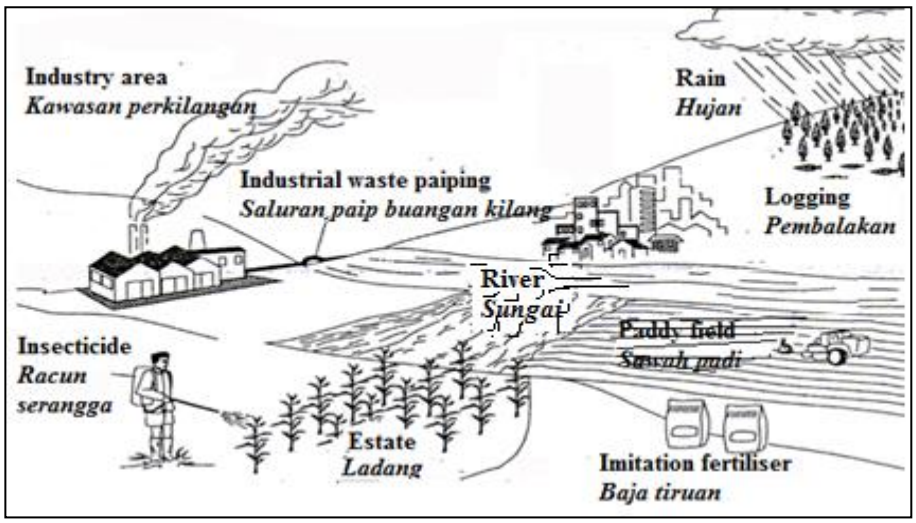


Diagram 9.1b
Rajah 9.1b

Discuss the good effects and bad effects of the changes.
Bincangkan kesan baik dan kesan buruk perubahan tersebut.

[10 *marks/* markah]

(b)

Sustainable development is the economic development that is conducted without the depletion of natural resources. *Pembangunan mampan ialah perkembangan ekonomi yang dilaksanakan tanpa mengurangkan sumber-sumber semulajadi.*

Explain the concept of sustainable development and the need for it to protect our environment.
Terangkan konsep pembangunan mampan dan keperluannya untuk melindungi alam persekitaran kita.

[10 marks/10 markah]

END OF QUESTION PAPER
KERTAS PEPERIKSAAN TAMAT