Answer all questions.

Jawab semua soalan.

1 Diagram 1 shows an animal cell.
Rajah 1 menunjukkan satu sel haiwan..

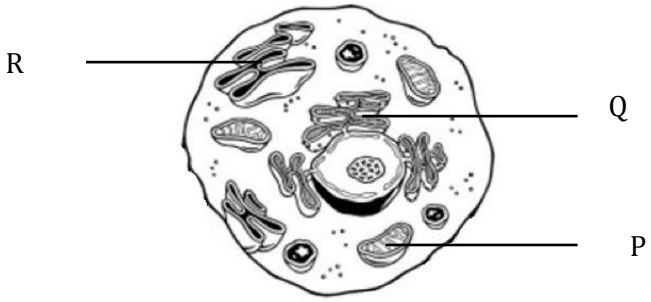


Diagram 1
Rajah 1

What are P, Q and R ?
Apakah P, Q dan R ?

	P	Q	R
A	Smooth Endoplasmic Reticulum *Jalinan Endoplasma Licin*	Vacoule *vakuol*	Chloroplast *Kloroplas*
B	Rough Endoplasmic Reticulum *Jalinan Endoplasma Kasar*	Golgy Apparatus *Jasad Golgi*	Mitochondria *Mitokondrion*
C	Mitochondria *Mitokondrion*	Rough Endoplasmic Reticulum *Jalinan Endoplasma Kasar*	Golgy Apparatus *Jasad Golgi*
D	Rough Endoplasmic Reticulum *Jalinan Endoplasma Kasar*	Smooth Endoplasmic Reticulum *Jalinan Endoplasma Licin*	Mitochondria *Mitokondrion*

2 Which organelle synthesis lipid ?
Organel manakah yang mensintesis lipid ?

A Lysosom
Lisosom

B Ribosome
Ribosom

C Mitochondria
Mitokondrion

D Smooth Endoplasmic Reticulum
Jalinan Endoplasma Licin

3 Diagram 2 shows a structure of plasma membrane.
Rajah 2 menunjukkan struktur membran plasma.

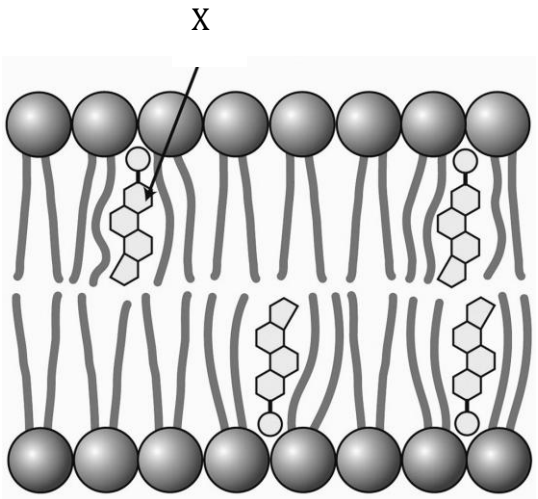


Diagram 2
Rajah 2

What is the function of X ?
Apakah fungsi X?

A Act as the barrier to separate the inner and outer part of the cell.
Sebagai penghalang yang mengasingkan bahagian dalam dan luar sel.

B Help to transport the substances in or out from the cell.
Membantu mengangkut bahan masuk atau keluar dari membran sel.

C Stabilized and strengthen the plasma membrane to become more flexible,
Menstabil dan menguatkan membran plasma supaya lebih fleksibel

D To prpvide fix shape for the cell.
Memberi bentuk yang tetap kepada sel.

4 Diagram 3 shows the apparatus set- up to investigate osmosis. X shows the initial level of the solution.
Rajah 3 menunjukkan susunan radas untuk mengkaji osmosis. X menunjukkan aras awal larutan.

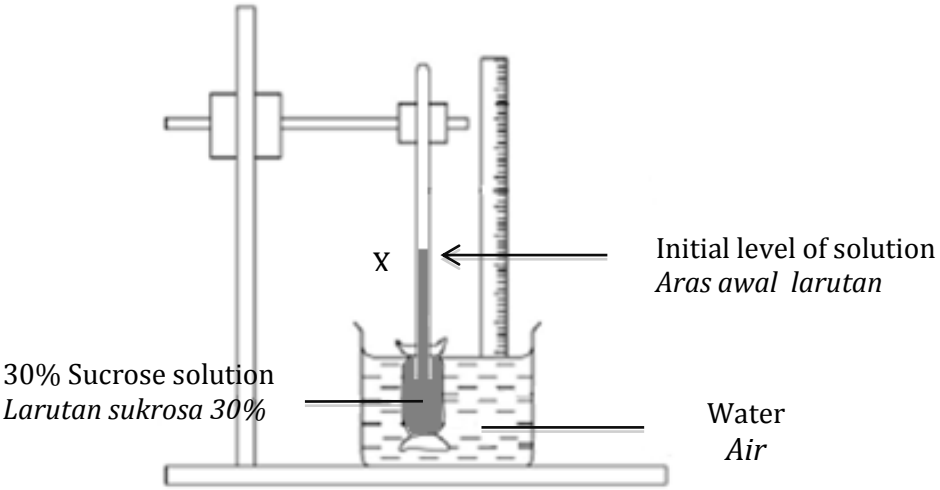
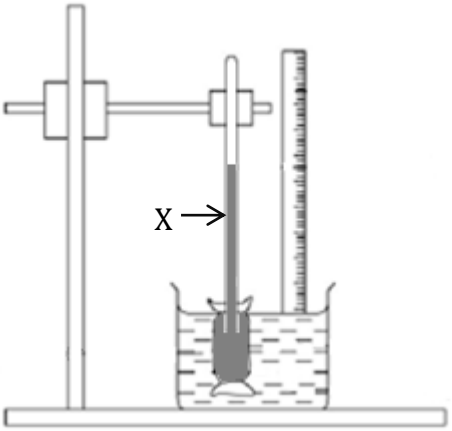


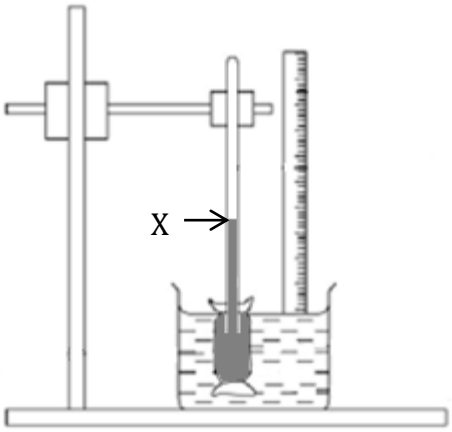
Diagram 3 / *Rajah 3*

Which of following will be observed after 1 hour ?
Antara yang berikut, yang manakah dapat diperhatikan selepas 1 jam ?

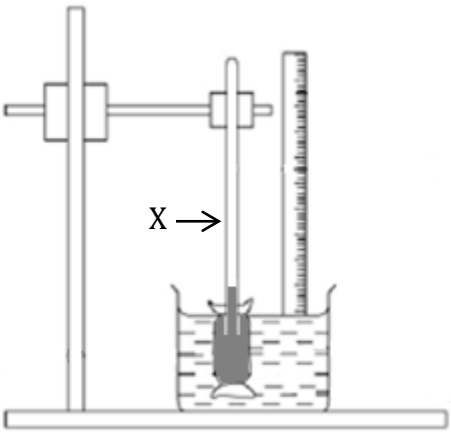
A



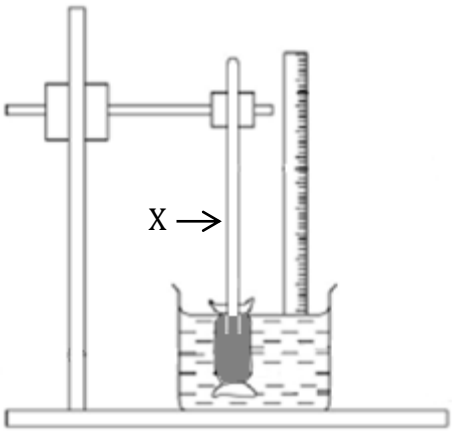
C



B



D



5 Diagram 4 shows the apparatus set-up to demonstrate process X.
Rajah 4 menunjukkan susunan radas untuk menunjukkan proses X.

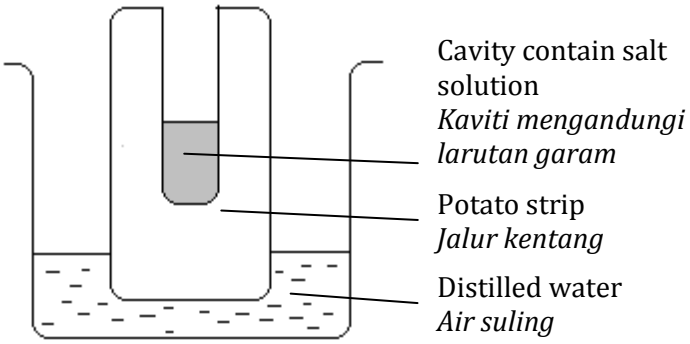


Diagram 4
Rajah 4

What is process X?
Apakah proses X ?

A Osmosis
Osmosis

B Plasmolysis
Plasmolisis

C Simple diffusion
Resapan ringkas

D Facilitated diffusion
Resapan berbantu

6 Diagram 5 shows organelles involved in the production and secretion of anextracellular enzyme.
Rajah 5 menunjukkan organel yang terlibat di dalam penghasilan dan perembesan enzim luar sel.

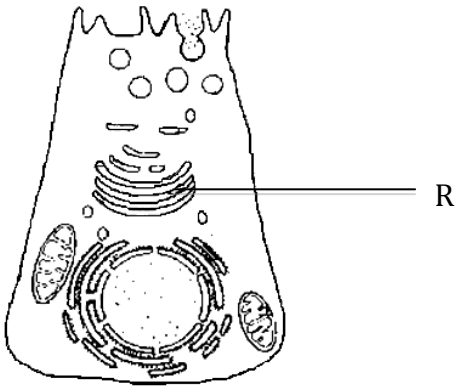


Diagram 5
Rajah 5

What would happen to the process if R is absent?
Apakah yang akan berlaku kepada proses tersebut sekiranya R tiada?

A Proteins are not modified
Protein tidak diubahsuai

B Proteins are not transcripted
Protein tidak ditranskripsi

C Proteins are not synthesized
Protein tidak disintesiskan

D Proteins are not secreted
Protein tidak dirembeskan

7 Diagram 6 shows the movement of glucose molecules through a plasma membrane.
Rajah 6 menunjukkan pergerakan molekul-molekul glukosa melalui membran plasma

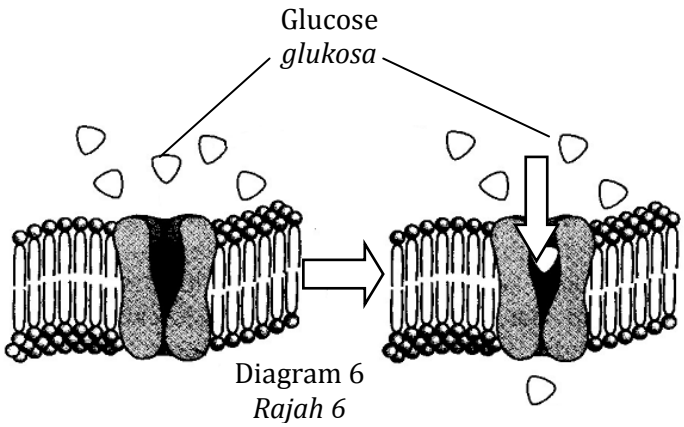


Diagram 6
Rajah 6

Which conclusion could be obtained from diagram 6.
Apakah kesimpulan yang boleh diperolehi daripada Rajah 6?

A Glucose moves by osmosis
Glukosa bergerak secara osmosis
B Glucose moves by simple diffusion
Glukosa bergerak secara resapan ringkas
C Glucose moves by facilitated diffusion
Glukosa bergerak secara resapan berbantu
D Glucose moves by active transport
Glukosa bergerak secara pengangkutan aktif

8 Diagram 7 shows a plant cell in an isotonic solutions.
Rajah 7 menunjukkan sel tumbuhan di dalam larutan isotonic.

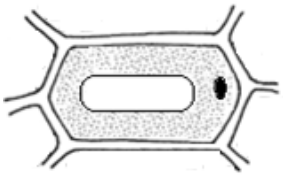
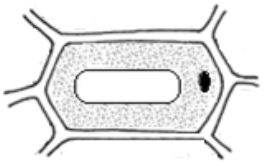
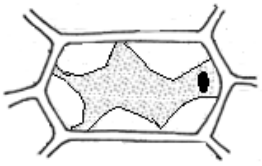


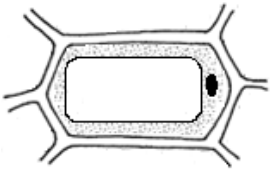
Diagram 7
Rajah 7

Which diagram shows the cell after it has been immersed in a hypotonic solution ?
Rajah manakah yang menunjukkan sel itu setelah direndam dalam larutan hipotonik ?

A


C


B


D


9 Diagram 8 shows the process of the breakdown of disaccharides into monosacharides.
Rajah 8 menunjukkan proses pemecahan molekul disakarida kepada monosakarida

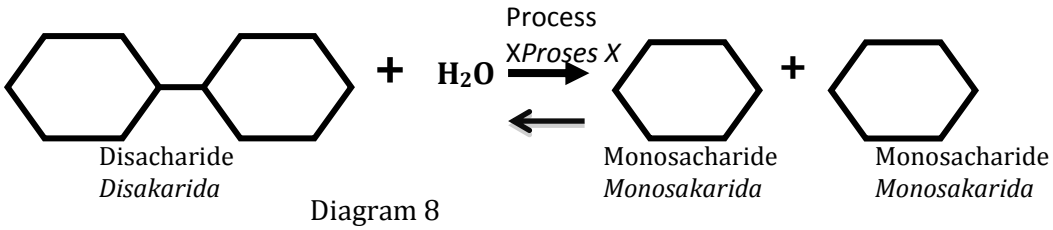


Diagram 8
Rajah 8

What is process X?
Apakah proses X?

A Dialysis
D*ialisis*

B Hydrolysis
Hidrolisis

C Assimilation
Asimilasi

D Condensation
Kondensasi

10 Which of the following represents the hydrolysis of triglycerides?
Antara berikut manakah mewakili hidrolisis trigliserida?

A Glycerol + Fatty acid → Triglycerides
Gliserol + Asid lemak → Trigliserida

B Glycerol + Fatty acids →Triglycerides + water
Gliserol + Asid lemak → Trigliserida + air

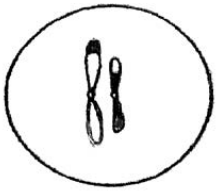
C Triglycerides → Glycerol + Fatty acids
Trigliserida → Gliserol + Asid lemak

D Triglycerides + water → Glycerol + Fatty acids
Trigliserida + air → Gliserol + Asid lemak

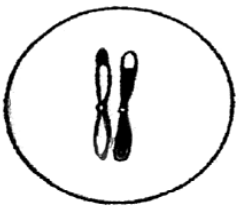
11 Diagram 9 shows cell at one particular stage of meiosis
Rajah 9 menunjukkan satu sel pada satu peringkat meiosis

Diagram 9/*Rajah 9*

Which of the cell is produced by the cell division?
Sel manakah yang dihasilkan daripada proses pembahagian sel tersebut?

A 

C 

B 

D 

12 Diagram10 shows amicrograph of an animal cell undergoing mitotic cell division.
Rajah 10 menunjukkan mikrograf satu sel haiwan yang sedang mengalami pembagian sel secara mitosis

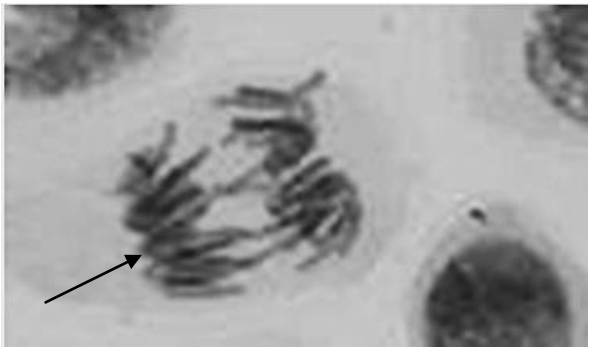


Diagram 10
Rajah 10

What is the stage of the mitotic cell division shows by the arrow?
Apakah peringkat pembahagian sel mitosis yang ditunjukkan oleh anak panah itu?

A Metaphase
Metafasa

B Anaphase
Anafasa

C Telophase
Telofasa

D Prophase
Profasa

13 Diagram 11 is a bar chart which illustrate the energy requirements of individual P, Q and R.
Rajah 11 menunjukkan carta bar yang mengambarkan keperluan tenaga bagi individu P,Q dan R.

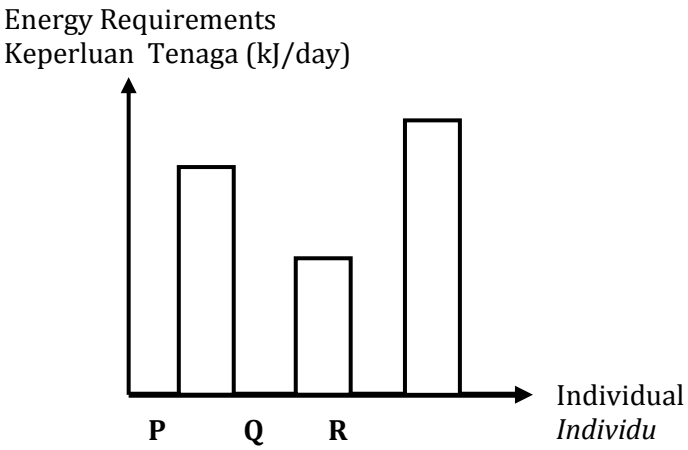


Diagram 11
Rajah 11

Which individual are represented by P, Q and R?
Individu manakah diwakili oleh P, Q dan R?

	P	Q	R
A	Clerk *Kerani*	Breast feeding mother *Ibu menyusu*	Consruction worker *Buruh binaan*
B	Breast feeding mother *Ibu menyusu*	Clerk *Kerani*	Consruction worker *Buruh binaan*
C	Clerk *Kerani*	Consruction worker *Buruh binaan*	Clerk *Kerani*
D	Consruction worker *Buruh binaan*	Breast feeding mother *Ibu menyusu*	Clerk *Kerani*

14 Diagram 12 shows the levels in a food guide pyramid for a balanced diet.
Rajah 12 menunjukkan aras pada suatu panduan piramid makanan untuk gizi seimbang

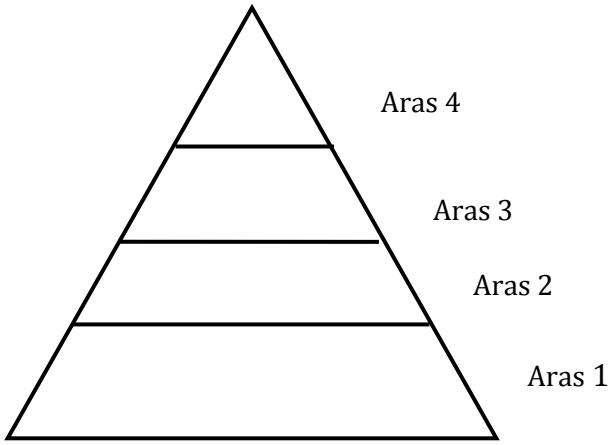


Diagram 12
Rajah 12

Which food is in level 4?
Makanan yang manakah berada pada aras 4?

A Butter
Mentega

C Egg
Telur

B Potato
Kentang

D Rice
Nasi

15 Table 1 shows the nutrient content for every 100g of certain food.
Jadual 1 menunjukkan kandungan nutrient bagi setiap 100g makanan tertentu.

Food	Protein(g)	Carbohydrate(g)	Calcium(mg)	Vitamin	
				A (ug)	C (mg)
H	12.3	4.2	4	155	0
I	17.4	0	16	0	0
J	3.3	4.8	120	44	1
K	0.7	5.4	48	2000	6

Which food is most suitable for those suffering from scurvy?
Makanan manakah paling sesuai untuk penghidap skurvi?

A H
B I
C J
D K

16 Diagram 13 shows a cross section of a dicotyledonous leaf.
Rajah 13 menunjukkan keratan rentas daun dikotiledon.

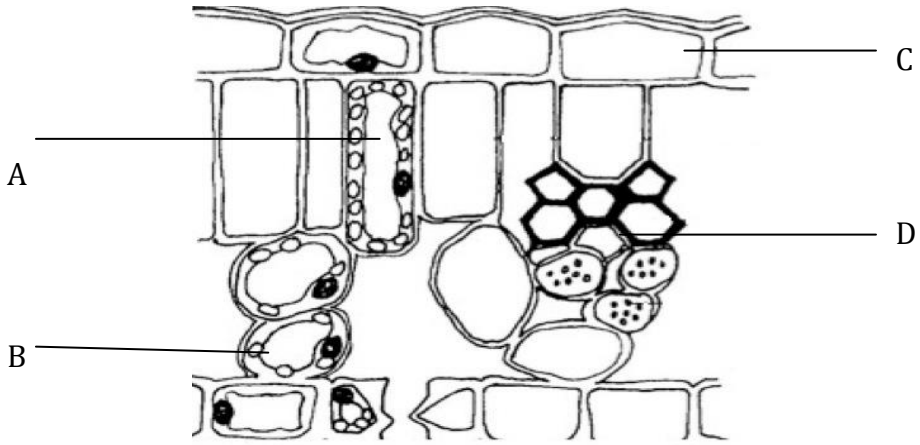


Diagram 13
Rajah 13

In which part of the cells labeled A, B, C and D, does transport in plants take place?
Bahagian manakah yang berlabel A, B, C dan D berlakunya proses pengangkutan dalam tumbuhan?

17 Diagram 14 shows the human digestive system.
Rajah 14 menunjukkan sistem pencernaan manusia.

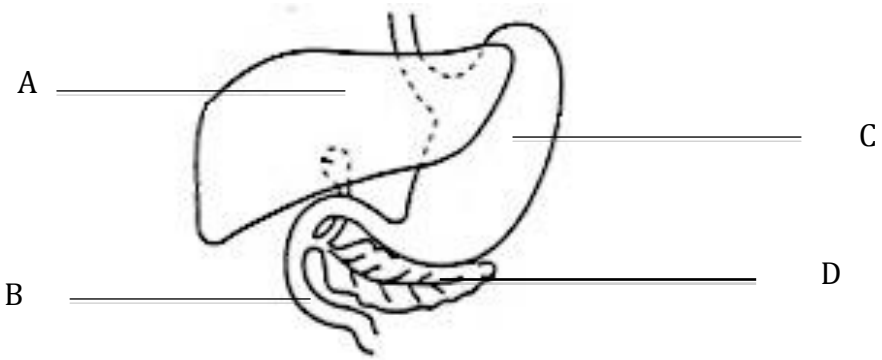


Diagram 14/*Rajah 14*

Which part labeled A, B, C and D secrete both hormones and enzymes?
Antara bahagian yang berlabel A,B,C dan D, yang manakah merembeskan hormon dan enzim?

18 Diagram 15 shows a pathway of nutrients after digestion process.
Rajah 15 menunjukkan laluan nutrient selepas proses pencernaan

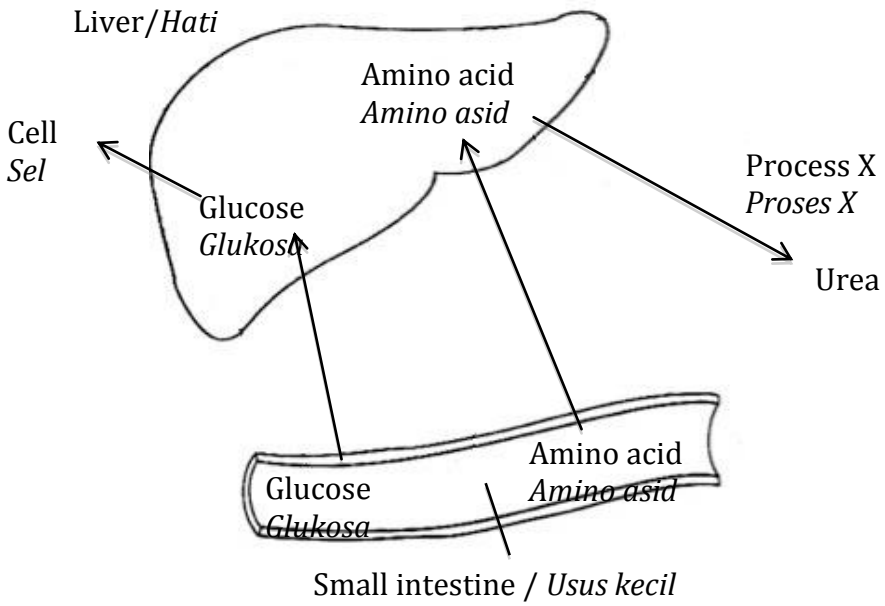


Diagram 15/*Rajah 15*

What is process X ?
Apakah proses X ?

A Assimilation
Asimilasi

B Hydrolisis
Hidrolisis

C Deamination
Deaminan

D Detoxification
Detoksifikasi

19 The following chemical reaction shows the reaction of photolysis of water in the process of photosynthesis.
Persamaan kimia berikut menunjukkan proses fotolisis air dalam proses fotosintesis.

$$2H_2O \longrightarrow 4H^+ + 4e^- + O_2$$

What will happen to the process if there is low light intensity?
Apakah yang akan berlaku pada proses tersebut sekiranya keamatan cahaya adalah rendah?

A More glucose is produced
Lebih glukosa akan dihasilkan

B Rate of starch production increased
Kadar penghasilan kanji meningka

C Less oxygen is released
Kurang oksigen dihasilkan

D More carbon dioxide will be used
Lebih banyak gas karbon dioksida akan digunakan

20 Which of the following changes will increase the rate of respiration in an organism?
Antara perubahan berikut, yang manakah akan meningkatkan kadar respirasi suatu organisma?

A Body temperature decreases.
Suhu badan menurun.

B The glucose concentration of blood decreases.
Kepekatan glukosa dalam darah menurun.

C The oxygen concentration in the blood increases.
Kepekatan oksigen dalam darah meningkat.

D The carbon dioxide concentration in the blood increases.
Kepekatan karbon dioksida dalam darah meningkat.

21 The following information's are about the changes that take place in the athlete's body during a 200m race.
Maklumat berikut adalah perubahan yang berlaku dalam badan seorang atlet semasa mengambil bahagian dalam acara lari 200m

P – Oxygen level in the muscles increase
Level oksigen dalam sel-sel otot meningkat

Q- Breathing rate increase
Kadar pernafasan meningkat

R - Concentration of carbon dioxide in the blood increase
Kepekatan karbon dioksida dalam darah meningkat

S - Muscle action produced more carbon dioxide
Aktiviti otot meningkatkan penghasilan karbon dioksida

In which order do these changes occur?
Apakah urutan untuk perubahan ini berlaku ?

A P,Q,R and S
P,Q,R dan S
B Q,S,R and P
Q,S,R dan P
C S,P,Q and R
S,P,Q dan R
D S,R,Q and P
S,R,Q dan P

22 Diagram 16 shows the structure of alveolus and blood capillary where the gaseous exchange occur in humans.
Rajah 16 menunjukkan struktur alveolus dan kapilari darah dimana pertukaran gas berlaku pada manusia.

Diagram 16/*Rajah 16*

Which of the following are the adaptivecharacteristics of alveolus to increase the rate of gaseous exchange?
Manakah antara yang berikut merupakan ciri-ciri penyesuaian pada alveolus untuk meningkatkan kadar pertukaran gas respirasi?

I Always moist
Sentiasa lembab
II Thin and permeable
Nipis dan telap
III Has a small surface area
Mempunyai luas permukan yang kecil
IV Able to expand and contract
Boleh mengembang dan menguncup

A I and II
B I and IV
C II and III
D III and IV

23 Diagram 17 is a graph showing the effect of light intensity on the rate of photosynthesis.
Rajah 17 ialah graf yang menunjukkan kesan keamatan cahaya ke atas kadar fotosintesis.

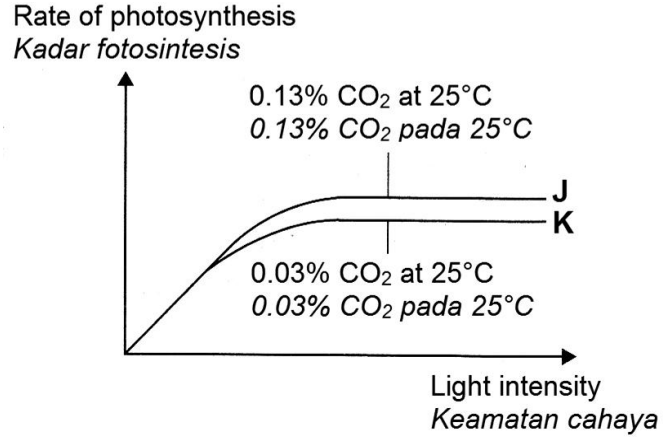


Diagram 17
Rajah 17

Which of the following can be concluded about the rate of photosynthesis between the curves J and K ?
Antara yang berikut. yang manakah boleh dirumuskan tentang kadar fotosintesis di antara lengkung J dan K?

A It is not influenced by the concentration of carbon dioxide.
Tidak dipengaruhi oleh kepekatan karbon dioksida

B It is limited by the concentration of carbon dioxide.
Dihadkan oleh kepekatan karbon dioksida.

C It is limited by the light intensity.
Dihadkan oleh keamatan cahaya.

D It is not influenced by the temperature.
Tidak dipengaruhi oleh suhu.

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

Yeast/ *Yis*
Glucose ⟶ P + Q + Energy
Zymase enzyme
Enzim zimase

What are P and Q ?
Apakah P dan Q ?

	P	Q
A	Ethanol *Etanol*	Carbon dioxide *Karbon dioksida*
B	Ethanol *Etanol*	Oxygen *Oksigen*
C	Lactic acid *Asid laktik*	Carbon dioxide *Karbon dioksida*
D	Lactic acid *Asid laktik*	Oxygen *Oksigen*

25 Which of the following are the effects of smoking?
Antara berikut,yang manakah adalah kesan menghisap rokok?

I Hepatitis / *Hipatitis*
II Common cold / *Selesema*
III Lung cancer / *Kanser Peparu*
IV Cardiovascular disease / *Penyakit kardiovaskular*

A I and II
B I and III
C II and IV
D III and IV

26 Table 1 shows the result of an experiment to study the population of frog in an area.
Jadual menunjukkan keputusan satu eksperimen untuk mengkaji populasi katak di satu kawasan.

Number of captured *Bilangan tangkapan*	Number of grasshoppers *Bilangan belalang*	
	Marked *Bertanda*	Unmarked *Tidak Bertanda*
First capture *Tangkapan pertama*	180	-
Second capture *Tangkapan kedua*	45	100

Table 1
Jadual 1

What is the estimated population size of the grasshoppers in the area?
Apakah anggaran saiz populasi belalang di kawasan tersebut?

A 70
B 180
C 261
D 580

27 Diagram 18 shows a food web.
Rajah18 menunjukkan suatu siratan makanan.

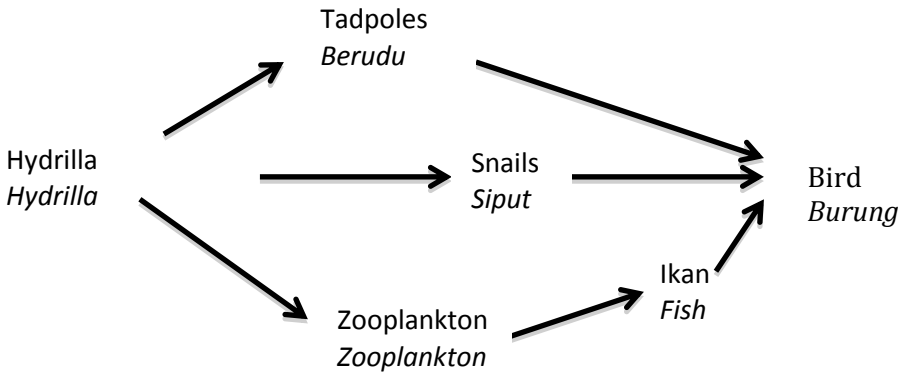


Diagram 18
Rajah 18

Which organism can be in the second trophic level?
Organisma manakah yang berada pada ars trof yang kedua?

A Tadpole, Snail
Berudu, Siput
B Snail, Bird
Siput, Burung
C Zooplankton, Fish
Zooplankton, Ikan
D Fish, Bird
Ikan, Burung

28 What is the main cause of eutrophication?
Apakah punca utama eutrofikasi?

A Burning of fossil fuels
Pembakaran bahan api fosil

B Leaching of excess fertilizers
Larut resap lebihan baja tak organik

C Thinning of ozone layer
Penipisan lapisam ozon

D Green house effect
Kesan rumah hijau

29 Diagram 19 shows an environmental phenomena.
Rajah 19 menunjukkan suatu fenomena persekitaran

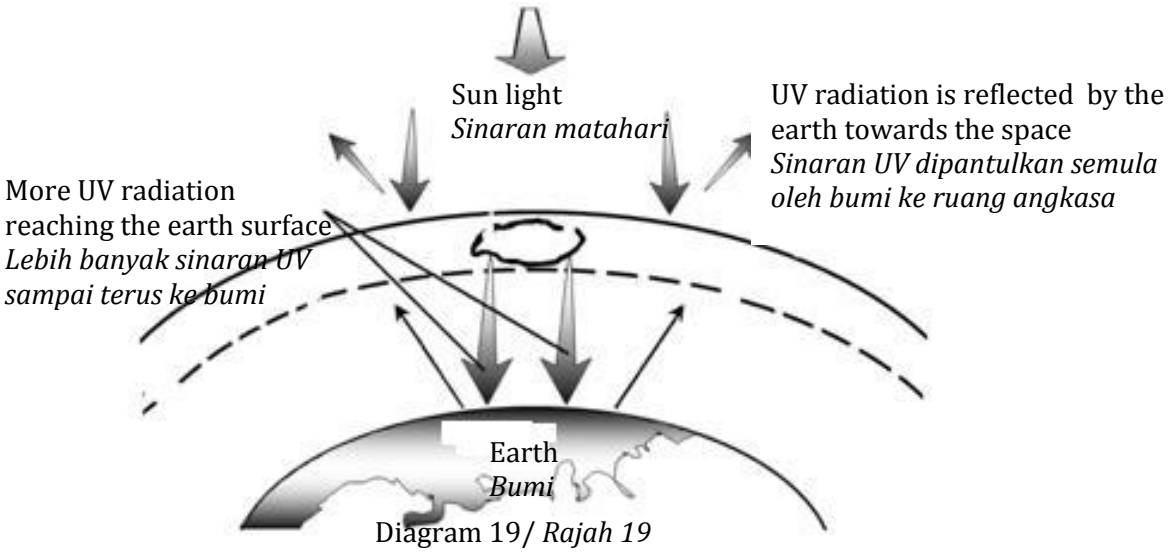


Diagram 19/ *Rajah 19*

Which of the following is the phenomena?
Antara berikut yang manakah menunjukkan fenomena tersebut?

A Effect of radiation
Kesan sinaran

B Air pollution
Pencemaran udara

C Green house effect
Kesan rumah hijau

D Thinning of ozone layer
Penipisan lapisan ozon

30 Four samples of water were taken from river J,K,L, and M and treated with methylene blue solution to determine the level of pollution in each river.
The results were recorded in Table 2
Empat sampel air telah diambil dari sungai J,K,L, and M dan dirawat dengan larutan metilena biru untuk menentukan tahap pencemaran setiap sungai.
Keputusan direkodkan dalam Jadual 2

River *Sungai*	Time taken for the methylene blue solution to decolourise *Masa yang diambil untuk larutan metilena biru meluntur*
J	1.5 hour / *jam*
K	3.0 hours / *jam*
L	3.5 hours / *jam*
M	5 hours / *jam*

Table 2/ *Jadual 2*

Based on the result, which river will have the highest population of fish?
Berdasarkan keputusan ,sungai manakah akan mempunyai populasi ikan yang paling tinggi?

A J C L
B K D M

31 Diagram 20 shows an oil palm factory located beside a river. The factory discharges its waste into the river.
Rajah 20 menunjukkan kilang minyak sawit yang terletak berdekatan sungai. Kilang ini membuang sisa buangannya ke dalam sungai

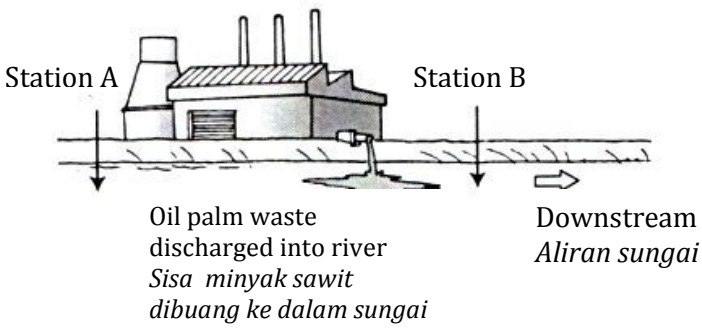


Diagram 20
Rajah 20

Which statement is true about station B.
Manakah pernyataan berikut benar berkaitan stesen B.

A Has a lower bacteria population
Mempunyai populasi bakteria yang rendah
B Has a lower organic matter content
Mempunyai kandungan bahan organic yang rendah
C Has a higher BOD (Biochemical Oxygen Demand) level
Mempunyai aras BOD yang tinggi (Keperluan Oksigen Biokimia)
D Has a higher carbon monoxide concentration
Kepekatan karbon monoksida yang tinggi.

32 Diagram 21 shows the cross section of a dicotyledon stem.
Rajah 21 menunjukkan keratan rentas batang dikotiledon

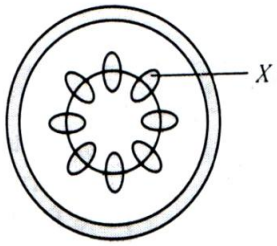


Diagram 21
Rajah 21

What is the function of X?
Apakah fungsi X.

A Transpiration
Transpirasi

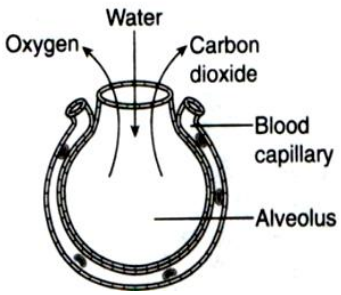
C Translocation
Translokasi

B Excretion
Rembesan

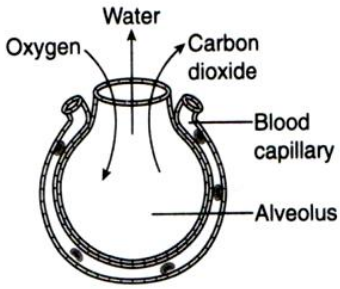
D Support
Sokongan

33 Diagram shows a process of gaseous exchange in the lung .
Which of the following shows what happens during normal breathing?
Rajah menunjukkan proses pertukaran gas dalam peparu
Manakah antara berikut menunjukkan apa yang berlaku semasa pernafasan normal?

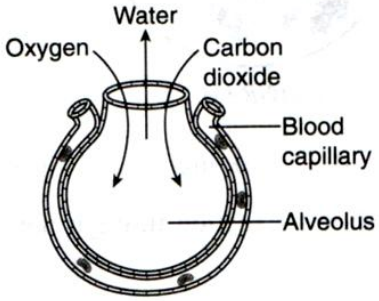
A



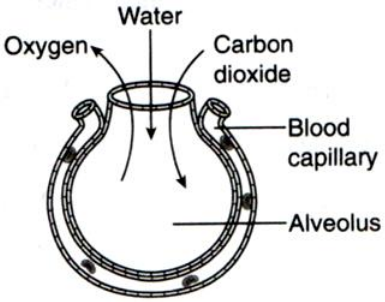
C



B



D



34 Diagram 22 shows the respiratory surface of three organism
Rajah 22 menunjukkan permukaan respirasi bagi tiga organism

Diagram 22
Rajah 22

Which of the following is the adaptation for gaseous exchange common in the three respiratory surfaces?
Manakah antara berikut ialah adaptasi umum bagi pertukaran gas dalam ke tiga –tiga permukaan respirasi tersebut?

A Supported by chitin rings
Disokong oleh gegelang kitin.

B Covered with blood capillaries
Diselaputi oleh kapilari darah.

C Have large surface areas
Mempunyai luas permukaan yang besar

D Have many branches
Mempunyai banyak cabangan

35 Diagram 23 shows the human heart together with the major blood vessels.
Rajah 23 menunjukkan jantung manusia dengan salur-salur darah utama.

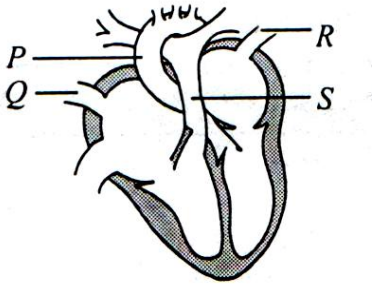


Diagram 23
Rajah 23

Which blood vessels transport deoxygenated blood?
Manakah salur darah yang mengangkut darah terderoksigen.

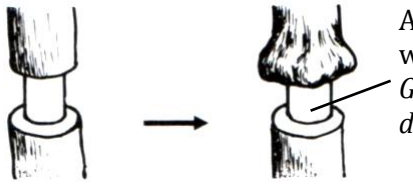
A P and Q only
P dan Q sahaja

B R and S only
R dan S sahaja

C P and R only
P dan R sahaja

D Q and S only
Q dan S sahaja

36 Diagram 24 shows an experiment carried out to study the transport of food substances in a plant.
Rajah 24 menunjukkan suatu eksperimen yang dijalankan untuk mengkaji pengangkutan bahan-bahan makanan dalam tumbuhan.



Before eksperiment
Sebelum eksperimen

After one week
Selepas seminggu

Diagram 24
Rajah 24

A Water is transported from the roots to the leaves.
Air diangkut daripada akar ke daun.

B Ringing has caused the dying of the xylem tissues
Penggelangan telah menyebabkan kematian tisu xylem.

C Ringing has removed all the transport system in the plant
Penggelangan telah menyingkirkan semua sistem pengangkutan dalam tumbuhan.

D Swelling of the trunk is due to the accumulation of food substances above the ring.
Pembengkakan pada batang pokok disebabkan oleh penggumpulan bahan-bahan makanan di bahagian atas gegelang

37 Diagram 25 is a graph showing the changes in the concentration of antibodies in the blood of a student after he was given an antiserum injection.
Rajah 25 menunjukkan graf perubahan kepekatan antibodi dalam darah seorang pelajar selepas diberi suntikan antiserum.

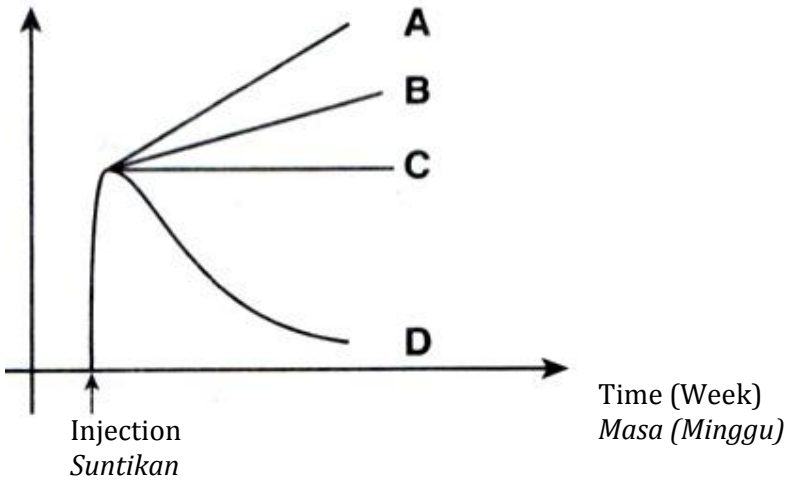


Diagram 25
Rajah 25

Which of the graphs A, B. C and D shows the changes in the concentration of antibodies in the blood after a period of time?
Manakah bagi graf A, B, C dan D menunjukkan perubahan kepekatan antibodi dalam darah selepas suatu tempoh masa tertentu?

38 A student accidently stepped on a rusty nail while playing in a field. He was given an antibodies tetanus injection.
What kind of immunity will he develop?
Seorang pelajar secara tidak sengaja terpijak ke atas paku berkarat semasa bermain di padang. Dia telah diberi suntikan antibodi tetanus.
Apakah jenis keimunan yang dibina?

A Natural active immunity
Keimunan aktif semulajadi

B Artificial active immunity
Keimunan aktif tiruan

C Natural passive immunity
Keimunan pasif semulajadi

D Artificial passive immunity
Keimuanan pasif tiruan

39 Diagram 26 shows two human vertebrae.
Rajah 26 menunjukkan dua vebtebra manusia.

F G

Diagram 26
Rajah 26

Where in the human body are vertebrae F and G located?
Di manakah letaknya vertebra F dan G alam badan manusia?

	Vertebrae F *Vertebra F*	Vertebrae G *Vertebra G*
A	Thorax *torak*	Abdomen *Abdomen*
B	Abdomen *abdomen*	Thorax *Torak*
C	Neck *leher*	Thorax *Torak*
D	Neck *leher*	Abdomen *Abdomen*

40 Diagram 27 shows the structure of synaptic knob.
Rajah 27 menunjukkan struktur bonggol sinap.

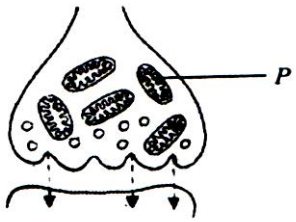


Diagram 27
Rajah 27

What is the function of P?
Apakah fungsi bagi P?

A To secrete neurotransmitters.
Untuk merembeskan neurotransmitter.

B To send impulses to the cell body
Untuk menghantar impul ke sel badan.

C To send impulses to the terminal of the synaptic knob.
Untuk menghantar impul ke hujung bonggol sinap.

D To generate energy to send impulses across the synapse.
Untuk menjana tenaga untuk menghantar impul merentasi sinap

41 Diagram 28 shows the cross section of the human spinal cord.
Rajah 28 menunjukkan keratan rentas saraf tunjang manusia.

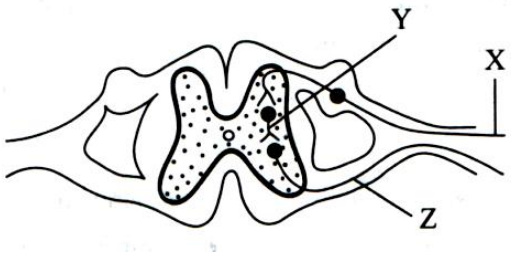


Diagram 28
Rajah 28

Which of the following shows the pathway of the nerve impulse of the reflex action?
Manakah antara berikut menunjukkan laluan impul saraf bagi tindakan reflek?

	Afferent neuron *Neuron eferen*	Interneuron *Neuron perantaraan*	Efferent neuron *Neuron Eferen*
A	X	Y	Z
B	X	Z	Y
C	Z	Y	X
D	Z	X	Y

42 Diagram 29 shows the function of hormones P and Q in regulating the blood glucose level.
Rajah 29 menunjukkan fungsi bagi hormone P dan Q dalam mengawalatur aras glukosa dalam darah.

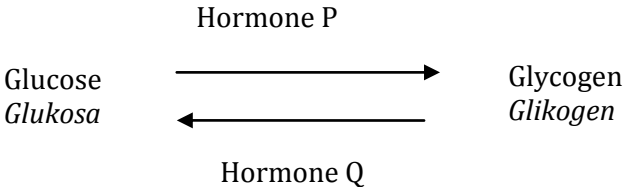


Diagram 29
Rajah 29

Name hormones P and Q
Namakan hormone P dan Q.

	Hormone P *Hormon P*	Hormone Q *Hormon Q*
A	Thyroxine *Tiroksin*	Insulin *Insulin*
B	Insulin *Insulin*	Glucagon *Glukagon*
C	Glucagon *Glukagon*	Thyroxine *Tiroksin*
D	Glucagon *Glukagon*	Insulin *Insulin*

43 Diagram 30 shows the structure of the human brain.
Which part of the brain is responsible for coordination of movement, posture and balance?
Rajah 30 menunjukkan struktur otak manusia.
Bahagian manakah pada otak bertangjungjawab untuk koordinasi bagi pergerakan, postur dan keseimbangan.

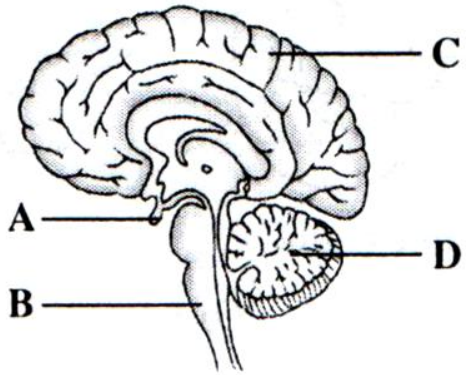


Diagram 30
Rajah 30

44 Diagram 31 shows a female reproductive system.
Rajah 31 menunjukkan sistem pembiakan perempuan

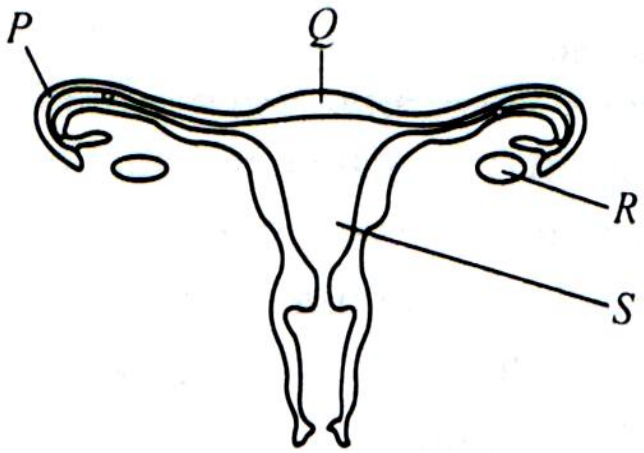


Diagram 31
Rajah 31

In which of the parts does the oogenesis occurs?
Bahagian manakah berlakunya oogenesis?

A P C R
B Q D S

45 Diagram 32 shows the stages in spermatogenesis.
Rajah32 menunjukkan peringkat-peringkat dalam spermatogenesis.

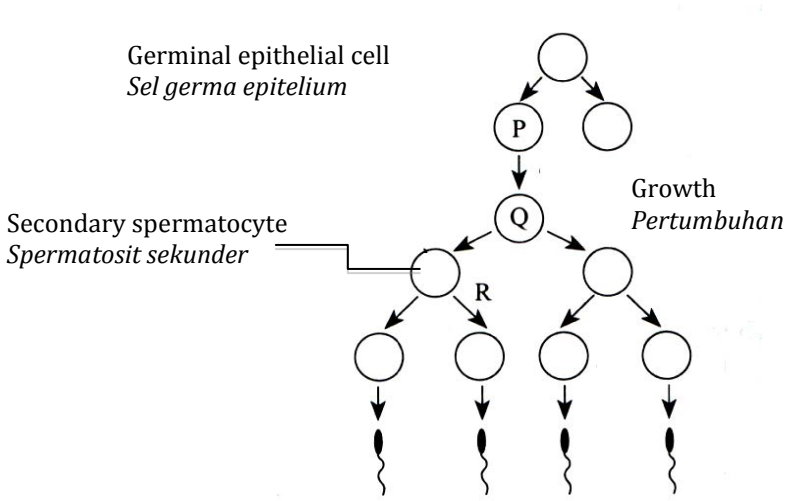


Diagram 32
Rajah 32

State what are represented by P, the correct chromosomal number of Q and the stage of cell division at R.
Nyatakan apakah yang diwakili oleh P, bilangan kromosom yang betul bagi Q dan peringkat pembahagian sel pada R.

	P	Q	R
A	Spermatid *spermatid*	n	Meiosis I *Meiosis I*
B	Spermatogonium *Spermatogonia*	2n	Meiosis II *Meiosis* II
C	Spermatogonium *Spermatogonia*	n	Meiosis II *Meiosis II*
D	Primary spermatocyte *Spermatosit primer*	2n	Meiosis I *Meiosis I*

46 The following statements is about hormone X.
Berikut adalah pernyataan tentang hormon X.

- Produced by corpus luteum and placenta
  Dihasilkan oleh korpus luteum dan plasenta
- Promotes growth of endometrium and prevents menstruation.
  Meransangkan pertumbuhan endometrium dan menghalang haid

What is hormone X?
Apakah hormon X?

A Progesterone
Progesteron

B Oestrogen
Estrogen

C Luteinising hormone
Hormon peluteinan

D Follicle stimulating hormone
Hormon perangsang folikel

47 Diagram 43 shows the ovulation stage in the process of development of follicle in the ovary ofhuman.
Rajah 43 menunjukkan peringkat ovulasi dalam proses perkembangan folikel dalam ovari manusia.

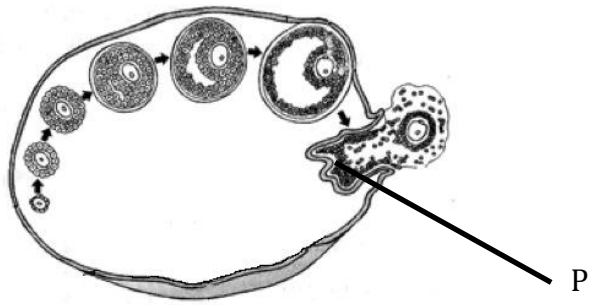


Diagram 43
Rajah 43

What happens to structure P after ovulation ?
Apakah yang berlaku pada struktur P selepas ovulasi?

A Degenerates
Merosot

B Develops into corpus luteum
Berkembang menjadi korpus luteum

C Develops into a secondary follicle
Berkembang menjadi folikel sekunder

D Initiates the production of follicle stimulating hormone (FSH)
Meransang penghasilan hormone peransang folikel (FSH)

48 Diagram 44 shows a karyotype of a person with a genetic abnormality.
Rajah 44 menunjukkan kariotip seorang individu dengan genetik yang tidak normal.

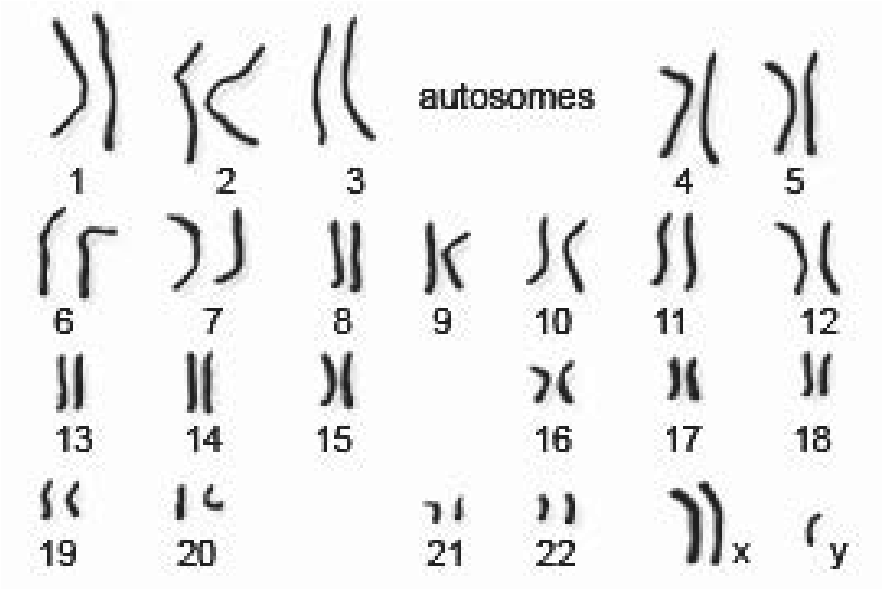


Diagram 44
Rajah 44

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

A Down syndrome
Sindrom Down

B Turner's syndrome
Sindrom Turner

C Hemophiliac male
Lelaki hemophilia

D Klinefelter's syndrome
Sindrom Klinefelter

49 P is a carrier for colour blindness married to Q a normal colour vision.
What is the probability that their son is colour blind?
P adalah pembawa bagi buta warna berkahwin dengan Q yang mempunyai penglihatan warna normal.
Apakah kemungkinan anak lelaki mereka adalah buta warna?

A 0%
B 25%
C 50%
D 100%

50 The following is information about two individuals R and S.
Berikut adalah maklumat tentang dua individu R dan S.

Individual R : Weight 40kg, height 130cm *Individu R : Berat 40kg, tinggi 130cm* Individual S : Weight 80 kg, height 170cm *Individu S : Berat 80 kg, tinggi 170 cm*

Which factors causes the difference in traits for the two individuals?
Faktor manakah yang menyebabkan perbezaan trait bagi kedua-dua individu tersebut?

A Hormone
Hormon

B Mutation
Mutasi

C Genetic and mutation
Genetik dan mutasi

D Environment and genetic
Persekitaran dan genetik

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

INFORMATION FOR CANDIDATES

MAKLUMAT UNTUK CALON

1. This question paper consists of **50** questions.

   Kertas soalan ini mengandungi **40** *soalan.*

2. Answer **all** questions.

   Jawab **semua** *soalan*

3. Each question is followed by four alternative answers, **A**, **B**, **C** and **D**. For each question, choose **one** answer only. Blacken your answer on the objective answer sheet provided.

   Tiap-tiap soalan diikuti oleh empat pilihan jawapan, **A**, **B**, **C** *dan* **D**. *Bagi setiap soalan, pilih* **satu** *jawapan sahaja. Hitam jawapan anda pada kertas jawapan objektif yang disediakan.*

4. If you wish to change your answer, erase the blackened mark that you have made. Then blacken the new answer.

   Jika anda hendak menukar jawapan, padamkan tanda yang telah dibuat. Kemudian hitamkan jawapan yang baru.

5. The diagrams in the questions provided are not drawn to scale unless stated.

   Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.

6. You may use a non-programmable scientific calculator.

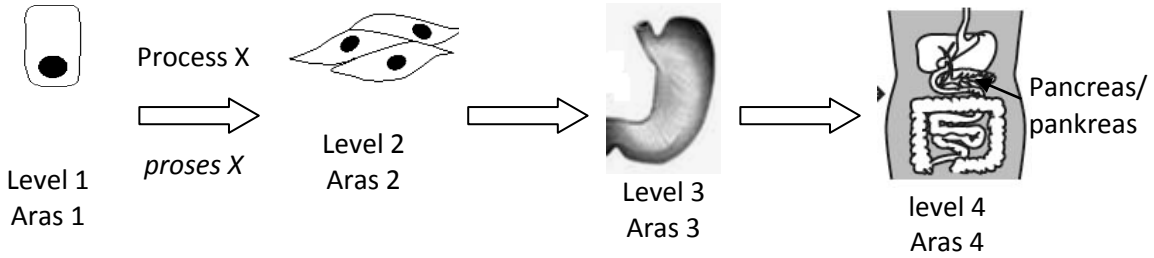
   Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.

Section A
Bahagian A

[60 marks]
[60 *markah*]

Answer **all** questions from this section.
*Jawab s**emua** soalan dalam bahagian ini.*

1 Diagram 1 shows four levels of cell organisation in humans.
Rajah 1 menunjukkan empat aras organisasi sel dalam manusia.



Diagram/ Rajah 1

(a) Complete Table 1 by naming Level 2 and Level 3.
Lengkapkan Jadual 1 *dengan menamakan Aras* 2 *dan Aras* 3.

Level / *Aras*	**Name /** *Nama*
1	Cells
2	……
3	……
4	System

[2 marks/ markah]

(b) (i) The cell undergo process X to become specific cells that perform a specific function.
Name process X.
Sel-sel itu melalui proses X untuk menjadi sel khusus yang menjalankan fungsi yang khusus.
Namakan proses X

Process X / *Proses X :* ……

[1 mark/ markah]

(ii) Based on the diagram 1 ,what is the function of the structure in level 2?
Berdasarkan Rajah 1, apakah fungsi struktur dalam aras 2?

……

……

[2 marks/ markah]

(iii) Name the system in level 4.
Namakan sistem dalam aras 4

……

[1 mark/ markah]

(c) Pancreas is one of the organ in the system. Explain how pancreas reacts in the regulation of the glucose content in human blood.
Terangkan bagaimana tindakan pankreas terhadap kawal atur kandungan glukosa dalam darah manusia.

……

……

……

……

……

……

[4 marks/ markah]

(d) (i) A man found his urine contain sugar when tested with Benedict solution
Seorang lelaki telah mendapati air kencingnya mengandungi gula dalam ujian dengan larutan benedict

State the health problem faced by the man.
Nyatakan masalah kesihatan lelaki tersebut.

……

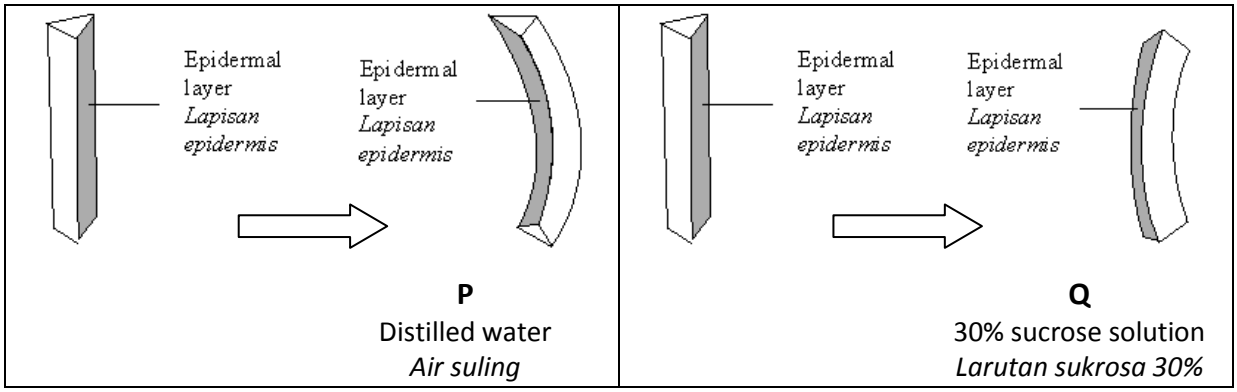
[1 mark/ markah]

(ii) Suggest the action need to be taken by the man to overcome his health problem in (d) (i)
Cadangkan satu tindakan perlu diambil oleh lelaki tersebut untuk mengatasi masalah Kesihatannya dalam (d) (i)

……

[1 mark/ markah]

2 Diagram 2.1 shows two strips of mustard green stem after 20 minutes immersed into two different solutions P and Q.
Rajah 2.1 menunjukkan dua jalur batang sawi selepas 20 minit direndam di dalam dua larutan yang berbeza, iaitu P dan Q.



Diagram/ Rajah 2.1

(a) Based on diagram 2.1 ,
Berdasarkan rajah 2.1 ,

(i) State the type of solution Q.
Nyatakan jenis larutan Q.

……

[1 mark/ markah]

(ii) Explain how solution Q affects the condition of the cells in the strip of mustard green.
Terangkan bagaimana larutan Q mempengaruhi keadaan sel di dalam jalur sawi

……

……

[2 marks/ markah]

(iii) If strip from the solution Q is transferred into solution P, explain what will happen to the cells in the strip after 20 minutes
Jika jalur dari larutan Q dipindahkan ke dalam larutan P, terangkan apa yang akan berlaku kepada sel dalam jalur tersebut selepas 20 minit.

……

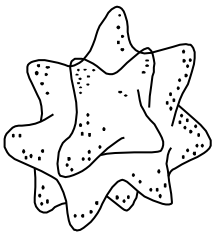
……

……

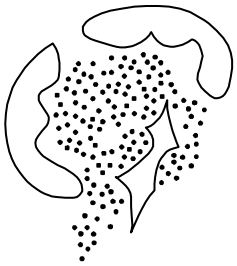
……

[3 marks/ markah]

(b) Diagram 2.2 shows the red blood cells in different concentrations of solutions.
Rajah 2.2 menunjukkan sel darah merah di dalam larutan yang berlainan kepekatan.



Red blood cells X in 3% sodium chloride solution after 30 minutes
Sel darah merah X dalam larutan natrium klorida 3% selepas 30 minit



Red blood cells Y in 0.1% sodium chloride solution after 30 minutes
Sel darah merah Y dalam larutan natrium klorida 0.1% selepas 30 minit

Diagram/Rajah 2.2

Explain the differences between the process experienced by the red blood cell X and Y after being immersed in the respective solution for half an hour.
Terangkan perbezaan di antara proses yang dialami oleh sel darah merah X dan Y setelah direndam dalam larutan masing-masing selama 30 minit.

……

……

……

……

[3 marks/ markah]

(c) Vinegar is a natural preservative that can be used to preserve fruits and vegetables to be kept longer. Explain how the vinegar is effective in the preservation of mangoes.
Cuka adalah pengawet semulajadi yang boleh digunakan untuk mengawet buah-buahan dan sayur-sayuran untuk tahan lama. Terangkan bagaimana cuka adalah berkesan dalam pengawetan buah mangga.

……

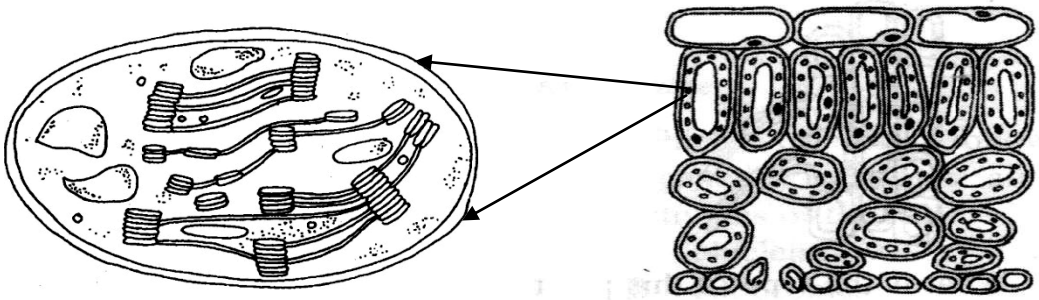
……

……

……

[3 marks/ markah]

3. Diagram 3.1(a) shows the structure of organelle P which is found in most plant cells and diagram 3.1(b) shows a cross section of leaf.
Rajah 3.1(a) menunjukkan organel P yang ditemui dengan banyaknya dalam kebanyakan sel-sel tumbuhan dan gambarajah 3.1(b) menunjukkan keratan rentas daun.



Organelle P

Cross section of leaf
Keratan rentas daun

Diagram 3.1(a)
Gambarajah 3,1(a)

Diagram 3.1 (b)
Gambarajah 3.1(b)

(a) (i) Name organelle P
Namakan organel P

.....

[1 mark / *markah*]

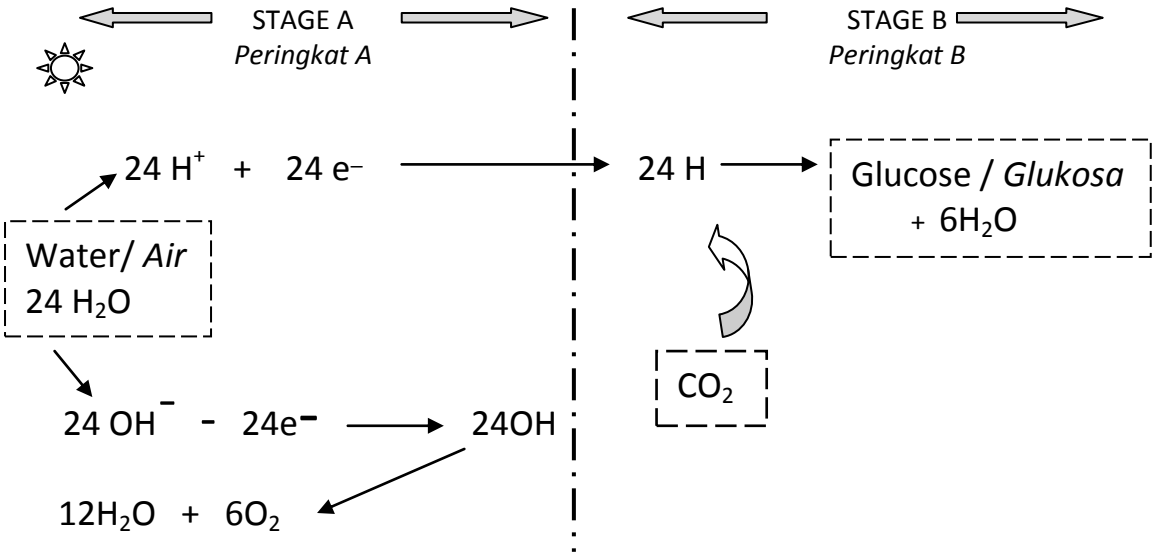
(ii) Based on diagram 3.1(b), state two types of cells where organelle P can be found abundantly.
Berdasarkan gambarajah 3.1 (b), nyatakan dua jenis sel di mana organel P dapat ditemui dengan banyaknya.

1. .....

2. .....

[2 marks / *markah*]

(b) Diagram 3.2 shows two stages of the reaction that occur in the photosynthesis process.
Gambarajah 3.2 menunjukkan dua peringkat bagi tindakbalas yang berlaku dalam proses fotosintesis.



Diagram/ Rajah 3.2

(i) Name stage A and B
Namakan peringkat A dan B.

A: .....

B: .....

[2 marks / *markah*]

(ii) Name the part of the organelle P where stage A and B take place?
Namakan bahagian dalam organel P di mana tindakbalas A dan B berlaku?

A: .....

B: .....

[2 marks / *markah*]

(iii) Explain the process that occurs in stage A.
Terangkan proses yang berlaku dalam peringkat A.

.....

.....

.....

[2 marks / *markah*]

(c) State one importance of photosynthesis in the balance of nature.
Nyatakan satu kepentingan fotosintesis dalam keseimbangan alam.

.....

.....

[1 mark / *markah*]

(d) Explain how the problem of air pollution can affect the rate of photosynthesis.
Terangkan bagaimana masalah pencemaran udara boleh memberi kesan kepada kadar fotosintesis

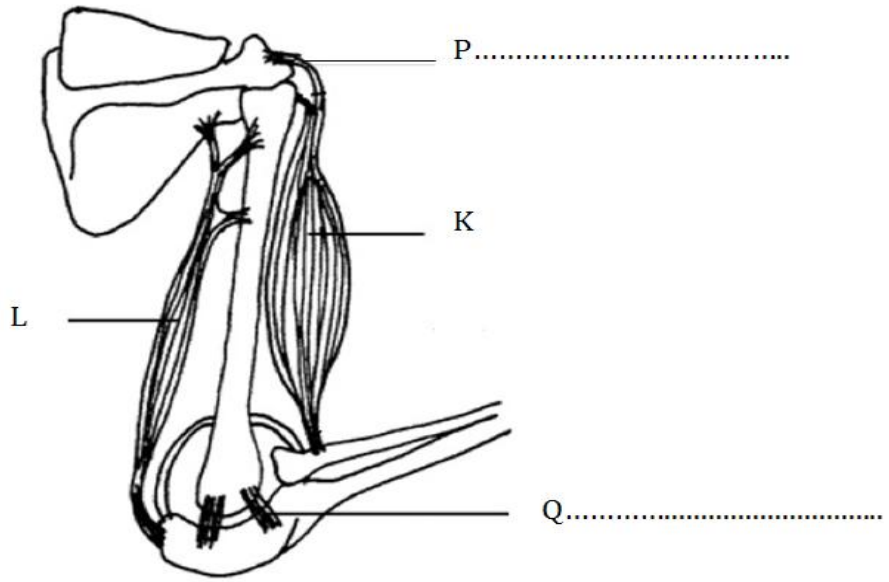
.....

.....

.....

[2 marks / *markah*]

4 Diagram 4 shows a human forearm with a pair of antagonistic muscles K and L.
Rajah 4 menunjukkan lengan manusia dengan sepasang otot K dan L yang bersifat antagonistik .



Diagram/ Rajah 4

(a) (i) On Diagram 4, label structure P and Q.
Label struktur P dan Q pada Rajah 4.

[2 marks / *markah*]

(ii) State **one** function of Q.
*Nyatakan **satu** fungsi Q.*

.....

[1 mark / *markah*]

(b) Describe how the characteristic of P is adapted for its function as stated in (a)(ii).
Huraikan bagaimana ciri P disesuaikan untuk menjalankan fungsi yang dinyatakan dalam (a) (ii).

.....

.....

.....

[2 marks / *markah*]

(c) What happen is tissue P is torn?
A*pakah kesannya apabila tisu P terkoyak?*

.....

[1 mark / *markah*]

(d) Muscle K and L works in pairs to allow movement of the skeletal joints.
Otot K dan L merupakan pasangan otot yang membantu dalam pergerakan sendi.

(i) Name K and L.
Namakan K dan L.

K : ……

L: ……

[2 marks / *markah*]

(ii) Explain how these muscle works together to bend the arm
Terangkan bagaimana otot ini berfungsi untuk membengkokkan tangan.

……

……

……

[2 marks/ markah]

(e) Draw structures K and L when the arm is straightened.
Lukis struktur K dan L apabila lengan diluruskan.

[2 marks/ markah]

5 Diagram 5 shows the structure of a nephron.
Rajah 5 menunjukkan satu nefron

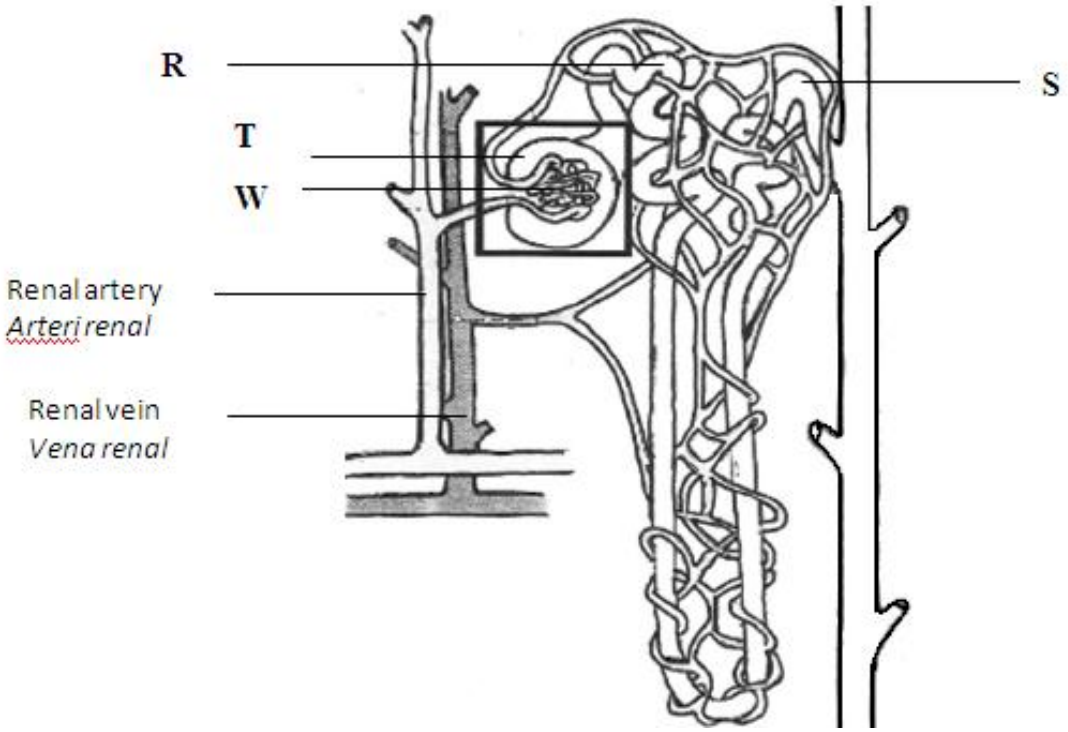


Diagram 5/Rajah 5

(a) Explain the process that occurs at W.
Terangkan proses yang berlaku di W.

.....

.....

.....

.....

[3 marks/markah]

(b) Certain substances such as plasma protein and erythrocyte are absent in T.
Explain why?
Sesetengah bahan seperti protein plasma dan eritrosit tiada di T.
Terangkan mengapa?

.....

[1 marks/markah]

(c) Table 5(a) and table 5(b) shows the filtrate content in R and S between two different patients.
Jadual 5(a) dan 5(b) menunjukkan kandungan hasil turasan antara R dan S bagi dua pesakit yang berbeza

Patient/pesakit A		
Filtrate content *Kandungan hasil turasan*	Concentration of filtrate content(%) *Kepekatan kandungn hasil turasan*	
	R	S
Glucose/*glukosa*	0.1	0
Amino Acid/*asid amino*	8.0	20.0
Water/*air*	90.0	95.0
Mineral salt/*garam*	1.87	2.65
Urea/*urea*	0.03	2.00

Table 5 (a)
Jadual 5(a)

Patient/pesakit B		
Filtrate content *Kandungan hasil turasan*	Concentration filtrate content(%) *Kepekatan kandungan hasil turasan*	
	R	S
Glucose/*glukosa*	0.10	13.00
Amino Acid/*asid amino*	0.05	0.00
Water/*air*	70.0	98.0
Mineral salt/*garam*	0.72	1.50
Urea/*urea*	0.03	2.00

Table 5(b)
Jadual 5(b)

(i) Based on the table , state the health condition of both patients.
Berdasarkan jadual, nyatakan keadaan kesihatan antara kedua-dua pesakit.

Patient / pesakit A :

……..

Patient / pesakit B:

……

[2 marks/markah]

(ii) Based on the answer on (c)(i), give your reason.
Berdasarkan kepada jawapan di (c)(i), berikan alasan anda.

……

……

……

[2 marks/markah]

(iii) Based to table 5(a), explain why there is a difference in the concentration of urea between R and S
Merujuk kepada jadual 5(a),terangkan mengapa terdapat perbezaan kepekatan urea di antara R dan S

……

……

……

[2 marks/markah]

(d) Patient B is addicted to coffee. Coffee contains the drugs caffeine which inhibits the release of ADH.
Decribe briefly the effect of drinking coffee on the volume and concentration of urine produced.
Pesakit B ketagih dengan minuman kopi. Kopi mengandungi dadah kafein yang merencat perembesan ADH.
Huraikan dengan ringkas kesan meminum kopi ke atas isipadu dan kepekatan air kencing yang dihasilkan

……

……

……

[2 marks/markah]

Section B
Bahagian B

[40 marks]
[*40 markah*]

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

6 (a) Diagram 6.1 shows the growth process of a plant.
Rajah 6.1 menunjukkan proses pertumbuhan pada tumbuhan

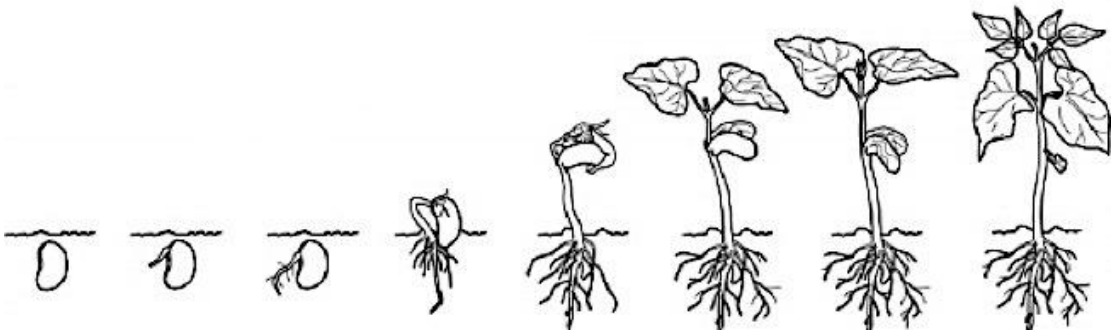


Diagram 6.1 / *Rajah 6.1*

Base on the diagram 6.1, describe the process briefly.
Berdasarkan Rajah 6.1, terangkan proses ini secara ringkas.

[4 marks/ markah]

(b) Diagram 6.2 shows the stages of secondary growth in a dicotyledonous stem.
Rajah 6.2 menunjukkan peringkat pertumbuhan sekunder di dalam batang dikotiledon.

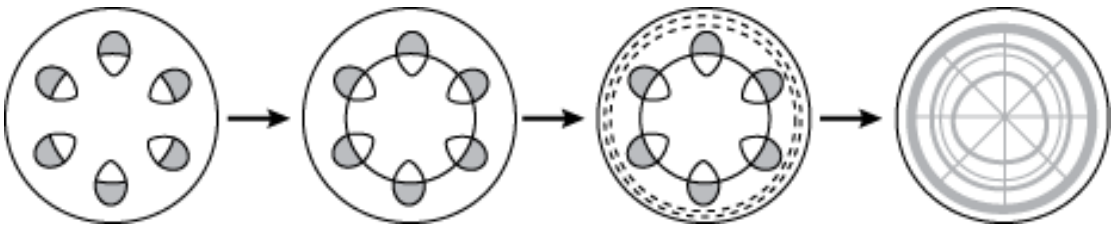


Diagram 6.2 /*Rajah 6.2*

(i) Describe the stages and the processes of secondary growth in a dicotyledonous stem.
Huraikan peringkat dan proses pertumbuhan sekunder dalam batang dikotiledon

[8 marks/*markah*]

(ii) What are the advantageous for plants to undergo secondary growth?
Discuss the importance of secondary growth.
Apakah kebaikan untuk tumbuhan mengalami pertumbuhan sekunder? Bincangkan kepentingan pertumbuhan sekunder.

[8 marks/*markah*]

7. Diagram 7.1 shows the blood group of a married couple and their offspring.
The couple has three boys and one girl but all of them have different types of blood group.

Rajah 7.1 menunjukkan jenis kumpulan darah bagi satu keluarga. Pasangan tersebut mempunyai tiga anak lelaki dan seorang anak perempuan dengan kumpulan darah yang berbeza.

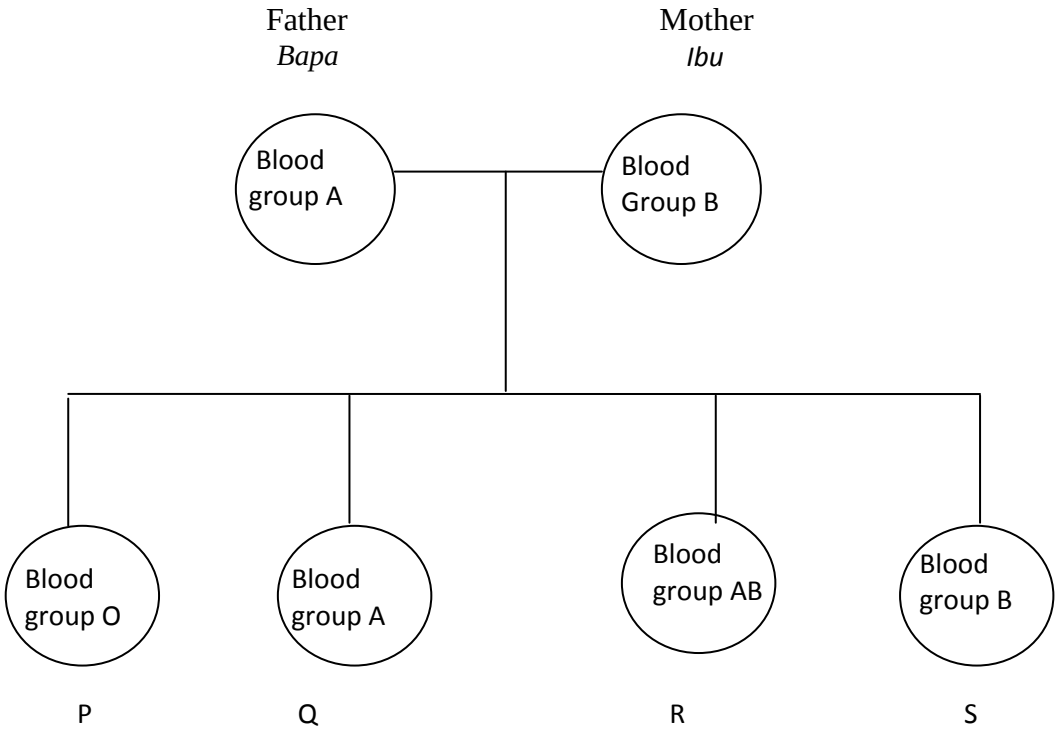


Diagram 7.1
Rajah 7.1

(a) State the alleles that determine the ABO blood group.
Nyatakan alel-alel yang menentukan kumpulan darah ABO.

[2 marks / *markah*]

(b) Based on Mendel's First Law , with the help of Punnet square schematic diagram , explain why the blood of each member in the family is different

Berdasarkan Hukum Mendel yang pertama dan dengan bantuan rajah segiempat Punnet, terangkan kenapa setiap ahli dalam keluarga tersebut mempunyai jenis darah yang berbeza.

[4 marks / markah]

(c) Male offspring P lost plenty of blood during an accident. He needs to replace the blood lost. Explain why her parents are not suitable donors to offspring P.

Anak lelaki P kehilangan banyak darah dalam satu kemalangan. Beliau perlu menggantikan darah yang hilang.
Terangkan mengapa ibubapanya bukan penderma yang sesuai kepada anak P.

[4 marks / *markah*]

(d) Colour blindness is a defect in which the person cannot distinguish red and green colours. It is a sex-linked disease which can be inherited.
A normal man has a wife who is a carrier of colour blindness.
With the help of a schematic diagram, explain the possibility genetic combination (phenotype) of their children to inherit colour blindness

Buta warna ialah satu kecacatan di mana seseorang itu tidak dapat membezakan warna merah dan hijau. Ia merupakan penyakit gen terangkai seks yang boleh diwarisi.
Seorang lelaki normal mempunyai seorang isteri pembawa buta warna.
Dengan bantuan rajah skematik , terangkan kemungkinan kombinasi genetic (fenotip) untuk anak mereka mewarisi buta warna

[10 marks / *markah*]

8 (a) Photosynthesis occurs in two stages which are the light reaction and dark reaction.
Describe the differences between the light reaction and dark reaction.
Fotosintesis berlaku dalam dua peringkat tindak balas cahaya dan tindak balas gelap.
Huraikan perbezaan antara tindak balas cahaya dan tindak balas gelap.

[4 marks/ markah]

(b) In countries with four seasons, plants are grown in greenhouses.
Diagram 8.1 shows plants grown in a greenhouse.
Dalam negara empat musim, tanaman ditanam di dalam rumah kaca.
Rajah 8.1 menunjukkan tanaman yang ditanam dalam rumah hijau

Diagram / Rajah 8.1

Based on the statement, explain how this method enable the continuous production of crops throughout the year.
Berdasarkan pernyataan ini, terangkan bagaimana kaedah ini membolehkan pengeluaran hasil tanaman yang berterusan sepanjang tahun.

[6 marks/ markah]

(c) Diagram 8.2 shows a few examples of processed food.

Rajah 8.2 menunjukkan beberapa contoh makanan diproses.

Diagram / Rajah 8.2

Discuss the good effects and bad effects of processed food in our daily life.

Bincangkan kesan-kesan baik dan buruk makanan diproses dalam kehidupan harian kita.

[10 marks/ markah]

9 (a) A group of farmers planned to develop an agriculture farm nearby a lake.
Besides obtaining a high agriculture yield, they suggested that the area can also be made into an eco-tourism centre. Details of their planning are listed as follow:

Sekumpulan peladang merancang membangunkan ladang pertanian berhampiran sebuah tasik. Selain mendapatkan hasil pertanian, mereka bercadang untuk membangunkan satu pusat eco- perlancongan. Butir – butir perancangan mereka adalah seperti di bawah:

Type of plants /*Jenis Tanaman*	: Strawberry and rose plant / *Strawberi dan bunga ros.*
Location/ *Lokasi*	: Near a natural lake/ *Berhampiran tasik semulajadi.*
Type of fertilisers used: *Jenis baja yang digunakan:*	Compost, lead nitrate salt, potassium nitrate, magnesium nitrate and phosphate. *Baja kompos, garam nitrat, potasium nitrat, magnesium nitrat dan fosfat.*

Berdasarkan maklumat di atas, terangkan kesan ke atas tasik ini akibat pengurusan yang tidak terancang.

[10 marks/ markah]

(b) Diagram 9 shows one phenomenon in the ecosystem due to an unplanned development.
Rajah 9 menunjukkan satu fenomena dalam ekosistem yang disebabkan oleh pembangunan yang tidak terancang

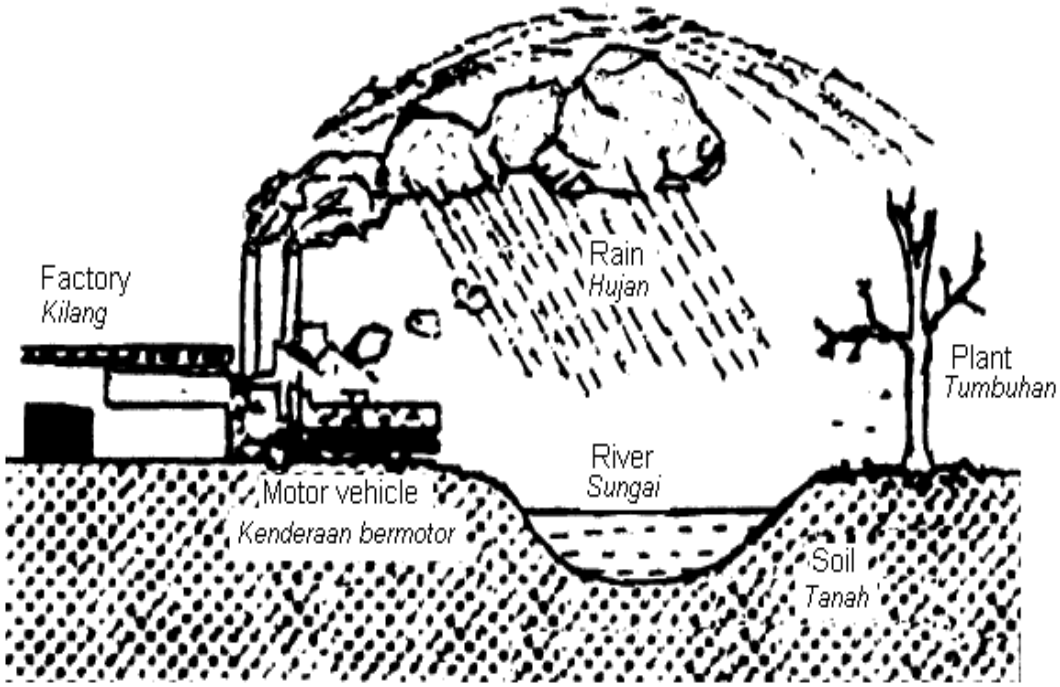


Diagram /Rajah 9

(i) Based on the Diagram 9, name the phenomenon and explain how it occurs.
Berdasarkan Rajah 9 ,namakan fenomena dan terangkan bagaimana ia berlaku.

[4 marks/markah]

(ii) Describe the effect s of the phenomenon on agriculture and aquatic ecosystem
Huraikan kesan fenomena tersebut ke atas pertanian dan ekosistem akuatik

[6 marks/markah]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

Answer **all** *the questions*
Jawab ***semua*** *soalan*

1 An experiment is carried out to study the effect of concentration of nutrients on yeast activity.
Diagram 1.1 shows the method used by the students.
The initial height of the coloured liquid in the manometer is shown in Diagram 1.2.
The experiment was repeated using different concentrations of glucose. Table 1.1 shows the results of the experiment after 10 minutes.

Satu eksperimen telah dijalankan untuk mengkaji kesan kepekatan nutrien ke atas aktiviti yis.
Rajah 1.1 menunjukkan kaedah yang dilakukan oleh pelajar-pelajar tersebut.
Bacaan awal cecair berwarna dalam tiub manometer ditunjukkan seperti Rajah 1.2.
Eksperimen ini diulang dengan menggunakan kepekatan glukosa yang berbeza. Jadual 1.1 menunjukkan keputusan eksperimen selepas 10 minit.

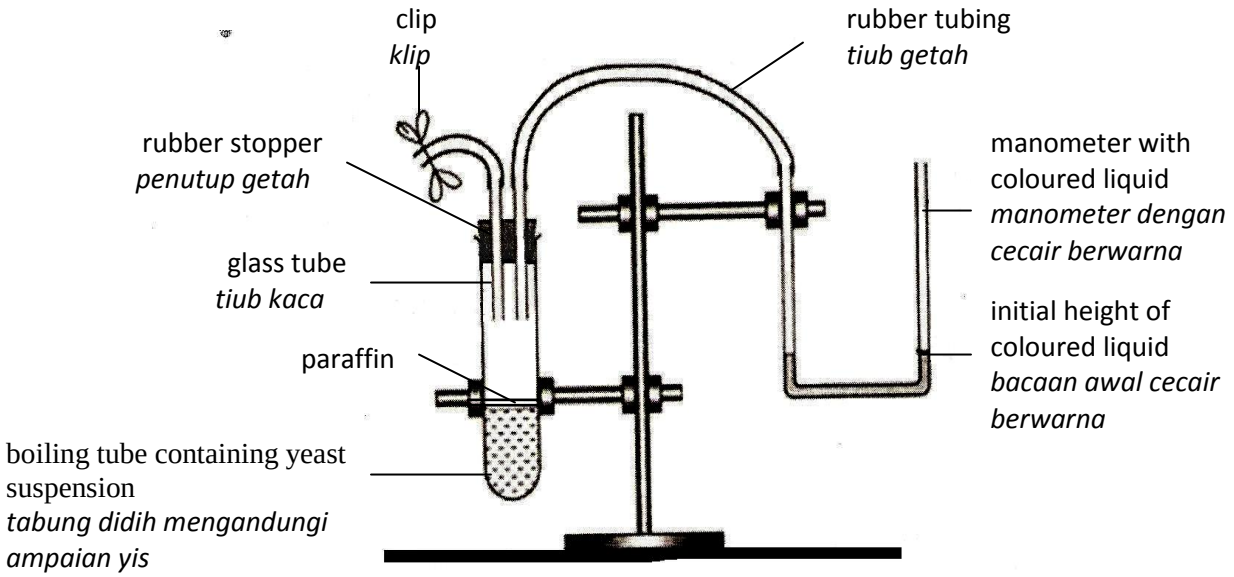


Diagram 1.1
Rajah 1.1

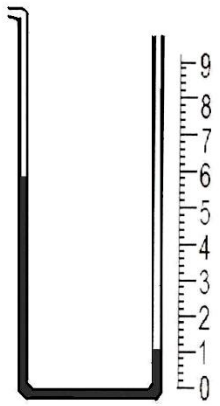


Diagram 1.2

Rajah 1.2

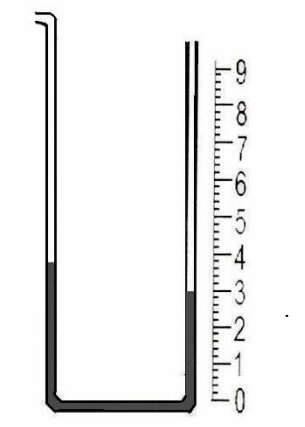
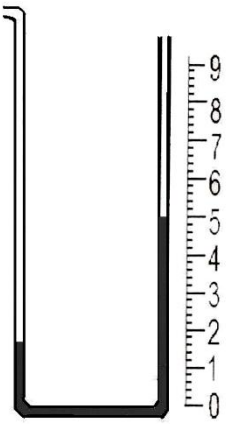
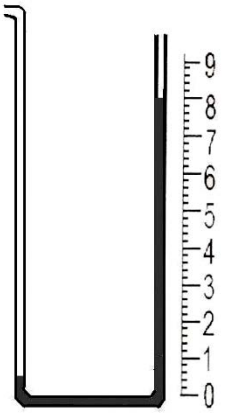
Percentage concentration of glucose *Peratus kepekatan glukosa / %*	**Final height of coloured liquid in the manometer** *Bacaan akhir cecair berwarna dalam manometer /cm*
10	
15	
20	

Table 1.1

Jadual 1.1

a) (i) Based on Table 1.1, state **two** observations .
*Berdasarkan Jadual 1.1, nyatakan **dua** pemerhatian.*

Observation 1 : .....
Pemerhatian 1:
.....

.....

Observation 2 : .....
Pemerhatian 2
.....

.....

[3 *marks/ markah*]

(ii) State the inferences which correspond to the observations in **1**(a)(i).
*Nyatakan inferen yang sepadan dengan pemerhatian di **1**(a)(i)*

Inference from observation 1 : .....
Inferen daripada pemerhatian 1:
.....

.....

Inference from observation 2 : .....
Inferen daripada pemerhatian 2:
.....

.....

[3 *marks/ markah*]

(b) Using the information provided in Table 1.1, complete Table 1.2 by recording the height of coloured liquid in the manometer after 10 minutes.
Menggunakan maklumat dalam Jadual 1.1, lengkapkan Jadual 1.2 dengan merekodkan jarak kenaikan cecair berwarna selepas 10 minit.

Percentage concentration of glucose *Peratusan kepekatan glukosa / %*	The height of coloured liquid *Bacaan akhir cecair berwarna /cm*
10	
15	
20	

Table 1.2
Jadual 1.2

[3 *marks/ markah*]

(c) (i) Complete Table 1.3 for the three variables based on the experiment.
Lengkapkan Jadual 1.3 bagi ketiga-tiga pembolehubah berdasarkan eksperimen ini.

Variable ***Pembolehubah***	**Method to handle the variable** ***Cara mengendali pembolehubah***
Manipulated variable: *Pembolehubah dimanipulasi :*	....
Responding variable: *Pembolehubah bergerakbalas*	....
Controlled variable : *Pembolehubah dimalarkan :*	....

Table 1.3
Jadual 1.3

[3 *marks* / markah]

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

yeast , metre rule, coloured liquid, electronic balance, glucose solution, measuring cylinder *yis , pembaris, cecair berwarna , penimbang elektronik , larutan glukosa, silinder penyukat*

Complete Table 1.4 by matching each variable with the apparatus and materials used in the experiment.
Lengkapkan Jadual 1.4 dengan memadankan setiap pembolehubah dengan radas dan bahan yang digunakan dalam eksperimen ini.

Variables ***Pembolehubah***	**Apparatus** ***Radas***	**Materials** ***Bahan***
Manipulated ***Dimanipulasi***	.....	.....
Responding ***Bergerakbalas***	.....	.....
Controlled ***Dimalarkan***	.....	.....

Table 1.4
Jadual 1.4

[3 *marks/ markah*]

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

.....

.....

.....

.....

[3 *marks / markah*]

(e)(i) Based on Table 1.1, construct a table and record the results of the experiment which includes the following aspects:
Berdasarkan Jadual 1.1, bina satu jadual dan rekodkan keputusan eksperimen yang meliputi aspek-aspek berikut :

- Percentage concentration of glucose
  Peratusan kepekatan larutan glukosa

- The rate of the yeast activity
  Kadar tindakbalas aktiviti yis

[3 *marks/ markah*]

(ii) Draw a graph of the rate of the activity of yeast against the concentration of glucose.
Lukis graf kadar tindak balas aktiviti yis melawan kepekatan glukosa.
[3 *marks / markah*]

(iii) Explain the relationship between the rate of the activity of yeast and the concentration of glucose based on the graph in **1**(e)(ii).
*Terangkan hubungan antara kadar tindak balas aktiviti yis dan kepekatan glukosa berdasarkan graf di **1**(e)(ii)*

.....

.....

.....

.....

.....

[3 *marks/ markah*]

(f) Based on the experiment, define operationally respiration of the yeast.
Berdasarkan ekperimen ini, definisikan respirasi yis secara operasi .

.....

.....

.....

[3 *marks/ markah*]

(g) The experiment is repeated by using the apparatus set up in Diagram 1.3 with 10% glucose. 1 ml of 0.1 mol dm^{-3} of sodium hydroxide solution is added into the boiling tube. The experiment is left for 10 minutes.
Eksperimen ini diulang dengan menggunakan radas seperti Rajah 1.3 dengan kepekatan glukosa 10%. 1 ml larutan natrium hidroksida 0.1 mol dm^{-3} ditambahkan ke dalam tabung didih. Eksperimen ini dibiarkan selama 10 minit.

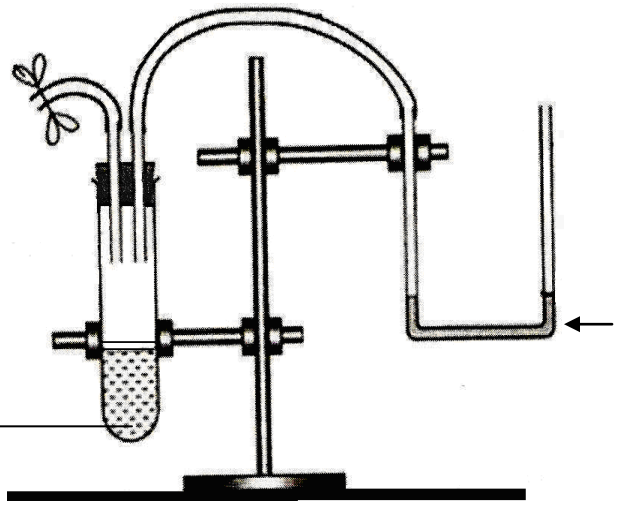
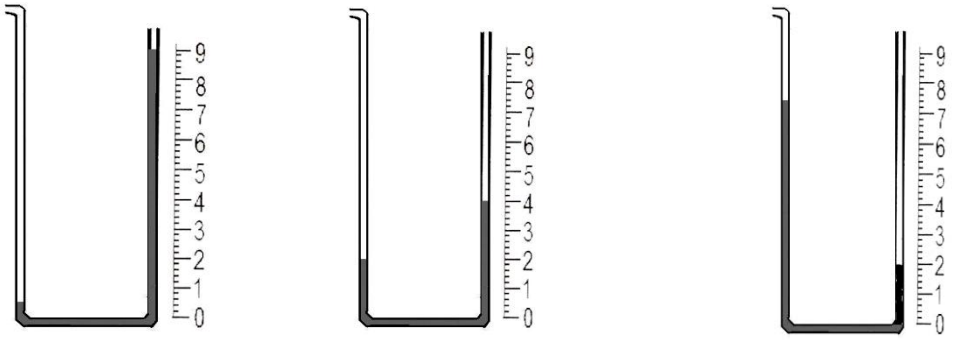


Diagram 1.3
Rajah 1.3

P , Q and R are three possible observations . Choose **one** correct observation and explain your choice.
*P, Q dan R adalah tiga kemungkinan pemerhatian. Pilih **satu** pemerhatian yang betul dan terangkan pilihan anda.*



P Q R

.....

.....

.....

[3 *marks / markah*]

2. Multicellular organisms are bigger and complex. The cells cannot depend on diffusion alone to obtain its requirements. Multicellular organisms need the transport system to transport respiration gaseous and nutrient to the inner part of the body. Whereas, unicellular organisms get their gaseous and nutrients supply by diffusion through their cell membrane because their total surface area per volume are big.

Based on the above information, plan a laboratory experiment to study the relationship between the size of organisms and the rate of diffusion.

The planning of your experiment must include the following aspects:

Organisma multisel adalah besar dan kompleks. Sel-sel tidak boleh bergantung kepada proses resapan sahaja untuk mendapatkan keperluannya. Oganisma multisel memerlukan sistem pengangkutan untuk mengangkut gas-gas respirasi dan bahan nutrien ke bahagian dalam seluruh tubuhnya. Manakala, organisma unisel mendapatkan bekalan gas repirasi dan bekalan nutriennya secara resapan menerusi membran sel kerana jumlah luas permkaan per isipadunya yang besar.

Berdasarkan maklumat diatas, reka bentuk satu eksperimen makmal untuk menentukan hubungan antara saiz organism dan kadar resapan.

Perancangan eksprimen anda hendaklah meliputi aspek-aspek berikut:

- Problem statement
  Pernyataan masalah

- Hypothesis
  Hipotesis

- Variables
  Pembolehubah

- List of apparatus and materials
  Senarai radas dan bahan

- Experimental procedure
  Prosedur eksperimen

- Presentation of data
  Persembahan data

[17 marks/markah]

END OF QUESTIONS
KERTAS SOALAN TAMAT

SKEMA BIOLOGI KERTAS 1 2013

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

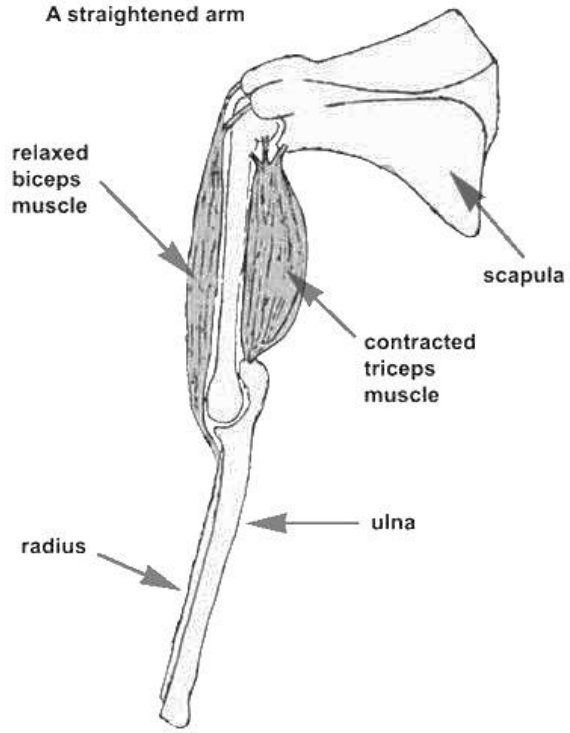
SKEMA KERTAS 2 BIOLOGI SET 2

QUESTION NO			MARKING CRITERIA	SUB MARKS	TOTAL MARKS
1	(a)		Level 2 : Tissue Level 3 : Organ	1 1	2
	(b)	(i)	Differentiation / specialization process	1	1
		(ii)	Contract and relax to produce peristaltic movement along the digestive tract	1 1	2
		(iii)	Digestive system	1	1
	(c)		- When the level of glucose high - detected by pancreas - Cells in pancreas secrete insulin - Excess glucose converted to glycogen - Glycogen store in the liver - Glucoce level in blood decrease/ back to normal level OR - When the level of glucose low - detected by pancreas - Cell in the pancreas secrete glucagon - Glucagon stimulates glycogen (in liver/muscles) convert to glucose -Glucose level in blood decrease/back to normal	1 1 1 1 1 1 1 1 1 1 1	Any 4 OR 4
	(d)	(i)	Diabetes mellitus/ diabetes/ kencing manis	1	1
		(ii)	Reduce /less intake of carbohydrates/ sugar Inject insulin	1	1
			TOTAL		12

QUESTION NO			MARKING CRITERIA	SUB MARKS	TOTAL MARKS
2	(a)	(i)	Hypertonic solution	1	1
		(ii)	P1: 30% sucrose solution/ solution in beaker Q is hypertonic compare to the cell sap P2: water molecules diffuse out from the vacuole P3: by osmosis. P4: Both vacuole and cytoplasm shrink // the plasma membrane pulls away from the rigid cell wall // the cells become flaccid, plasmolysis occurs	1 1 1 Any 2	Max 2
		(iii)	P1: distilled water/ solution in beaker P is hypotonic compare to the cell sap P2: water molecules diffuse into the vacuole/ cell sap P3: by osmosis P4: vacuole expand and swell up // plasma membrane pushes against the rigid cell wall P5: flaccid cell becomes fully turgid again P6: the cells is said to have undergone deplasmolysis	1 1 1 1 1	Max 3

				Any 3	
	(b)		**Red blood cell X** / **Red blood cell Y** D1: The red blood cell undergoes crenation. / D1: The red blood cell undergoes haemolysis. D2: The solution is hypertonic compare to the cytoplasmic of the red blood cell / D2: The solution is hypotonic compare to the cytoplasmic of the red blood cell D3: Water diffused out from red blood cell by osmosis / D3: Water diffused into red blood cell by osmosis. D4: Red blood cell shrivels. / D4: The red blood cell expands and bursts. Any 3 completed comparison	1 1 1 1	Max 3
	(c)		P1: Fruit/ mangoes are immersed in vinegar which has a low pH/ acidic P2: Vinegar diffuses into the tissues of the mangoes/ fruit P3: The tissues of mangoes/ fruits become acidic P4: The low pH prevent bacterial growth in the tissues/ mangoes/ fruits P5: This prevents decay of the fruits/ mangoes Any 3	1 1 1 1 1	Max 3
				Total	12

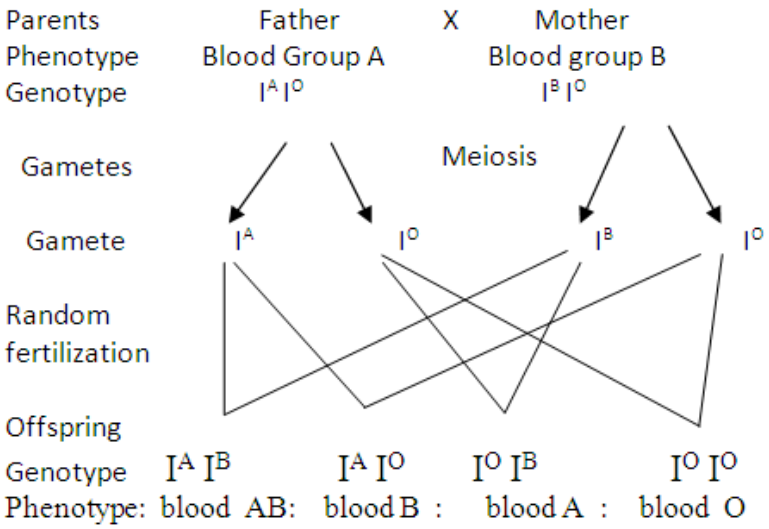
QUESTION NO			MARKING CRITERIA	SUB MARKS	TOTAL MARKS
3	(a)	(i)	Chloroplast	1	1
		(ii)	1. Palisade mesophyl	1	
			2. Spongy mesophyl	1	2
	(b)	(i)	A: Light reaction	1	
			B: Dark reaction	1	2
		(ii)	A: Grana / Granum	1	
			B: Stroma	1	2
		(iii)	Photolysis of water	1	
			Splitting/breaking of water molecule to form hydrogen ions and hydroxyl ions.	1	
			By energy		
			Hydroxyl groups combine to form water and oxygen gas.	1	
			Any two		2
	(c)		Provide food for animals and mans.		
			Replaces oxygen in the atmosphere		
			Maintain the percentage of oxygen and carbon in atmosphere		
			Any one		1
	(d)		- Particles (soot and dust) from polluted air accumulate on the leaf surface / cover the stomata	1	
			- The particles reduce light intensity / gaseous exchange	1	
			- Thereby reducing the rate of photosynthesis.	1	
			Any 2		2
			Total		12

QUESTION NO			MARKING CRITERIA	SUB MARKS	TOTAL MARKS
4	(a)	(i)	P : Tendon Q : Ligamen	1 1	2
		(ii)	connect bone to bone	1	1
	(b)		Q1 - Ligaments are flexible/strong/elastic connective tissue Q2- permits limited movement so that bones are not dislocated	1 1	2
	(c)		P1 - Muscle is not connected to bone. P2 – no movement/pain when moved	1 1	1
	(d)	(i)	K : biceps L : triceps	1 1	2
		(ii)	P1 - Biceps muscle contracts / triceps muscle relaxes P2 – Contraction of biceps will pull the ulna up	1 1	2
	(e)				
			P1 - muscle – biceps thinner compared to triceps P2 - shows tendon connect muscle to bone	1 1	2
			Total		12

QUESTION NO		MARKING CRITERIA	SUB MARKS	TOTAL MARKS
5(a)		**Able to explain the process at W** F1: Ultrafiltration P1: The difference size of afferent arteriole and efferent arteriole P2: cause high hydrostatic pressure P3:some components in blood plasma is filtered out from the glomerulus into the lumen of Bowman's capsule P4:forms the glomerular filtrate	 1 1 1 1 1	 Max 3
(b)		**Able to explain why certain substances are absent after process at W** The size of protein plasma and erythrocytes are too large to pass through the glomerulus	 1	 1
(c)	(i)	**Able to state the health condition of both patients** Patient A : kidney failure Patient B : diabetes mellitus/ kidney failure	 1 1	 2
	(ii)	**Able to give reason why both patient had their health condition as shown in table 5(a) and (b)** **F**1: (Patient A suffers kidney failure) because the concentration of filtrate content in distal convoluted tubule(S) is higher in protein (amino acid) compared to in proximal convoluted tubule(R) P1: protein molecules are too large to pass through glomerulus P2:in normal person, amino acid is reabsorbed into blood capillaries Any 1 F2: (Patient B suffers diabetes mellitus) because the concentration of filtrate content in distal convoluted tubule(S) is higher with glucose compared to in proximal convoluted tubule (R) P1: in normal person, glucose are reabsorbed into the blood capillaries Any 1	 1 1 1 1 1	 max 2
	(iii)	**Able to explain why the difference in the concentration of urea between R and S occur** F1: S is proximal convoluted tubule , R is distal convoluted tubule P1 : urea in S is higher compared to R P2 : due to the process of secretion P3 : urea, uric acid and ammonium are secreted from blood stream into the distal convoluted tubule P4: by active transport any 2	 1 1 1 1 1	 Max 2
(d)		**Able to describe briefly the effect of drinking coffee contains caffeine which inhibits the release of ADH** P1:less ADH results in distal convoluted tubule and collecting duct less permeable to water P2:less water is absorbed into the blood capillaries P3:more urine volume P4: less concentrated urine produced Any 2	 1 1 1 1	 Max 2
		total		12

SKEMA ESEI

QUESTION NO		MARKING CRITERIA	SUB MARKS	TOTAL MARKS
6	(a)	Able to describe the growth process		
		P1- Primary growth P2- irreversible process P3- increase in the number of cells/size/mass/height/leaves P4- process of differentiation /specialization of the organs P5- due to cell division/mitosis P6- cell elongation/enlargement	1 1 1 1 1 1	Any 4
	(b) (i)	Able to describe process in the secondary growth of a dicot plant.		
		P1- growth involves the lateral meristem tissues P2- begins when vascular cambium divides P3- to produce two layers of cells / the inner layer and the outer layer) P4- the inner layer will form the secondary xylem P5-the outer layer will form secondary phloem P6- This result – the primary xylem will be pushed towards the pith and the secondary xylem will be pushed towards the epidermis P7-The walls of secondary xylem will be thickened with lignin P8- this give tissues mechanical strength to support the plant P9- (Secondary xylem grow outwards), the tissues outside become increasingly compresed P10- The circumference increased caused the epidermis to be stretched sideway P11- The ruptured epidermis will be replaced by cork as a result of the activity of cork cambium.	1 1 1 1 1 1 1 1 1 1 1	Any 8
	(ii)	Able to give the importance of secondary growth		
		P1- Increase the diameter of plant stems and roots P2- gives mechanical support P3- increase the amount of vascular tissue, xylem and phloem P4- accommodate the increase demand of water and minerals salt and organic nutrients P5- more sugars and other organic products can be transported from the leaves to the other part of the trees. P6- Produces new xylem and phloem to replace old and damage tissues P7- Produce a thick trunk/tough bark P8- reduces the evaporation of water from the surface of the stem P9- and protects the stem and plant P10- can continue living and growing for many years P11- as a result they can produce flower and seed season after season thus increasing the chances of propagation and continuation of the species.	1 1 1 1 1 1 1 1 1 1 1	Any 8
		total		20

QUESTION NO		MARKING CRITERIA	SUB MARKS	TOTAL MARKS
7	(a)	***Able to state alleles that determine the ABO blood group*** **Sample answer** 1. The ABO blood is controlled by two alleles I^A, I^B 2. Allele I^A and I^B are codominant to allele I^O which is recessive. 3. can be expressed equally in the phenotype of the heterozygous offspring.	1 1 1	Any 2
		Able to state the genotype of the parents ***Able to show the formation of gamete during meiosis using a schematic diagram.*** ***Able to explain why the blood group type is different for each member in the family*** **Sample answer**  Every child in this family has 25% chances of getting different blood group. Any 4	1 1 1 1 1 1 1 1	Max 4
	(c)	Father has blood group A; he has antigen A and antibody B in his blood.	1	
		Mother has blood group B, she has antigen B and antibody A in her blood	1	
		P has blood group O, he has no antigen A or B but has both antibody A and B in his blood	1	
		If father is the donor, agglutination will occur as P's antibody A will react with father's antigen A	1	
		If mother is the donor, agglutination will also occur as P's antibody B will react with mother's antigen B.	1	
				max: 4
		total		10
	(d)	The allele for colour blindness is recessive.	1	
		Found on the X chromosome.	1	
		Mother is a carrier carrying one recessive allele for colour blindness and	1	

		one dominant allele for normal vision // P's mother : XX^b		
		Father is normal carrying one dominant allele for normal vision in his X chromosome and none in his Y chromosome // P's father : XY	1	
		Let X^b represents the X chromosome carrying the colour blind allele.		
		Let X represents the X chromosome carrying the normal allele.		
		XY : normal male		
		X^bY: colour blind male		
		XX : normal female		
		X^bX: carrier (normal) female		
		X^bX^b : colour blind female.		

Sample answer

Parents: Father (Normal male) X Mother (Carrier female) — 1

Genotype: Father XY, Mother XX^b — 1

Meiosis

Gamete: X, Y, X, X^b — 1

Random fertilization — 1

Offspring Genotype: XX, XX^b, XY, X^bY — 1

Offspring Phenotype: Normal female, Carrier female, Normal male, Colour blind — 1

50% of the males are colour blind while 100% of the females are normal. — 1

Any 10 | 10

QUESTION NO		MARKING CRITERIA	SUB MARKS	TOTAL MARKS
8	(a)		4	4

Light reaction	Dark reaction
D1. Occurs in granum	Occurs in stroma
D2. Requires light	Does not require light
D3. Involves photolysis of water	Involves reduction/ fixation of carbon dioxide
D4. Materials required is water/ chlorophyll	Materials required is carbon dioxide/ hydrogen atoms/ ATP
D5. Produces oxygen and water	Produces glucose

Any 4 pairs

	(b)	F: In temperate countries, light intensity/ temperature changes throughout the year.	1	
		P1: During winter, temperature is very low.	1	

		P2: During autumn, the plants shed their leaves // light intensity // temperature is low P3: Rate of photosynthesis is very low P4: During spring and summer, the light intensity/ temperature are optimum for photosynthesis. P5: So the rate of photosynthesis is maximum/ highest P6: In the greenhouse, light intensity/ concentration of carbon dioxide/ temperature can be controlled/maintained at optimum level P7 : Plant can carry out photosynthesis throughout the year P8: at maximum rate (regardless of changes in light intensity or temperature). P9: The plants are able to increase yields/ increase the crops production throughout the years. *Any 6*	1 1 1 1 1 1 1 1	6
	(c)	**Good effect: By producing processed food** G1: Food can be preserved/ kept longer. G2: to prevent food poisoning/ wasting of food. G3: Crops can be planted/ livestock/ poultry can be reared in big scale. G4: to prevent food shortage. G5: (Food are packaged) to increase the commercial value/ easier to be transported. G6: More types/ varieties of food can be produced. **Bad effect: By regular consuming of processed food** B1: Loss a lot of nutrition value (under high temperature during the process). B2: (Contain) preservative/ colouring/ dye/ flavour which is carcinogenic. B3: lead to mutation/ cancer/ health problem/ suitable example. B4: Contain excessive salt/ sugar. B5: lead to high blood pressure/ diabetes/ obesity. Any 10	1 1 1 1 1 1 1 1 1 1 1	Max 10
		Total		20

QUESTION NO		MARKING CRITERIA	SUB MARKS	TOTAL MARKS
9	(a)	F - The leaching of chemical/fertiliser/phosphate/nitrate from the agriculture area to the lake	1	
		E1 – Increase the fertility / nutrient in the lake	1	
		E2 - Promotes rapid growth of algae/algae bloom	1	
		E3 - Algae cover up the surface of the lake	1	
		E4 – Eutrophication occur	1	
		E5 – Prevent penetrating of the sunlight reaching the base of the lake.	1	Any 10
		E6 – Reduce/prevent photosynthesis by aquatic plant	1	
		E7 – Aquatic plant die	1	
		E8 - Decomposed by bacteria/microorganism	1	
		E9 – The number of bacteria increase	1	
		E10 – Lead to the increase in Biochemical Oxigen Demand (BOD)	1	
		E11 – Depletion/decrease of dissolved oxygen in the lake	1	
		E 12- Result in the death of aquatic organism/animal	1	
	(b)	F – Acid rain	1	
		E1 - Motor vehicles/lorry/ factory released large amount of smoke	1	
		E2 – contain nitroden dioxide/ sulphur dioxside	1	
		E3 – Oxide of nitrogen/sulphur combine/ dissolve with water vapour/ rain water (in atmosphere)	1	Any 4
		E4 – to form nitric acid/ sulphuric acid	1	
		E5 - the rain fall as acid rain	1	
		Effect:		
		E1 - may corrode metal structure in bridges and the building	1	
		E2 - drop the water pH// water become acidic	1	
		E3 - cause aquatic animal die	1	
		E4 – destroyed the food chain in the lake/river	1	Any 6
		E5 - leach the mineral in the soil	1	
		E6 – Soil become infertile/ not suitable for plant to growth	1	
		E7 - Less yield produced	1	
		Total		20

MARKING SCHEME BIOLOGY PAPER 3- set 2
SKEMA PEMARKAHAN BIOLOGI KERTAS 3

Question	EXPLAINATION	Score
1(a)(i)	Able to state **any two** correct observations based on the following criteria : Sample Answer Horizontal observation: 1. When the concentration of glucose is 10% ,the final height of coloured liquid is 3 cm 2. When the concentration of glucose is 15% , the final height of coloured liquid is 5 cm 3. When the concentration of glucose is 20% , the final height of coloured liquid is 8 cm Vertical observation : 4. The final height of coloured liquid of 5% glucose solution is lower than that 20% glucose solution	3
	Able to state **any one** observation correctly **and** another **one** incomplete // **any two incomplete** observations . *Sample answer* Incomplete observation : (*the concentration of glucose, but no value of height but in qualitative*) 1. When 10% glucose solution is used ,the final height of coloured liquid is low 2. When 20% glucose solution is used ,the final height of coloured liquid is high	2
	Able to state **any one** observation incompletely or **both** ideas (*neither value of glucose concentration nor height of coloured liquid*) *Sample answer* 1. In low concentration of glucose, the final height of coloured liquid is low	1
	No response or wrong response *Sample answer* : (*Hyphothesis statement*) 1. The higher the concentration of glucose, the higher the rate of yeast activity 2. If the concentration of glucose is higher/lower, the higher/lower the rate of yeast activity	0

Question	EXPLAINATION	Score
1(a)(ii)	Able to state **any two** correct inferences which correspond to the observation in 1(a)(i) : F : glucose concentration + activity of yeast P : the amount of carbon dioxide released *Sample Answer* Horizontal observation Inference 1 1. In low concentration of glucose , less carbon dioxide is released because the activity of yeast is low. 2. In high concentration of glucose, more carbon dioxide is released because the activity of yeast is high. Vertical observation 3. In lower concentration of glucose, less carbon dioxide is released because the activity of yeast is lower compared to in higher concentration of glucose Notes : The inferences should be correspond to the observations. - inference 1→observation 1 - inference 2→observation 2 } 0 mark if not correspond	3
	Able to state at least one complete inference (F or P is incomplete) *Sample Answer* Inference (horizontal observation) P incomplete(without P) 1. In low concentration of glucose, activity of yeast is low 2. In high concentration of glucose, activity of yeast is high F incomplete(without F) 1. In low concentration of glucose, less carbon dioxide is released 2. In high concentration of glucose, more carbon dioxide is released	2
	Able to state **both** inferences are incomplete or **both** ideas only *Sample answer* 1. The activity of yeast is low / / high 2. The activity of yeast depends on the concentration of glucose	1
	No response or wrong response	0

<table>
<tr><th>Question</th><th>EXPLAINATION</th><th>Score</th></tr>
<tr><td>1(b)</td><td>Able to record all the three final heights correctly

Sample answer

<table>
<tr><th>Percentage /%</th><th>Final height / cm</th></tr>
<tr><td>10</td><td>3</td></tr>
<tr><td>15</td><td>5</td></tr>
<tr><td>20</td><td>8</td></tr>
</table>
</td><td>3</td></tr>
<tr><td></td><td>Able to record any two heights correctly</td><td>2</td></tr>
<tr><td></td><td>Able to record any one height correctly</td><td>1</td></tr>
<tr><td></td><td>No response or wrong response</td><td>0</td></tr>
</table>

<table>
<tr><th>Question</th><th>EXPLAINATION</th><th>Score</th></tr>
<tr><td>1(c)(i)</td><td>Able to state all the variables and method to handle the variables correctly
Sample Answer
<table>
<tr><th>Variables</th><th>Method to handle the variable</th></tr>
<tr><td><u>Manipulated variable</u>
The concentration of nutrients/glucose</td><td>Change the concentration of nutrients/glucose
Use different concentration of nutrients/glucose</td></tr>
<tr><td><u>Responding variable</u>
Height of the coloured liquid

The rate of yeast activity</td><td>Measure the height of the coloured liquid by using a metre rule

Calculate the rate of yeast activity by using the formulae
= <u>the height of coloured liquid/cm</u>
time taken /min</td></tr>
<tr><td><u>Controlled variable</u>
Volume of yeast suspension /volume of glucose/pH/light intensity/temperature/time taken</td><td>Use the same volume of yeast suspension /volume of glucose/pH /light intensity /temperature/time taken</td></tr>
</table>
</td><td>3</td></tr>
<tr><td></td><td>Able to state six (variables + methods to handle the variables) correctly</td><td>3</td></tr>
</table>

	Able to state **any 4-5 (variables + methods to handle the variables)** correctly	2
	Able to state **any 2-3 (variables + methods to handle the variables)** correctly	1
	No response or wrong response	0

Question	EXPLAINATION	Score
1(c)(ii)	Able to match the apparatus and material used to obtain data for the three variables correctly *Sample Answer* Variables / Apparatus / Material Manipulated / measuring cylinder / glucose solution Responding / metre rule / coloured liquid Controlled / electronic balance / Yeast	3
	Able to match the apparatus and material for **any two** variables correctly	2
	Able to match the apparatus or material for **any one** variable correctly	1
	No response or wrong response	0

<table>
<tr><th>Question</th><th>EXPLAINATION</th><th>Score</th></tr>
<tr><td>1(d)</td><td>Able to state the hypothesis correctly based on the following criteria :
K1 – state the manipulated variable (concentration of glucose)
K2- state the responding variable (the rate of yeast activity)
K3- state the relationship between K1 and K2

Sample Answer
The higher/ lower (K3) the concentration of glucose(K1), the higher / lower (K3) the rate of yeast activity(K2)
Notes:
<table>
<tr><th>K1</th><th>K2</th><th>K3</th><th>Score</th></tr>
<tr><td>√</td><td>√</td><td>√</td><td>3</td></tr>
<tr><td>√</td><td>√</td><td>X</td><td>2</td></tr>
<tr><td>√</td><td>X</td><td>√</td><td>2</td></tr>
<tr><td>√</td><td>X</td><td>X</td><td>1</td></tr>
<tr><td>X</td><td>√</td><td>X</td><td>1</td></tr>
</table></td><td>3</td></tr>
<tr><td></td><td>Able to state the hypothesis but less accurate
(Any 2 K correct)
Sample answer
The concentration of glucose (K1) affects the rate of yeast activity(K2)
(K3 incomplete)</td><td>2</td></tr>
<tr><td></td><td>Able to state the idea of the hypothesis
(K1 or K2 or K3 // only one K present // general idea)</td><td>1</td></tr>
<tr><td></td><td>No response or wrong response</td><td>0</td></tr>
</table>

<table>
<tr><th>Question</th><th>EXPLAINATION</th><th>Score</th></tr>
<tr><td>1(e)(i)</td><td>Able to construct a table and record the results of the experiment with the following criteria:

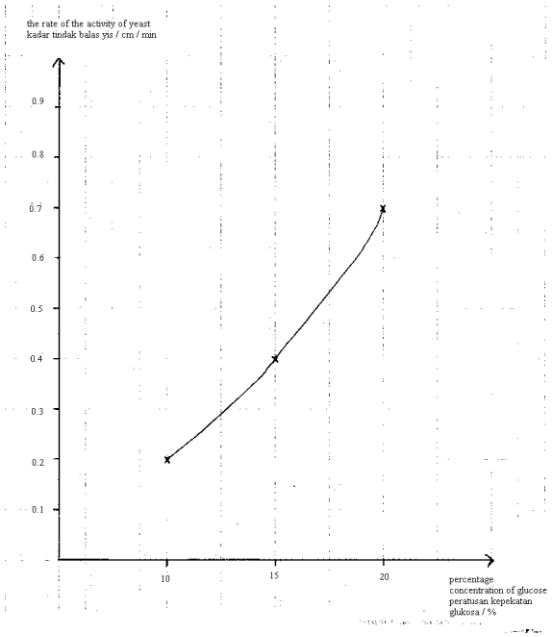
T- state all the three aspects with the units correctly
D- transfer all the data for concentration of glucose and the increase in height of coloured liquid
K- state all the values for rate of yeast activity

Sample Answer

<table>
<tr><th>Percentage concentration of glucose /%</th><th>Increase in height of coloured liquid /cm</th><th>Rate of yeast activity / cmmin^{-1}</th></tr>
<tr><td>10</td><td>2</td><td>0.2</td></tr>
<tr><td>15</td><td>4</td><td>0.4</td></tr>
<tr><td>20</td><td>7</td><td>0.7</td></tr>
</table></td><td>3</td></tr>
</table>

	Able to construct a table and record the results of the experiment with **any two** criterias	2
	Able to construct a table and record the results of the experiment with **any one** criteria	1
	No response or wrong response	0

Question	EXPLAINATION	Score
1(e)(ii)	Able to draw a graph of the rate of yeast activity against the concentration of glucose which satisfies the following criteria: Axes (P) - both axes are labelled and uniform scales, - manipulated variable on horizontal axis, correct units. Points(T)- all points correctly plotted Shape(B)- all points are connected smoothly *Sample Answer* Refer to the graph	3
	Graph which satisfies **any two** criterias	2
	Graph which satisfy **any one** criteria	1
	No response or wrong response	0



Question	EXPLAINATION	Score
1(e)(iii)	Able to explain the relationship between the rate of yeast activity and the concentration of glucose which satisfies the following criterias: K1- state the relationship between the rate of yeast activity and the concentration of glucose K2- state the activity of anaerobic respiration is increased/decreased K3- state the carbon dioxide released is increase/decrease *Sample Answer* K1-When the concentration of glucose increases/decreases, the rate of yeast activity increases/decreases K2-Because of the activity of anaerobic respiration increase /decreases K3-So the carbon dioxide released is increased/ decreased	3
	Able to explain **any two** citerias	2
	Able to explain **any one** criteria	1
	No response or wrong response	0
Question	EXPLAINATION	Score
1(f)	Able to define operationally respiration in yeast based on the following criteria: K1- yeast is breaking down glucose to release ethanol and carbon dioxide K2- (the released of carbon dioxide) causes the pressure in the manometer rises/increases K3- in the absence of oxygen / anaerobically *Sample answer* Respiration in yeast is the process in which yeast breaking down glucose to release ethanol and carbon dioxide (K1) that causes the pressure in the manometer tube to rise (K2) in the absence of oxygen(K3)	3
	Able to state any two criterias	2
	Able to state any one criteria.	1
	No response or wrong response	0

Question	EXPLAINATION	Score
1(g)	Able to predict correctly and explain the prediction based on the following criteria: K1 – manometer R K2- the height of coloured liquid falls / decreases / 2cm K3- the activity of yeast is decreased / lowered in an alkaline medium //optimum / higher in an acidic medium *Sample answer* The height of coloured liquid in manometer R decreased .This is because the activity of yeast decreased in an alkaline medium // optimum / higher in an acidic medium	3
	Able to predict **any two** criterias	2
	Able to predict **any one** criteria.	1
	No response or wrong response	0

QUESTION 2

2(i)	Able to state a problem statement relating the manipulated variable with the responding variable correctly. P1: MV – total surface area per volume P2: RV – rate of diffusion P3: Question Sample answer: What is the relationship between total surface area per volume ratio and the rate of diffusion?	3
	Able to state a problem statement inaccurately Sample answer: What is the relationship between total surface area per volume on diffusion?	2
	Able to state a problem statement at idea level Sample answer: Total surface area per volume influenced the diffusion	1
	Able to state a problem statement at idea level	0
2(ii)	Able to state hypothesis relating the manipulated variable to the responding variable correctly P1: MV – total surface area per volume P2: RV – the rate of diffusion P3: Relationship Sample answer: The larger the total surface area per volume ratio / the smaller the size of cube, the faster the rate of diffusion.	3
	Able to state a hypothesis inaccurately Sample answer: Total surface area per volume ratio influenced the rate of diffusion	2
	Able to state a hypothesis at idea level Sample answer: There is a relationship between the total surface area per volume ratio and the rate of diffusion.	1
	No response or incorrect response	0

2(iii)	Able to state all three variables correctly Sample answer: Manipulated variable: Total surface area per volume ratio / the size of cubes. Responding variable: Rate of diffusion. Fixed variable: Colored water temperature / time taken.	3
	Able to state any two variables correctly	2
	Able to state any one variable correctly	1
	No response or incorrect response	0
2(iv)	Able to list all the important apparatus and materials correctly Sample answer: Materials: 1. Potato 2. Colored water. Apparatus: 1. Penknife 2. White tiles 3. Beaker 4. Forceps 5. Basin 6. Gridded transparency.	3
	Able to list at least 4 apparatus and 2 materials correctly	2
	Able to list at least 3 apparatus and 2 materials correctly	1
	No response or incorrect response	0

<table>
<tr><td>2(v)</td><td>Able to describe the steps of the experiment procedure or method correctly
Sample answer:
Procedure:
1. Potato are cut into 0.5 cm, 2 cm, 3 cm and 4 cm length of sides cubes each.
2. Then the cubes are immersed into a basin containing 100ml of colored water.
3. All the cubes are left for 30 minutes.
4. After 20 minutes, the outer surface of the cubes are dried with filter paper and cut into two halves.
5. The percentage of colored area in each cube is estimated by using a girded transparency.
6. The rate of diffusion of each cube is calculated by using a formula:

Formula:
Rate of diffusion = Percentage of colored area ($\%min^{-1}$)
Time taken
7. The results are recorded in the table.
8. Beware of using knife.
Note:
K1 : Steps 1, 2, 3, 4, 5 (preparation of materials and apparatus)
K2 : Steps 2, 3 (operating fixed variable)
K3 : Steps 6 (operating responding variable)
K4 : Steps 1 (operating manipulated variable)
K5 : Steps 8 (precaution)
All the ‘K’</td><td>3</td></tr>
<tr><td></td><td>Any 3 – 4 K</td><td>2</td></tr>
<tr><td></td><td>Any 2 K</td><td>1</td></tr>
<tr><td></td><td>Only 1 K or no response or incorrect response</td><td>0</td></tr>
<tr><td>2(vi)</td><td>Able to present all the data with units correctly
Sample answer:
<table>
<tr><th>Cube</th><th>Length of side / cm</th><th>Total surface area cm^2</th><th>Volume cm^3</th><th>TSA/V ratio cm^{-1}</th><th>Volume of stained part</th><th>Percentage of coloured area / %</th></tr>
<tr><td>A</td><td>0.5</td><td>1.5</td><td>0.125</td><td>12</td><td></td><td></td></tr>
<tr><td>B</td><td>1</td><td>6</td><td>1</td><td>6</td><td></td><td></td></tr>
<tr><td>C</td><td>2</td><td>24</td><td>8</td><td>3</td><td></td><td></td></tr>
<tr><td>D</td><td>3</td><td>54</td><td>27</td><td>2</td><td></td><td></td></tr>
<tr><td>E</td><td>4</td><td>96</td><td>64</td><td>1.5</td><td></td><td></td></tr>
</table></td><td>2</td></tr>
<tr><td></td><td>Able to present a table with at least 5 titles</td><td>1</td></tr>
<tr><td></td><td>No response or incorrect response</td><td>0</td></tr>
</table>