

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

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

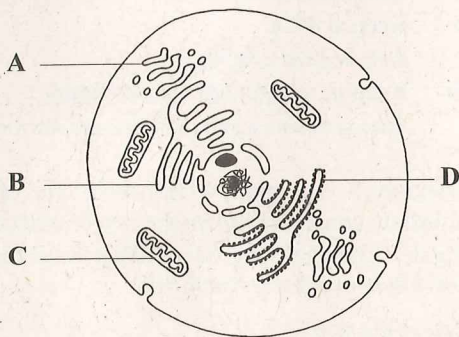


Diagram 1
Rajah 1

Which structure A, B, C or D is a smooth endoplasmic reticulum?
Antara struktur A, B, C dan D yang manakah jalinan endoplasma licin?

- 2 Diagram 2 shows a specialised cell in a digestive system.
Rajah 2 menunjukkan sel khusus dalam sistem pencernaan.

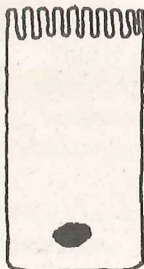
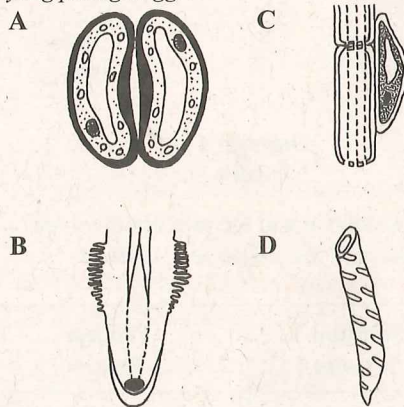


Diagram 2
Rajah 2

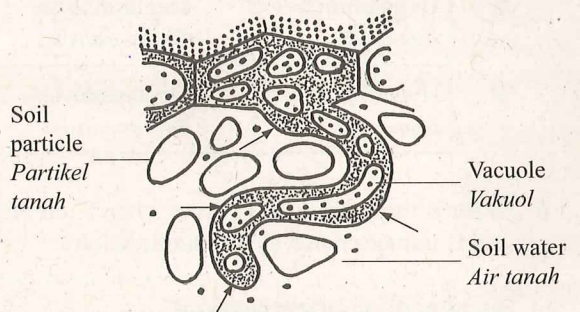
Which organ is abundant with the cell?
Organ manakah yang padat dengan sel itu?

- | | |
|---------------------------|---------------------------------|
| A Stomach
Perut | C Large intestine
Usus besar |
| B Oesophagus
Esophagus | D Small intestine
Usus kecil |

- 3 Which tissue has the highest density of mitochondria?
Tisu manakah mempunyai kepadatan mitokondrion yang paling tinggi?



- 4 Diagram 3 shows the movement of mineral ions through process X in the root hair of a plant.
Rajah 3 menunjukkan pergerakan ion mineral melalui proses X dalam akar rambut tumbuhan.



Key / Kekunci : —————> Process X / Proses X

Diagram 3
Rajah 3

What is process X?

Apakah proses X?

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

- 5 Diagram 4 shows the condition of a cell before and after being immersed in solution Y.

Rajah 4 menunjukkan keadaan satu sel sebelum dan selepas direndam dalam larutan Y.

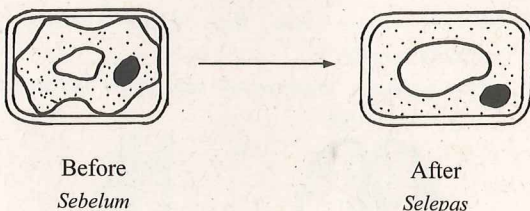


Diagram 4
Rajah 4

What is solution Y and the process involved?

Apakah larutan Y dan proses yang terlibat?

	Solution Y <i>Larutan Y</i>	Process <i>Proses</i>
A	Hypotonic <i>Hipotonik</i>	Plasmolysis <i>Plasmolisis</i>
B	Hypertonic <i>Hipertonik</i>	Plasmolysis <i>Plasmolisis</i>
C	Hypotonic <i>Hipotonik</i>	Deplasmolysis <i>Deplasmolisis</i>
D	Hypertonic <i>Hipertonik</i>	Deplasmolysis <i>Deplasmolisis</i>

- 6 What is the process that occurs when a red blood cell is immersed in a hypertonic solution?

Apakah proses yang berlaku apabila sel darah merah direndam dalam larutan hipertonik?

- A Crenation
Krenasi
- B Haemolysis
Hemolisis
- C Plasmolysis
Plasmolisis
- D Deplasmolysis
Deplasmolisis

- 7 Housewives usually marinate meat with slices of unripe papaya to tenderise the meat.

Which of the following can be used with the method above to minimise the time for tenderising the meat?

Suri rumah biasanya memerap daging dengan kepingan betik muda untuk melembutkan daging tersebut.

Antara yang berikut, yang manakah dapat digunakan dengan kaedah di atas untuk meminimumkan masa bagi melembutkan daging?

- A Add some salt
Tambahkan sedikit garam
- B Add some sugar
Tambahkan sedikit gula
- C Keep at 40°C
Simpan pada suhu 40°C
- D Keep in refrigerator for two hours
Simpan di dalam peti sejuk selama dua jam

- 8 Diagram 5 is a graph which shows the effect of substrate concentration on the rate of reaction.

Rajah 5 ialah graf yang menunjukkan kesan kepekatan substrat ke atas kadar tindak balas.

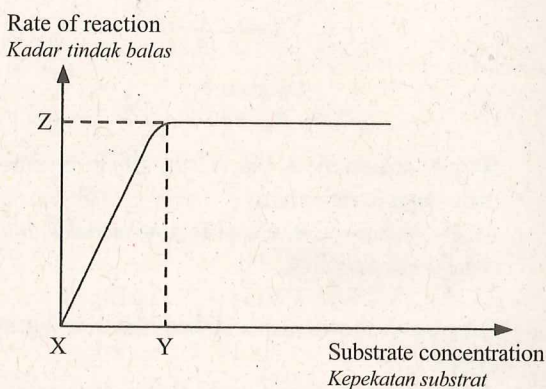


Diagram 5
Rajah 5

Which of the following conclusions can be deduced from the graph?

Antara berikut, kesimpulan manakah yang dapat dideduksikan daripada graf?

- I Enzyme concentration is the limiting factor at level Z
Kepekatan enzim adalah faktor pengehad pada aras Z
- II When the concentration of substrate is increased from X to Y, more substrate molecules are available to bind with the active site of the enzymes
Apabila kepekatan substrat bertambah dari X ke Y, lebih banyak molekul substrat mengikat kepada tapak aktif enzim

III At concentration Y, no more reaction takes place as all the active sites of enzymes are fully saturated

Pada kepekatan Y, tiada tindak balas yang berlaku kerana semua tapak aktif enzim telah tepu sepenuhnya

IV Rate of reaction at level Z can be increased if more substrate is added in the reaction

Kadar tindak balas pada aras Z boleh ditingkatkan jika lebih banyak substrat ditambah ke dalam tindak balas

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

9 The following are organelles in a pancreatic cell.

Berikut adalah organel-organel dalam sel pankreas.

- Ribosomes
Ribosom
- Secretory vesicles
Vesikel rembesan
- Transport vesicles
Vesikel angkutan
- Golgi apparatus
Jasad Golgi

Which of the following is the correct sequence of the organelles in the production of lipase enzyme?

Antara yang berikut, yang manakah menunjukkan urutan organel-organel yang betul dalam menghasilkan enzim lipase?

- A Ribosomes → Golgi apparatus → Transport vesicles → Secretory vesicles
Ribosom → Jasad Golgi → Vesikel angkutan → Vesikel rembesan
- B Ribosomes → Transport vesicles → Golgi apparatus → Secretory vesicles
Ribosom → Vesikel angkutan → Jasad Golgi → Vesikel rembesan
- C Secretory vesicles → Ribosomes → Transport vesicles → Golgi apparatus
Vesikel rembesan → Ribosom → Vesikel angkutan → Jasad Golgi
- D Secretory vesicles → Transport vesicles → Ribosomes → Golgi apparatus
Vesikel rembesan → Vesikel angkutan → Ribosom → Jasad Golgi

10 Enzyme activity in the alimentary canal is affected by temperature.

Which of the following will occur when someone has high fever?

Aktiviti enzim dalam salur alimentari dipengaruhi oleh suhu.

Antara yang berikut, apakah yang akan berlaku apabila seseorang mengalami demam panas?

- A Diarrhoea
Cirit-birit
- B Gastritis
Gastritis
- C Indigestion
Ketidakhadaman
- D Constipation
Sembelit

11 Diagram 6 shows a shirt which has a food stain on it. The shirt is washed using some biological washing powder.

Rajah 6 menunjukkan sehelai baju yang mempunyai kotoran makanan di atasnya. Baju tersebut dicuci menggunakan serbuk pencuci biologi.

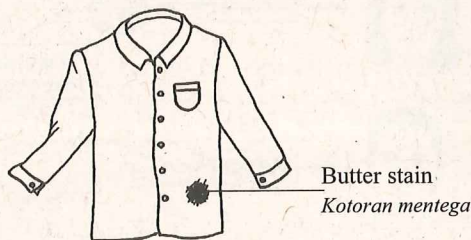


Diagram 6
Rajah 6

Which of the following enzymes helps in removing the stain?

Antara berikut, enzim manakah membantu menanggalkan kotoran tersebut?

- A Lipase C Protease
Lipase Protease
B Amylase D Cellulase
Amilase Selulase

12 Diagram 7 shows the chromosomes in an abnormal human gamete.

Rajah 7 menunjukkan kromosom dalam gamet manusia yang abnormal.

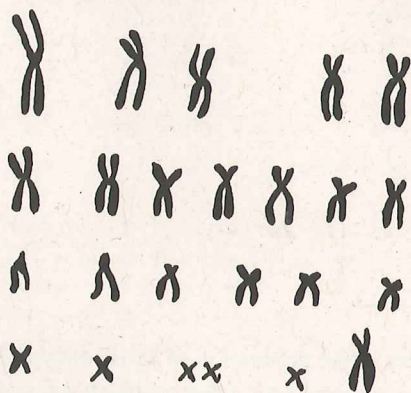


Diagram 7
Rajah 7

At which stage of the cell division did this mutation occur?

Pada peringkat pembahagian sel yang manakah mutasi ini berlaku?

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

13 Diagram 8 shows a part of human life cycle.

Rajah 8 menunjukkan sebahagian kitar hidup manusia.

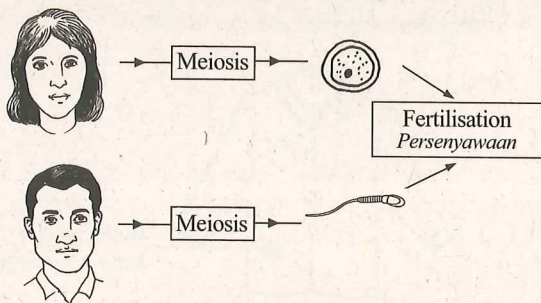


Diagram 8
Rajah 8

What is the importance of the process shown in the diagram?

Apakah kepentingan proses yang ditunjukkan dalam rajah tersebut?

- A To double up the chromosomal number of offspring
Untuk mengandakan bilangan kromosom anak
B To halve the chromosomal number of offspring
Untuk menjadikan bilangan kromosom anak menjadi separuh
C To maintain the chromosomal number of offspring
Untuk mengekalkan bilangan kromosom anak
D To reduce the chromosomal number of offspring
Untuk mengurangkan bilangan kromosom anak

14 Diagram 9 shows phases of a cell cycle.

Rajah 9 menunjukkan fasa dalam kitar sel.

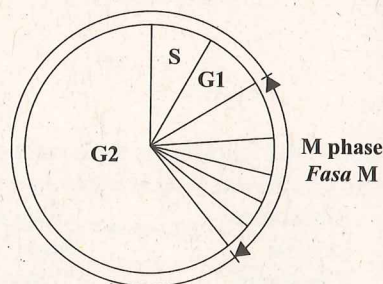


Diagram 9
Rajah 9

Which of the following is correct about the phases in the cell cycle?

Antara yang berikut, yang manakah betul tentang fasa dalam kitar sel?

	G1	S	G2	M Phase Fasa M
A	ATP production Penghasilan ATP	Nuclear division Pembahagian nukleus	Synthesis of organelle Sintesis organel	DNA replication Replikasi DNA
B	Synthesis of organelle Sintesis organel	DNA replication Replikasi DNA	ATP production Penghasilan ATP	Nuclear division Pembahagian nukleus
C	ATP production Penghasilan ATP	Synthesis of organelle Sintesis organel	Nuclear division Pembahagian nukleus	DNA replication Replikasi DNA
D	Synthesis of organelle Sintesis organel	ATP production Penghasilan ATP	DNA replication Replikasi DNA	Nuclear division Pembahagian nukleus

- 15 Diagram 10 shows homologous chromosomes in a stage of meiosis.

Rajah 10 menunjukkan kromosom homolog dalam satu peringkat meiosis.

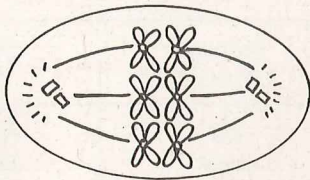


Diagram 10
Rajah 10

What is the number of chromosomes found in a daughter cell after completing meiosis?

Berapakah bilangan kromosom dalam sel anak selepas meiosis lengkap?

- A 24 C 6
B 12 D 3

- 16 Diagram 11 shows a cross section of a leaf.

Rajah 11 menunjukkan keratan rentas daun.

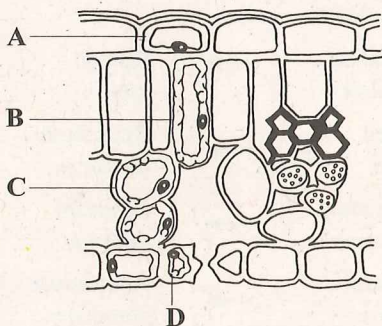


Diagram 11
Rajah 11

Which structure A, B, C or D has a large number of chloroplasts?

Antara struktur A, B, C dan D, yang manakah mempunyai bilangan kloroplas yang paling banyak?

- 17 The following statements are the effects of excessive consumptions of a vitamin for a long period.

Pernyataan berikut adalah kesan-kesan pengambilan sejenis vitamin bagi suatu jangka masa yang panjang.

- Interferes with the functions of muscles
Gangguan fungsi otot
- Calcification of muscles
Enapan kalsium pada otot

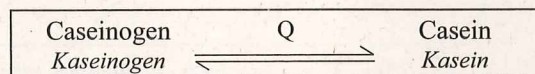
What is the vitamin?

Apakah vitamin tersebut?

- A Vitamin A
Vitamin A
B Vitamin B
Vitamin B
C Vitamin C
Vitamin C
D Vitamin D
Vitamin D

- 18 The following information shows a biochemical reaction.

Maklumat berikut menunjukkan suatu tindak balas biokimia.



What is Q?

Apakah Q?

- A Rennin C Trypsin
Rennin Trypsin
B Pepsin D Erepsin
Pepsin Erepsin

- 19 Diagram 12 shows a human digestive system.

Rajah 12 menunjukkan suatu sistem pencernaan manusia.

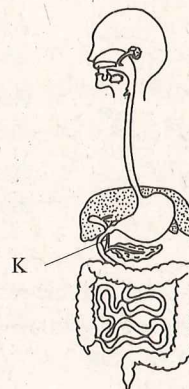


Diagram 12
Rajah 12

What is the effect towards the individual if a part of K is removed because of a disease?

Apakah kesan terhadap individu jika sebahagian K dibuang kerana suatu penyakit?

- A More bile is secreted
Lebih banyak hempedu dirembeskan
B Less pepsin is secreted
Kurang pepsin dirembeskan
C Less lipid is digested
Kurang lipid dicernakan
D More protein is digested
Lebih protein dicernakan

- 20 Diagram 13 shows the stages of food digestion along the human alimentary canal.

Rajah 13 menunjukkan peringkat pencernaan makanan di sepanjang salur alimentari manusia.

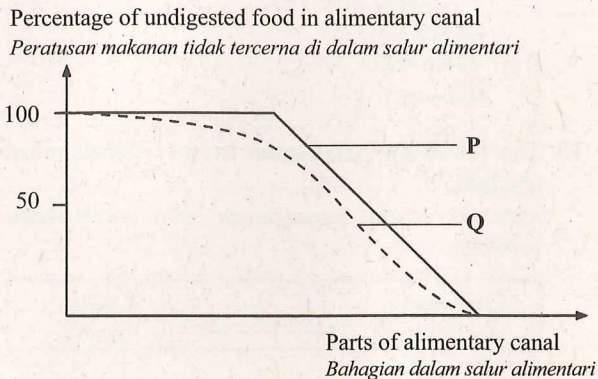


Diagram 13
Rajah 13

What are P and Q?

Apakah P dan Q?

	P	Q
A	Protein <i>Protein</i>	Starch <i>Kanji</i>
B	Fat <i>Lemak</i>	Protein <i>Protein</i>
C	Starch <i>Kanji</i>	Fat <i>Lemak</i>
D	Starch <i>Kanji</i>	Protein <i>Protein</i>

- 21 Which is the correct sequence of cellulose digestion in the stomach of a ruminant?

Manakah urutan yang betul tentang pencernaan selulosa di dalam perut haiwan ruminan?

- A Abomasum → Omasum → Reticulum → Rumen
Abomasum Omasum Retikulum Rumen
- B Omasum → Abomasum → Rumen → Reticulum
Omasum Abomasum Rumen Retikulum
- C Reticulum → Rumen → Abomasum → Omasum
Retikulum Rumen Abomasum Omasum
- D Rumen → Reticulum → Omasum → Abomasum
Rumen Retikulum Omasum Abomasum

- 22 Which process involves aerobic respiration?

Proses manakah yang melibatkan respirasi aerob?

- A Fermentation by yeast
Penapaian oleh yis
- B Initial stage of seed germination
Peringkat awal percambahan biji benih
- C Contraction of heart muscles when a person is at rest
Pengecutan otot jantung semasa seseorang sedang berehat
- D Growth of paddy plants under waterlogged condition
Pertumbuhan pokok padi dalam keadaan air bertakung

- 23 Diagram 14 shows gaseous exchange between body cells and blood capillaries.

Rajah 14 menunjukkan pertukaran gas antara sel badan dengan kapilari darah.

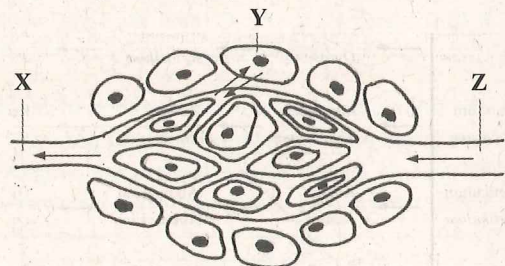


Diagram 14
Rajah 14

What is the partial pressure of carbon dioxide at X, Y and Z?

Apakah tekanan separa karbon dioksida di X, Y dan Z?

	X	Y	Z
A	Low <i>Rendah</i>	High <i>Tinggi</i>	Low <i>Rendah</i>
B	High <i>Tinggi</i>	High <i>Tinggi</i>	Low <i>Rendah</i>
C	Low <i>Rendah</i>	High <i>Tinggi</i>	High <i>Tinggi</i>
D	High <i>Tinggi</i>	Low <i>Rendah</i>	High <i>Tinggi</i>

- 24 Which structure in the respiratory system of a fish increases the surface area for gaseous exchange?

Struktur manakah dalam sistem respirasi ikan meningkatkan luas permukaan untuk pertukaran gas?

- A Filament C Operculum
Filamen *Operkulum*
B Gill arch D Buccal cavity
Lengkung insang *Lantai mulut*

- 25 Diagram 15 shows the breathing mechanism in humans.
Rajah 15 menunjukkan mekanisme pernafasan manusia.

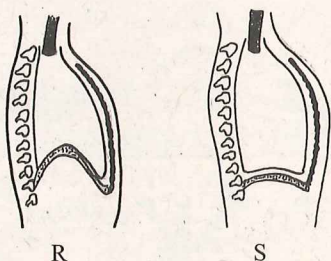


Diagram 15
Rajah 15

Which statements explain the diagram correctly?

Pernyataan yang manakah menerangkan gambar rajah dengan betul?

	R	S
A	Diaphragm flattened <i>Diafragma mendatar</i>	Diaphragm in dome shape <i>Diafragma berbentuk kubah</i>
B	External intercostals muscles contract <i>Otot interkostal luar mengecut</i>	External intercostals muscles relax <i>Otot interkostal luar mengendur</i>
C	Lung volume decreases <i>Isi padu paru berkurang</i>	Lung volume increases <i>Isi padu paru bertambah</i>
D	Low air pressure in the alveoli <i>Tekanan udara dalam alveolus rendah</i>	High air pressure in the alveoli <i>Tekanan udara dalam alveolus tinggi</i>

- 26 Diagram 16 shows the tracheal system of an insect.

Rajah 16 menunjukkan sistem trakea bagi seekor serangga.

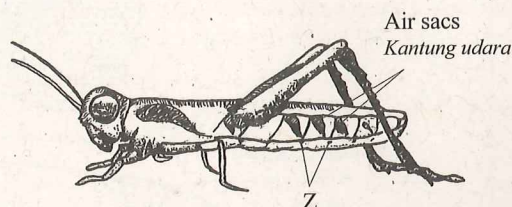


Diagram 16
Rajah 16

What is Z?

Apakah Z?

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

- 27 Diagram 17 shows the distribution of white mould, yellow mould and black mould on a moist bread which was kept in a dark condition at room temperature after 12 days.

Rajah 17 menunjukkan taburan kulapuk putih, kulapuk kuning dan kulapuk hitam di atas roti lembap yang disimpan dalam keadaan gelap pada suhu bilik selepas 12 hari.

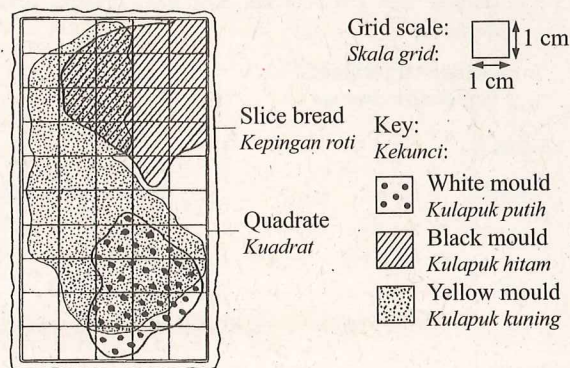


Diagram 17
Rajah 17

What is the percentage of coverage of yellow mould on the bread?

Apakah peratusan lipupan kulapuk kuning di atas roti itu?

- A 18% C 54%
B 30% D 60%

- 28 Diagram 18 shows the distribution of mangrove tree in a swamp area.

Rajah 18 menunjukkan taburan pokok paya bakau di suatu kawasan berpayau.

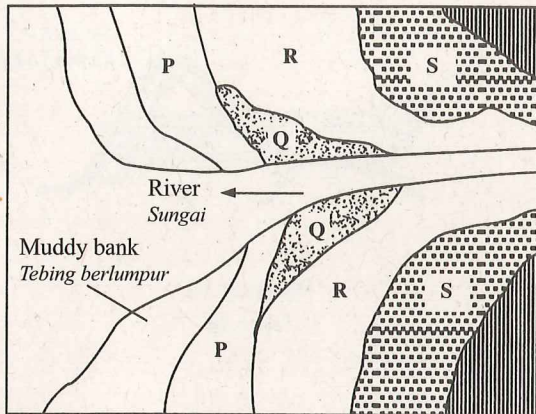


Diagram 18
Rajah 18

Which of the following is *Rhizophora* sp.?

Antara yang berikut, yang manakah *Rhizophora* sp.?

- A P C R
B Q D S

- 29 Diagram 19 shows a graph of the population of *Paramecium aurelia* and *Paramecium caudatum* when cultured together.

Rajah 19 menunjukkan graf bagi populasi *Paramecium aurelia* dan *Paramecium caudatum* apabila dikultur bersama.

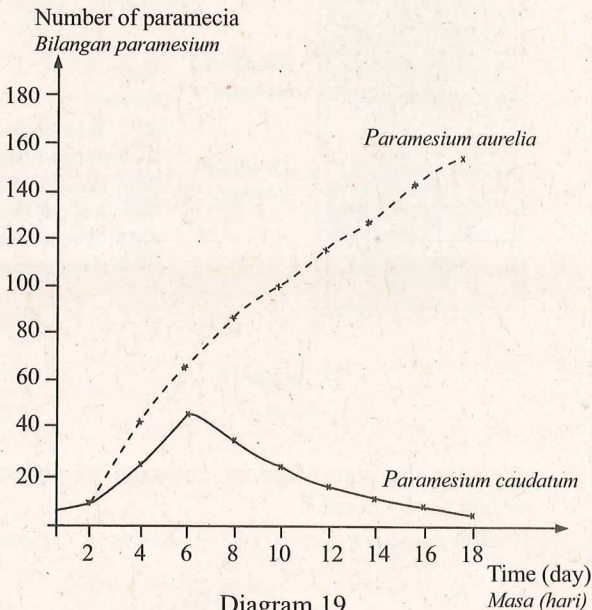


Diagram 19
Rajah 19

Which of the following statements is correct about the diagram?

Antara berikut, pernyataan manakah yang betul mengenai rajah itu?

- A *Paramecium aurelia* will migrate
Paramecium aurelia akan berpindah
B *Paramecium caudatum* is a weak species
Paramecium caudatum adalah spesies yang lemah
C *Paramecium caudatum* is a successful species
Paramecium caudatum adalah spesies yang berjaya
D Both species compete for different resources
Kedua-dua spesies bersaing untuk sumber yang berbeza

- 30 Diagram 20 shows an ecosystem in a pond.

Rajah 20 menunjukkan ekosistem dalam sebuah kolam.

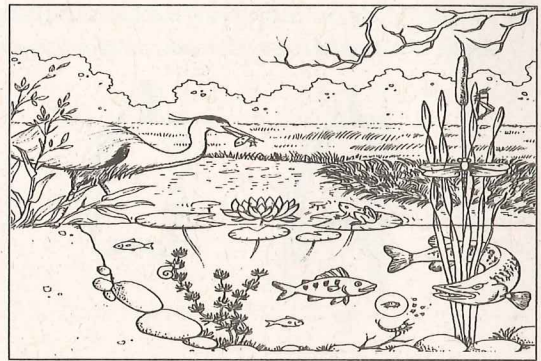


Diagram 20
Rajah 20

Which organism represents the correct trophic level?

Organisma manakah yang mewakili aras trofik yang betul?

	Organism Organisma	Trophic level Aras trofik
A	Frog Katak	Primary consumer Pengguna pertama
B	Algae Alga	Decomposer Pengurai
C	Flamingo Burung bangau	Tertiary consumer Pengguna tertier
D	Grasshopper Belalang	Secondary consumer Pengguna sekunder

- 31 Which of the following is the effect of an increase in biochemical oxygen demand (BOD)?

Antara yang berikut, yang manakah kesan daripada peningkatan keperluan oksigen biokimia (BOD)?

- A Algal bloom occurs
Berlaku pertumbuhan alga yang pesat
- B Decomposition by bacteria
Penguraian oleh bakteria
- C Death of aquatic organisms
Kematian organism akuatik
- D Rapid growth of microorganisms
Pertumbuhan pesat mikroorganisma

- 32 Diagram 21 shows a human activity.

Rajah 21 menunjukkan suatu aktiviti manusia.

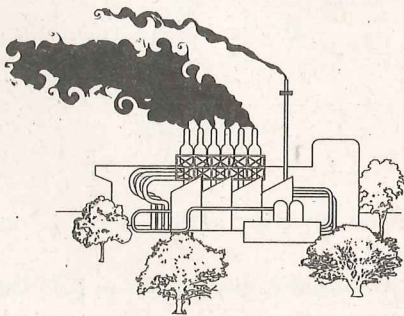


Diagram 21

Rajah 21

Which of the following are the long-term effects on human health?

Antara yang berikut, yang manakah kesan jangka panjang kepada kesihatan manusia?

- I Bronchitis
Bronkitis
- II Skin itchiness
Kegatalan pada kulit
- III Infertility
Kemandulan
- IV Skin cancer
Kanser kulit

- 34 Which of the following shows the correct sequence of blood flow in a systemic blood circulation of a human being?

Antara berikut, urutan manakah yang betul tentang aliran darah dalam peredaran darah sistemik dalam manusia?

- | | | | | | | | | | |
|---|---|---|-------------------------------|---|-----------------------------------|---|-------------------------------|---|---|
| A | Left ventricle
<i>Ventrikel kiri</i> | → | Vena cava
<i>Vena kava</i> | → | Body tissues
<i>Tisu badan</i> | → | Aorta
<i>Aorta</i> | → | Left atrium
<i>Atrium kiri</i> |
| B | Right ventricle
<i>Ventrikel kanan</i> | → | Vena cava
<i>Vena kava</i> | → | Left atrium
<i>Atrium kiri</i> | → | Aorta
<i>Aorta</i> | → | Body tissues
<i>Tisu badan</i> |
| C | Left ventricle
<i>Ventrikel kiri</i> | → | Aorta
<i>Aorta</i> | → | Body tissues
<i>Tisu badan</i> | → | Vena cava
<i>Vena kava</i> | → | Right atrium
<i>Atrium kanan</i> |
| D | Right ventricle
<i>Ventrikel kanan</i> | → | Aorta
<i>Aorta</i> | → | Body tissues
<i>Tisu badan</i> | → | Vena cava
<i>Vena kava</i> | → | Left ventricle
<i>Ventrikel kiri</i> |

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

- 33 Diagram 22 shows a human heart.

Rajah 22 menunjukkan jantung manusia.

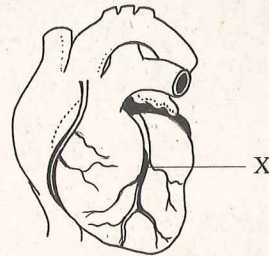


Diagram 22

Rajah 22

What will happen if there is a blockage of blood flow in X?

Apakah yang akan berlaku jika aliran darah tersumbat dalam X?

- A Stroke
Angin ahmar
- B Hypertension
Hipertensi
- C Low blood pressure
Tekanan darah rendah
- D Myocardial infarction
Penginfarkan miokardium

- 35 Diagram 23 shows an aphid feeding from tissue X of a plant.

Rajah 23 menunjukkan seekor afid mendapatkan makanan daripada tisu X suatu tumbuhan.

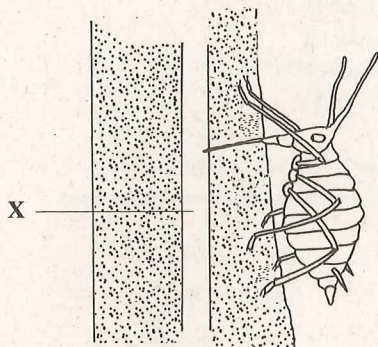


Diagram 23

Rajah 23

What is tissue X?

Apakah tisu X?

- | | |
|---------------------|--------------------------|
| A Xylem
Xilem | C Phloem
Floem |
| B Cortex
Korteks | D Epidermis
Epidermis |

- 36 Diagram 24 shows the locomotion of a fish.

Rajah 24 menunjukkan pergerakan seekor ikan.

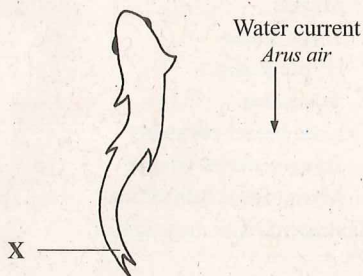


Diagram 24

Rajah 24

What will happen to the locomotion of the fish if structure X is injured?

Apakah yang akan berlaku kepada pergerakan ikan itu jika struktur X tercedera?

- A The fish cannot float
Ikan itu tidak boleh terapung
- B The fish cannot overcome resistance
Ikan itu tidak boleh mengatasi rintangan
- C The fish cannot move up and down
Ikan itu tidak boleh bergerak ke atas dan ke bawah
- D The fish cannot produce forward thrust
Ikan itu tidak boleh menghasilkan tujahan ke hadapan

- 37 Diagram 25 shows the vertebral column of a human.

Rajah 25 menunjukkan turus vertebra manusia.

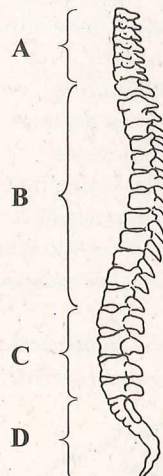


Diagram 25

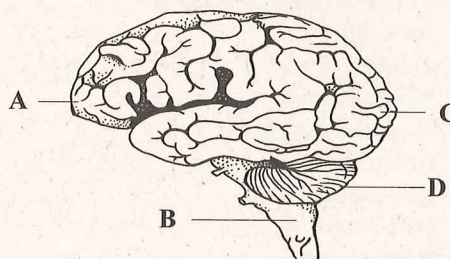
Rajah 25

Which of the parts labeled A, B, C or D is a sacrum?

Bahagian manakah yang berlabel A, B, C dan D ialah sakrum?

- 38 An accident victim injured his head and had difficulties in breathing.

Seorang mangsa kemalangan mengalami kecederaan kepala dan kesukaran bernafas.



Which part A, B, C or D was injured?

Antara bahagian A, B, C dan D yang manakah mengalami kecederaan?

- 39 A rubber tapper encounters a large cobra in his plantation.

What is the response of his body to this fearful situation?

Seorang penoreh getah berhadapan dengan seekor ular tedung yang besar di ladangnya.

Apakah tindak balas yang berlaku dalam badannya untuk menghadapi situasi yang menakutkan ini?

- I Adrenaline secretion increases
Rembesan adrenalina bertambah
- II Thyroxine secretion decreases
Rembesan tiroksina menurun
- III Rate of respiration increases
Kadar respirasi bertambah
- IV Rate of heartbeat decreases
Kadar denyutan jantung menurun
- A I and II C II and IV
I dan II II dan IV
- B I and III D III and IV
I dan III III dan IV

- 40 Diagram 26 is a graph which shows the relationship between blood glucose level and time.
Rajah 26 ialah graf yang menunjukkan hubungan antara aras glukosa darah dengan masa.

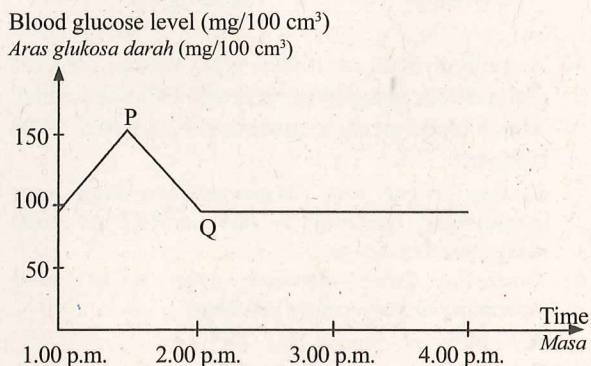


Diagram 26
Rajah 26

A meal containing sugar is consumed at 1.00 p.m.
Which statement explains the graph from P to Q?
Makanan yang mengandungi gula diambil pada pukul 1.00 tengah hari.

Pernyataan yang manakah menerangkan graf dari P ke Q?

- A ADH was secreted
ADH dirembeskan
- B Insulin was secreted
Insulin dirembeskan
- C Orange juice was drank
Jus oren diminum
- D Glucose was absorbed
Glukosa diserap

- 41 Diagram 27 shows a nephron.
Rajah 27 menunjukkan satu nefron.

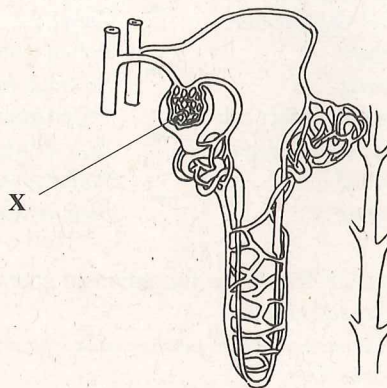


Diagram 27
Rajah 27

What process occurs at X?

Apakah proses yang berlaku di X?

- A Osmosis
Osmosis
- B Secretion
Rembesan
- C Reabsorption
Penyerapan semula
- D Ultrafiltration
Ultraturasan.

- 42 A woman has a weak uterus during her pregnancy.

Which treatment can overcome the problem?

Seorang wanita mempunyai uterus yang lemah semasa kehamilannya.

Rawatan manakah yang dapat mengatasi masalah itu?

- A Oxytocin injection
Suntikan oksitosin
- B Prolactin injection
Suntikan prolaktin
- C Progesterone injection
Suntikan progesteron
- D Follicle stimulating hormone (FSH) injection
Suntikan hormon perangsang folikel (FSH)

43 Which of the following is the correct sequence for the stages in the development of pollen grains?

Antara yang berikut, urutan yang manakah betul bagi peringkat-peringkat perkembangan butir debunga?

- | | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | Pollen mother cell
Sel induk debunga | → | Tetrad
Tetrad | → | Pollen grains
Butir debunga | → | Mature pollen grain
Butir debunga matang |
| B | Tetrad
Tetrad | → | Pollen mother cell
Sel induk debunga | → | Pollen grains
Butir debunga | → | Mature pollen grain
Butir debunga matang |
| C | Pollen mother cell
Sel induk debunga | → | Pollen grains
Butir debunga | → | Mature pollen grain
Butir debunga matang | → | Tetrad
Tetrad |
| D | Tetrad
Tetrad | → | Pollen grains
Butir debunga | → | Pollen mother cell
Sel induk debunga | → | Mature pollen grain
Butir debunga matang |

44 Diagram 28 shows the formation of sperm in the seminiferous tubule.

Rajah 28 menunjukkan pembentukan sperma dalam tubul seminiferus.

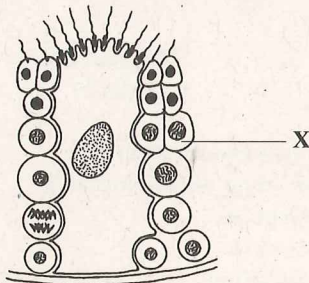


Diagram 28
Rajah 28

What is cell X?

Apakah sel X?

- A Spermatid
Spermatid
- B Spermatogonium
Spermatogonium
- C Primary spermatocyte
Spermatosit primer
- D Secondary spermatocyte
Spermatosit sekunder

45 Diagram 29 shows the double fertilisation process in flowering plants.

Rajah 29 menunjukkan proses persenyawaan ganda dua dalam tumbuhan berbunga.

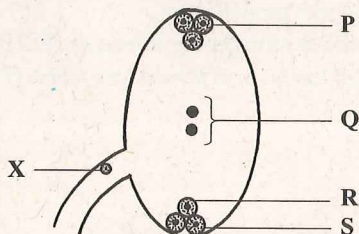


Diagram 29
Rajah 29

Which structure are fertilised by nucleus X?

Struktur yang manakah akan disenyawakan oleh nukleus X?

- | | | | |
|---|--------------------|---|--------------------|
| A | P and Q
P dan Q | C | Q and R
Q dan R |
| B | P and S
P dan S | D | R and S
R dan S |

46 A student with a blood type which contains antibodies A and antibodies B met with an accident. Which blood group is suitable to be donated to the student?

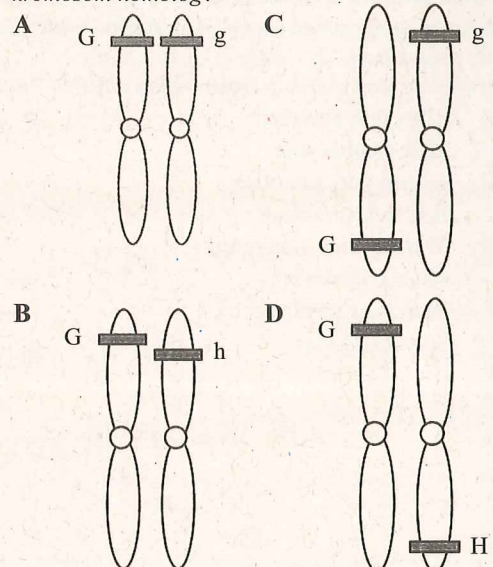
Seorang pelajar yang mempunyai jenis darah yang mengandungi antibodi A dan antibodi B telah mengalami kemalangan.

Kumpulan darah manakah yang sesuai untuk didermakan kepada pelajar tersebut?

- | | | | |
|---|-----------|---|-----------|
| A | $I^A I^O$ | C | $I^A I^B$ |
| B | $I^A I^O$ | D | $I^B I^O$ |

47 Which diagram shows the correct allele on homologous chromosomes?

Rajah manakah menunjukkan alel yang betul pada kromosom homolog?



- 48 Diagram 30 shows a graph of blood groups for a few students.

Rajah 30 menunjukkan graf bagi kumpulan-kumpulan darah bagi beberapa orang pelajar.

Number of students
Bilangan pelajar

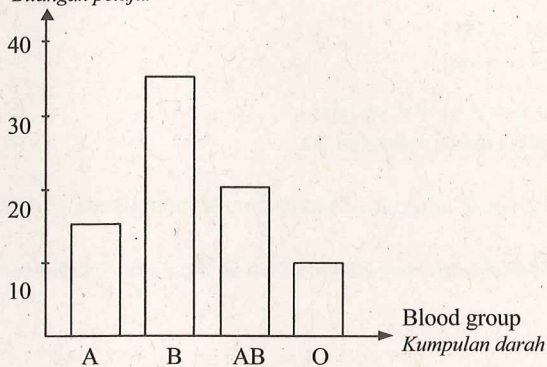


Diagram 30
Rajah 30

Which of the following characteristics refers to that type of variation?

Antara berikut ciri manakah yang merujuk kepada jenis variasi itu?

- A Quantitative
Kuantitatif
 - B Shows intermediates
Menunjukkan perantaraan
 - C Shows distinct categories
Menunjukkan kategori yang ketara
 - D Influenced by environment
Dipengaruhi oleh persekitaran
- 49 Diagram 31 shows combinations of chromosomes produced in gametes after meiosis II. This results in a variety of gametes that leads to genetic variation.

Rajah 31 menunjukkan gabungan kromosom yang dihasilkan di dalam gamet selepas meiosis II. Ini mengakibatkan pelbagai gamet yang menyebabkan variasi genetik.

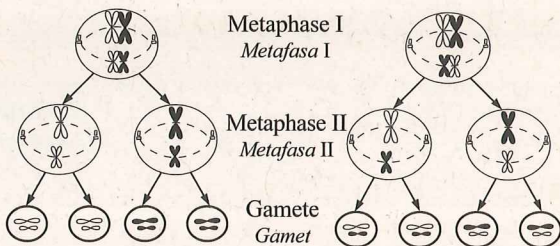


Diagram 31
Rajah 31

Which of the following conditions causes the production of gametes with different combinations?

Antara berikut, keadaan manakah yang menyebabkan penghasilan gamet dengan kombinasi yang berbeza?

- A Mutation
Mutasi
- B Crossing over
Pindah silang
- C Random fertilisation
Persenyawaan rawak
- D Independent assortment of chromosomes
Penyusunan rawak kromosom

- 50 Diagram 32 shows a karyotype of a genetic disease in humans.

Rajah 32 menunjukkan kariotip penyakit genetik pada manusia.

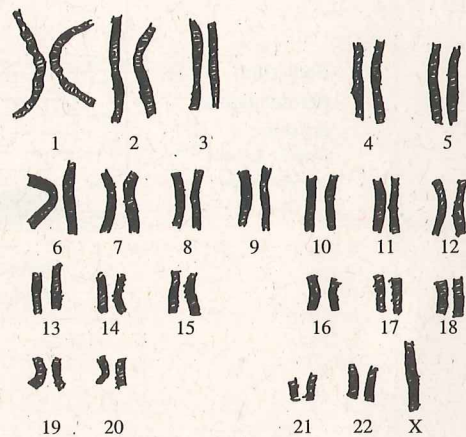


Diagram 32
Rajah 32

What is the genetic disease?

Apakah penyakit genetik tersebut?

- A Albinism
Albinisme
- B Turner's syndrome
Sindrom Turner
- C Sickle-cell anaemia
Anemia sel sabit
- D Klinefelter's syndrome
Sindrom Klinefelter

END OF QUESTION PAPER
KERTAS PEPERIKSAAN TAMAT

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

Section A
Bahagian A

[60 marks]
[60 markah]

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

- 1** Diagram 1.1 shows a change occurs when a small amount of potassium permanganate crystal is put into the water.

Rajah 1.1 menunjukkan suatu perubahan yang berlaku apabila sejumlah kecil hablur kalium permanganat dimasukkan ke dalam air.

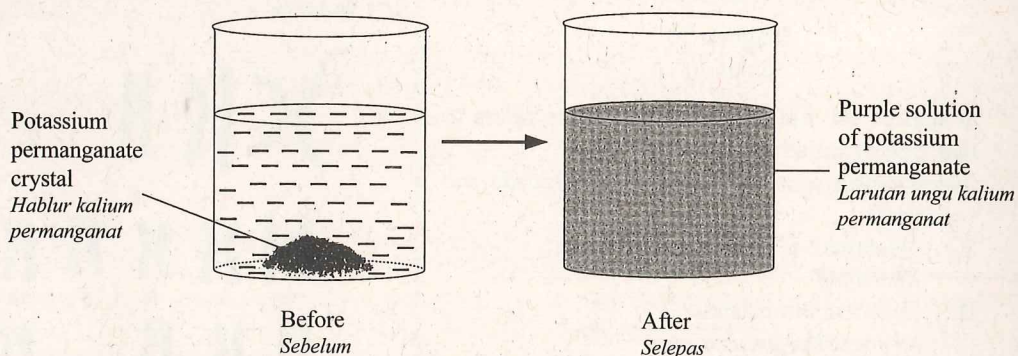


Diagram 1.1
Rajah 1.1

- (a) (i) Name the process involved in Diagram 1.1.
Namakan proses yang terlibat dalam Rajah 1.1.

1(a)(i)

	1
--	---

[1 mark]
[1 markah]

- (ii) How does the process in 1(a)(i) occur?
Bagaimanakah proses di 1(a)(i) berlaku?

1(a)(ii)

	2
--	---

[2 marks]
[2 markah]

(iii) Table 1 shows several examples of the movement of substances in daily life.

In Table 1, tick (✓) the correct examples of the process as named in 1(a)(i).

Jadual 1 menunjukkan beberapa contoh pergerakan bahan dalam kehidupan seharian.

Dalam Jadual 1, tandakan (✓) bagi contoh yang betul seperti proses yang dinamakan di 1(a)(i).

Gaseous exchange in alveolus <i>Pertukaran gas di dalam alveolus</i>	
Mineral ions move from soil water which is hypotonic into the root hair cell <i>Ion mineral bergerak dari air tanah yang hipotonik ke dalam sel akar rambut</i>	
A drop of blue ink is added into a glass of water causing the water turns blue <i>Setitis dakwat biru ditambah ke dalam segelas air menyebabkan air menjadi biru</i>	

Table 1

Jadual 1

[2 marks]

[2 markah]

1(a)(iii)

2

(b) Diagram 1.2 shows two types of food and the preservation methods.

Rajah 1.2 menunjukkan dua jenis makanan dan cara pengawetan.

(i) Match the food to the suitable method of preservation.

Padankan makanan itu kepada cara pengawetan yang sesuai.

[2 marks]

[2 markah]

1(b)(i)

2

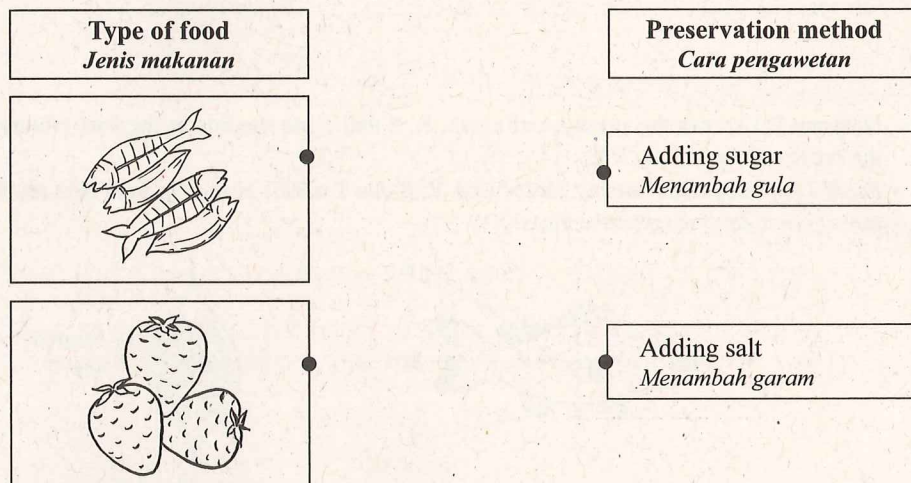


Diagram 1.2

Rajah 1.2

(ii) State **three** importances of preserving the food.

Nyatakan tiga kepentingan mengawet makanan itu.

.....

.....

.....

[3 marks]

[3 markah]

1(b)(ii)

3

- (c) Diagram 1.3 shows the transport of glucose from proximal convoluted tubule into the blood capillary in the kidney.

Rajah 1.3 menunjukkan pengangkutan glukosa dari tubul berlingkar proksimal ke dalam kapilari darah dalam ginjal.

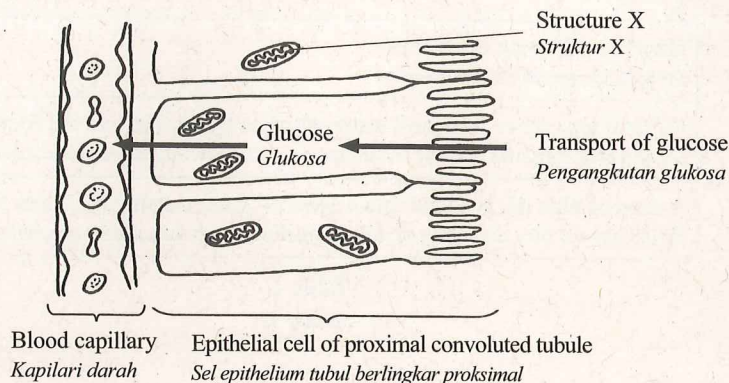


Diagram 1.3

Rajah 1.3

Explain what will happen to the transport of glucose if the structure X is absent.

Terangkan apa yang akan berlaku kepada pengangkutan glukosa jika struktur X tiada.

.....

.....

[2 marks]

[2 markah]

- 2 Diagram 2.1 shows the structure of a fish. R, S and T are the fins of the fish. Diagram 2.2 shows the cross section across XY.

Rajah 2.1 menunjukkan struktur seekor ikan. R, S dan T adalah sirip-sirip pada ikan tersebut. Rajah 2.2 menunjukkan keratan rentas merentasi XY.

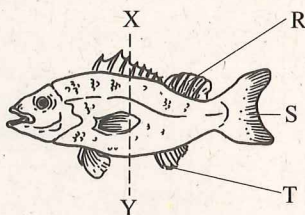


Diagram 2.1

Rajah 2.1

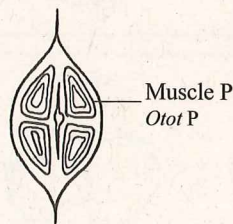


Diagram 2.2

Rajah 2.2

- (a) (i) Name fins R and T.
Namakan sirip R dan sirip T.

R :

T :

[2 marks]

[2 markah]

- (ii) Explain why fin R is important to the fish when swimming.

Terangkan mengapa sirip R adalah penting bagi ikan semasa berenang.

.....

.....

[2 marks]

[2 markah]

- (b) Explain how muscle P acts during the movement of the fish.
Terangkan bagaimana otot P bertindak semasa pergerakan ikan itu.

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2(b)

[2 marks]
[2 markah]

2

- (c) Fin S is injured as shown in Diagram 2.3.
Sirip S tercedera seperti yang ditunjukkan dalam Rajah 2.3.

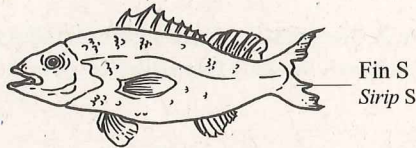


Diagram 2.3
Rajah 2.3

- (i) Explain how does the injury affect the movement of the fish.
Terangkan bagaimana kecederaan itu mempengaruhi pergerakan ikan tersebut.

[2 marks]
[2 markah]

2(c)(i)

2

- (ii) The fish is able to adapt with the injury and survived.
 Describe how the fish overcomes the problem while swimming.
*Ikan itu dapat menyesuaikan diri dengan kecederaannya dan terus hidup.
 Jelaskan bagaimana ikan itu mengatasi masalah tersebut semasa berenang.*

[2 marks]
[2 markah]

2(c)(ii)

2

- (d) Hot water from a factory is released into the river. Diagram 2.4 shows the effect of temperature on the concentration of dissolved oxygen in the river.
Air panas daripada kilang dilepaskan ke dalam sungai. Rajah 2.4 menunjukkan kesan suhu ke atas kepekatan oksigen terlarut di dalam air sungai.

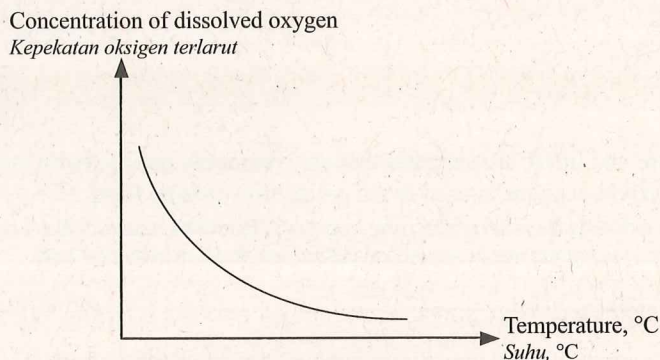


Diagram 2.4
Rajah 2.4

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2(d)

2

Total A2

12

Explain how this situation causes the death of fish in the river.
Terangkan bagaimana situasi ini menyebabkan kematian ikan di dalam sungai.

.....

.....

[2 marks]

[2 markah]

- 3 Cell wall is made up of fibre X. Diagram 3.1 shows fibre X and its monomers.
Dinding sel terbina daripada gentian X. Rajah 3.1 menunjukkan gentian X dan monomernya.

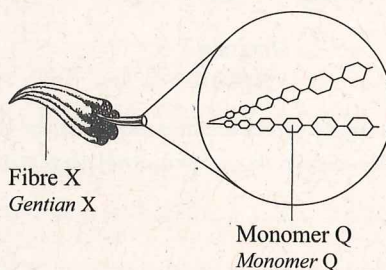


Diagram 3.1

Rajah 3.1

- (a) Name fibre X and monomer Q.
Namakan gentian X dan monomer Q.

X:

Q:

[2 marks]

[2 markah]

- (b) Explain how fibre X maintains the shape of a plant cell.
Terangkan bagaimana gentian X mengekalkan bentuk suatu sel tumbuhan.

.....

.....

.....

[3 marks]

[3 markah]

- (c) Protease and lipase are enzymes that are commonly used in baby food industry.
Explain why enzyme is used in the production of baby food.
*Protease dan lipase ialah enzim yang biasanya digunakan dalam industri makanan bayi.
Terangkan mengapa enzim digunakan dalam penghasilan makanan bayi.*

.....

.....

[2 marks]

[2 markah]

3(c)

2

- (d) An apple contains a lot of pectin. Pectin is a substance which helps to stick plant cells together. In industry, pectinase is used in the extraction of apple to produce apple juice industrially. Apple juice which is extracted using pectinase is clear while homemade apple juice is cloudy. *Epal mempunyai pektin yang banyak. Pektin ialah bahan yang membantu untuk melekatkan sel-sel tumbuhan bersama. Dalam industri, pektinase digunakan dalam pengekstrakan buah epal bagi menghasilkan jus buah secara industri. Jus epal yang diekstrak dengan menggunakan pektinase adalah jernih manakala jus epal buatan sendiri adalah keruh.*

Explain why the enzyme pectinase is used in the fruit juice production.

Terangkan mengapa enzim pektinase digunakan dalam penghasilan jus buah.

.....

.....

.....

[3 marks]

[3 markah]

3(d)

	3
--	---

- (e) Activation energy is the minimum energy required to start a biochemical reaction. Diagram 3.2 shows the effect of enzyme on the activation energy of the biochemical reaction.

Tenaga pengaktifan ialah tenaga minima yang diperlukan untuk memulakan suatu tindak balas biokimia. Rajah 3.2 menunjukkan kesan enzim ke atas tenaga pengaktifan bagi tindak balas biokimia tersebut.

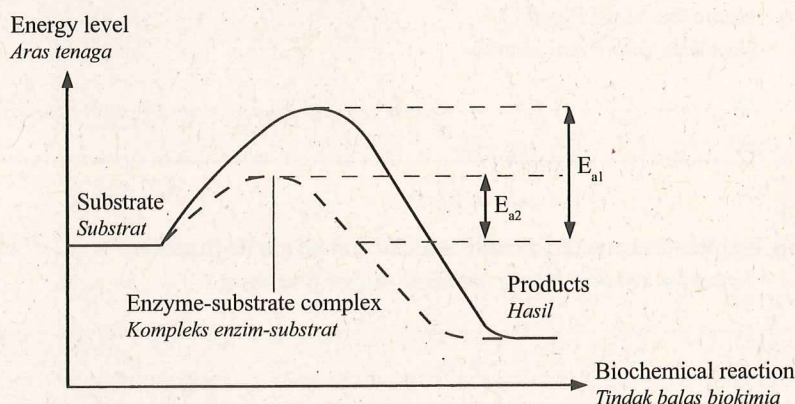


Diagram 3.2
Rajah 3.2

Key / Kekunci:

E_a = Activation energy
Tenaga pengaktifan

— = Reaction without enzyme
Tindak balas tanpa enzim

- - - = Reaction with enzyme
Tindak balas dengan enzim

Based on Diagram 3.2, explain how enzyme affects the rate of biochemical reaction.

Berdasarkan Rajah 3.2, terangkan bagaimana enzim mempengaruhi kadar tindak balas biokimia.

.....

.....

[2 marks]

[2 markah]

3(e)

	2
--	---

Total A3

	12
--	----

- 4 Diagram 4 shows a part of human respiratory system.
Rajah 4 menunjukkan sebahagian sistem respiratori manusia.

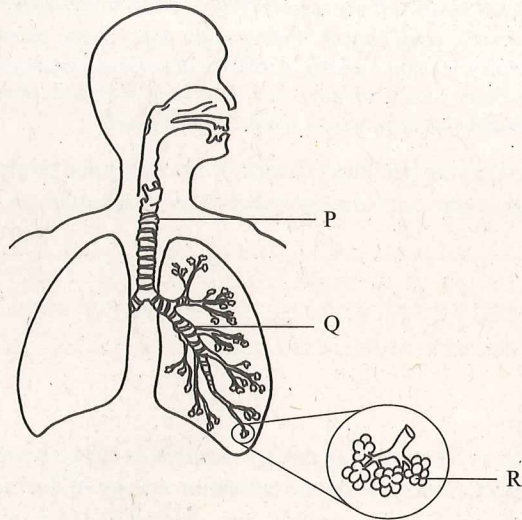


Diagram 4
Rajah 4

- (a) (i) Name the tubes P and Q.
Namakan salur P dan salur Q.

P:

Q:

[2 marks]
[2 markah]

- (ii) Explain a characteristic of P which is related to its function.
Terangkan ciri bagi P yang berkaitan dengan fungsinya.

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

[3 marks]
[3 markah]

- (b) (i) A heavy smoker is prone to persistent cough.
Explain how this habit reduces the efficiency of respiratory system to function.
Seorang perokok tegar mudah mendapat batuk berterusan.
Terangkan bagaimana tabiat ini mengurangkan kecekapan sistem respirasi berfungsi.

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

[3 marks]
[3 markah]

- (ii) Explain another possible disease which may be suffered by the heavy smoker.
Terangkan satu penyakit lain yang mungkin dihidapi oleh perokok tegar tersebut.

.....
.....

[2 marks]
[2 markah]

- (c) Give **one** suggestion on how to increase the ventilation rate during breathing. Explain your suggestion.

Berikan satu cadangan bagaimana untuk meningkatkan kadar ventilasi semasa bernafas. Terangkan cadangan anda.

.....

.....

[2 marks]

[2 markah]

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4(c)

	2
--	---

Total A4

	12
--	----

- 5 Diagram 5.1 shows a part of the female reproductive system in human.
Diagram 5.2 shows the stages of the ovarian cycle in the ovary.

Rajah 5.1 menunjukkan sebahagian sistem pembiakan perempuan pada manusia.

Rajah 5.2 menunjukkan peringkat kitar ovari dalam ovari.

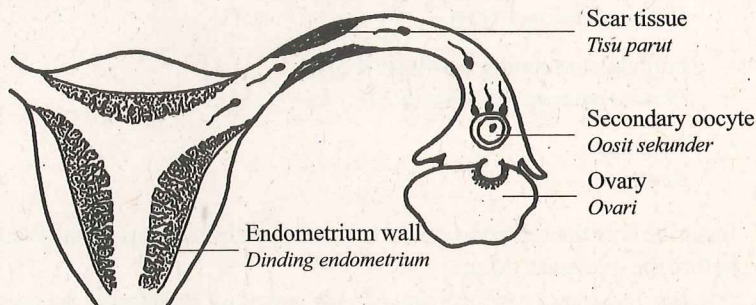


Diagram 5.1

Rajah 5.1

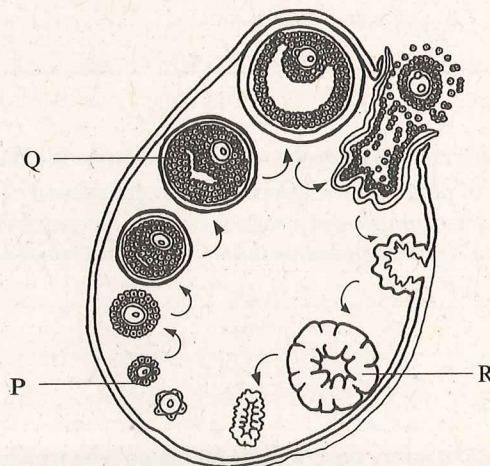


Diagram 5.2

Rajah 5.2

- (a) Based on Diagram 5.2,
Berdasarkan Rajah 5.2,

- (i) explain the development of structure P to form structure Q.
terangkan perkembangan struktur P untuk membentuk struktur Q.

.....

.....

[2 marks]

[2 markah]

5(a)(i)

	2
--	---

- (ii) structure Q will develop to form structure R.
explain the differences between structure Q and R.
*struktur Q akan berkembang untuk membentuk struktur R.
terangkan perbezaan antara struktur Q dan struktur R.*

5(a)(ii)

	3
--	---

[3 marks]
[3 markah]

- (b) (i) The following hormones are involved in ovum formation.
Berikut adalah hormon-hormon yang terlibat dalam pembentukan ovum.

- Luteinising hormone (LH)
Hormon peluteinan (LH)
- Follicle-stimulating hormone (FSH)
Hormon perangsang folikel (FSH)
- Oestrogen
Estrogen

Describe how the secretion of one hormone controls the secretion of the other hormones before the ovulation occurs.

Jelaskan bagaimana rembesan satu hormon mengawal perembesan hormon-hormon yang lain sebelum ovulasi berlaku.

5(b)(i)

	3
--	---

[3 marks]
[3 markah]

- (ii) Contraceptive pills contain oestrogen and progesterone hormones.
Explain the role of progesterone hormone in the prevention of pregnancy.
*Pil pencegah kehamilan mengandungi hormon estrogen dan progesteron.
Terangkan peranan hormon progesteron dalam pencegahan kehamilan.*

5(b)(ii)

	2
--	---

[2 marks]
[2 markah]

- (c) In certain pregnancies, an injury occurs in the Fallopian tube which will cause the formation of scar tissue as shown in Diagram 5.1.

Explain how the presence of scar tissue may affect the pregnancy.

Dalam sesetengah kehamilan, suatu kecederaan berlaku dalam tiub Fallopio yang akan menyebabkan pembentukan tisu parut seperti ditunjukkan dalam Rajah 5.1.

Terangkan bagaimana kehadiran tisu parut boleh memberi kesan kepada kehamilan.

5(c)

	2
--	---

Total A5

	12
--	----

[2 marks]
[2 markah]

Section B
Bahagian B

[40 marks]

[40 markah]

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

6 Diagram 6 shows the pathway of nerve impulse in a reflex action.

Rajah 6 menunjukkan laluan impuls saraf dalam suatu tindakan refleks.

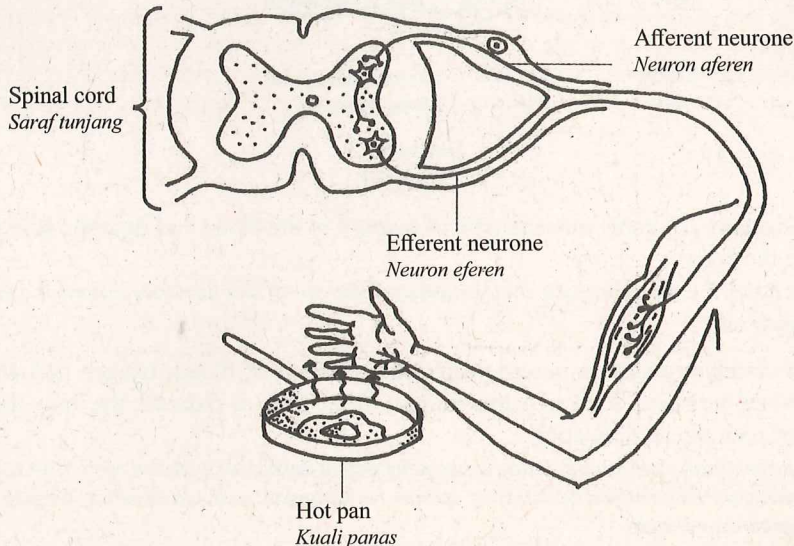


Diagram 6

Rajah 6

- (a) (i) Explain the transmission of nerve impulse during reflex action in Diagram 6. [4 marks]
Terangkan penghantaran impuls saraf semasa tindakan refleks dalam Rajah 6. [4 markah]
- (ii) Based on Diagram 6, compare and contrast the afferent neurone and efferent neurone. [10 marks]
Berdasarkan Rajah 6, bandingkan dan bezakan di antara neuron aferen dan neuron eferen. [10 markah]
- (b) Depressant is given to a patient to relieve the anxieties in everyday life. [6 marks]
Explain the effect of the drugs on the transmission of impulse through synapse. [6 marks]
Dadah penenang diberikan kepada seorang pesakit untuk mengurangkan ketegangan dalam kehidupan seharian.
Terangkan kesan dadah tersebut ke atas penghantaran impuls melalui sinaps. [6 markah]

7 Diagram 7.1 shows body cells and blood vessels.

Rajah 7.1 menunjukkan sel badan dan salur darah.

The interstitial fluid is a liquid which bathes the cells in the body.

It acts as a medium for intercellular communication, delivery of nutrients to the cells and removal of metabolic waste.

Bendalir interstis adalah bendalir yang membasahi sel dalam badan.

Ia bertindak sebagai medium komunikasi antara sel, penghantaran nutrien kepada sel dan penyingkiran bahan buangan metabolik.

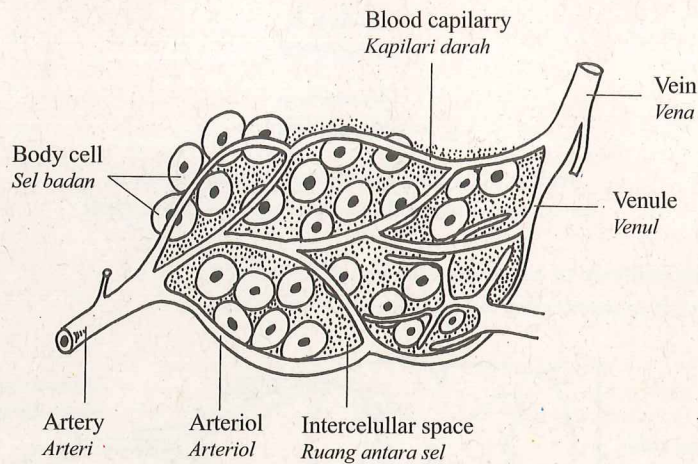


Diagram 7.1
Rajah 7.1

- (a) Based on Diagram 7.1, name **one** example of nutrient in the blood and describe how the nutrient can be delivered to the cells. [4 marks]

Berdasarkan Rajah 7.1, namakan satu contoh nutrien dalam darah dan huraikan bagaimana nutrien tersebut dapat dihantar kepada sel. [4 markah]

- (b) The human circulatory system is responsible for transport of blood, oxygen and nutrients throughout the body. When the blood flows to a specific part of the body is reduced, the individual may experience symptoms of poor blood circulation.

Sistem peredaran darah manusia bertindak untuk mengangkut darah, oksigen dan nutrien ke seluruh badan. Apabila darah yang mengalir ke bahagian badan yang spesifik berkurangan, individu tersebut mungkin mengalami simptom peredaran darah yang lemah.

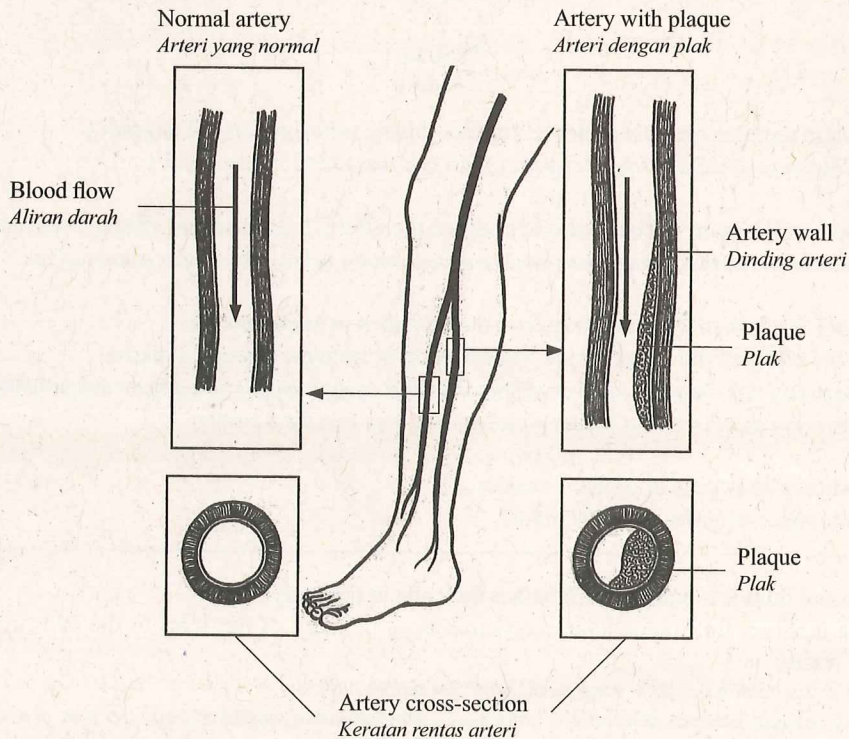


Diagram 7.2
Rajah 7.2

Diagram 7.2 shows blood flow in a normal artery and blood flow in an artery with plaque.

Explain the cause of poor blood circulation and the effect to the health.

[6 marks]

Rajah 7.2 menunjukkan pengaliran darah dalam arteri yang normal dan pengaliran darah dalam arteri yang mengandungi plak.

Terangkan sebab peredaran darah yang lemah dan kesan kepada kesihatan.

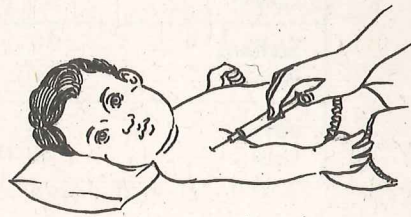
[6 markah]

(c) Diagram 7.3 shows two methods on how the baby obtains immunity against diseases.

Rajah 7.3 menunjukkan dua kaedah bagaimana bayi memperoleh keimunan terhadap penyakit.



Method 1
Kaedah 1



Method 2
Kaedah 2

Diagram 7.3
Rajah 7.3

Compare the immunities obtained by the baby through these two methods.

[10 marks]

Bandingkan keimunan yang diperoleh oleh bayi melalui dua kaedah ini.

[10 markah]

8 (a) Diagram 8 shows several eating habits of human.

Rajah 8 menunjukkan beberapa tabiat pemakanan manusia.

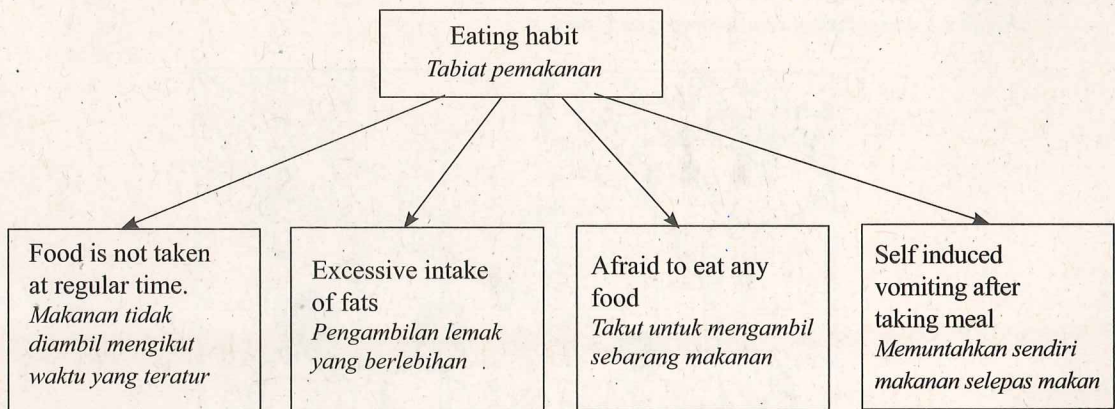


Diagram 8
Rajah 8

Explain how the eating habits affect the human health.

[10 marks]

Terangkan bagaimana tabiat pemakanan tersebut mempengaruhi kesihatan manusia.

[10 markah]

- (b) Table 8 shows the nutrient content of a chicken burger and a vegetable burger.

Jadual 8 menunjukkan kandungan nutrien burger ayam dan burger sayuran.

Content per 100 g <i>Kandungan per 100 g</i>	Chicken burger <i>Burger ayam</i>	Vegetable burger <i>Burger sayuran</i>
Protein <i>Protein</i>	12.8 g	10.0 g
Carbohydrate <i>Karbohidrat</i>	21.9 g	19.2 g
Fat <i>Lemak</i>	18.2 g	6.8 g
Sodium <i>Natrium</i>	534.0 mg	484.0 mg
Fibre <i>Serat</i>	0.9 g	2.7 g

Table 8

Jadual 8

- (i) Based on Table 8, suggest the best burger for the diet of a 16 years old student.
Berdasarkan Jadual 8, cadangkan burger yang terbaik untuk diet murid berumur 16 tahun.

- (ii) The student consumes the burger everyday for a long period of time.
Discuss the good and the bad effects of the diet on his health.
*Pelajar berkenaan mengambil burger itu setiap hari untuk tempoh yang panjang.
Bincangkan kesan baik dan kesan buruk pemakanan itu ke atas kesihatannya.*

[10 marks]

[10 markah]

- 9 (a) Diagram 9.1 shows an atmospheric phenomenon.

Rajah 9.1 menunjukkan satu fenomena atmosfera.

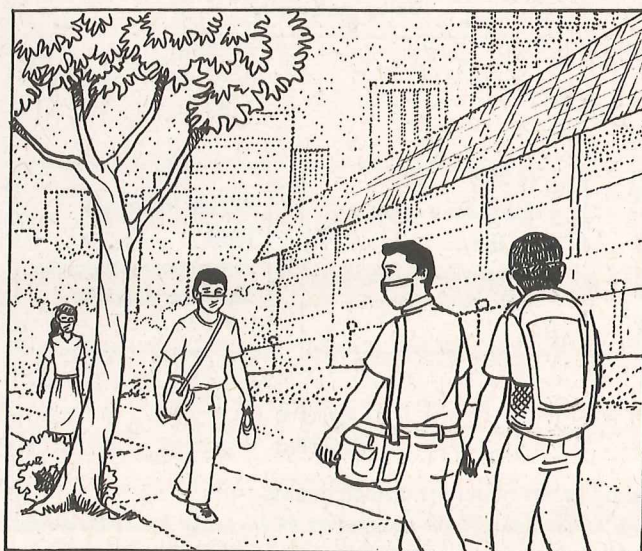


Diagram 9.1

Rajah 9.1

A phenomenon that causes low visibility due to fine suspended particles at the atmospheric layer closed to the Earth surface.

Discuss the phenomenon based on the following issues:

Satu fenomena yang menyebabkan kadar penglihatan yang rendah disebabkan oleh zarah-zarah terampai yang halus pada lapisan atmosfera berhampiran dengan permukaan bumi.

Bincangkan fenomena tersebut berdasarkan isu-isu berikut:

(i) The amount of suspended particles in the air increases

Jumlah zarah-zarah terampai di udara meningkat

(ii) This phenomenon will affect the living organisms

Fenomena ini akan memberi kesan ke atas organisma hidup

[10 marks]

[10 markah]

(b) Diagram 9.2 shows the current situation of Bukit Mesra.

Rajah 9.2 menunjukkan situasi semasa di Bukit Mesra.

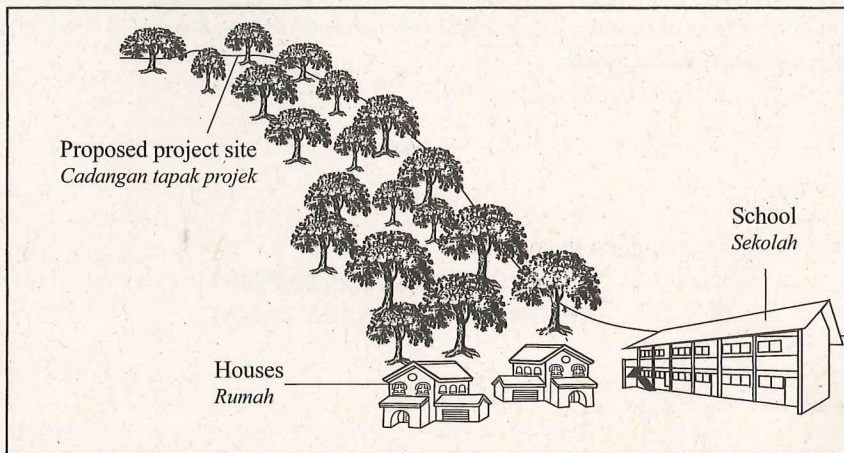


Diagram 9.2

Rajah 9.2

A developer has proposed to build a hospital and a few quarters for the hospital staff in Bukit Mesra as shown in Diagram 9.3.

Pemaju telah mencadangkan untuk membina sebuah hospital dan beberapa buah kuarters bagi kakitangan hospital di Bukit Mesra seperti yang ditunjukkan dalam Rajah 9.3.

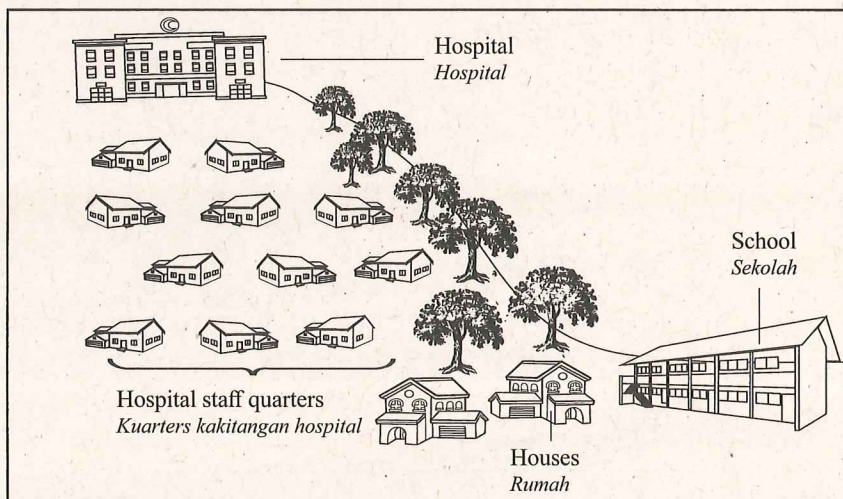


Diagram 9.3

Rajah 9.3

The developer has listed the following steps to ensure the safety of the area:

Pemaju itu telah menyenaraikan langkah-langkah berikut untuk memastikan keselamatan kawasan itu:

- Build barriers to prevent landslide
Membina penghadang bagi menghalang tanah runtuh
- Build a drainage system
Membina sistem perparitan

The proposal has been rejected by the local authority. The developer plans to submit a new proposal to the local authority with a few additional safety steps.

Suggest and explain what are the additional safety steps that the developer should include in the proposal in order to convince the authority. [10 marks]

Cadangan itu telah ditolak oleh pihak berkuasa tempatan. Pemaju itu kemudiannya merancang untuk menghantar cadangan baharu kepada pihak berkuasa tempatan dengan beberapa langkah keselamatan tambahan.

Cadang dan terangkan apakah langkah keselamatan tambahan yang perlu pemaju sertakan dalam kertas cadangan itu bagi meyakinkan pihak berkuasa. [10 markah]

END OF QUESTION PAPER
KERTAS PEPERIKSAAN TAMAT

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

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

Answer **all** questions.

Jawab **semua** soalan.

- 1** Most fruits contain ascorbic acid normally known as vitamin C. Vitamin C is a strong reducing agent for Dichlorophenolindophenol (DCPIP).

A group of students carried out an experiment to determine the concentration of vitamin C in fruit juices using DCPIP solution.

Kebanyakan buah mengandungi asid askorbik yang umumnya dikenali sebagai vitamin C. Vitamin C merupakan agen penurunan yang kuat bagi Diklorofenolindofenol (DCPIP).

Sekumpulan pelajar menjalankan satu eksperimen untuk menentukan kepekatan vitamin C dalam jus buah menggunakan larutan DCPIP.

Diagram 1.1 shows the initial volume of 0.1% ascorbic acid solution and Diagram 1.2 shows the initial volume of the fruit juice used in this experiment.

Rajah 1.1 menunjukkan isi padu awal bagi larutan asid askorbik 0.1 % dan Rajah 1.2 menunjukkan isi padu awal bagi jus buah yang digunakan dalam eksperimen ini.

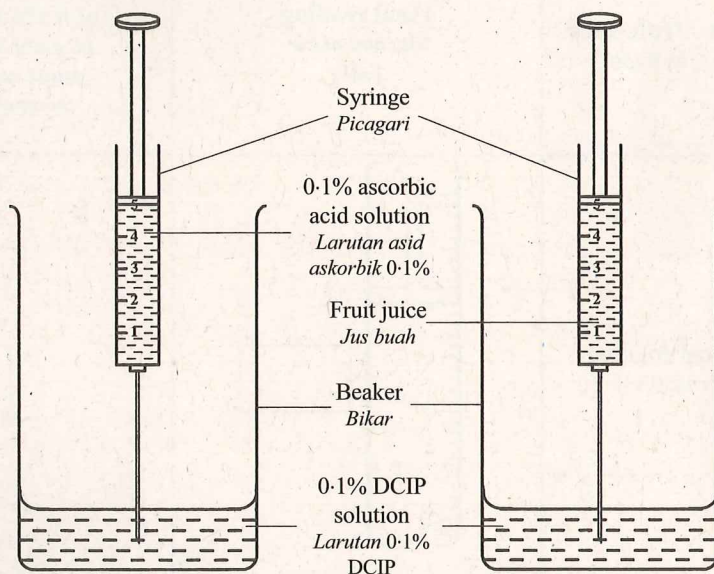


Diagram 1.1

Rajah 1.1

Diagram 1.2

Rajah 1.2

The students carried out the following steps:

Pelajar telah menjalankan langkah-langkah berikut:

Step 1

1 ml 0.1% DCPIP solution is placed in a beaker.

Langkah 1

1 ml larutan DCPIP 0.1 % dimasukkan ke dalam bikar.

Step 2

5 ml 0.1 % ascorbic acid solution is filled into a 5 ml syringe with needle. 0.1% ascorbic acid solution is added drop by drop to the 0.1 % DCPIP solution until the solution becomes colourless.

Langkah 2

5 ml larutan asid askorbik 0.1 % dimasukkan ke dalam 5 ml picagari berjarum. Larutan asid askorbik 0.1 % ditambah setitis demi setitis ke dalam larutan DCPIP 0.1 % sehingga larutan menjadi tidak berwarna.

Step 3

Record the volume of 0.1 % ascorbic acid solution used in Table 1 on pages 236 and 237.

Langkah 3

Rekod isi padu larutan asid askorbik 0.1 % yang digunakan dalam Jadual 1 di halaman 236 dan 237.

Step 4


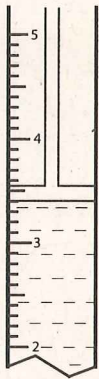
Step 1 until Step 3 are repeated by using papaya juice, guava juice and mango juice.

Langkah 4

Langkah 1 hingga Langkah 3 diulangi dengan menggunakan jus betik, jus jambu batu dan jus mangga.

Table 1 shows the result of the experiment.

Jadual 1 menunjukkan keputusan eksperimen itu.

Type of solution / fruit juice <i>Jenis larutan / jus buah</i>	Final reading <i>Bacaan akhir</i> (ml)	Volume of solution / fruit juice to decolourise 1 ml of 0.1% DCPIP solution <i>Isi padu larutan / jus buah</i> <i>untuk melunturkan 1 ml</i> <i>larutan DCPIP 0.1%</i> (ml)
0.1% ascorbic acid solution <i>Larutan asid askorbik 0.1%</i>	 <input data-bbox="662 1103 775 1174" type="text"/>	<input data-bbox="1001 1103 1114 1174" type="text"/>
Papaya juice <i>Jus betik</i>	 <input data-bbox="662 1514 775 1586" type="text"/>	<input data-bbox="1001 1514 1114 1586" type="text"/>



Type of solution fruit juice <i>Jenis larutan jus buah</i>	Final reading <i>Bacaan akhir</i> (ml)	Volume of solution / fruit juice to decolourise 1 ml of 0.1% DCPIP solution <i>Isi padu larutan / jus buah untuk melunturkan 1 ml larutan DCPIP 0.1%</i> (ml)
Guava juice <i>Jus jambu</i>	 <div style="display: inline-block; width: 80px; height: 30px; border: 1px solid black; margin-left: 10px;"></div>	<div style="display: inline-block; width: 80px; height: 30px; border: 1px solid black; margin-left: 10px;"></div>
Mango juice <i>Jus mangga</i>	 <div style="display: inline-block; width: 80px; height: 30px; border: 1px solid black; margin-left: 10px;"></div>	<div style="display: inline-block; width: 80px; height: 30px; border: 1px solid black; margin-left: 10px;"></div>

Table 1
Jadual 1

- (a) Record the volume of 0.1% ascorbic acid solution or fruit juices to decolourise 1 ml 0.1 % DCPIP solution in Table 1 on pages 236 and 237.

Rekod isi padu larutan asid askorbik 0.1% atau jus buah untuk melunturkan 1 ml larutan DCPIP 0.1 % dalam Jadual 1 di halaman 236 dan 237.

[3 marks]

[3 markah]

1(a)

	3
--	---

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

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

Observation 1:

Pemerhatian 1:

.....

.....

For
Examiner's
Use

1(b)(i)

	3
--	---

Observation 2:
Pemerhatian 2:

.....

.....

[3 marks]
[3 markah]

- (ii) State **two** inferences which correspond to the observations in 1(b)(i).
Nyatakan **dua** inferens yang sepadan dengan pemerhatian di 1(b)(i).

Inference from observation 1:

Inferens daripada pemerhatian 1:

.....

.....

Inference from observation 2:

Inferens daripada pemerhatian 2:

.....

.....

[3 marks]
[3 markah]

1(b)(ii)

	3
--	---

- (c) Complete Table 2 based on the experiment.
Lengkapkan Jadual 2 berdasarkan eksperimen itu.

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

Table 2
Jadual 2

[3 marks]
[3 markah]

1(c)

	3
--	---

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

For
Examiner's
Use

1(d)

[3 marks]
[3 markah]

3

- (e) (i) Construct a table and record all the data collected from the experiment.
Your table should have the following titles:

Bina satu jadual dan rekod semua data yang dikumpul daripada eksperimen itu.
Jadual anda hendaklah mengandungi tajuk-tajuk berikut:

- Types of solution or fruit juices
Jenis larutan atau jus buah
- Volume of solution or fruit juices used to decolourise 1 ml of 0.1 % DCPIP solution
Isi padu larutan atau jus buah yang digunakan untuk melunturkan warna 1 ml larutan DCPIP 0.1 %
- Concentration of vitamin C
Kepekatan vitamin C

Use the formula:

Gunakan formula:

$$\text{Concentration of vitamin C} = \frac{\text{Volume of 0.1\% ascorbic acid}}{\text{Volume of fruit juice}} \times 1.0 \text{ mg / ml}$$

$$\text{Kepekatan vitamin C} = \frac{\text{Isi padu asid askorbik 0.1\%}}{\text{Isi padu jus buah}} \times 1.0 \text{ mg / ml}$$

[3 marks]
[3 markah]

1(e)(i)

3

- (ii) Use the graph paper provided on page 240 to answer this question.
Using the data in 1(e)(i), draw a bar chart of the concentration of vitamin C against the types of fruit juices.

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

Menggunakan data di 1(e)(i), lukis satu carta bar bagi kepekatan vitamin C melawan jenis jus buah.

[3 marks]
[3 markah]

1(e)(ii)

3

- (f) Based on the bar chart drawn in 1(e)(ii), state the relationship between the concentration of vitamin C and types of fruit juices.

Explain your answer.

Berdasarkan carta bar yang dilukis di 1(e)(ii), nyatakan hubungan kepekatan vitamin C dengan jenis jus buah.

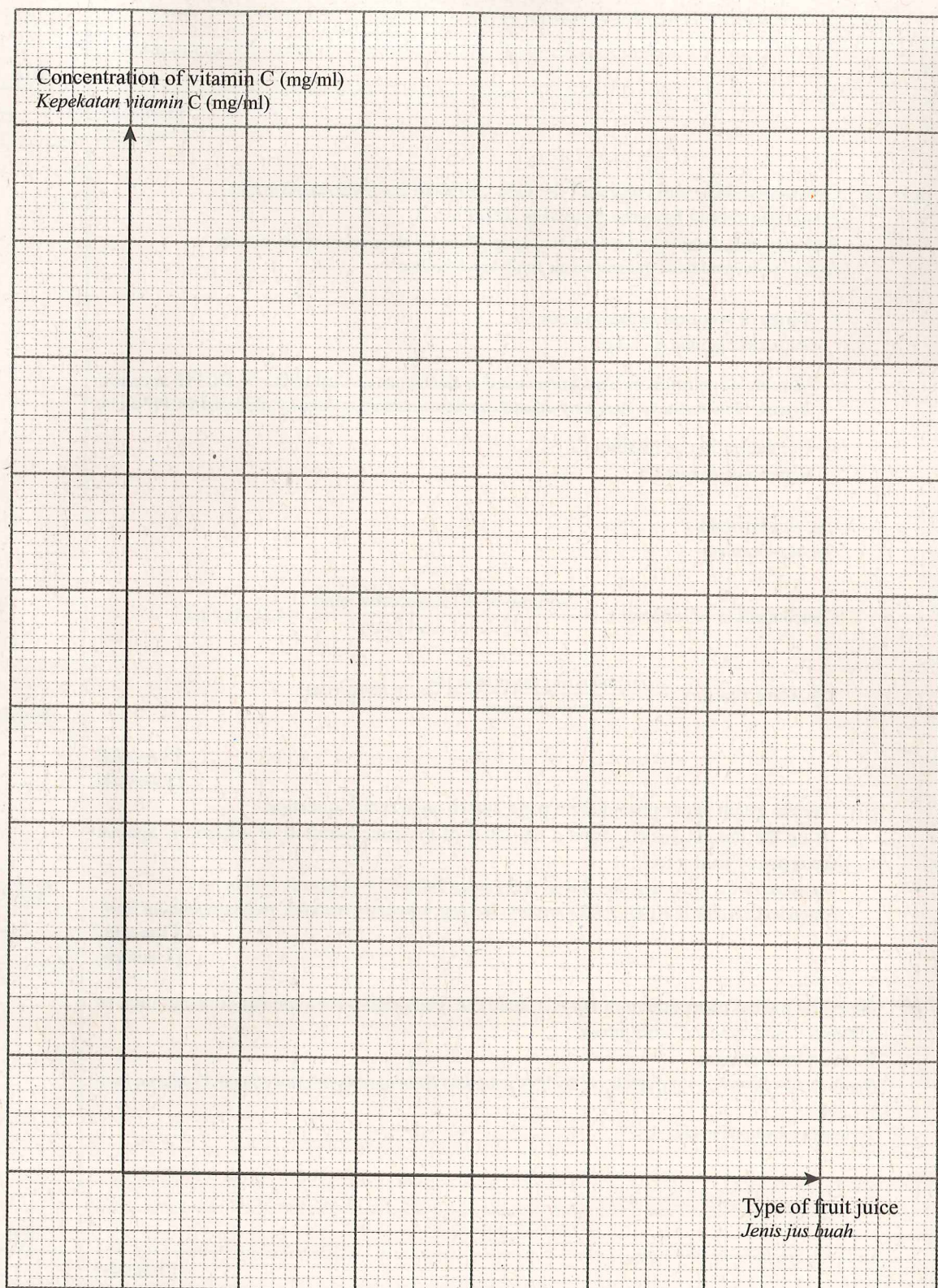
Terangkan jawapan anda.

[3 marks]
[3 markah]

1(f)

3

Bar chart of concentration of vitamin C against the types of fruit juices
Carta bar bagi kepekatan vitamin C melawan jenis jus buah



- (g) Another group of students carried out the same experiment by using processed mango juice as shown in Diagram 2.

Sekumpulan pelajar yang lain menjalankan eksperimen yang sama dengan menggunakan jus mangga yang diproses seperti yang ditunjukkan dalam Rajah 2.

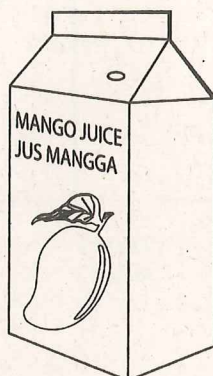


Diagram 2

Rajah 2

Predict the volume of processed mango juice that need to be used to decolourise the DCPIP solution.

Explain your answer.

Ramal isi padu jus mangga yang diproses yang perlu digunakan untuk melunturkan warna larutan DCPIP.

Terangkan jawapan anda.

.....

.....

.....

[3 marks]

[3 markah]

1(g)

	3
--	---

- (h) Based on the result from this experiment, state the operational definition for vitamin C.

Berdasarkan keputusan eksperimen ini, nyatakan definisi secara operasi bagi vitamin C.

.....

.....

.....

[3 marks]

[3 markah]

1(h)

	3
--	---

- (i) The following list are fruits that contain vitamin C.

Senarai berikut ialah buah-buahan yang mengandungi vitamin C.

Banana	Apple	Blackcurrant	Pineapple
Pisang	Epal	Beri hitam	Nanas

Classify the fruits into high content of vitamin C and low content of vitamin C in Table 3.

Kelaskan buah-buahan itu kepada kandungan vitamin C yang tinggi dan kandungan vitamin C yang rendah dalam Jadual 3.

1(i)

	3
--	---

Total
1

	33
--	----

High content of vitamin C <i>Kandungan vitamin C yang tinggi</i>	Low content of vitamin C <i>Kandungan vitamin C yang rendah</i>

Table 3
Jadual 3

[3 marks]

[3 markah]

- 2 Based on the information below, plan an experiment to study the effect of types of soil on the length of leaves for *Hibiscus* sp..

Berdasarkan maklumat di bawah, rancang satu eksperimen untuk mengkaji kesan jenis tanah terhadap panjang daun Hibiscus sp..

Variation is the difference between organisms of the same species.

Variation in plants can be seen through the length of leaves.

Variasi ialah perbezaan antara organisma bagi spesies yang sama.

Variasi pada tumbuhan boleh dilihat melalui panjang daun.

The planning of your experiment must include the following aspects:

Perancangan eksperimen anda hendaklah meliputi aspek-aspek berikut:

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

[17 marks]

[17 markah]

END OF QUESTION PAPER
KERTAS PEPERIKSAAN TAMAT