

1. Diagram 1 shows organelles found in a cell.
Rajah 1 menunjukkan organel yang terdapat dalam satu sel

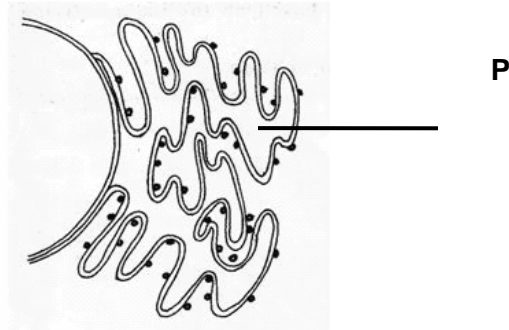


Diagram 1
Rajah 1

What is P?
Apakah P ?

- A. Mitochondria
Mitokondria
 - B. Golgi Apparatus
Alat golgi
 - C. Rough endoplasmic reticulum
Jalinan endoplasma kasar
 - D. Smooth endoplasmic reticulum
Jalinan endoplasma licin
2. Diagram 2 shows a plant cell.
Rajah 2 menunjukkan satu sel tumbuhan

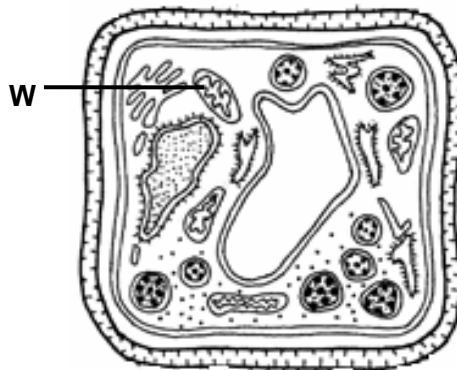


Diagram 2
Rajah 2

What process occurs in organelle W ?
Apakah proses yang berlaku dalam organel ini ?

- A. Photosynthesis.
 Fotosintesis
- B. Synthesis of protein
 Sintesis protein
- C. Transport protein
 Mengangkut protein
- D. Generation of energy
 Penjanaan tenaga

3. The information given below shows the characteristics of organelle Y.
Maklumat di bawah menunjukkan ciri-ciri organel Y.

- the largest organelle in a cell
 organel yang paling besar dalam sel
- spherical in shape
 Berbentuk sfera

What is the function of organelle Y?
Apakah fungsi organel Y?

- A Site of synthesis of proteins
 Tapak sintesis protein
- B Carries out photosynthesis
 Menjalankan fotosintesis
- C Controls the cellular activities
 Mengawal aktiviti sel
- D Site of synthesis of lipids
 Tapak untuk sintesis protein

4. Diagram 3 shows a type of tissue found in a plant.
Rajah 3 menunjukkan sejenis tisu tumbuhan.

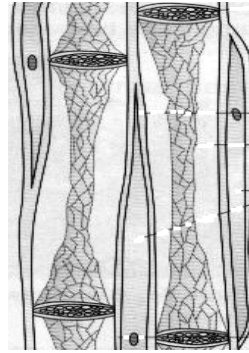


Diagram 3
Rajah 3

What is the tissue?
Apakah tisu tersebut?

- A Xylem
 Xilem
- B Phloem
Floem
- C. Colenchyma
 Kolenkima
- D. Schlerenchyma
Sklerenkima
5. The following statements are about the movement of substances across the plasma membrane
Pernyataan berikut adalah berkaitan pergerakan bahan merentasi membrane plasma

- Transport large water soluble molecules following the concentration gradient.
Mengangkut molekul-molekul besar yang larut air mengikuti kecerunan kepekatan
- Required carrier protein.
Memerlukan protein pembawa

What is the process ?
Apakah proses tersebut ?

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

6. Diagram 4 shows the structure of a plasma membrane.
Rajah 4 menunjukkan struktur membran plasma.

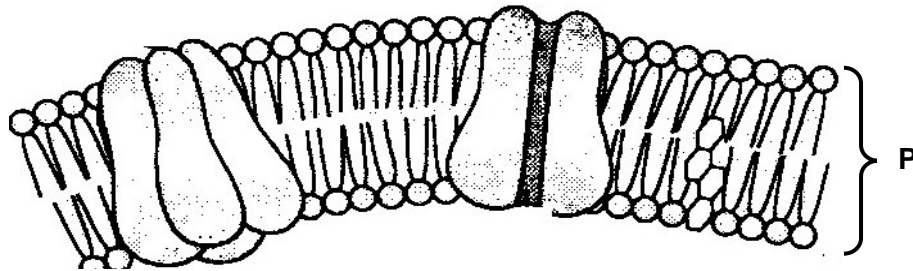


Diagram 4
Rajah 4

Which molecules can pass through P?
Apakah molekul yang dapat melepasi P?

- A Glucose
Glukosa
- B Amino Acid
Amino Asid
- C Water
Air
- D Glycogen
Glikogen

7. Diagram 5a and 5b show a red blood cell before and after it has been immersed in solution X.

Rajah 3a dan 3b menunjukkan sel darah merah sebelum dan selepas direndam dalam larutan X.

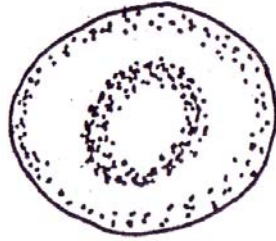


Diagram 5a (Before)
Rajah 5a (sebelum)

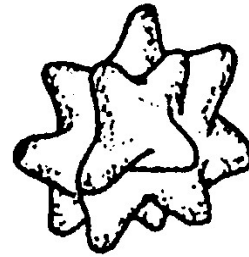


Diagram 5b (After)
Rajah 5b (selepas)

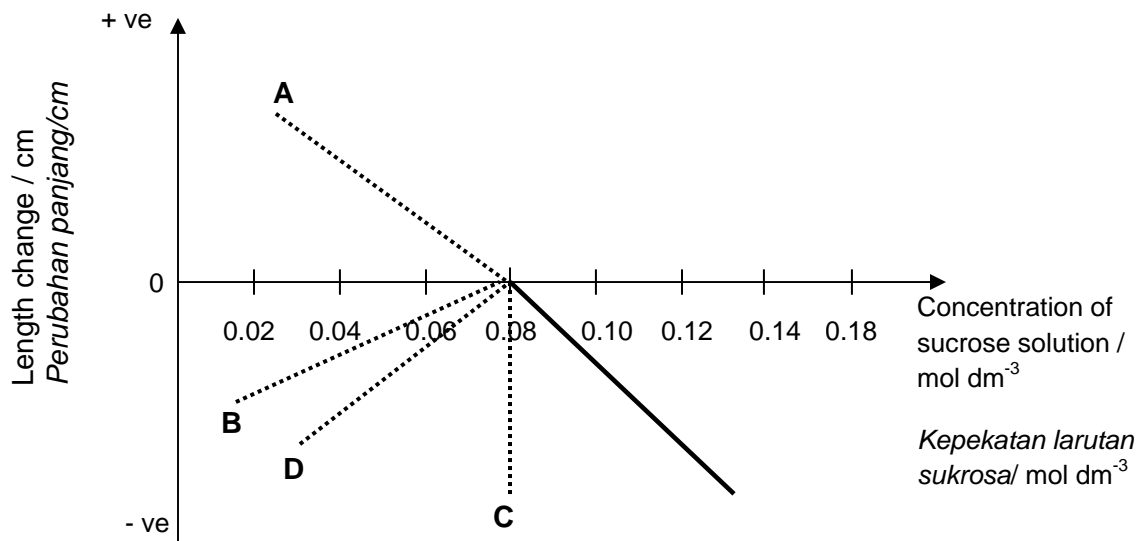
What is solution X and the process that takes place in the red blood cell?

Apakah larutan X dan proses apakah yang berlaku ke atas sel darah merah?

	Solution X <i>Larutan X</i>	Process <i>Proses</i>
A	Distilled water <i>Air suling</i>	Plasmolysis <i>Plasmolisis</i>
B	Distilled water <i>Air suling</i>	Crenation <i>Krenasi</i>
C	20% sucrose solution <i>Larutan sukrosa 20%</i>	Plasmolysis <i>Plasmolisis</i>
D	20% sucrose solution <i>Larutan sukrosa 20%</i>	Crenation <i>Krenasi</i>

8. An experiment was carried out to investigate the effect of different concentration of sucrose solution on the length of potato strips. The graph shows the result of the experiment.

Satu kajian telah dijalankan untuk mengkaji kesan larutan sukrosa berlainan kepekatan keatas panjang keratan kentang. Graf menunjukkan keputusan kajian.



Which of the graphs, **A**, **B**, **C** and **D**, may be expected if the concentration of the sucrose solution is less than 0.08 mol dm^{-3} ?

Antara graf A, B, C dan D, yang manakah mungkin diperolehi jika kepekatan larutan sukrosa adalah kurang daripada 0.08 mol dm^{-3} ?

9. What is the main carbohydrate reserve in liver cells?
Apakah jenis karbohidrat utama yang disimpan dalam sel hati?

- A Glucose
Glukosa
- B Glycogen
Glikogen
- C Lactose
Laktosa
- D Starch
Kanji

10. Which of the following is formed from condensation of 3 molecules of fatty acids and 1 molecule of glycerol?
 Yang manakah antara berikut terbentuk daripada kondensasi 3 molekul asid lemak dan 1 molekul gliserol ?

- A Glycogen.
Glikogen
 B Lipid.
Lemak
 C Starch
Kanji
 D Urea
Urea.

11. Statements below shows the hydrolysis of 4 different types of carbohydrates.
 Pernyataan dibawah menunjukkan hidrolisis 4 jenis karbohidrat yang berbeza.

M : Maltose	+	water	→	glucose	+	glucose
N : Galactose	+	water	→	glucose	+	lactose
O : Sucrose	+	water	→	glucose	+	fructose
P : Fructose	+	water	→	glucose	+	sucrose

Which is correct?
 Yang manakah benar ?

- A M and N only
M dan N sahaja
 B O and P only
O dan P sahaja
 C N and O only
N and O sahaja
 D M and O only
M dan O sahaja

12. The statement describes a characteristic of enzyme maltase.
Pernyataan di bawah menerangkan tentang satu ciri enzim maltase

Maltase can speed up both the hydrolysis and condensation process
Maltase boleh mempercepatkan kedua-dua tindakbalas hidrolisis dan kondensasi

Which of the following refers to the characteristic above?
 Yang manakah antara berikut merujuk kepada ciri tersebut ?

- A Specific in action
Spesifik dalam tindakan
- B Reversible reaction
Tindakbalas berbalik
- C Required in small quantity
Diperlukan dalam kuantiti yng kecil
- D Not destroyed after reaction
Tidak termusnah diakhir tindakbals
13. Diagram 6 shows the structures of a substrate and an enzyme.
Rajah 6 menunjukkan struktur substrat dan enzim

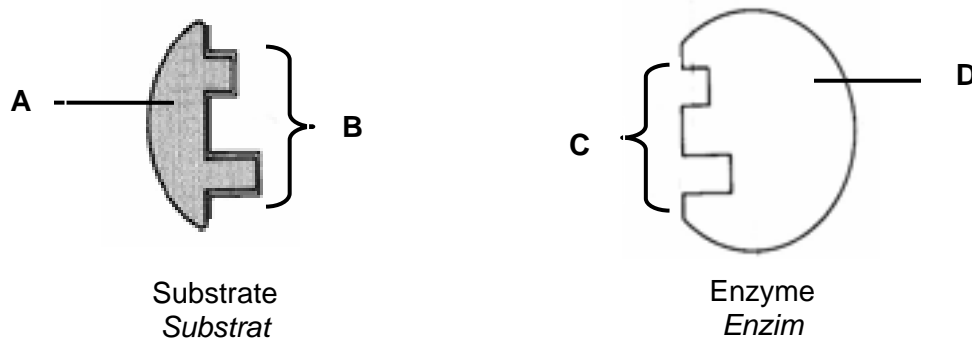


Diagram 6
Rajah 6

Which of the labeled parts A, B, C and D is the active site ?
Antara A, B, C dan D, yang manakah tapak aktif ?

14. The given information is about the events in a phase of cell cycle
Maklumat dibawah 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
- B S phase
Fasa S
- C G2 phase
Fasa G2
- D M phase
Fasa M
15. Diagram 7 shows a cell undergoing stage Q of mitosis
Rajah 7 menunjukkan satu sel yang sedang mengalami peringkat Q mitosis.

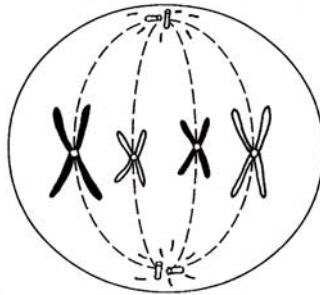


Diagram 7
Rajah 7

What is stage Q ?

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

16. Diagram 8 shows a cell cycle of an organism.
Rajah 8 menunjukkan kitaran sel satu organisma

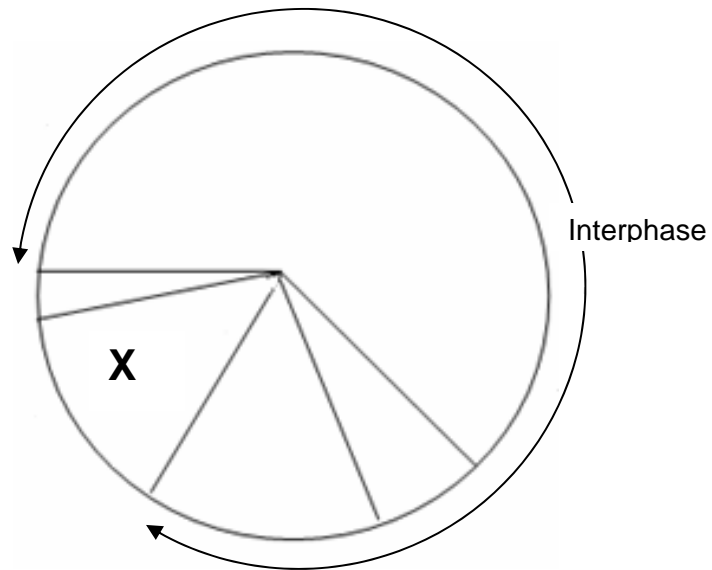
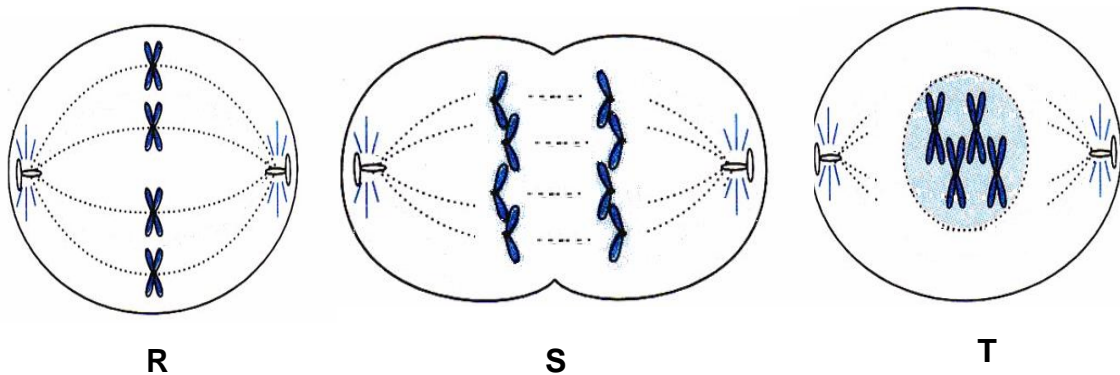


Diagram 8
Rajah 8

Which of the following is the correct sequence of process X ?
Yang manakah antara berikut merupakan susunan yang betul bagi proses X ?

- A. Telophase → Anaphase → Metaphase → Prophase
Telofasa → Anafasa → Metafasa → Profasa
- B. Anaphase → Metaphase → Prophase → Telophase
Anfasa → Metafasa → Profasa → Telofasa
- C. Prophase → Metaphase → Anaphase → Telophase
Profasa → Metafasa → Anafasa → Telofasa
- D. Prophase → Anaphase → Metaphase → Telophase
Profasa → Anafasa → Metafasa → Telofasa

17. Processes R, S and T occur during mitosis in a cell.
Proses R, S dan T berlaku semasa mitosis.



Which of the following shows the correct sequence for mitosis ?
Antara yang berikut, yang manakah menunjukkan urutan yang betul untuk mitosis?

	I	II	III
A	T	S	R
B	R	T	S
C	S	R	T
D	T	R	S

18. Diagram 9 shows a diploid cell. This cell undergoes meiosis.
Rajah 9 menunjukkan satu sel diploid. Sel ini menjalani meiosis.

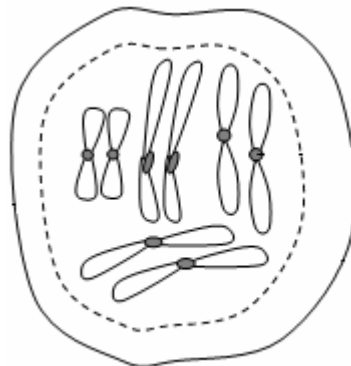


Diagram 9
Rajah 9

If one of the homologous chromosome pairs does not separate during Meiosis I, how many chromosomes can be found in the gametes ?

Jika satu daripada pasangan kromosom tidak berpisah semasa Meiosis I, berapakah bilangan kromosom boleh didapati dalam gamet ?

- A 8
- B 4
- C 5
- D 7

19. Diagram 10 shows a stage in one of the phases in meiosis.
Rajah 10 menunjukkan peringkat dalam satu fasa meiosis

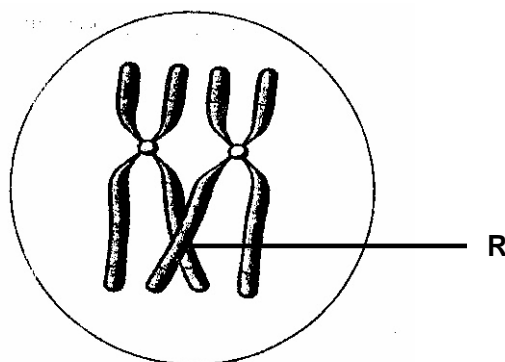


Diagram 10
Rajah 10

What is the importance of process R ?
Apakah kepentingan proses R ?

- A Replace dead cells.
Menggantikan sel-sel mati
- B Variation among the spesies.
Variasi dikalangan spesies
- C Maintains diploid chromosome number in a zygote.
Mengekalkan bilangan diploid kromosom di dalam zigot
- D Causes genetically identical from the parent cell to next generation
Menyebabkan persamaan genetik dari sel induk ke generasi berikutnya.

20. Diagram 11 shows the protein digestion in human alimentary canal.
Rajah 11 menunjukkan penghadaman protein dalam salur alimentary manusia.

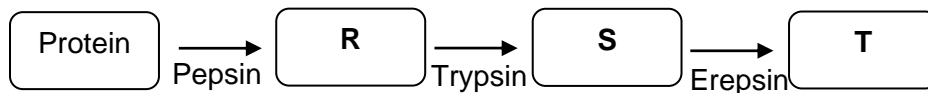


Diagram 11
Rajah 11

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

	R	S	T
A	Polypeptide	Peptide	Amino acid
B	Amino acid	Peptide	Polypeptide
C	Peptide	Polypeptide	Amino acid
D	Peptide	Amino acid	Polypeptide

21. Table 2 shows the average volume of solutions R,S,T and U needed to decolourise 1ml of DCPIP solution.
Jadual 2 menunjukkan purata isipadu larutan R , S, T dan U yang diperlukan untuk menyahwarnakan 1 ml larutan DCPIP

Solution <i>Larutan</i>	Volume of solution to decolourise 1 ml of DCPIP (ml) <i>Isipadu larutan untuk me nyahwarnakan 1 ml DCPIP (ml)</i>
R	4.2
S	1.8
T	2.7
U	7.3

TABLE 1
Jadual 1

Which of the solution contains the lowest ascorbic acid content?

Larutan yang manakah mengandungi kandungan asid askorbik yang paling rendah ?

- A R
- B S
- C T
- D U

22. Table 2 shows the types and quantity of food taken by a student in a day
Jadual 2 menunjukkan jenis makanan dan kuantiti makanan yang diambil oleh seorang pelajar dalam satu hari.

Types of food <i>Jenis makanan</i>	Quantity/g <i>Kuantiti /g</i>	Energy /kJ per 100g <i>Tenaga/ kJ per 100g</i>
Rice <i>Nasi</i>	150	2000
Potatoes <i>Kentang</i>	50	3000
Milk <i>Susu</i>	200	300
Chicken <i>Ayam</i>	150	800

Table 2
Jadual 2

The total energy obtained by the student is

Jumlah tenaga yang diperolehi oleh pelajar tersebut ialah

- A 6500 kJ
- B 6300 kJ
- C 6100 kJ
- D 4900 KJ

23. Diagram 12 shows the digestive system of a rodent.
Raja 12 menunjukkan sistem penghadaman rodensia.

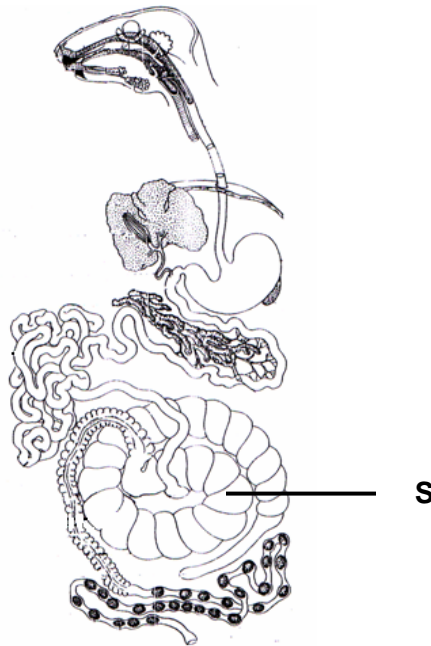


Diagram 12
 Rajah 12

What is the organism found in **S** and the enzyme produced by the organism?
*Apakah organisma yang boleh didapati dalam **S** dan enzim yang dihasilkan oleh organisma tersebut?*

	Organism Organisma	Enzyme produced Enzim yang dihasilkan
A	Bacteria <i>Bakteria</i>	Cellulase <i>Selulosa</i>
B	Fungi <i>Fungi</i>	Amylase <i>Amilase</i>
C	Viruses <i>Virus</i>	Protease <i>Protease</i>
D	Fungi <i>Fungi</i>	Lipase <i>Lipase</i>

24. Diagram 13 shows the bile ducts which have been blocked by gallstone.
Rajah 13 menunjukkan salur hempedu yang tersumbat oleh batu hempedu.

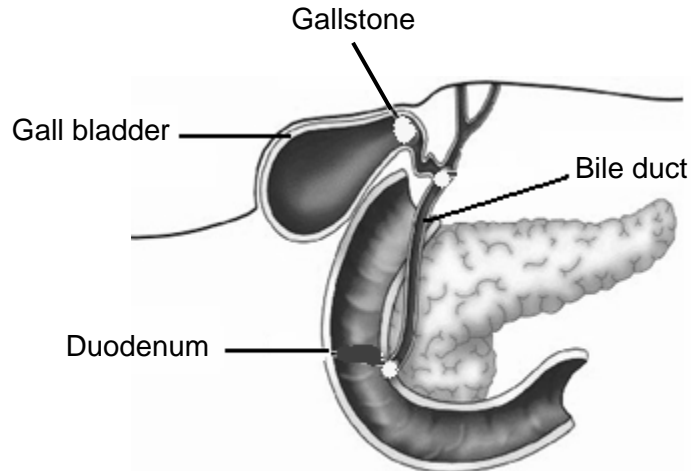


Diagram 13
Rajah 13

Which statement is the consequences of the occurrence.
Manakah pernyataan berikut adalah akibatnya dari kejadian itu .

- A Lipase is not produced
Enzim lipase tidak dapat dirembeskan
- B Amylase is not produced
Enzim amylase tidak dapat dihasilkan
- C Digestion of lipids will be slow
Penghadaman lemak akan menjadi lambat
- D Digestion of starch will not occur
Penghadaman kanji tidak akan berlaku

25. Diagram 14 shows an experiment set-up to investigate factors which affect the rate of photosynthesis.
Rajah 14. menunjukkan satu eksperimen untuk mengkaji faktor yang mempengaruhi kadar fotosintesis.

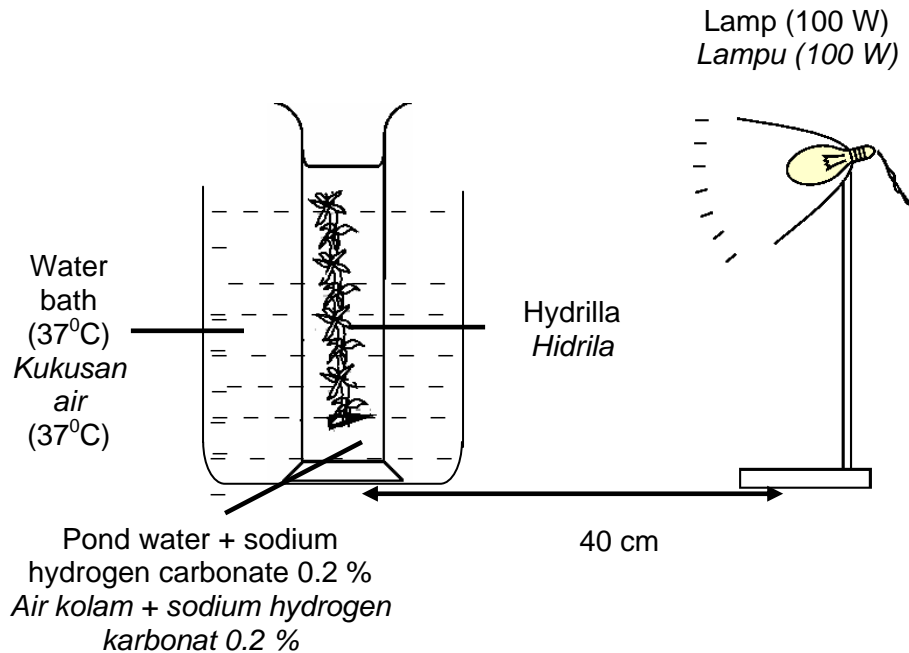


Diagram 14
 Rajah 14

Which of the following will increase the rate of photosynthesis in the experiment.
Antara berikut yang manakah akan meningkatkan kadar fotosintesis dalam kajian ini ?

- A Using a waterbath at 60° C
Menggunakan kukusan air pada suhu 60° C
- B Placing a 100W bulb 20 cm from the hydrilla
Meletakkan 100W lampu pada jarak 20cm daripada hidrilla
- C Using 0.1% sodium hydrogen carbonate solution
Menggunakan 0.1% larutan sodium hydrogen karbonat
- D Replacing the *Hydrilla* with *Elodea*
Menggantikan Hidrilla dengan Elodea

26. Diagram 15 shows the structure of a chloroplast. Which of the parts labeled A, B, C or D is the site for light reaction ?
Rajah 15 me nunjukkan struktur satu kloroplas. Di antara bahagian yang berlabel A , B, C atau D, di manakah berlakunya tindak balas cahaya ?.

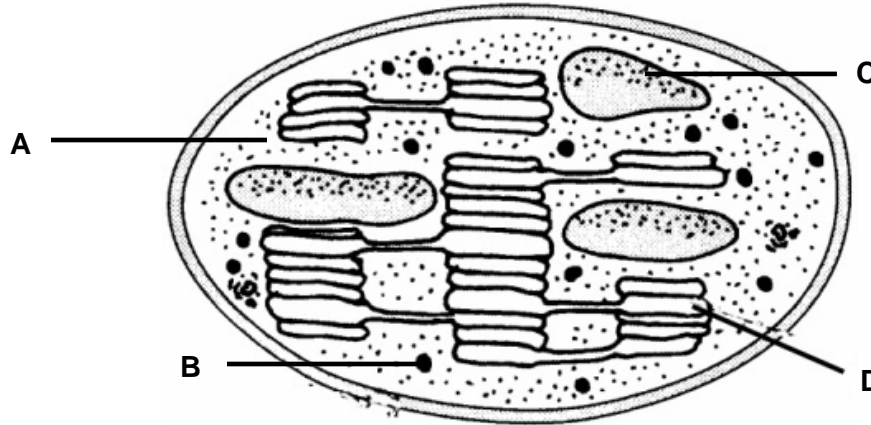
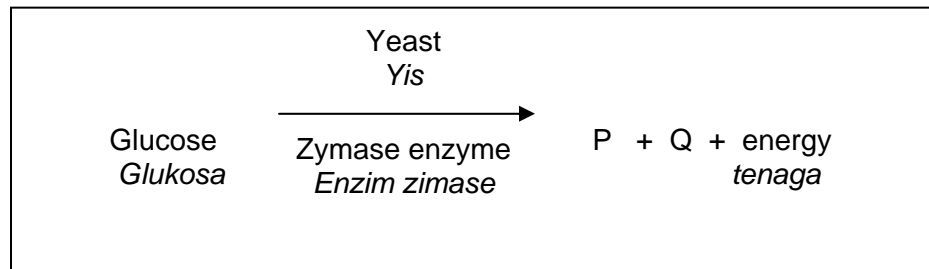


Diagram 15
Rajah 15

27. The equation represents a chemical reaction for anaerobic respiration by yeast.
Persamaan perkataan mewakili tindakbalas kimia untuk respirasi anaerob oleh yis



What are P and Q?
Apakah P dan Q ?

	P	Q
A	Ethanol <i>Etanol</i>	Carbon dioxide <i>Karbon dioksida</i>
B	Ethanol <i>Etanol</i>	Oxygen <i>Oksigen</i>
C	Lactic acid <i>Asid Laktik</i>	Carbon dioxide <i>Karbon diokida</i>
D	Lactic acid <i>Asid Laktik</i>	Oxygen <i>Oksigen</i>

28. Diagram 16 shows the apparatus set up to investigate the activity of yeast.
Rajah 16 menunjukkan susunan radas untuk mengkaji aktiviti yis

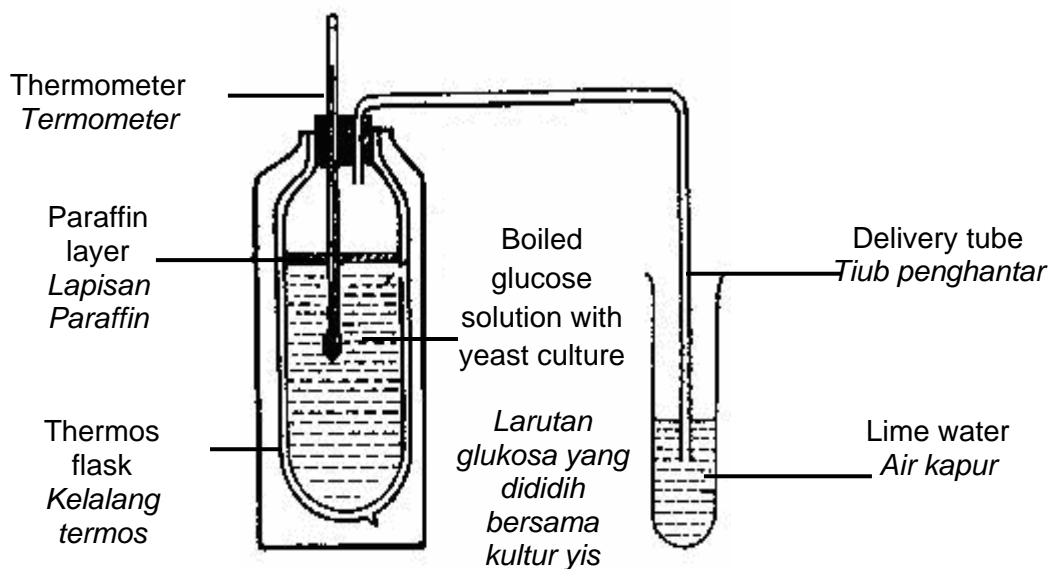


Diagram 16
Rajah 16

What can be observed after 30 minutes?
Apakah yang boleh diperhatikan selepas 30 minit

X	Lime-water turns cloudy <i>Air kapur bertukar keruh</i>
Y	Gas bubbles are released <i>Gelembung udara dibebaskan</i>
Z	Temperature in thermos-flask increases <i>Suhu dalam kelalang termos bertambah</i>

- A X and Y only
X dan Y sahaja
- B Y and Z only
Y dan Z sahaja
- C X and Z only
X dan Z sahaja
- D X, Y and Z
X, Y dan Z

29. **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.
Air mengandungi oksigen terlarut masuk ke dalam mulut
- M** The floor of the buccal cavity is lowered.
Dasar rongga mulut direndahkan
- N** The mouth opens.
Mulut terbuka
- O** The operculum closes.
Operkulum tertutup

Arrange K, L, M, N and O in the correct sequence ?
 Susun K, 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
30. Which methods of transporting carbon dioxide gas released by the respiring cell of human body are correct?
 Manakah antara cara pengangkutan karbon dioksida yang terhasil dari respirasi sel badan manusia adalah betul?
- I Carbon dioxide is transported as carboxyhaemoglobin.
Karbon dioksida diangkut sebagai karboksihemoglobin.
- II Carbon dioxide is transported as carbaminohaemoglobin
Karbon dioksida diangkut sebagai atom karbaminohemoglobin
- III Carbon dioxide is transported in the form of bicarbonate ions
Karbon dioksida diangkut dalam bentuk ion bikarbonat
- IV Carbon dioxide is transported as dissolved carbon dioxide in blood plasma
Karbon dioksida diangkut sebagai molekul karbon dioksida yang larut dalam plasma darah

- A I and II only
- B I, III and IV only
- C II, III and IV only
- D I, II, III and IV

- 31 Diagram 17 shows a food web in an ecosystem.
Rajah 17 menunjukkan satu jaringan makanan dalam satu ekosistem.

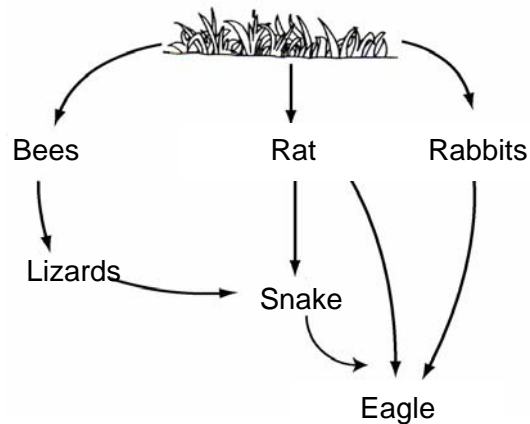
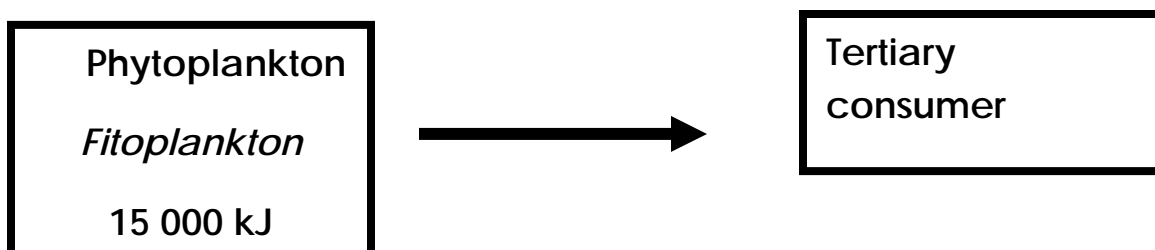


Diagram 17
Rajah 17

- Which of the following is the primary consumer?
Yang manakah antara berikut merupakan pengguna primer ?

- A. Eagle
Burung helang
- B. Rabbits
Arnab
- C. Snake
Ular
- D. Lizards
Cicak

32. The diagram below shows the energy flow from phytoplankton to the tertiary consumer.
Rajah di bawah menunjukkan aliran tenaga dari fitoplankton ke pengguna tertiar.



If 90% of energy is lost from one trophic level to the next trophic, how much energy is received by the tertiary consumer?

Jika 90% tenaga hilang dari satu aras trof ke aras trof yang lain, berapakah tenaga yang diterima oleh pengguna tertiar?

- A 15 kJ
 B 85 kJ
 C 150 kJ
 D 13500 kJ
33. Table 3 shows the number of plant **S** present in 8 different quadrats, each measuring 1.5 m X 1.5 m
*Jadual 3 menunjukkan bilangan tumbuhan **S** dalam 8 kuadrat yang berlainan, setiap satu berukuran 1.5 m X 1.5m.*

Quadrat number <i>Nombor kuadrat</i>	I	II	III	IV	V	VI	VII	VIII
Number of plant S <i>Bilangan tumbuhan S</i>	15	10	11	22	13	11	0	8

Calculate the density of plant **S**
*Hitung kepadatan tumbuhan **S***

- A 5 m^{-2}
 B 0.2 m^{-2}
 C 25.3 m^{-2}
 D 320 m^{-2}

34. Diagram 18 shows a human activity.
Rajah 18 menunjukkan satu aktiviti manusia



Diagram 18
Rajah 18

What is the effect of the activity ?
Apakah kesan aktiviti ini ?

- A. Decrease in BOD level
Penurunan aras BOD
- B. Increase the habitat of the fauna
Peningkatan habitat fauna
- C. Decrease the temperature in north pole
Penurunan suhu di kutub utara
- D. Increase the carbon dioxide level in the atmosphere
Peningkatan aras karbon dioksida dalam atmosfera

35. Diagram 19 shows four types of blood cells in human.
Rajah 19 menunjukkan empat jenis sel darah manusia

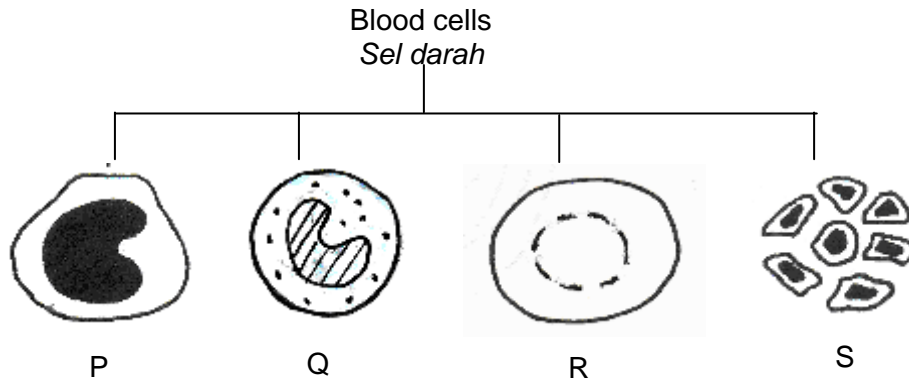


Diagram 19
Rajah 19

What is the function of cell Q ?
Apakah fungsi sel Q ?

- A To stimulate clotting of blood
Untuk menghasilkan pembekuan darah
- B To engulf foreign particles by phagocytosis
Untuk menelan bahan asing secara fagositosis
- C To transport oxygen
Mengangkut oksigen
- D To produce antibodies
Untuk menghasilkan antibody
36. Which immunization will be given to a person who suffers from tetanus which cause by *Clostridium tetani* ?
Immunisasi yang manakan akan diberi kepada seseorang yang mengidap penyakit tetanus yang disebabkan oleh Clostridium tetani?
- A Artificially acquired passive immunity
Keimunan pasif semulajadi
- B Naturally acquired passive immunity
Keimunan pasif buatan
- C Naturally acquired active immunity
Keimunan aktif semulajadi
- D Artificially acquired active immunity
Keimunan aktif buatan

37. Diagram 20 shows a type of plant tissue.
Rajah 20 menunjukkan satu jenis tisu tumbuhan

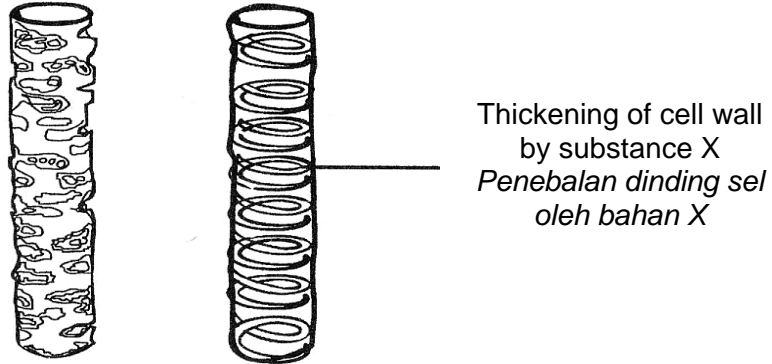


Diagram 20
Rajah 20

What is the importance of the thickening of cell wall by substance X?
Apakah kepentingan penebalan dinding sel oleh bahan X ?

- A To give turgidity to the tissue
Untuk memberikan kesegahan kepada tisu
- B To transport water and mineral salts
Untuk mengangkut air dan garam mineral
- C To transport photosynthesis products
Untuk mengangkut hasil fotosintesis
- D To give support and mechanical strength
Untuk memberi sokongan dan kekuatan mekanikal

38. Diagram 21 shows the lymphatic system.
Rajah 21 menunjukkan system limfa

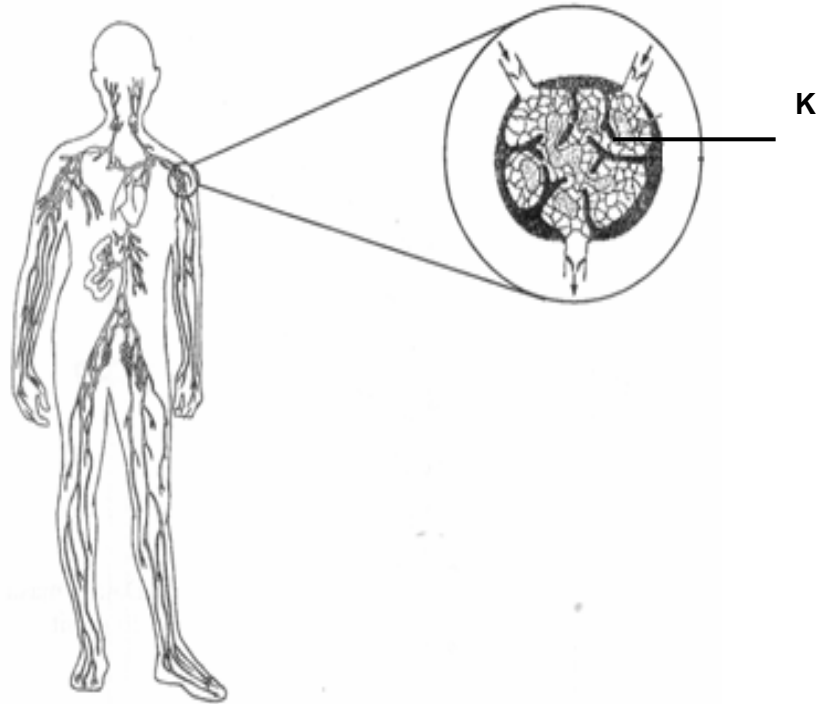


Diagram 21
Rajah 21

What is the role of K ?
Apakah peranan K ?

- A To filter lymph and destroy antigens
Untuk menapis limfa dan memusnahkan antigen
- B. To destroy erythrocytes of more than 120 days old
Untuk memusnahkan eritrosit yang melebihi 120 hari
- C To store fatty acid and glycerol absorbed by the lacteal
Untuk menyimpan lemak asid dan gliserol yang diserap oleh lakteal
- D To get rid of excess tissue fluid thus preventing oedema
Untuk menyingkirkan lebihan bendalir tisu bagi mengelakkan edema

- 39 Diagram 22 shows the structure of a human forearm
Rajah 22 menunjukkan struktur lengan manusia

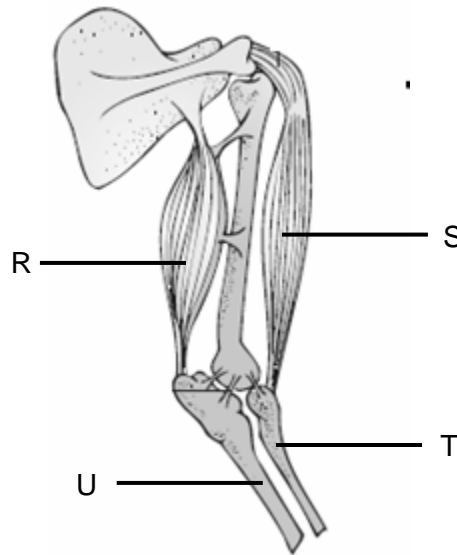


Diagram 22

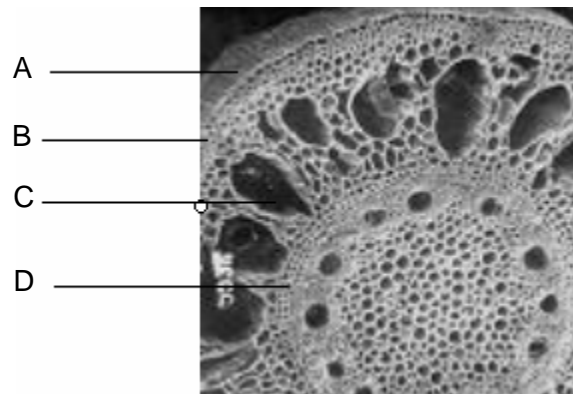
Rajah 22

What happen to R, S, T and U when the arm is in the position as shown in diagram 21?

Apakah yang berlaku kepada R, S, T dan U apabila lengan berada di posisi seperti dalam rajah 21?

	R	S	T	U
A	Relaxes <i>Mengendur</i>	Contracts <i>Mengecut</i>	Is pushed upwards <i>Di tolak keatas</i>	Is pushed downwards <i>Di tolak kebawah</i>
B	Contracts <i>Mengecut</i>	Relaxes <i>Mengendur</i>	Is pushed downwards <i>Di tolak kebawah</i>	Is pushed downwards <i>Di tolak kebawah</i>
C	Relaxes <i>Mengendur</i>	Contracts <i>Mengecut</i>	Is pulled upwards <i>Di tarik ke atas</i>	Is pulled upwards <i>Di tarik ke atas</i>
D	Contracts <i>Mengecut</i>	Relaxes <i>Mengendur</i>	Is pulled downwards <i>Di tarik ke bawah</i>	Is pulled downwards <i>Di tarik ke bawah</i>

40. Which of the following tissue helps to support an aquatic plant?
Yang manakah antara tisu berikut memberi sokongan kepada tumbuhan akuatik ?



41. Diagram 23 shows a site where the process of ultrafiltration takes place.
Rajah 23 menunjukkan bahagian dimana proses ultraturasan berlaku

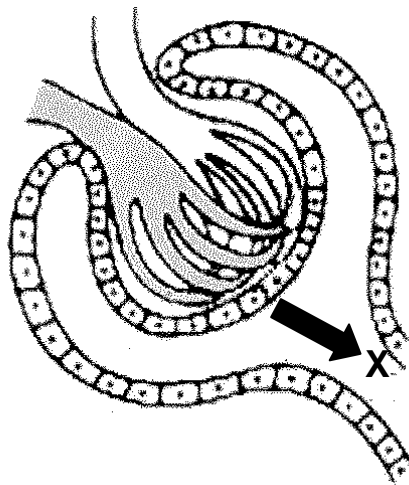
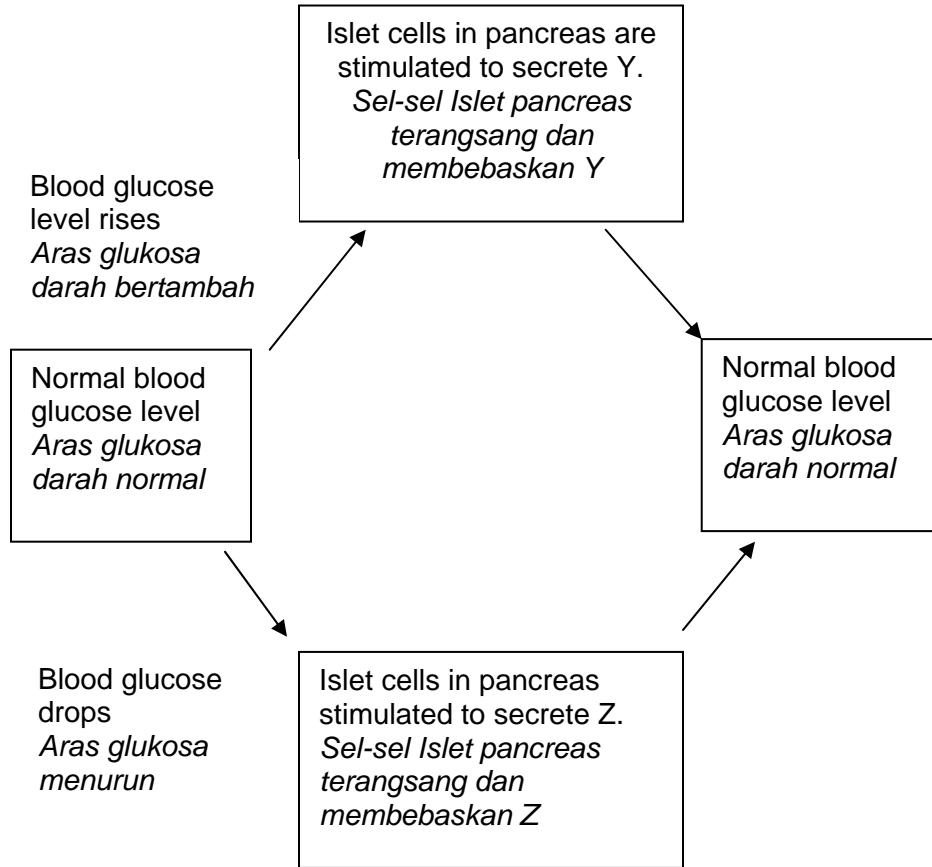


Diagram 23
Rajah 23

Which of the following is possible to represent in X
Manakah antara berikut boleh terdapat di bahagian X?

- A Glucose, amino acid and mineral salt.
Glukosa, asid amino dan garam mineral
- B Glucose, mineral salt and erythrocyte
Glukosa, garam mineral dan eritrosit
- C Leucocytes, platelets and erythrocyte
Leukosit. Platlet dan eritrosit
- D Glucose, mineral salt and platelets
Glukosa, garam mineral dan platlet

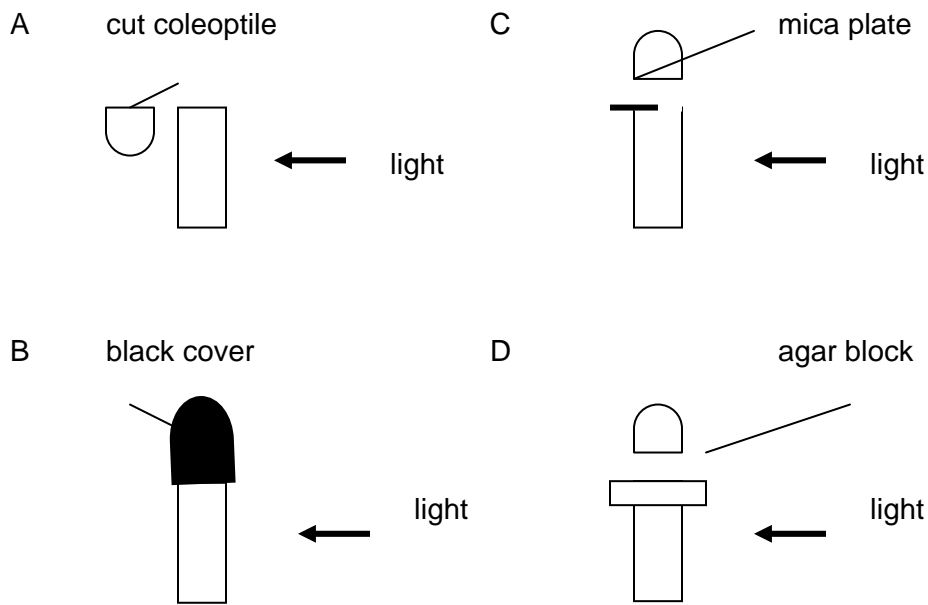
42. The diagram shows the regulation of blood glucose level in the human body.
Rajah di bawah menunjukkan pengawalan aras gula dalam darah manusia.



Which of the following are Y and Z?
Manakah antara berikut merupakan Y dan Z?

	Y	Z
A	Glucagon <i>Glukagon</i>	Insulin <i>Insulin</i>
B	Insulin <i>Insulin</i>	Adrenaline <i>Adrenalena</i>
C	Insulin <i>Insulin</i>	Glucagon <i>Glukagon</i>
D	Adrenaline <i>Adrenalena</i>	Insulin <i>Insulin</i>

- 43 An experiment was conducted to investigate the effect of auxin on phototropism. Which shoot will bend towards the light source?
 Satu eksperimen dijalankan untuk mengkaji kesan auksin terhadap fototropisma. Pucuk manakah yang akan membengkok ke arah sumber cahaya?



44.

A child ran very fast when chased by a fierce dog.

Seorang kanak-kanak berlari pantas apabila dikejar seekor anjing

Which of the following reactions occur in the child's body?
 Yang manakah antara reaksi berikut berlaku dalam badan kanak-kanak tersebut ?

- I Metabolic rate increases
Kadar metabolisme bertambah
- II Rate of heart beat increases
Kadar denyutan jantung bertambah
- III Body temperature decreases
Suhu badan meningkat
- IV Blood glucose level increases
Aras glukosa darah meningkat

- A I and III only
- B III and IV only
- C I, II and IV only
- D II, III and IV only

45 Which of the following hormones repairs the endometrium of the uterus after menstruation occurs ?

Antara berikut, hormon yang manakah memperbaiki endometrium pada uterus selepas berlakunya haid

- A. Oestrogen hormone
Hormon estrogen
- B Progesterone hormone
Hormon progesteron
- C Luteinizing hormone
Hormon peluteinan
- D Follicle stimulating hormone
Hormon perangsang folikel

46. The diagram 24 shows the reproductive organ of a female. Which part labelled A, B, c or D does oogenesis occur ?

Rajah 24 menunjukkan organ pembiakan perempuan.

Di bahagian manakah antara A, B, C dan D proses oogenesis berlaku.

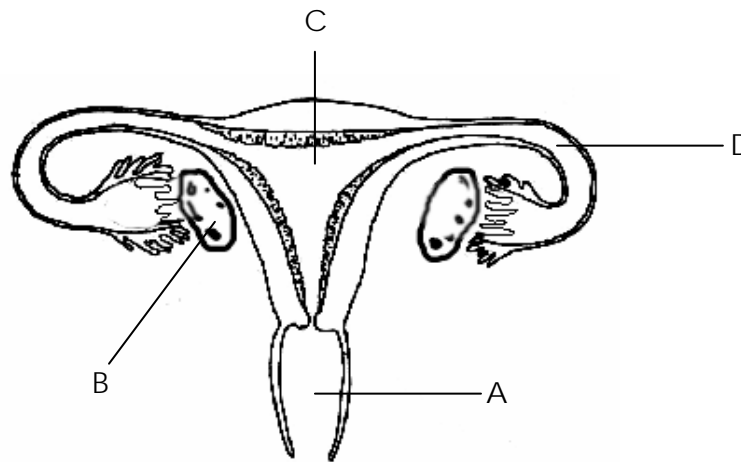


Diagram 24
Rajah 24

47. The diagram 25 shows the formation of a pollen tube
Rajah 25 menunjukkan pembentukan tiub debunga

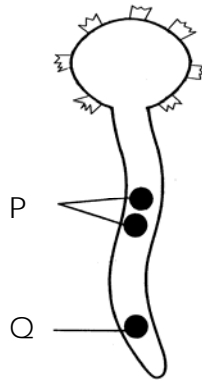


Diagram 25
Rajah 25

What are P and Q?
Apakah P dan Q ?

	P	Q
A	Male gamete nucleus <i>Nukleus jantan</i>	Tube nucleus <i>Nukleus tiub</i>
B	Generative nucleus <i>Nukleus penjana</i>	Tube nucleus <i>Nukleus tiub</i>
C	Generative nucleus <i>Nukleus penjana</i>	Male gamete nucleus <i>Nukleus jantan</i>
D	Male gamete nucleus <i>Nukleus jantan</i>	Generative nucleus <i>Nukleus penjana</i>

48. Diagram 26 shows a karyotype of a person with a genetic abnormality.
Rajah 26 menunjukkan kariotip seseorang dengan genetik yang tidak normal.

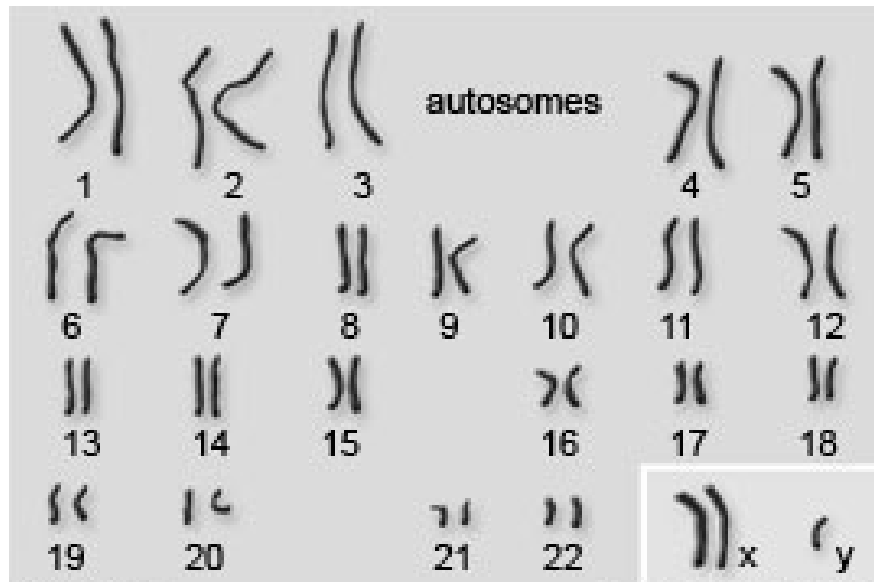


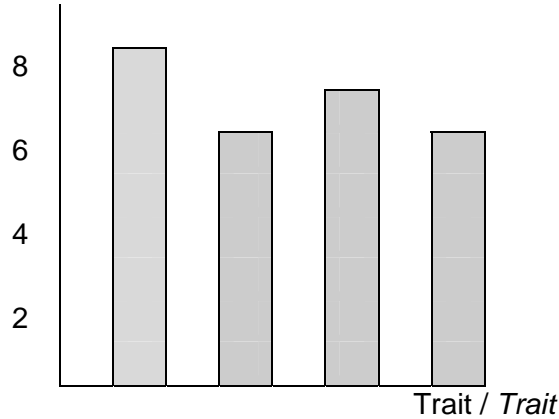
Diagram 26
Rajah 26

What is the phenotype of this person ?
Apakah fenotip individu ini ?

- A Turner's syndrome
Sindrom Turner
- B Klinefelter's syndrome
Sindrom Klinefelter's
- C Haemophiliac male
Lelaki hemofilia
- D Down syndrome male
Lelaki sindrom Down

- 49 The bar chart shows the variation among students in a class.
Carta bar menunjukkan variasi dikalangan pelajar dalam satu kelas.

Number of students
Bilangan pelajar



This trait most probably refers to the
Trait ini berkemungkinan besar merujuk kepada

- A Height
Tinggi
 - B Weight
Berat
 - C Skin colour
Warna kulit
 - D Type of blood group
Jenis kumpulan darah.
- 50 Which of the followings caused by gene mutation?
Yang manakah antara berikut disebabkan oleh mutasi gen ?
- I Albinism
Albino
 - II Hemophilia
Hemofilia
 - III Turner's syndrome
Sindrom Turner
 - IV Down's syndrome
Sindrom Down
- A I and II
 - B I and III
 - C II and IV
 - D III and IV

END OF QUESTION PAPER

KERTAS SOALAN TAMAT

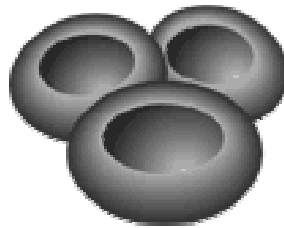
**MARK SCHEME PAPER 1 TRIAL SPM
NEGERI MELAKA 2009**

1	C	2	D	3	C	4	B	5	D
6	C	7	D	8	A	9	B	10	B
11	D	12	B	13	C	14	A	15	B
16	C	17	D	18	C	19	B	20	A
21	D	22	B	23	A	24	C	25	B
26	D	27	A	28	D	29	C	30	C
31	B	32	B	33	A	34	D	35	B
36	A	37	D	38	A	39	D	40	C
41	A	42	C	43	D	44	C	45	A
46	B	47	A	48	B	49	D	50	A

For
Examiner's
Use

SECTION A
Bahagian A
[60 marks]
Answer **all** questions
Jawab semua soalan

1. An experiment was conducted to investigate the effect of different concentrations of sodium chloride solution on cells P. Table 1 shows the result of the experiment.
Satu kajian telah dijalankan untuk mengkaji kesan larutan sodium klorida berlainan kepekatan terhadap sel-sel P. Jadual 1 menunjukkan keputusan kajian tersebut.



Cells P
Sel-sel P

Solution	Concentrations of sodium chloride solution (g/100 cm ³) <i>Kepekatan larutan sodium klorida (g/100 cm³)</i>	Percentage of crenated and haemolysed cells (%) <i>Peratus sel yang mengecut dan meletus (%)</i>	
		Crenated <i>Mengecut</i>	Haemolysed <i>Meletus</i>
R	0.35	-	52
S	0.40	-	28
T	0.47	-	-
U	0.50	9	-
V	0.55	35	-
W	0.60	86	-

- (a) (i) State the type of cells P

Nyatakan jenis sel P

..... [1 mark]

1(a)(i)



SULIT

1(a)(ii)

(ii) Name cells P.

Namakan sel P

.....
[1 mark]

1(a)(iii)

(iii) State the function of cells P

Nyatakan fungsi sel P

.....
[1 mark]

1(b)

(b) State the type of solution R and W relative to cell P.

Nyatakan jenis larutan R dan W berbanding kepada sel P.

Solution R:

Larutan R :

Solution W

Larutan W :

[2 marks]

1(c) (i)

(c) (i) Based on table 1, state the concentration of sodium chloride in the blood plasma.

Berdasarkan jadual 1, nyatakan kepekatan sodium klorida dalam plasma darah

.....
[1 mark]

(ii) Explain the reason for your answer in (c)(i).

Terangkan alasan bagi jawapan anda di (c)(i)

.....
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[3 marks]

(d) If cells P are placed in distilled water, explain what will be the result of the experiment ?

Jika sel P dimasukkan ke dalam air suling, terangkan apakah keputusan kajian tersebut ?

.....
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.....

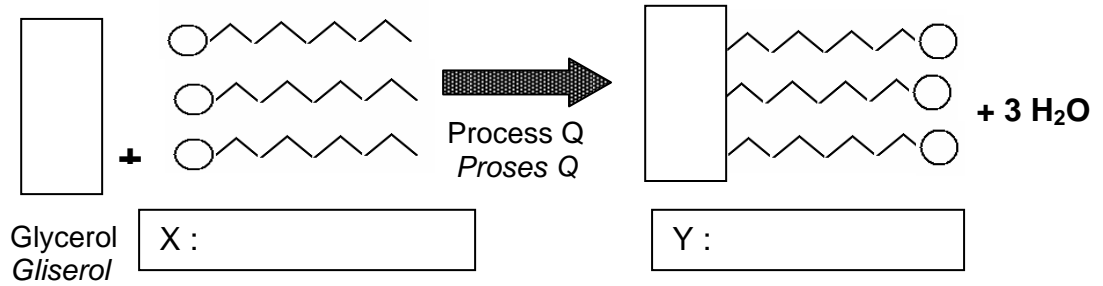
[3 marks]

1(c) (ii)

1(d)

TOTAL

2. (a) Diagram 2 (a) shows the formation of a lipid molecule.
Rajah 2 (a) menunjukkan pembentukan satu molekul lemak.



- (i) Label X and Y
Label X dan Y

[2 marks]

- (ii) State what process Q is .
Nyatakan proses Q

[1 mark]

- (iii) Write a word equation to represent the biochemical process in diagram 2 (a)
Tuliskan persamaan perkataan untuk mewakili proses biokimia dalam rajah 2 (a)

[1 mark]

2(a) (i)

2(a) (ii)

2(a)(iii)

(b) Diagram 2(b) shows two types of fats.

Rajah 2 (b) menunjukkan dua jenis lemak



P

Q

Diagram 2(b)

Rajah 2 (b)

(i) State the type of fats shown in diagram 2 (b)

Nyatakan jenis lemak yang ditunjukkan dalam rajah 2 (b)

2(b)(i)

P :

Q :

[2 marks]

- (ii) A girl takes food from group P continuously for a long period of time. Explain the consequences to the health of her heart.
Seorang budak perempuan mengambil makanan dari kumpulan P secara berterusan untuk jangkamasa yang panjang. Terangkan kesannya terhadap kesihatan budak tersebut.

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

[3 marks]

2(b)(ii)

- (c) A man has his bile duct blocked with gallstones. He is advised to cut down on his fat intake. Explain why such an advice is given to him ?
Seorang lelaki telah mengalami masalah tersumbat salur hempedu oleh batu hempedu. Beliau telah dinasihatkan oleh doktor untuk mengurangkan pengambilan makanan yang berlemak. Terangkan mengapa nasihat seperti itu telah diberikan kepadanya ?

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.....

[3 marks]

2(c)

TOTAL

3. Diagram 3 shows the exchange of respiratory gases X and Y between the alveolus , blood capillary and the body cells and the transport of the gaseous.

Rajah 3 menunjukkan pertukaran gas respirasi X dan Y diantara alveoli, saluran darah dan sel badan serta pengangkutan gas-gas tersebut.

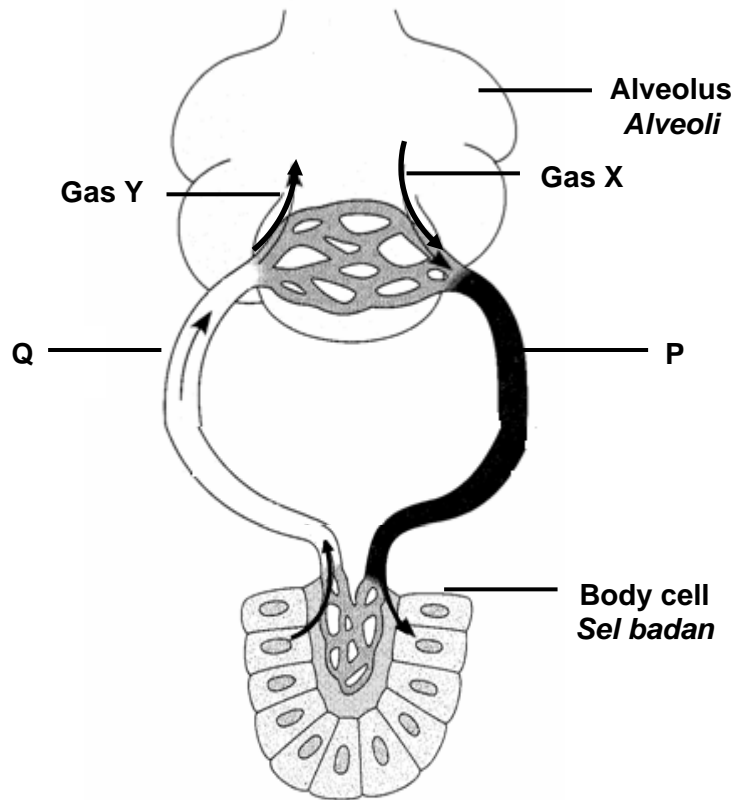


Diagram 3
Rajah 3

- (a) (i) Name gas X and Y.

Namakan gas X dan Y

Gas X :

Gas Y :

[2 marks]

3(a)(i)

- (ii) Explain how the alveolus is structured to increase the efficiency of gaseous exchange.

Terangkan bagaimana alveoli distrukturkan untuk meningkatkan kecekapan proses pertukaran gas.

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[2 marks]

3(a)(ii)

□

- (b) Explain the difference between the concentration of gas X and Y in blood vessel Q.

Terangkan perbezaan antara kepekatan gas X dan Y dalam salur darah Q.

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

[2 marks]

3(b)

□

- (c) The concentration of gas X transported in blood vessel P of a cigarette smoker is usually lower than the one in healthy individual. Explain why does this occur ?

Kepekatan gas X yang diangkut dalam salur darah P seseorang penghisap rokok adalah lebih rendah berbanding individu yang sihat. Terangkan mengapa keadaan ini berlaku.

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

[2 marks]

3(c)

□

- (d) In an experiment, a boy takes part in an 800 metre event track. His exhaled air was obtained three times which were before running , right after he finished running and 10 minutes after running to determine the percentage of carbon dioxide. Table 3.1 shows the result of the experiment.

Dalam satu kajian, seorang budak lelaki telah mengambil bahagian dalam acara trek 800 meter. Udara hembusannya telah diambil sebanyak tiga kali iaitu sebelum berlari, sebaik sahaja selesai berlari dan 10 minit selepas berlari untuk mendapatkan peratus karbon dioksida. Jadual 3.1 menunjukkan hasil kajian tersebut.

	Before running <i>Sebelum berlari</i>	Right after he finishes running <i>Sebaik sahaja selesai berlari</i>	After 10 minutes running <i>Selepas 10 minit berlari</i>
Percentage of carbon dioxide (%) <i>Peratus karbon dioksida (%)</i>	4 %	7.5 %	4 %

Table 3.1
Jadual 3.1

Based on table 3.1, explain how the percentage of carbon dioxide is returned to normal after 10 minutes running.

Berdasarkan jadual 3.1, terangkan bagaimana peratus karbon dioksida dapat dikembalikan kepada normal selepas 10 minit berlari

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.....

.....

.....

[4 marks]

3(d)

TOTAL

4. Diagram 4.1 shows the transmission pathway of information from receptors in the ear to effectors U.

Rajah 4.1 menunjukkan laluan penghantaran maklumat dari reseptor dalam telinga kepada efektor U.

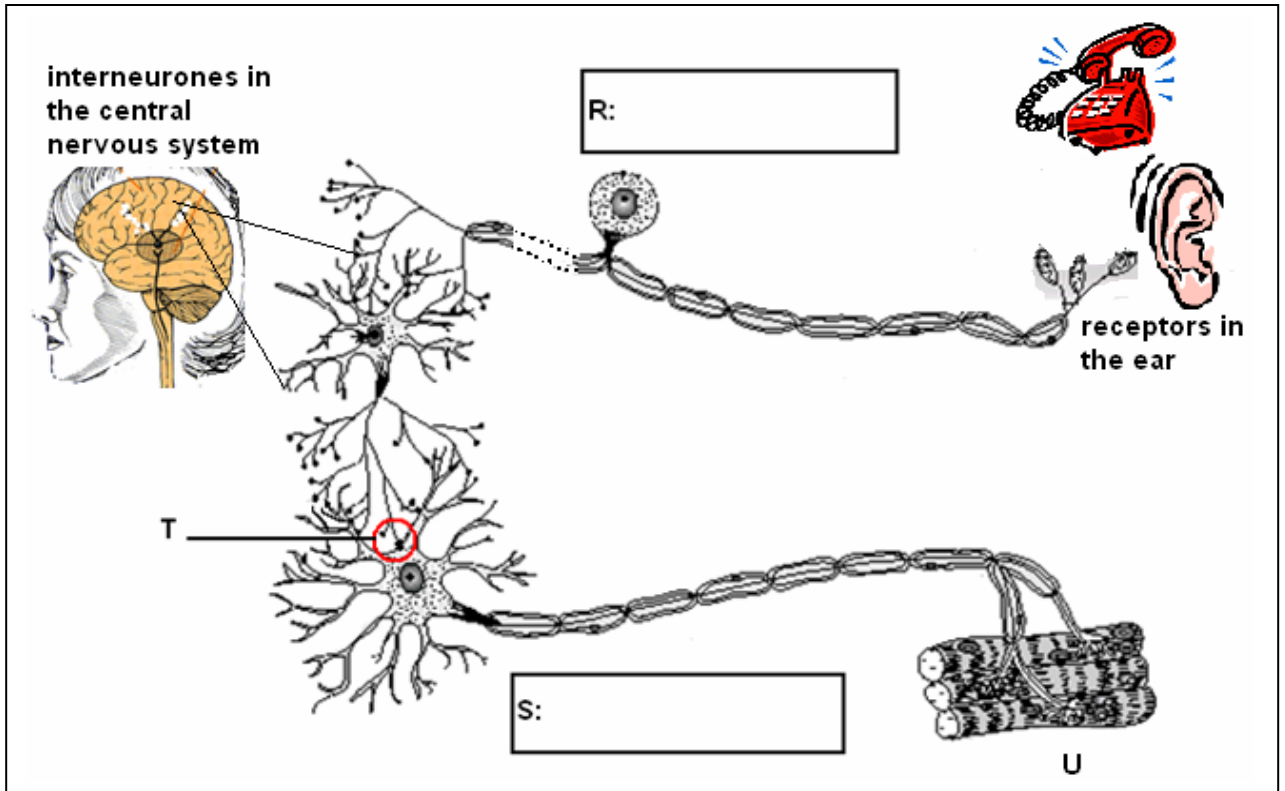


Diagram 4.1

4(a)(i)

- (a)(i) Name structures R and S in Diagram 4.1

Namakan struktur R dan S dalam Rajah 4.1

[2 marks]

4(a)(ii)

- (ii) State the function of R

Nyatakan fungsi R

[1 mark]

(b) Compare **two** differences of structures R and S.

Bandingkan dua perbezaan dari segi struktur bagi R dan S.

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

[2 marks]

(c) Based on Diagram 4.1 describes briefly the pathway of transmission of information from the moment you hear the sound of the ringing telephone until you pick up the phone.

Berdasarkan Rajah 4.1 huraikan secara ringkas laluan penghantaran maklumat dari ketika anda mendengar telefon berbunyi sehingga anda mengangkat telefon itu.

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

[3 marks]

4(b)

4(c)

- (d) Diagram 4.2 shows the transmission of information across structure T.
Rajah 4.2 menunjukkan penghantaran maklumat merentasi srtuktur T.

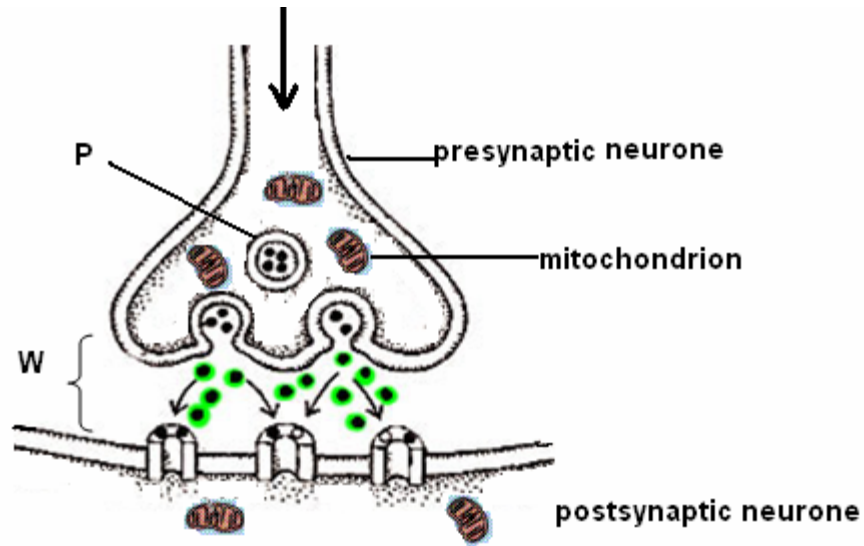


Diagram 4.2

- (i) Explain the role of P in transmission of nerve impulses.

Terangkan peranan P dalam penghantaran impuls saraf.

4(d)(i)

.....

.....

.....

[2 marks]

- (ii) If the chemical substances release from P across W is reduced due to a neurodegenerative disease, explain its effect to a person's health.

Jika bahan kimia yang dibebaskan oleh P merentasi W berkurangan disebabkan oleh kemerosotan sistem saraf, terangkan kesannya kepada kesihatan seseorang.

4(d)(ii)

.....

.....

.....

.....

[2 marks]

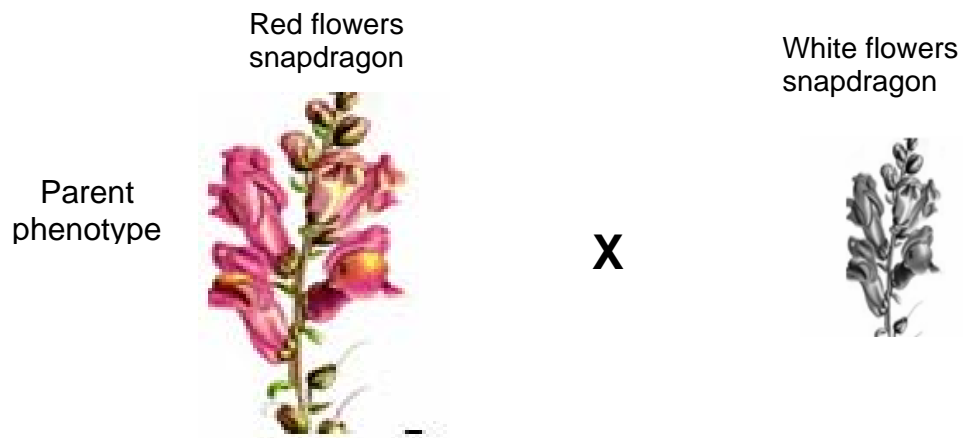
TOTAL

5. When the mechanism of inheritance of flower colour in garden peas was investigated, red flowered plant were crossed with white flowered plants. The first generation plants all had red flowers. However, when these red flowered plants allow to self-fertilized, about 25% of the offspring had white flowers, the reminder having red flowers.

In a similar investigation with snapdragon plants , when pure breeding red flowered of snapdragon plants were crossed with a pure breeding white flowered of snapdragon plants, the resulting all the first generation had pink flowers. When these pink flowered plants were self fertilized, 25% of the offspring had white flowers, 25% had red flowers and 50% had pink flowers.

Dalam satu kajian mekanisme pewarisan warna bunga, pokok kacang pea berbunga merah telah dikacukan dengan pokok kacang pea berbunga putih. Didapati semua anak generasi pertamanya berbunga merah. Apabila generasi ini dikacukkan sama sendiri, 25% anak generasi itu berbunga putih, bakinya berbunga merah.

Dalam satu kajian yang serupa, baka tulen pokok snapdragon berbunga merah dikacukkan dengan baka tulen pokok snapdragon berbunga putih. Semua anak generasi pertamanya berbunga merah jambu. Kemudian pokok berbunga merah jambu itu di kacukkan sama sendiri, didapati 25% anak pokok berbunga putih, 25% berbunga merah dan 50% berbunga merah jambu.



(a)(i) Suggest why the results obtained with pea garden are different from those obtained with the snapdragon plants.

Cadangkan mengapa keputusan yang diperlehi dengan pokok kacang pea tidak sama dengan keputusan yang diperolehi pada pokok snapdragon.

5(a)(i)

.....

.....

.....

[2 marks]

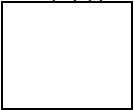
(b)(i) Draw the schematic diagram to show the above cross based on Mendel's First Law.

Lukiskan rajah skema untuk menunjukkan kacukkan di atas berdasarkan Hukum Mendel Pertama.

Keys/kekunci:

R = red allele
W = white allele

5(b)(i)

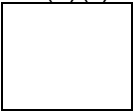


[5 marks]

(ii) State the genotype of the flower colour for the second generation of the snapdragon plants

Nyatakan genotip warna bunga bagi anak generasi kedua pokok snapdragon.

5(b)(ii)



.....
[1 mark]

(c) Some barley plants are susceptible to attack by mildew (a fungus) whilst others are resistance to mildew attack. It was found that the susceptible plants produced only susceptible offspring when self fertilised , but that a resistant plant produced a mixture of resistant and susceptible plants when self – fertilised.

Terdapat sebahagian pokok barli yang mudah diserang oleh kulat, manakala yang lain mempunyai daya tahan terhadap serangan kulat. Didapati bahawa pokok yang mudah diserang kulat menghasilkan anak yang mudah diserang apabila dikacuk sesama sendiri. Tetapi, pokok yang berdaya tahan menghasilkan campuran baka yang tahan rintang dan mudah diserang penyakit apabila dikacuk sesama sendiri.

(i) How would the plant breeder obtain a stock of barley plants which were all resistant to mildew?

Bagaimanakah seorang pembiak tanaman boleh mendapatkan pokok barli yang tahan serangan kulat ?

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

[3 marks]

(ii) Assuming that resistance to mildew is controlled by a single gene. What must be the genotype of the resistant stock ?

Anggapkan baka yang tahan serangan kulat, dikawal oleh satu gen. Apakah genotip baka barli tersebut ?

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

[1marks]

TOTAL

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SECTION B
Bahagian B
 [40 marks]

Answer only **two** question from this section
 Jawab mana-mana **dua** soalan daripada bahagian ini.

6. (a) Diagram 6.1 shows the longitudinal section of a dicotyledonous stem
 Rajah 6.1 menunjukkan keratan menegak batang dikotiledon

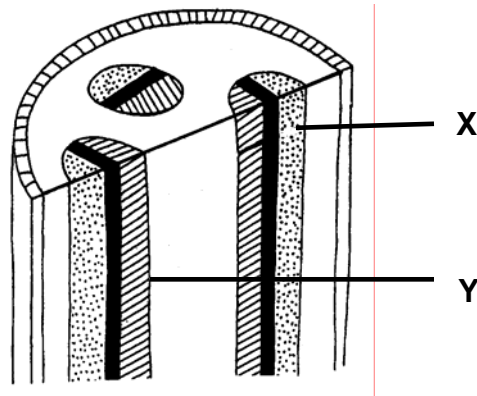


Diagram 6.1

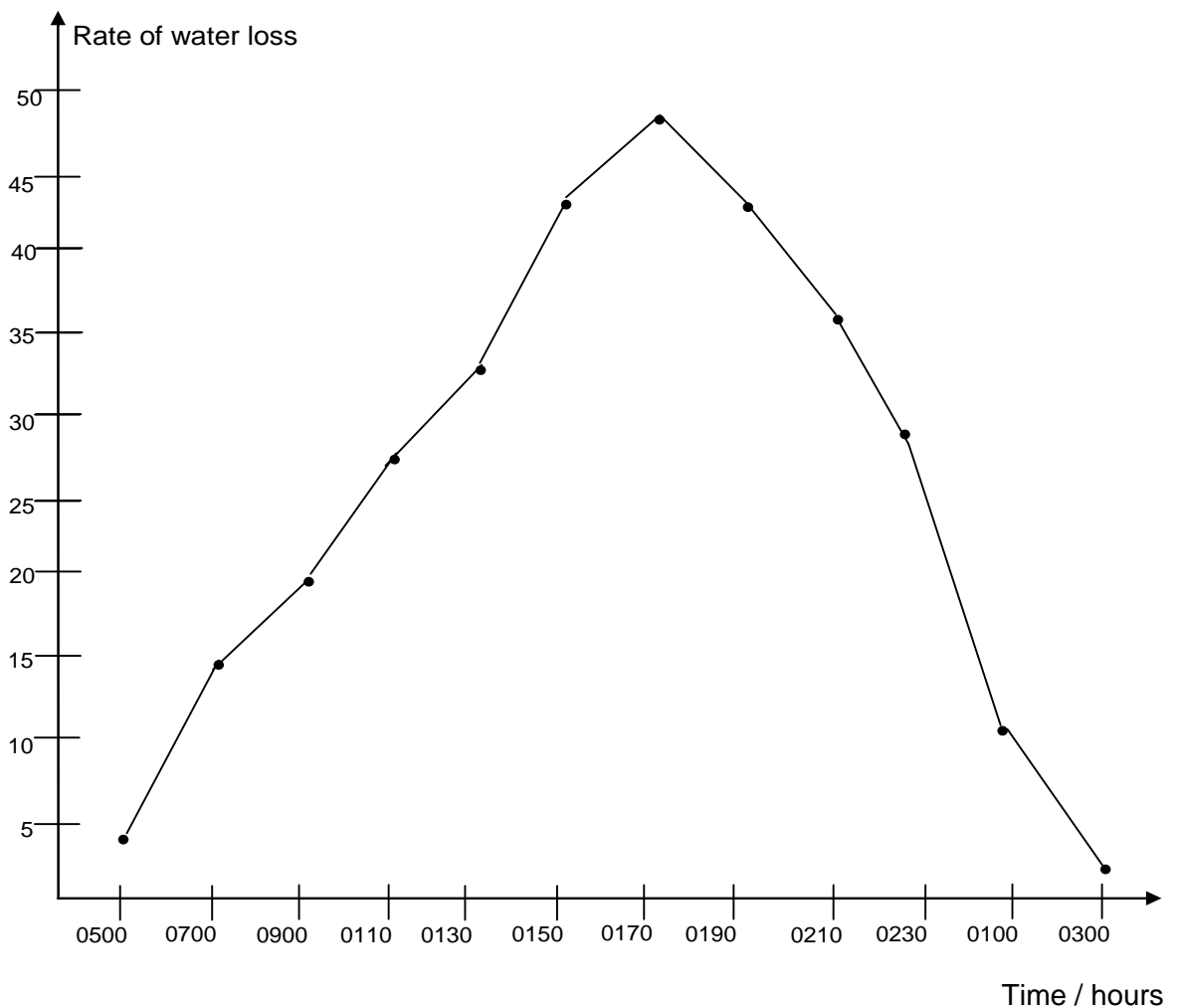
- (i) State what tissue X and Y are.
 Nyatakan apakah tisu X dan Y
 [2 marks]
- (ii) State the function of tissue X.
 Nyatakan fungsi tisu X.
 [2 marks]
- (iii) Tissue Y is formed from the specialization of a cell. During cell specialization, the plant is unable to produce lignin. Explain the effect of this on the function of tissue Y.
 Tisu Y terhasil daripada proses pengkhususan sel. Sewaktu proses pengkhususan sel, satu tumbuhan tidak dapat menghasilkan lignin. Terangkan kesannya keatas fungsi tisu Y.
 [6 marks]

(b) An experiment on a plant is carried out to study the rate of water loss from 0500 to 0300 the next day.

Satu kajian keatas sebatang pokok telah dijalankan untuk mengkaji kadar kehilangan air dari jam 0500 hingga 0300 keesokkan harinya

Graph 6.1 shows the result of the experiment and diagram 6.2 shows the structure of a stoma and the cells found in the epidermal layer of a leaf.

Graf 6.1 menunjukkan keputusan kajian dan rajah 6.2 menunjukkan struktur stoma dan sel-sel yang terdapat pada lapisan epidermal sehelai daun.



Graph 6.1

Graf 6.1

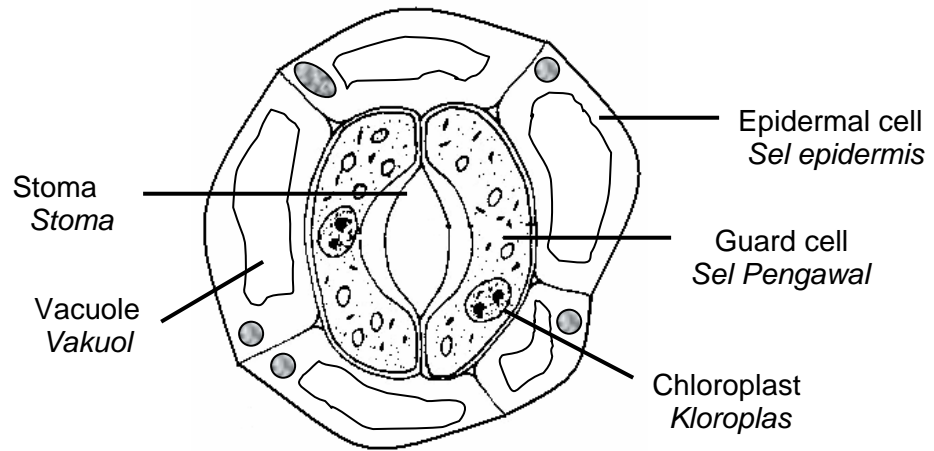


Diagram 6.2
Rajah 6.2

Based on the graph, explain how light intensity and the structure in diagram 6.2 affect the rate of water loss

Berdasarkan graf, terangkan bagaimana keamatan cahaya dan struktur dalam rajah 6.2 memberi kesan keatas kadar kehilangan air.

[10 marks]

7. (a) Diagram 7.1 shows part of the circulatory system and a nephron in human kidney.

Rajah 7.1 menunjukkan sebahagian daripada sistem pengangkutan dan nefron dalam ginjal manusia.

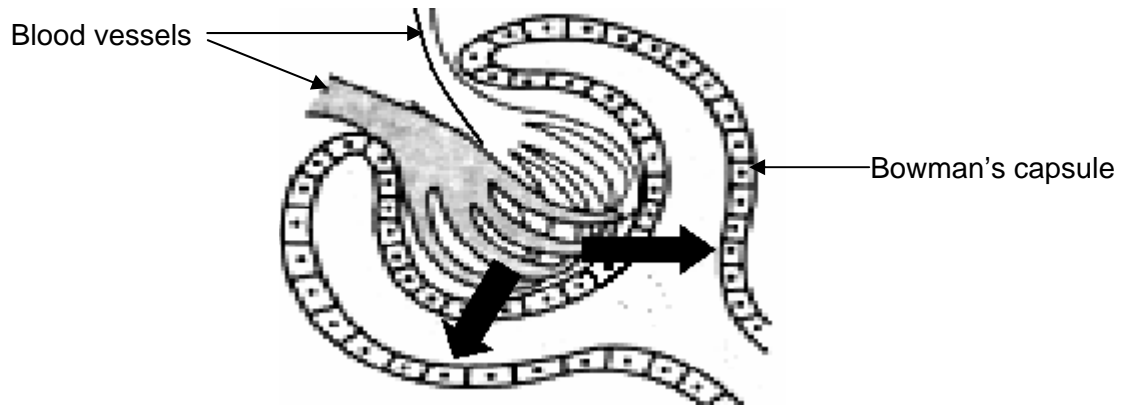


Diagram 7.1
Rajah 7.1

Describe the formation of the glomerular filtrate.

Jelaskan pembentukan turasan glomerular

[4 marks]

- (b) (i) Table 7.1 shows the concentration of solutes in the blood plasma, glomerular filtrate and urine of an adult.

Jadual 7.1 menunjukkan kepekatan bahan dalam plasma darah, turasan glomerular dan air kencing seorang dewasa.

Solute <i>Bahan</i>	Concentration of solutes (g/dm ³) <i>Kepekatan bahan (g/dm³)</i>		
	Blood plasma in the afferent arteriole <i>Plasma darah dalam arteriol afferen</i>	Glomerular filtrate <i>Turasan glomerular</i>	Urine <i>Air kencing</i>
Glucose	1.0	1.0	0.0
Amino acid	1.5	1.5	0.0
Protein	80.0	0.0	0.0
Urea	0.3	0.3	20.0
Sodium ion, Na ⁺	3.2	3.2	1.6

Table 7.1
Jadual 7.1

Based on Table 1, explain why the concentration of solutes in the blood plasma, glomerular filtrate and urine of the adult are differ.

Berdasarkan jadual 7.1, terangkan mengapa kepekatan bahan dalam plasma darah, turasan glomerular dan air kencing bagi seorang individu dewasa tersebut berbeza.

[10 marks]

- (ii) The adult later suffers from diabetes but does not take his regular injection of insulin.
Explain the changes that might occur to the content of his urine and suggest a laboratory experiment to confirm the content of the urine

Individu ini kemudiannya diserang penyakit kencing manis tetapi beliau tidak mengambil suntikan insulin secara berkala. Terangkan perubahan yang akan berlaku pada kandungan air kencingnya dan cadangkan satu kajian makmal untuk mengesahkan kandungan air kencingny

[6 marks]

8

- (a) All organisms require nitrogen to live and grow. The atmospheric nitrogen cannot be absorbed directly by plants.

Semua organisme memerlukan nitrogen untuk hidup dan membesar. Nitrogen atmosfera tidak boleh diserap secara terus oleh tumbuhan.

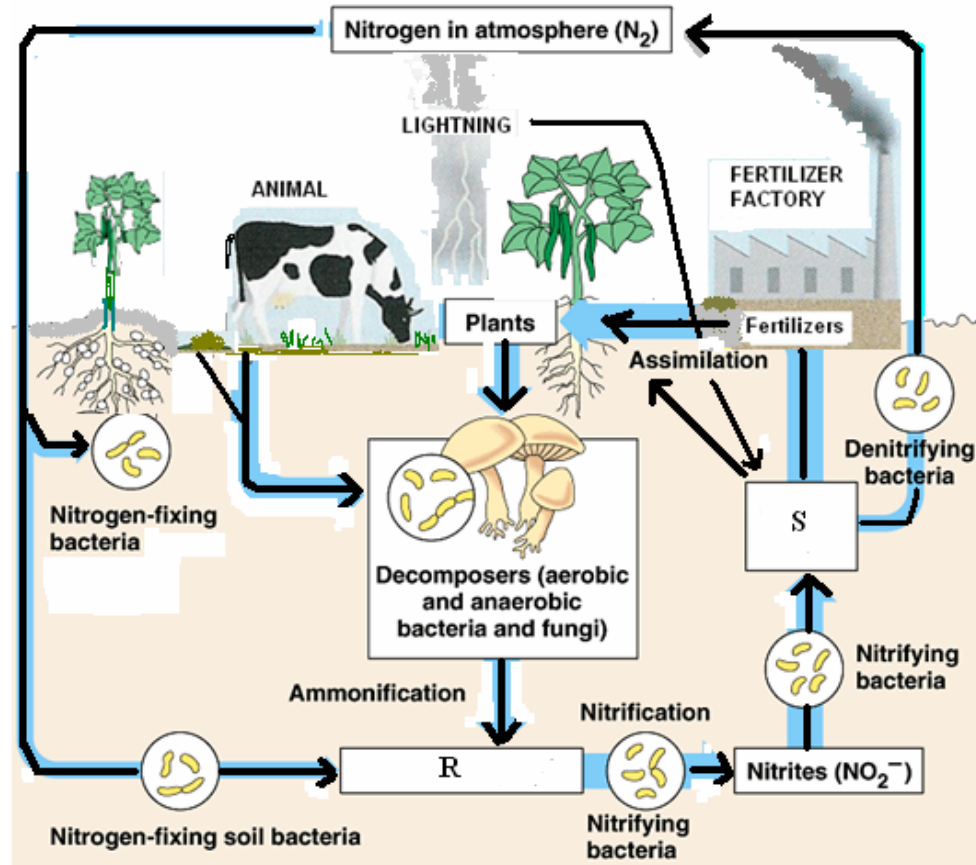


Diagram 8.1

Based on Diagram 8.1 explain how nitrogen in the atmosphere is converted into usable form such as compound R, S, or organic nitrogen and is maintained through the activities of :

Berdasarkan Rajah 8.1 terangkan bagaimana nitrogen di atmosfera ditukarkan kepada bentuk yang dapat digunakan seperti sebatian R dan S atau nitrogen organik dan dikekalkan melalui aktiviti :

- Microorganisms / mikroorganisme
- Factories / kilang
- Lightning / kilat

[10 marks]

- (b) The mangroves are fragile complex and dynamic ecosystem, and are dependent on both biotic and abiotic factors .
Paya bakau adalah suatu ekosistem yang kompleks dan dinamik, dan bergantung kepada kedua-dua faktor biotik dan abiotik.

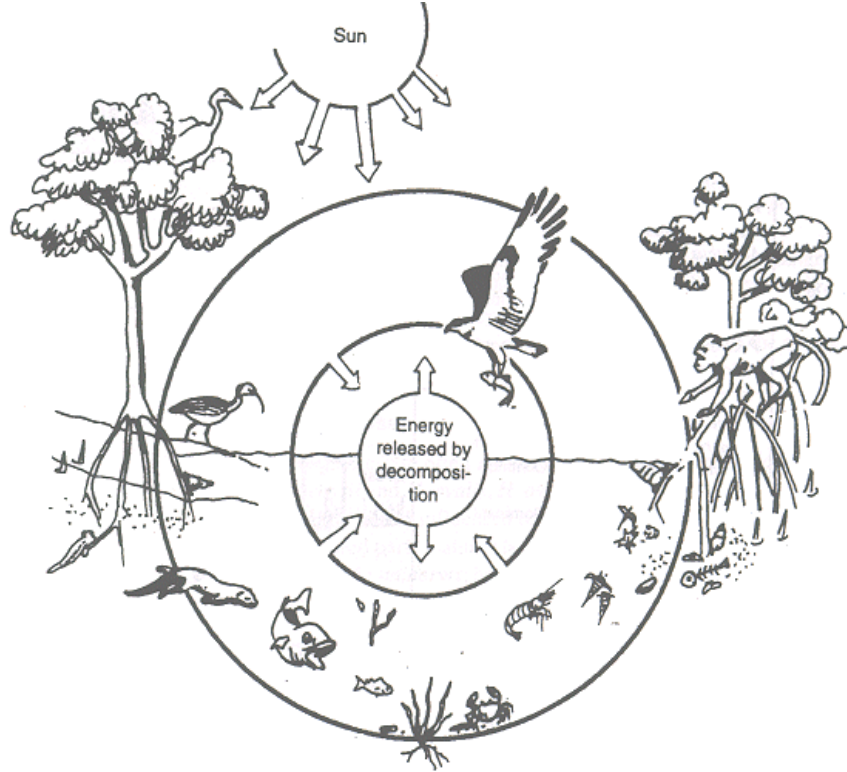


Diagram 8(b)

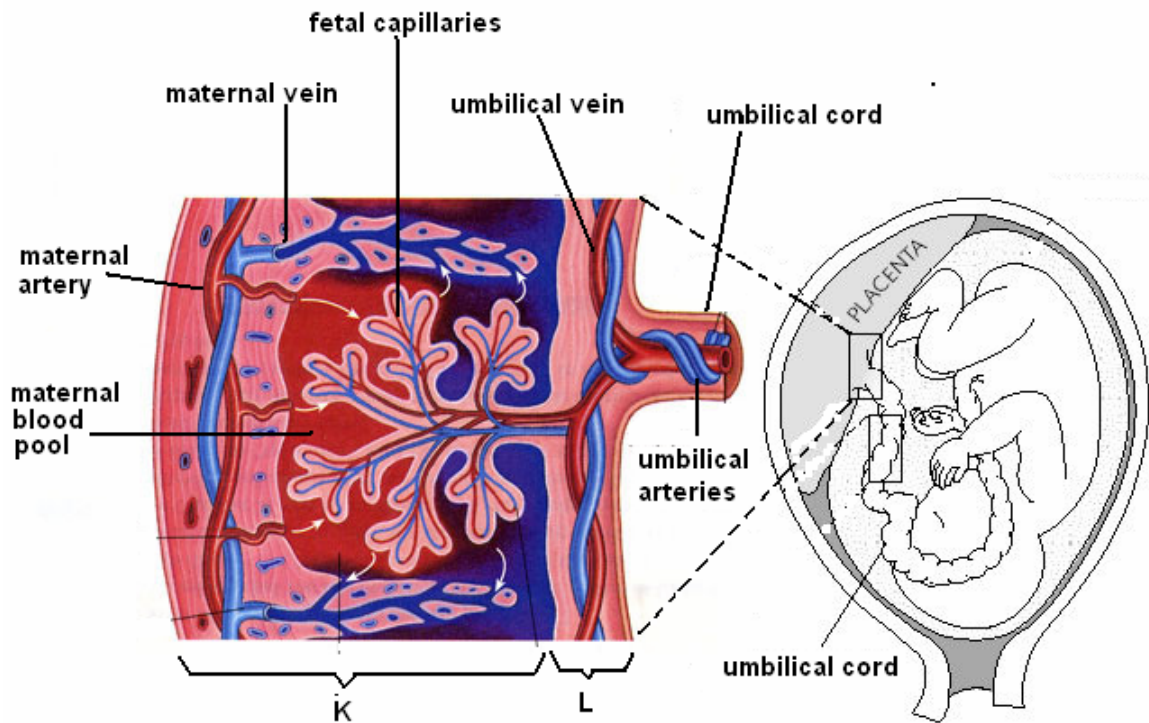
Based on diagram 8 (b), discuss the importance of mangrove.

Berdasarkan kepada rajah 8(b), bincangkan kepentingan paya bakau.

[10 marks]

9.(a) Diagram 9 shows relationship between K and L of placental blood circulatory system.

Rajah 9 menunjukkan perhubungan antara K dan L dari sistem peredaran darah plasenta.



Explain why K and L circulatory system are not directly connected to each other.

Terangkan mengapa sistem peredaran K dan L tidak berhubung secara terus antara satu sama lain.

[10 marks]

(b)

Preventing pregnancy and difficulty in having children are two main problems in human reproduction.

Menghalang kehamilan dan kesukaran mendapat anak adalah dua masalah utama dalam pembiakan manusia.

Based on the statement, discuss the moral issues related to application of Science and Technology in overcoming human reproduction's problems.

Berdasarkan kepada pernyataan di atas, bincangkan isu-isu moral yang berkait dengan penggunaan Sains dan Teknologi dalam pembiakan manusia

[10 marks]

END OF QUESTION PAPER

**JABATAN PELAJARAN NEGERI MELAKA
MARKING SCHEME
BIOLOGY PAPER 2
TRIAL EXAMINATION SPM 2009**

SECTION A

QUESTION 1

Question	Marking criteria	Marks	
1(a)(i)	Able to state the type of cell P correctly <u>Answer</u> Animal cell	1	1
(ii)	Able to name cell P correctly <u>Answer</u> Red Blood Cell // Erythrocyte	1	1
(iii)	Able to state the function of cell P correctly <u>Answer:</u> To transport oxygen	1	1
1 (b)	Able to state the type of solution given correctly <u>Answer:</u> Solution R : hypotonic Sodium W : hypertonic	1 1	2
(c) (i)	Able to state the concentration of sodium chloride in the blood plasma. <u>Answer:</u> 0.47 g/100 cm ³	1	1

(c) (ii)	<p>Able to give reason for the answer in (c) (i)</p> <p><u>Sample answer.</u></p> <p>E1: There is no cell P which bursts /heamolyses</p> <p>E2 : and shrinks /crenates</p> <p>E3 : There is no net movement of water molecules in and out of cells P</p>	<p>1</p> <p>1</p> <p>1</p>	<p>3</p>
(d)	<p>Able to explain what will the result of the experiment be when cells P is placed in distilled water</p> <p><u>Sample answer.</u></p> <p>E1 : The percentage of cells which haemolyse will be higher than 52 % // 100%</p> <p>E2 : Distilled water is more hypotonic than solution R</p> <p>E3 : More water molecules diffuse into the cells by osmosis</p>	<p>1</p> <p>1</p> <p>1</p>	<p>3</p>
	TOTAL MARKS		12

QUESTION 2

Question	Marking criteria	Marks	
2(a)(i)	Able to label X and Y correctly <u>Answers</u> X : Fatty acids Y : Triglyceride	1 1	2
(ii)	Able to state process Q correctly <u>Answer</u> Condensation	1	1
(iii)	Able to write the word equation correctly <u>Answer</u> Glycerol + fatty acids $\xrightarrow{\text{lipase}}$ triglyceride + water	1	1
(b) (i)	Able to state the type of fats correctly <u>Answer:</u> P : Saturated fat Q : Unsaturated fat	1 1	2
(b) (ii)	Able to explain the consequences of taking food from group P for a long time. <u>Sample answer 1:</u> F1 : Food fro group P contains high level of cholesterol E1 : Cholesterol // fatty deposits tend to accumulate on the inner wall of arteries E2 : Causes the narrowing of the blood vessels /Coronary arteries are blocked by the build-up of fatty tissues.	1 1 1	

	E3 : Reduces the flow of blood	1	
	E4 : The heart muscles become starved of oxygen and dies	1	
	E5 : The girl might get heart attack.	1	Max
	Any three		3
(c)	Able to explain why the man is advised to cut down his fat intake .		
	F1 : (When the bile duct is blocked) , bile cannot be channeled out to the duodenum	1	
	F2 : Fats / lipids cannot be emulsified	1	
	F3 : Digestion of fats /lipids will be very slow / digestion of fats /lipids will be incomplete	1	3
	TOTAL MARKS		12

QUESTION 3

Question	Marking criteria	Marks	
3 (a)(i)	Able to name gas X and Y correctly <u>Answer</u> X : Oxygen Y : Carbon dioxide	1 1	2
(ii)	Able to explain how alveolus is structured to increase the efficiency of gaseous exchange <u>Sample answer</u> F1 : Alveolus has thin wall (one cell thick) E1 : Gaseous can diffuse in and out through the wall more efficiently	1 1	

	<p>F2 : The (inner) surface of the alveolus is moist</p> <p>E2: Allowing oxygen to dissolve first before diffusing out</p> <p>F3 : The (outer surface) of the alveolus is covered by a network of blood capillaries</p> <p>E3 : Increase the surface area for rapid diffusion of gaseous</p> <p>Notes : F1/2/3 + E 1/2/3 = 2 mark F1/2/3 = 1 mark E1/2/3 = 0 mark</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>F</th> <th>E</th> <th>Marks</th> </tr> </thead> <tbody> <tr> <td>F</td> <td>E</td> <td>2</td> </tr> <tr> <td>F</td> <td>X/0</td> <td>1</td> </tr> <tr> <td>X/0</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	F	E	Marks	F	E	2	F	X/0	1	X/0	E	0	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>Max</p> <p>3</p>
F	E	Marks													
F	E	2													
F	X/0	1													
X/0	E	0													
(b)	<p>Able to explain the difference between the concentration of gas X and Y in blood vessel Q.</p> <p><u>Sample answer:</u></p> <p>F1 : The concentration of gas X in blood vessel Q is lower than gas Y</p> <p>E1 : Oxygen has been used by the body cells /cellular respiration</p> <p>E2 : (Cellular respiration) produces gas Y</p> <p>E3 : to be sent to the lung (to be excreted)</p> <p>Notes : 1 F + any 2 E</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>Max</p> <p>3</p>												
(c)	<p>Able to explain why the concentration of gas X of a cigarette smoker is lower than the one in a healthy person.</p> <p><u>Sample answer:</u></p> <p>F1 : Cigarette smoke contains carbon monoxide</p> <p>E1 : (Carbon monoxide) has higher affinity to bind with hemoglobin compared to oxygen</p>	<p>1</p> <p>1</p>													

	<p>E2 : forms carbaminohaemoglobin</p> <p>E3 : Therefore, less oxygen will bind with hemoglobin to be transported in blood vessel</p> <p>P</p> <p>Notes : F1 + any two Es</p>	<p>1</p> <p>1</p>	<p>Max</p> <p>3</p>
(d)	<p>Able to explain changes in the percentage of carbon dioxide</p> <p><u>Sample answer:</u></p> <p>E1 : The high concentration of carbon dioxide</p> <p>E2 : decreases the blood pH</p> <p>E3 : Detected by central chemoreceptor and/ peripheral chemoreceptor</p> <p>E4 : Impulses are sent to the respiratory centre</p> <p>E5 : (Impulses are sent to) the cardiac and respiratory muscles</p> <p>E6 : Increase the heart beat and breathing rate</p> <p>E7 : To remove excess carbon dioxide (so that the percentage of carbon dioxide is returned to normal)</p> <p>Notes : Choose any three Es</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>Max</p> <p>3</p>
	TOTAL MARKS		12

QUESTION 4

4 (a) (i)	<p>Able to named structures R and S</p> <p>Answer:</p> <p>R: sensory / afferent neurone</p> <p>S: motor /efferent neurone</p>	1 1	2		
(a) (ii)	<p>Able to state the function of R</p> <p>Sample answer:</p> <p>P Sensory / R neuron conducts the impulse from the receptor to (its axonal end in) the central nervous system.</p>	1	1		
(b)	<p>Able to compare two differences of structures R and S.</p> <p>Sample answer:</p> <table border="1" data-bbox="418 1014 1230 1052"> <tr> <td data-bbox="418 1014 824 1052">Sensory neurone/R</td> <td data-bbox="829 1014 1230 1052">Motor neurone/S</td> </tr> </table>	Sensory neurone/R	Motor neurone/S	1 1	2
Sensory neurone/R	Motor neurone/S				
(c)	<p>Able to describes briefly the pathway of transmission of information in coordination.</p> <p>Sample answer:</p> <p>F1 receptor detects stimulus</p> <p>P1 (is stimulated to) trigger nerve impulses in afferent neuron</p> <p>P2 (nerve impulses) are carried to the central nervous system</p> <p>P3 (the central nervous system) integrates and interprets the information</p> <p>P4 then send new impulses</p> <p>P5 are carried by motor/efferent neuron to effectors//effectors produces responds</p> <p style="text-align: right;">(F1 + any 2 points)</p>	1 1 1 1 1 1	3		

(d) (i)	<p>Able to explain the role of P in transmission of nerve impulses</p> <p>Sample answer:</p> <p>F P is synaptic vesicle</p> <p>E1 contains neurotransmitters</p> <p>E2 which transmit the nerve impulses//convert an electrical signal to chemical signal</p> <p>E3 diffuse across W / synaptic cleft /synapse</p> <p>E4 requires / using energy provided by mitochondria //active transport</p> <p style="text-align: right;">[Any two]</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	2
(d) (ii)	<p>Able to explain the effect of low level of neurotransmitter produced, to a person's health</p> <p>Sample answer:</p> <p>F due to lack of acetylcholine in the brain</p> <p>E1 the person may suffer from Alzheimer's disease</p> <p>E2 causes loss of reasoning/ability to care for oneself/intellectual ability/memory/speak/write//confusion</p> <p>E3 can be inherited</p> <p style="text-align: right;">.[Any two]</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	2
	TOTAL MARKS		12

QUESTION 5

<p>5 (a) (i)</p>	<p>Able to suggest why the results obtained with pea garden are different from those obtained with the snapdragon plants.</p> <p>Sample answer: P1 Both R and W alleles are dominance/ co-dominance</p> <p>P2 both trait are express equally</p>	<p>1</p> <p>1</p>	<p>2</p>
<p>(a)(ii)</p>	<p>Able to draw the schematic diagram to show the above cross based on Mendel's First Law.</p> <p>Answer:</p> <p>Parent genotype: Red (RR) x White (WW)</p> <p>Gametes: R and W</p> <p>First generation F1: RW (all pink)</p> <p>Parent Self-fertilised: RW x RW</p> <p>Gametes: R and W</p> <p>Second generation F2: RR, RW, RW, WW</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>Max 5</p>
<p>(b) (i)</p>	<p>Able to state the genotype of the flowers colour for the second generation</p> <p><u>Answer</u></p> <p>RR RW WW</p>	<p>1</p>	<p>1</p>

(b) (ii)	Able to describes how would the plant breeder obtain a stock of barley plants which were all resistant to mildew Sample answer: P1 by repeated crossing P2 of true breeding P3 which produced homozygous dominat (resistant plant) Any two	1 1 1	Max 2
(c)	Able to state the genotype of the resistant stock Answer: Heterozygous (Rr)	1	1
	TOTAL MARKS		12

QUESTION 6

6 (a) (i)	Able to state tissue X and Y <u>Answer</u> X : Phloem Y : Xylem	1 1	2
(a) (ii)	Able to state the function of tissue X <u>Sample Answer</u> P1: Transport dissolved organic solutes // organic substances P2 : From the leaves to the storage organs (e.g roots)	1 1	2
(a) (iii)	Able to explain the effect of no lignin formation on the function f issue Y <u>Sample answer:</u>		

	<p>F1 : Lignin is important to make tissue Y strong // increase its mechanical strength</p> <p>E1 : Without lignin, tissue Y will collapse</p> <p>E2 : Therefore, it cannot form a continuous hollow tube</p> <p>E3 : To allow water (molecules) to flow upwards continuously</p> <p>F2 : Lignin makes the tissue become impermeable</p> <p>E4 : Materials cannot pass into the xylem cells</p> <p>E5 : Causes the tissue to become hollow</p> <p>E6 : Allows continuous flow of water</p> <p>Notes : (F1 + any 2 E1 / E2 / E3) and (F2 + any 2 E4 / E5 / E6)</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	6
(b)	<p>Able to explain how light intensity and the stomata and the cells found on the epidermal layer affect the rate of water loss</p> <p><u>Sample answer:</u></p> <p>F1 : From 0500 to 0170, the rate of water loss increases</p> <p>E1: Light intensity increases</p> <p>E2 : stimulates photosynthesis in the guard cells./ (The guard cells) start producing glucose</p> <p>E3 : This makes energy available for potassium to move into guard cells</p> <p>E4 by active transport</p> <p>E5 : (The guard cells) become hypertonic (compared to the cell sap) of the epidermal cells.</p> <p>E6 : Water molecules from the epidermal cells diffuse into the guard cells by osmosis</p> <p>E7 : Causing the guard cells to bend outwards</p> <p>E8 : the stoma opens (to allow water to escape to</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	

	the atmosphere through it)	1	
	F2 : From 0170 to 0300, the rate of water loss decreases	1	
	E9 : Light intensity decreases / causes the rate of photosynthesis to decrease / soon stop.	1	
	E10 : The guard cells become flaccid	1	
	E11 : and bend inwards		
	E12: The stoma closes and this prevent water molecules to escape through it.		Max 10
	Notes : (F1 + any 5 Es) + (F2 + 3 Es)		
	TOTAL MARKS		20

QUESTION 7

7.(a)	Able to describe the formation of glomerular filtrate <u>Sample Answer</u> E1 : When blood enters the glomerulus, ultrafiltration takes place E2 : because blood from the aorta reaches the Nephron/glomerulus at high pressure E3 : and due to the different between the diameter of the afferent arteriole and efferent arteriole E4 : The high pressure forces fluid through the filtration membrane into capsular space forming glomerular filtrate	1 1 1 1	4
(b)	Able to explain the different in the concentration of solutes in the blood plasma, glomerular filtrate and urine of the adult <u>Sample Answer</u>		

	F1 : Concentration of glucose / amino acid / urea / sodium ions in the blood plasma and glomerular filtrate are the same.	1	
	E1 : All glucose / amino acid / urea / sodium ions enter the Bowman's capsule / nephron / are in the glomerular filtrate	1	
	E2 : through ultrafiltration.	1	
	E3 : Able to pass through the wall of blood capillaries / Bowman's capsule.	1	
	F2: No glucose / amino acid in the urine.	1	
	E4 : All glucose / and amino acid are reabsorbed from the proximal convoluted tubule / nephron		
	E5 : by facilitated diffusion / active transport into the (peritubular) capillaries // blood capillaries	1	
	F3 : Less sodium ions in the urine than in the blood plasma / glomerular filtrate.	1	
	E6 : Some sodium ion have been reabsorbed from the Nephron (by active transport into the peritubular capillaries // blood capillaries)	1	
	F4 : No protein in the glomerular filtrate / urine.	1	
	E7 : They are large molecules.	1	
	E8 : Unable to pass through the wall of blood capillaries / Bowman's capsule.	1	
	F5 : Very high content of urea in the urine.	1	
	E9 : Secretion of urea into the nephron at the distal convoluted tubules	1	Max
	Any ten points		10
(b) (ii)	Able to explain changes that might occur to the content of the adult's urine. <u>Sample answer:</u> E1 : excess glucose is found in his urine	1	

	<p>E2 : glucose cannot be converted into glycogen</p> <p>E3 : Excess glucose will not be reabsorbed from the nephron // proximal convoluted tubules</p> <p>E4 : into (peritubular) capillaries // blood capillaries</p> <p style="text-align: right;">Any three points</p> <p>Able to suggest a laboratory experiment to confirm the content of the urine</p> <p><u>Sample answer:</u></p> <p>F1 : (The laboratory experiment to be conducted) is the Benedict's test.</p> <p>P1 : (In a test tube) , add about 1 ml of urine sample with 1 ml of Benedict's solution</p> <p>P2 : The mixture is heated (in a water bath) for 5 minutes</p> <p>P3 : Observe the presence of brick red precipitate to confirm the presence of glucose in the urine</p> <p style="text-align: right;">Any three points</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	
	TOTAL MARKS		20

QUESTION 8

8.(a)	<p>Able to explain how nitrogen in the atmosphere is converted into usable forms and is maintained.</p> <p>Sample answer:</p> <p><u>Microorganisms:</u></p> <p>F1 - Nitrogen fixation / conversion of N₂</p> <p>E1 – (Nitrogen fixing bacteria such as)<i>Rhizobium sp</i> / symbiotic bacteria . 1</p> <p>E2 - living in / mutual in root-nodules of leguminous plant 1</p> <p>E3 – (and) receive carbohydrates / a favorable environment (from their host plant) 1</p> <p>E4 - <i>Nostoc</i> / <i>Azotobacter</i>/<i>Clostridium</i> / free living (bacteria in the soil)/ blue-green algae (cyanobacteria) 1</p> <p>E5 - (convert atmospheric nitrogen)into (R) ammonium compound / (S) nitrate 1</p> <p>E6 – used for the synthesis of protein 1</p> <p>E7 – (when plants and animals die), decomposition (produces R / ammonium/ammonia) 1</p> <p>E8 – (ammonium is converted into R/ nitrites) by <i>Nitrosomonas</i> (nitrifying bacteria) 1</p> <p>E9 – (nitrites is converted to nitrates) by <i>Nitrobacter</i> 1</p> <p>E10 – An anaerobic process (which carry out by Denitrifying bacteria) convert nitrates back (to atmospheric nitrogen). 1</p> <p><u>Lightening</u></p> <p>F2 – Atmospheric / energy fixation / energy (of lightening). 1</p> <p>E11 - combines oxygen and nitrogen 1</p> <p>E12 – to form oxide of nitrogen 1</p> <p>E13 – dissolves in raindrops to form nitric acid 1</p> <p>E14 – which combines with minerals in soil (to form nitrate) 1</p> <p><u>Fertilizer factory</u></p> <p>F3 – using synthetic nitrogen fertilizers/urea 1</p> <p>E15 – increase the amount of fixed nitrogen/ fertility/ nitrate enrichment in the soil 1</p> <p style="text-align: right;">(Any ten)</p>		10
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(b)	<p>Able to discuss the importance of mangrove.</p> <p>Sample answer :</p> <p><u>F1 - The stabilization of the shoreline</u></p> <p>E1 - dense network of prop roots/ pneumatophores / stilt roots</p> <p>E2 – give mechanical support to the plant</p> <p>E3 - trap the sediments</p> <p>E4 - prevent the shore from erosion /strong wind / tsunami</p> <p><u>F2 - Nutrient cycling</u></p> <p>E5 - decomposition of litter fall (from the trees)</p> <p>E6 - produces detritus / heterotrophic microorganisms,</p> <p>E7 - thus enhancing its nutritive value</p> <p>E8 - forming a food source / better feeding</p> <p>E9 - and protection.</p> <p>E10 - for suspension / deposit feeders /consumed by the juveniles of a variety of bivalves/shrimps / fishes</p> <p>E11 - which migrate into the mangrove environments in their life cycle</p> <p><u>F3 – Biodiversity</u></p> <p>E12 – (In mangrove forests) habitat for varieties of species</p> <p><u>F4 – Economic value</u></p> <p>E13 - The mangrove water, rich in detritus</p> <p>E14 - suitable for fishing / sustaining coastal fisheries.</p> <p>E15 – The trees for firewood / boat building / timber / tannin extraction</p> <p>E16 - collect wax, honey, shells,</p> <p>(Any ten)</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>10</p>
	TOTAL MARKS		20

QUESTION 9

9.(a)	<p>Able to explain why K and L circulatory system are not directly connected to each other.</p> <p>Sample answer: :</p> <p>F1 both system separated E1 blood of both not mixing E2 permits exchange of gases/food E3 waste product E4 between the foetus and the mother</p> <p>F2 prevent the action of maternal hormone/other chemical E5 in mothers blood E6 which could harm the development of the foetus E7 but the protection is incomplete. E8 Harmful chemical/alcohol/nicotine/morphine/bacteria/toxine/viruses E9 can enter the foetus from mothers blood E10 cause permanent damage</p> <p>F3 (protect foetus) from high blood pressure of maternal circulation.</p> <p style="text-align: right;">Any ten</p>		
(b)	<p>Able to discuss the moral issues related to application of Science and Technology in overcoming human reproduction's problems.</p> <p>Sample answer:</p> <p>Preventing pregnancy F1 Contraceptive method P1 stop ovum from being formed P2 stop the fertilize ovum from developing in the uterus. P3 stop sperm from reaching ovum.</p> <p>F2 Could harm the foetus when a women has the ability to bear a child.</p> <p>F3 Only use contraception for health P4 for health P5 financial reason</p> <p>F4 (Prevention of fertilize egg from developing) is an act of killing.</p> <p>F5 The use of spermicides kills life</p> <p>F6 Religious believe there is only accept natural method of</p>		

	<p>contraception.</p> <p>Overcoming infertility</p> <p>F7 Infertility is the failure of the couple to have a baby P6 due to block fallopian tubes. P7 low sperm count</p> <p>F8 Sperm bank P8 not allowed (religion) if used sperm not from husband,</p> <p>F9 In-vitro fertilization IVF P9 it is wrong to destroy extra embryos P10 abuse the technique to select the sex /zygote P11 to produce perfect offspring</p> <p>F10 Surrogate mother P12 Life of surrogate mother is threatened.</p> <p style="text-align: right;">Any ten</p>		
	TOTAL MARKS		20

Answer **all** questions.

1. An organism always choose suitable habitat to live. However, abiotic factors such as temperature, pH, light intensity and nutrient will affect on their activity.
For instance, yeast activity in different pH medium. During respiration, yeast will produced carbon dioxide (CO_2) and the amount of CO_2 produced is affected by the pH of the solutions.

Base on the above information, a group of students had carried out an experiment to study the effect of pH value on the activities of yeast. The glucose concentration used in the experiment is 10 %. Diagram 1 shows the apparatus set up of the experiment.

Organisma kebiasaannya memilih habitat yang sesuai untuk tinggal di situ.

Walaubagaimanapun faktor-faktor abiosis seperti suhu, pH, keamatan cahaya dan nutrisi akan mempengaruhi aktiviti.

Sebagai contoh, aktiviti yis di dalam medium pH yang berbeza. Semasa respirasi, yis akan menghasilkan karbon dioksida dan jumlah gas karbon dioksida terhasil dipengaruhi oleh pH larutan tersebut.

Berdasarkan maklumat di atas, sekumpulan pelajar menjalankan suatu eksperimen mengkaji kesan nilai pH kepada aktiviti yis. Kepekatan larutan glukosa yang telah digunakan ialah sebanyak 10%. Rajah 1 di bawah menunjukkan susun atur radas untuk eksperimen tersebut.

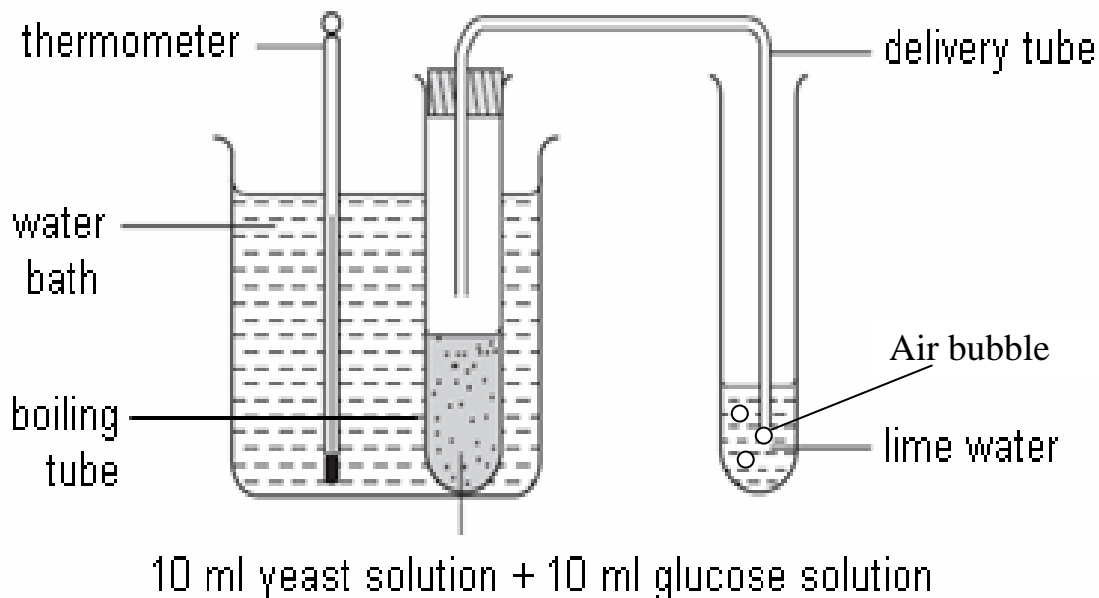
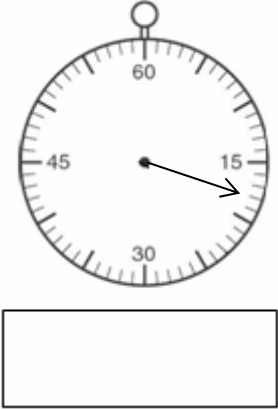
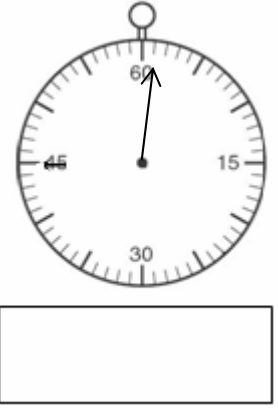
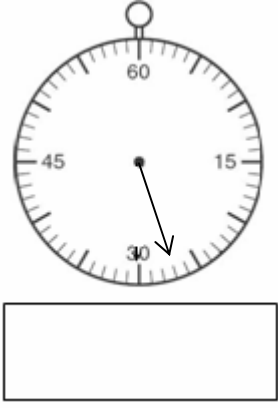


DIAGRAM 1

Three sets of apparatus A, B and C are prepared using three different solutions shown in the table 1 . The results are recorded in the table.

Sebanyak tiga set radas A, B dan C telah disediakan dengan menggunakan tiga larutan yang berlainan sebagaimana yang ditunjukkan pada jadual 1. Keputusan kepada eksperimen tersebut a dicatatkan di dalam jadual tersebut.

TABLE 1.0

Set	Content in the boiling tube	pH solutions in the boiling tube	Time taken for lime water to turn cloudy.(min)
A	10ml yeast solutions + 10ml glucose solutions + 0.1M 2ml Acetic acid	5	
B	10ml yeast solutions + 10ml glucose solutions + 2ml distilled water	7	
C	10ml yeast solutions + 10ml glucose solutions + 0.1M 2ml Ammonium hydroxide	9	

- (a) Complete Table 1.0 by filling in the time taken for lime water to turn cloudy.
Lengkapkan Jadual di atas dengan mencatatkankan masa yang diambil oleh air kapur untuk bertukar menjadi keruh

[3 marks]

For
examiner's
use

1 (a)

- (b) (i) State **two** observations which can be made from this experiment.
Nyatakan dua pemerhatian yang boleh dibuat daripada eksperimen ini.

Observation 1 :.....

.....

Observation 2 :.....

.....

[3 marks]

1 (b)(i)

- (ii) State two inferences from the observations in (a)(i).
Nyatakan dua inferens daripada pemerhatian di (a)(i)

Inference 1 :.....

.....

Inference 2 :.....

.....

[3 marks]

1 (b)(ii)

(c) Complete Table 1.2 based on the experiment.
Lengkapkan jadual 1.2 berdasarkan kepada eksperimen.

*For
 examiner's
 use*

Variables	Method to operating the variables
Manipulated Variables:	How to alter the manipulated variable?:
Responding variable :	How to determine the responding variable?:
Constant Variable :	How to maintain the control variable ?:

TABLE 1.2

[3marks]

1 (c)

(d) State the suitable hypothesis for the experiment.
Nyatakan hipotesis yang bersesuaian bagi eksperimen ini.

.....

[3 marks]

1 (d)

- (e) (i) Construct a table and record the result of the eksperimen.
Binakan satu jadual dan rekodkan keputusan eksperimen tersebut.

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

- Content in the boiling tube
Kandungan di dalam tabung didih
- pH
pH
- Time taken for the lime water to turn cloudy
Masa yang diambil untuk air kapur bertukar menjadi keruh

[3marks]

For
examiner's
use

1 (e)(i)

(ii) Use the graph paper provided to answer this question.
 Using the data in 1(e)(i), draw a bar chart to show the relationship between the pH and the time taken for lime water to turn cloudy.
*Gunakan kertas graf yang telah disediakan bagi menjawab soalan ini.
 Dengan menggunakan data di 1(e)(i) lukiskan graf bar untuk menunjukkan perkaitan diantara pH dan masa yang diambil bagi air kapur menjadi keruh.*
 [3 marks]

For
examiner's
use

1 (e)(ii)

(f) Explain the relationship between the pH and the time taken for the limewater to turn cloudy based on the graph in 1 (e) (ii).
Terangkan perkaitan diantara pH dan masa yang diambil untuk air kapur menjadi keruh berdasarkan graf di 1 (e) (ii).

.....

1 (f)

[3 marks]

(g) Base on the result from this experiment, what can you deduce about abiotic factor?
Berdasarkan keputusan eksperimen, apakah yang dapat dirumuskan tentang faktor abiosis?

.....

1 (g)

[3 marks]

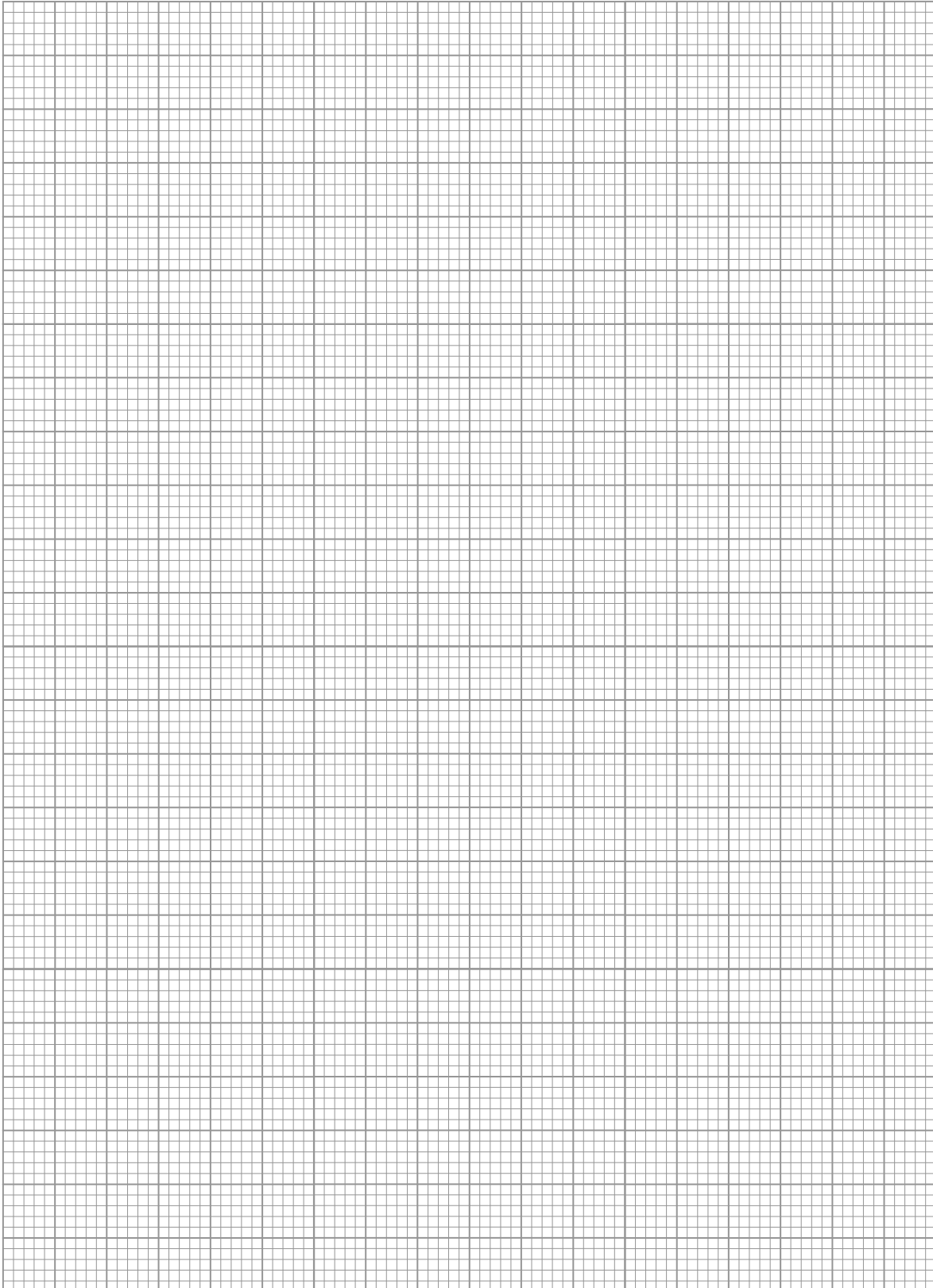
(h) This experiment is repeated by using 30% of glucose solution in set A, set B and set C . Predict the time taken for the lime water to turn cloudy in set B.
Eksperimen ini diulangi dengan menggunakan 30% larutan glukosa bagi set A, set B dan set C. Ramalkan masa yang diambil oleh air kapur untuk menjadi keruh bagi set B.

.....

1 (h)

[3 marks]

Graph of the time taken for lime water to turn cloudy against the pH
Graf masa yang diambil untuk air kapur menjadi keruh.melawan pH



- (i) In Table 1.3, list all the materials and apparatus used by the students to carry out the experiment.
Dalam jadual 1.3, senaraikan semua bahan dan radas yang telah digunakan oleh pelajar tersebut untuk menjalankan eksperimen tersebut.

*For
examiner's
use*

Material	Apparatus

Table 1.3

[3 marks]

1 (i)

- 2 Growth in organisms is permanent and irreversible. It involves in an increase in the mass and size of the organism. Growth of an organism can be measured by using certain parameter for examples heights, length, fresh mass, dry mass and volume.

Based on the given information, design an experiment to study the relationship between the growth of maize plants and time/days/duration after planting at a nursery site.

Tumbuhan organisma boleh diukur dengan menggunakan beberapa parameter seperti ketinggian, panjang, jisim segar, jisim kering dan isipadu.

Berdasarkan maklumat di atas, rekabentuk suatu eksperimen untuk mengkaji perkaitan diantara tumbuhan pokok jagung dan masa/hari/tempoh selepas ditanam di tapak semaian .

The planning of for the experiment must include the following aspects:
Perancangan ekeperimen anda hendaklah mengandungi aspek-aspek berikut :

- (a) Problem statement
Pernyataan masalah
- (b) Aim of experiment
Tujuan eksperimen
- (c) Hypothesis
Hipotesis
- (d) Variables
Pembolehubah
- (e) List of apparatus and material
Senarai radas dan bahan
- (f) Technique used
Teknik yang digunakan
- (g) Experimental procedure or method
Kaedah eksperimen
- (h) Presentation of data
Persembahan data
- (i) Conclusion
Kesimpulan

[17 marks]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

Answer scheme

Biology Paper 3

Question 1

No	Mark Scheme	Score								
1(a)	<p>Able to record the time taken for lime water to turn cloudy in Table 1 correctly.</p> <p>Sample answers:</p> <table border="1"> <thead> <tr> <th>pH solution in boiling tubes</th> <th>Time taken for lime water to turn cloudy (min)</th> </tr> </thead> <tbody> <tr> <td>5</td> <td>18</td> </tr> <tr> <td>7</td> <td>1</td> </tr> <tr> <td>9</td> <td>27</td> </tr> </tbody> </table>	pH solution in boiling tubes	Time taken for lime water to turn cloudy (min)	5	18	7	1	9	27	3
pH solution in boiling tubes	Time taken for lime water to turn cloudy (min)									
5	18									
7	1									
9	27									
	Able to record 2 correct and 1 incorrect answer	2								
	Able to record 1 correct and 2 incorrect answers	1								
	No response or wrong response	0								
1(b) (i)	<p>Able to state two different observations correctly according 2 criteria:</p> <ul style="list-style-type: none"> pH (MV) time taken for lime water to turn cloudy (RV) <p>Note: Observation must match with inference</p> <p>Sample answers</p> <ol style="list-style-type: none"> At pH 5/pH 7/ pH 9 the time taken for lime water to turn cloudy is 18min/1min/27min. At pH 7 the time taken for lime water to turn cloudy is faster than at pH5/pH9. At pH 9 the time taken for lime water to turn cloudy is slower than at pH 5/pH7 . 	3								
	<p>Able to state any one observation correctly. or</p> <p>Able to state any two incomplete observations (any 2 criteria)</p> <p>Sample answers</p> <ol style="list-style-type: none"> At pH 7 the time taken for lime water to turn cloudy is the fastest. At pH 9 the time taken for lime water to turn cloudy is the slowest. The time taken for lime water to turn cloudy is slowest at pH 9 compare to other. The time taken for lime water to turn cloudy is fastest at pH 7 compare to other. 	2								

	<p>Able to state any one idea of observation.(any 1 criteria)</p> <p><u>Sample answers</u> (idea level)</p> <ol style="list-style-type: none"> 1. The time taken for lime water to turn cloudy is different in different pH/solutions. 2. In neutral condition the time taken for lime water turn cloudy is fast 3. In alkaline condition the time taken for lime water turn cloudy is slow 4. In acidic and alkaline medium the time taken for lime water to turn cloudy is slower compare to neutral medium. 	1
	No response <u>or</u> incorrect response <u>or</u> one idea only	0
1(b)(ii)	<p>Able to make two correct inferences base on the three criteria:</p> <ul style="list-style-type: none"> • Suitable abiotic condition /pH • Increases/decreases yeast activity • More/less CO₂ released <p>Note: Inference must match with observation</p> <p><u>Sample answers:</u></p> <ol style="list-style-type: none"> 1. In acidic/alkaline//neutral condition yeast activity decreases//increases thus less/more CO₂ released 2. In neutral condition yeast activity increases compare to other conditions thus more CO₂ released. 3. In acidic/alkaline condition yeast activity decreases compare to neutral condition thus less CO₂ released. 	3
	<p>Able to make one logical inference for any one observation. <i>Or</i></p> <p>Able to make one logical and incomplete inference base on one criterion for each observation.</p> <p><u>Sample answers:</u></p> <ol style="list-style-type: none"> 1. In neutral//acidic/alkaline condition yeast activity increases//decreases. 2. Acidic/alkaline condition is not suitable for yeast activity. 3. pH will affect yeast activity. 4. When yeast activity increases/decreases, more/less CO₂ released. 5. When yeast in suitable/not suitable condition, more/less CO₂ released. 	2
	<p>Able to state only one correct inference <i>Or</i></p>	1

	<p>Able to state two inferences at idea level</p> <p><u>Sample answers:</u></p> <ol style="list-style-type: none"> 1. Yeast activity depends on suitable condition/pH 2. Yeast activity did not occur under unsuitable condition/pH 3. Yeast activity cause the released of CO₂ <p>Or any other suitable answer.</p>									
	No response or incorrect response	0								
1(c)	<p>Able to state all 3 variables and methods to handle each variable</p> <p><u>Sample answers:</u></p> <table border="1"> <thead> <tr> <th>Variables</th> <th>Method to handle the variable</th> </tr> </thead> <tbody> <tr> <td><u>Manipulated variable:</u> pH</td> <td>Add/use acetic acid for acidic condition, ammonium for alkaline condition and distilled water for neutral condition // different pH solutions// Change the pH medium.</td> </tr> <tr> <td><u>Responding variable:</u> Time taken for lime water turn cloudy.</td> <td>Measure and record the time taken for lime water to turn cloudy using a stopwatch //</td> </tr> <tr> <td><u>Constant variable:</u> Temperature/glucose concentration/volume of glucose/yeast suspension/light intensity.</td> <td>Use / maintain/same water bath temperature , 37°C / 10% glucose concentration / 10ml glucose/yeast suspension./light intensity</td> </tr> </tbody> </table>	Variables	Method to handle the variable	<u>Manipulated variable:</u> pH	Add/use acetic acid for acidic condition, ammonium for alkaline condition and distilled water for neutral condition // different pH solutions// Change the pH medium.	<u>Responding variable:</u> Time taken for lime water turn cloudy.	Measure and record the time taken for lime water to turn cloudy using a stopwatch //	<u>Constant variable:</u> Temperature/glucose concentration/volume of glucose/yeast suspension/light intensity.	Use / maintain/same water bath temperature , 37°C / 10% glucose concentration / 10ml glucose/yeast suspension./light intensity	3
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	Able to state 4-5 ticks	2								
	Able to state 2-3 ticks	1								
	No response or incorrect response or 1 tick only	0								
1(d)	<p>Able to state a hypothesis relating the manipulated variable and the responding variable correctly with the following aspects: P1 = Manipulated variable (pH) P2 = Responding variable (time taken for lime water to turn cloudy) H = relationship</p> <p><u>Sample answers:</u></p>	3								

	<ol style="list-style-type: none"> In neutral pH/condition/medium the time taken for lime water to turn cloudy is the fastest. In alkaline pH/ condition/medium the time taken for lime water to turn cloudy is the slowest. If the pH higher than 7 the time taken for lime water to turn cloudy is slower. In neutral pH/condition/medium the time taken for lime water to turn cloudy is faster than in acidic/alkaline pH/condition/medium. 													
	<p>Able to state a hypothesis relating the manipulated variable and the responding variable but inaccurately</p> <p><u>Sample answers:</u></p> <ol style="list-style-type: none"> Different pH/condition/medium has different time taken for lime water to turn cloudy. Different pH/condition/medium influence/affect the time taken for lime water to turn cloudy. pH affect the time taken for lime water to turn cloudy 	2												
	<p>Able to state one idea of a hypothesis</p> <p><u>Sample answers:</u></p> <ol style="list-style-type: none"> Time taken for lime water to turn cloudy is varied/different pH is varied in the solutions/medium. 	1												
	No response or incorrect response	0												
1(e) (i)	<p>Able to construct a table and fill a table with all columns labeled with correct unit.</p> <p><u>Sample answers:</u></p> <table border="1"> <thead> <tr> <th>Content in the boiling tube</th> <th>pH</th> <th>Time taken for the lime water to turn cloudy (min)</th> </tr> </thead> <tbody> <tr> <td>10ml yeast suspension +10ml glucose solution + 0.1 M 2ml Acetic acid</td> <td>5</td> <td>18</td> </tr> <tr> <td>10ml yeast suspension +10ml glucose solution + 2ml distilled water</td> <td>7</td> <td>1</td> </tr> <tr> <td>10ml yeast suspension +10ml glucose solution + 0.1M</td> <td>9</td> <td>27</td> </tr> </tbody> </table>	Content in the boiling tube	pH	Time taken for the lime water to turn cloudy (min)	10ml yeast suspension +10ml glucose solution + 0.1 M 2ml Acetic acid	5	18	10ml yeast suspension +10ml glucose solution + 2ml distilled water	7	1	10ml yeast suspension +10ml glucose solution + 0.1M	9	27	3
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10ml yeast suspension +10ml glucose solution + 0.1 M 2ml Acetic acid	5	18												
10ml yeast suspension +10ml glucose solution + 2ml distilled water	7	1												
10ml yeast suspension +10ml glucose solution + 0.1M	9	27												

	2ml Ammonium Hydroxide			
	Able to draw a table with incomplete data			2
	Able to draw a table without data			1
	No response or incorrect response			0
1(e) (ii)	Able to draw a graph of the time taken for lime water to turn cloudy against the pH include the following aspects:			3
	P	:	Correct title of x-axis and y-axis with unit and uniform scale on the axis x-axis : pH y-axis : time taken for lime water to turn cloudy.	1 mark
	T	:	Correct data transferred / all points plotted	1 mark
	B	:	Bar graph	1 mark
	Any two correct aspects			2
	Any one correct aspects			1
	No response or incorrect response			0
1(f)	Able to explain the relationship between the condition of the medium and time taken for lime water to turn cloudy based on the criteria: <ul style="list-style-type: none"> • P1- Alkaline, acidic or neutral condition • P2- yeast activity // CO₂ released • P3- time taken for lime water to turn cloudy <p><u>Sample answers:</u></p> <ol style="list-style-type: none"> 1. In neutral medium/At pH 7 there is increase in yeast activity // more CO₂ released thus the time taken for lime water to turn cloudy is fastest. 2. In alkaline medium/At pH 9 there is decrease in yeast activity//less CO₂ released thus time taken for lime water to turn cloudy is slowest. 3. In acidic medium / At pH 5 there is decrease in yeast activity//less CO₂ released thus time taken for lime water to turn cloudy is slower than neutral medium/ at pH 7 but faster than alkaline medium/ at pH 9. 			3
	Able to explain the relationship using any two criteria			2
	<u>Sample answer:</u> <ol style="list-style-type: none"> 1. In the neutral medium /At pH 7 //alkaline medium/At pH 9 time taken for lime water to turn cloudy is fastest//slowest. 2. In acidic medium / At pH 5 time taken for lime water to turn cloudy is slower than neutral medium/ at pH 7 but faster than alkaline medium/ at pH 9. 			

	3. In the neutral medium/ At pH 7 the time taken for lime water to turn cloudy is fastest than other medium.							
	Able to explain the relationship using one criteria <u>Sample answer:</u> 1. Time taken for lime water to turn cloudy depends on the medium/abiotic condition. 2. Different pH medium affect the time taken for lime water to turn cloudy.	1						
	No response or incorrect response	0						
	REJECT: 1. The higher the pH medium, the time taken for lime water to turn cloudy increase.							
1(g)	Able to state the definition of abiotic factor operationally, complete and correctly based on the following criteria: <table border="1" data-bbox="347 804 1333 917"> <tr> <td>D1 :</td> <td>pH of medium (abiotic factor)</td> </tr> <tr> <td>D2 :</td> <td>Yeast activity/growth //amount CO₂ release</td> </tr> <tr> <td>D3 :</td> <td>Time taken for lime water to turn cloudy</td> </tr> </table> <u>Sample answers:</u> 1. Abiotic factor is the pH value in the medium/solutions of yeast and glucose that affect the yeast activity/growth//amount of CO ₂ release hence affect the time taken for lime water to turn cloudy.	D1 :	pH of medium (abiotic factor)	D2 :	Yeast activity/growth //amount CO ₂ release	D3 :	Time taken for lime water to turn cloudy	3
D1 :	pH of medium (abiotic factor)							
D2 :	Yeast activity/growth //amount CO ₂ release							
D3 :	Time taken for lime water to turn cloudy							
	Any two criteria stated	2						
	Any one criteria stated	1						
	No response or incorrect response	0						
1(h)	Able to predict the outcome of the experiment correctly based on the following criteria: <table border="1" data-bbox="347 1423 1333 1537"> <tr> <td>C1 :</td> <td>Prediction on the time taken for lime water to turn cloudy.</td> </tr> <tr> <td>C2 :</td> <td>Effect of increase the glucose concentration</td> </tr> <tr> <td>C3 :</td> <td>Effect yeast activity//more CO₂ produced</td> </tr> </table> <u>Sample answers:</u> The time taken for lime water to turn cloudy is decreased/less than 1min in set A. This is because of more nutrient present/added in the solutions(30% glucose solutions), thus yeast activity will increases and more CO ₂ produced in lime water make it become cloudy at much faster rate.	C1 :	Prediction on the time taken for lime water to turn cloudy.	C2 :	Effect of increase the glucose concentration	C3 :	Effect yeast activity//more CO ₂ produced	3
C1 :	Prediction on the time taken for lime water to turn cloudy.							
C2 :	Effect of increase the glucose concentration							
C3 :	Effect yeast activity//more CO ₂ produced							
	Any two criteria stated	2						
	Any one criteria stated	1						

	No response or incorrect response	0																
1(i)	Able to classify all the materials and apparatus correctly <u>Sample answers:</u>	3																
	<table border="1"> <thead> <tr> <th>MATERIALS (M)</th> <th>APPARATUS (A)</th> </tr> </thead> <tbody> <tr> <td>Yeast solution</td> <td>Boiling tube</td> </tr> <tr> <td>Glucose solution</td> <td>Delivery tube</td> </tr> <tr> <td>Lime water</td> <td>Thermometer</td> </tr> <tr> <td>Acetic Acid</td> <td>Beaker</td> </tr> <tr> <td>Ammonium Hydroxide</td> <td>stopwatch</td> </tr> <tr> <td>Distilled water</td> <td>Water bath</td> </tr> <tr> <td></td> <td></td> </tr> </tbody> </table>	MATERIALS (M)	APPARATUS (A)	Yeast solution	Boiling tube	Glucose solution	Delivery tube	Lime water	Thermometer	Acetic Acid	Beaker	Ammonium Hydroxide	stopwatch	Distilled water	Water bath			
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Distilled water	Water bath																	
	All six materials and six apparatus are correct																	
	Refer to the scoring below	2																
	Refer to the scoring below	1																
	Refer to the scoring below	0																

Scoring:

MATERIALS	APPARATUS	SCORE
6M	6A	3
6M	5A	2
5M	4A	
5M	3A	
5M	4A	1
4M	4A	
3M	3A	0
3M	1/2A	
2M	1/2/3/4A	

QUESTION 2

CONSTRUCT	SAMPLE ANSWERS	NOTES ON SCORING
1. OBJECTIVE (Ob)	1. To study the relationship between average height/growth rate of maize plants and the time/days/duration after planting.	No mark just a TICK ✓
2. PROBLEM STATEMENT (Ps) <div style="border: 1px solid black; display: inline-block; padding: 2px;">01</div>	Able to relate P1, P2 and H in a question form. 1. What is the relationship between the average height/growth rate of maize plants and time/days after planting? 2. Does the time/days after planting affect the average height/growth rate of maize plants?	P1 = MV P2 = RV H = question P1 + P2 + H = 3 marks ✓ MV = Time/days/duration after planting RV = Average height of maize plants./growth rate H = a question (?)
	Able to state problem statement inaccurately 1. Does the time/days/duration after planting affect the average height/growth rate of maize plants. (no ?) 2. What is the effect of time/days/duration after planting on maize plants? 3. The time/days/duration after	Only two aspects P1+P2/ P1+P3/ P2+P3 2 marks ✓

	planting affect the average height/growth rate of maize plants.							
	Able to state the idea 1. Growth of maize depends on days of planting.	Only one aspect P1/P2/P3 1 mark ✓						
3. HYPOTHESIS (Hp) 02	Able to state the hypothesis by relating two variables correctly (P1+P2+H) 1. The longer the time/days/duration after planting (P1), the more the average heights/growth rate of maize plants (P2) until they reach maturity.	P1- manipulated variable Time/days after planting P2-responding variable The average height of maize plants / growth maize plants H-relationship P1+P2+H P1 + P2 + H = 3 marks ✓						
	Able to state any two criteria correctly or inaccurate hypothesis 1. The time/days/duration after planting (P 1) affect the average height/growth rate of maize plants. (P2) (no H) 2. The average height/growth rate of the plants depends on the time/days/duration after planting.	Only two aspects P1+P2/ P1+H/ P2+H 2 marks ✓						
	Able to draw the idea of hypothesis 1. The time/days/duration after planting affect the plants (no P2 + H)	Only one aspect P1/P2/H 1 mark ✓						
4. VARIABLES (Vr)	<table border="1"> <tr> <td>Manipulated</td> <td>The time/days/duration after planting</td> </tr> <tr> <td>Responding</td> <td>The average height of maize plants / the growth rate of maize plants.</td> </tr> <tr> <td>Fixed</td> <td>Spacing between each maize seed.</td> </tr> </table>	Manipulated	The time/days/duration after planting	Responding	The average height of maize plants / the growth rate of maize plants.	Fixed	Spacing between each maize seed.	No mark just a TICK ✓
Manipulated	The time/days/duration after planting							
Responding	The average height of maize plants / the growth rate of maize plants.							
Fixed	Spacing between each maize seed.							

		/Number of seedlings/types//quantity of garden soil/amount of water/light intensity/time taken																			
5. APPARATUS AND MATERIALS (AM) 05	<p>Able to list 4 materials and 2 apparatus correctly to make a functional experiment and able to get the data</p> <p><u>MATERIALS:</u></p> <ol style="list-style-type: none"> 1. Maize seeds 2. Nursery site 3. garden/loam soil 4. tap water 5. fertilizer <p><u>APPARATUS:</u></p> <ol style="list-style-type: none"> 1. Measuring tape 2. metre rule 	<table border="1"> <thead> <tr> <th>materials</th> <th>apparatus</th> <th>score</th> </tr> </thead> <tbody> <tr> <td>5M</td> <td>2A</td> <td>3 (✓)</td> </tr> <tr> <td>5M</td> <td>1A</td> <td rowspan="2">2 (✓)</td> </tr> <tr> <td>4M</td> <td>2A/1A</td> </tr> <tr> <td>3M</td> <td>2A/1A</td> <td rowspan="2">1 (✓)</td> </tr> <tr> <td>2M</td> <td>1A</td> </tr> <tr> <td>1M</td> <td>1A</td> <td>0 (✓)</td> </tr> </tbody> </table>	materials	apparatus	score	5M	2A	3 (✓)	5M	1A	2 (✓)	4M	2A/1A	3M	2A/1A	1 (✓)	2M	1A	1M	1A	0 (✓)
materials	apparatus	score																			
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2M	1A																				
1M	1A	0 (✓)																			
6. TECHNIQUE (Tq)	<p>Able to state the operating responding variable correctly with suitable apparatus</p> <ol style="list-style-type: none"> 1. Measure and record the height of maize plants by using a metre rule. 	B1 = 1 mark ✓																			
7. PROCEDURE (K) 04	<p>Able to state K1, K2, K3, K4 and K5 (5K) correctly</p> <p>K1: The set up of materials and apparatus (S1/S2/S3)</p> <p>K2: Operating the manipulate variable (S5)</p> <p>K3: Operating the responding variable(S4/S6)</p> <p>K4: Operating the constant variable (S1/S2/S4)</p> <p>K5: Precautions (S2/S3)</p>	<p>K1+K2+K3+K4+K5 (5 K) = 3 marks ✓</p> <p>3 to 4 K =2 marks ✓</p> <p>2 K only =1 mark ✓</p> <p>1 K = 0 mark but ✓</p>																			

	<p>S1 – Prepare a site for nursery with garden/loam soil.</p> <p>S2 – Plant 20 maize seeds in the soil with even /same spacing between each seed.</p> <p>S3 – Water the seeds daily throughout the period of experiment.</p> <p>S4 – After 10 days, measure the height of maize plants using the metre rule or measuring tape.</p> <p>S5 – Repeat steps 4 over 90/120 days /3-4 consecutive month</p> <p>S6 – Record all the results obtained in a table</p> <p>S7- Plot a graph of the average height/growth of maize plants against time/days after planting.</p>	
8. RECORDING DATA/RESULT (RD)	<p>Able to construct a table to record all data with the following aspects:</p> <p>1. At least 2 titles (MV and RV) and unit</p> <p>2. NO data is required</p> <p>REFER BELOW FOR SAMPLE TABLE</p>	B2 = 1 mark ✓
9. CONCLUSION (Cn)	<p>A hypothesis statement.</p> <p>Hypothesis is accepted</p>	No mark just a TICK ✓
10. PLANNING EXPERIMENT 03		<p>7 – 9 TICKS = 3 marks</p> <p>4 – 6 TICKS = 2 marks</p> <p>2 – 3 TICKS = 1 mark</p>

Time/days after planting	The height of maize plants/ cm										Average heights of maize plants (cm)
	1	2	3	4	5	6	7	8	9	10	
10											
20											
30											
40											
50											

60																				
70																				
80																				
90																				
100																				
110																				
120																				