

SPM EXAMINATION PAPER 2010

PAPER 1

Time: 1 hour 15 minutes

This question paper consists of 50 questions. Answer all questions.
Kertas soalan ini mengandungi 50 soalan. Jawab semua soalan.

- 1 The following statements are characteristics of a cell structure.

Pernyataan berikut adalah ciri-ciri suatu struktur sel.

- Permeable to all fluids
Telap kepada semua cecair
- Rigid and not elastic
Tegar dan tidak kenyal

Which structure has these characteristics?

Struktur manakah yang mempunyai ciri-ciri ini?

- | | |
|----------------------------|-------------------------------------|
| A Vacuole
Vakuol | C Golgi apparatus
Jasad Golgi |
| B Cell wall
Dinding sel | D Plasma membrane
Membran plasma |

- 2 Diagram 1 shows the structure of rough endoplasmic reticulum.

Rajah 1 menunjukkan struktur retikulum endoplasma kasar.

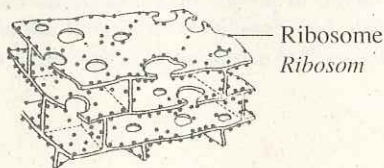


Diagram 1
Rajah 1

Which process occurs in the ribosomes?

Proses manakah yang berlaku di ribosom?

- | |
|---|
| A Transportation of lipids
Pengangkutan lipid |
| B Synthesis of proteins
Sintesis protein |
| C Production of ATP
Penghasilan ATP |
| D Digestion of phospholipids
Pencernaan fosfolipid |

- 3 Diagram 2 shows a process carried out by an *Amoeba* sp.

Rajah 2 menunjukkan suatu proses yang dijalankan oleh *Amoeba* sp.

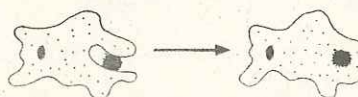


Diagram 2
Rajah 2

What is the process?

Apakah proses tersebut?

- | | |
|---|-------------------------------|
| A Osmoregulation
Pengosmokawalaturan | C Phagocytosis
Fagositosis |
| B Binary fission
Belahan dedua | D Diffusion
Resapan |

- 4 Diagram 3 shows a plant cell which is immersed in distilled water.

Rajah 3 menunjukkan sel tumbuhan yang direndam dalam air suling.

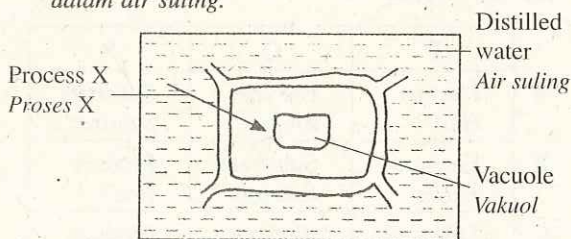


Diagram 3
Rajah 3

What is process X?

Apakah proses X?

- | | |
|---|--|
| A Facilitated diffusion
Resapan berbantu | C Active transport
Pengangkutan aktif |
| B Simple diffusion
Resapan ringkas | D Osmosis
Osmosis |

- 5 Diagram 4 shows a substance moves across the phospholipid bilayer of a plasma membrane.

Rajah 4 menunjukkan satu bahan bergerak merentasi dwilapisan fosfolipid membran plasma.

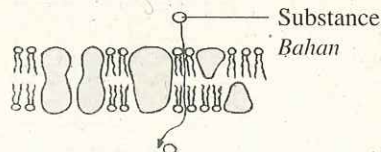


Diagram 4
Rajah 4

What is this substance?

Apakah bahan ini?

- A Oxygen
Oksigen
- B Glucose
Glukosa
- C Sodium ion
Ion natrium
- D Amino acid
Asid amino

- 6 What is the optimum temperature for enzyme reactions in the human body?

Apakah suhu optimum bagi tindak balas enzim dalam badan manusia?

- A 27 °C
- B 30 °C
- C 37 °C
- D 40 °C

- 7 Diagram 5 shows the 'lock and key' hypothesis of enzyme action.

Rajah 5 menunjukkan hipotesis 'mangga dan kunci' bagi tindakan enzim.

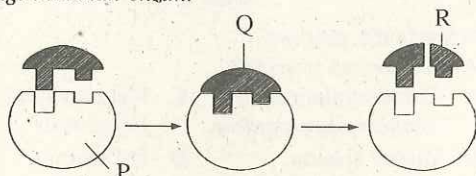


Diagram 5
Rajah 5

What are P, Q and R?

Apakah P, Q dan R?

	P	Q	R
A	Product Hasil	Enzyme Enzim	Substrate Substrat
B	Enzyme Enzim	Substrate Substrat	Product Hasil
C	Substrate Substrat	Enzyme Enzim	Product Hasil
D	Enzyme Enzim	Product Hasil	Substrate Substrat

- 8 Diagram 6 shows an experiment to study the action of pepsin on protein.

Rajah 6 menunjukkan suatu eksperimen untuk mengkaji tindakan pepsin ke atas protein.

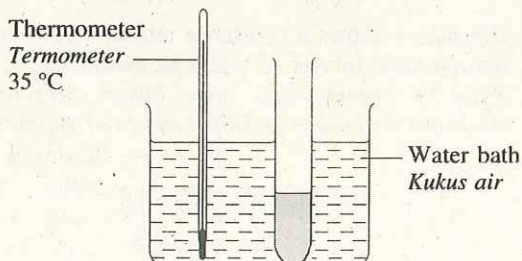


Diagram 6
Rajah 6

The contents of the test tube are mixture of 2 ml of albumen suspension which has been boiled and cooled, 1 ml of 1% pepsin solution and four drops of 0.1 M hydrochloric acid. The albumen suspension turns clear after 30 minutes.

Which step is able to reduce the time taken for the albumen suspension to turn clear?

Kandungan dalam tabung uji itu ialah campuran 2 ml ampaijan albumen yang telah dididihkan dan disejukkan, 1 ml 1% larutan pepsin dan empat titis 0.1 M asid hidroklorik. Ampaijan albumen menjadi jernih selepas 30 minit.

Langkah manakah yang dapat mengurangkan masa yang diambil oleh ampaijan albumen untuk menjadi jernih?

- A Reduce the volume of 0.1 M hydrochloric acid to two drops
Kurangkan isi padu 0.1 M asid hidroklorik kepada dua titis
- B Reduce the temperature of water bath to 30 °C
Kurangkan suhu kukus air kepada 30 °C
- C Increase the volume of 1% pepsin solution to 2 ml
Tingkatkan isi padu 1% larutan pepsin kepada 2 ml
- D Increase the volume of albumen suspension to 4 ml
Tingkatkan isi padu ampaijan albumen kepada 4 ml

- 9 Diagram 7 shows structure P in a cell which is involved in producing extracellular enzymes.

Rajah 7 menunjukkan struktur P dalam suatu sel yang terlibat dalam penghasilan enzim luar sel.

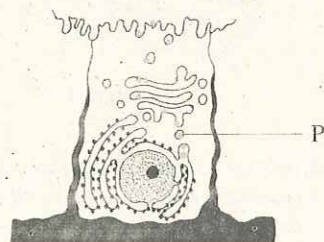


Diagram 7
Rajah 7

What will happen if structure P fails to fuse with the Golgi apparatus?

Apakah yang akan berlaku jika struktur P gagal bercantum dengan jasad Golgi?

- A Proteins are not synthesised
Protein tidak disintesis
- B Proteins are not modified
Protein tidak diubahsuai

C Proteins are denatured
Protein dinyahasilkan

D Protein are hydrolysed
Protein dihidrolisisikan

- 10 Diagram 8 shows different stages in mitosis.
Rajah 8 menunjukkan peringkat-peringkat yang berlainan dalam mitosis.

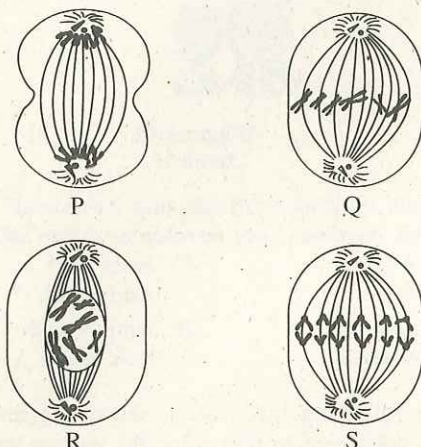


Diagram 8
Rajah 8

Which sequence is correct?
Urutan manakah yang betul?

- A P → Q → R → S
B Q → P → R → S
C R → Q → S → P
D R → S → Q → P

- 11 Diagram 9 shows a stage of oogenesis in a human.
Rajah 9 menunjukkan satu peringkat oogenesis dalam manusia.

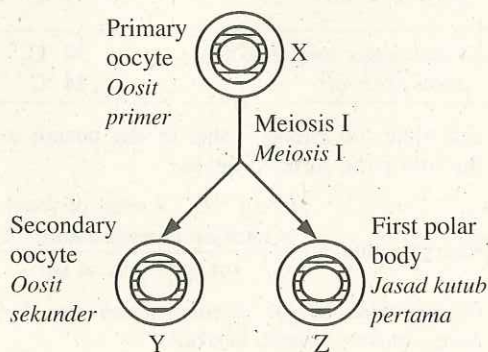


Diagram 9
Rajah 9

What is the number of chromosomes in X, Y and Z?

Berapakah bilangan kromosom dalam X, Y dan Z?

	X	Y	Z
A	46	46	46
B	46	23	23
C	23	23	23
D	46	46	23

- 12 Diagram 10 shows the digestive system of a rabbit.
Rajah 10 menunjukkan sistem pencernaan bagi arnab.

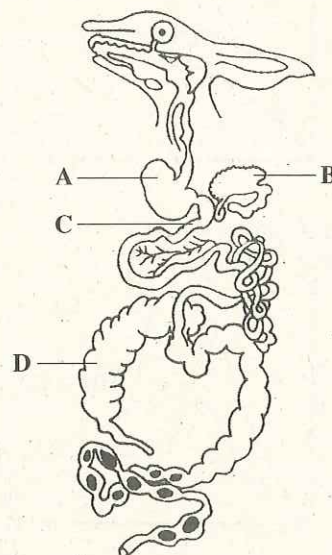


Diagram 10
Rajah 10

Which part, A, B, C or D is the caecum?
Antara bahagian A, B, C dan D, yang manakah sekum?

- 13 Diagram 11 shows an organelle in a plant cell.
Rajah 11 menunjukkan organel di dalam sel tumbuhan.

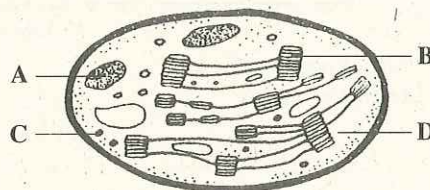


Diagram 11
Rajah 11

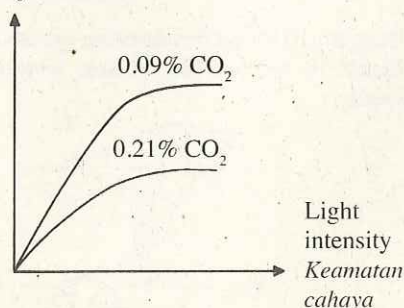
In which structure, A, B, C or D does photolysis of water occur?

Antara struktur A, B, C dan D, di manakah fotolisis air berlaku?

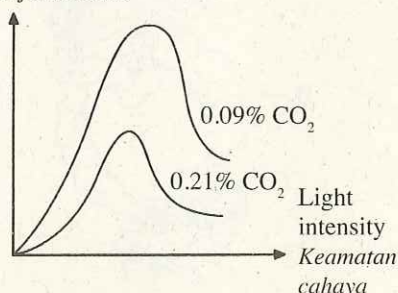
- 14 Which graph shows the effect of light intensity and carbon dioxide, CO_2 , concentration on the rate of photosynthesis at room temperature?

Graf manakah yang menunjukkan kesan keamatan cahaya dan kepekatan karbon dioksida, CO_2 , ke atas kadar fotosintesis pada suhu bilik?

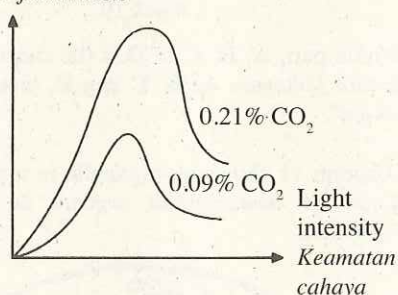
- A Rate of photosynthesis
Kadar fotosintesis



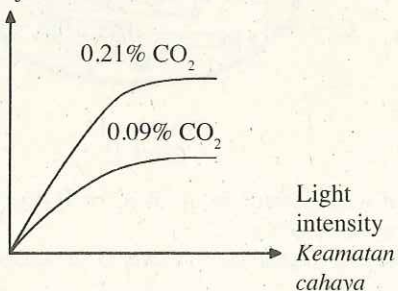
- B Rate of photosynthesis
Kadar fotosintesis



- C Rate of photosynthesis
Kadar fotosintesis



- D Rate of photosynthesis
Kadar fotosintesis



- 15 Diagram 12 shows a longitudinal section of a villus. Rajah 12 menunjukkan suatu keratan memanjang bagi vilus.

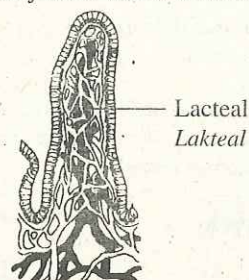


Diagram 12
Rajah 12

Which substance diffuses into the lacteal?
Bahan manakah yang meresap ke dalam lakteal?

- A Water
Air
B Glucose
Glukosa
C Fatty acid
Asid lemak
D Amino acid
Asid amino

- 16 The following information shows the result of an experiment to determine the energy value of a peanut.

Maklumat berikut menunjukkan keputusan suatu eksperimen untuk menentukan nilai tenaga sebiji kacang tanah.

The mass of peanut Jisim kacang tanah	= 5 g = 5 g
The volume of distilled water Isi padu air suling	= 20 ml = 20 ml
The density of water Ketumpatan air	= 1 g ml ⁻¹ = 1 g ml ⁻¹
Initial water temperature Suhu awal air	= 29 °C = 29 °C
Final water temperature Suhu akhir air	= 34 °C = 34 °C

Calculate the energy value of the peanut using the following formula below:

$$\text{Energy value} = \frac{4.2 \text{ J g}^{-1} \text{ }^{\circ}\text{C}^{-1} \times \text{mass of water (g)} \times \text{increase in temperature (}^{\circ}\text{C)}}{\text{mass of peanut (g)}}$$

Hitung nilai tenaga kacang tanah itu dengan menggunakan formula berikut:

$$\text{Nilai tenaga} = \frac{4.2 \text{ J g}^{-1} \text{ }^{\circ}\text{C}^{-1} \times \text{jisim air (g)} \times \text{peningkatan suhu (}^{\circ}\text{C)}}{\text{jisim kacang tanah (g)}}$$

- A 84.0 J g⁻¹
B 67.2 J g⁻¹
C 50.4 J g⁻¹
D 33.6 J g⁻¹

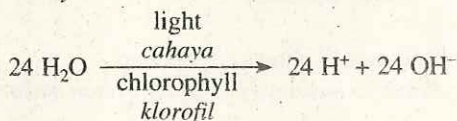
- 17 In the respiratory system of a fish, where does gaseous exchange occur?

Dalam sistem respirasi ikan, di manakah pertukaran gas berlaku?

- A Gill raker
Sisir insang
B Gill arch
Lengkungan insang
C Filament
Filamen
D Mouth
Mulut

- 18 The following chemical equation shows a process of photosynthesis that happens during the light reaction.

Persamaan kimia berikut menunjukkan suatu proses fotosintesis yang berlaku semasa tindak balas cahaya.



What will happen to this process of photosynthesis if the light intensity is low?

Apakah yang akan berlaku kepada proses fotosintesis ini jika keamatan cahaya rendah?

- A More oxygen is released
Lebih banyak oksigen dibebaskan
B Less glucose is produced
Kurang glukosa dihasilkan
C Rate of photolysis of water increases
Kadar fotolisis air bertambah
D Rate of starch production increases
Kadar penghasilan kanji bertambah

- 19 Diagram 13 shows the respiratory structure of an insect.

Rajah 13 menunjukkan struktur respirasi bagi seekor serangga.

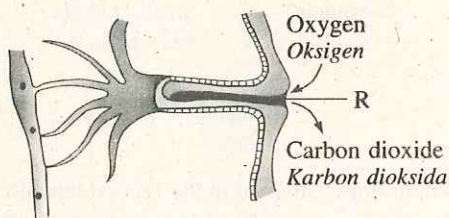


Diagram 13
Rajah 13

What is R?
Apakah R?

- A Trachea
Trakea
B Spiracle
Spirakel
C Muscle
Otot
D Tracheole
Trakeol

- 20 A student takes part in a 200 m sprint event. Which equation represents his respiration process after he has run the first 100 m?

Seorang murid mengambil bahagian dalam acara larian pecut 200 m.

Persamaan manakah yang mewakili proses respirasinya setelah dia berlari 100 m pertama?

- A Glucose \rightarrow Lactic acid + Energy
Glukosa \rightarrow Asid laktik + Tenaga
B Glucose + Oxygen \rightarrow Lactic acid + Energy
Glukosa + Oksigen \rightarrow Asid laktik + Tenaga
C Glucose \rightarrow Ethanol + Carbon dioxide + Energy
Glukosa \rightarrow Etanol + Karbon dioksida + Tenaga
D Glucose + Oxygen \rightarrow Carbon dioxide + Water + Energy
Glukosa + Oksigen \rightarrow Karbon dioksida + Air + Tenaga

- 21 Diagram 14 shows a longitudinal section of an alveolus and a blood capillary.

Rajah 14 menunjukkan keratan memanjang alveolus dan kapilari darah.

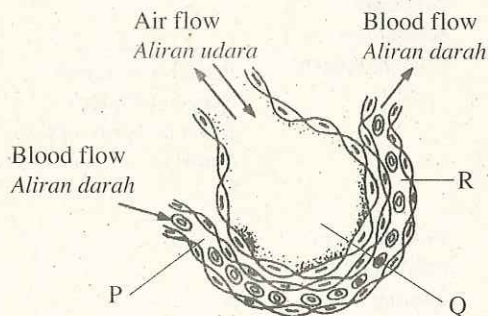


Diagram 14
Rajah 14

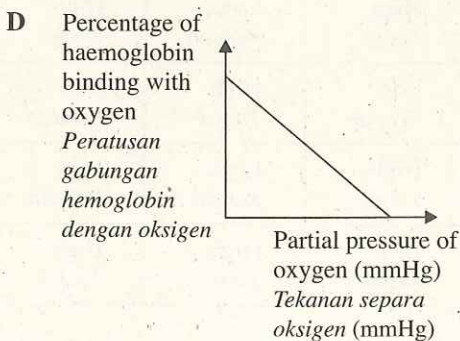
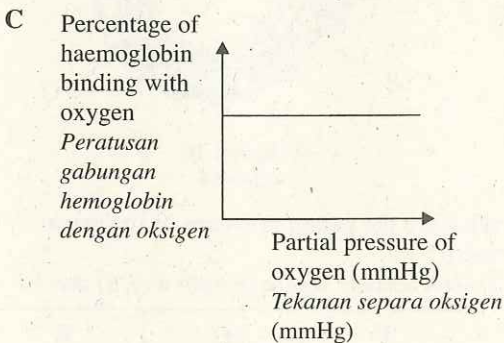
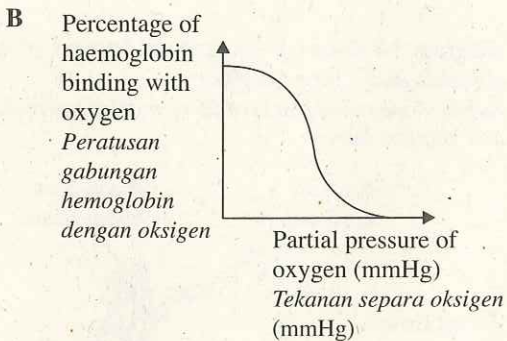
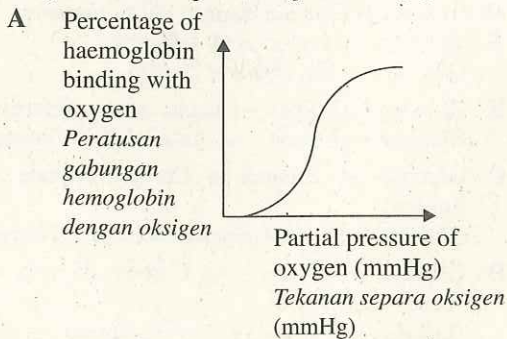
What are the partial pressures of oxygen at P, Q and R?

Apakah tekanan separa oksigen di P, Q dan R?

	P	Q	R
A	High Tinggi	Low Rendah	High Tinggi
B	Low Rendah	High Tinggi	Low Rendah
C	High Tinggi	Low Rendah	Low Rendah
D	Low Rendah	High Tinggi	High Tinggi

- 22 Which graph shows the relationship between the percentage of hemoglobin binding with oxygen and the partial pressure oxygen in the lungs?

Graf manakah yang menunjukkan hubungan antara peratusan gabungan hemoglobin dengan oksigen dengan tekanan separa oksigen dalam paru?



- 23 Two species of organisms have a relationship where both organisms benefit. What is this relationship?

Dua spesies organisma mempunyai satu hubungan dengan keadaan kedua-dua organisma mendapat keuntungan.

Apakah hubungan ini?

- A Mutualism
Mutualisme
B Parasitism
Parasitisme
C Saprophytism
Saprofitisme
D Commensalism
Komensalisme

- 24 Diagram 15 shows a food web.

Rajah 15 menunjukkan suatu siratan makanan.

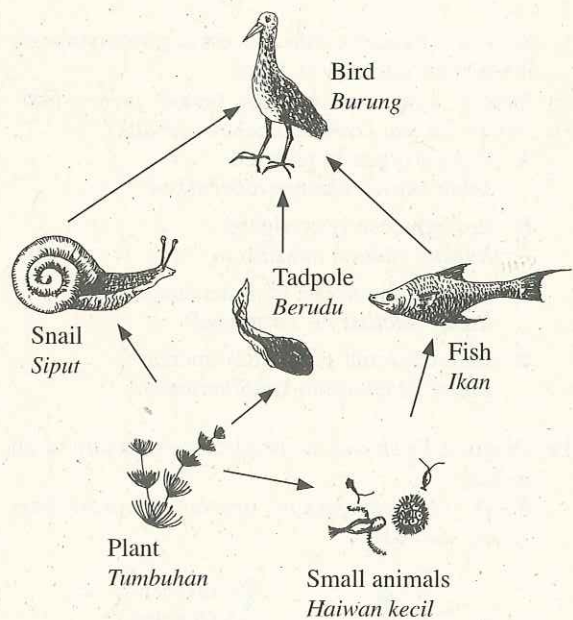


Diagram 15

Rajah 15

Which organisms are in the second trophic level?
Organisma manakah yang berada pada aras trof kedua?

- A Bird, Tadpole
Burung, Berudu
B Snail, Fish
Siput, Ikan
C Bird, Fish, Small animals
Burung, Ikan, Haiwan kecil
D Snail, Tadpole, Small animals
Siput, Berudu, Haiwan kecil

- 25 Diagram 16 shows the different zones of a mangrove swamp.

Rajah 16 menunjukkan zon-zon yang berlainan di sebuah paya bakau.

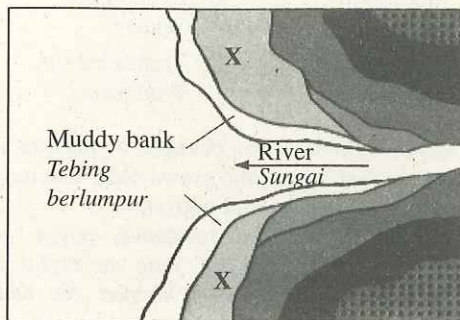


Diagram 16

Rajah 16

What is the pioneer species in Zone X?

Apakah spesies perintis di Zon X?

- A *Avicennia* sp.
 - B *Sonneratia* sp.
 - C *Rhizophora* sp.
 - D *Bruguiera* sp.
- 26 Which situation shows the dynamic equilibrium in an ecosystem?
- Situasi manakah yang menunjukkan keseimbangan dinamik di dalam suatu ekosistem?
- A The population of deer in the forest decreases because of deforestation.
Populasi rusa berkurangan di dalam hutan kerana penyahutan
 - B The population of owls decreases because the population of rats decreases in the plantation.
Populasi burung hantu berkurangan kerana populasi tikus berkurangan dalam ladang
 - C The population of fish in a lake decreases because the lake is polluted.
Populasi ikan berkurangan dalam sebuah tasik kerana tasik tercemar
 - D The population of algae increases because of the excessive usage of fertiliser.
Populasi alga meningkat kerana penggunaan baja yang berlebihan
- 27 Excess logging was carried out in a tropical forest. What is the effect of this activity on the environment?
- Pembalakan yang berleluasa telah dijalankan dalam suatu hutan tropika.
- Apakah kesan aktiviti ini ke atas alam sekitar?

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

- 28 Diagram 17 shows an ecosystem of a pond.

Rajah 17 menunjukkan ekosistem bagi sebuah kolam.

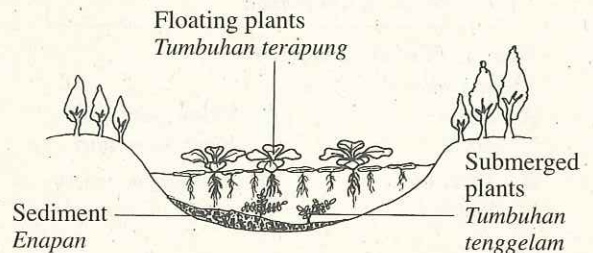


Diagram 17

Rajah 17

Which activity does **not** reduce sediment?

Aktiviti yang manakah **tidak** dapat mengurangkan enapan?

- A Dig the pond
Menggali kolam tersebut
 - B Remove the floating plants
Mengalihkan tumbuhan terapung
 - C Remove the submerged plants
Mengalihkan tumbuhan tenggelam
 - D Spray the aquatic plant with herbicides
Menyembur tumbuhan akuatik itu dengan herbisid
- 29 What is the main gas that causes green house effect?
- Apakah gas utama yang menyebabkan kesan rumah hijau?
- A Ozone
Ozon
 - B Methane
Metana
 - C Carbon dioxide
Karbon dioksida
 - D Nitrogen oxide
Nitrogen oksida

- 30 The following statements are the characteristics of blood transported by a blood vessel in the human body.

Pernyataan berikut adalah ciri-ciri darah yang diangkut oleh suatu salur darah dalam badan manusia.

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

What is this blood vessel?

Apakah salur darah ini?

- | | |
|---------------------------------|---|
| A Aorta
<i>Aorta</i> | C Pulmonary vein
<i>Vena pulmonari</i> |
| B Vena cava
<i>Vena cava</i> | D Pulmonary artery
<i>Arteri pulmonari</i> |

- 31 Diagram 18 shows a cross-section of the human heart.

Rajah 18 menunjukkan satu keratan rentas jantung manusia.

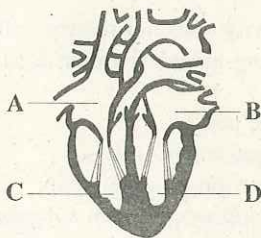


Diagram 18
Rajah 18

Which part, A, B, C or D pumps the blood into the pulmonary artery?

Antara bahagian A, B, C dan D, yang manakah mengepam darah ke dalam arteri pulmonari?

- 32 Diagram 19 shows dew formed on a plant during a cool and humid night.

Rajah 19 menunjukkan embun terbentuk pada tumbuhan di waktu malam yang sejuk dan lembab.

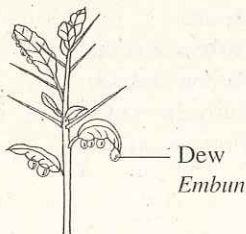


Diagram 19
Rajah 19

Which process in the leaves helps to form the dew?

Proses manakah di dalam daun yang membantu membentuk embun itu?

- | | |
|---------------------------------------|---------------------------------------|
| A Guttation
<i>Gutasi</i> | C Evaporation
<i>Sejatan</i> |
| B Transpiration
<i>Transpirasi</i> | D Translocation
<i>Translokasi</i> |

- 33 Diagram 20 shows the changes of posture in a woman's skeleton as she grows older due to lack of certain hormones and nutrients.

Rajah 20 menunjukkan perubahan postur pada rangka seorang perempuan yang meningkat usia disebabkan oleh kekurangan hormon dan nutrien tertentu.

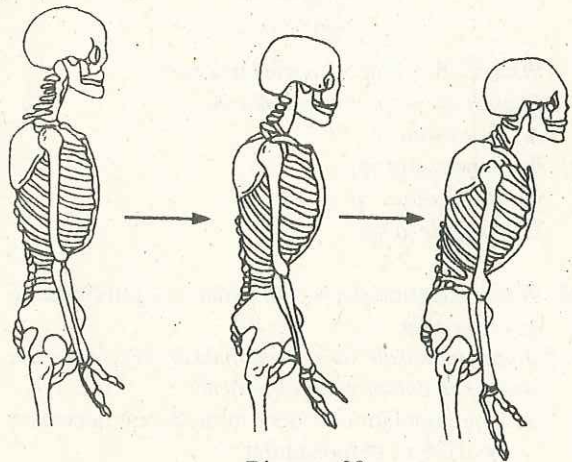


Diagram 20
Rajah 20

What are these hormone and nutrient?

Apakah hormon dan nutrien ini?

- A Progesterone and ferum
Progesteron dan ferum
- B Progesterone and calcium
Progesteron dan kalsium
- C Oestrogen and ferum
Estrogen dan ferum
- D Oestrogen and calcium
Estrogen dan kalsium

- 34 Diagram 21 shows the side view of the human brain.

Rajah 21 menunjukkan pandangan sisi otak manusia.



Diagram 21
Rajah 21

What is the function of the cerebellum?

Apakah fungsi serebelum itu?

- A Coordinates body movement
Mengkoordinasi pergerakan badan
- B Regulates the blood pressure
Mengawal atur tekanan darah
- C Regulates the rate of heart beat
Mengawal atur kadar denyutan jantung
- D Coordinates action of endocrine glands
Mengkoordinasi tindakan kelenjar endokrin

- 35 Diagram 22 shows three types of neurone.
Rajah 22 menunjukkan tiga jenis neuron.

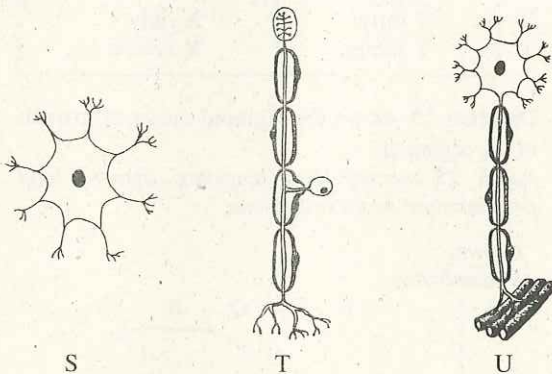


Diagram 22
Rajah 22

What are S, T and U?
Apakah S, T dan U?

	S	T	U
A	Afferent neurone Neuron aferen	Efferent neurone Neuron eferen	Interneurone Neuron perantaraan
B	Efferent neurone Neuron eferen	Interneurone Neuron perantaraan	Afferent neurone Neuron aferen
C	Interneurone Neuron perantaraan	Afferent neurone Neuron aferen	Efferent neurone Neuron eferen
D	Interneurone Neuron perantaraan	Efferent neurone Neuron eferen	Afferent neurone Neuron aferen

- 36 Which hormone is correctly matched to its function?

Hormon manakah yang dipadankan dengan betul kepada fungsinya?

Hormone Hormon	Function Fungsi
A Antidiuretic Antidiuresis	Stimulates the absorption of salt in the kidneys Merangsang penyerapan garam dalam ginjal
B Insulin Insulin	Stimulates the conversion of glucose to glycogen Merangsang penukaran glukosa kepada glikogen
C Glucagon Glukagon	Stimulates the conversion of glycogen to amino acid Merangsang penukaran glikogen kepada asid amino
D Aldosterone Aldosteron	Stimulates the absorption of water in the kidneys Merangsang penyerapan air dalam ginjal

- 37 Diagram 23 shows a graph of the changes in the glucose level in an individual's blood over a period of two hours.

Rajah 23 menunjukkan graf perubahan aras glukosa dalam darah seseorang individu dalam tempoh masa dua jam.

Glucose level in blood
Aras glukosa dalam darah

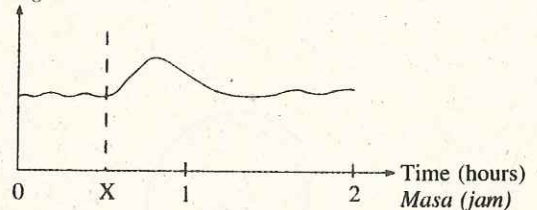


Diagram 23
Rajah 23

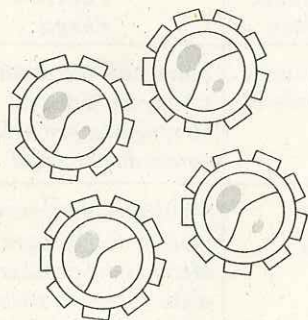
What happened at X?

Apakah yang berlaku di X?

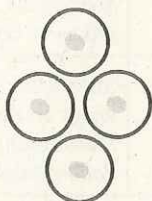
- A The individual started fasting
Individu itu mula berpuasa
- B The individual ate vegetables
Individu itu telah makan sayuran
- C The individual drank a glass of grape juice
Individu itu telah minum segelas jus anggur
- D The individual was given an insulin injection
Individu itu telah diberi suntikan insulin

- 38 Diagram 24 shows the stages in the formation of pollen grains in an anther.
Rajah 24 menunjukkan peringkat-peringkat dalam pembentukan butir debunga di dalam suatu anter.

I



II



III



IV

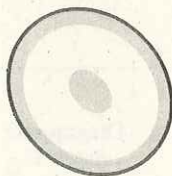


Diagram 24
Rajah 24

Which is the correct sequence?
Urutan manakah yang betul?

- A I → II → III → IV
B I → III → II → IV
C IV → II → III → I
D IV → III → II → I

- 39 What are the sex chromosomes in the male gametes and female gametes?
Apakah kromosom seks dalam gamet jantan dan gamet betina?

	Male gametes Gamet jantan	Female gametes Gamet betina
A	X or Y X atau Y	Y only Y sahaja
B	X or Y X atau Y	X only X sahaja
C	X only X sahaja	Y only Y sahaja
D	Y only Y sahaja	X only X sahaja

- 40 Diagram 25 shows the sigmoid curve of growth of an organism.
Rajah 25 menunjukkan lengkung sigmoid bagi pertumbuhan suatu organisma.

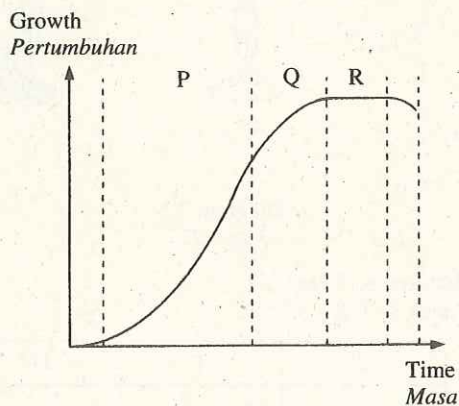


Diagram 25
Rajah 25

What are the growth rates at parts P, Q and R?
Apakah kadar pertumbuhan di bahagian P, Q dan R?

	P	Q	R
A	Slow Perlahan	Fast Cepat	Zero Sifar
B	Fast Cepat	Zero Sifar	Slow Perlahan
C	Zero Sifar	Slow Perlahan	Fast Cepat
D	Fast Cepat	Slow Perlahan	Zero Sifar

- 41 Diagram 26 shows a cross-section of a dicotyledonous stem which had secondary growth.
Rajah 26 menunjukkan keratan rentas batang dikotiledon yang telah mengalami pertumbuhan sekunder.

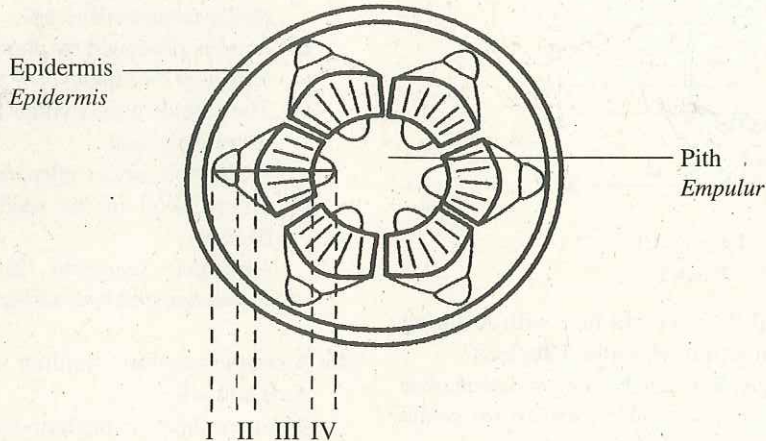


Diagram 26
Rajah 26

Which arrangement of the tissues is correct?
Susunan tisu-tisu yang manakah betul?

	I	II	III	IV
A	Primary phloem <i>Floem primer</i>	Secondary phloem <i>Floem sekunder</i>	Secondary xylem <i>Xilem sekunder</i>	Primary xylem <i>Xilem primer</i>
B	Secondary phloem <i>Floem sekunder</i>	Primary phloem <i>Floem primer</i>	Primary xylem <i>Xilem primer</i>	Secondary xylem <i>Xilem sekunder</i>
C	Primary xylem <i>Xilem primer</i>	Secondary xylem <i>Xilem sekunder</i>	Secondary phloem <i>Floem sekunder</i>	Primary phloem <i>Floem primer</i>
D	Secondary xylem <i>Xilem sekunder</i>	Primary xylem <i>Xilem primer</i>	Primary phloem <i>Floem primer</i>	Secondary phloem <i>Floem sekunder</i>

- 42 Diagram 27 shows a longitudinal section of a flower.
Rajah 27 menunjukkan keratan memanjang sekuntum bunga.

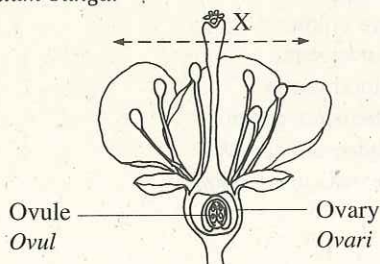


Diagram 27
Rajah 27

The flower is cut at X.
 Which statement explains why the ovary does not develop into a fruit?

*Bunga itu dipotong pada X.
 Pernyataan manakah yang menerangkan mengapa ovari itu tidak berkembang menjadi buah?*

- A The ovules are not fertilised
Ovul tidak disenyawakan
- B The ovules do not receive nutrient
Ovul tidak menerima nutrien
- C The ovules fail to obtain oxygen from the air
Ovul gagal mendapat oksigen daripada udara
- D The ovules fail to produce embryo sacs
Ovul gagal menghasilkan pundi embrio

- 43 Diagram 28 shows the structure of an ovule
Rajah 28 menunjukkan struktur satu ovul.

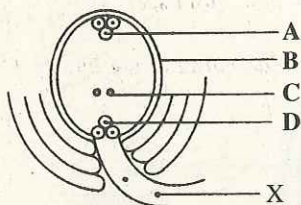


Diagram 28
Rajah 28

- Which part, A, B, C or D will fuse with X during double fertilisation to form triploid nucleus?
Antara bahagian A, B, C dan D, yang manakah akan bergabung dengan X semasa persenyawaan ganda dua untuk membentuk nukleus triploid?

- 44 What is the genotype of the offsprings in the F1 generation in a monohybrid cross between BB × bb?

Apakah genotip anak dalam generasi F1 hasil kacukan monohibrid antara BB × bb?

- A 100% are Bb
100% ialah Bb
B 100% are BB
100% ialah BB
C 100% are bb
100% ialah bb
D 75% are Bb and 25% are bb
75% ialah Bb dan 25% ialah bb

- 45 Diagram 29 shows the growth curve of germinating seeds.
Rajah 29 menunjukkan lengkung pertumbuhan biji benih yang bercambah.

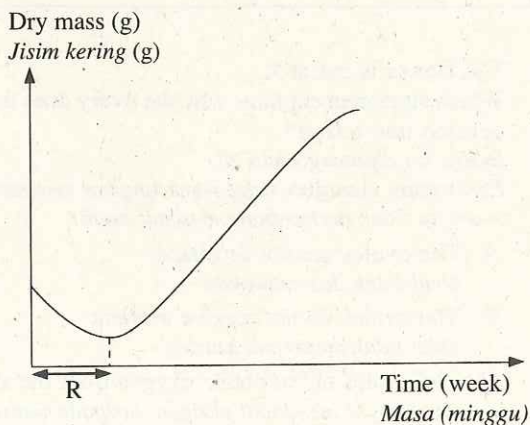


Diagram 29
Rajah 29

What happens during stage R?

Apakah yang berlaku semasa peringkat R?

- A The rate of transpiration is high
Kadar transpirasi tinggi
B Food is produced by photosynthesis
Makanan dihasilkan oleh fotosintesis
C The rate of photosynthesis is equal to the rate of transpiration
Kadar fotosintesis sama dengan kadar respirasi
D Stored food in the seed is used to provide energy
Makanan simpanan di dalam biji benih digunakan untuk membekalkan tenaga

- 46 A couple has four children with blood groups O, A, B and AB.

What are the possible blood groups of the couple?
Sepasang suami isteri mempunyai empat orang anak dengan kumpulan darah A, O, B dan AB.

Apakah kumpulan darah yang mungkin bagi pasangan suami isteri tersebut?

	Husband Suami	Wife Isteri
A	A	B
B	AB	O
C	AB	AB
D	B	AB

- 47 Which of the following is an example of continuous variation?

Antara yang berikut, yang manakah contoh bagi variasi selanjur?

- A Height
Ketinggian
B Eye colour
Warna mata
C Blood group
Kumpulan darah
D Shape of ear lobe
Bentuk cuping telinga

- 48 Diagram 30 shows a type of chromosomal mutation.

Rajah 30 menunjukkan sejenis mutasi kromosom.

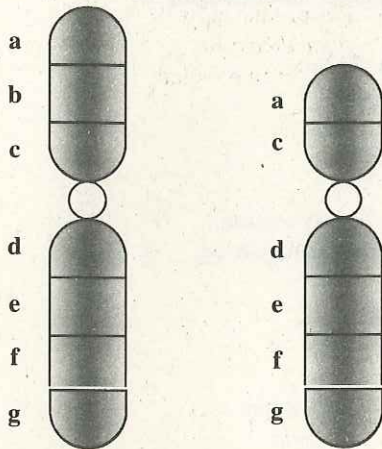


Diagram 30
Rajah 30

What type of mutation is this?

Apakah jenis mutasi ini?

- | | |
|------------------------------|--------------------------------|
| A Deletion
Pelenyapan | C Duplication
Penggandaan |
| B Inversion
Penyongsangan | D Translocation
Translokasi |

- 49 The genotype of a person blood group is $I^A I^B$.
What is his blood group?

Genotip kumpulan darah seorang individu ialah $I^A I^B$.

Apakah kumpulan darah orang itu?

- A O
- B A
- C B
- D AB

- 50 A girl has sickle-cell anaemia disease.
What caused this disease?

Seorang budak perempuan mengidap penyakit anemia sel sabit.

Apakah yang menyebabkan penyakit ini?

- A Lack of ferum in the diet
Kekurangan ferum dalam gizi
- B Change in the structure of a gene
Perubahan struktur gen
- C Loss of blood during menstruation
Kehilangan darah semasa haid
- D Decrease in the number of chromosomes
Pengurangan bilangan kromosom

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

This question paper consists of two sections: **Section A** and **Section B**.
Kertas soalan ini mengandungi dua bahagian: **Bahagian A** dan **Bahagian B**.

Section A
Bahagian A

[60 marks]
[60 markah]

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

- 1 Diagram 1 shows the structure of an animal cell.
Rajah 1 menunjukkan struktur satu sel haiwan.

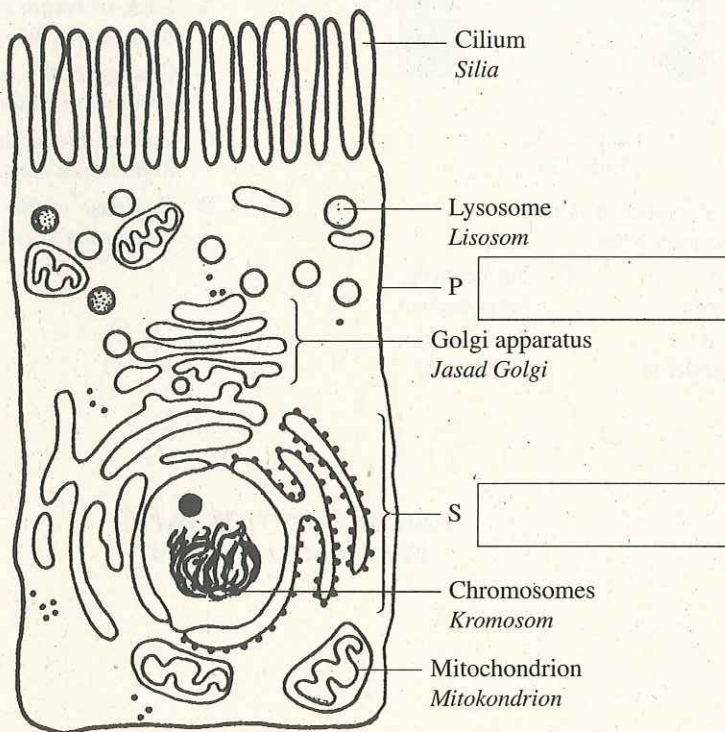


Diagram 1
Rajah 1

1(a)(i)

2

- (a) (i) In Diagram 1, label P and S.
Pada Rajah 1, labelkan P dan S.

[2 marks]
[2 markah]

- (ii) Explain the function of the chromosomes.
Terangkan fungsi kromosom.

.....

.....

.....

[2 marks]
[2 markah]

1(a)(ii)

2

- (b) Explain what will happen to the production of extracellular enzymes if the Golgi apparatus and S are absent.

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Terangkan apa yang akan berlaku kepada penghasilan enzim luar sel jika jasad Golgi dan S tidak ada.

1(b)

	4
--	---

[4 marks]

[4 markah]

- (c) Explain why the sperm cells contain more mitochondria.

Terangkan mengapa sel sperma mempunyai lebih mitokondrion.

1(c)

	2
--	---

[2 marks]

[2 markah]

- (d) Explain how lysosomes help in eliminating damaged organelles in the cells.

Terangkan bagaimana lisosom membantu dalam penyingkiran organel-organel yang rosak di dalam sel.

1(d)

	2
--	---

[2 marks]

[2 markah]

- 2 Diagram 2.1 and Diagram 2.2 show the movement of substances X and Y across the plasma membrane respectively. The movement of X needs energy but the movement of Y does not.
Rajah 2.1 dan Rajah 2.2 masing-masing menunjukkan pergerakan bahan X dan Y merentasi membran plasma. Pergerakan X memerlukan tenaga tetapi pergerakan Y tidak memerlukan tenaga.

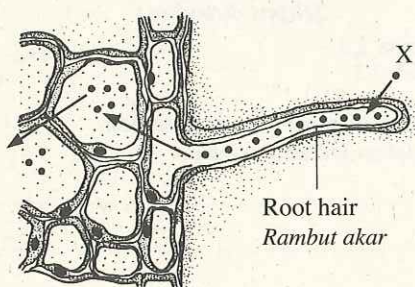


Diagram 2.1
Rajah 2.1

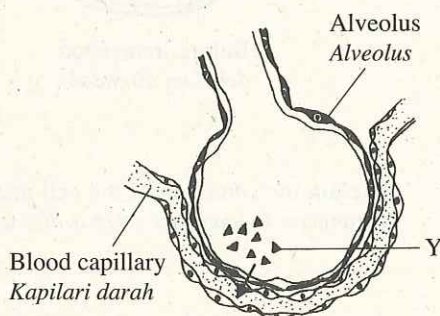


Diagram 2.2
Rajah 2.2

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2(a)

2

- (a) Name the processes involved in the movement of X and Y.
Terangkan proses yang terlibat dalam pergerakan X dan Y.

X:

Y:

[2 marks]

[2 markah]

- (b) (i) Name **one** example of X and Y.
Namakan satu contoh X dan Y.

X:

Y:

[2 marks]

[2 markah]

- (ii) Describe the movement of Y shown in Diagram 2.2.
Huraikan pergerakan Y seperti ditunjukkan pada Rajah 2.2.

.....

.....

.....

[2 marks]

[2 markah]

- (c) Diagram 2.3 shows the condition of a plant cell before and after being immersed in a type of solution.

Rajah 2.3 menunjukkan keadaan sel tumbuhan sebelum dan selepas direndam dalam sejenis larutan.

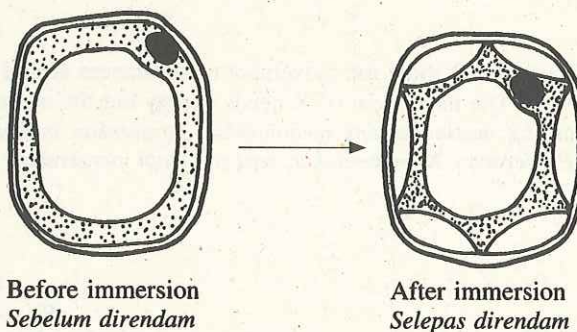


Diagram 2.3
Rajah 2.3

Explain the condition of the cell after being immersed in the solution.
Terangkan keadaan sel selepas direndam dalam larutan tersebut.

.....

.....

.....

.....

.....

[3 marks]

[3 markah]

2(c)

3

(d) A housewife makes mango pickles by immersing mango slices in a concentrated sugar solution.

State **one** advantage and **two** disadvantages of the method used, compared to storing fresh mangoes.

Seorang suri rumah membuat jeruk mangga dengan merendam kepingan buah mangga dalam larutan gula yang pekat.

*Nyatakan **satu** kebaikan dan **dua** keburukan kaedah yang digunakan berbanding dengan menyimpan mangga segar.*

Advantage / Kebaikan:

Disadvantages / Keburukan:

1.
2.

[3 marks]

[3 markah]

3 Diagram 3.1 shows the different stages in a cell division.

Rajah 3.1 menunjukkan peringkat-peringkat yang berbeza dalam suatu pembahagian sel.

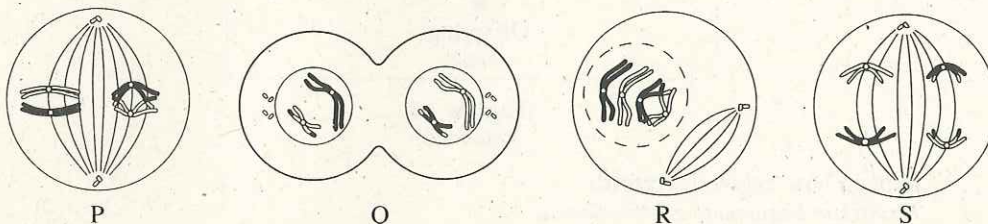


Diagram 3.1

Rajah 3.1

(a) (i) Name the type of cell division.

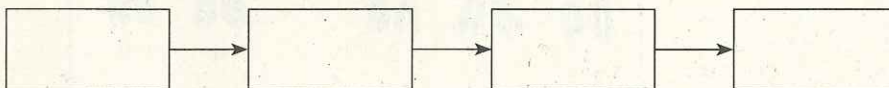
Namakan jenis pembahagian sel itu.

[1 mark]

[1 markah]

(ii) Arrange the stages of the cell division in the correct sequence.

Susun peringkat-peringkat pembahagian sel itu mengikut urutan yang betul.



[1 mark]

[1 markah]

(b) (i) Explain the chromosomal behaviour in stage R.

Terangkan perlakuan kromosom dalam peringkat R.

.....

.....

.....

[2 marks]

[2 markah]

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2(d)

	3
--	---

Total A2

	12
--	----

3(a)(i)

	1
--	---

3(a)(ii)

	1
--	---

3(b)(i)

	2
--	---

3(b)(ii)

	1
--	---

- (ii) State **one** importance of the chromosomal behaviour in 3(b)(i).
Nyatakan **satu** kepentingan perlakuan kromosom dalam 3(b)(i).

[1 mark]
[1 markah]

- (c) Diagram 3.2 shows the involvement of cells produced by this type of cell division in the formation of zygote.

Rajah 3.2 menunjukkan penglibatan penghasilan sel dengan jenis pembahagian sel ini dalam pembentukan zygote.

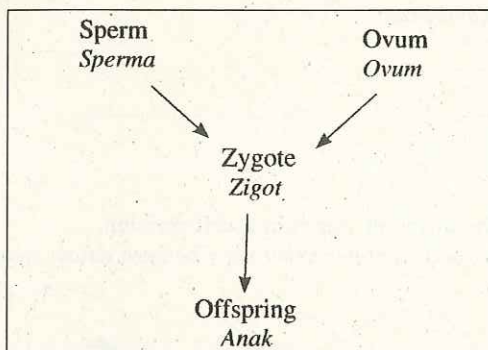


Diagram 3.2
Rajah 3.2

Explain how zygote is formed.
Terangkan bagaimana zygote terbentuk.

.....

.....

.....

[2 marks]
[2 markah]

3(c)

	2
--	---

- (d) Diagram 3.3 shows the karyotype of an offspring produced.
Rajah 3.3 menunjukkan kariotip seorang anak yang dihasilkan.

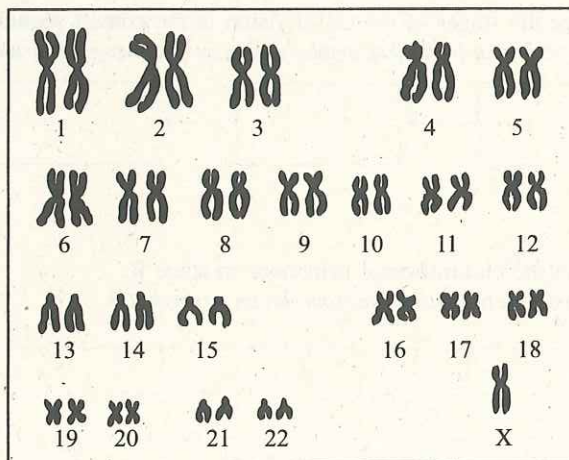


Diagram 3.3
Rajah 3.3

- (i) State the number of chromosomes in the offspring.
Nyatakan bilangan kromosom anak itu.

.....
.....
[1 mark]
[1 markah]

3(d)(i)

	1
--	---

- (ii) Name the genetic disease suffered by the offspring.
Namakan penyakit genetik yang dialami oleh anak itu.

.....
.....
[1 mark]
[1 markah]

3(d)(ii)

	1
--	---

- (iii) Give one reason for the answer in 3(d)(ii).
Berikan satu sebab bagi jawapan dalam 3(d)(ii).

.....
[1 mark]
[1 markah]

3(d)(iii)

	1
--	---

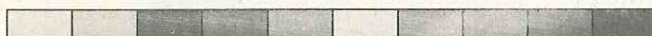
- (iv) Explain how radioactive rays can cause this genetic disease.
Terangkan bagaimana sinar radioaktif boleh menyebabkan penyakit genetik ini.

.....
.....
[2 marks]
[2 markah]

3(d)(iv)

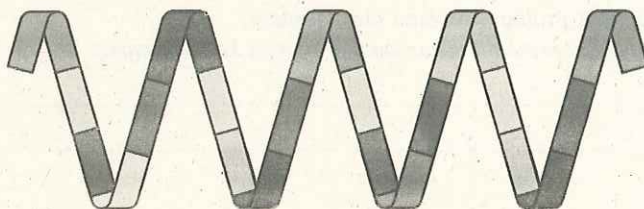
	2
--	---

- 4 Diagram 4.1 shows two levels of organisation in protein structure.
Rajah 4.1 menunjukkan dua peringkat organisasi di dalam struktur protein.



Level of organisation in protein X:.....

Peringkat organisasi dalam protein X:.....



Level of organisation in protein Y:.....

Peringkat organisasi dalam protein Y:.....

Diagram 4.1
Rajah 4.1

4(a)

2

- (a) In Diagram 4.1, name the level of organisation in the protein structures of X and Y.

Pada Rajah 4.1, namakan peringkat organisasi di dalam struktur protein X dan Y.

[2 marks]

[2 markah]

- (b) Describe the structure of protein X.

Huraikan struktur protein X.

.....

.....

.....

[2 marks]

[2 markah]

4(b)

2

- (c) Diagram 4.2 shows how protein X is broken down to form products.

Rajah 4.2 menunjukkan bagaimana protein X diuraikan untuk membentuk hasil.

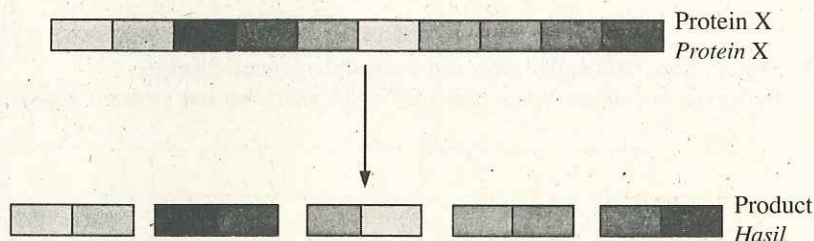


Diagram 4.2

Rajah 4.2

Explain how the products in Diagram 4.2 are formed.

Terangkan bagaimana hasil-hasil dalam Rajah 4.2 dibentuk.

.....

.....

.....

[2 marks]

[2 markah]

4(c)

2

- (d) State why animal proteins are first class protein.

Nyatakan mengapa protein haiwan adalah protein kelas pertama.

.....

.....

[1 mark]

[1 markah]

4(d)

1

- (e)

Silk is an example of protein. A silk garment crumples when it is washed using hot water at a temperature of 65 °C.

Sutera adalah suatu contoh protein. Pakaian sutera menjadi berkedut apabila dibasuh menggunakan air panas pada suhu 65 °C.

- (i) Explain the above statement.
Terangkan pernyataan di atas.

.....
.....
.....

[3 marks]
[3 markah]

4(e)(i)

	3
--	---

- (ii) Based on the above statement, suggest two ways to maintain the quality of silk garments.
Berdasarkan pernyataan di atas, cadangkan dua cara untuk mengekalkan kualiti pakaian sutera.

1.
.....
2.
.....

[2 marks]
[2 markah]

4(e)(ii)

	2
--	---

Total A4

	12
--	----

- 5 Diagram 5.1 and Diagram 5.2 show different positions of a forearm during a movement.
Rajah 5.1 dan Rajah 5.2 menunjukkan kedudukan yang berlainan bagi lengan dalam satu pergerakan.

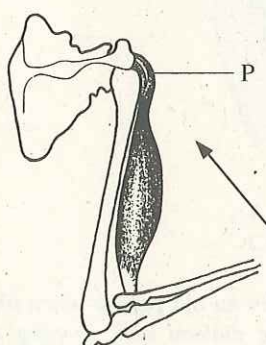


Diagram 5.1
Rajah 5.1

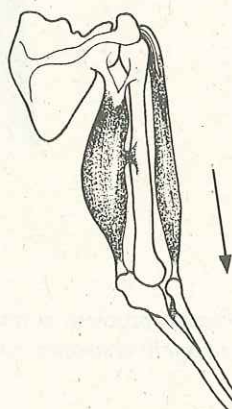


Diagram 5.2
Rajah 5.2

- (a) Complete Diagram 5.1 by drawing the triceps muscle which is involved in the movement of the forearm.
Lengkapkan Rajah 5.1 dengan melukis otot triceps yang terlibat dalam pergerakan lengan tersebut.

[2 marks]
[2 markah]

5(a)

	2
--	---

- (b) State one adaptive characteristic of tissue P shown in Diagram 5.1 which helps in the movement of the forearm.
Nyatakan satu ciri penyesuaian tisu P yang ditunjukkan dalam Rajah 5.1 yang membantu dalam pergerakan lengan.

.....
[1 mark]
[1 markah]

5(b)

	1
--	---

5(c)

3

- (c) Explain the action of the muscles which cause the movement of the forearm in Diagram 5.2.

Terangkan tindakan otot-otot yang menyebabkan pergerakan lengan dalam Rajah 5.2.

.....

.....

.....

[3 marks]

[3 markah]

- (d) Diagram 5.3 shows a joint at the knee.

Rajah 5.3 menunjukkan sendi pada lutut.

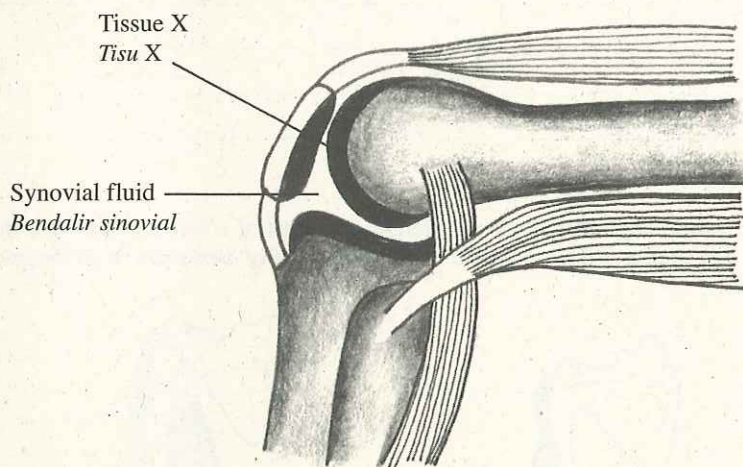


Diagram 5.3

Rajah 5.3

Explain the health problem normally faced by an old person when tissue X is impaired.
Terangkan masalah kesihatan yang biasanya dialami oleh seorang tua apabila tisu X rosak.

.....

.....

.....

[3 marks]

[3 markah]

- (e) An athlete must do a warming up exercise before starting an event.

Explain why.

Seorang atlet mesti melakukan senaman memanaskan badan sebelum memulakan acara.

Terangkan mengapa.

.....

.....

.....

[3 marks]

[3 markah]

5(d)

3

5(e)

3

Total A5

12

Section B Bahagian B

[40 marks]

[40 markah]

Answer any **two** questions from this section.
Jawab mana-mana dua soalan daripada bahagian ini.

- 6** Diagram 6.1 shows the location of the pituitary gland in a human.
Rajah 6.1 menunjukkan kedudukan kelenjar pituitari seorang manusia.

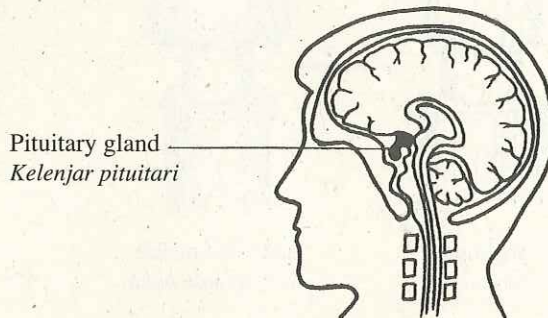


Diagram 6.1
Rajah 6.1

- (a) (i) Explain why the pituitary gland is a ductless gland and also known as the master gland. [4 marks]
Terangkan mengapa kelenjar pituitari adalah kelenjar tanpa duktus yang juga bertindak sebagai kelenjar utama. [4 markah]
- (ii) Explain the role of the pituitary gland in regulating the blood osmotic pressure when the intake of water is too little. [8 marks]
Terangkan peranan kelenjar pituitari dalam mengawal tekanan osmosis darah apabila pengambilan air adalah terlalu sedikit. [8 markah]
- (b) Diagram 6.2 shows the transmission of a nerve impulse from neurone P to neurone R.
Rajah 6.2 menunjukkan pemindahan impuls saraf dari neuron P ke neuron R.

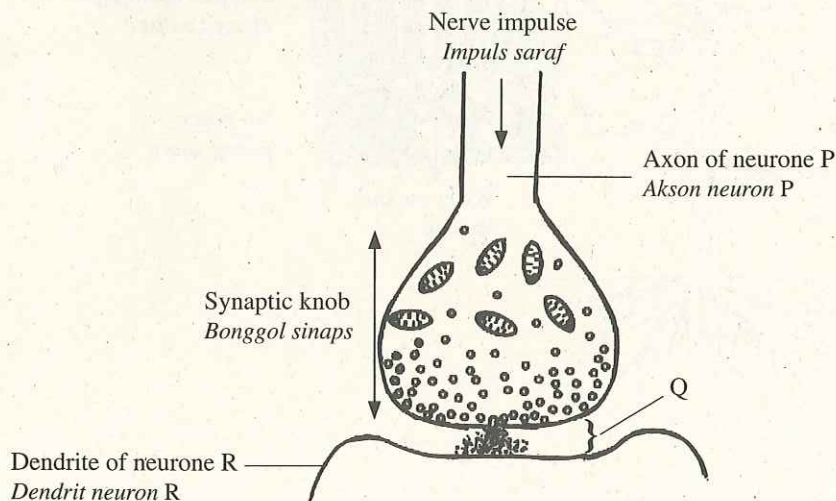


Diagram 6.2
Rajah 6.2

Explain the transmission of a nerve impulse from neurone P to neurone R across Q.
 Terangkan pemindahan impuls saraf dari neuron P ke neuron R merentasi Q.

[8 marks]
 [8 markah]

- 7 (a) Diagram 7.1 shows the part of a stem of a tree where the ring of bark has been removed. The tree is watered every day.
 Rajah 7.1 menunjukkan bahagian batang satu pokok yang gelang kulitnya telah dibuang. Pokok tersebut disiram dengan air setiap hari.

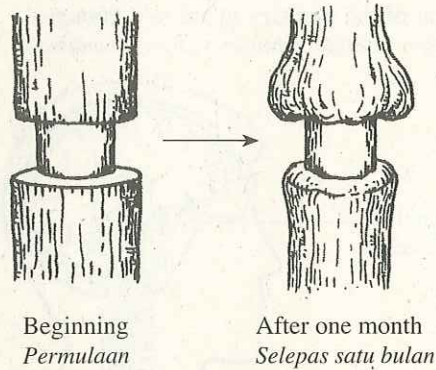


Diagram 7.1
 Rajah 7.1

Based on Diagram 7.1, explain what happens to the tree after one month.
 Berdasarkan Rajah 7.1, terangkan apa yang berlaku kepada pokok tersebut selepas satu bulan.

[4 marks]
 [4 markah]

- (b) Diagram 7.2 shows water movement through a tree.
 Rajah 7.2 menunjukkan pergerakan air melalui pokok.

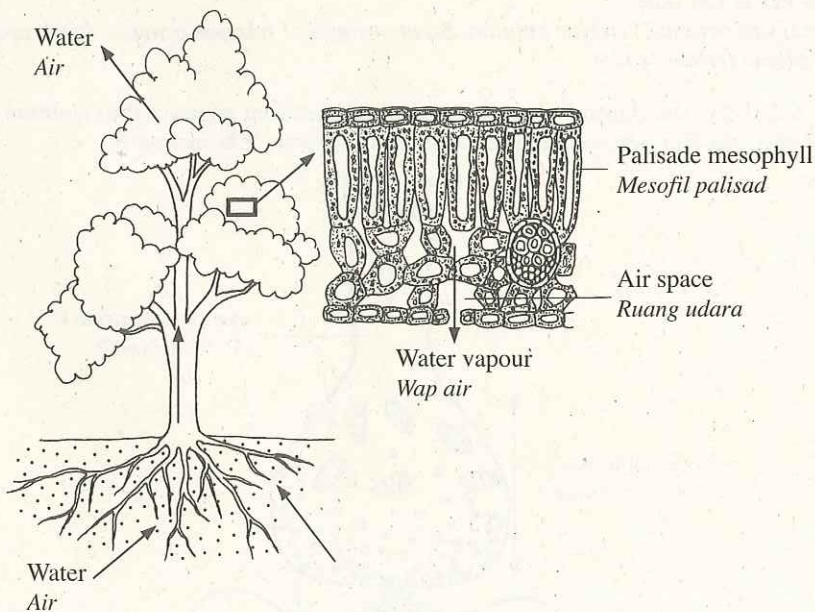


Diagram 7.2
 Rajah 7.2

High temperature in the environment causes overheating in plants.

Based on Diagram 7.2, explain how transpiration helps to prevent the occurrence of overheating in plants. [8 marks]

Suhu persekitaran yang tinggi menyebabkan kepanasan melampau pada tumbuhan.

Berdasarkan Rajah 7.2, terangkan bagaimana transpirasi membantu menghalang kejadian kepanasan melampau pada tumbuhan. [8 markah]

(c) Diagram 7.3 shows the blood circulatory systems of two organisms, X and Y.

Rajah 7.3 menunjukkan sistem peredaran darah bagi dua organisma, X dan Y.

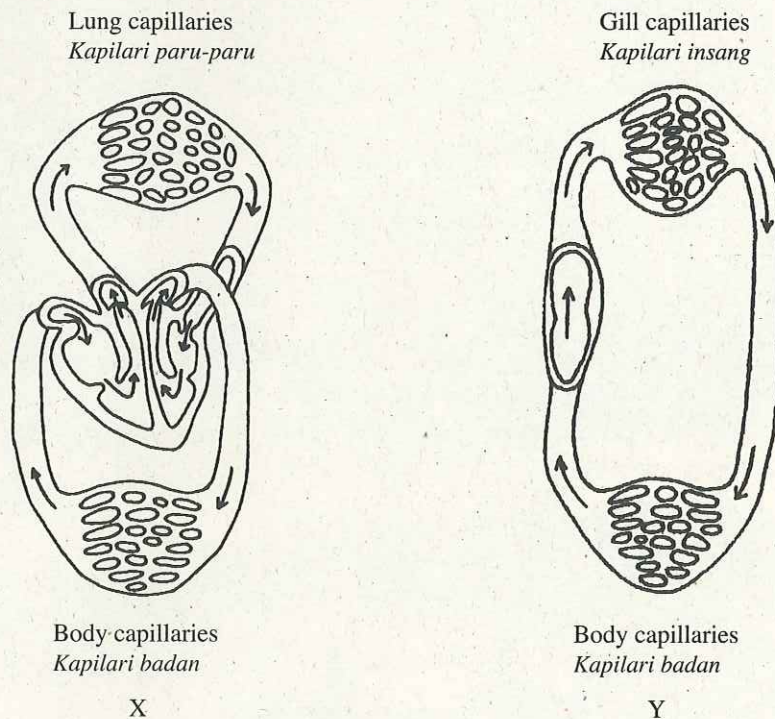


Diagram 7.3
Rajah 7.3

Explain the similarities and differences in the blood circulatory systems of X and Y.

[8 marks]

Terangkan persamaan dan perbezaan sistem peredaran darah bagi X dan Y.

[8 markah]

- 8 Diagram 8.1 shows an ecosystem.
Rajah 8.1 menunjukkan suatu ekosistem.



Diagram 8.1
Rajah 8.1

- (a) Explain why the ecosystem in Diagram 8.1 has to be preserved and conserved.
Terangkan mengapa ekosistem dalam Rajah 8.1 perlu dipelihara dan dipulihara.

[10 marks]
[10 markah]

- (b) Diagram 8.2 shows some human activities which release carbon dioxide to the atmosphere in an ecosystem.

Rajah 8.2 menunjukkan beberapa aktiviti manusia yang membebaskan karbon dioksida ke atmosfera dalam suatu ekosistem.

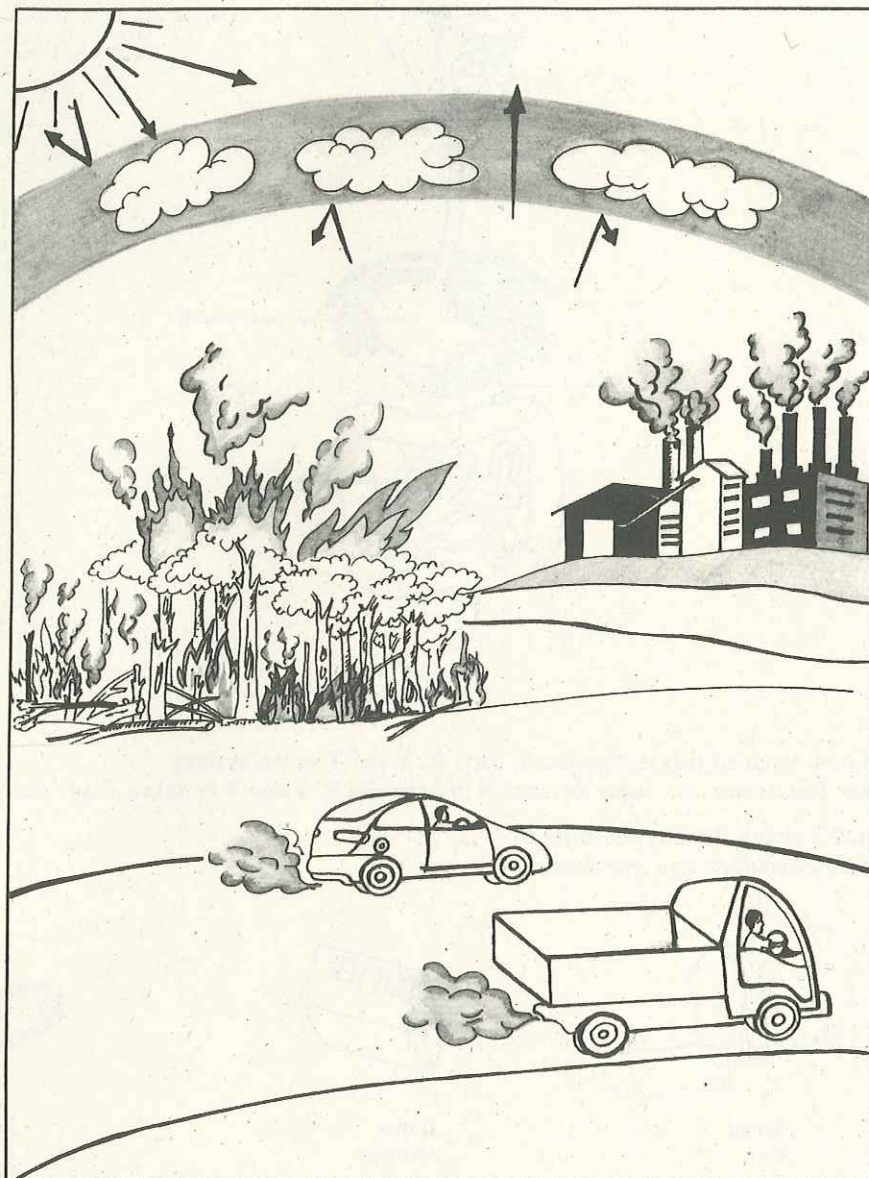


Diagram 8.2

Rajah 8.2

Explain the effect of an increase in carbon dioxide concentration on the ecosystem.

[10 marks]

Terangkan kesan pertambahan kepekatan karbon dioksida pada ekosistem itu.

[10 markah]

- 9 (a) Diagram 9.1 shows the digestive system and organs associated with digestion.
Rajah 9.1 menunjukkan sistem pencernaan dan organ-organ berkaitan pencernaan.

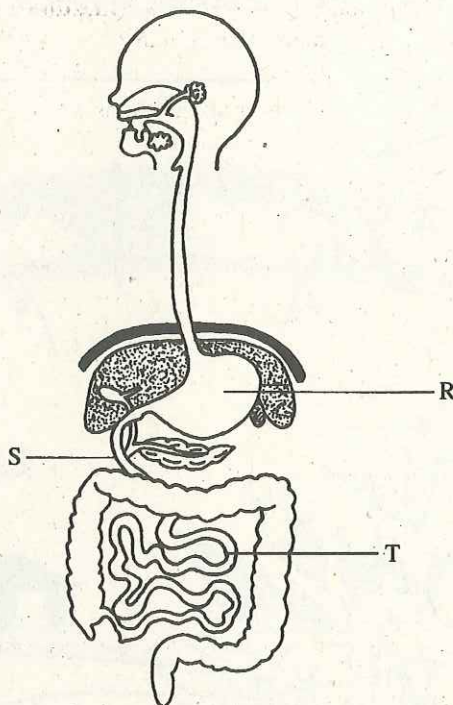
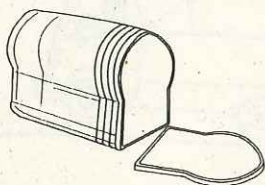


Diagram 9.1
Rajah 9.1

Explain how steamed fish is digested in parts R, S and T in the system. [10 marks]
Terangkan bagaimana ikan kukus dicernakan di bahagian R, S dan T di dalam sistem itu. [10 markah]

- (b) Diagram 9.2 shows three types of food.
Rajah 9.2 menunjukkan tiga jenis makanan.



Bread
Roti



Butter
Mentega



Fried chicken
Ayam goreng

Diagram 9.2
Rajah 9.2

Explain the long term effects of consuming excess of these foods on an individuals's health. [10 marks]
Terangkan kesan jangka masa panjang pengambilan makanan-makanan tersebut yang berlebihan ke atas kesihatan individu. [10 markah]

END OF QUESTION PAPER
 KERTAS SOALAN TAMAT

This question paper consists of two questions: **Question 1** and **Question 2**.

Kertas soalan ini mengandungi dua soalan: **Soalan 1** dan **Soalan 2**.

Answer **all** questions.

Jawab **semua** soalan.

- 1** An experiment was carried out to investigate the effect of different duration of activity on the percentages of carbon dioxide in exhaled air.

In this experiment, a student rests for 0 minute and his exhaled air is collected to analyse the carbon dioxide content in the air sample.

The experiment is repeated with the same student after running on the spot for 1 minute, 2 minutes and 3 minutes. The exhaled air is collected immediately after each activity.

In this experiment, a J-tube is used to analyse carbon dioxide content in the exhaled air. Potassium hydroxide solution is used to absorb carbon dioxide in exhaled air.

Satu eksperimen telah dijalankan untuk menyiasat kesan tempoh aktiviti yang berbeza ke atas peratusan karbon dioksida dalam udara hembusan.

Dalam eksperimen ini, seorang murid telah berehat selama 0 minit dan udara hembusannya dikumpul untuk dianalisis kandungan karbon dioksida dalam sampel udara itu.

Eksperimen ini diulangi oleh murid yang sama setelah berlari setempat selama 1 minit, 2 minit dan 3 minit. Udara hembusan dikumpul serta merta selepas setiap aktiviti.

Dalam eksperimen ini, tiub-J digunakan untuk menganalisis kandungan karbon dioksida dalam udara hembusan, larutan kalium hidroksida telah digunakan untuk menyerap karbon dioksida dalam udara hembusan.

Table 1 shows the initial reading of sample air column for all the four activities carried out by the student.

Jadual 1 menunjukkan bacaan awal sampel turus udara untuk semua empat aktiviti yang dijalankan oleh murid itu.

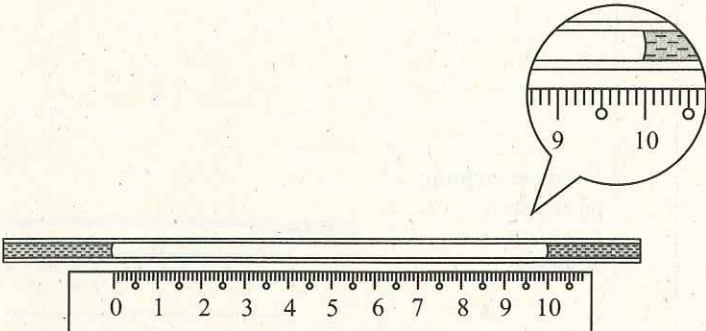
Activity Aktiviti	Before using potassium hydroxide solution Sebelum menggunakan larutan kalium hidroksida
Initial reading for all activities Bacaan awal untuk semua aktiviti	 <p style="text-align: center;">Length of air column Panjang turus udara</p> <div style="border: 1px solid black; width: 100px; height: 30px; margin-left: auto; margin-right: 0; text-align: center; line-height: 30px;">10 cm</div>

Table 1

Jadual 1

Table 2 shows the result of the length of the air column after being treated with potassium hydroxide solution.

Jadual 2 menunjukkan keputusan panjang turus udara selepas dirawat dengan larutan kalium hidroksida.

Activity Aktiviti	After being treated with potassium hydroxide solution Selepas dirawat dengan larutan kalium hidroksida
<p>Resting 0 minute Berehat 0 minit</p>	<div data-bbox="1067 430 1252 643"> </div> <div data-bbox="548 664 1186 761"> </div> <p data-bbox="731 807 961 865">Length of air column Panjang turus udara</p> <div data-bbox="1071 942 1280 1025"> <div></div> <div>cm</div> </div>
<p>1 minute running on the spot 1 minit berlari setempat</p>	<div data-bbox="1067 1141 1252 1354"> </div> <div data-bbox="548 1375 1186 1472"> </div> <p data-bbox="731 1503 961 1561">Length of air column Panjang turus udara</p> <div data-bbox="1071 1644 1280 1725"> <div></div> <div>cm</div> </div>

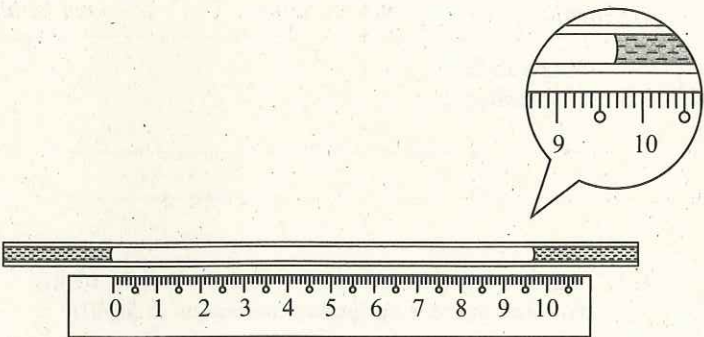
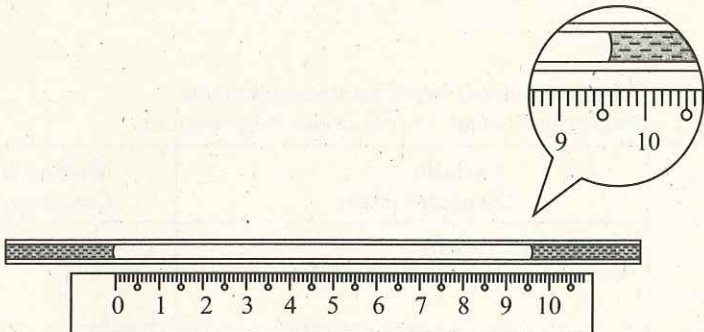
Activity Aktiviti	After being treated with potassium hydroxide solution <i>Selepas dirawat dengan larutan kalium hidroksida</i>
2 minutes running on the spot <i>2 minit berlari setempat</i>	 <p>Length of air column <i>Panjang turus udara</i></p> <div data-bbox="861 755 1077 840" style="border: 1px solid black; width: 100px; height: 40px; margin-left: auto; text-align: center; padding-top: 5px;">cm</div>
3 minutes running on the spot <i>3 minit berlari setempat</i>	 <p>Length of air column <i>Panjang turus udara</i></p> <div data-bbox="861 1377 1077 1464" style="border: 1px solid black; width: 100px; height: 40px; margin-left: auto; text-align: center; padding-top: 5px;">cm</div>

Table 2
Jadual 2

- (a) Record the lengths of the air column in the four boxes provided in Table 2 on pages 30 and 31.

Rekod panjang turus udara dalam petak yang disediakan, dalam Jadual 2 pada halaman 30 dan 31.

[3 marks]
[3 markah]

1(a)

3

For
Examiner's
Use

1(b)(i)

	3
--	---

- (b) (i) State **two** different observations made from Table 2.
Nyatakan dua pemerhatian yang berbeza yang dibuat daripada Jadual 2.

Observation 1:

Pemerhatian 1:

.....

.....

Observation 2:

Pemerhatian 2:

.....

.....

[3 marks]

[3 markah]

- (ii) State the inferences from the observations in 1(b)(i).
Nyatakan inferens daripada pemerhatian di 1(b)(i).

Inference from observation 1:

Inferens daripada pemerhatian 1:

.....

.....

Inference from observation 2:

Inferens daripada pemerhatian 2:

.....

.....

[3 marks]

[3 markah]

- (c) Complete Table 3 based on this experiment.
Lengkapkan Jadual 3 berdasarkan eksperimen ini.

Variable <i>Pemboleh ubah</i>	Method to handle the variable <i>Cara mengendali pemboleh ubah</i>
Manipulated variable <i>Pemboleh ubah dimanipulasikan</i>	
.....
.....
Responding variable <i>Pemboleh ubah bergerak balas</i>	
.....
.....
Constant variable <i>Pemboleh ubah dimalarkan</i>	
.....
.....

Table 3
Jadual 3

[3 marks]

[3 markah]

1(c)

	3
--	---

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

.....

[3 marks]
[3 markah]

- (e) (i) Construct a table and record all the data collected in this experiment.
Bina satu jadual dan rekodkan semua data yang dikumpul dalam eksperimen ini.

Your table should have the following titles:
Jadual anda hendaklah mengandungi tajuk-tajuk berikut:

- Type of activity
Jenis aktiviti
- Initial and final readings of the lengths of air column
Bacaan awal dan akhir panjang turus udara
- Percentage of carbon dioxide in the air sample
Peratusan karbon dioksida dalam sampel udara

Use the formula:

$$\text{Percentage of carbon dioxide} = \frac{\text{Initial length of air column} - \text{Final length of air column}}{\text{Initial length of air column}} \times 100\%$$

Gunakan formula:

$$\text{Peratusan karbon dioksida} = \frac{\text{Panjang awal turus udara} - \text{Panjang akhir turus udara}}{\text{Panjang awal turus udara}} \times 100\%$$

For
Examiner's
Use

1(d)

	3
--	---

1(e)(i)

	3
--	---

[3 marks]
[3 markah]

1(e)(ii)

	3
--	---

- (ii) Use the graph paper provided on page 35 to answer this question.
Using the data in 1(e)(i), draw a line graph of the percentage of carbon dioxide against the time of activity.
*Guna kertas graf yang disediakan di halaman 35 untuk menjawab soalan ini.
Menggunakan data di 1(e)(i), lukis graf garis bagi peratusan karbon dioksida melawan masa aktiviti.*

[3 marks]
[3 markah]

- (f) Based on the line graph in 1(e)(ii), explain the relationship between the time of activity and the percentage of carbon dioxide in the air sample.
Berdasarkan graf garis di 1(e)(ii), terangkan hubungan antara masa aktiviti dengan peratusan karbon dioksida dalam sampel udara.

.....

.....

.....

.....

[3 marks]
[3 markah]

- (g) This experiment is repeated on the same student but the exhaled air is collected 10 minutes after each activity.

Predict the percentage of carbon dioxide released.
Explain your prediction.

Eksperimen ini diulangi ke atas murid yang sama tetapi udara hembusan dikumpul selepas 10 minit setiap aktiviti.

*Ramalkan peratusan karbon dioksida yang dibebaskan.
Terangkan ramalan anda.*

.....

.....

.....

.....

[3 marks]
[3 markah]

- (h) State the operational definition for exhaled air.
Nyatakan definisi secara operasi bagi udara hembusan.

.....

.....

.....

[3 marks]
[3 markah]

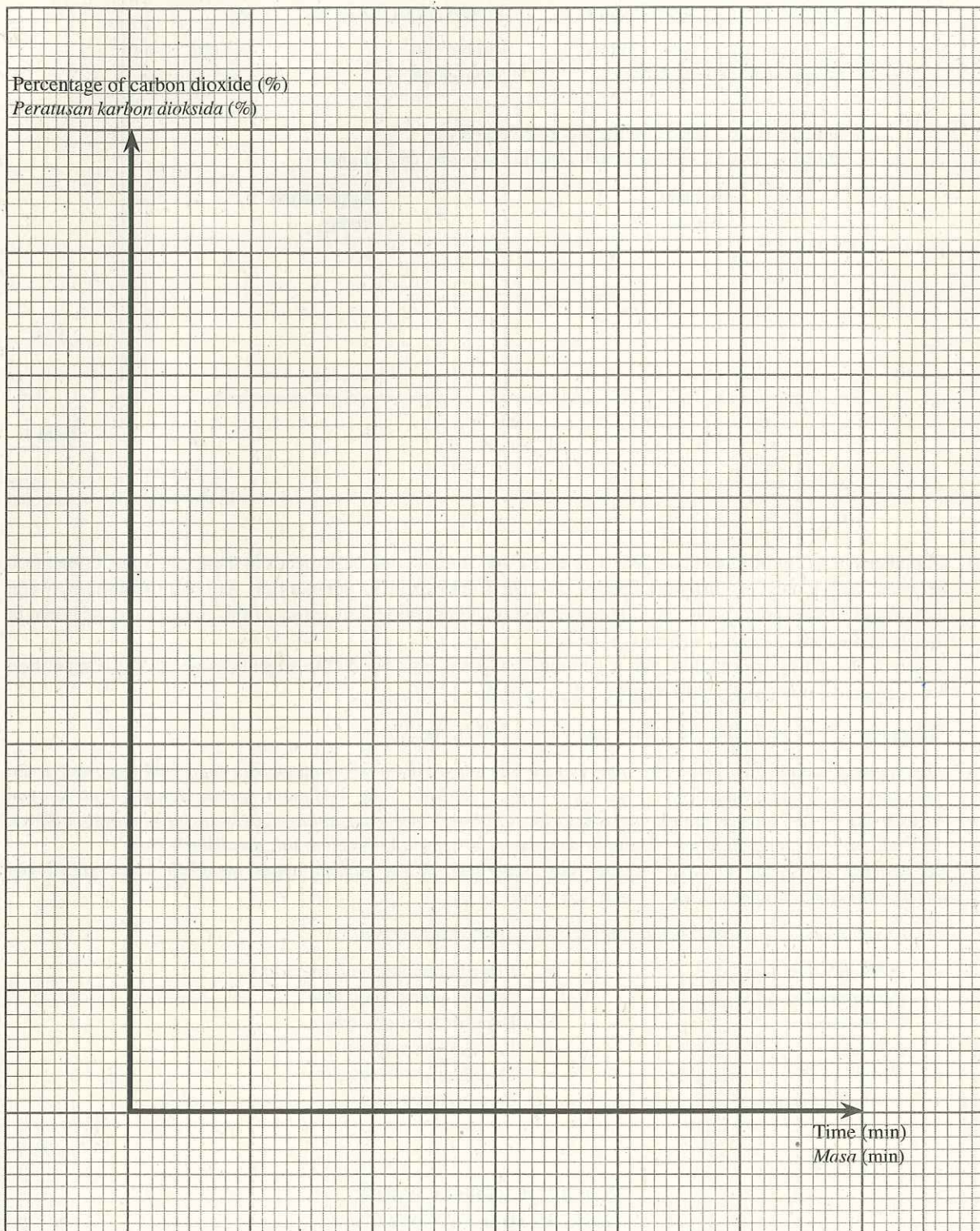
1(g)

	3
--	---

1(h)

	3
--	---

Graph of the percentage of carbon dioxide against the time of activity
Graf bagi peratusan karbon dioksida melawan masa aktiviti



- (i) The following list is part of the materials and apparatus used in this experiment.
Senarai berikut adalah sebahagian daripada bahan dan radas yang digunakan dalam eksperimen ini.

For
Examiner's
Use

Beaker <i>Bikar</i>	Boiling tube <i>Tabung didih</i>	Exhaled air sample <i>Sampel udara hembusan</i>	Water <i>Air</i>
Potassium hydroxide solution <i>Larutan kalium hidroksida</i>	Rubber tube <i>Salur getah</i>	J-Tube <i>Tiub-J</i>	

Complete Table 4 based on the list given above.
Lengkapkan Jadual 4 berdasarkan senarai yang diberikan di atas.

Material <i>Bahan</i>	Apparatus <i>Radas</i>

Table 4
Jadual 4

[3 marks]
 [3 markah]

1(i)

	3
--	---

Total 1

	33
--	----

- 2 Organisms in an environment compete with each other for the same basic needs in their survival. Competition between individuals of different species is called interspecific competition and competition between individuals of the same species is called intraspecific competition. The effect of the competition is shown in their growth such as height, size and dry mass.

Based on the above information, plan a laboratory experiment to study the effect of interspecific competition between maize plant and paddy plants on their growth.

The planning of your experiment must include the following aspect.

Organisma di dalam alam sekitar bersaing antara satu sama lain untuk mendapatkan keperluan asas yang sama bagi kemandirian masing-masing. Persaingan antara individu yang berlainan spesies dipanggil persaingan interspesifik dan persaingan antara individu daripada spesies yang sama dipanggil persaingan intraspesifik. Kesan daripada persaingan ini ditunjuk melalui pertumbuhannya seperti ketinggian, saiz dan jisim kering.

Berdasarkan maklumat di atas, rancang satu eksperimen dalam makmal untuk mengkaji kesan persaingan interspesifik di antara pertumbuhan jagung dan padi.

Perancangan eksperimen anda hendaklah meliputi aspek-aspek berikut:

- Problem statement
Pernyataan masalah
- Hypothesis
Hipotesis
- Variables
Pemboleh ubah
- List of apparatus and materials
Senarai radas dan bahan
- Experimental procedure
Prosedur eksperimen
- Presentation of data
Persembahan data

[17 marks]
 [17 markah]

END OF QUESTION PAPER
 KERTAS SOALAN TAMAT