

# SPM EXAMINATION PAPER 2016

## PAPER 1

Time: 1 hour and 15 minutes

**Instructions:** This question paper consists of 50 questions. Answer all questions.

**Arahan:** Kertas soalan ini mengandungi 50 soalan. Jawab semua soalan.

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

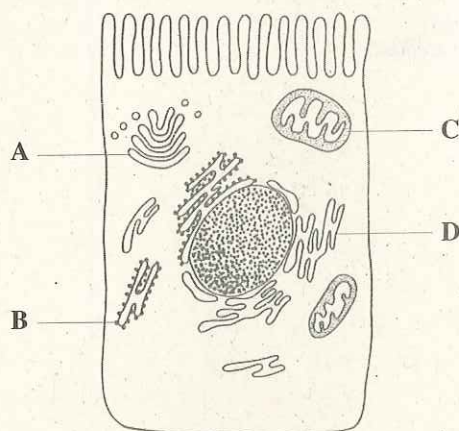


Diagram 1  
Rajah 1

Which organelle A, B, C or D, modifies, packages and transports molecules which have been synthesised by the cell?

Antara organel A, B, C dan D, yang manakah mengubahsuai, membungkus dan mengangkut molekul yang disintesis oleh sel tersebut?

- 2 What is the use of genetically modified penicillin in daily life?

Apakah kegunaan penisilin yang telah diubahsuai secara genetik dalam kehidupan seharian?

- A To clean oil spills  
Untuk membersihkan tumpahan minyak
- B To produce insulin  
Untuk menghasilkan insulin
- C To produce antibiotic  
Untuk menghasilkan antibiotik
- D To decompose bioplastics  
Untuk menguraikan bioplastik

- 3 Diagram 2 is a graph of the rate of contractile vacuole contraction.

Rajah 2 ialah graf bagi kadar pengecutan vakuol mengecut.

Rate of contractile vacuole contraction  
Kadar pengecutan vakuol mengecut

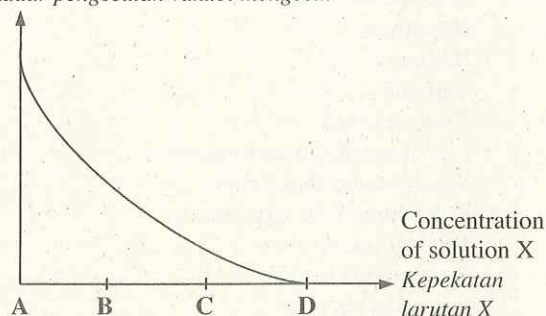


Diagram 2  
Rajah 2

In an experiment, *Amoeba* sp. is placed in solution X with different concentration.

Which concentration A, B, C or D of solution X is the same as the osmotic concentration of *Amoeba* sp.?

Dalam satu eksperimen, *Amoeba* sp. diletakkan dalam larutan X dengan kepekatan yang berbeza.

Kepekatan A, B, C dan D bagi larutan X yang manakah sama dengan kepekatan osmosis *Amoeba* sp.?

- 4 What is plant cell wall made of?

Apakah membina dinding sel tumbuhan?

- A Cellulose  
Selulosa
- B Cholesterol  
Kolesterol
- C Phospholipid  
Fosfolipid
- D Glycoprotein  
Glikoprotein

- 5 Diagram 3 shows an experiment to study osmosis.  
Rajah 3 menunjukkan satu eksperimen untuk mengkaji osmosis.

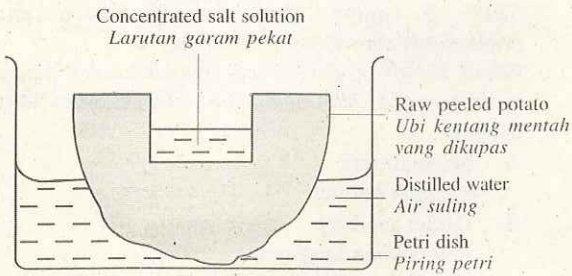
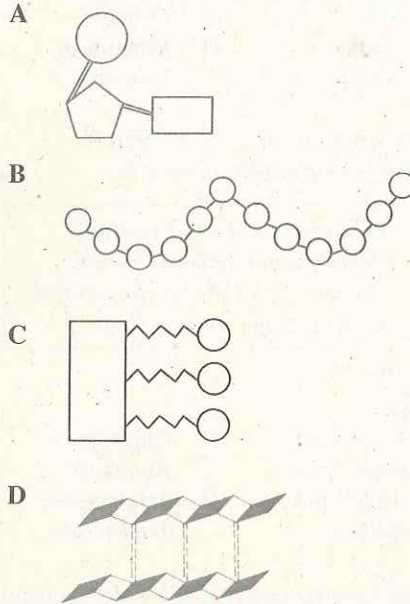


Diagram 3  
Rajah 3

What is the observation after 30 minutes?  
Apakah pemerhatian selepas 30 minit?

- A The level of water in the petri dish decreases  
Aras air dalam piring petri itu menurun
  - B The level of water in the petri dish increases  
Aras air dalam piring petri itu meningkat
  - C The level of salt solution in the potato decreases  
Aras larutan garam dalam ubi kentang menurun
  - D The level of salt solution in the potato remains the same  
Aras larutan garam dalam ubi kentang kekal sama
- 6 Which of the following will occur when a cell is immersed in an isotonic solution?  
Antara yang berikut, yang manakah akan berlaku apabila suatu sel direndam dalam larutan isotonik?
- A Water molecules diffuse out of the cell  
Molekul air meresap keluar dari sel
  - B Water molecules diffuse from the outside into the cell  
Molekul air meresap dari luar ke dalam sel
  - C Water molecules diffuse into and out of the cell at equal rates  
Molekul air meresap ke dalam dan ke luar sel pada kadar yang sama
  - D Water molecules diffuse into and out of the cell at different rates  
Molekul air meresap ke dalam dan ke luar sel pada kadar yang berbeza

- 7 Which of the following is a structure of triglyceride?  
Antara yang berikut, yang manakah struktur trigliserida?



- 8 Diagram 4 shows the structure of human skin.  
Rajah 4 menunjukkan struktur kulit manusia.

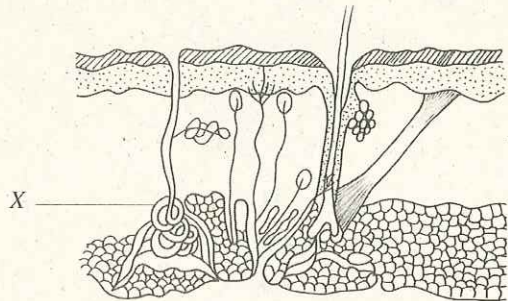


Diagram 4  
Rajah 4

What is X?  
Apakah X?

- A Heat receptor  
Reseptor haba
- B Sebum glands  
Kelenjar sebum
- C Sweat glands  
Kelenjar peluh
- D Hair follicle  
Folikel rambut



- 9 Which of the following is an enzyme inhibitor?  
Antara yang berikut, yang manakah adalah perencat enzim?

A Iron Ferum	C Penicillin Penisilin
B Mercury Merkuri	D Vitamin B Vitamin B

- 10 The following information is about R.  
Maklumat berikut adalah tentang R.

- Precursor for steroid synthesis  
Pelopor untuk sintesis steroid
- Component of plasma membrane  
Komponen membran plasma

What is R?

Apakah R?

A Glycoprotein Glikoprotein	C Cholesterol Kolesterol
B Phospholipid Fosfolipid	D Triglyceride Trigliserida

- 11 Diagram 5 shows polarity of a water molecule.  
Rajah 5 menunjukkan kepolaran bagi suatu molekul air.

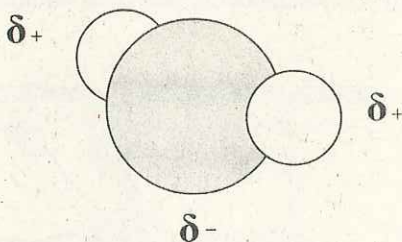


Diagram 5  
Rajah 5

What is the effect of unequal charges distribution?  
Apakah kesan taburan cas-cas yang tidak sama?

- A Water molecule can act as universal solvent  
Molekul air dapat bertindak sebagai pelarut universal
- B Water has the same density in the form of solid or liquid  
Air mempunyai ketumpatan yang sama dalam bentuk pepejal atau cecair
- C Water cannot dissolve another polar molecule such as sugar  
Air tidak dapat melarutkan molekul berketub yang lain, contohnya gula
- D Water forms a medium to transport blood  
Air membentuk suatu medium untuk mengangkut darah

- 12 *Stevia* sp. is a type of herbaceous plant that can be used as sweetener.

Which technique can be used by a farmer to produce the plants in large quantities?

*Stevia* sp. adalah sejenis tumbuhan herba yang boleh digunakan sebagai pemanis.

Teknik manakah yang boleh digunakan oleh petani untuk menghasilkan tumbuhan dalam kuantiti yang banyak?

- A Stem cutting  
Keratan batang
- B Direct seeding  
Penanaman langsung
- C Tissue culture  
Kultur tisu
- D Genetic engineering  
Kejuruteraan genetik

- 13 Diagram 6 shows a graph of the optimum pH of enzyme activity.

Rajah 6 menunjukkan graf pH optimum bagi aktiviti enzim.

Rate of enzyme activity ( $\text{min}^{-1}$ )  
Kadar aktiviti enzim ( $\text{min}^{-1}$ )

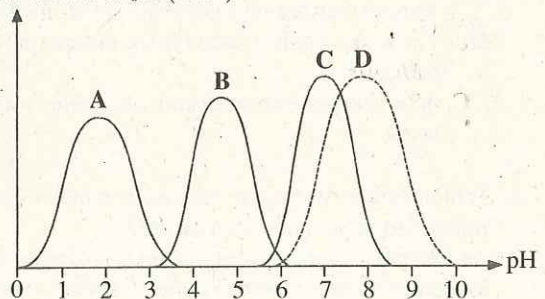


Diagram 6  
Rajah 6

Which of the curves A, B, C or D represents the activity of pepsin?

Antara lengkung A, B, C dan D yang manakah mewakili aktiviti pepsin?

- 14 Which of the following is the correct sequence of the interphase stage of a cell cycle?

Antara berikut, urutan manakah yang betul dalam peringkat interfasa suatu kitar sel?

- A  $G_1 \rightarrow G_2 \rightarrow S$
- B  $G_1 \rightarrow S \rightarrow G_2$
- C  $S \rightarrow G_1 \rightarrow G_2$
- D  $S \rightarrow G_2 \rightarrow G_1$

- 15 Diagram 7 shows the different phase of a cell cycle.  
*Rajah 7 menunjukkan fasa-fasa berbeza bagi suatu kitar sel.*

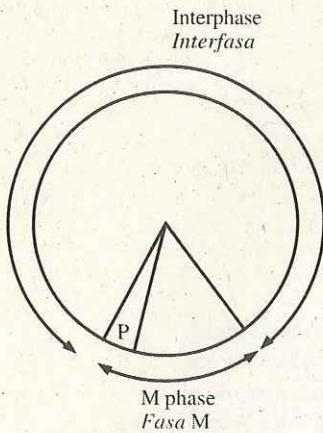


Diagram 7  
*Rajah 7*

What is P?  
*Apakah P?*

- A Growth  
*Pertumbuhan*
  - B Mitosis  
*Mitosis*
  - C Synthesis  
*Sintesis*
  - D Cytokinesis  
*Sitokinesis*
- 16 Diagram 8 shows a physical process in digestion of lipids which is aided by substance X.  
*Rajah 8 menunjukkan satu proses fizikal dalam pencernaan lipid yang dibantu oleh bahan X.*

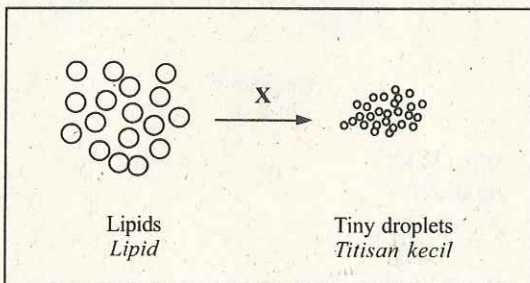


Diagram 8  
*Rajah 8*

What is X and its importance?  
*Apakah X dan kepentingannya?*

	X	Importance Kepentingan
A	Bile salt Garam hempedu	Creates acidic medium Menyediakan medium berasid
B	Bile salt Garam hempedu	Reduces surface tension Mengurangkan ketegangan permukaan
C	Hydrochloric acid Asid hidroklorik	Creates acidic medium Menyediakan medium berasid
D	Hydrochloric acid Asid hidroklorik	Reduces surface tension Mengurangkan ketegangan permukaan

- 17 Micronutrients are needed in small quantity by plant.  
 Which of the following is a micronutrient?  
*Mikronutrien diperlukan dalam kuantiti yang sedikit oleh tumbuhan.*  
*Antara yang berikut, yang manakah merupakan mikronutrien?*
- A Nitrogen  
*Nitrogen*
  - B Phosphorus  
*Fosforus*
  - C Magnesium  
*Magnesium*
  - D Manganese  
*Mangan*
- 18 Autotrophic nutrition is a process of obtaining nutrient  
*Nutrisi autotrof adalah satu proses untuk memperoleh nutrien*
- A from other living organisms  
*daripada organisma hidup yang lain*
  - B from decomposition on dead and decaying organic matter  
*daripada penguraian bahan-bahan organik yang mati dan mereput*
  - C through the intake and digestion of organic substances  
*melalui pengambilan dan pencernaan bahan organik*
  - D by synthesizing complex organic compounds using light energy or chemical energy  
*dengan mensintesis sebatian organik kompleks menggunakan tenaga cahaya atau tenaga kimia*



19 Which equation shows the enzymatic reaction in stomach?

*Persamaan yang manakah menunjukkan tindak balas enzim dalam perut?*

- A Starch + Water  $\xrightarrow[\text{Amilase}]{\text{Amylase}}$  Maltose  
*Kanji + Air  $\xrightarrow[\text{Amilase}]{\text{Amilase}}$  Maltosa*
- B Protein + Water  $\xrightarrow[\text{Pepsin}]{\text{Pepsin}}$  Polypeptide  
*Protein + Air  $\xrightarrow[\text{Pepsin}]{\text{Pepsin}}$  Polipeptida*
- C Fat + Water  $\xrightarrow[\text{Lipase}]{\text{Lipase}}$  Fatty acids + Glycerol  
*Lemak + Air  $\xrightarrow[\text{Lipase}]{\text{Lipase}}$  Asid lemak + Gliserol*
- D Lactose + Water  $\xrightarrow[\text{Laktase}]{\text{Lactase}}$  Glucose + Galactose  
*Laktosa + Air  $\xrightarrow[\text{Laktase}]{\text{Lactase}}$  Glukosa + Galaktosa*

20 What causes oxygen debt to occur?

*Apakah sebab berlakunya hutang oksigen?*

- A Increases in heart beat  
*Peningkatan denyutan jantung*
- B Rapid breathing  
*Pernafasan laju*
- C High level of carbon dioxide in the blood  
*Aras karbon dioksida yang tinggi dalam darah*
- D Oxygen demand exceeding oxygen supply  
*Keperluan oksigen melebihi bekalan oksigen*

21 Which of the following is the location of gaseous exchange of human and insects?

*Antara yang berikut, yang manakah lokasi pertukaran gas untuk manusia dan serangga?*

	Respiratory structure of humans <i>Struktur respirasi manusia</i>	Respiratory structure of insects <i>Struktur respirasi serangga</i>
A	Alveolus <i>Alveolus</i>	Tracheoles <i>Trakeol</i>
B	Alveolus <i>Alveolus</i>	Trachea <i>Trakea</i>
C	Lungs <i>Peparu</i>	Tracheoles <i>Trakeol</i>
D	Lungs <i>Peparu</i>	Trachea <i>Trakea</i>

22 What is the adaptation of frog skin for gas exchange?

*Apakah penyesuaian kulit katak untuk pertukaran gas?*

- A Moist and rich in blood capillaries  
*Lembab dan kaya dengan kapilari darah*

- B Smooth and dry  
*Licin dan kering*
- C Thick and moist  
*Tebal dan lembab*
- D Folded and thin  
*Berlipat dan nipis*

23 Diagram 9 shows the structure of human respiratory system.

*Rajah 9 menunjukkan struktur sistem respirasi manusia.*

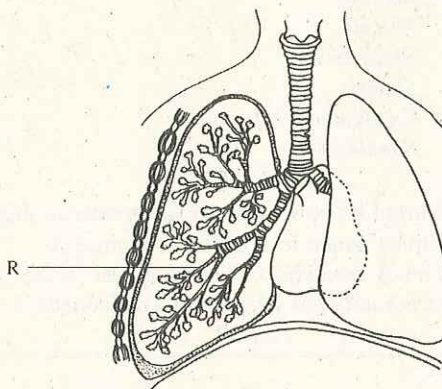


Diagram 9  
*Rajah 9*

What is R?  
*Apakah R?*

- A Trachea  
*Trakea*
- B Alveolus  
*Alveolus*
- C Bronchus  
*Bronkus*
- D Bronchiole  
*Bronkiol*

- 24 Diagram 10 shows the structure of an insect respiratory system.  
Rajah 10 menunjukkan struktur sistem respirasi bagi serangga.

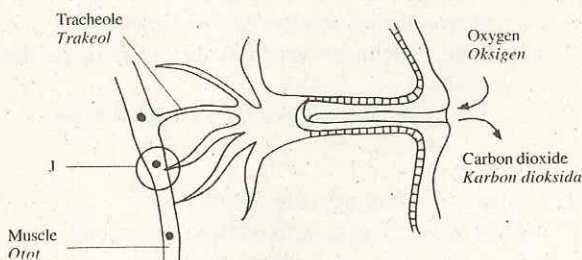


Diagram 10

Rajah 10

What process occurs at J during the gas exchange in the insect?

Apakah proses yang berlaku di J semasa pertukaran gas dalam serangga?

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

- 25 Diagram 11 shows a type of interaction between two organisms.

Rajah 11 menunjukkan satu jenis interaksi antara dua organisma.

Population size  
Saiz populasi

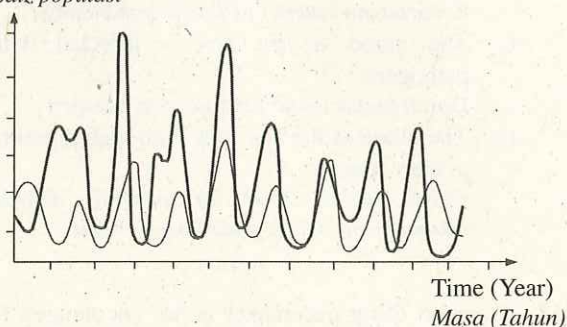


Diagram 11

Rajah 11

What is the type of interaction shown?

Apakah jenis interaksi yang ditunjukkan?

- A Symbiosis  
Simbiosis
- B Parasitism  
Parasitisme
- C Saprophytism  
Saprofitisme
- D Prey-predator  
Mangsa-pemangsa

- 26 What is the importance of vivipary in the seedlings of mangroves?

Apakah kepentingan vivipariti dalam biji benih pokok bakau?

- A Increases the chance of survival of the seedlings  
Meningkatkan peluang kemandirian biji benih
- B Eliminates excess salt from the plant  
Menyingkirkan garam berlebihan daripada pokok
- C Supplies nutrients to the plant  
Membekalkan nutrien kepada pokok
- D Allows variation to occur  
Membenarkan variasi berlaku

- 27 *Elaeis guineensis* is the scientific name for oil palm in Linnaeus Binomial System.

Which hierarchical level does *Elaeis* refer to?

*Elaeis guineensis* ialah nama saintifik untuk kelapa sawit dalam Sistem Binomial Linnaeus.

Apakah aras hierarki yang diwakili oleh *Elaeis*?

- A Class  
Kelas
- B Order  
Order
- C Genus  
Genus
- D Species  
Spesies

- 28 An experiment was carried out to study the level of pollution in water from four different sources A, B, C or D.

Which water sample is the most polluted?

Satu eksperimen telah dijalankan untuk mengkaji tahap pencemaran air dari empat sumber yang berlainan A, B, C dan D.

Sampel air yang manakah paling tercemar?

Time taken for methylene blue to decolourise (Hour) Masa yang diambil oleh metilena biru dilunturkan (Jam)	
A	4
B	3
C	2
D	1



- 29 The following information shows a negative effect on environment.

Maklumat berikut menunjukkan kesan negatif ke atas persekitaran.

Ozone layer depletion, acid rain, greenhouse effect and eutrophication are the negative effects on environment caused by uncontrolled human activities.

Penipisan ozon, hujan asid, kesan rumah hijau dan eutrofikasi adalah kesan-kesan negatif ke atas alam sekitar yang disebabkan oleh aktiviti manusia yang tidak dikawal.

Which of the following is correctly matched?

Antara yang berikut, yang manakah dipadankan dengan betul?

	Negative effect on environment <i>Kesan negatif ke atas alam sekitar</i>	Cause <i>Penyebab</i>
A	Ozone layer depletion <i>Penipisan lapisan ozon</i>	Carbon dioxide <i>Karbon dioksida</i>
B	Acid rain <i>Hujan asid</i>	Sulphur dioxide <i>Sulfur dioksida</i>
C	Greenhouse effect <i>Kesan rumah hijau</i>	Oxides of nitrogen <i>Oksida nitrogen</i>
D	Eutrophication <i>Eutrofikasi</i>	Chlorofluorocarbon (CFC) <i>Klorofluorokarbon (CFC)</i>

- 30 The following information is the definition of BOD.

Maklumat berikut adalah definisi bagi BOD.

Biochemical oxygen demand (BOD) refers to the amount of dissolved oxygen taken up by microorganisms that decompose organic waste matter in water.

Keperluan oksigen biokimia (BOD) merujuk kepada jumlah oksigen terlarut yang digunakan oleh mikroorganisma yang menguraikan bahan buangan organik dalam air.

Which of the following causes the BOD value of the water in a pond increases?

Antara yang berikut, yang manakah menyebabkan nilai BOD bagi air dalam kolam meningkat?

- A The growth of microorganisms stops  
*Pertumbuhan mikroorganisma terhenti*  
B The growth of microorganisms increases  
*Pertumbuhan mikroorganisma meningkat*  
C The growth of microorganisms decreases  
*Pertumbuhan mikroorganisma menurun*  
D The growth of microorganisms remains the same  
*Pertumbuhan mikroorganisma kekal sama*

- 31 A person is having a chest pain.

What is the disease suffered by the person?

Seorang individu mengalami sakit dada.

Apakah penyakit yang dialami oleh individu tersebut?

- A Angina  
*Angina*  
B Embolism  
*Embolisme*  
C Thrombosis  
*Trombosis*  
D Hypertension  
*Hipertensi*

- 32 A boy accidentally cut his finger. The blood clots occur slowly.

What caused the blood to clot slowly?

Seorang budak lelaki terluka jarinya dengan tidak sengaja. Darah membeku dengan perlahan.

Apakah yang menyebabkan darah membeku dengan perlahan?

- A Lack of vitamin D in his meal  
*Kekurangan vitamin D dalam makanannya*  
B Lack of vitamin K in his meal  
*Kekurangan vitamin K dalam makanannya*  
C The blood of the boy is infected with pathogens  
*Darah budak lelaki itu dijangkiti patogen*  
D The blood of the boy flow with high pressure at the wound  
*Darah budak lelaki itu mengalir dengan tekanan yang tinggi pada luka tersebut*

- 33 A person using pacemaker is not encouraged to carry out vigorous activity.

Which statement explains the situation?

Seorang individu yang menggunakan perentak tiruan tidak digalakkan melakukan aktiviti cergas.

Penyataan manakah yang menerangkan situasi tersebut?



- A Pacemaker blocks the transmission of electrical impulse  
*Perentak tiruan menghalang pemindahan impuls elektrik*
- B Pacemaker causes relaxation of atria and ventricle  
*Perentak tiruan menyebabkan pengenduran atria dan ventrikel*
- C Heart beat is already controlled by the pacemaker  
*Denyutan jantung dikawal oleh perentak tiruan*
- D The heart beat is slowed down by the pacemaker  
*Denyutan jantung diperlahankan oleh perentak tiruan*

- 34 Diagram 12 shows a fish.  
*Rajah 12 menunjukkan seekor ikan.*

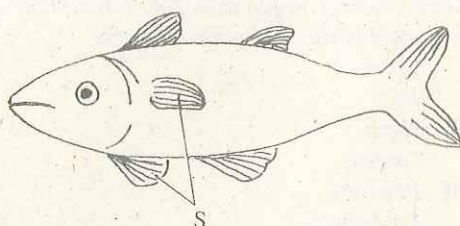


Diagram 12  
*Rajah 12*

What problem will occur to the movement of the fish if S is injured?

*Apakah masalah yang akan berlaku kepada pergerakan ikan sekiranya S tercedera?*

- A Pitching  
*Junaman*
- C Rolling  
*Gerakan*
- B Yawing  
*Pesongan*
- D Frictional drag  
*Seretan*

- 35 AIDS patients are common to get secondary infections such as pneumonia and fungal diseases. What caused the AIDS patients prone to get secondary infection?

*Penghidap AIDS biasanya akan mendapat jangkitan sekunder seperti pneumonia dan penyakit disebabkan fungi.*

*Apakah yang menyebabkan penghidap AIDS mudah mendapat jangkitan sekunder itu?*

- A HIV causes monocytes to engulf more pathogens  
*HIV menyebabkan monosit memusnahkan lebih banyak patogen*
- B HIV attacks neutrophils and inhibits phagocytosis  
*HIV menyerang neutrofil dan merencat fagositosis*

- C HIV causes eosinophils to increase allergic responses  
*HIV menyebabkan eosinofil meningkatkan tindak balas alergik*
- D HIV attacks and destroys T-lymphocyte and inhibits phagocytosis by macrophage  
*HIV menyerang dan memusnahkan limfosit-T dan merencat fagositosis oleh makrofaj*

- 36 Diagram 13 shows a hinge joint.  
*Rajah 13 menunjukkan satu sendi engsel.*

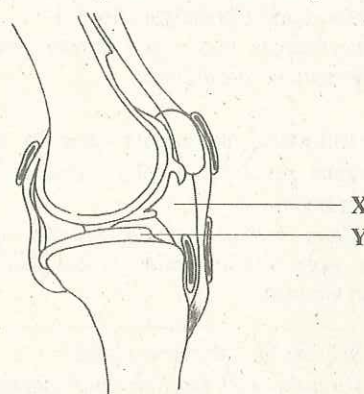


Diagram 13  
*Rajah 13*

What are parts X and Y?  
*Apakah bahagian X dan Y?*

	X	Y
A	Cartilage <i>Rawan</i>	Synovial membrane <i>Membran sinovial</i>
B	Cartilage <i>Rawan</i>	Articulating bone <i>Tulang artikulasi</i>
C	Synovial fluid <i>Bendalir sinovial</i>	Cartilage <i>Rawan</i>
D	Synovial fluid <i>Bendalir sinovial</i>	Articulating bone <i>Tulang artikulasi</i>

- 37 A person with chronic kidney failure can be treated by using haemodialysis machine.  
*Seorang individu yang mengalami kegagalan ginjal yang kronik boleh dirawat dengan menggunakan mesin hemodialisis.*

Which of the following process occurs during the treatment?

*Antara berikut, proses manakah yang berlaku semasa rawatan?*



- A** Toxin diffuses from the dialysis fluid to the blood  
*Toksin meresap dari cecair dialisis ke darah*
- B** Water molecules diffuse from the blood to the dialysis fluid  
*Molekul air meresap dari darah ke cecair dialisis*
- C** Nutrient diffuses from the dialysis fluid to the blood  
*Nutrien meresap dari cecair dialisis ke darah*
- D** Exchange of toxin and nutrient between the blood and the dialysis fluid  
*Pertukaran toksin dan nutrien antara darah dengan cecair dialisis*

- 38** The following statements refer to a chemical substance involved in physiological process in human body.  
*Penyataan berikut merujuk kepada suatu bahan kimia yang terlibat dalam proses fisiologi dalam badan manusia.*

- Secrete by a ductless gland  
*Dirembes oleh kelenjar tanpa duktus*
- Transport by blood to the target organ  
*Diangkut oleh darah ke organ sasaran*
- The effects are slow and long-lasting  
*Kesannya perlahan dan jangka masa panjang*

What is the chemical substance?

*Apakah bahan kimia tersebut?*

- A** Enzyme                      **C** Hormone  
*Enzim                          Hormon*
- B** Antibody                  **D** Haemoglobin  
*Antibodi                      Hemoglobin*

- 39** Diagram 14 shows the pathway of transmission of information.  
*Rajah 14 menunjukkan laluan penghantaran maklumat.*

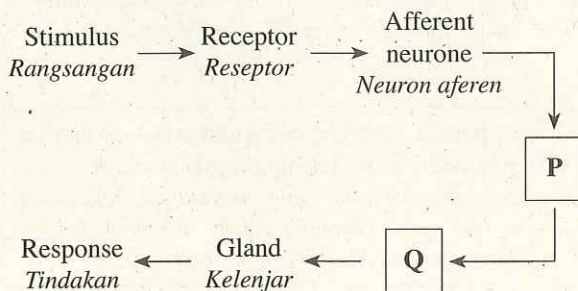


Diagram 14  
*Rajah 14*

What are represented by **P** and **Q**?

*Apakah yang diwakili oleh **P** dan **Q**?*

	<b>P</b>	<b>Q</b>
<b>A</b>	Interneurone <i>Neuron perantaraan</i>	Brain <i>Otak</i>
<b>B</b>	Brain <i>Otak</i>	Efferent neurone <i>Neuron eferen</i>
<b>C</b>	Efferent neurone <i>Neuron eferen</i>	Brain <i>Otak</i>
<b>D</b>	Brain <i>Otak</i>	Interneurone <i>Neuron perantaraan</i>

- 40** Which of the following organs are involved in the regulation of blood glucose level?  
*Antara berikut, organ manakah yang terlibat dalam pengawalaturan aras glukosa darah?*

- I** Liver  
*Hati*
- II** Heart  
*Jantung*
- III** Pancreas  
*Pankreas*
- IV** Duodenum  
*Duodenum*

- A** I and II                      **C** II and IV  
*I dan II                      II dan IV*
- B** I and III                    **D** III and IV  
*I dan III                    III dan IV*

- 41** What is the type of reproduction in yeast?  
*Apakah jenis pembiakan pada yis?*

- A** Budding  
*Pertunasan*
- B** Conjugation  
*Pengkonjugatan*
- C** Regeneration  
*Pertumbuhan semula*
- D** Binary fission  
*Belahan dedua*

- 42** A wife is not able to get pregnant because her husband has low sperm count.  
Which of the following methods can help to overcome the problem?  
*Seorang isteri tidak boleh mengandung kerana bilangan sperma suaminya rendah.*  
*Antara berikut, kaedah manakah yang boleh membantu mengatasi masalah tersebut?*

- A Vasectomy  
*Vasektomi*
- B Spermicide  
*Spermisid*
- C Artificial insemination  
*Permanian berhadass*
- D Injection of testosterone  
*Suntikan testosteron*

43 The information below is about the follicle development, ovulation and the formation of corpus luteum.

*Maklumat di bawah adalah tentang perkembangan folikel, ovulasi dan pembentukan korpus luteum.*

- I Ovulation  
*Ovulasi*
- II Development of corpus luteum  
*Perkembangan korpus luteum*
- III Primary oocyte develops into secondary oocyte  
*Oosit primer berkembang menjadi oosit sekunder*
- IV Corpus luteum secretes progesterone  
*Korpus luteum merembeskan progesteron*

Which of the following is the correct sequence in menstrual cycle?

*Antara yang berikut, yang manakah urutan yang betul dalam kitar haid?*

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

44 A childless couple consulted a doctor about their infertility problem. The doctor diagnosed and found that the wife had a problem of follicle cell development.

Which of the following treatments can overcome the problem?

*Sepasang suami isteri yang tidak mempunyai anak meminta nasihat doktor berkaitan masalah kesuburan mereka. Doktor mendiagnosis dan mendapati bahawa isterinya menghadapi masalah perkembangan sel folikel.*

*Antara berikut, rawatan manakah yang boleh mengatasi masalah tersebut?*

- A Treat with follicle stimulating hormone (FSH)  
*Merawat dengan hormon perangsang folikel (FSH)*
- B Treat with progesterone  
*Merawat dengan progesteron*

- C Treat with oestrogen  
*Merawat dengan estrogen*
- D Treat with luteinising hormone (LH)  
*Merawat dengan hormon peluteinan (LH)*

45 An individual is suffering from Thalassaemia. Which activity is suitable to be carried out by the individual?

*Seorang individu menghidap Talasemia.*

*Aktiviti manakah yang sesuai dilakukan oleh individu itu?*

- A Scuba diving  
*Menyelam skuba*
- B Running  
*Berlari*
- C Aerobic exercise  
*Latihan aerobik*
- D Driving  
*Memandu*

46 Diagram 15 shows a monohybrid cross between two plants. The possible genotypes of Z is TT, Tt or tt.

*Rajah 15 menunjukkan satu kacukan monohibrid antara dua batang pokok. Genotip yang mungkin bagi Z ialah TT, Tt atau tt.*

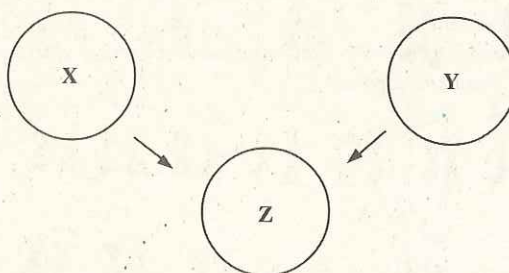


Diagram 15

*Rajah 15*

What are the genotypes of X and Y?

*Apakah genotip bagi X dan Y?*

	X	Y
A	Tt	Tt
B	TT	Tt
C	Tt	TT
D	Tt	tt



- 47 Diagram 16 shows a karyotype of a human with chromosomal mutation.

*Rajah 16 menunjukkan satu kariotip bagi seorang manusia dengan mutasi kromosom.*

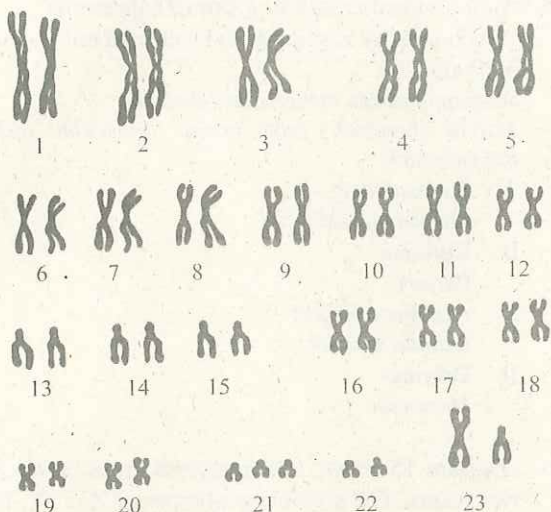


Diagram 16

*Rajah 16*

Which set of chromosome differs from normal human?

*Set kromosom yang manakah berbeza daripada manusia normal?*

- A Set 1  
*Set 1*
- B Set 13  
*Set 13*
- C Set 21  
*Set 21*
- D Set 23  
*Set 23*

- 48 What is the genotype of a carrier for haemophilia?

*Apakah genotip seorang pembawa hemofilia?*

- A  $X^hX^h$
- B  $X^HX^h$
- C  $X^hY$
- D  $X^HY$

- 49 Which of the following are examples of discontinuous variation?

*Antara berikut, contoh yang manakah variasi tak selanjut?*

- I Weight  
*Berat*
- II Skin colour  
*Warna kulit*
- III Blood group  
*Kumpulan darah*
- IV Tongue rolling  
*Menggulung lidah*

- A I and II  
*I dan II*
- B I and III  
*I dan III*
- C II and IV  
*II dan IV*
- D III and IV  
*III dan IV*

- 50 Which of the following traits is sex-linked?

*Antara berikut, trait yang manakah terangkai seks?*

- A Albinism  
*Albinisme*
- B Haemophilia  
*Hemofilia*
- C Thalassemia  
*Talasemia*
- D Sickle-cell anaemia  
*Anemia sel sabit*

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 1.1 shows a cross section of dicotyledonous stem.  
Rajah 1.1 menunjukkan keratan batang dikotiledon.

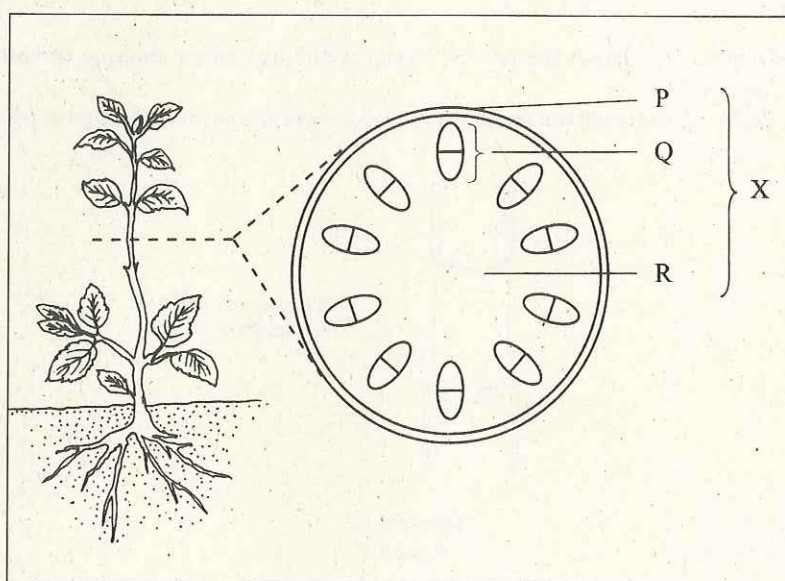


Diagram 1.1  
Rajah 1.1

- (a) (i) Name the level of organisation of X.  
Namakan peringkat organisasi bagi X.

[1 mark]  
[1 markah]

1(a)(i)

	1
--	---

- (ii) Name structures P, Q and R.  
Namakan struktur P, Q dan R.

P : .....  
Q : .....  
R : .....

[3 marks]  
[3 markah]

1(a)(ii)

	3
--	---



- (b) Structure P is the outermost layer of X.  
Explain the characteristic of P.  
*Struktur P adalah lapisan paling luar bagi X.*  
*Terangkan ciri P.*

1(b)

3
---

[3 marks]

[3 markah]

- (c) (i) Name **two** tissues that form structure Q which involved in transportation.  
*Namakan **dua** tisu yang membentuk struktur Q yang terlibat dalam pengangkutan.*

1(c)(i)

3
---

[1 mark]

[1 markah]

- (ii) Diagram 1.2 shows the part of a stem of the tree where the ring of bark has been removed.

*Rajah 1.2 menunjukkan bahagian batang pokok itu yang gelang kulitnya telah dibuang.*

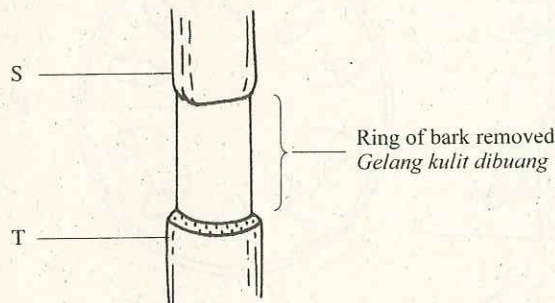


Diagram 1.2

*Rajah 1.2*

Predict the condition at S and T after one month.

*Ramalkan keadaan pada S dan T selepas satu bulan.*

S : .....

T : .....

[2 marks]

[2 markah]

- (iii) Explain your prediction at S.  
*Terangkan ramalan anda pada S.*

1(c)(iii)

2
---

[2 marks]

[2 markah]

Total A1

12
----

2 Diagram 2.1 shows a reaction of enzyme R on substrate P.  
Rajah 2.1 menunjukkan tindak balas enzim R ke atas substrat P.



- [2 marks]  
[2 markah]

- [illegible]

[3 marks]  
[3 markah]

- 
- The diagram illustrates the lock-and-key model of enzyme action in three stages:
- Stage I (Peringkat I):** Shows the **Enzyme R** (Enzim R) as a lock with a specific shape. **Substrate P** (Substrat P) and **Substrate S** (Substrat S) are shown as keys. Substrate P has a shape that matches the enzyme's active site, while Substrate S does not.
  - Stage II (Peringkat II):** Shows the **Enzyme - substrate complex** (Kompleks enzim - substrat). Substrate P is bound to the enzyme's active site, forming a complex. Substrate S remains unbound.
  - Stage III (Peringkat III):** Shows the **Products** (Hasil). The enzyme is released, and the substrate P is broken down into two smaller products. Substrate S remains unbound.

Diagram 2.2  
*Rajah 2.2*



2(b)(i)

2
---

- (i) Explain why enzyme R only acts on substrate P as shown at stage II in Diagram 2.2.  
*Terangkan mengapa enzim R hanya bertindak ke atas substrat P seperti yang ditunjukkan pada peringkat II dalam Rajah 2.2.*

[2 marks]

[2 markah]

- (ii) Only a small quantity of enzyme R is needed in the reaction.  
Explain why.  
*Hanya sedikit kuantiti enzim R diperlukan dalam tindak balas itu.  
Terangkan mengapa.*

2(b)(ii)

2
---

[2 marks]

[2 markah]

- (c) Diagram 2.3 shows the action of molecule X on enzyme R.  
*Rajah 2.3 menunjukkan tindakan molekul X ke atas enzim R.*

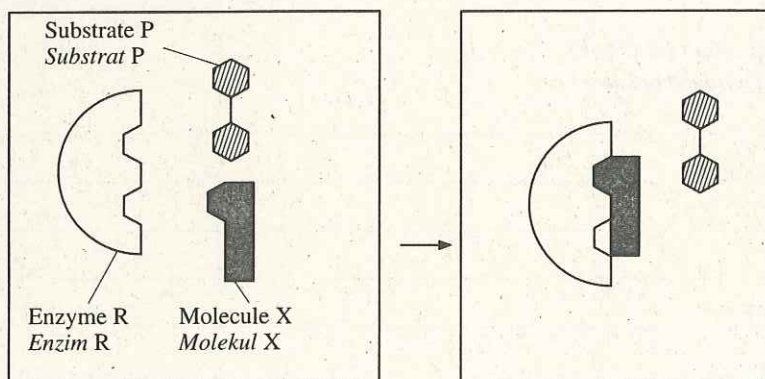


Diagram 2.3

*Rajah 2.3*

Explain how the presence of molecule X affects the reaction of enzyme R with substrate P.  
*Terangkan bagaimana kehadiran molekul X mempengaruhi tindak balas enzim R dengan substrat P.*

[3 marks]

[3 markah]

2(c)

3
---

Total A2

12
----

- 3 Plasma membrane is important to control the exchange of materials such as nutrients and water in and out of a cell. Diagram 3.1 shows components of the plasma membrane.  
*Membran plasma adalah penting untuk mengawal pertukaran bahan seperti nutrien dan air ke dalam dan ke luar sel. Rajah 3.1 menunjukkan komponen-komponen membran plasma.*

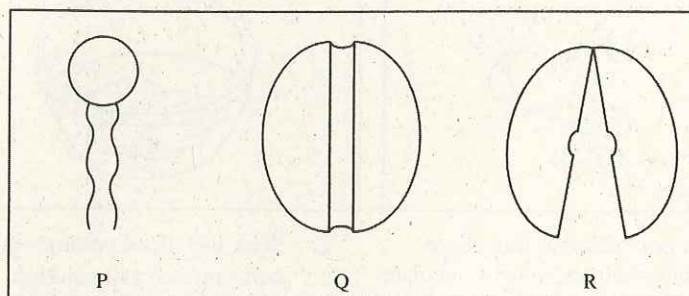


Diagram 3.1  
*Rajah 3.1*

- (a) (i) Name P and Q.  
*Namakan P dan Q.*

P : .....

Q : .....

[2 marks]

[2 markah]

3(a)(i)

	2
--	---

- (ii) State the function of P and Q.  
*Nyatakan fungsi P dan Q.*

P : .....

Q : .....

[2 marks]

[2 markah]

3(a)(ii)

	2
--	---

- (iii) Water molecules able to diffuse across P.  
 Give your reason.  
*Molekul air boleh meresap merentasi P.*  
*Beri alasan anda.*

.....

[1 mark]

[1 markah]

3(a)(iii)

	1
--	---

- (b) State **two** differences of transport process which occur at Q and R.  
*Nyatakan **dua** perbezaan proses pengangkutan yang berlaku pada Q dan R.*

.....

.....

.....

[2 marks]

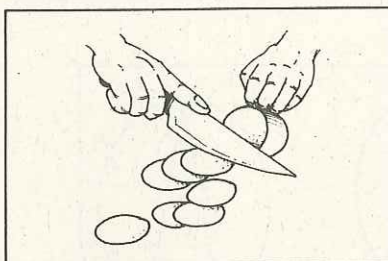
[2 markah]

3(b)

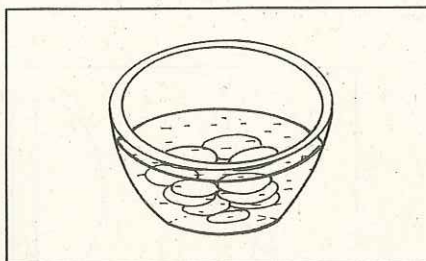
	2
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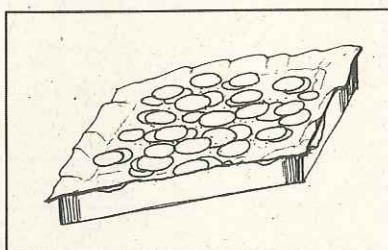
- (c) Diagram 3.2 shows steps in preparing a homemade crispy potato chips.  
*Rajah 3.2 menunjukkan kaedah penyediaan kepingan kentang rangup buatan sendiri.*



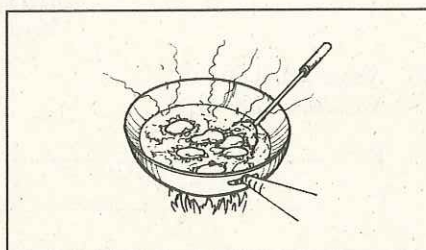
1. Cut potatoes into thin slices  
*Potong kentang kepada kepingan nipis*



2. Soak the sliced potatoes into concentrated salt solution  
*Rendamkan kepingan kentang ke dalam larutan garam pekat*



3. Rinse a few times and dry the sliced potatoes  
*Bilas beberapa kali dan keringkan kepingan kentang*



4. Fry sliced potatoes in hot cooking oil  
*Goreng kepingan kentang dalam minyak masak yang panas*

Diagram 3.2  
*Rajah 3.2*

In your opinion, explain which step is important to produce potato chips that are crispy.  
*Pada pendapat anda, terangkan langkah yang manakah penting untuk menghasilkan kepingan kentang rangup.*

.....

.....

.....

[3 marks]  
[3 markah]

3(c)

	3
--	---

(d) A housewife uses coconut husk to plant an orchid as in Diagram 3.3.

Seorang suri rumah menggunakan sabut kelapa untuk menanam pokok orkid seperti ditunjukkan pada Rajah 3.3.

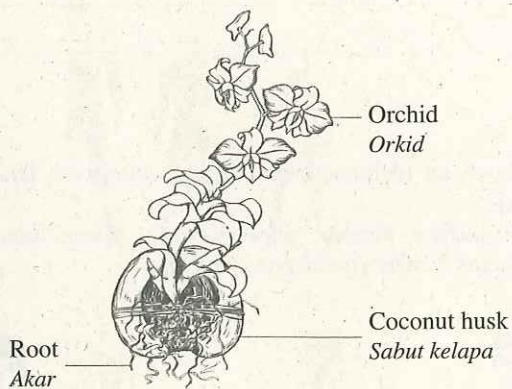


Diagram 3.3  
Rajah 3.3

Why coconut husk is used to plant the orchid?

Mengapakah sabut kelapa digunakan untuk menanam pokok orkid itu?

.....

.....

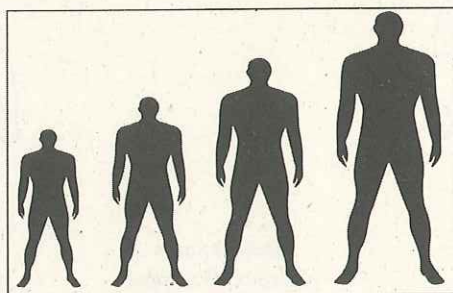
.....

[2 marks]

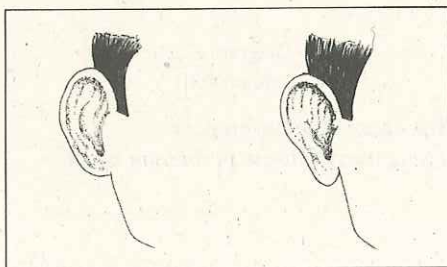
[2 markah]

4 Diagram 4.1 shows two examples of variation in human, P and Q.

Rajah 4.1 menunjukkan dua contoh variasi pada manusia, P dan Q.



P



Q

Diagram 4.1  
Rajah 4.1

For  
Examiner's  
Use

3(d)

	2
--	---

Total A3

	12
--	----



4(a)

	2
--	---

- (a) State the types of variation of P and Q.  
*Nyatakan jenis variasi bagi P dan Q.*

P : .....

Q : .....

[2 marks]

[2 markah]

- (b) Diagram 4.2.1 shows an identical twins during childhood. Diagram 4.2.2 shows the twins after 20 years.

*Rajah 4.2.1 menunjukkan kembar seiras semasa zaman kanak-kanak. Rajah 4.2.2 menunjukkan pasangan kembar itu selepas 20 tahun.*



During childhood  
*Semasa kanak-kanak*



Diagram 4.2.1  
*Rajah 4.2.1*



After 20 years  
*Selepas 20 tahun*



Diagram 4.2.2  
*Rajah 4.2.2*

Give **two** reasons that causes the differences.

*Berikan **dua** alasan yang menyebabkan perbezaan tersebut.*

.....

.....

[2 marks]

[2 markah]

4(b)

	2
--	---

- (c) Albinism is a genetic disorder. An albino person cannot produce an enzyme for the production of skin pigment, melanin. Melanin is an effective absorber of light. It is able to dissipate over 99.9 % of absorbed UV radiation.

*Albinisme merupakan satu ketidakaturan genetik. Seorang penghidap albino tidak boleh menghasilkan enzim untuk penghasilan pigmen kulit, melanin. Melanin ialah sejenis penyerap cahaya yang berkesan. Ia dapat memudahkan kira-kira 99.9 % sinar UV yang diserap.*

- (i) Explain the cause of albinism.

*Terangkan sebab albinisme.*

.....  
.....

[2 marks]

[2 markah]

4(c)(i)

	2

- (ii) Explain the measures should be taken by an albino person if he wants to carry out outdoor activities during daytime.

*Terangkan langkah yang perlu diambil oleh penghidap albino jika dia mahu menjalankan aktiviti luar rumah pada waktu siang.*

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

[3 marks]

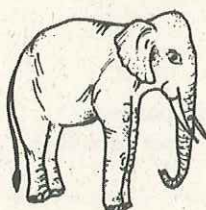
[3 markah]

4(c)(ii)

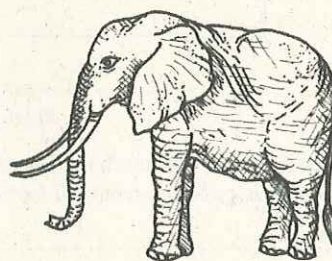
	3

- (d) Diagram 4.3 shows two different species of elephant, Asian elephant and African elephant.

*Rajah 4.3 menunjukkan dua spesies gajah yang berlainan, gajah Asia dan gajah Afrika.*



Asian elephant  
Gajah Asia



African elephant  
Gajah Afrika

Diagram 4.3

Rajah 4.3

- (i) State another physical difference other than body size that can be observed from African elephant compared to Asian elephant.

*Nyatakan perbezaan fizikal lain selain daripada saiz badan yang dapat diperhatikan pada gajah Afrika berbanding dengan gajah Asia.*

.....

[1 mark]

[1 markah]

4(d)(i)

	1



For  
Examiner's  
Use

4(d)(ii)

3
---

Total A4

12
----

- (ii) Explain your answer in 4(d)(i).  
*Terangkan jawapan anda di 4(d)(i).*

[2 marks]

[2 markah]

- 5 Farmers in Kagawa, Japan have produced square-shaped watermelons. This is done during the early stage of the fruit development.  
*Pekebun di Kagawa, Jepun telah menghasilkan tembikai berbentuk segi empat. Ini dilakukan pada peringkat awal perkembangan buah.*

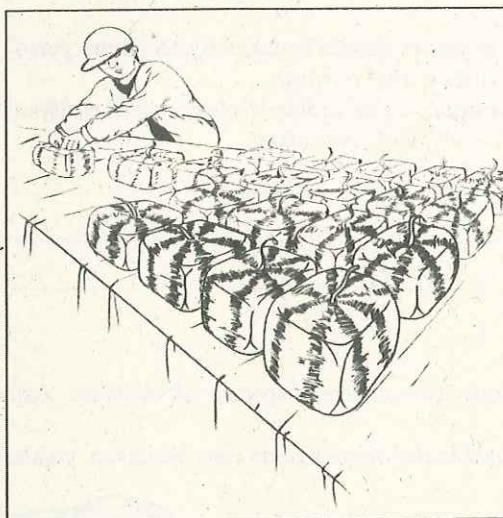


Diagram 5.1

Rajah 5.1

- (a) (i) Suggest how the square-shaped watermelons are produced?  
*Cadangkan bagaimana tembikai berbentuk segi empat dihasilkan?*

[2 marks]

[2 markah]

- (ii) Based on Diagram 5.1, give **two** advantages of producing square-shaped watermelon.  
*Berdasarkan Rajah 5.1, beri **dua** kebaikan menghasilkan tembikai berbentuk segi empat.*

[2 marks]

[2 markah]

5(a)(i)

2
---

5(a)(ii)

2
---

- (b) Diagram 5.2 shows different shapes of watermelon fruits and the hereditary factors which determine the characteristic of the watermelon fruits.

Write the correct genetic terms in the space provided.

Rajah 5.2 menunjukkan buah tembikai yang berbeza bentuk dan faktor pewarisan yang menentukan ciri pada buah tembikai itu.

Tuliskan istilah genetik yang betul dalam ruang yang disediakan.



Genetic terms Istilah genetik		
Genotype Genotip	Phenotype Fenotip	
		.....
Tt	Tt	.....

Diagram 5.2

Rajah 5.2

[2 marks]

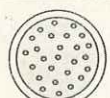
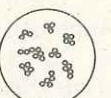
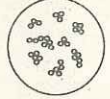
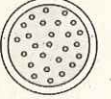
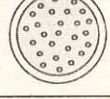
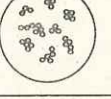
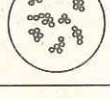
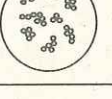
[2 markah]

5(b)

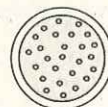
2
---

- (c) Table 5.1 shows the ABO blood group. ABO test is used to determine the blood group. The blood sample is mixed with antibody A and antibody B. if the blood cells agglutinate, it means the blood cell has reacted with the antibodies.

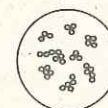
Jadual 5.1 menunjukkan kumpulan darah ABO. Ujian ABO digunakan untuk menentukan kumpulan darah. Sampel darah dicampurkan dengan antibodi A dan antibodi B. Jika sel-sel darah bergumpal, ini bermakna sel darah telah bertindak balas dengan antibodi itu.

Blood group Kumpulan darah	Serum	
	Anti-A	Anti-B
O		
A		
B		
AB		

Key:  
Kekunci:



No agglutination  
Tiada penggumpalan



Agglutination  
Penggumpalan

Table 5.1

Jadual 5.1



Table 5.2 shows the result of ABO test of patients that need blood transfusion.  
Jadual 5.2 menunjukkan keputusan ujian ABO untuk pesakit-pesakit yang memerlukan pemindahan darah.

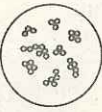
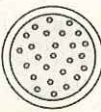
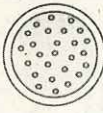
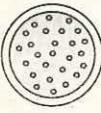
Patient Pesakit	Serum		Blood group Kumpulan darah
	Anti-A	Anti-B	
David			.....
Lee			.....

Table 5.2  
Jadual 5.2

- (i) Complete Table 5.2 by writing the blood group for David and Lee.  
Lengkapkan Jadual 5.2 dengan menulis kumpulan darah untuk David dan Lee.  
[2 marks]  
[2 markah]
- (ii) Based on Table 5.1, which type of blood group donor that is compatible to David and Lee for blood transfusion?  
Berdasarkan Jadual 5.1, manakah jenis kumpulan darah penderma yang sesuai untuk David dan Lee bagi pemindahan darah?  
David : .....  
Lee : .....  
[2 marks]  
[2 markah]
- (iii) An accident victim with blood type B needs blood transfusion during emergency.  
Is it safe for the victim to receive blood type O?  
Explain why.  
Seorang mangsa kemalangan yang mempunyai darah jenis B memerlukan pemindahan darah semasa kecemasan.  
Adakah selamat untuk dia menerima darah jenis O?  
Terangkan mengapa.

5(c)(i)  
2

5(c)(ii)  
2

5(c)(iii)  
2

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.

- 6 . (a) Diagram 6.1 shows the end of two neurones.

Rajah 6.1 menunjukkan hujung dua neuron.

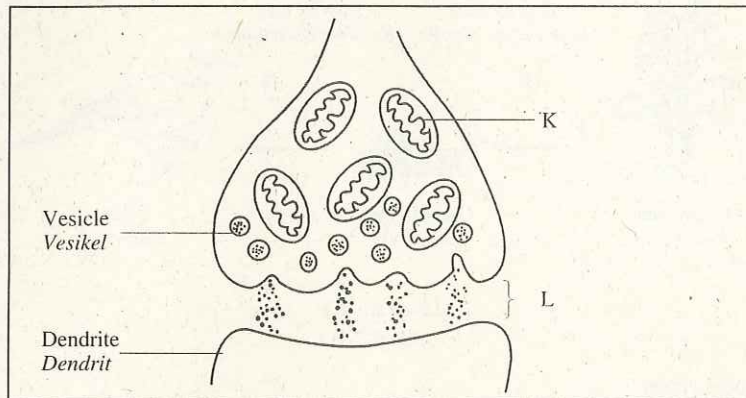


Diagram 6.1

Rajah 6.1

- (i) Explain the functions of structure K and L in the transmission of information from neurone to another neurone. [4 marks]

Terangkan fungsi struktur K dan struktur L dalam pemindahan maklumat dari satu neuron ke neuron yang lain. [4 markah]

- (ii) Misuse of stimulants and depressants for a long term will affect a person's health. Explain the effect. [6 marks]

Penyalahgunaan stimulan dan depresan untuk jangka masa yang lama akan memberi kesan kepada kesihatan seseorang. [6 markah]

Terangkan kesan tersebut.

[6 markah]

- (b) Diagram 6.2 shows activities of a group of football fans and football players in a stadium.

Rajah 6.2 menunjukkan aktiviti sekumpulan peminat bola sepak dan pemain bola sepak di dalam sebuah stadium.

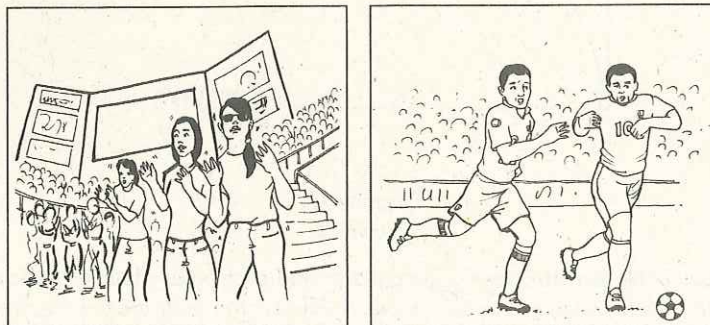


Diagram 6.2

Rajah 6.2



During the match, the heartbeat rate of the football fans and players increases.

Explain the relationship between the heartbeat rate and the activities of the football fans and the players. [10 marks]

Semasa perlawanan sedang berlangsung, kadar denyutan jantung peminat dan pemain bola sepak meningkat. Terangkan hubungan antara kadar denyutan jantung dengan aktiviti peminat dan pemain bola sepak.

[10 markah]

- 7 (a) Diagram 7.1 shows a food chain in a paddy field.

Rajah 7.1 menunjukkan satu rantai makanan di suatu sawah padi.

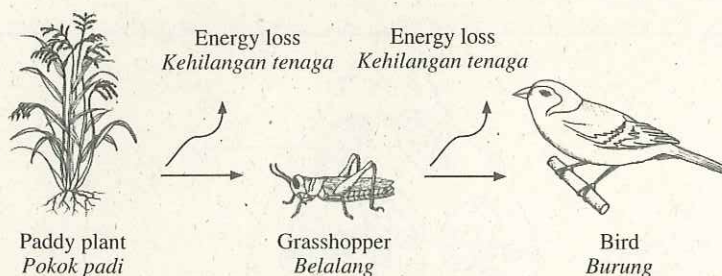


Diagram 7.1

Rajah 7.1

Explain the food chain.

[4 marks]

Terangkan rantai makanan ini.

[4 markah]

- (b) A study on interaction between plants was conducted in a farm by a scientist. In his study, he uses maize plants and padi bukit. Diagram 7.2 shows the growth rate of maize plants and padi bukit planted in two different plots.

Suatu kajian tentang interaksi antara tumbuhan telah dijalankan oleh seorang saintis. Dia menggunakan tanaman jagung dan tanaman padi bukit. Rajah 7.2 menunjukkan kadar pertumbuhan pokok jagung dan padi bukit yang ditanam di dua plot yang berbeza.

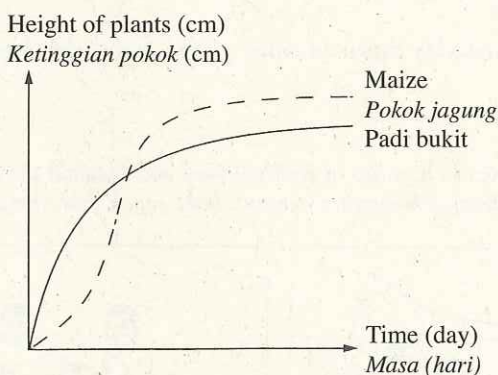


Diagram 7.2

Rajah 7.2

Diagram 7.3 shows the growth rate of maize plants and padi bukit planted in the same plot.

Rajah 7.3 menunjukkan kadar pertumbuhan pokok jagung dan padi bukit yang ditanam di dua plot yang sama.

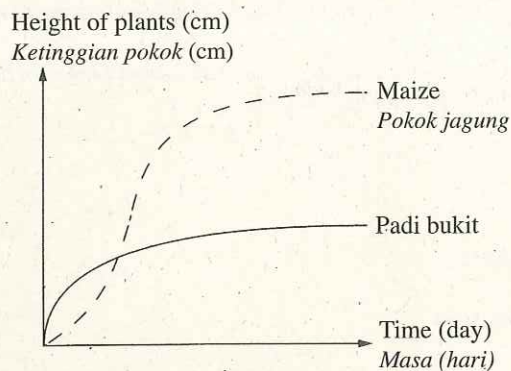


Diagram 7.3  
Rajah 7.3

The plants are given the same amount of nutrients and water.

Explain the interaction in Diagram 7.2 and Diagram 7.3.

[10 marks]

*Pokok-pokok tersebut diberi jumlah nutrien dan jumlah air yang sama.*

*Terangkan interaksi dalam Rajah 7.2 dan Rajah 7.3.*

[10 markah]

(c) AIDS and dengue are diseases which can be easily spread.

Explain how these diseases affect a person's health.

[6 marks]

*AIDS dan denggi ialah penyakit yang boleh merebak dengan mudah.*

*Terangkan bagaimana penyakit-penyakit ini memberi kesan terhadap kesihatan seseorang.*

[6 markah]

8 (a) Diagram 8 shows the transport system of plant.

*Rajah 8 menunjukkan sistem pengangkutan bagi tumbuhan.*

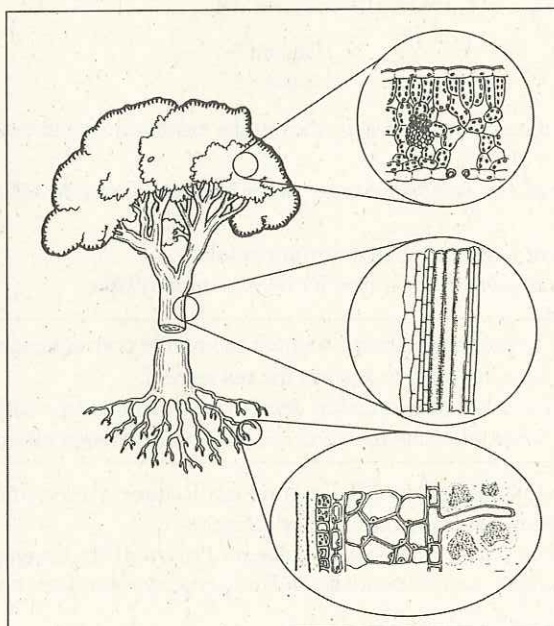


Diagram 8  
Rajah 8

Based on the diagram, describe the mechanism of water transport from the soil to the leaves. [10 marks]

*Berdasarkan rajah, huraikan mekanisme pengangkutan air dari tanah ke daun.*

[10 markah]



- (b) Cardiovascular disease is one of the main causes of death in our country. The following are the factors that can lead to the disease:

*Penyakit kardiovaskular adalah satu daripada penyebab utama kematian dalam negara kita. Berikut adalah faktor-faktor yang boleh menyebabkan penyakit itu:*

- Smoking  
*Merokok*
- Unbalanced diet  
*Diet yang tidak seimbang*
- Unhealthy lifestyle  
*Gaya hidup yang tidak sihat*

Explain the factors given which contribute to the cardiovascular disease.

[10 marks]

*Terangkan faktor-faktor yang diberi yang menyumbang kepada penyakit kardiovaskular.*

[10 markah]

- 9 (a) Diagram 9 shows a location of a popular eco-tourism in Malaysia.

*Rajah 9 menunjukkan suatu lokasi eko-pelancongan yang popular di Malaysia.*

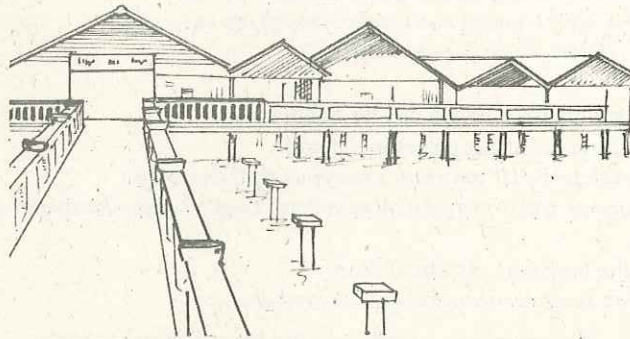


Diagram 9

*Rajah 9*

Discuss the effects of the eco-tourism activities to the community and environment in that area.

[10 marks]

*Bincangkan kesan aktiviti eko-pelancongan terhadap komuniti dan alam sekitar di kawasan itu.* [10 markah]

- (b) The following statement is given by an environmentalist.

*Berikut adalah pernyataan yang diberikan oleh pencinta alam sekitar.*

“We cannot continue to pollute the Earth without facing the consequences. Our demand for resources have to be balanced with the need to sustain the resources.”

*“Kita tidak boleh berterusan mencemarkan Bumi tanpa menghadapi akibatnya. Permintaan terhadap sumber-sumber alam mesti seimbang dengan keperluan untuk mengekalkan sumber-sumber itu.”*

Based on the statement, suggest how 3R Programme; Reduce, Reuse and Recycle of resources can be practiced to create a green environment in your school.

[10 marks]

*Berdasarkan pernyataan di atas, cadangkan bagaimana Program 3R; Mengurangkan, Menggunakan semula dan Mengitar semula sumber-sumber boleh diamalkan untuk mewujudkan suatu persekitaran hijau di sekolah anda.*

[10 markah]

KERTAS PEPERIKSAAN 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 A group of students carried out an experiment to study the effect of relative humidity on the rate of transpiration of a balsam plant.

A potometer used in this experiment is shown in Diagram 1 on page 233. The reduction in mass of the potometer is caused by the transpiration of plant.

*Sekumpulan pelajar menjalankan satu eksperimen untuk mengkaji kesan kelembapan relatif ke atas kadar transpirasi pokok keembung.*

*Satu potometer yang digunakan dalam eksperimen ini ditunjukkan dalam Rajah 1 di halaman 233. Penurunan jisim potometer disebabkan oleh transpirasi tumbuhan.*

The following steps were carried out:

*Langkah-langkah berikut telah dijalankan:*

- Step 1 : A balsam plant was selected and removed from the soil. Soil particles were removed from the roots of the plant under running water.

*Langkah 1 : Satu pokok keembung dipilih dan dicabut dari tanah. Partikel tanah disingkirkan daripada akar pokok itu di bawah air yang mengalir.*

- Step 2 : The balsam plant was put into a conical flask which was filled with 100 mL of distilled water.

*Langkah 2 : Pokok keembung itu dimasukkan ke dalam kelalang kon yang diisi dengan 100 mL air suling.*

- Step 3 : A few drops of paraffin oil was placed on the surface of the distilled water in the conical flask.

*Langkah 3 : Beberapa titik minyak parafin diletakkan di atas permukaan air suling di dalam kelalang kon.*

- Step 4 : The initial mass of the potometer was recorded.

*Langkah 4 : Jisim awal potometer direkod.*

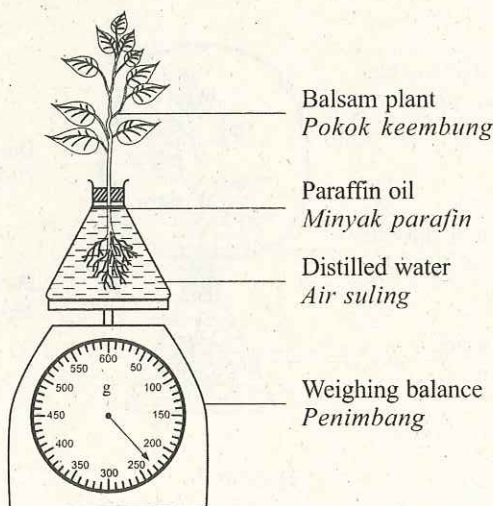


Diagram 1  
Rajah 1



Step 5 : A transparent polythene bag was placed over the leafy part of the balsam plant as shown in Diagram 2.

Langkah 5: Beg politena lutsinar diletakkan pada bahagian pokok keembung yang berdaun seperti yang ditunjukkan dalam Rajah 2.

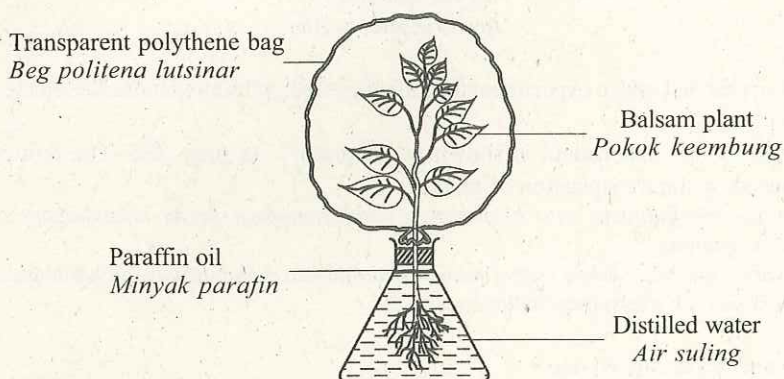


Diagram 2  
Rajah 2

Step 6 : The balsam plant was placed under sunlight for 30 minutes.

Langkah 6: Pokok keembung itu diletakkan di bawah cahaya matahari selama 30 minit.

Step 7 : After 30 minutes, the transparent polythene bag was removed and the final mass of potometer was recorded.

Langkah 7: Selepas 30 minit, beg politena lutsinar dikeluarkan dan jisim akhir potometer direkodkan.

Step 8 : The experiment was repeated by placing anhydrous calcium chloride with the mass of 50 g and 100 g into the transparent polythene bag as shown in Diagram 3.

Langkah 8: Eksperimen diulang dengan meletakkan kalsium klorida kontang berjisim 50 g dan 100 g ke dalam beg politena lutsinar seperti yang ditunjukkan dalam Rajah 3.

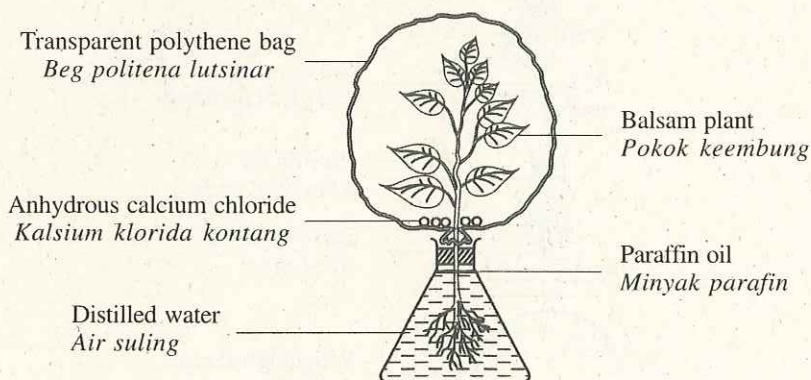
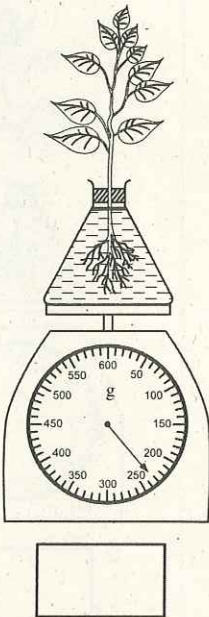
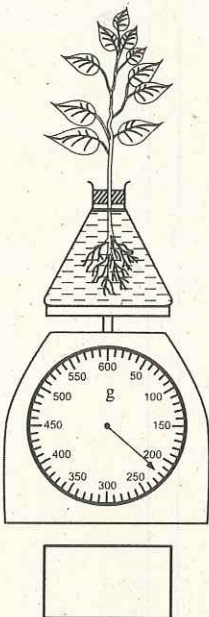
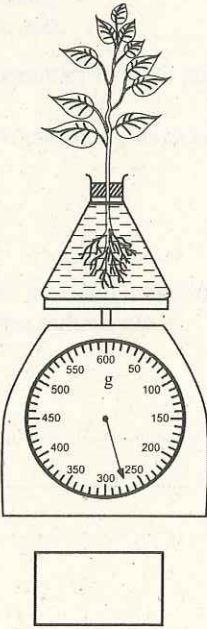
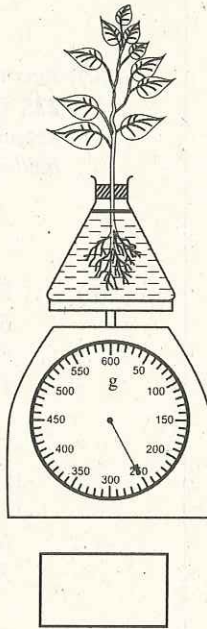


Diagram 3  
Rajah 3

Table 1 shows the result of the experiment.  
Jadual 1 menunjukkan keputusan eksperimen itu.

Mass of anhydrous calcium chloride (g) <i>Jisim kalsium klorida kontang (g)</i>	Mass of potometer (g) <i>Jisim potometer (g)</i>	
	Initial mass <i>Jisim awal</i>	Final mass <i>Jisim akhir</i>
0		
50		



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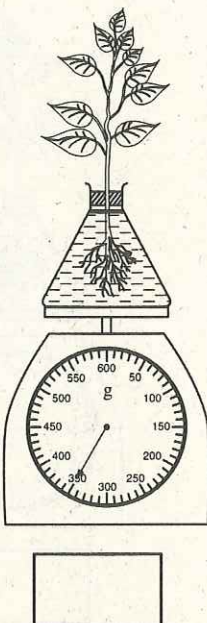
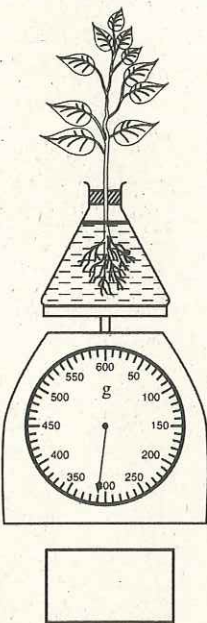
Mass of anhydrous calcium chloride (g) <i>Jisim kalsium klorida kontang (g)</i>	Mass of potometer (g) <i>Jisim potometer (g)</i>	
	Initial mass <i>Jisim awal</i>	Final mass <i>Jisim akhir</i>
100		

Table 1

Jadual 1

- (a) Record the initial and final mass of potometer in the boxes provided in Table 1 on pages 235 and 236.

*Rekod jisim awal dan jisim akhir potometer dalam kotak yang disediakan dalam Jadual 1 di halaman 235 dan 236.*

[3 marks]

[3 markah]

- (b) (i) Based on Table 1, state **two** different observations.

*Berdasarkan Jadual 1, nyatakan dua pemerhatian yang berbeza.*

Observation 1:

*Pemerhatian 1:*

.....

.....

Observation 2:

*Pemerhatian 2:*

.....

.....

[3 marks]

[3 markah]

(ii) State **two** inferences which correspond to the observations in 1(b)(i).

*Nyatakan dua inferens yang sepadan dengan 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]

1(b)(ii)

	3
--	---

(c) Complete Table 2 based on the experiment.

*Lengkapkan Jadual 2 berdasarkan eksperimen itu.*

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

Table 2

Jadual 2

[3 marks]

[3 markah]

1(c)

	3
--	---

(d) State the hypothesis for the experiment.

*Nyatakan hipotesis bagi eksperimen itu.*

.....

.....

[3 marks]

[3 markah]

1(d)

	3
--	---



- (e) (i) Construct a table and record all the data collected from the experiment.

Your table should have the following titles:

*Bina satu jadual dan rekod semua data yang dikumpul daripada eksperimen itu.*

*Jadual anda hendaklah mengandungi tajuk-tajuk berikut:*

- Mass of anhydrous calcium chloride  
*Jisim kalsium klorida kontang*
- Initial mass of potometer  
*Jisim awal potometer*
- Final mass of potometer  
*Jisim akhir potometer*
- Mass of water absorbed by roots after 30 minutes  
*Jisim air yang diserap oleh akar selepas 30 minit*
- The rate of transpiration  
*Kadar transpirasi*

$$\left[ \text{The rate of transpiration} = \frac{\text{Mass of water absorbed by roots after 30 minutes}}{\text{Time}} \right]$$

$$\left[ \text{Kadar transpirasi} = \frac{\text{Jisim air yang diserap oleh akar selepas 30 minit}}{\text{Masa}} \right]$$

1(e)(i)

	3
--	---

[3 marks]

[3 markah]

- (ii) Use the graph paper provided on page 240 to answer this question.

Using the data in 1(e)(i), draw a graph to show the rate of transpiration against the mass of anhydrous calcium chloride.

*Guna kertas graf yang disediakan di halaman 240 untuk menjawab soalan ini.*

*Menggunakan data di 1(e)(i), lukis sebuah graf untuk menunjukkan kadar transpirasi melawan jisim kalsium klorida kontang.*

1(e)(ii)

	3
--	---

[3 marks]

[3 markah]

- (f) Based on the graph drawn in 1(e)(ii), state the relationship between the mass of anhydrous calcium chloride and the rate of transpiration.

Explain your answer.

Berdasarkan graf yang dilukis di 1(e)(ii), nyatakan hubungan antara jisim kalsium klorida kontang dengan kadar transpirasi.

Terangkan jawapan anda.

.....

.....

.....

.....

.....

[3 marks]

[3 markah]

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1(f)

3

- (g) Based on the result of this experiment, state the operational definition for transpiration.

Berdasarkan keputusan eksperimen ini, nyatakan definisi secara operasi bagi transpirasi.

.....

.....

.....

.....

[3 marks]

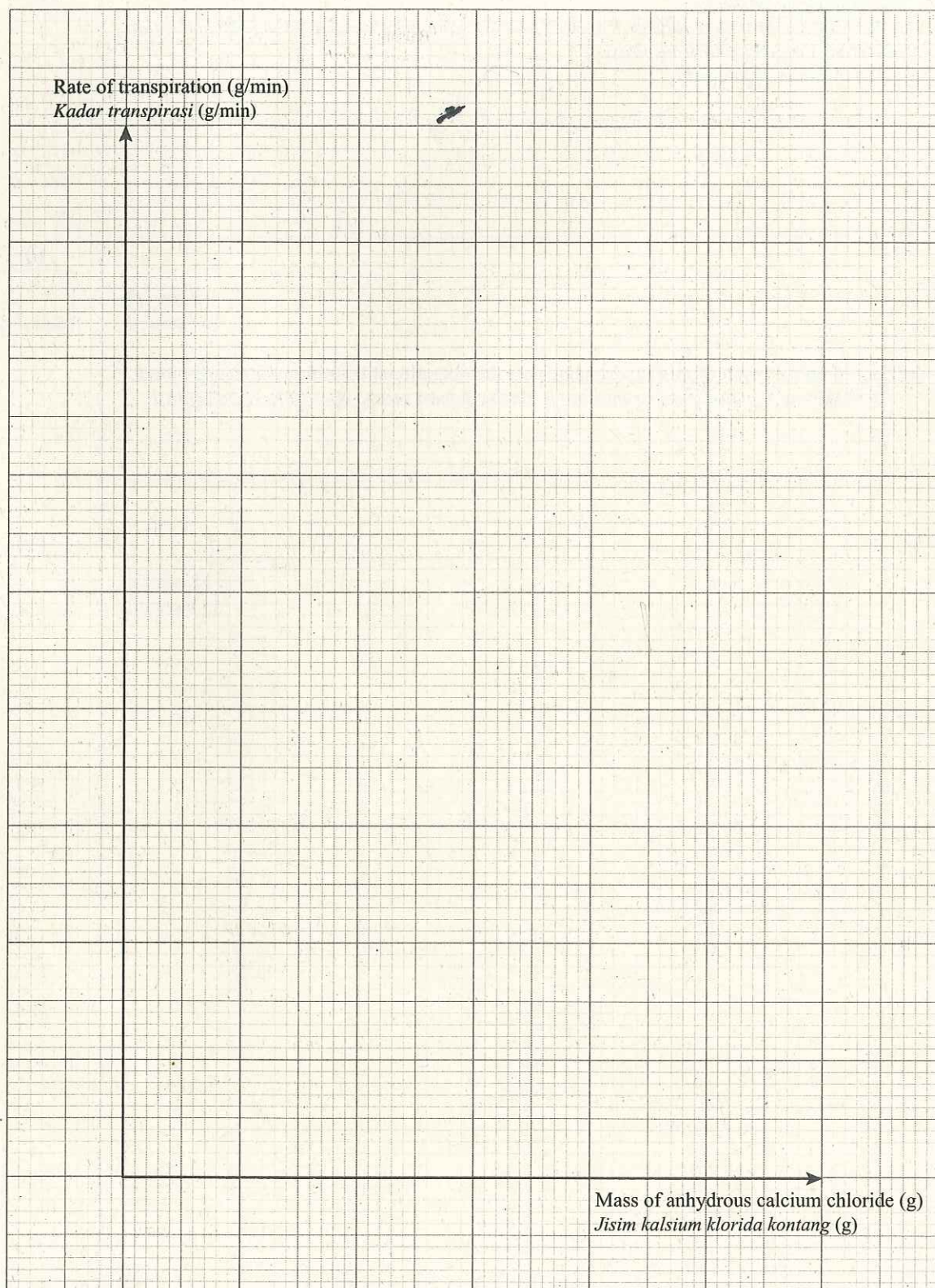
[3 markah]

1(g)

3



**Rate of transpiration against the mass of anhydrous calcium chloride**  
*Kadar transpirasi melawan jisim kalsium klorida kontang*



- (h) A group of students carried out another experiment as shown in Diagram 4.  
 Sekumpulan pelajar menjalankan satu lagi eksperimen seperti ditunjukkan dalam Rajah 4.

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 Use

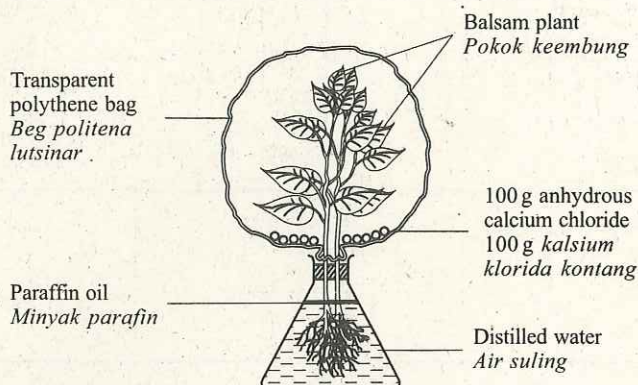


Diagram 4  
 Rajah 4

Predict the rate of transpiration for the plants.

Explain your answer.

Ramal kadar transpirasi bagi tumbuhan ini.

Terangkan jawapan anda.

.....

.....

.....

[3 marks]

[3 markah]

- (i) The following list are the conditions that affect the rate of transpiration.

Senarai berikut ialah keadaan yang mempengaruhi kadar transpirasi.

Hazy Berjerebu	Drizzle Gerimis	Sunny day Hari panas
Windy day Hari berangin	Rainy day Hari hujan	Cloudy Mendung

Classify the above conditions which either will cause high rate of transpiration or low rate of transpiration in Table 3.

Kelaskan keadaan di atas sama ada akan menyebabkan kadar transpirasi tinggi atau kadar transpirasi rendah dalam Jadual 3.



1(i)

	3
--	---

Total 1

	33
--	----

High rate transpiration <i>Kadar transpirasi tinggi</i>	Low rate transpiration <i>Kadar transpirasi rendah</i>

Table 3  
Jadual 3

[3 marks]  
[3 markah]

2

Plant can synthesize their own food through photosynthesis process in the presence of carbon dioxide and light. Sugar is formed and stored as chemical energy and oxygen gas is released.

*Tumbuhan boleh mensintesis makanan sendiri melalui proses fotosintesis dengan kehadiran karbon dioksida dan cahaya. Gula terbentuk dan disimpan sebagai tenaga kimia dan gas oksigen dibebaskan.*

Based on the above information, plan an experiment in the laboratory to study the effect of different carbon dioxide concentrations on the rate of photosynthesis of an aquatic plant.

The planning of your experiment should include the following aspects:

*Berdasarkan maklumat di atas, rancang satu eksperimen dalam makmal untuk mengkaji kesan kepekatan karbon dioksida yang berlainan ke atas kadar fotosintesis suatu tumbuhan akuatik.*

*Perancangan eksperimen anda hendaklah meliputi aspek-aspek berikut:*

- Problem statement  
*Penyataan masalah*
- Hypothesis  
*Hipotesis*
- Variables  
*Pembolehubah*
- List of apparatus and materials  
*Senarai radas dan bahan*
- Procedure of the experiment  
*Prosedur eksperimen*
- Presentation of data  
*Persembahan data*

[17 marks]  
[17 markah]

END OF QUESTION PAPER  
KERTAS SOALAN TAMAT