



PROGRAM PENINGKATAN AKADEMIK SPM 2013
ANJURAN
MAJLIS PENGETUA SEKOLAH MALAYSIA (KEDAH)

SET B
BIOLOGI SPM
KERTAS 1, 2 dan 3

Answer all questions.

Jawab semua soalan.

- 1 Diagram 1 shows a plant cell.
Rajah 1 menunjukkan satu sel tumbuhan.

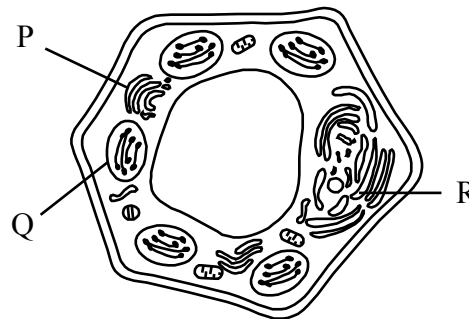


Diagram 1 / Rajah 1

What are P, Q and R?

Apakah P, Q dan R?

	P	Q	R
A	Rough endoplasmic reticulum <i>Jalinan endoplasma kasar</i>	Chloroplast <i>Kloroplas</i>	Smooth endoplasmic reticulum <i>Jalinan endoplasma licin</i>
B	Golgi apparatus <i>Jasad Golgi</i>	Chloroplast <i>Kloroplas</i>	Smooth endoplasmic reticulum <i>Jalinan endoplasma licin</i>
C	Smooth endoplasmic reticulum <i>Jalinan endoplasma licin</i>	Mitochondrion <i>Mitokondrion</i>	Golgi apparatus <i>Jasad Golgi</i>
D	Rough endoplasmic reticulum <i>Jalinan endoplasma kasar</i>	Mitochondrion <i>Mitokondrion</i>	Golgi apparatus <i>Jasad Golgi</i>

- 2 Diagram 2 shows the different structures P, Q and R in a cell organization
Rajah 2 menunjukkan pelbagai struktur P, Q dan R dalam organisasi.

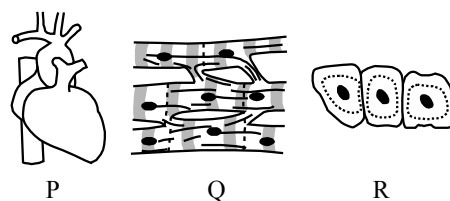


Diagram 2 / Rajah 2

Which of the following is the correct level of cell organization?

Yang manakah antara berikut adalah aras organisasi sel yang betul?

- A $P \rightarrow Q \rightarrow R$
 B $R \rightarrow Q \rightarrow P$
 C $P \rightarrow R \rightarrow Q$
 D $Q \rightarrow R \rightarrow P$

- 3 The following information refers to organelle Y.
Maklumat berikut berkenaan organel Y.

- Found in large number in flight muscle cells of insects and birds
Terdapat dengan banyak pada sel otot serangga dan burung
- Function as site to generate ATP
Berfungsi sebagai tapak penjanaan tenaga ATP

What is organelle Y?

Apakah organel Y?

- A** Mitochondrion
Mitokondrion
- B** Golgi apparatus
Jasad Golgi
- C** Ribosome
Ribosom
- D** Lysosome
Lisosom
- 4 Diagram 3 shows a unicellular organism.
Rajah 3 menunjukkan sejenis organisma unisel.

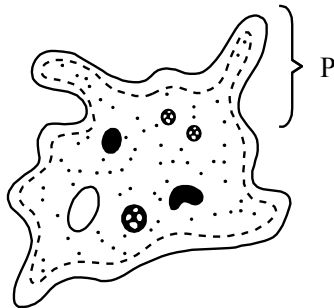


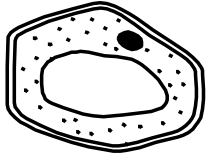
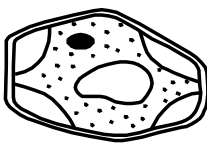
Diagram 3/ Rajah 3

What is the function of P?

Apakah fungsi P?

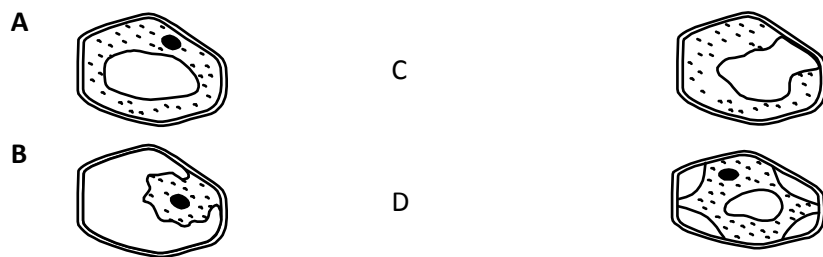
- A** Movement
Pergerakan
- B** Osmoregulation
Pengosmokawalaturan
- C** Respiration
Respirasi
- D** Growth
Pertumbuhan

- 5 A cell is immersed in distilled water for 20 minutes. It is then taken out and immersed in 30% sucrose solution. Table below shows the observed condition of the cell.
- Satu sel direndam dalam air suling selama 20 minit. Sel itu kemudian dikeluarkan dan direndam di dalam larutan sukrosa 30%. Jadual di bawah menunjukkan pemerhatian ke atas keadaan sel tersebut.*

Condition of cell <i>Keadaan sel</i>		
Type of solution <i>Jenis larutan</i>	Distilled water <i>Air suling</i>	30% sucrose solution <i>Larutan sukrosa 30%</i>

If the cell is put back into the distilled water for 20 minutes, which condition of the cell would be expected?

Jika sel itu dimasukkan semula ke dalam air suling selama 20 minit, yang manakah keadaan sel yang dijangkakan?



- 6 Potato slices are immersed in distilled water. After 30 minutes, the slices are found turgid and hard. Which of the following statements explains this phenomenon?
- Kepingan ubi kentang direndam dalam air suling. Selepas 30 minit, didapati kepingan ubi menjadi segah dan keras. Manakah antara pernyataan berikut dapat menerangkan fenomena ini?*

- A Potato cell wall will prevent it from shrinking.
Dinding sel ubi kentang akan mengelakkannya daripada mengecut.
- B The cell sap is hypotonic towards the distilled water.
Sap sel adalah hipotonik terhadap air suling.
- C The high concentration of the cell sap in the vacuole causes water to diffuse in.
Sel sap di dalam vakuol mempunyai kepekatan yang tinggi menyebabkan air meresap masuk ke dalamnya.
- D The potato cell wall allows the distilled water molecules to diffuse into the cell.
Dinding sel ubi kentang membenarkan molekul sukrosa meresap masuk ke dalam.

- 7 What is the function of cholesterol molecules in the plasma membrane?
Apakah fungsi molekul kolestrol dalam membran plasma n?
- A As membrane carriers to move substances across the plasma membrane by active transport.
Sebagai membran pembawa yang mengangkut bahan merentasi membrae plasma secara pengangkutan aktif.
 - B To form protein channels for facilitated diffusion of mineral ions.
Membentuk protein liang untuk resapan berbantu ion mineral.
 - C To join the proteins with phospholipid molecules.
Menghubungkan protein dengan molekul fosfolipid.
 - D To stabilize the fluidity of the plasma membrane.
Menstabilkan keanjalan membran plasma.
- 8 Diagram 4 shows the condition of a plant after being given some fertiliser.
Rajah 4 menunjukkan keadaan pokok selepas diberi baja.



Diagram 4/ Rajah 4

Which of the following explain the phenomena?

Antara berikut yang manakah menerangkan tentang fenomena tersebut?

- A Water diffuses from the soil into the cell sap by osmosis.
Air meresap daripada tanah ke dalam sap sel melalui osmosis.
- B The plant loses water and this causes the cells to become deplasmolysed.
Tumbuhan tersebut kehilangan air dan mengakibatkan sel mengalami deplasmolisis.
- C Fertilisers dissolved in the soil water and causes it to become more concentrated and hypertonic to the cell sap of the roots.
Baja melarut ke dalam air tanah dan menyebabkannya lebih pekat dan hipertonik terhadap sap sel akar.
- D Fertilisers dissolved in the soil water and causes it to become less concentrated and hypotonic to the cell sap of the roots.
Baja melarut ke dalam air tanah dan menyebabkannya kurang pekat dan hipotonik terhadap sap sel akar.

- 9 Diagram 5 shows the protein structure in haemoglobin molecule.
Rajah 5 menunjukkan struktur protein dalam molekul hemoglobin.

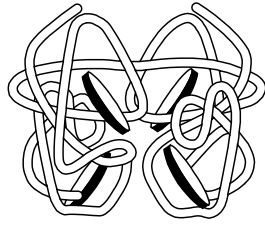
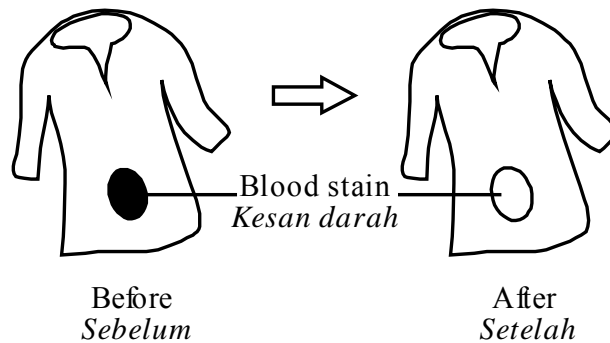


Diagram 5/ Rajah 5

Which level of this protein structure is?

Aras manakah yang diwakili oleh struktur protein ini?

- A** Primary structure
Struktur primer
- B** Secondary structure
Struktur sekunder
- C** Tertiary structure
Struktur tertier
- D** Quaternary structure
Struktur kuarterner
- 10 Which of the following monosaccharides combination produces sucrose?
Yang manakah antara kombinasi monosakarida berikut menghasilkan sukrosa?
- A** Glucose + fructose
Glukosa + fruktosa
- B** Glucose + galactose
Glukosa + galaktosa
- C** Fructose + galactose
Fruktosa + galaktosS
- D** Glucose + glucose
Glukosa + glukosa
- 11 Diagram below shows a shirt with a blood stain before and after being washed with detergent containing enzyme.
Rajah di bawah menunjukkan baju dengan kesan darah sebelum dan selepas dibasuh dengan pencuci mengandungi enzim.



Which are the most suitable enzyme and temperature to give the result shown?
Yang manakah enzim dan suhu yang paling sesuai untuk menghasilkan keputusan seperti di atas?

	Enzyme <i>Enzim</i>	Temperature <i>Suhu</i>
A	Lipase/Lipase	37°C
B	Protease/Protease	18°C
C	Lipase/Lipase	18°C
D	Protease/Protease	37°C

- 12 The given information is about the events in a phase of cell cycle.
Maklumat di bawah adalah keadaan yang berlaku dalam sesuatu fasa kitaran sel.

- Proteins are being synthesized.
Sintesis protein dijalankan.
- New organelles are being synthesized.
Organel baru dihasilkan.
- The chromosomes are known as chromatin.
Kromosom dikenali sebagai kromatin.

What is the phase?
Apakah fasa tersebut?

- A** G1 phase/ *Fasa G1* **C** G2 phase/ *Fasa G2*
B S phase/ *Fasa S* **M** phase/ *Fasa M*
- 13 Diagram 7 shows an animal cell undergoing mitotic cell division.
Rajah 7 menunjukkan sel haiwan sedang menjalani pembahagian sel secara mitosis.

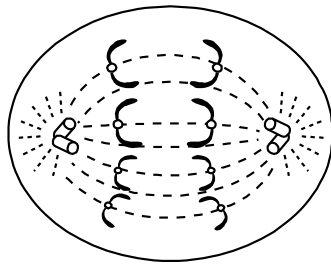


Diagram 7/ *Rajah 7*

What is the stage of the mitotic cell division?
Apakah peringkat pembahagian sel secara mitosis itu?

- A** Prophase
Profasa
B Metaphase
Metafasa
C Anaphase
Anafasa
D Telophase
Telofasa

- | | |
|-----|--|
| S - | The homologous chromosomes come together to form bivalents.
<i>Kromosom homolog berdekatan membentuk bivalen.</i> |
| T - | The chromosomes begin to condense.
<i>Kromosom mula menjadi pendek dan tebal.</i> |
| U - | Crossing over occurs.
<i>Pindah silang berlaku.</i> |

A	S,U,T	C	T,S,U
B	U,T,S	D	S,T,U

-

Which food A, B, C or D should be taken often by the child to recover?
Manakah antara makanan A, B, C atau D yang perlu diambil dengan kerap oleh kanak-kanak ini untuk sembuh?

- A** Fruits
Buah-buahan
- B** Sweets
Manisan
- C** Butter
Mentega
- D** Meat
Daging

- 16 Diagram shows a part of digestive system and organ involved in digestion process
Rajah menunjukkan sebahagian sistem dan organ yang terlibat dalam proses pencernaan

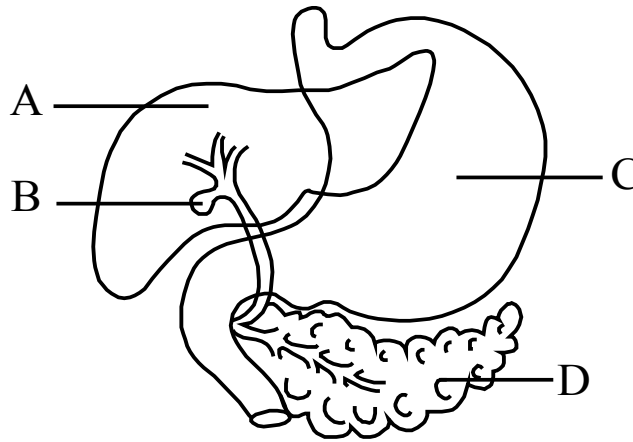


Diagram 9/ *Rajah 9*

Which of the labeled part as A,B,C and D secretes lipase enzymes
Antara bahagian A,B,C dan D, yang manakah merembes enzim lipase?

- 17 What is the monomer product from digestion of carbohydrate?
Apakah monomer yang terhasil daripada pencernaan karbohidrat?
- | | |
|--|--|
| A Glycerol
<i>Gliserol</i> | C Glucose
<i>Glukosa</i> |
| B Fatty acid
<i>Asid lemak</i> | D Amino acid
<i>Asid amino</i> |
- 18 A scientist produced a new variety of oilpalm after several cross pollination.
 Which technique is suitable to increase the number of new variety for commercial purpose?
Seorang ahli sains menghasilkan varieti baharu kelapa sawit selepas beberapa kali melakukan pendebungaan kacuk. Teknik manakah yang sesuai untuk menambahkan bilangan varieti baharu ini untuk komersial.
- | | |
|---|---|
| A Hydroponics
<i>Hidroponik</i> | C Aeroponic
<i>Aeroponik</i> |
| B Tissue culture
<i>Kultur tisu</i> | D Direct seedling
<i>Penyemaian biji benih secara terus</i> |
- 19 What is the product of anaerobic respiration in human muscles?
Apakah hasil respirasi anaerob dalam otot manusia?
- | | |
|---|--|
| A Ethanol
<i>Etanol</i> | C Lactic acid
<i>Asid laktik</i> |
| B Carbon dioxide
<i>Karbon dioksida</i> | D Oxygen
<i>Oksigen</i> |

- 20 *L, M, N and O describe the mechanism of inhalation in a fish*
L, M, N dan O menerangkan mekanisma penarikan nafas pada seekor ikan.

- | | |
|----------|---|
| L | Water containing dissolved oxygen is drawn into the mouth.
<i>Air mengandungi oksigen terlarut masuk ke dalam mulut.</i> |
| M | The floor of the buccal cavity is lowered.
<i>Dasar rongga mulut direndahkan.</i> |
| N | The mouth opens.
<i>Mulut terbuka.</i> |
| O | The operculum closes.
<i>Operkulum tertutup.</i> |

Arrange L, M, N and O in the correct sequence.
Susun L, M, N dan O dalam susunan yang betul.

- A** N,O,M,L
B M,N,L,O
C N,M,O,L
D L,M,O,N
- 21 Diagram 12 is a graph showing the effect of light intensity on the rate of photosynthesis.
Rajah 12 ialah graf yang menunjukkan kesan keamatan cahaya ke atas kadar fotosintesis.

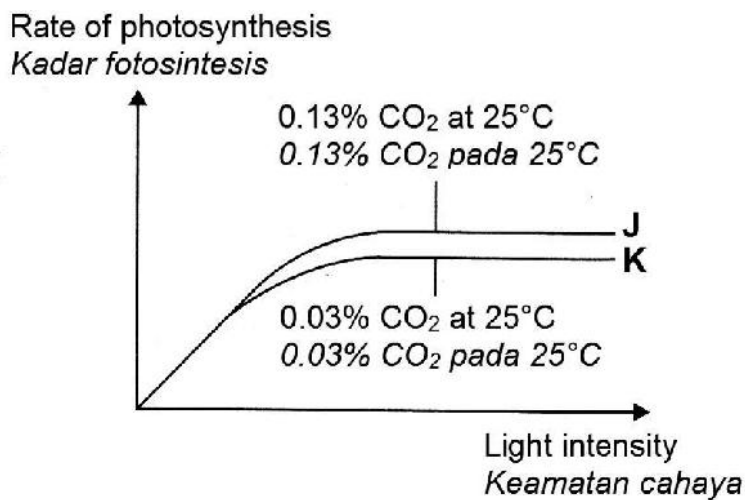


Diagram 12 / *Rajah 12*

Which of the following can be concluded about the rate of photosynthesis between the curves J and K?

Antara yang berikut, yang manakah boleh dirumuskan tentang kadar fotosintesis di antara lengkung J dan K?

- A It is not influenced by the concentration of carbon dioxide
Tidak dipengaruhi oleh kepekatan karbon dioksida.
- B It is limited by the concentration of carbon dioxide.
Dihadkan oleh kepekatan karbon dioksida
- C It is limited by the light intensity.
Dihadkan oleh keamatan cahaya
- D It is not influenced by the temperature
Tidak dipengaruhi oleh suhu.

- 22 Diagram 13 shows a cross section of an alveolus in the lungs of a mammal.
Rajah 13 menunjukkan keratan rentas satu alveolus di dalam paru-paru mamalia

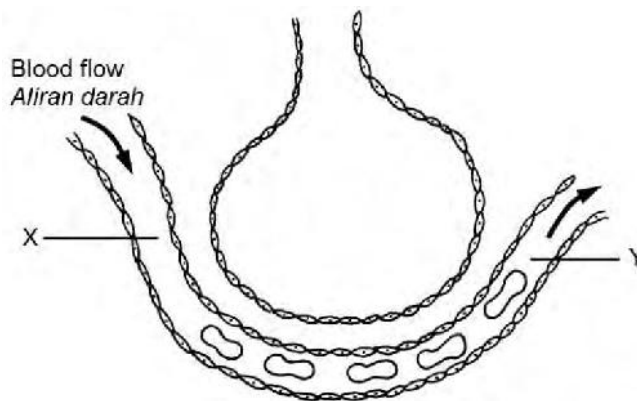


Diagram 13/Rajah 13

	Oxygen		Carbon dioxide	
	X	Y	X	Y
A	Low	High	High	Low
B	High	Low	Low	High
C	High	Low	High	Low
D	Low	High	Low	High

- 23 Which of the following is abiotic components in an ecosystem?
Antara yang berikut, yang manakah merupakan komponen abiotik dalam suatu ekosistem?

- A Consumer
Pengguna
- B Producer
Pengeluar
- C Light intensity
Keamatan cahaya
- D Decomposer
Pengurai

- 24 Diagram 14 shows the organisms P and Q.
 Rajah 14 menunjukkan organisma P dan Q.

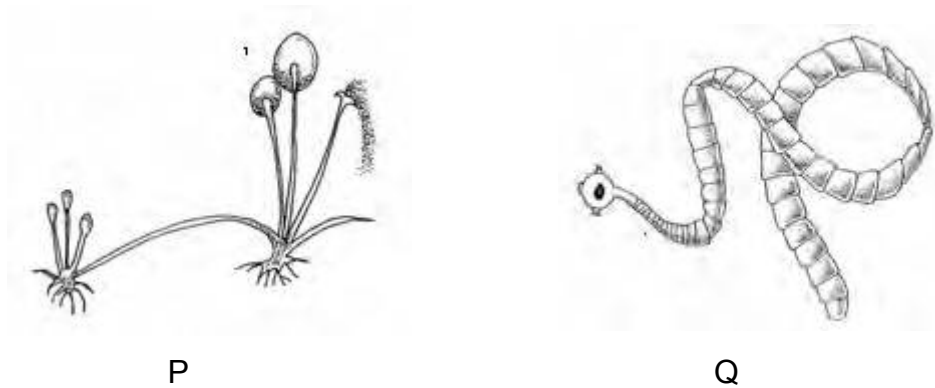


Diagram 14/ Rajah 14

	P	Q
A	Autotrophic <i>Autotrof</i>	Parasitic <i>Parasit</i>
B	Saprophitic <i>Saprofit</i>	Parasitic <i>Parasit</i>
C	Parasitic <i>Parasit</i>	Saprophitic <i>Saprofit</i>
D	Holozoic <i>Holozoik</i>	Heterotrophic <i>Heterotrof</i>

- 25 A farmer carries out an experiment to estimate the rat population in a farm. Farmer catches rats and marks the rats before releasing them. After a week, the farmer catches 60 rats, of which 5 are marked. What is the estimated rat population in the farm?

Seorang petani menjalankan eksperimen untuk menganggarkan populasi tikus di ladangnya. Petani itu telah menangkap 70 ekor tikus pada tangkapan pertama dan menandanya sebelum dilepaskan. Selepas seminggu, petani itu telah menangkap 60 ekor tikus ditempat yang sama dan mendapati 5 ekor adalah bertanda. Berapakah anggaran populasi tikus di ladangnya

- A 300
 B 350
 C 370
 D 840

- 26 Which of the following are adaptations by the *Sonneratia* sp. to be able to grow in the mangrove swamp?
Antara berikut, yang manakah penyesuaian Sonneratia sp. Untuk membolehkannya tumbuh di paya bakau tersebut?
- I Thick and succulent leaves
Daun yang tebal dan sukulen
- II Vivipary
Vivipariti
- III Buttress roots
Akar banir
- I High osmotic pressure in the cell sap
V *Tekanan osmosis yang tinggi di dalam sap sel.*
- A I and II C I, II and III
B I and III D I, II and IV
- 27 Which of the following activities causes the thermal pollution?
Antara aktiviti-aktiviti berikut, yang manakah menyebabkan pencemaran terma?
- A Burning of fossil fuel
Pembakaran bahan api fosil
- B Dumping of radioactive waste
Pembuangan sisa radioaktif
- C Releasing of chlorofluorocarbon (CFC)
Pembebasan klorofluorokarbon(CFC)
- D Discharged of hot water into the river
Pelepasan air panas ke sungai
- 28 The sample of water in a lake show a low Biochemical Oxygen Demand, BOD level .
Sampel air di suatu tasik menunjukkan tahap keperluan Oksigen biokimia, BOD yang rendah.
Manakah antara pernyataan berikut yang paling baik menerangkan keadaan tersebut?
- A Pollution by untreated waste
Pencemaran oleh sisa yang tidak dirawat
- B An increase in the temperature of the lake
Peningkatan suhu tasik
- C The high amount of dissolved oxygen in the lake
Jumlah oksigen terlarut yang tinggi di dalam tasik
- D A decrease activity of microorganism in the lake
Penurunan aktiviti mikroorganisma dalam tasik

- 29 Diagram 15 shows the changes of the temperature in the atmosphere from the year of 1960 to 2005.

Rajah 15 menunjukkan perubahan suhu dalam atmosfera dari tahun 1960 hingga 2005

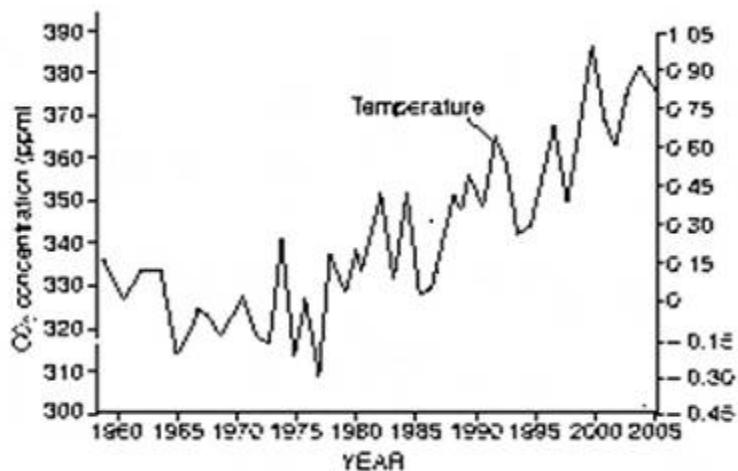


Diagram 15 / Rajah 15

Which activities contributes to above situation?

Aktiviti manakah yang menyumbang kepada situasi di atas?

- A The increasing level of chlorofluorocarbon (CFC) in the atmosphere
Peningkatan aras kloroflourokarbon dalam atmosfera
 - B Deforestation and open burning
Penyahhutan dan pembakaran terbuka
 - C Dumping of radioactive waste
Pembuangan sisa radioaktif
 - D The uses of excess fertilisers in the agriculture farm
Penggunaan baja berlebihan dalam ladang pertanian
- 30 Which of the following show s the correct sequence of the blood flowing in the pulmonary circulation?
- Antara berikut yang manakah menunjukkan urutan yang betul tentang pengaliran darah dalam peredaran pulmonari?*
- A Pulmonary artery → Lungs → Pulmonary vein → Heart
Arteri pulmonary → Peparu → vena pulmonari → Jantung
 - B Aorta → Lungs → Pulmonary artery → Heart
Aoata → Peparu → vena pulmonari → Jantung
 - C Pulmonary vein → Heart → Aorta → Body cells
Vena pulmonary → Jantung → Aorta → Sel badan
 - D Vena cava → Heart → Pulmonary artery → Lungs
Vena kava → Jantung → Arteri pulmonari → Peparu

31

A young plant has all its root hair removed.
 The rate of transpiration of the plant is drops.
*Satu tumbuhan muda telah dibuang akar rerambutnya.
 Kadar transpirasi tumbuhan tersebut menurun.*

Which of the following statement correctly explain the condition. *Antara pernyataan berikut yang manakah menerangkan keadaan tersebut.*

- A** Reduce surface area for absorption of water.
Mengurangkan luas permukaan untuk penyerapan air.
- B** Reduce rate of water transport.
Mengurangkan kadar pengangkutan air
- C** Reduce rate of evaporation.
Mengurangkan kadar penyerapan.
- D** Reduce capillarity action.
Mengurangkan tindakan kapilari.

- 32 Diagram 16 shows one of the blood vessel in the human body .
Rajah 16 menunjukkan salah satu salur darah di dalam badan manusia.

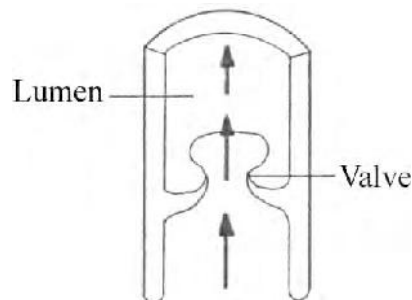


Diagram 16/ Rajah 16

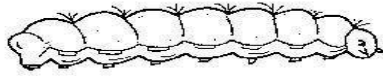
What is the function of this blood vessel?

Apakah fungsi salur darah ini?

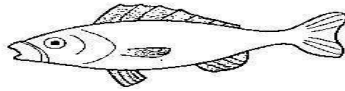
- A** Carries oxygenated blood
Membawa darah beroksigen
- B** Carries blood to the heart
Membawa darah ke jantung
- C** The blood pressure in this blood vessel is high
Tekanan darah dalam salur darah ini tinggi
- D** Branches out into small tubes called arterioles
Mempunyai cabang yang lebih kecil iaitu arteriol

- 33 Which of the following animals has a skeleton made of chitin?
Yang manakah antara haiwan berikut mempunyai rangka yang dibina daripada kitin?

A



B



C

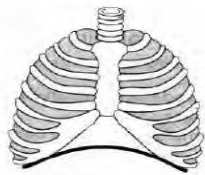


D



- 34 Diagram 17 shows parts of the skeleton.
Rajah 17 menunjukkan bahagian-bahagian pada tulang.

A.



B.



C.



D.



Which part A, B, C or D, are axial skeleton ?
Antara bahagian A, B, C dan D, yang manakah adalah rangka paksi?

- 35 Diagram 18 shows the bones of a human.
Rajah 18 menunjukkan tulang-tulang pada manusia.

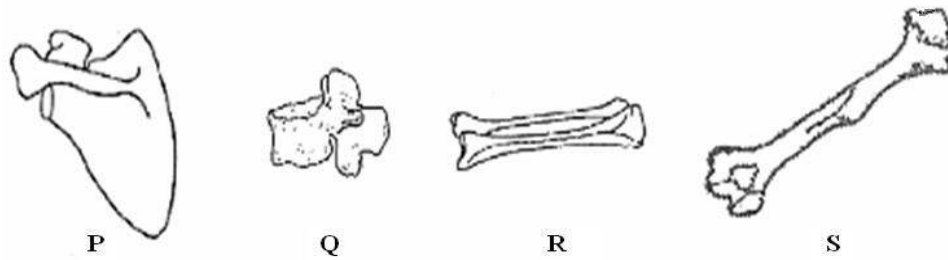


Diagram 18/Rajah 18

Which of the following forms a ball and socket joint ?

Antara yang berikut, yang manakah membentuk sendi lesung dan soket ?

- A P and R
 - B P and S
 - C Q and R
 - D Q and S
- 36 Diagram 19 shows a part of vertebral column of human .
Rajah 19 menunjukkan sebahagian daripada turus vertebra manusia.

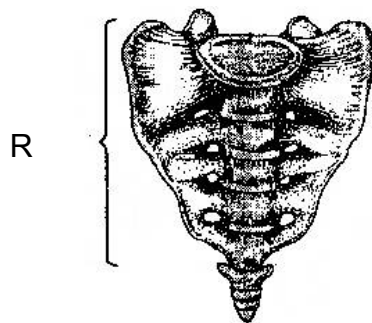


Diagram 19/Rajah 19

- A 1
- B 8
- C 5
- D 33

- 37 Diagram 20 shows a joint in human skeletal system.
Rajah 20 menunjukkan sendi yang terdapat sistem rangka manusia



Diagram 20 /Rajah 20

What is the function of X ?

Apakah fungsi X?

- A Attach bone to the bone.
Menghubungkan tulang dengan tulang
 - B Secretes fluid to lubricate the joint.
Merembeskan cecair untuk melicinkan pergerakan sendi.
 - C Reduces friction between the bones
Mengurangkan geseran antara tulang
 - D Prevents the bones from being dislocated.
Mencegah tulang daripada berganjak
- 38 Diagram 21 shows three types of nerve cells P, Q and R
Rajah 21 menunjukkan tiga jenis sel saraf P, Q dan R

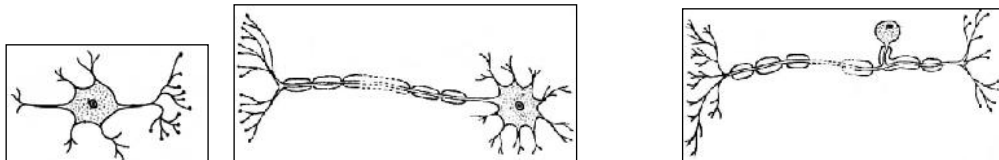


Diagram 21/ Rajah 21

Which of the following is the correct sequence of impulses transfer?
Antara berikut yang manakah urutan pemindahan impuls yang betul?

- A $R \rightarrow Q \rightarrow P$
- B $R \rightarrow P \rightarrow Q$
- C $P \rightarrow Q \rightarrow R$
- D $P \rightarrow R \rightarrow Q$

- 39 Diagram 22 shows ultrafiltration that occurs in kidney.
Rajah 22 menunjukkan ultraturasan yang berlaku dalam ginjal.

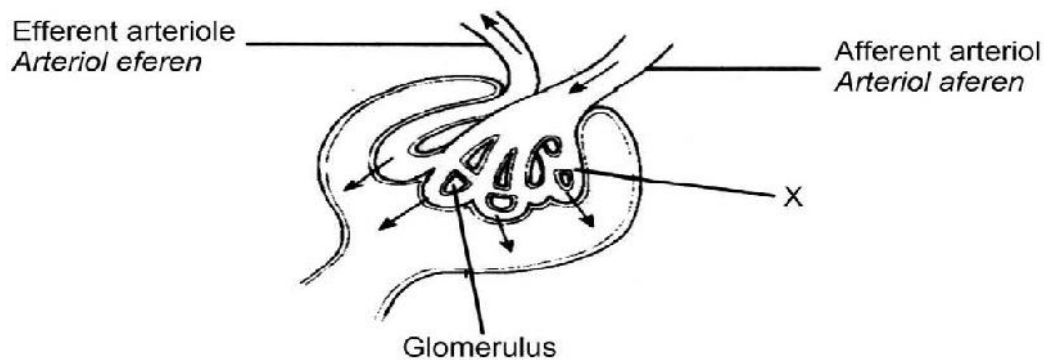


Diagram 22 /Rajah 22

which of the following substances cannot move across X?
Bahan manakah antara berikut, tidak boleh merentasi X?

- A Fibrinogen
Fibrinogen
 - B Glucose
Glukosa
 - C Water molecule
Molekul air
 - D Urea
Urea
- 40 Diagram 23 shows the main parts of the brain.
Rajah 23 menunjukkan bahagian utama otak.



Diagram 23 / Rajah 23

Which part controls the breathing rate?
Bahagian manakah yang mengawal kadar pernafasan?

- 41 Diagram 24 shows the radicle of a seedling divided into 10 equal zones from its tip. The change in length of each zone is observed after three days.
Rajah 24 menunjukkan radikel satu biji benih yang dibahagikan kepada 10 zon yang sama dari hujungnya. Perubahan panjang pada setiap zon diperhatikan selepas tiga hari.

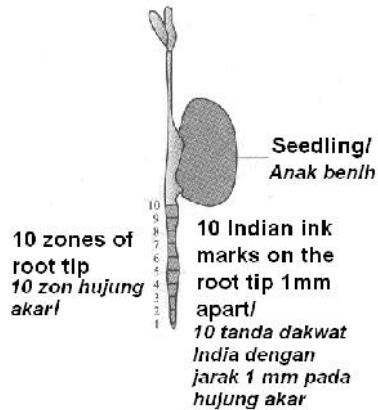
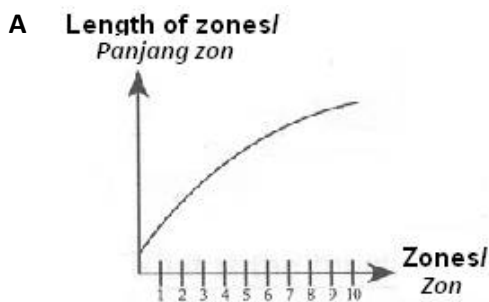
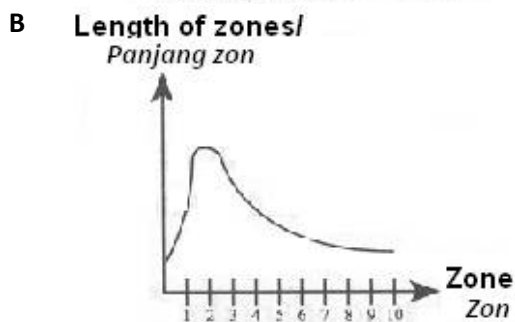
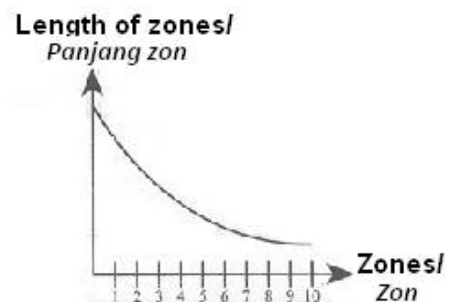


Diagram 24/Rajah 24

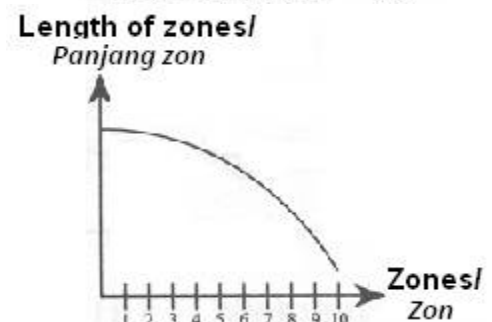
Which of the following graphs represents the growth of the radicle?
Manakah graf berikut yang mewakili pertumbuhan radikel itu?



C



D



- 42 The following sequence is related to human spermatogenesis process.
Urutan berikut berkaitan dengan proses spermatogenesis manusia

Germinal epithelial cell → X → Primary spermatogonia → Y → Spermatids
Sel germa epitelial → X → Spermatogonium primer → Y → Spermatid

Which of the following is true on the chromosomal numbers of both X and Y?
 Antara berikut, manakah benar tentang bilangan kromosom bagi X dan Y?

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

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

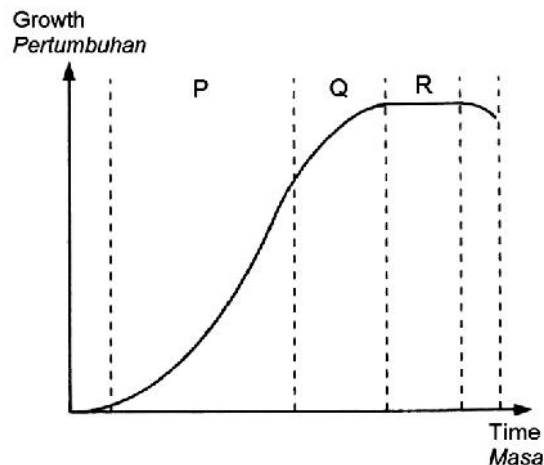


Diagram 25 / Rajah 25

Which of the following shows the growth rates at parts P, Q and R?
 Manakah di antara berikut menerangkan kadar pertumbuhan di bahagian P, Q and R?

	P	Q	R
A	Slow <i>Perlahan</i>	Fast <i>Cepat</i>	Zero <i>Sifar</i>
B	Fast <i>Cepat</i>	Zero <i>Sifar</i>	Slow <i>Perlahan</i>
C	Zero <i>Sifar</i>	Slow <i>Perlahan</i>	Fast <i>Cepat</i>
D	Fast <i>Cepat</i>	Slow <i>Perlahan</i>	Zero <i>Sifar</i>

- 44 The pistil of a flower consists of
Pistil sekuntum bunga termasuklah
- A stigma, style, anther, sepal and ovary
stigma, stil, anter, sepal dan ovari
- B stigma, style, ovary, filament and ovary
stigma, stil, ovary, filamen dan ovary
- C stigma, style, ovule, ovary and sepal
stigma, stil, ovul, ovary dan sepal
- D stigma, style, ovary and ovule
stigma, stil, ovary dan ovul
- 45 Diagram 26 shows a pair of chromosomes in a cell of an organism.
Rajah 26 menunjukkan sepasang kromosom dalam sel suatu organisma.

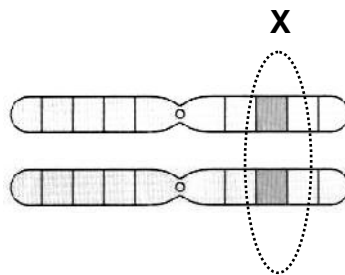


Diagram 26/ Rajah 26

What is X ?

Apakah X?

- A Allele/ *Alel*
- B Gene/ *Gen*
- C Nucleotide/ *Nukleotida*
- D Chromosome/ *Kromosom*
- 46 A boy has a blood group A and his sister has blood group O.
 Which are the possible genotype of the parents?
Seorang budak lelaki mempunyai kumpulan darah A dan kakaknya mempunyai kumpulan darah O.
Genotip manakah yang mungkin dipunyai oleh ibu bapa mereka?
- A $I^A I^B$ and $I^A I^O$
- B $I^A I^A$ and $I^B I^O$
- C $I^A I^B$ and $I^O I^O$
- D $I^A I^O$ and $I^B I^O$

- 47 In humans, the ability to roll the tongue is controlled by a dominant allele. A man with heterozygous genotype for tongue rolling married to a woman cannot roll the tongue.

Dalam manusia, kebolehan menggulung lidah dikawal oleh alel dominan.

Seorang lelaki dengan genotip heterozigot boleh menggulung lidah berkahwin dengan seorang perempuan tidak boleh menggulung lidah.

What is the probability to get child with tongue rolling?

Apakah kebarangkalian mendapat anak yang boleh menggulung lidah?

- A 0.25
- B 0.75
- C 0.50
- D 1.00

- 48 Diagram 27 below shows a part of DNA sequence
Rajah 27 di bawah menunjukkan sebahagian daripada urutan DNA

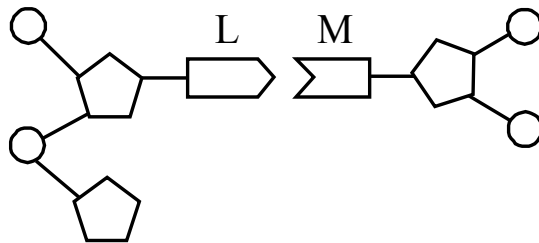


Diagram27 /Rajah27

L and M is a pair of nitrogenous bases.

Which of the following is the correct pair of L and M?

L dan M ialah satu pasangan bes bernitrogen.

Yang manakah antara berikut merupakan pasangan yang betul untuk L dan M?

	L	M
A	Adenine <i>Adenina</i>	Guanine <i>Guanina</i>
B	Guanine <i>Guanina</i>	Thymine <i>Timina</i>
C	Cytosine <i>Sitosina</i>	Cytosine <i>Sitosina</i>
D	Thymine <i>Timina</i>	Adenine <i>Adenina</i>

- 49 In pea plants, the allele for tall plant is dominant over the allele for dwarf plant. Two heterozygous plants are cross-bred. What is chance of the offspring being tall plants?
Dalam tumbuhan kekacang, alel bagi ciri tinggi adalah dominan kepada alel untuk bagi ciri rendah.
Dua pokok heterozigot dikacukkan.
Apakah keberangalian untuk menghasilkan anak pokok yang tinggi?
- A 25%
 B 50%
 C 75%
 D 100%
- 50 Diagram 28 shows a karyotype of genetic disorder in human.
Rajah 28 menunjukkan kariotip suatu kecacatan genetic dalam manusia.

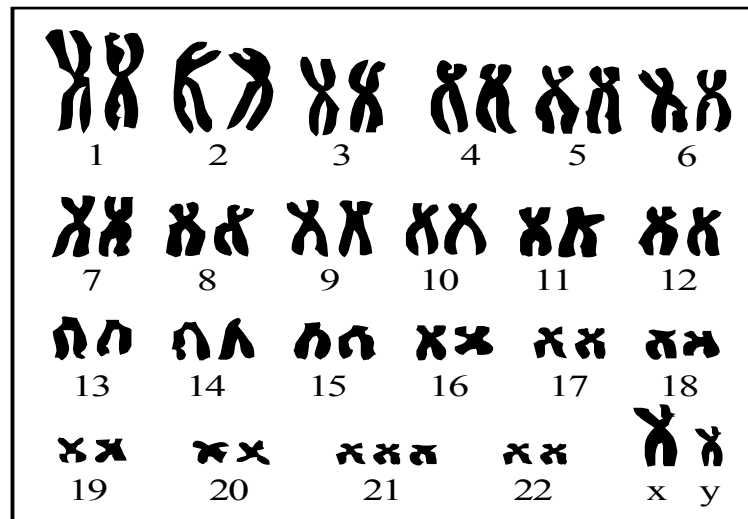


Diagram 28 / Rajah 28

- What is the characteristic of the person?
Apakah ciri bagi kecacatan ini
- A Short neck and slanted eyes
Leher yang pendek dan bermata sepet
- B Pinkish eyes and skin
Mata dan kulit berwarna merah jambu
- C Rapid aging process
Process penuaan yang cepat
- D Skin very sensitive to sunlight
Kulit sangat sensitif terhadap cahaya matahari

END OF QUESTION PAPER

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 a plant cell
Rajah 1 menunjukkan struktur satu sel tumbuhan

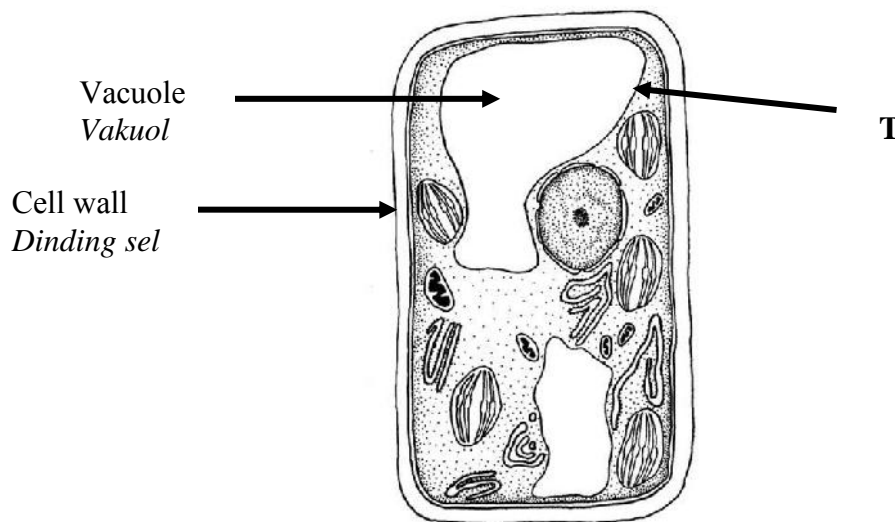


Diagram 1
Rajah 1

- (a) Name the membrane labelled T
Namakan membrane berlabel T

.....
[1 mark/markah]

- (b) (i) State ONE characteristic of membrane T.
Nyatakan SATU ciri bagi membran T.

.....
[1 mark / markah]

- (ii) State **two** functions of the vacuole in plants
*Nyatakan **dua** fungsi vakuol dalam tumbuhan*

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

- (c) (i) State the component that make up the cell wall
Nyatakan komponen yang membina dinding sel

.....

[1 mark/markah]

- (ii) Describe briefly the function of the cell wall in plant.
Terangkan dengan ringkas fungsi dinding sel dalam tumbuhan.

.....

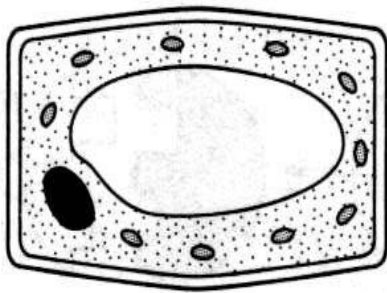
.....

[2 marks / markah]

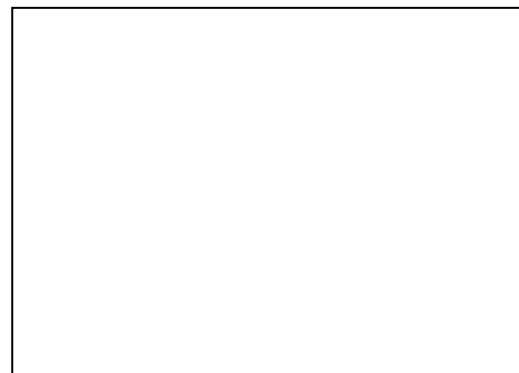
- (d) A housewife decided to make papaya pickles. She immersed the fresh slices of papayas in concentrated sugar solution for a certain period of time
Seorang suri rumah bercadang membuat jeruk betik. Dia merendamkan beberapa kepingan betik segar di dalam larutan gula pekat untuk tempoh beberapa lama.

- (i) Draw a labelled diagram to show the condition of papaya cell after being immersed in the concentrated sugar solution in the box provided.
Lukiskan rajah berlabel bagi menunjukkan keadaan sel betik selepas direndam dalam larutan gula pekat dalam kotak yang disediakan.

[2 marks / markah]



Before immersed in the concentrated sugar solution.
Sebelum direndam dalam larutan gula pekat



After being immersed in the concentrated sugar solution.
Selepas direndam dalam larutan gula pekat

[2 markas / markah]

- (ii) Explain the condition of the cell in the concentrated sugar solution?
Terangkan keadaan sel di dalam larutan gula pekat?

.....

.....

.....

[3 marks / markah]

2.

Diagram 2 shows human reproductive cells undergoing process X to form gametes.
Rajah 2 menunjukkan sel pembiakan manusia menjalani proses X untuk menghasilkan gamet.

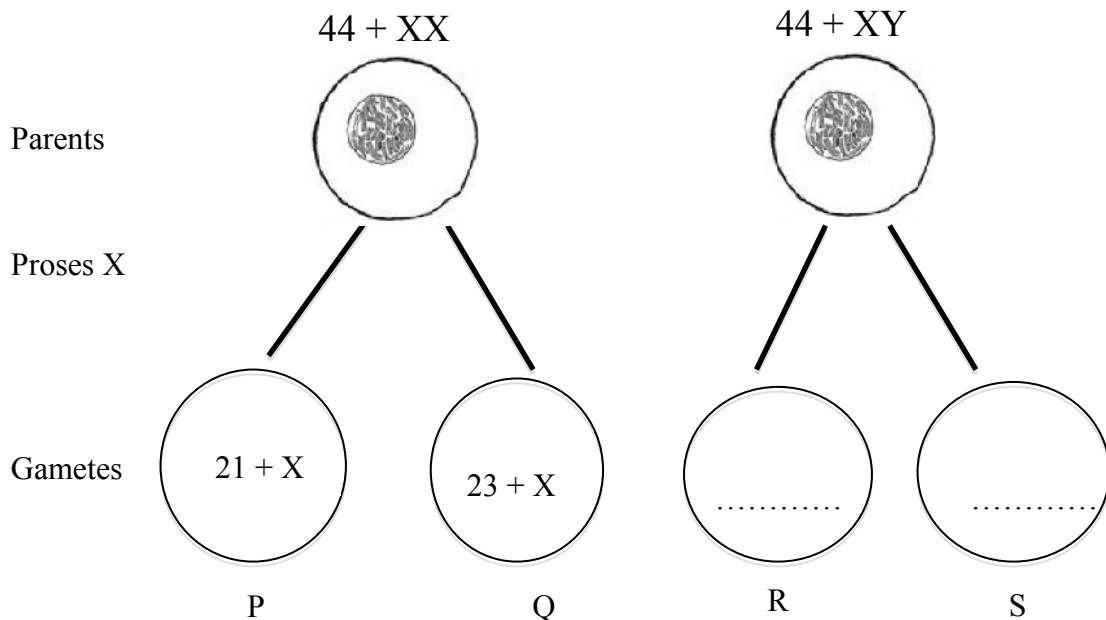


Diagram 2

Rajah 2

- (a) (i) Name proses X.
Namakan proses X.

.....

[1 mark / markah]

- (ii) State the number of chromosome in gametes R and S.
Nyatakan bilangan kromosom gamet R and S.

[2 marks / markah]

- (iii) Cell P has 22 chromosomes compared to cell Q which has 24 number of chromosomes.
Explain what has happened to cause the difference in chromosome number between cell P and cell Q

Sel P mempunyai 22 kromosom berbanding dengan sel Q mempunyai 24 bilangan kromosom.

Terangkan apakah yang berlaku menyebabkan terdapat perbezaan bilangan kromosom antara P dan Q

.....

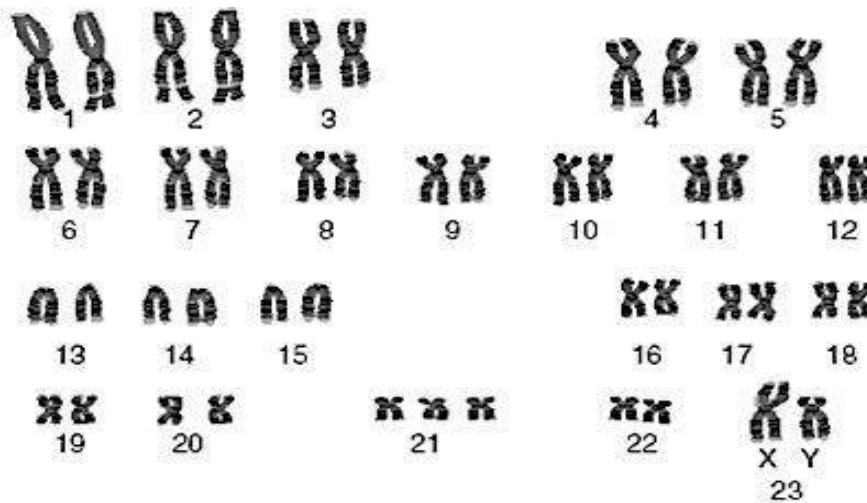
.....

.....

[3 marks / markah]

(b)

Diagram shows the karyotype of one of the child from the above couple.
Rajah menunjukkan kariotip salah seorang anak pasangan di atas.



- (i) What is the sex of the child.
Apakah jantina kanak-kanak tertsebut.

.....

[1 mark / markah]

- (ii) Name the genetic disorder suffered by this child.
Namakan penyakit genetik kanak-kanak ini.

.....

[1 mark / markah]

- (c) State the type of mutation that causes the genetic disorder suffered by the child.
Nyatakan jenis mutasi yang menyebabkan penyakit genetik tersebut

[1 mark / markah]

- (d) State THREE characteristics of this genetic disorder.
Nyatakan TIGA ciri penyakit genetik ini

1.
2.
3.

[3 marks / markah]

3. Diagram 3.1 shows the two different types of plants and cross section of their stem.
Rajah 3.1 menunjukkan dua jenis tumbuhan yang berbeza dan keratan rentas bagi batangnya.

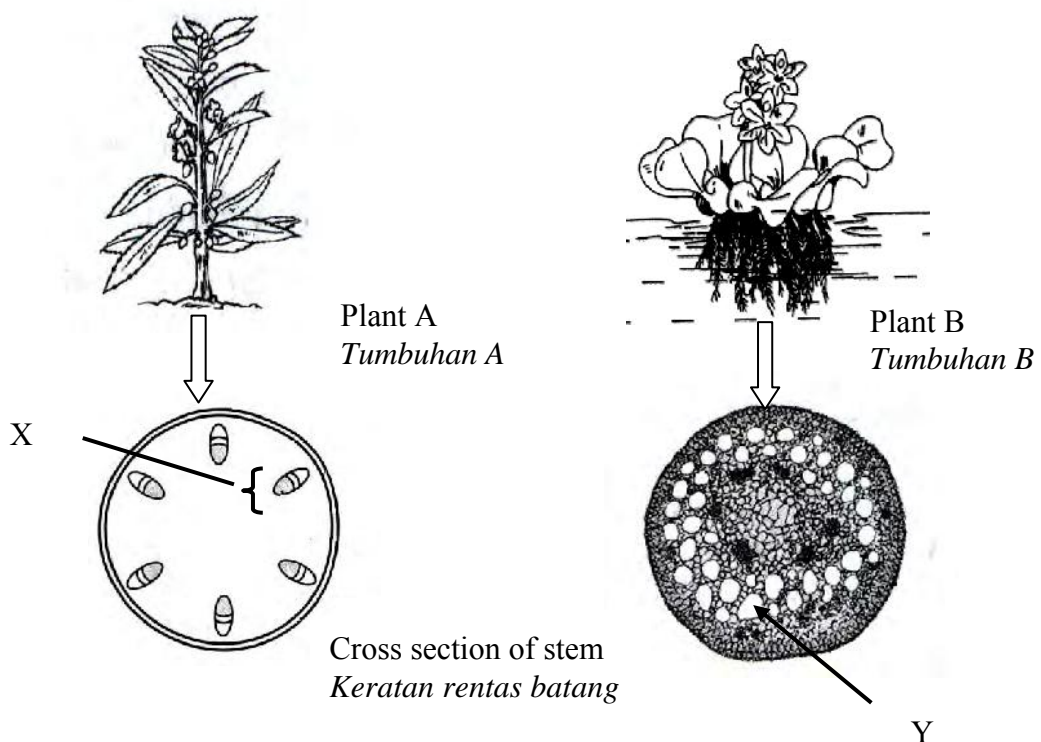


Diagram 3.1
Rajah 3.1

- (a) Based on the diagram 3.1 above, name the structure labelled X and Y.
Berdasarkan kepada rajah 3.1 di atas, namakan struktur berlabel X dan Y.

X:

Y:

[2 marks / markah]

- (b) Based on their habitat, state how plant A and plant B obtain the mechanical support? *Berdasarkan kepada habitatnya, nyatakan bagaimana tumbuhan A dan B memperoleh sokongan mekanikal?.*

A:

.....

B:

[2 marks / markah]

- (c) Diagram 3.2 shows various types of lignified thickening on the wall of xylem vessels.
Rajah 3.2 menunjukkan pelbagai jenis penebalan lignin pada dinding salur xylem.

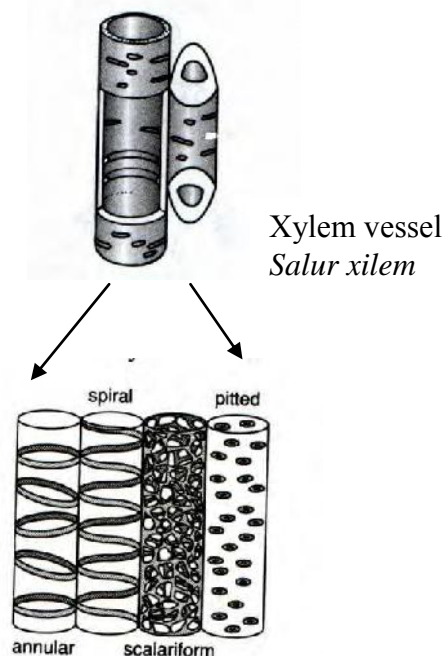


Diagram 3.2
Rajah 3.2

- (i) State the function of wall thickening in xylem vessel.
Nyatakan fungsi penebalan dinding bagi salur xylem.

.....

[1 mark / markah]

- (ii) Explain why the xylem vessel is long and hollow.
Terangkan kenapa salur zilem panjang dan berongga.

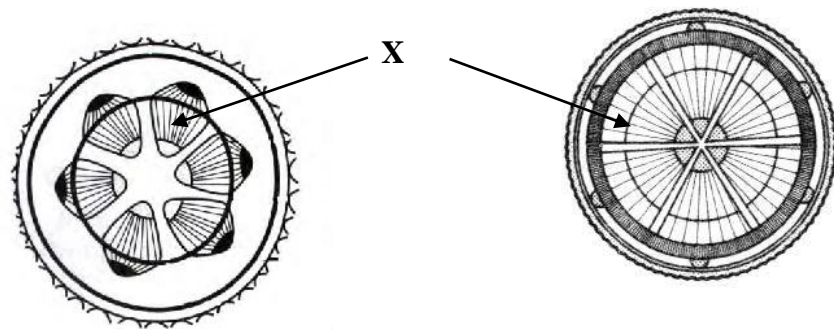
.....

.....

.....

[2 marks / markah]

- (d) Diagram 3.3 shows the cross section of a young and old dicotyledons stems.
Rajah 3.3 menunjukkan keratan rentas bagi batang dikotiledon muda dan tua.



Young dicotyledon stem
Batana dikotiledon

Old dicotyledon stem
Batang dikotiledon tua

Diagram 3.3
Rajah 3.3

- (i) Name part labelled X.
Namakan bahagian berlabel X.

.....

[1 mark / markah]

- (ii) State two economic importance for the plant which has the part labelled X.
Nyatakan dua kepentingan dari segi ekonomi bahagian berlabel X.

1.

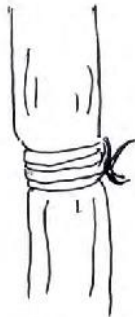
2.

[2 marks / markah]

- (e) Pn. Siti tied her bougainvillea plant to the fence using a wire. After three weeks, she found that the part of the plant above the wire became swollen and bigger than the area below the wire.

Explain why.

*Pn. Siti telah mengikat pokok bunga kertasnya kepada pagar dengan menggunakan wayar. Selepas tiga minggu, dia mendapati bahagian pokok yang berada atas daripada ikatan wayar semakin membesar dan bengkak berbanding bahagian bawahnya.
 Terangkan kenapa?*



At the beginning
Pada permulaan



After three weeks.
Selepas tiga minggu

Diagram 3.4
Raiah 3.4

.....

.....

.....

[2 marks / markah]

- 4 Diagram 4.1 shows a schematic diagram of the gaseous exchange across the respiratory surface with the blood circulatory system in humans.

Rajah 4.1 menunjukkan rajah skema pertukaran gas merentasi permukaan respirasi dan hubungannya dengan sistem peredaran darah.

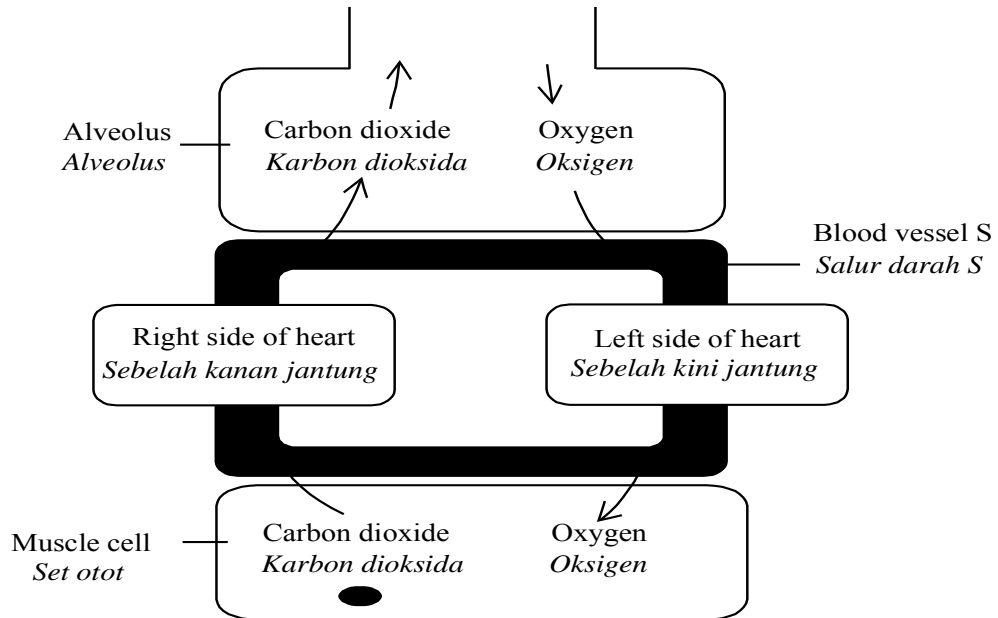


Diagram 4.1

Rajah 4.1

- (a) (i) State the process of gaseous exchange which takes place across the alveolus.
Nyatakan proses di mana pertukaran gas berlaku merentasi alveolus.

.....
[1 mark / markah]

- (ii) Explain how the process occurs.
Terangkan bagaimana proses ini berlaku.

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

- (b) (i) Name blood vessel S.

Namakan salur darah S.

.....
[1 mark / markah]

- (ii) Explain how oxygen is transported from lungs to the body cells.
Terangkan bagaimana oksigen diangkut daripada paru-paru ke sel-sel badan.

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

- (c) Table 1 below shows the equations for process P and process Q which occur in human muscle.
Jadual 1 di bawah menunjukkan persamaan bagi proses P dan proses Q yang berlaku dalam otot manusia.

Process	Equation
<i>Proses</i>	<i>Persamaan</i>
P	Glucose + Oxygen → Carbon dioxide + Water + Energy <i>Glukosa + Oksigen → Karbon dioksida + Air + Tenaga</i>
Q	Glucose → Lactic acid + Energy <i>Glukosa → Asid laktik + Tenaga</i>

Table 1
Jadual 1

- (i) Name process P and process Q
Namakan proses P dan proses Q

Process P:

Proses P:

Process Q:

Proses Q :

[2 marks / markah]

- (ii) Explain ONE difference between process P and process Q.
Terangkan SATU perbezaan di antara proses P dan proses Q.

.....

.....

.....

[2 marks / markah]

- (d) When a person is resting, the heartbeat rate is between 60 to 70 beats per minute. During vigorous activities, the heartbeat rate increases to 120 beats per minute.

Apabila seseorang sedang berehat, kadar denyutan jantung adalah di antara 60 hingga 70 denyutan per minit. Semasa aktiviti cergas kadar denyutan jantung meningkat kepada 120 denyutan per minit.

Explain the above statement.

Terangkan pernyataan di atas.

.....

.....

.....

.....

[2 marks / markah]

5. Diagram 5 shows the changes and regulations of hormone during menstrual cycle.
Rajah 5 menunjukkan perubahan dan kawal atur hormon semasa kitar haid.

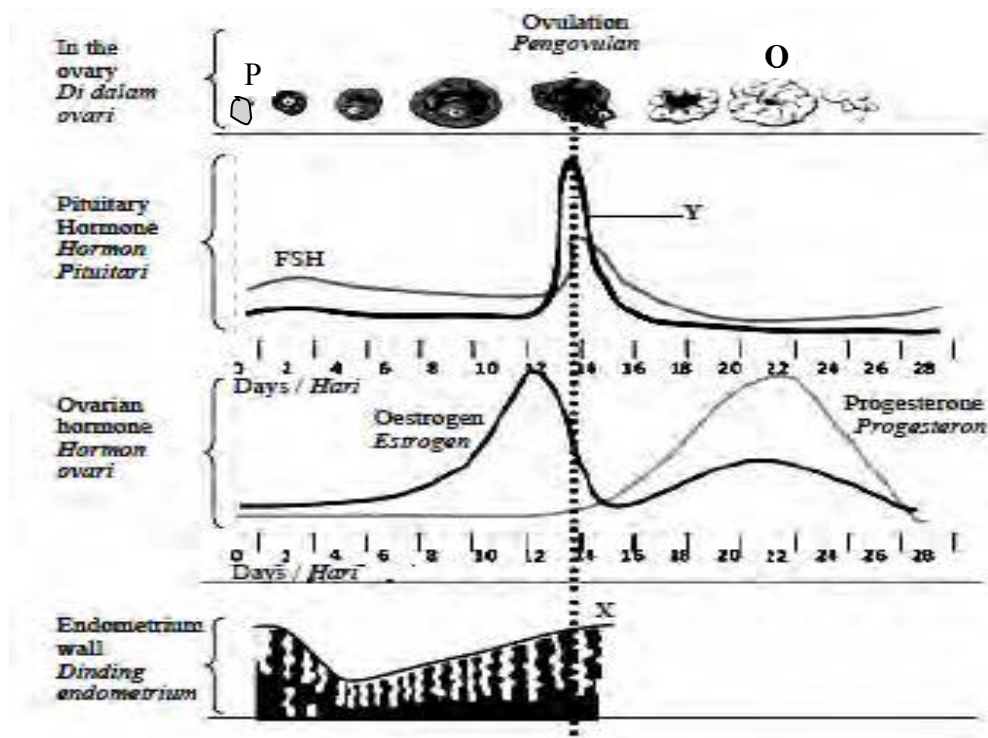


Diagram 5
Rajah 5

- (a) (i) Name the structure P and Q
Namakan struktur P dan Q

P:

Q:

[2 marks / markah]

- (ii) Explain the effect of Follicle Stimulating Hormone (FSH) on structure P.
Terangkan kesan hormon perangsang folikel (FSH) ke atas struktur P.

.....

.....

.....

[2 marks / markah]

- (b) Explain the effect to Q if the level of hormone Y is low
Terangkan kesan kepada Q jika aras hormon Y adalah rendah

.....

.....

.....

[2 marks / markah]

- (c) (i) Complete the graph starting from point X in Diagram 2 to show the changes in the thickness wall of endometrium if the fertilisation does not occur.

Lengkapkan graf bermula daripada titik X dalam Rajah 2 untuk menunjukkan perubahan dalam ketebalan dinding endometrium sekiranya persenyawaan tidak berlaku

[1 mark / markah]

- (ii) Explain the graph that you have drawn in c(i)
Terangkan graf yang dilukis dalam c (i)

.....

.....

.....

[2 marks / markah]

- (d) Explain the importance of structure Q during foetal development
Terangkan kepentingan struktur Q dalam perkembangan fetus

.....

.....

.....

.....

[3 marks / markah]

Bahagian B

[40 marks]

[40 markah]

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

6. (a) Mendel carried out dihybrid crosses between pure breeding pea plants (*Pisum sativum*) with two different characters which are round and yellow seeds with wrinkled and green seeds. The trait of round seeds (R) and yellow seeds (Y) are dominant over wrinkled seeds (r) and green seeds (y)
Diagram 6 shows the characters and traits of the crosses and the phenotypic ratios of the F2 offspring.

*Mendel menghasilkan kacukan dihibrid antara baka tulen pokok kacang pea (*Pisum sativum*) biji benih bulat dan kuning dengan baka tulen biji benih kedut dan hijau. Trait bagi biji benih bulat (R) dan biji benih kuning (Y) adalah dominan ke atas biji benih kedut (r) dan biji benih hijau (y).*

Rajah 6 menunjukkan ciri dan trait bagi kacukan dan nisbah fenotip bagi generasi F2





Characteristics Ciri	Phenotype of F2 Generation Fenotip Generasi F2			
				
Seed shape Seed colour	Round Yellow	Round Green	Wrinkled Yellow	Wrinkled Green
Number of F2 generations	315	108	101	32

Diagram 6

Rajah 6

Based on diagram 6,
Berdasarkan rajah 6,

- (i) Calculate the ratio of the dominant phenotype to the recessive phenotype.
Hitung nisbah fenotip dominan kepada fenotip resesif.

[3 marks / markah]

- (ii) Describe the cross based on Mendel's Law by using Punnet Square.
Huraikan kacukan berdasarkan Hukum Kedua Mendel dengan bantuan segiempat Punnet.

[10 marks / markah]

- (b) A colourblind man ($X^b Y$) marries a woman who is a carrier for colour blindness. Using a schematic diagram, explain the possible genetic combination (phenotype) of their children
Seorang lelaki buta warna ($X^b Y$) mengahwini seorang perempuan pembawa buta warna. Dengan menggunakan rajah skema, terangkan kemungkinan kombinasi genetik yang terbentuk pada anak-anaknya.

[7 marks/markah]

7. Diagram 7.1 shows a type of fungi.
Rajah 7.1 menunjukkan sejenis fungi.

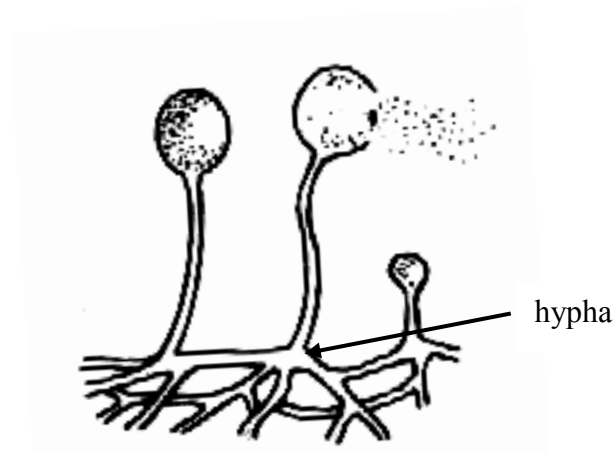


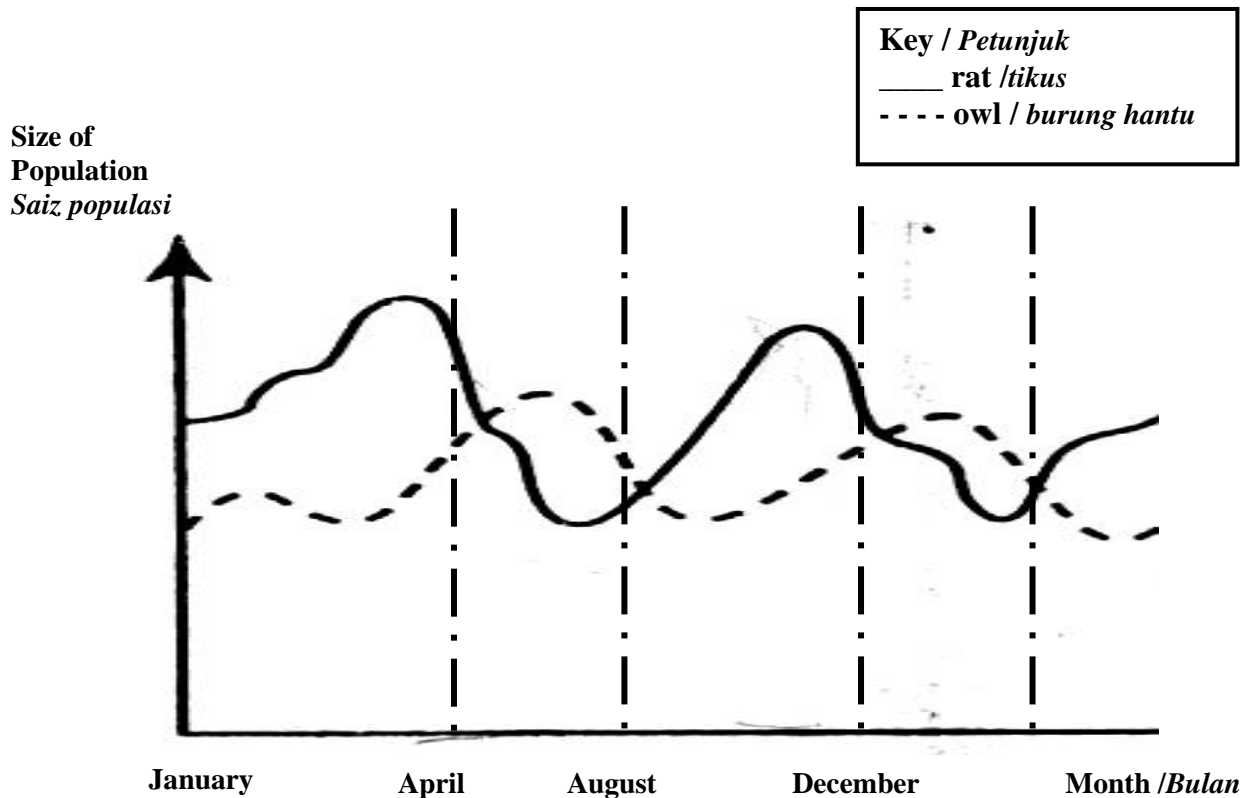
Diagram 7.1
Rajah 7.1

- (a) Explain how this organism obtained the nutrient.
Terangkan bagaimana organisma ini memperoleh makanan..

[4 marks]

- (b) Graph 7.2 below shows the changes of the population size of rats and owls in an oil palm estate throughout the year.

Graf di bawah menunjukkan perubahan saiz populasi tikus dan burung hantu dalam sebuah ladang kelapa sawit sepanjang tahun.



Graph 7.2
Graf 7.2

Based on graph 7.2, explain the changes in the size of population of the owls and the rats throughout the year.

Berdasarkan kepada graf di atas, huraikan perubahan saiz populasi bagi burung hantu dan tikus sepanjang tahun.

[6 marks / markah]

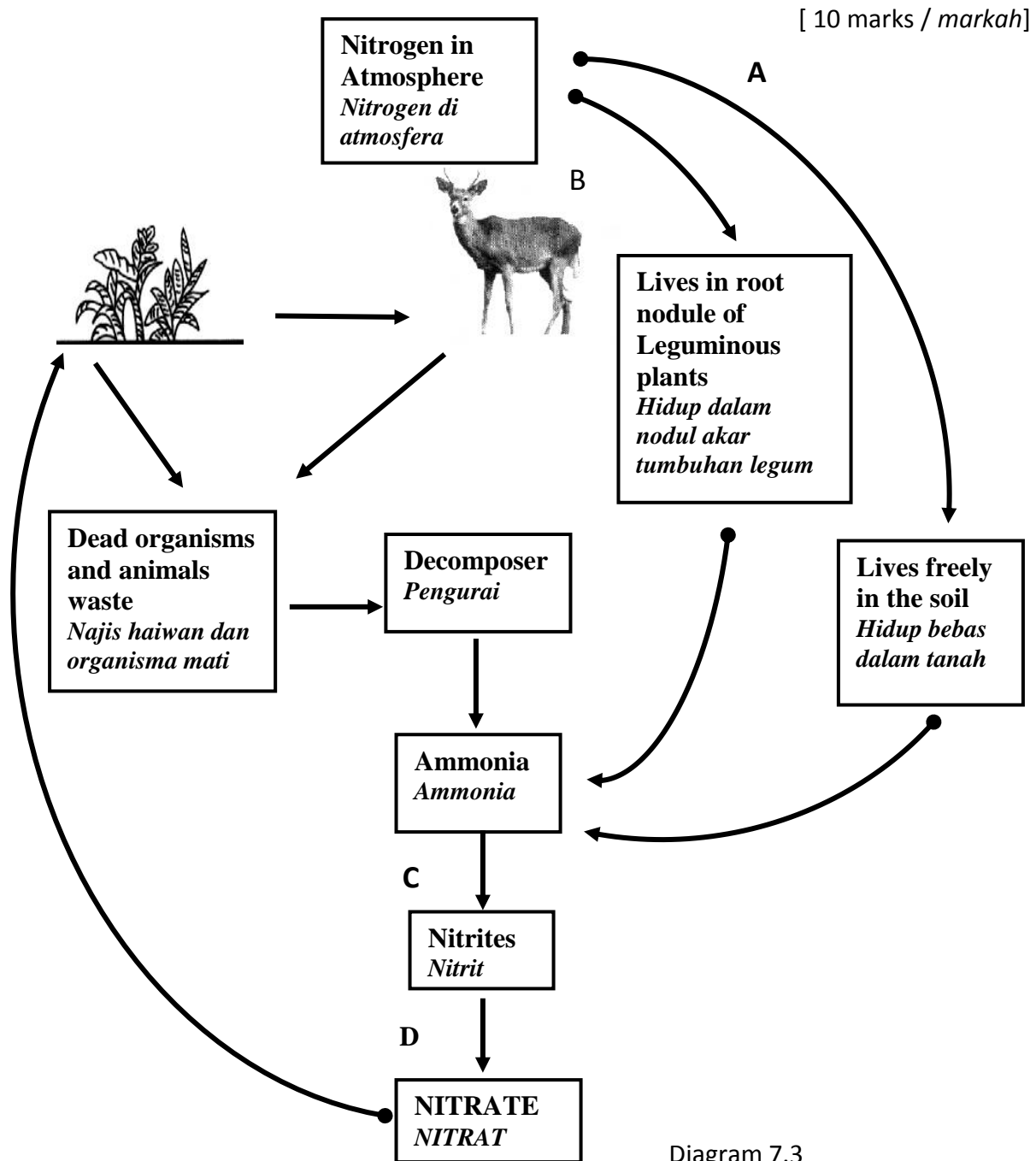
(c)

Diagram 7.3 shows the nitrogen cycle which plays an important role in the formation of protein. Plants and animals need nitrate to form protein.

Explain the role of plants, animals and microorganism A, B, C, and D in this cycle.

Rajah 7.3 menunjukkan kitar nitrogen yang memainkan peranan penting dalam pembentukan protein. Tumbuhan dan haiwan memerlukan nitrat untuk membentuk protein.

Huraikan peranan tumbuhan, haiwan dan mikroorganisma A, B, C, dan D dalam kitar ini.



8. Diagram 8 shows different type of tissues which involve in plant transport.
Rajah menunjukkan jenis tisu berbeza yang terlibat dalam pengangkutan tumbuhan.

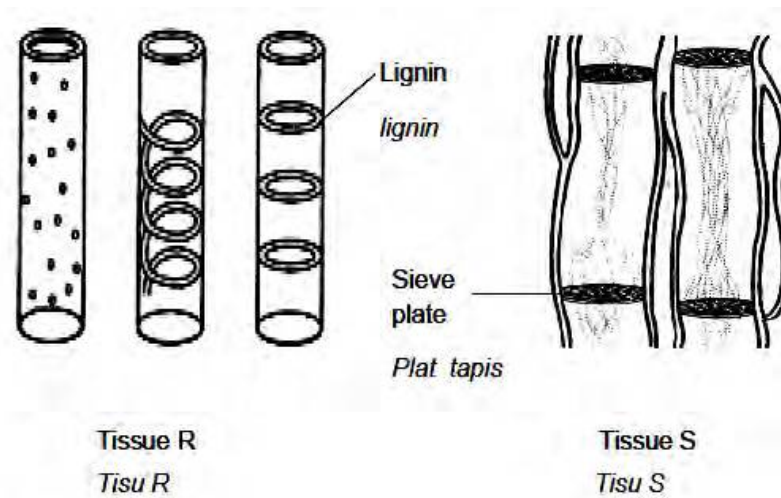
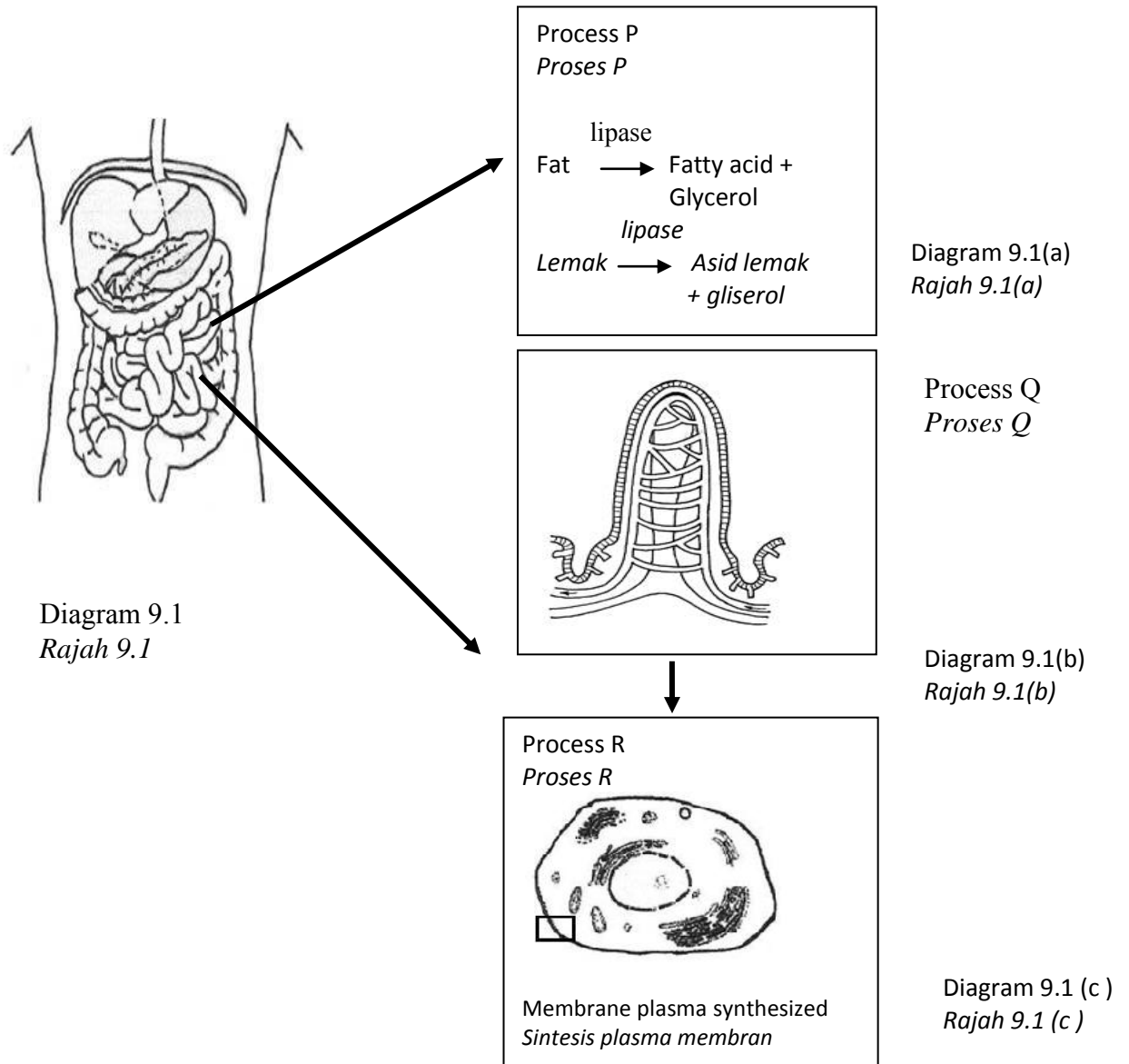


Diagram 8
Rajah 8

- (a) State the differences in the function and structure of tissue R and S
Nyatakan perbezaan dari segi fungsi dan struktur tisu R dan S.
 [8 marks / markah]
- (b) Explain the adaptation of tissue R to carry out its function in water transport efficiently.
Terangkan penyesuaian tisu R untuk menjalankan fungsinya dalam pengangkutan air dengan berkesan
 [8 marks / markah]
- (c) During hot day, water evaporate from leaves of the plant to the environment. Explain how this process help to prevent the occurrence of overheating in plants
Semasa hari panas, air tersejat daripada daun tumbuhan ke persekitaran. Terangkan bagaimana proses ini membantu menghalang kejadian kepanasan melampau pada tumbuhan
 [4 marks / markah]

- 9 Diagram 9.1 shows the human digestive system.
 Diagram 9.1(a) , (b) and (c) shows the three processes P, Q and R in the body.
Rajah 9.1 menunjukkan sistem pencernaan
Rajah 9.1 (a), (b) dan (c) menunjukkan tiga proses yang terlibat di dalam sistem badan



- (a) Explain the three processes which occur to the fat before the fat molecules can be used by body cells.

Terangkan ketiga-tiga proses yang berlaku kepada lemak sebelum molekul lemak dapat digunakan oleh sel badan .

[10 marks/markah].

- (b) Diagram 9.2(a) and (b) shows the physical condition of two different people which is related to their eating habits.

Rajah 9.2 (a) dan (b) menunjukkan keadaan fizikal dua orang berbeza yang berkaitan dengan tabiat makan mereka.



Diagram 9.2(a)
Rajah 9.2(a)



Diagram 9.2 (b)
Rajah 9.2(b)

As a dietician, explain the relationship between the eating habits and the physical condition of each person and suggest the ways to improve their health condition.

Sebagai seorang pakar pemakanan, terangkan hubungan antara tabiat makan dengan keadaan fizikal setiap individu itu dan cadangkan kaedah untuk meningkatkan tahap kesihatan mereka.

[10 marks/ markah]

END OF QUESTION PAPER

Answer **all** questions.

Jawab **semua** soalan.

1. A group of students carried out an experiment to study the effects of various concentrations of carbon dioxide on the rate of photosynthesis. Diagram 1 shows the apparatus set-up to collect the gas released when an aquatic plant, *Hydrilla sp* is exposed to light from the lamp. The apparatus is placed at a distance of 20 cm from the light source. The *Hydrilla sp* is immersed in 0.2%, 0.4%, 0.6% and 0.8% concentration of sodium hydrogen carbonate solution respectively. The number of gas bubbles released in five minute is counted and recorded. The temperature of the water is maintained at 28°C throughout the experiment.

Sekumpulan pelajar menjalankan eksperimen untuk mengkaji kesan kepekatan karbon dioksida terhadap kadar fotosintesis. Rajah 1 menunjukkan susunan radas untuk mengumpul gas yang dibebaskan oleh tumbuhan akuatik, *Hydrilla sp* yang didedahkan kepada cahaya daripada mentol. Radas diletakkan pada jarak 20 cm daripada sumber cahaya. *Hydrilla sp* kemudian direndam dalam 0.2%, 0.4%, 0.6% dan 0.8% kepekatan larutan natrium hidrogen karbonat. Bilangan gelembung gas yang dibebaskan dalam masa lima minit dikira dan direkodkan. Suhu air dikekalkan pada 28°C sepanjang eksperimen ini.

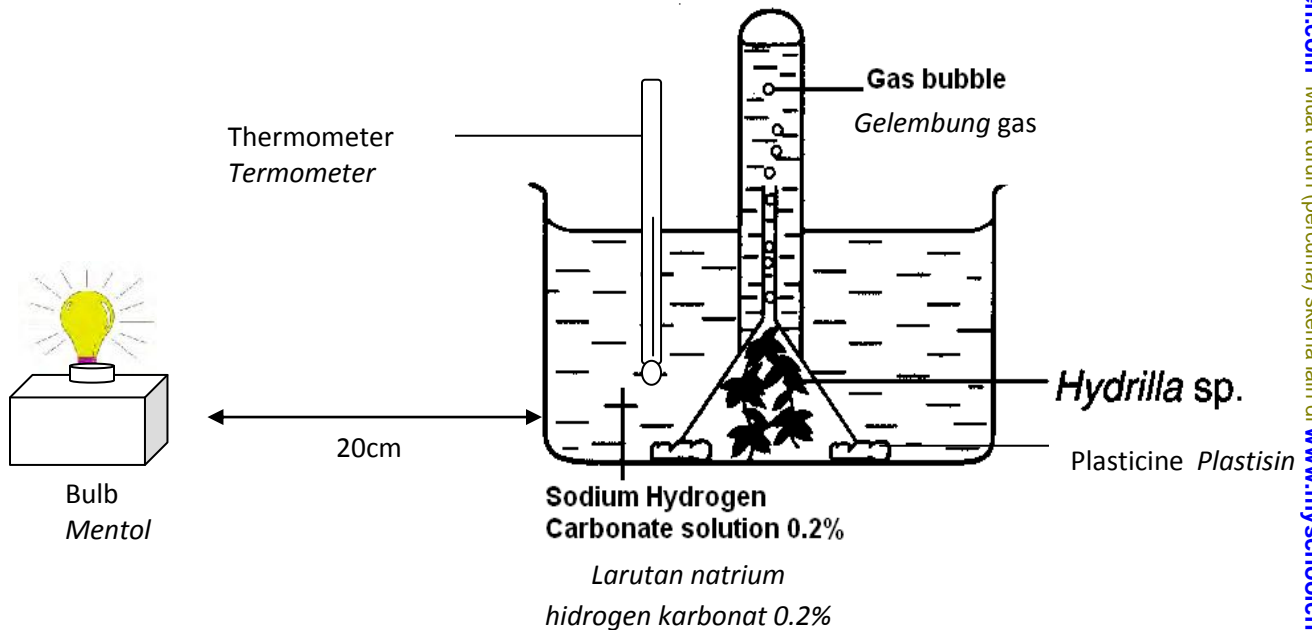


Diagram 1
Rajah 1

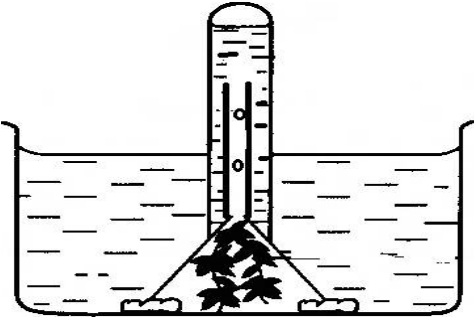
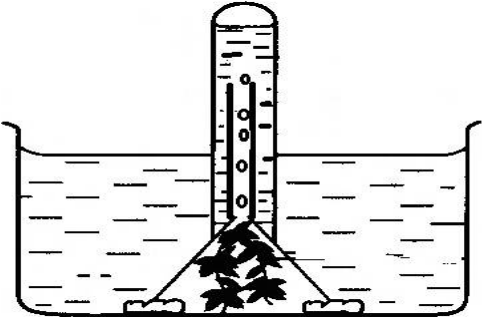
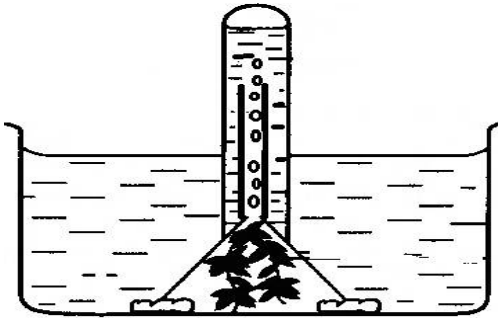
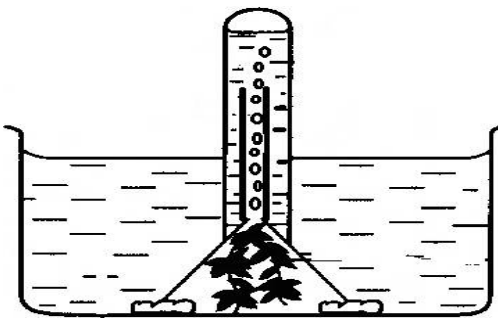
Concentration of sodium hydrogen carbonate solution (%) <i>Kepekatan larutan natrium hidrogen karbonat (%)</i>	Number of gas bubbles released in 5 minutes <i>Bilangan gelembung gas yang dibebaskan dalam 5 minit</i>
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0.4	 <div data-bbox="1385 982 1507 1081" style="float: right; width: 50px; height: 50px; border: 1px solid black; margin-left: auto;"></div>
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0.8	 <div data-bbox="1385 1753 1507 1852" style="float: right; width: 50px; height: 50px; border: 1px solid black; margin-left: auto;"></div>

Table 1
Jadual 1

- a) Record the number of gas bubbles released

space provided in Table 1.

Catatkan bilangan gelembung gas yang dibebaskan selama 5 minit di ruang yang disediakan dalam jadual 1.

[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 the inference which corresponds to the observation in 1(b)(i).

Nyatakan 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]

c) Complete table 2 based on this experiment.

Lengkapkan Jadual 2 berdasarkan eksperimen ini.

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]

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.

Your table should have the following titles:

Bina satu jadual dan rekodkan semua data yang dikumpul dalam eksperimen ini.

Jadual anda hendaklah mengandungi tajuk-tajuk berikut:

- Concentration of sodium hydrogen carbonate solution
Kepekatan larutan natrium hidrogen karbonat
- Number of gas bubble
Bilangan gelembung gas
- Rate of photosynthesis
Kadar fotosintesis

$$\left[\text{Rate of photosynthesis} = \frac{\text{Number of gas bubble}}{\text{Time}} \right]$$

$$\left[\text{Kadar fotosintesis} = \frac{\text{Bilangan gelembung gas}}{\text{Masa}} \right]$$

[3 marks]
[3 markah]



(ii) Use the graph paper provided , draw the graph of the rate of photosynthesis against the

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[Lihat halaman sebelah

concentration of sodium hydrogen carbonate solution.

Menggunakan kertas graf yang disediakan, lukis graf kadar fotosintesis melawan kepekatan larutan hidrogen karbonat

[3 marks]

[3 markah]

- f) Based on the graph in 1(e)(ii), explain the relationship between the rate of photosynthesis and the concentration of sodium hydrogen carbonate solution.

Berdasarkan graf di 1(e)(ii), terangkan hubungan antara kadar fotosintesis dengan kepekatan larutan natrium hidrogen karbonat.

.....

.....

.....

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.....

.....

[3 marks]

[3 markah]

- g) Another group of students carried out the same experiment but the light bulb was put at a distance of 10cm from the beaker containing *Hydrilla sp* in 0.2% sodium hydrogen carbonate solution . Predict the result obtained and explain your prediction.

Sekumpulan murid yang lain menjalankan eksperimen yang sama tetapi mentol diletakkan pada jarak 10cm dari bikar yang mengandungi Hydrilla sp dalam larutan natrium hidrogen karbonat 0.2%.

Ramalkan keputusan yang diperoleh dan terangkan ramalan anda.

.....

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.....

.....

[3 marks]

[3 markah]

- h) Based on the results of this experiment, state the operational definition for the process of photosynthesis.

Berdasarkan keputusan eksperimen ini, nyatakan definisi secara operasi bagi proses fotosintesis

.....

.....

.....

.....

[3 marks]
[3 markah]

- i) Another student conducts a similar experiment but uses the following apparatus and materials :
Sekumpulan pelajar yang lain menjalankan eksperimen yang hamper sama tetapi menggunakan bahan dan radas berikut:

0.3% sodium	hydrogen carbonate solution
water bath	lamp
An aquatic plant	stopwatch
	thermometer

Classify the list above as material and apparatus.

Klasifikasikan senarai di atas sebagai bahan dan radas

Materials <i>Bahan</i>	Apparatus <i>Radas</i>

[3 marks]
[3 markah]

2 Situation A

A housewife used a product of detergent A to wash her clothes. She found that all the stains such as blood and grease are not easily vanished.

Situation B

Another housewife used a product detergent B to wash her clothes. She was so satisfied when all the stains such as blood and grease are easily vanished.

Diagram 1 shows the informations stated on both product of detergents.

Situasi A

Seorang surirumah menggunakan produk detergen A untuk mencuci pakaiannya. Beliau mendapati bahawa kekotoran seperti darah dan gris tidak dapat dibersihkan .

Situasi B

Surirumah lain pula menggunakan produk detergen B untuk mencuci pakaiannya. Beliau sangat berpuashati apabila segala kekotoran samada darah dan gris dapat dibersihkan dengan sempurna. Rajah 1 menunjukkan maklumat yang tercatat pada kedua-dua produk detergen.

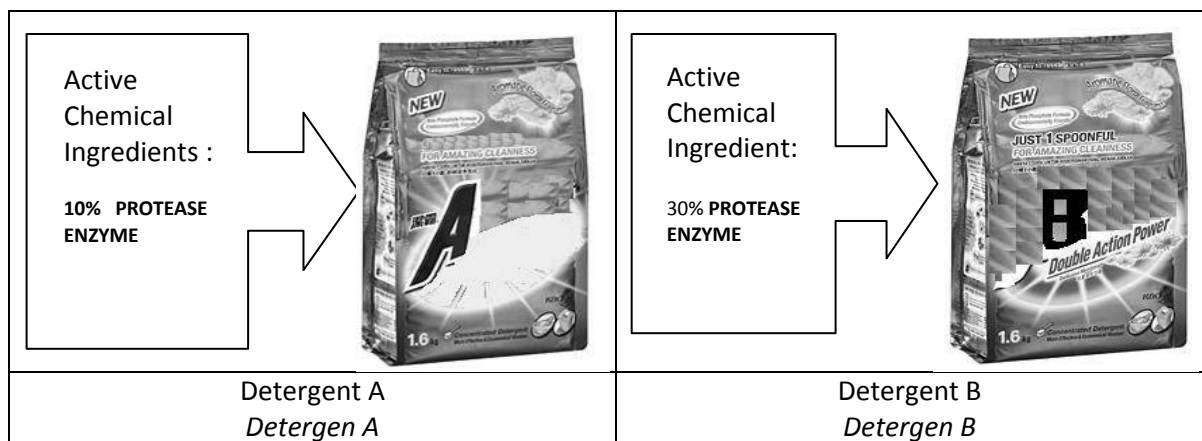


Diagram 1

Rajah 1

Based on the above situation, design a laboratory experiment to study the effect of enzyme concentration on the activity of salivary amylase.

The planning of your experiment must include the following aspects:

Berdasarkan situasi di atas, reka bentuk satu eksperimen makmal untuk mengkaji kesan kepekatan enzim ke atas aktiviti enzim amilase liur.

Perancangan eksperimen anda hendaklah meliputi aspek-aspek berikut:

- Problem statement
Pernyataan masalah
- Hypothesis
Hipotesis
- Variables
Pembolehubah
- List of materials and apparatus
Senarai bahan dan radas
- Procedure
Prosedur
- Presentation of data
Persembahan data

[17 marks/markah]

**END OF QUESTION PAPER
KERTAS SOALAN TAMAT**