

SULIT
4551/1
BIOLOGY
KERTAS/PAPER 1
18 OGOS 2011
1¼ jam

MAJLIS KEBANGSAAN PENGETUA – PENGETUA
SEKOLAH MENENGAH
NEGERI KEDAH DARUL AMAN

PEPERIKSAAN PERCUBAAN SPM 2011

BIOLOGY

Paper 1

One hour and fifteen minutes

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini adalah dalam dwibahasa.*
2. *Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Melayu.*
3. *Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*

Kertas soalan ini mengandungi 32 halaman bercetak.

Answer all questions.

Jawab semua soalan.

- 1 Diagram 1 shows the structure of a cell.
Rajah 1 menunjukkan struktur sejenis sel.

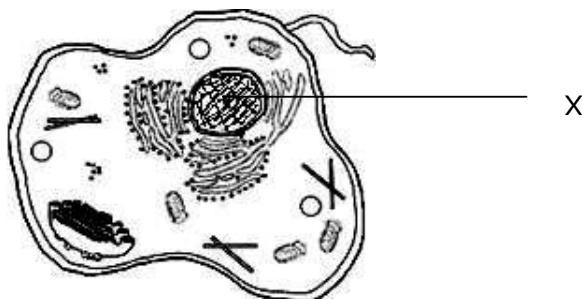


Diagram 1
Rajah 1

What is the function of organelle X?

Apakah fungsi organel X ?

- | | |
|--|---|
| A Produce ATP
<i>Menghasilkan ATP</i> | C Site of protein synthesis
<i>Tapak penjaanaan protein</i> |
| B Absorbed light energy
<i>Menyerap tenaga cahaya</i> | D Coordinate cellular activities
<i>Mengkordinasi aktiviti sel</i> |
- 2 Diagram 2 shows gaseous exchange in a unicellular organism.
Rajah 2 menunjukkan pertukaran gas pada organisma unisel.

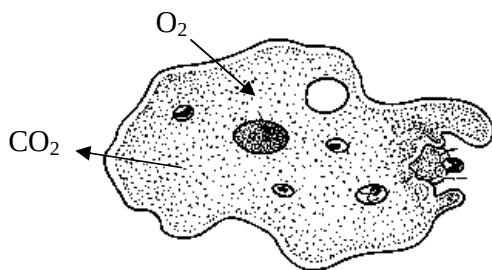


Diagram 2
Rajah 2

State the method of gaseous exchange at the organism.

Namakan cara bagaimana pertukaran gas berlaku pada organisma ini.

- | | |
|---|--|
| A Osmosis
<i>Osmosis</i> | C Simple diffusion
<i>Resapan ringkas</i> |
| B Active transport
<i>Pengangkutan aktif</i> | D Facilitated diffusion
<i>Resapan berbantu</i> |

- 3 Diagram 3 shows a plant cell.
Rajah 3 menunjukkan suatu sel tumbuhan.

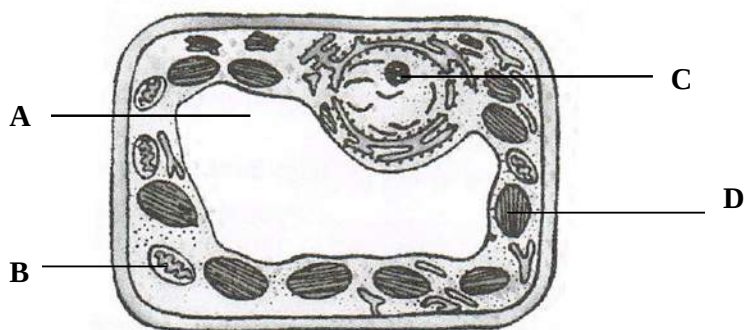


Diagram 3

Rajah 3

Which structure labeled A,B , C and D traps light energy from sunlight for the process of photosynthesis ?

Struktur manakah yang berlabel A, B, C dan D yang memerangkap tenaga daripada cahaya matahari untuk menjalankan proses fotosintesis?

- 4 Diagram 4 shows the movement of molecules K across phospholipid bilayer.
Rajah 4 menunjukkan pergerakan molekul K merentasi lapisan fosfolipid.

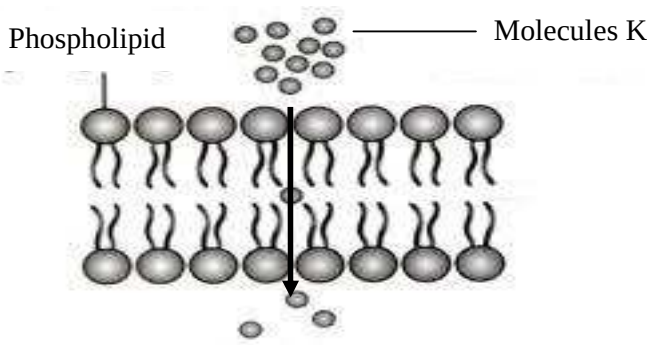


Diagram 4

Rajah 4

Name molecule K.

Namakan molekul K.

A Glucose
Glukosa

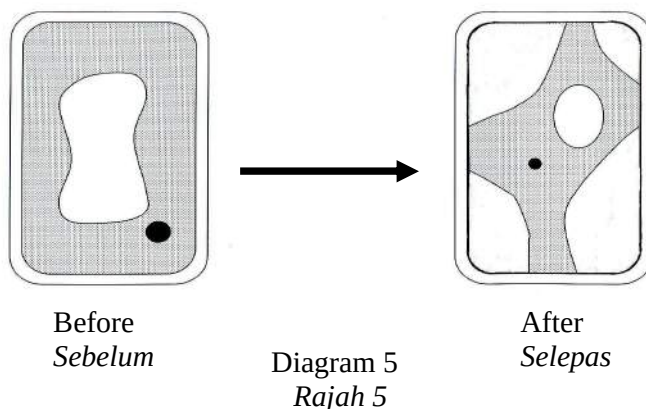
B Amino acid
Asid amino

C Fatty acids
Asid lemak

D Glycoprotein
Glycoprotein

- 5 Diagram 5 shows the condition of a plant cell after being immersed in 10% sucrose solution for 30 minutes.

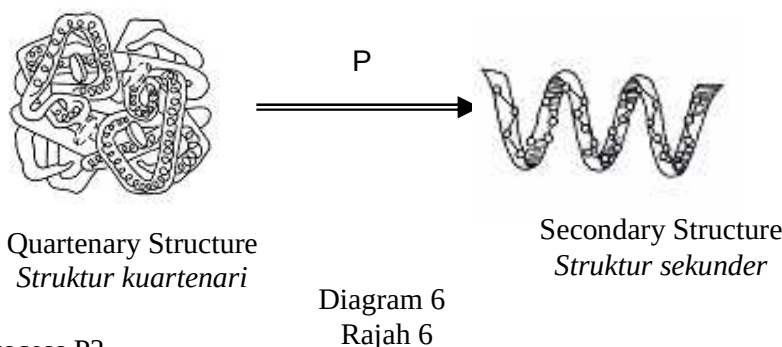
Rajah 5 menunjukkan keadaan sel tumbuhan setelah direndam di dalam larutan sukrosa 10% selama 30 minit.



What has happened to the plant cell after 30 minutes?

Apakah yang telah berlaku kepada sel tumbuhan tersebut selepas 30 minit?

- | | |
|------------------------------|----------------------------------|
| A Crenated
Mengecut | C Haemolysed
Hemolisis |
| B Plasmolysed
Plasmolisis | D Deplasmolysed
Deplasmolisis |
- 6 Diagram 6 shows the changes of protein level from quaternary structure to secondary structure through process P.
- Rajah 6 menunjukkan perubahan peringkat protein dari kuarteneri ke sekunder melalui proses P.



What is process P?

Apakah proses P?

- | | |
|------------------------------|------------------------------|
| A Denaturation
Denaturasi | C Hydrolysis
Hidrolisis |
| B Deamination
Deaminasi | D Condensation
Kondensasi |

- 7 Diagram 7 shows the effects of pH on the rate of reaction of enzyme Y in human alimentary canal.
Rajah 7 menunjukkan kesan pH terhadap kadar tindakan enzim Y di dalam salur alimentari manusia.

Rate of reaction of enzyme Y
Kadar tindakan enzim Y

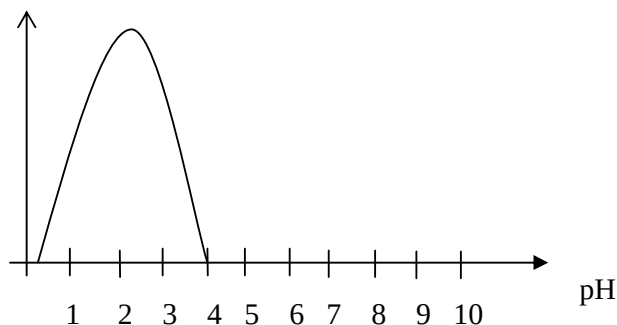


Diagram 7

Rajah 7

What is enzyme Y ?

Apakah enzim Y?

A Rennin

B Trypsin

C Amylase

D Lipase

- 8 Diagram 8 shows an enzyme, P and four substrates, W, X, Y and Z.
Rajah 8 menunjukkan enzim P dan empat substrat, W, X, Y dan Z.

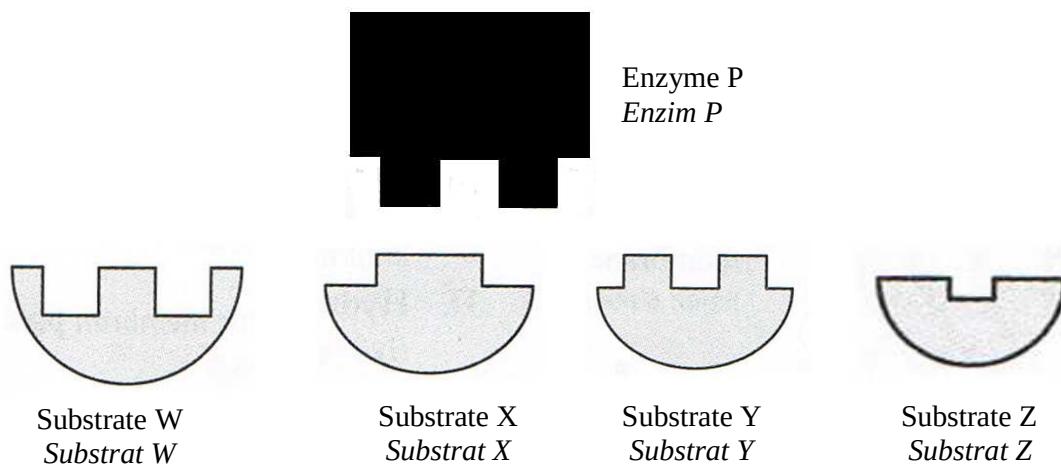


Diagram 8

Rajah 8

Which substrate W,X,Y and Z can be hydrolysed by enzyme P?

Substrat manakah W,X,Y dan Z boleh dihidrolisiskan oleh enzim P ?

A W

B X

C Y

D Z

- 9 The information below shows the use of an enzyme in our daily lives.
Maklumat berikut merujuk kepada penggunaan sejenis enzim dalam kehidupan seharian.

- Tenderized meat
Melembutkan daging
- Remove the skin of fish
Menanggalkan kulit ikan
- Dissolved stains in clothes
Melarutkan kotoran pada pakaian

Based on the information above, which of the following is the enzyme?
Berdasarkan pernyataan di atas, manakah menunjukkan enzim tersebut?

- | | |
|------------|------------|
| A Lipase | C Amylase |
| B Protease | D Selulase |

- 10 Diagram 9 shows a cell undergoing meiosis.
Rajah 9 menunjukkan satu cell mengalami meiosis

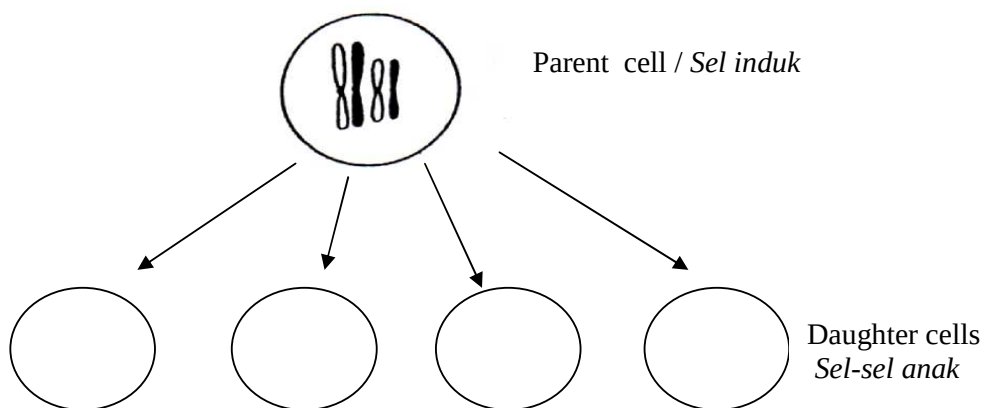


Diagram 9
Rajah 9

Which of the following daughter cells is the gamete of the parent cell.
Yang manakah dari sel anak yang berikut ialah gamet kepada sel induk.

- | | |
|---|---|
| A | C |
| | |
| B | D |
| | |

11 Diagram 10 shows the life cycle of frogs.
Rajah 10 menunjukkan kitaran hidup katak

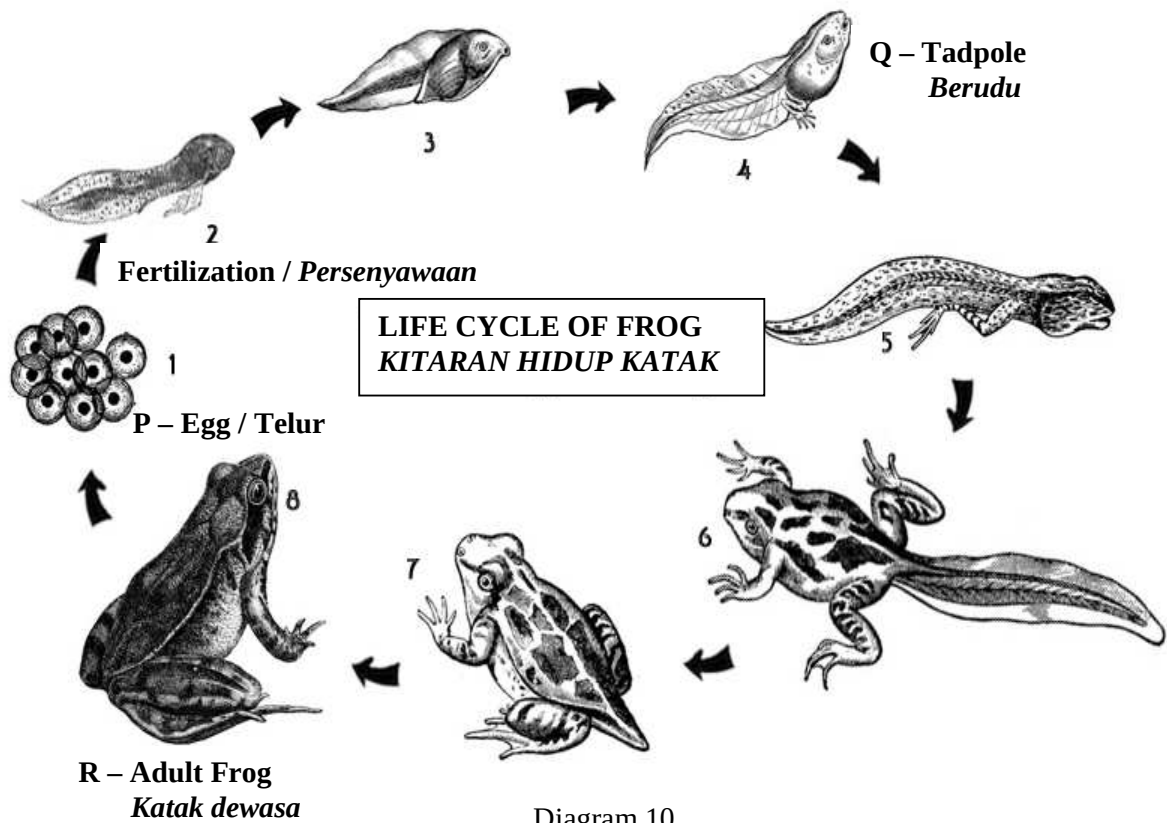


Diagram 10
Rajah 10

What is the chromosomal number of P, Q and R?
Berapakah nombor kromosom bagi P, Q dan R?

	P (Egg / Telur)	Q (Tadpole / Berudu)	R (Adult Frog / Katak Dewasa)
A	Haploid	Haploid	Diploid
B	Haploid	Diploid	Diploid
C	Diploid	Haploid	Diploid
D	Diploid	Diploid	Diploid

- 12 Diagram 11 shows an aquatic plant *Hydrilla sp* carrying out photosynthesis.
Rajah 11 menunjukkan tumbuhan akuatik *Hydrilla sp* menjalankan fotosintesis

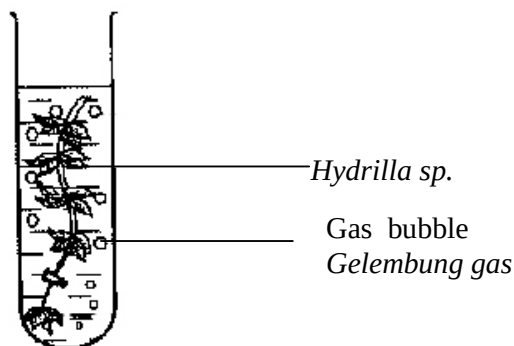


Diagram 11
Rajah 11

What is the gas ?
Apakah gas tersebut?

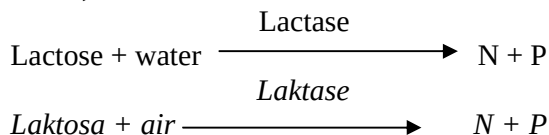
- A Carbon dioxide
Karbon dioksida
- B Hydrogen
Hidrogen
- C Oxygen
Oksigen
- D Nitrogen
Nitrogen
- 13 An experiment is carried out to determine the concentration of vitamin C in a fruit juice. 1 cm³ of DCPIP solution was used.
Satu eksperimen dijalankan untuk menentukan kepekatan vitamin C dalam jus buah.
1 cm³ of DCPIP larutan digunakan.

Volume of 0.1% ascorbic acid used to decolourise 1 cm ³ of DCPIP Isipadu 0.1% asid askorbik yang digunakan untuk melunturkan 1 cm ³ of DCPIP	1.0 cm ³
Volume of the fruit juice used to decolourised 1 cm ³ of DCPIP Isipadu jus buah yang digunakan untuk melunturkan 1 cm ³ of DCPIP	1.2 cm ³

What is the concentration of vitamin C in the fruit juice?
Berapakah kepekatan vitamin C dalam jus buah?

- A 0.83 mg cm⁻³
- B 1.10 mg cm⁻³
- C 1.20 mg cm⁻³
- D 8.30 mg cm⁻³

- 14 In the intestine , lactose is hydrolysed by lactase.The following shows the equation of the process.
Dalam usus kecil, laktosa dihidrolisiskan oleh laktase. Berikut menunjukkan persamaan proses itu.



What are N and P?

Apakah N dan P?

	N	P
A	Glucose <i>Glukosa</i>	Glucose <i>Glukosa</i>
B	Glucose <i>Glukosa</i>	Fructose <i>Fruktose</i>
C	Glucose <i>Glukosa</i>	Galactose <i>Galaktosa</i>
D	Glucose <i>Glukosa</i>	Maltose <i>Maltosa</i>

- 15 Diagram 12 shows a ruminant that has a stomach with four chambers.
Rajah 12 menunjukkan ruminan yang mempunyai empat ruang perut.

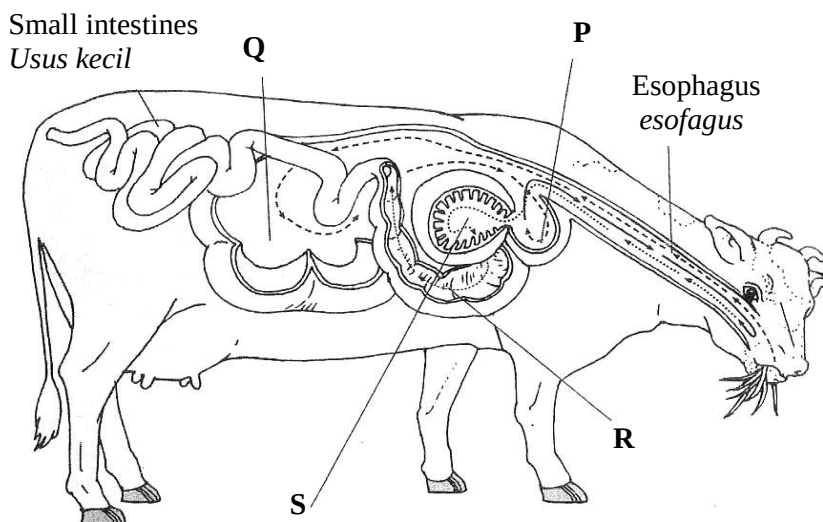


Diagram 12

Rajah 12

Which of the following P, Q, R and S is the true stomach of the cow?
Yang manakah berikut P, Q, R dan S ialah perut sebenar lembu?

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

- 16 Three different tests were carried out on a food sample. The results are shown in Table 1.
Tiga ujian yang berbeza dijalankan atas sampel makanan . Keputusan ditunjukkan dalam Jadual 1

Food test <i>Ujian makanan</i>	Results <i>Keputusan</i>
Biuret test <i>Ujian Biuret</i>	Solution changes from blue to purple colour <i>Larutan berubah dari warna biru ke warna ungu</i>
Benedict's test <i>Ujian Benedict</i>	The solution remains blue, no changes occur <i>Larutan kekal warna biru, tiada perubahan berlaku</i>
Iodine test <i>Ujian Iodin</i>	Solution changes from yellow brown to blue black. <i>Larutan berubah dari warna kuning perang ke biru hitam</i>

Table 1
Jadual 1

What does the food sample contain?
Apakah kandungan sampel makanan?

- A Protein, reducing sugar
Protein, gula penurun
- B Protein, starch
Protein, kanji
- C Reducing sugar, starch
Gula penurun, kanji
- D Starch , lipid
Kanji, lipid

- 17 Diagram 13 shows children suffering from a deficiency disease.
Rajah 13 menunjukkan kanak-kanak menghidap penyakit kekurangan zat makanan.



Diagram 13

Rajah 13

What deficiency disease is the children suffering from?

Apakah penyakit kekurangan zat makanan yang dihidapi oleh kanak-kanak ini?

- | | |
|--------------------|-------------------------------|
| A Scurvy / Skurvi | C Kwashiorkor / Kwasyiorkor |
| B Anaemia / Anemia | D Osteoporosis / Osteoporosis |
- 18 Diagram 14 shows a part of human respiratory structures.
Rajah 14 menunjukkan sebahagian daripada struktur respirasi manusia

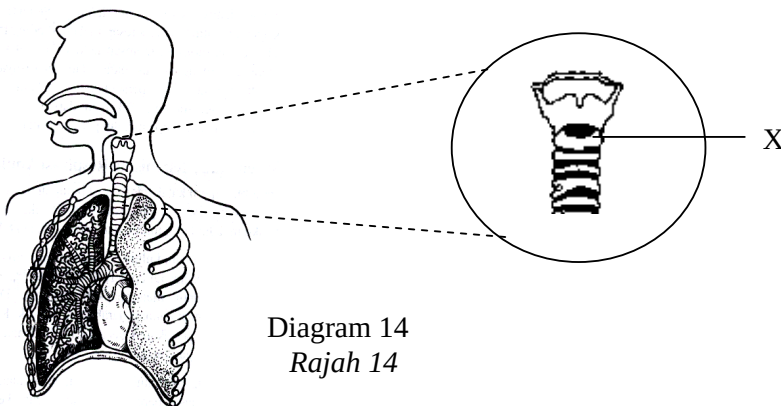


Diagram 14

Rajah 14

What is the function of X?

Apakah fungsi X ?

- | | |
|--|--|
| A To produce mucus
<i>Untuk menghasilkan mucus</i> | |
| B To filter bacteria in the air
<i>Untuk menapis bakteria di udara</i> | |
| C To increase surface area
<i>Untuk menambahkan luas permukaan</i> | |
| D To prevent the trachea from collapsing
<i>Untuk mengelakkan trakea daripada ranap</i> | |

19 Diagram 15 shows inhalation and exhalation mechanisms of a fish.
Rajah 15 menunjukkan mekanisma menarik nafas dan menghembus nafas bagi seekor ikan

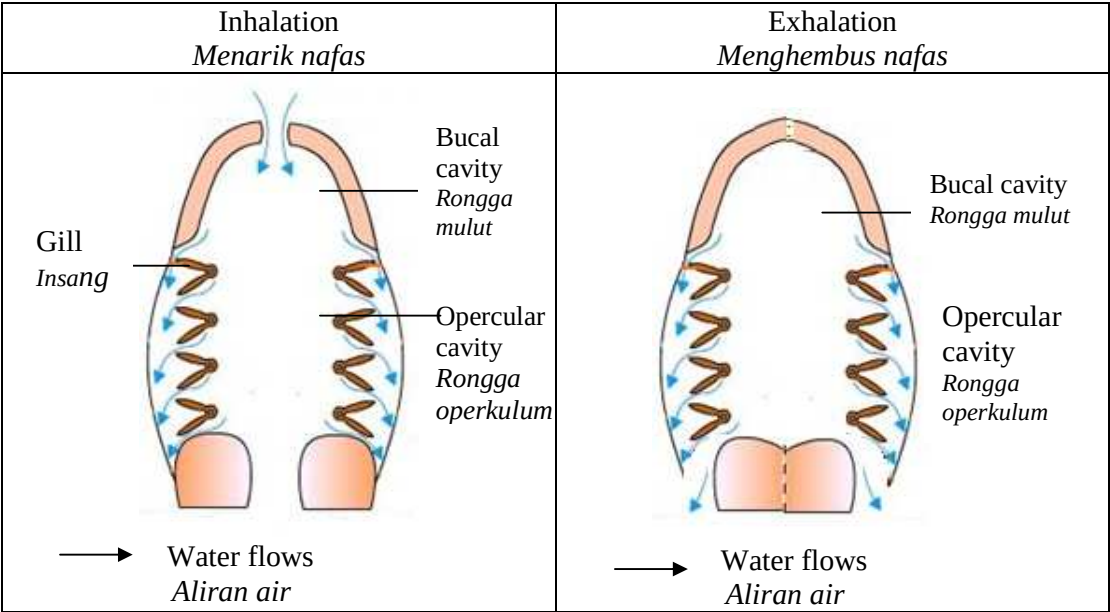
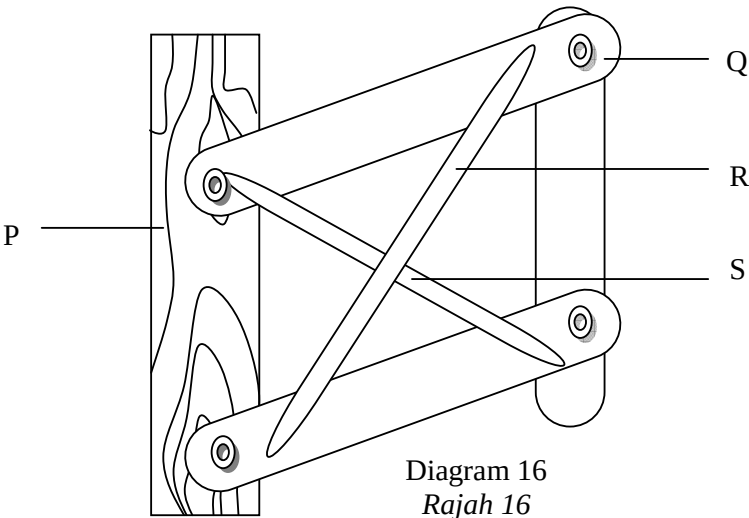


Diagram 15
Rajah 15

Which of the following statement is correct between the two processes?
Yang manakah pernyataan berikut adalah benar tentang kedua-dua proses di atas?

	Inhalation Menarik nafas	Exhalation Menghembus nafas
A	The floor of bucal cavity is raised <i>Lantai mulut diangkat</i>	The floor of bucal cavity is lowered <i>Lantai mulut diturunkan</i>
B	The opercular cavity becomes larger <i>Rongga mulut menjadi lebih besar</i>	The opercular cavity becomes smaller <i>Rongga mulut menjadi lebih kecil</i>
C	The external intercostal muscle contract <i>Otot interkostal luar mengecut</i>	The external intercostals muscle relax <i>Otot interkostal luar mengendur</i>
D	The pressure in the bucal cavity is higher than the pressure outside <i>Tekanan di dalam rongga mulut lebih tinggi daripada tekanan di luar</i>	The pressure in the bucal cavity is lower than the pressure outside <i>Tekanan di dalam rongga mulut lebih rendah daripada tekanan di luar</i>

20 Diagram 16 shows a model of human rib cage
Rajah 16 menunjukkan model sangkar rusuk manusia



Which of the following P, Q R and S represent the correct parts of human rib cage during inhalation.
Manakah antara berikut P, Q, R dan S adalah bahagian yang benar tentang sangkar rusuk manusia semasa menarik nafas

	P	Q	R	S
A	Rib cage Sangkar rusuk	Internal intercostal muscle Otot interkostal dalam	External intercostal muscle Otot interkostal luar	Backbone Tulang belakang
B	Internal intercostal muscle Otot interkostal dalam	Rib cage Sangkar rusuk	Backbone Tulang belakang	External intercostal muscle Otot interkostal luar
C	Backbone Tulang belakang	Rib cage Sangkar rusuk	External intercostal muscle Otot interkostal luar	Internal intercostal muscle Otot interkostal dalam
D	Rib cage Sangkar rusuk	Backbone Tulang belakang	External intercostal muscle Otot interkostal luar	Internal intercostals muscle Otot interkostal dalam

- 21 Which of the following are the products of aerobic respiration and anaerobic respiration in muscle tissue?

Yang manakah berikut adalah hasil respirasi aerobik dan respirasi anaerobik yang berlaku dalam tisu otot?

	Aerobic respiration <i>Respirasi aerobik</i>	Anaerobic respiration <i>Respirasi anaerobik</i>
A	Ethanol <i>Etanol</i>	Carbon dioxide and water <i>Karbon dioksida dan air</i>
B	Carbon dioxide and water <i>Karbon dioksida dan air</i>	Ethanol <i>Etanol</i>
C	Lactic Acid <i>Asid laktik</i>	Carbon dioxide and water <i>Karbon dioksida dan air</i>
D	Carbon dioxide and water <i>Karbon dioksida dan air</i>	Lactic Acid <i>Asid laktik</i>

- 22 Diagram 17 shows the transport of carbon dioxide from the body cell to the blood capillary. *Rajah 17 menunjukkan pengangkutan gas karbon dioksida daripada sel badan ke kapilari darah manusia*

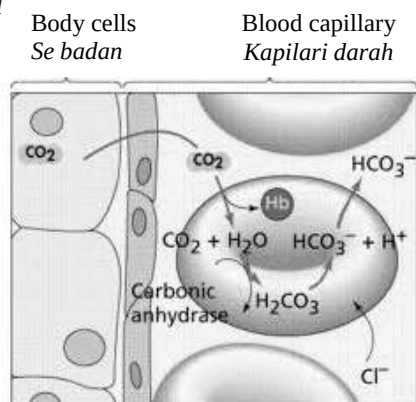


Diagram 17
Rajah 17

Which statement is incorrect?

Pernyataan manakah yang tidak benar?

- A Carbon dioxide is transported as dissolved carbon dioxide in blood plasma
Karbon dioksida diangkut sebagai karbon dioksida terlarut dalam plasma darah
- B Carbon dioxide is transported in the form of bicarbonate ion
Karbon dioksida diangkut dalam bentuk ion bikarbonat
- C Carbon dioxide is transported as carbaminohaemoglobin
Karbon dioksida diangkut sebagai karbominohaemoglobin
- D Carbon dioxide is transported as carboxyhaemoglobin
Karbon dioksida diangkut sebagai karboksiaemoglobin

- 23 Which of the following enable the gaseous exchange in plants?
Yang manakah berikut membolehkan pertukaran gas berlaku di dalam tumbuhan?

A Nostrils
Nostril
B Spiracle
Spirakel
C Lenticels
Lentisel
D Hydatode
Hidatod

- 24 Diagram 18 shows an energy flow in a food chain.
Rajah 18 menunjukkan satu pengaliran tenaga dalam satu rantai makanan.

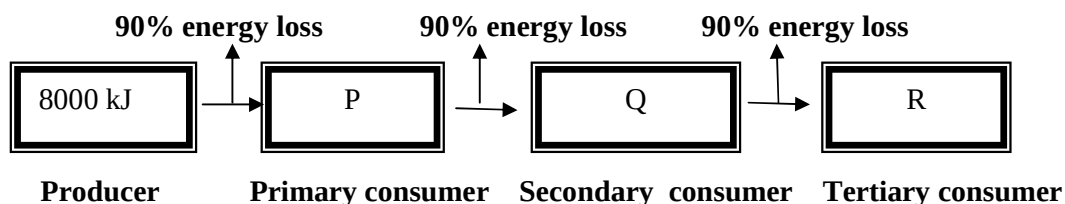
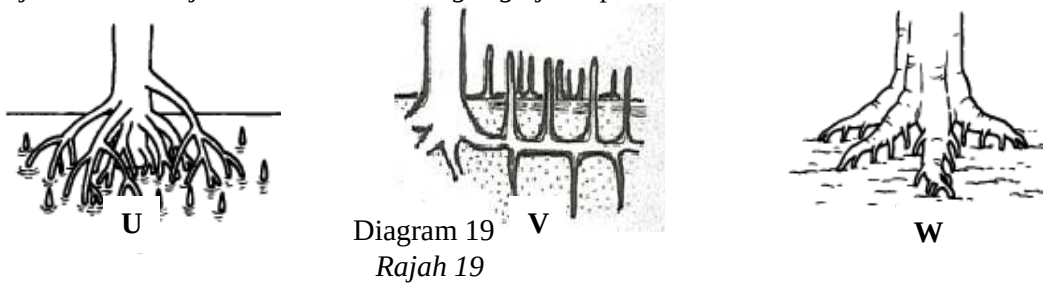


Diagram 18
Rajah 18

Calculate the sum of energy received by the organism Q.
Hitung jumlah tenaga yang diterima oleh organisma Q.

A 800 kJ
B 80 kJ
C 88 kJ
D 8 kJ

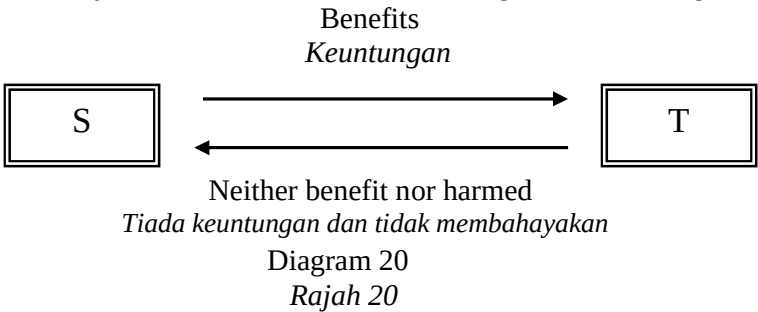
- 25 The Diagram 19 shows the root system of three types of mangrove plants, U, V and W.
Rajah 19 menunjukkan sistem akar bagi tiga jenis pokok bakau, U, V, dan W.



Which of the following is a correct match for U, V and W?
Antara yang berikut, yang manakah adalah padanan betul bagi U, V dan W?

	U	V	W
A	<i>Rhizophora sp.</i>	<i>Avicennia sp.</i>	<i>Bruguiera sp.</i>
B	<i>Avicennia sp.</i>	<i>Sonneratia sp.</i>	<i>Bruguiera sp.</i>
C	<i>Bruguiera sp.</i>	<i>Avicennia sp.</i>	<i>Rhizophora sp.</i>
D	<i>Sonneratia sp.</i>	<i>Bruguiera sp.</i>	<i>Rhizophora sp.</i>

- 26 Diagram 20 shows a type of interaction between organism S and organism T.
Rajah 20 menunjukkan satu interaksi diantara organism S dan organism T.



What may possibly be the organisms S and T?
Apakah kemungkinan organisma S dan T ?

	S	T
A	Tapeworm <i>Cacing pita</i>	Human <i>Manusia</i>
B	Sea anemones <i>Buran laut</i>	Hermit crab <i>Ketam hermit</i>
C	Rhizobium <i>Rhizobium</i>	Leguminous plants <i>Tumbuhan legum</i>
D	Aphids <i>Afid</i>	Plant <i>Tumbuhan</i>

- 27 Which of the following statements best describes biochemical oxygen demand (BOD)?
Manakah pernyataan berikut menerangkan keperluan oksigen biokimia (BOD) dengan betul?
- A The volume of water sample to decolourise the methylene blue solution
Isipadu sampel air untuk melunturkan larutan metelina biru
 - B The amount of oxygen produced by plant plankton in 1 litre of water
Amaun oksigen yang dihasilkan oleh tumbuhan fitiplankton dalam 1 liter air
 - C The amount of oxygen used up by microorganism in 1 litre of water.
Amaun oksigen yang digunakan oleh mikroorganisma dalam satu liter air.
 - D The amount of excessive organic fertilisers dissolves in 1 litre of water.
Amaun lebihan baja organic yang larut dalam satu liter air.
- 28 Diagram 21 shows the thinning of ozone layer in the earth's stratosphere.
Rajah 21 menunjukkan penipisan lapisan ozon dalam stratosfera bumi

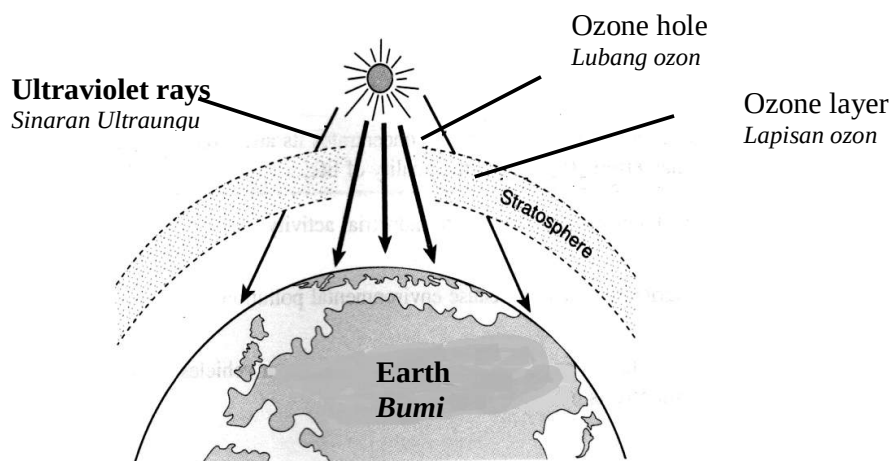


Diagram 21
Rajah 21

Which of the following substances causes this phenomenon?
Manakah antara bahan-bahan berikut menyebabkan fenomena ini?

- A Carbon dioxide / *Karbon dioksida*
- B Nitrogen dioxide / *Nitrogen dioksida*
- C Carbon monoxide / *Karbon monoksida*
- D Chlorofluorocarbon (CFC) / *Klorofluorokarbon*

- 29 Diagram 22 shows the phenomenon of landslide caused by uncontrolled human activities.
Rajah 22 menunjukkan fenomena tanah runtuh yang disebabkan oleh aktiviti-aktiviti manusia yang tidak terancang.

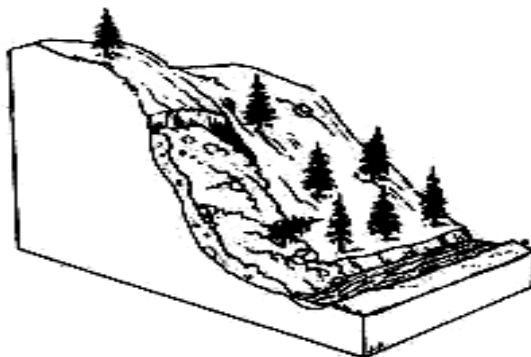


Diagram 22
Rajah 22

- A Farming / *Perladangan*
B Industrialisation / *Perindustrian*
C Deforestation / *Penebangan hutan*
D Open burning / *Pembakaran terbuka*
- 30 Which of the following involved in the blood-clotting process?
Manakah yang berikut terlibat dalam proses pembekuan darah?
- A Globulin, thrombin and fibrin
Globulin, thrombin, dan fibrin
B Albumin, globulin, and fibrinogen
Albumin, globulin, dan fibrinogen
C Thrombin, thrombokinase and fibrinogen
Trombin, trombokinase, dan fibrinogen
D Albumin, prothrombin, and thrombokinase.
Albumin, protrombin, dan trombokinase

- 31 Diagram 23 shows the structure of phloem tissue.
Rajah 23 menunjukkan struktur tisu floem.

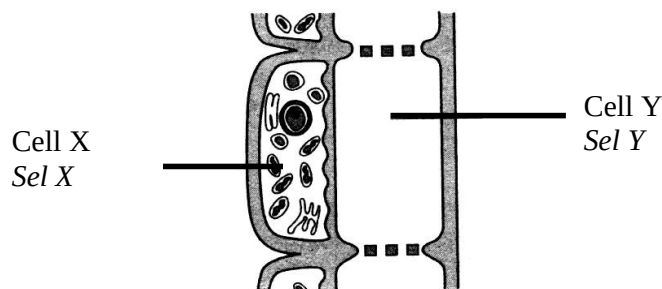


Diagram 23
Rajah 23

Which of the statement are true about the diagram above?
Manakah pernyataan berikut benar berkaitan rajah di atas?

	Cell X / Sel X	Cell Y / Sel Y
A	Gives mechanical support to plant <i>Memberi sokongan mekanikal kepada pokok.</i>	Has a nucleus when matured <i>Mempunyai nukleus apabila matang</i>
B	Has numerous mitochondria <i>Mempunyai banyak mitokondria</i>	Has cytoplasmic strands to help in translocation of organic matters. <i>Mempunyai bebenang sitoplasma untuk membantu dalam pengangkutan bahan-bahan organik.</i>
C	Provides the metabolic needs of the cell Y <i>Menyediakan keperluan metabolik bagi sel Y</i>	Gives mechanical support to plant <i>Memberi sokongan mekanikal kepada pokok.</i>
D	Transport organic matters in plants <i>Mengangkut bahan-bahan organik dalam tumbuhan</i>	Transport water and dissolved mineral salts in plants. <i>Mengangkut air dan garam-garam mineral terlarut dalam tumbuhan.</i>

- 32 Diagram 24 shows the concentration of antibodies in the blood of two individuals A and B. Both of them have been given two injections respectively
Rajah 24 menunjukkan kepekatan antibodi dalam darah bagi dua individu A dan B. Kedua-duanya telah diberikan masing-masing dua suntikan.

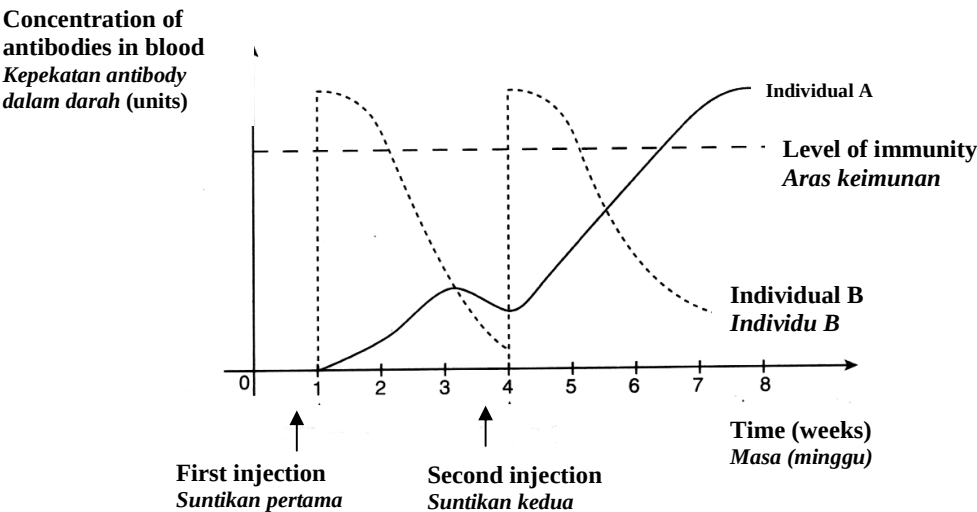


Diagram 24
Rajah 24

What type of immunity is obtained by individuals A and B?
Apakah jenis imuniti yang diperolehi oleh individu A dan B?

	Individual A Individu A	Individual B Individu B
A	Natural passive immunity Keimunan pasif semulajadi	Artificial active immunity Keimunan aktif tiruan
B	Artificial passive immunity Keimunan pasif tiruan	Artificial active immunity Keimunan aktif tiruan
C	Artificial passive immunity Keimunan pasif tiruan	Natural active immunity Keimunan aktif semulajadi
D	Artificial active immunity Keimunan aktif tiruan	Artificial passive immunity Keimunan pasif tiruan

- 33 Diagram 25 a vertical section through the human heart.
Rajah 25 menunjukkan keratan menegak jantung manusia.

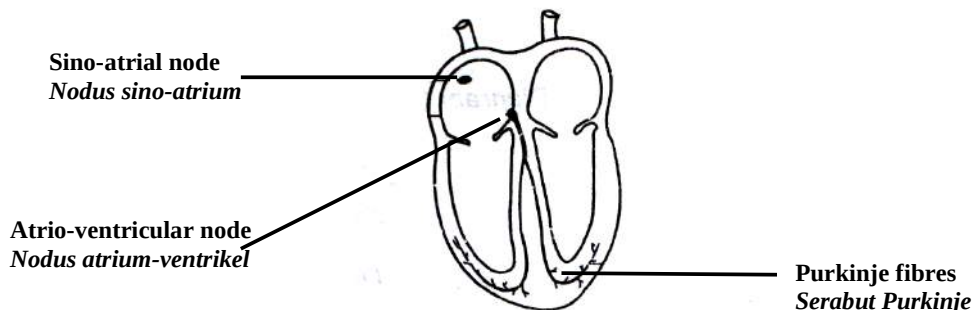


Diagram 25
Rajah 25

Which of the following is the function of sino-atrial node (SAN)?
Manakah yang berikut adalah fungsi nodus sino-atrium (SAN)?

- A Control the ventricular contraction
Mengawal pengecutan ventrikel
 - B Transmit the impulse to the ventricular walls
Menghantar impul ke dinding ventrikel.
 - C Control the opening of semilunar valves
Mengawal pembukaan injap separa bulat.
 - D Act as a pacemaker which initiates the heart beat.
Berperanan sebagai perentak yang memulakan denyutan jantung.
- 34 Diagram 26 shows an aquatic plant
Rajah 26 menunjukkan tumbuhan air.



Diagram 26
Rajah 26

Which of the following are adaptation help the plant to float?
Manakah yang berikut adalah adaptasi yang membantu tumbuhan ini terapung?

- A Thickened cell walls, broad leaves.
Sel berdinding tebal, daun yang lebar.
- B Broad leaves, Aerenchyma tissue
Daun lebar, tisu arenkima.
- C Aerenchyma tissue, thick cuticle on leaf surface.
Tisu arenkima, kutikel yang tebal pada permukaan daun.
- D Sclereids, have numerous vascular tissue.
Sklerid, mempunyai banyak tisu vascular.

- 35 Diagram 27 shows the growth of coleoptil when exposed to uniform sunlight.
Rajah 27 menunjukkan pertumbuhan koleoptil apabila didedahkan kepada cahaya yang sekata

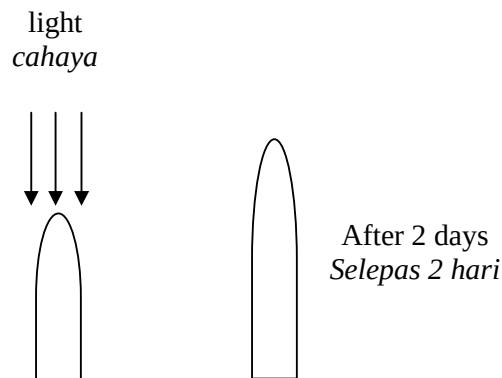


Diagram 27
Rajah 27

Which of the following explained why the coleoptil grow vertically upwards?
Yang manakah antara berikut menerangkan kenapa koleoptil tumbuh menegak ke atas?

- A Auxin is produced and evenly distributed
Auksin dihasilkan dan taburannya adalah sekata
- B Auxin produced is destroyed by light
Auksin yang dihasilkan telah dimusnahkan oleh cahaya
- C Auxin production is inhibited
Penghasilan auksin terbantut
- D No auxin is produced
Tiada auksin yang dihasilkan

- 36 Diagram 28 shows the negative feedback mechanism during the regulation of blood osmotic pressure.

Rajah 28 menunjukkan mekanisme suap balik negatif semasa pengawalan tekanan osmosis darah

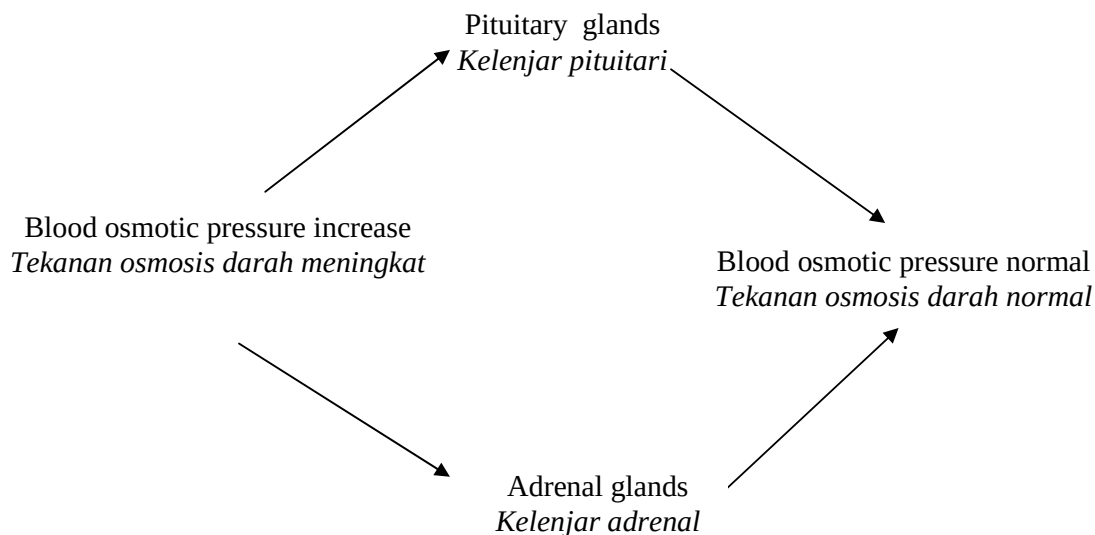


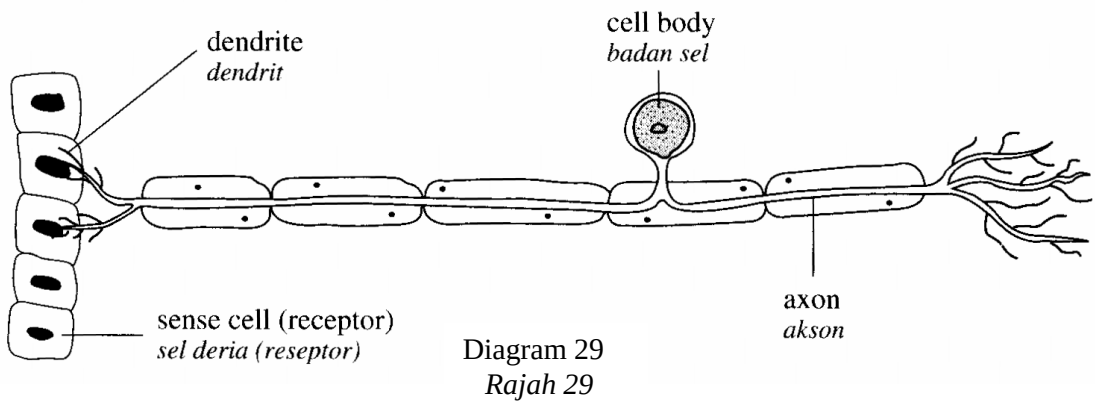
Diagram 28
Rajah 28

What is the response of pituitary and adrenal glands ?

Apakah hasil tindakbalas oleh kelenjar pituitari dan adrenal?

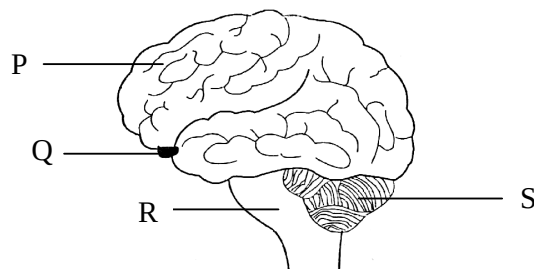
	Pituitary gland Kelenjar pituitari	Adrenal gland Kelenjar adrenal
A	Secretes more ADH <i>Merembeskan lebih ADH</i>	Secretes more aldosterone <i>Merembeskan lebih aldosteron</i>
B	Secretes less ADH <i>Merembeskan kurang ADH</i>	Secretes less aldosterone <i>Merembeskan kurang aldosteron</i>
C	Secretes more ADH <i>Merembeskan lebih ADH</i>	Secretes less aldosterone <i>Merembeskan kurang aldosteron</i>
D	Secretes less ADH <i>Merembeskan kurang ADH</i>	Secretes more aldosterone <i>Merembeskan lebih aldosteron</i>

- 37 Diagram 29 shows the structure of a neurone.
Rajah 29 menunjukkan struktur satu neuron.



What type of neuron is it?
Apakah jenis neuron ini?

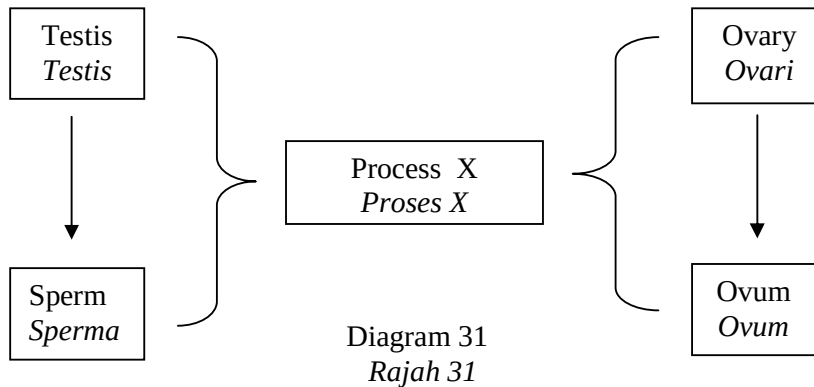
- A Interneurone / Interneuron
B Motor neurone / Neuron motor
C Efferent neurone / Neuron eferen
D Afferent neurone / Neuron aferen
- 38 Diagram 30 shows part of human brain. A person injured his head and experienced breathing difficulties after an accident.
Rajah 30 menunjukkan sebahagian daripada otak manusia. Seseorang telah cedera di kepalanya selepas satu kemalangan dan mengalami masalah sukar untuk bernafas .



Which part of the brain is injured?
Bahagian otak yang manakah cedera?

- A P
B Q
C R
D S

- 39 Diagram 31 shows process X which involve in production of sperm and ovum .
Rajah 31 menunjukkan proses X yang melibatkan penghasilan sperma dan ovum .



What is process X?
Apakah proses X?

- A Spermatogenesis/*Spermatogenesis*
B Gametogenesis / *Gametogenesis*
C Oogenesis / *Oogenesis*
D Spermatid / *Spermatid*
- 40 The following information represent ones of the hormones in menstrual cycle.
Pernyataan berikut merujuk kepada salah satu hormon dalam kitar haid.

- Reaches a peak at day 14.
Mencapai kemuncak pada hari ke 14
- Triggers the mature follicle to rupture and release the egg
Menggalakkan pematangan folikel untuk ranap dan mengeluarkan telur

What is the hormone?
Apakah hormon itu?

- A Oestrogen / *Estrogen*
B Progesterone / *Progesteron*
C Luteinizing hormone (LH) / *Luteinising hormon (LH)*
D Follicle stimulating hormone (FSH) / *Hormon perangsang folikel*

- 41 Diagram 32 shows the structure of a sperm.
Rajah 32 menunjukkan struktur sperma.

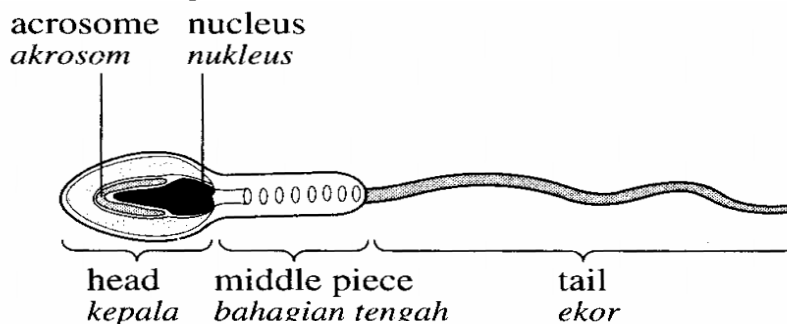


Diagram 32

Rajah 32

The middle piece contains a large number of a type of organelle.

Bahagian tengah mengandungi sejenis organel dalam bilangan yang banyak.

What is the organelle?

Apakah organel itu?

- A Mitochondrion / Mitokondria
B Chloroplast / Kloroplas
C Ribosome / Ribosom
D Vacuole / Vakuol
- 42 Diagram 33 shows a cross section of a flower.
Rajah 33 menunjukkan keratan rentas bunga.

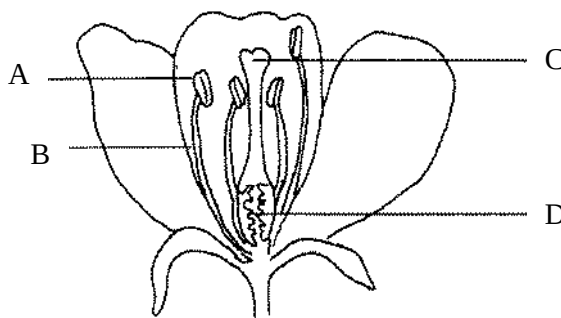


Diagram 33

Rajah 33

Which part A, B, C or D produce pollen grain?

Antara bahagian A, B, C atau D, yang manakah menghasilkan butir debunga?

- 43 Diagram 34 shows the level of oestrogen and progesterone in the blood of a female.
Rajah 34 menunjukkan aras estrogen dan progesteron dalam darah seorang perempuan.

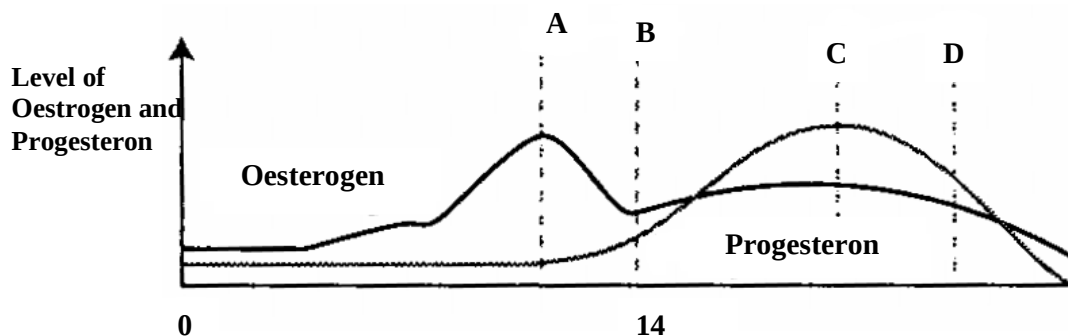


Diagram 34
Rajah 34

Which of the labeled stage A, B C or D, ovulation occur?
Antara peringkat berlabel A, B, C atau D, yang manakah ovulasi berlaku?

- 44 Diagram 35 shows the female reproductive system.
Rajah 35 menunjukkan sistem pembiakan perempuan

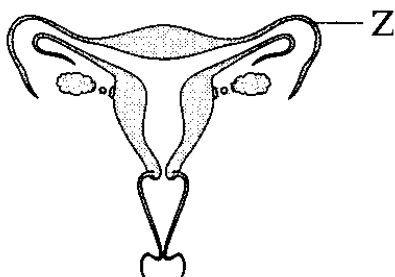
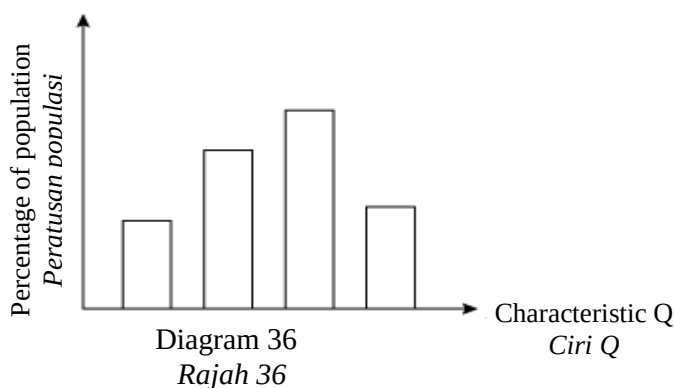


Diagram 35
Rajah 35

What is the effect of cutting and tying up the part labelled Z?
Apakah kesan pemotongan dan pengikatan struktur yang berlabel Z?

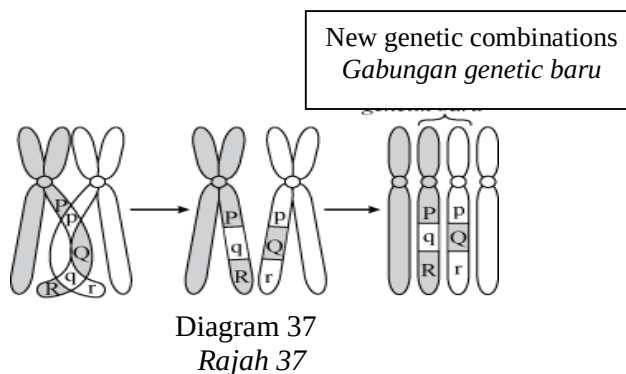
- A Sperm cannot enter the uterus
Sperma tidak dapat masuk ke uterus
- B Fertilization does not occur
Persenyawaan tidak berlaku
- C The ovum is not produced
Ovum tidak terhasil
- D Ovulation does not occur
Ovulasi tidak berlaku

- 45 Diagram 36 is a bar chart which shows the distribution of characteristics Q in human.
Rajah 36 adalah carta bar yang menunjukkan taburan untuk ciri Q dalam manusia



Which of the following characteristics is represented by the bar chart in Diagram 36?
Diantara ciri berikut yang manakah diwakili oleh carta bar dalam Rajah 36?

- A Blood group / Kumpulan darah
 - B Ear lobe type / Jenis cuping telinga
 - C Presence of dimple / Mempunyai Lesung pipit
 - D Ability to roll tongue / Kebolehan menggulung lidah.
- 46 Diagram 37 shows how new genetic combination is formed which contributes to variation.
Rajah 37 menunjukkan bagaimana kombinasi baru genetik terbentuk yang menyumbang kepada variasi.



Which of the process causes the new genetic combination in Diagram 37?
Proses yang manakah menyebabkan kombinasi genetik baru dalam Rajah 37?

- A Gene mutation
Mutasi gen
- B Crossing over
Pindah silang
- C Independent assortment
Gabungan bebas
- D Random fertilisation
Persenyawaan secara rawak

- 47 The diagram 38 shows the karyotype of an individual who is suffering from a genetic disorder.
Rajah 38 menunjukkan kariotip seseorang yang menghadapi penyakit genetic.

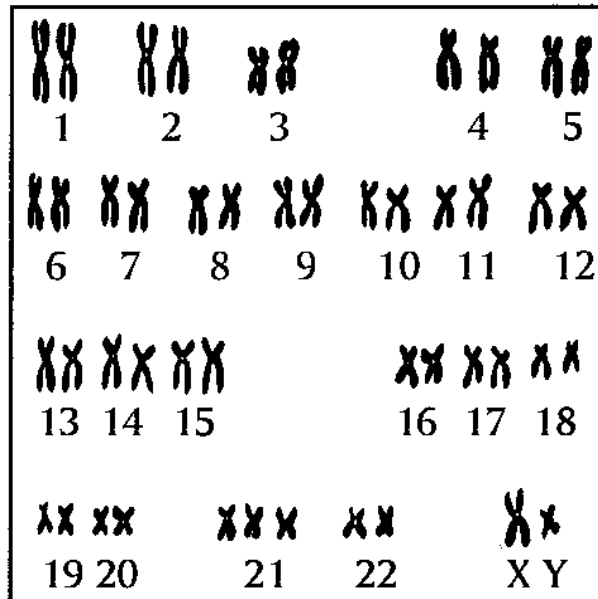


Diagram 38

Rajah 38

What is the genetic disorder?

Apakah penyakit genetic tersebut?

- A Klinefelter's s syndrome / *Sindrom Klinefelter*
- B Turner's syndrome / *Sindrom Turner*
- C Down's Syndrom / *Sindrom Down*
- D Polydactyl / *Polidaktil*

-
- Pedigree chart showing a family with three children. The mother is a carrier (heterozygous) and the father is unaffected. The children are an unaffected daughter, an affected son, and an unaffected son.

 : Carrier female
Perempuan pembawa

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SULIT
2011 PSPM Kedah

- 50 Diagram 4 shows a dihybrid cross between two types of pea plants.
Rajah 4 menunjukkan satu kacukan dihibrid antara dua pokok kacang pea.

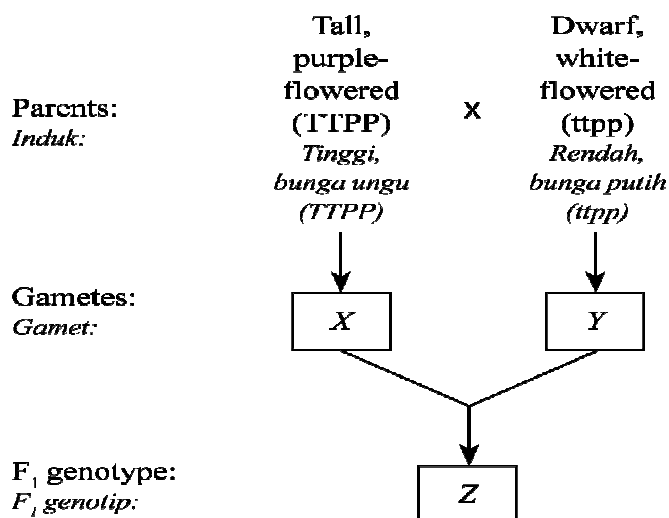


Diagram 4

What are the genotypes of X, Y and Z?
Apakah genotip bagi X, Y dan Z?

	X	Y	Z
A	TP	Tp	TTpp
B	pp	tt	Ttpp
C	TP	tp	TtPp
D	TT	Pp	TTpp

END OF QUESTION PAPER
KERATS SOALAN TAMAT

SKEMA KERTAS 1

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

4551/2

SULIT
4551/2
BIOLOGY
KERTAS/PAPER 2
18 OGOS 2011
2½ jam

MAJLIS KEBANGSAAN PENGETUA – PENGETUA
SEKOLAH MENENGAH
NEGERI KEDAH DARUL AMAN

PEPERIKSAAN PERCUBAAN SPM 2011

BIOLOGY

Paper 2

Two hours and thirty minutes

PERATURAN PEMARKAHAN

4551/2

[Lihat sebelah
SULIT



Section A
Bahagian A

[60 marks]
[60 markah]

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

- 1 Diagram 1 shows a group of plant cells undergo specialisation in the formation of a leaf.
Rajah 1 menunjukkan sekumpulan sel tumbuhan menjalani pengkhususan untuk membentuk daun.

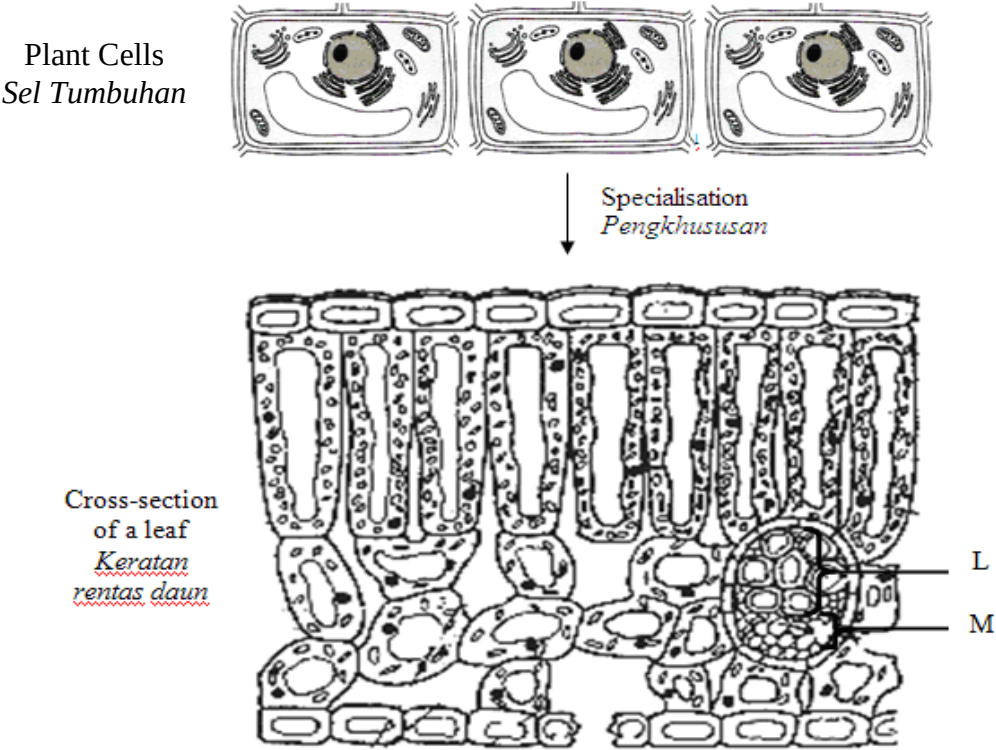


Diagram 1
Rajah 1

- (a) (i) Name tissue L and tissue M.
Namakan tisu L dan tisu M.

L :

M :

[2 marks]
[2 markah]

(ii) State the function of tissue L and M in the leaf.
Nyatakan fungsi sel L dan M di dalam daun.

L :

M :

[2 marks]
[2 markah]

(b) State the meaning of tissue and organ.
Nyatakan maksud tisu dan organ.

Tissue:
Tisu:

Organ:
Organ :

[2 marks]
[2 markah]

(c) Based on Diagram 1, explain the process of cell specialization.
Berdasarkan Rajah 1, terangkan proses pengkhususan sel.

.....
.....

[2 marks]
[2 markah]

(d) Leaf is the main photosynthetic organ of plant.
Explain **two** adaptation of the leaf in order to carry out photosynthesis efficiently
Daun adalah organ utama fotosintetik pada tumbuhan.
*Terangkan **dua** penyesuaian daun untuk menjalankan proses fotosintesis dengan cekap*

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

[4 marks]
[4 markah]

2 Diagram 2 shows an animal cell undergoes mitosis at stage P and produce two daughter cells.

Rajah 2 menunjukkan satu sel haiwan yang sedang menjalani proses mitosis pada peringkat P dan seterusnya menghasilkan dua sel anak.

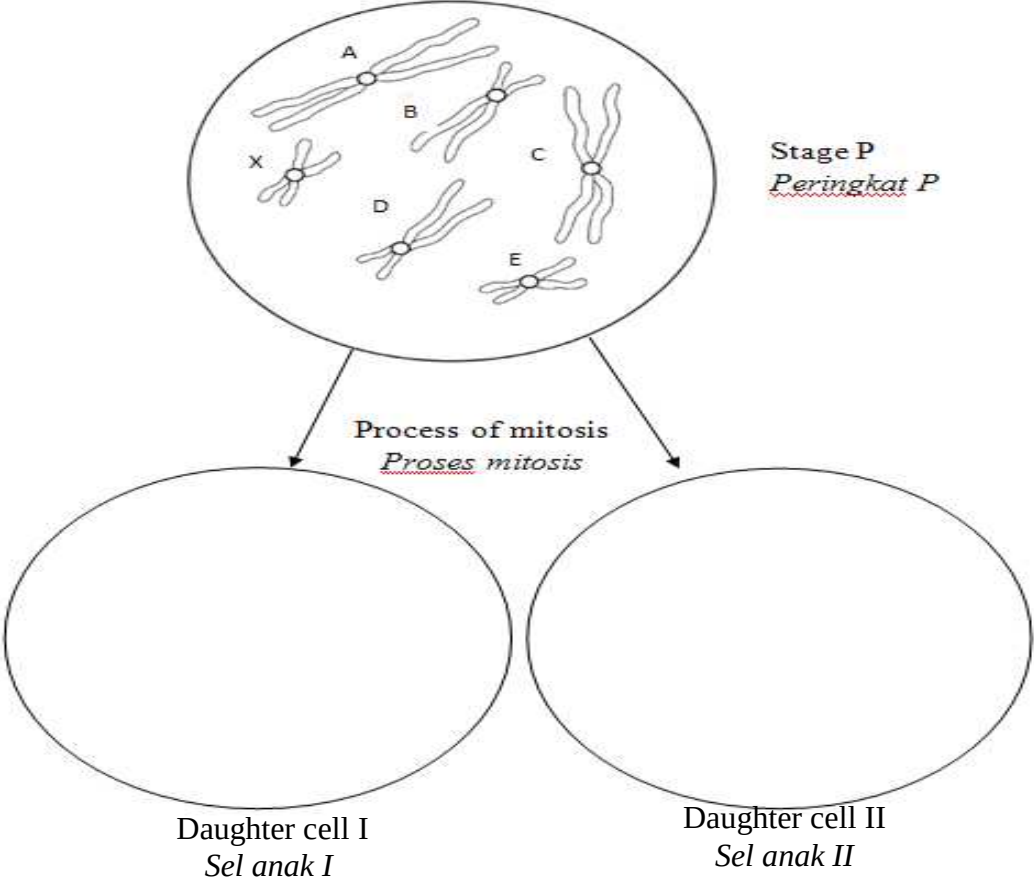


Diagram 2
Rajah 2

(a) (i) Name stage P.
Namakan peringkat P.

.....
[1 mark]
[1 markah]

(ii) In diagram 2, which chromosome labeled A,B,C,D or E is homologous to chromosome X ?
Dalam rajah 2, kromosom manakah yang bertanda A,B,C,D dan E adalah homolog dengan kromosom X?

.....
[1 mark]
[1 markah]

(iii) Draw the chromosomes in daughter cell I and daughter cell II produced through mitosis in Diagram 2.
Lukis kromosom dalam sel anak I dan sel anak II yang dihasilkan melalui mitosis dalam Rajah 2.

[2 marks]
[2 markah]

(b) State **three** importance of mitosis to living organism
*Nyatakan **tiga** kepentingan mitosis kepada organism hidup.*

.....

.....

.....

.....

.....

.....

[3 marks]
[3 markah]

(c) Diagram 2.1 shows the formation of tumor in lungs.
Tumor is an abnormal mass of cells that can invade and destroy neighboring cells.
Rajah 2.1 menunjukkan pembentukan tumor dalam peparu.
Tumor adalah sekumpulan sel tidak normal yang boleh menceroboh dan memusnahkan sel berdekatan.

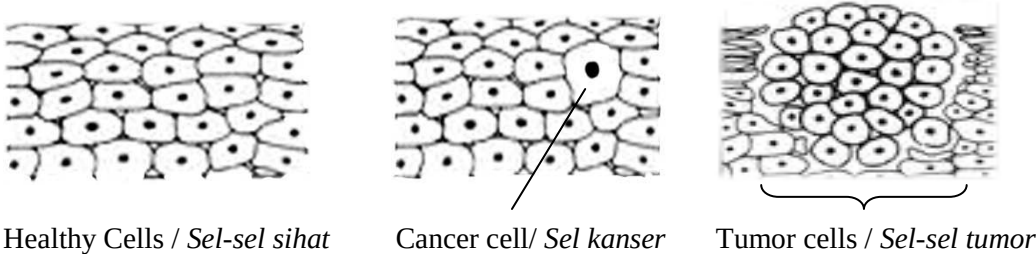


Diagram 2.1
Rajah 2.1

(i) Explain the formation of tumor.
 Terangkan proses pembentukan sel tumor.

.....

.....

.....

.....

.....

.....

.....

[3 marks]
[3 markah]

(ii) Explain **one** activity that can cause tumor in lung.
 *Terangkan **satu** aktiviti yang boleh menyebabkan ketumbuhan di dalam peparu.*

.....

.....

.....

.....

[2 marks]
[2 markah]

SULIT

7

4551/2

- 3 Diagram 3.1 shows a structure of cells P that were seen under a microscope.
Rajah 3.1 menunjukkan struktur sel P yang dapat dilihat di bawah mikroskop

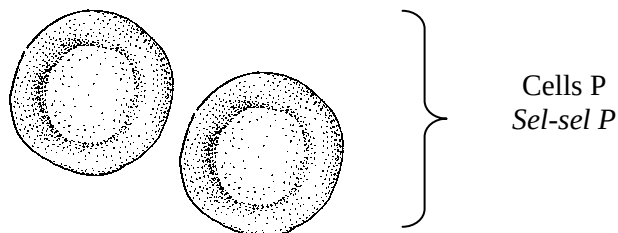


Diagram 3.1
Rajah 3.1

- (a) (i) Name cell P.
Namakan sel P.

.....
[1 mark]
[1 markah]

- (ii) State **one** function of cell P.
*Nyatakan **satu** fungsi P.*

.....
[1 mark]
[1 markah]

- (b) Cell P is immersed in a concentrated salt solution.
Sel P telah direndamkan dalam larutan garam yang pekat.

- i) Draw a diagram to show the condition of cell P after 20 minutes.
Lukis rajah untuk menunjukkan keadaan P selepas 20 minit.



[2 marks]
[2 markah]

- (ii) Explain what had happened to cell P in b(i)
Terangkan apakah yang telah berlaku pada sel P di b(i).

.....

.....

.....

.....

[3 marks]
[3 markah]

- (c) Diagram 3.2 shows the structure of a plasma membrane of cell P.
Rajah 3.2 menunjukkan struktur membran plasma.

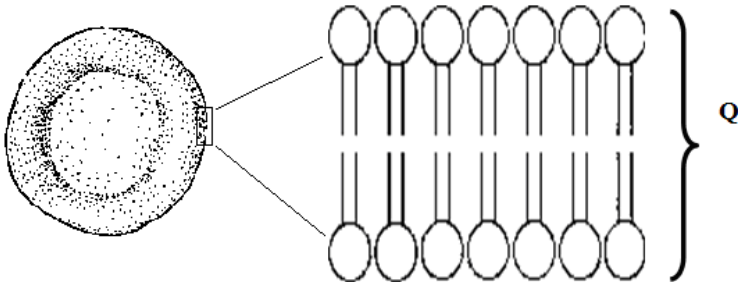


Diagram 3.2
Rajah 3.2

- (i) Name layer Q.
Namakan lapisan Q.

.....

[1 mark / markah]

- (ii) State the main component of layer Q.
Nyatakan komponen utama bagi lapisan Q.

.....

[1 mark]
[1 markah]

- (iii) Cells P is mixed with detergent. The detergent dissolves lipids.
After 10 minutes, the mixture is examined under a microscope, no cells P were
seen but the mixture turn red and cloudy.

Explain why?

*Sel P telah dicampurkan dengan bahan pencuci. Bahan pencuci tersebut
melarutkan lemak.
Selepas 10 minit campuran tersebut telah diperiksa di bawah mikroskop. Tiada
sel P yang dapat diperhatikan tetapi campuran tersebut telah menjadi merah
keruh.*

Terangkan kenapa?

.....

.....

.....

.....

.....

[3 marks]
[3 markah]

- 4 Diagram 4.1 shows the cross section of the spinal cord and the reflex arc.
Rajah 4.1 menunjukkan keratan rentas saraf tunjang dan arka reflex.

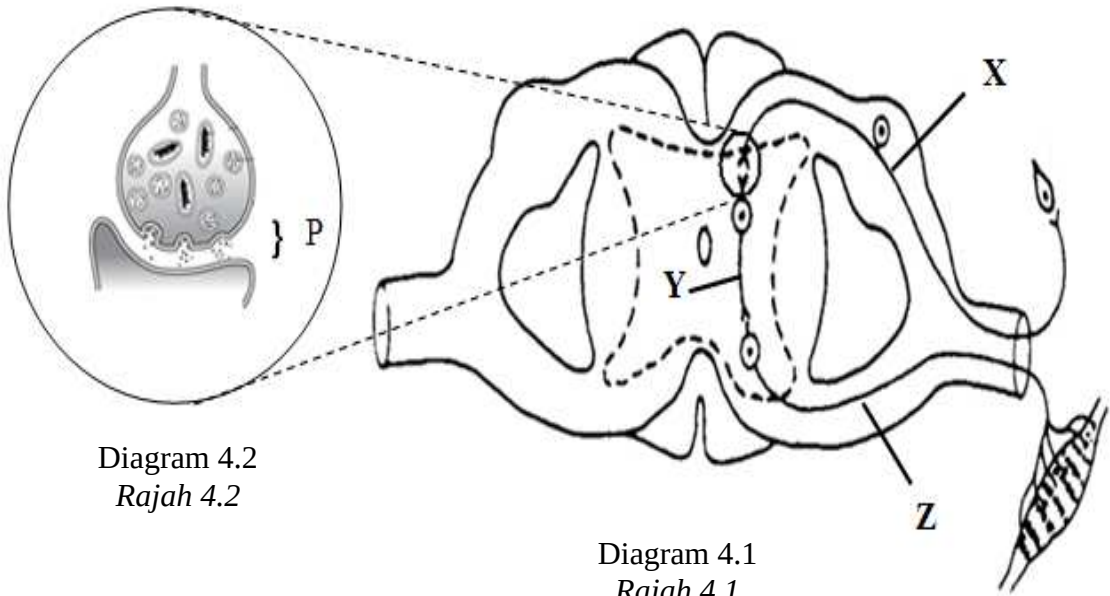


Diagram 4.2
Rajah 4.2

Diagram 4.1
Rajah 4.1

- (a) On diagram 4.1 draw the arrow on X, Y and Z to show the direction of the nerves impulses on the reflex arc.
Pada rajah 4.1 lukiskan anak panah pada X, Y dan Z untuk menunjukkan arah impuls saraf pada arka reflex tersebut.

[1 mark]
[1 markah]

- (b) (i) Name X, Y and Z in the box provided.
Namakan X, Y dan Z dalam kotak yang disediakan

X	Y	Z

[3 marks]
[3 markah]

(ii) State **two** differences between X and Z.
*Nyatakan **dua** perbezaan di antara X dan Z*

.....

.....

.....

.....

[4 marks]
[4 markah]

(c) Diagram 4.2 shows gap P between the axon terminal and dendrite terminal of two neurones.
Rajah 4.2 menunjukkan ruang P diantara terminal axon dan terminal dendrite bagi dua neuron.

(i) Name gap P .
Namakan ruang P.

.....

[1 mark]
[1 markah]

(ii) Name one example of chemical substances which is released across P
Namakan satu contoh bahan kimia yang dirembeskan merentasi P

.....

[1 mark]
[1 markah]

(iii) A disease related to the nervous system which usually affect the elderly people is caused by lack of the chemical substances in (c) (ii)
Sejenis penyakit berkaitan dengan sistem saraf yang biasanya terjadi di kalangan orang tua disebabkan oleh kekurangan bahan kimia in (c) (ii).

Explain the disease .
Terangkan penyakit itu.

.....

.....

[2 marks]
[2 markah]



- 5 Diagram 5.1 shows the hand of a polydactyl. Polydactyl is a genetic disorder and caused by a **dominant allele** in the autosome.
*Rajah 5.1 menunjukkan tangan polidaktil. Polidaktil ialah kecacatan genetik yang disebabkan oleh **allel dominan** pada autosom*



Diagram 5.1

Rajah 5.1

A heterozygous polydactyl man marries a normal woman.
Seorang lelaki heterozygous polidaktil berkahwin dengan seorang wanita yang normal.

Use **D** for polydactyl allele and **d** for normal allele
*Gunakan **D** untuk trait polidaktil dan **d** untuk trait normal*

- (a) State the genotype of the polydactyl man and the normal woman.
Nyatakan genotip lelaki polidaktil dan wanita yang normal

- (i) Polydactyl man / lelaki polidaktil:

.....

[1 mark]
[1 markah]

- (ii) Normal woman / wanita normal:

.....

[1 mark]
[1 markah]

(b) The couple gives birth to a child. State the possible genotype and phenotype of the child.
Pasangan suami isteri mendapatkan seorang anak. Nyatakan genotip dan fenotip yang mungkin bagi anak mereka..

(i) genotype of the child / *genotip anak-anak*

.....

[1 mark]
[1 markah]

(ii) phenotype of the children / *fenotip anak-anak*

.....

[1 mark]
[1 markah]

Diagram 5.2 shows how blood group is inherited in a family.
Rajah 5.2 menunjukkan bagaimana kumplan darah diwarisi dalam satu keluarga.

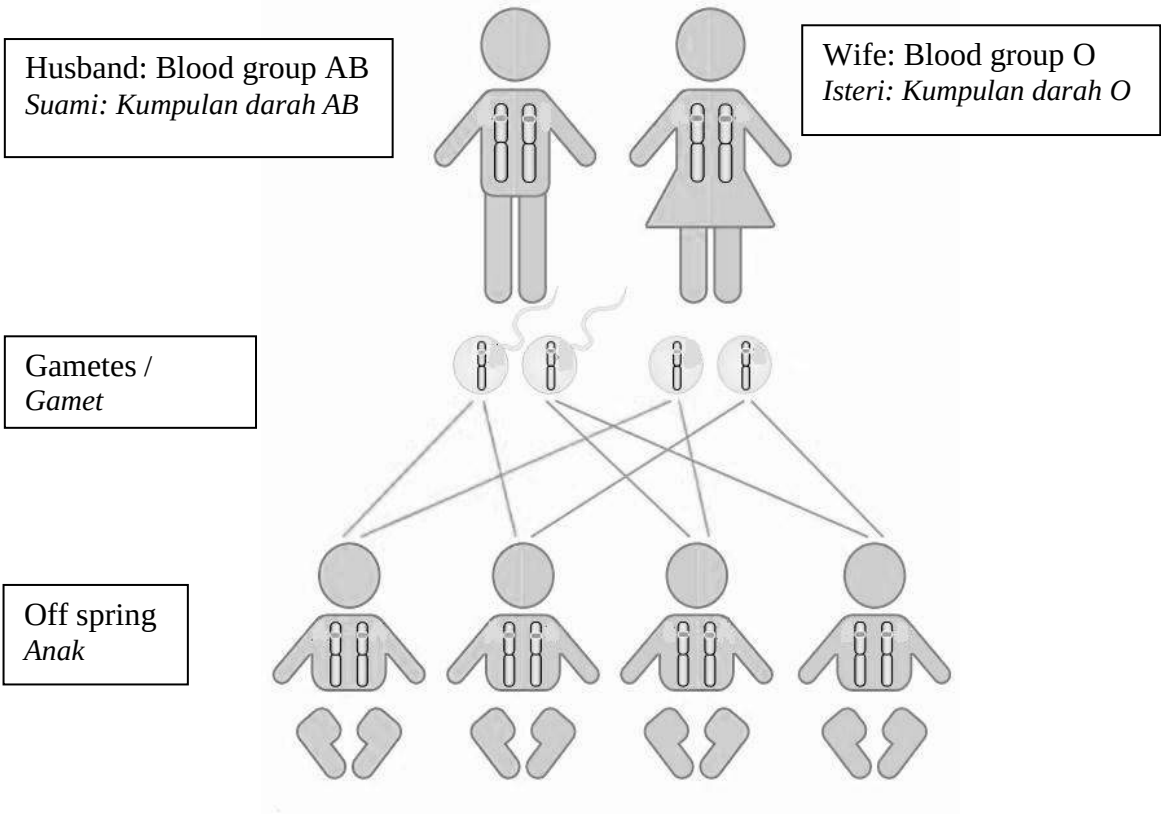


Diagram 5.2
Rajah 5.2

- (c) (i) Draw a schematic diagram to show the blood group inherited by the offsprings.
Lukiskan gambarajah skema untuk menunjukkan kumpulan darah yang diwarisi oleh anak-anak.

[3 marks]
[3 markah]

- (ii) What is the percentage of the offspring having blood group O?
Berapakan peratus anaknya mempunyai kumpulan darah O?

.....
[1 mark / markah]

- (d) Diagram 5.3 (a) shows the variation of human ABO blood group. Diagram 5.3 (b) shows the variation of height in human .
Rajah 5.3(a) menunjukkan variasi kumpulan darah ABO manusia. Rajah 5.3 (b) menunjukkan variasi ketinggian dalam manusia

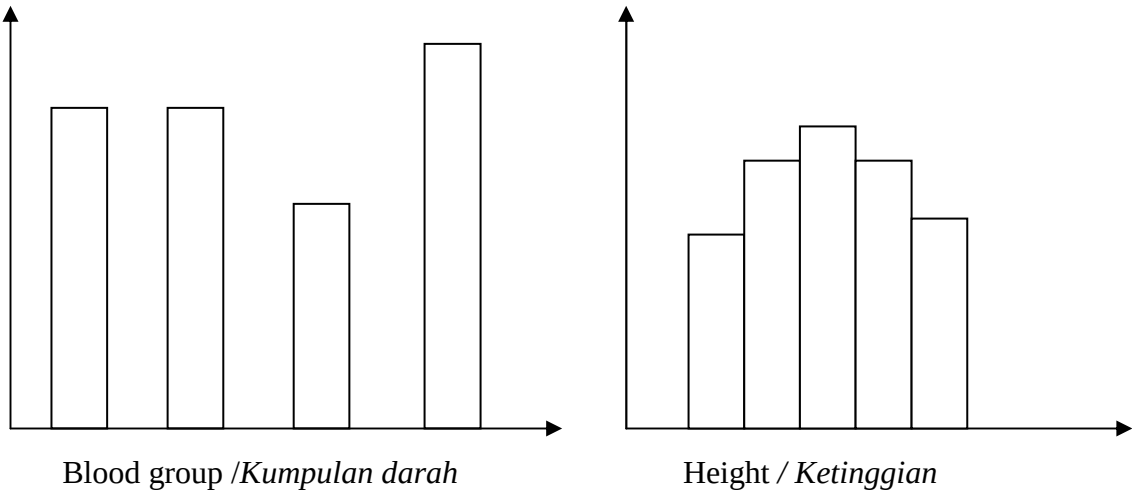


Diagram 5.3(a) / Rajah 5.3(a)

Diagram 5.3(b) / Rajah 5.3(b)

- (i) State the type of variations shown in Diagram 5.3 (a) and Diagram 5.3(b)
Nyatakan jenis variasi yang ditunjukkan dalam Rajah 5.3(a) dan Rajah 5.3(b)

Diagram 5.3(a) / *Rajah 5.3(a)* :

.....

Diagram 5.3(b)/ *Rajah 5.3(b)*:

.....

[2 marks]
[2 markah]

- (ii) Explain one difference between the type of variations in (d) (i)
Terangkan satu perbezaan antara jenis variasi di (d) (i)

.....

.....

.....

.....

[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 ini.

6. The diagram 6 shows two processes of energy production in human muscles.
Rajah 6 menunjukkan dua proses penghasilan tenaga dalam otot manusia.

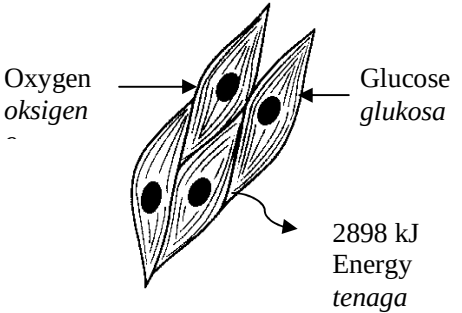
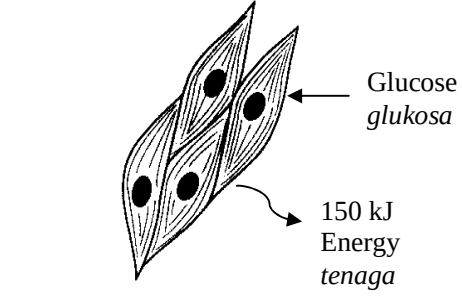
 Process P Proses P	Chemical equation: Persamaan kimia : $\text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \longrightarrow 6\text{CO}_2 + 6\text{H}_2\text{O} + 2898 \text{ kJ}$ glucose oxygen carbon dioxide water energy glukosa oksigen karbon dioksida air tenaga
 Process Q Proses Q	Chemical equation: Persamaan kimia : $\text{C}_6\text{H}_{12}\text{O}_6 \longrightarrow \text{C}_3\text{H}_6\text{O}_3 + 150 \text{ kJ}$ glucose lactic acid energy glukosa asid laktik tenaga

Diagram 6.1
Rajah 6.1

- (a) Based on Diagram 6.1 , explain process P and process Q.
Berdasarkan Rajah 6.1, terangkan proses P dan otot Q.

[4 marks]
[4 markah]

- (b) Diagram 6.2 shows the respiratory centre and chemoreceptors which are involved in the regulation of the carbon dioxide content in the body.

Rajah 6.2 menunjukkan pusat respirasi dan kemoreseptor yang mana terlibat dalam kawalatur kandungan karbon dioksida dalam badan

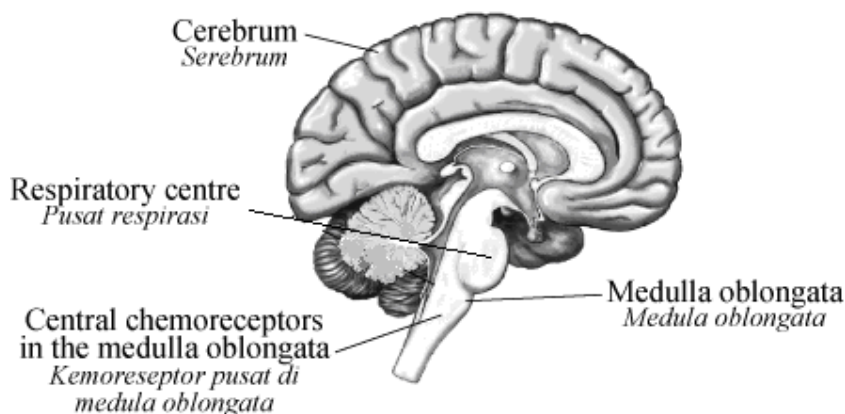


Diagram 6.2
Rajah 6.2

Based on Diagram 6.2 , explain how respiratory centre responds when the carbon dioxide content in the body increases during vigorous exercise.
Berdasarkan rajah 6.2, terangkan bagaimana pusat respirasi bergerakbalas apabila karbon dioksida meningkat semasa aktiviti cergas.

[6 marks]
[6 markah]

- (c) Diagram 6.3 shows the inhalation process in a fish.
Rajah 6.3 menunjukkan proses menarik nafas dalam ikan

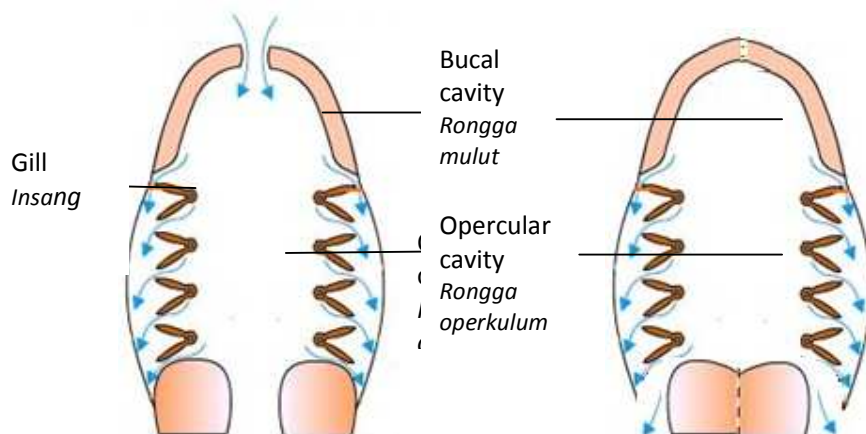


Diagram 6.3

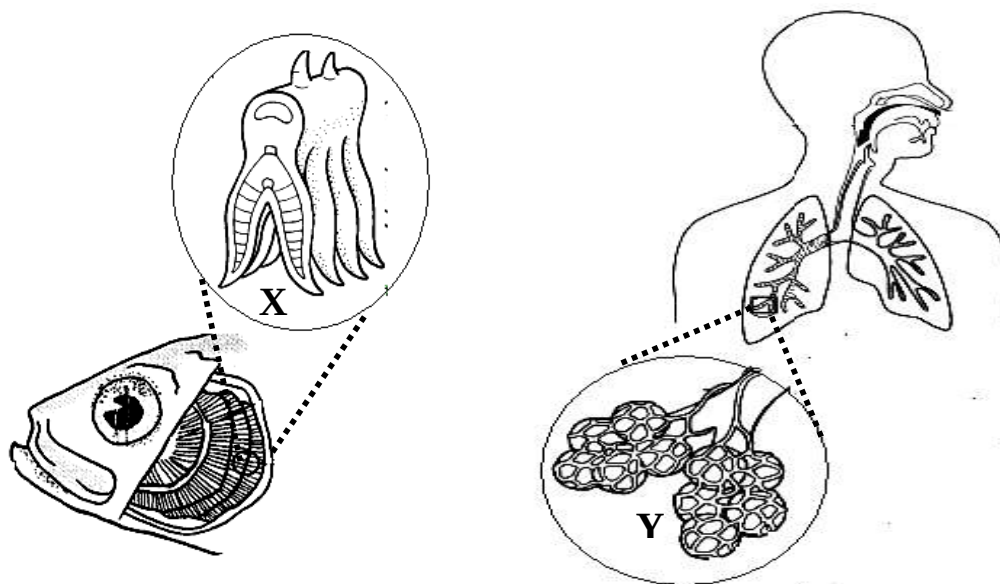
Rajah 6.3

- (i) Describe the breathing mechanisms in fish.
Terangkan mekanisma pernafasan dalam ikan.

[4 marks]

[4 markah]

Diagram 6.4 shows the respiratory structure X and Y in the fish and human..
Rajah 6.4 menunjukkan struktur respirasi X dan Y dalam ikan dan manusia



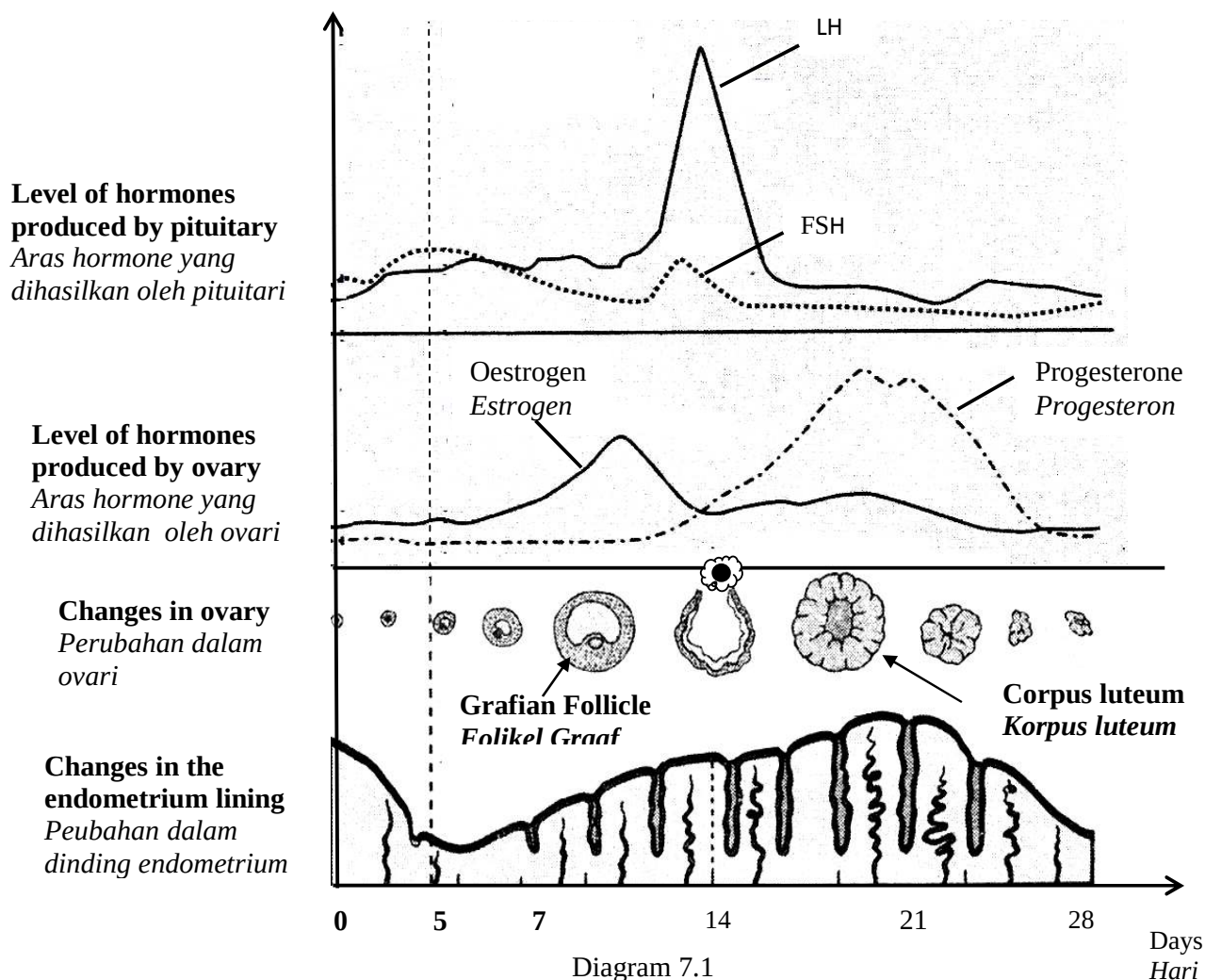
- (ii) Explain the similarities between respiratory structure X and Y in order to function efficiently .
Terangkan persamaan di antara struktur respirasi X dan Y untuk berfungsi dengan baik

[6 marks]

[6 markah]

7. Diagram 7.1 shows menstrual cycle which is controlled by certain hormones produced by pituitary and ovary.

Rajah 7.1 menunjukkan kitar haid yang dikawal oleh hormon-hormon tertentu yang dihasilkan oleh pituitari dan ovari.

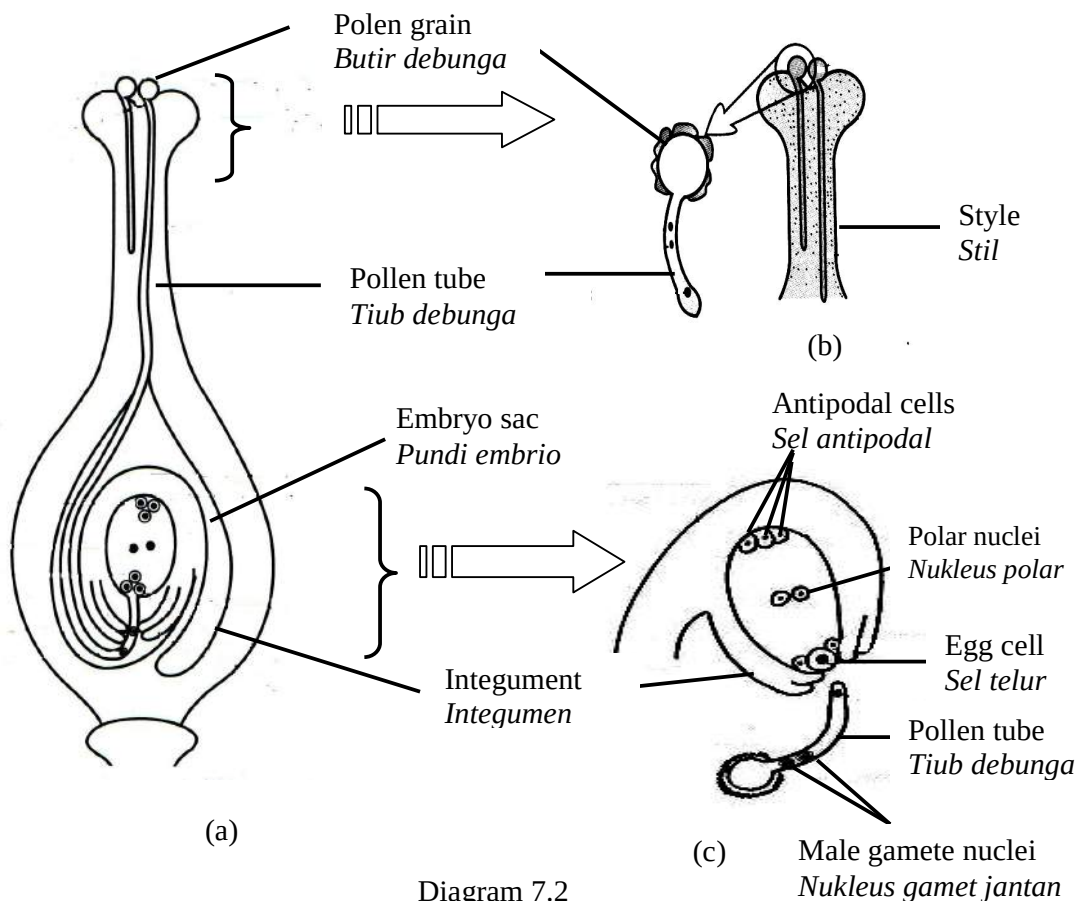


- (a) Explain the changes and the functions of each type of hormone produced by pituitary and ovary.
 Huraikan perubahan dan fungsi bagi setiap hormon yang dihasilkan oleh pituitari dan ovari.

[8 marks]
 [8 markah]

- 7(b) Diagram 7.2 shows the growing of pollen tube in the style and the process of double fertilisation in flowering plant.

Rajah 7.2 menunjukkan pertumbuhan tiub debunga di dalam stil dan proses persenyawaan ganda dua bagi tumbuhan berbunga.



- (i) Describe the growing process of pollen tube in the style and the process of double fertilisation in flowering plant.

Huraikan proses pertumbuhan tiub debunga di dalam stil dan proses persenyawaan ganda dua bagi tumbuhan berbunga.

[7 marks]

[7 markah]

- 7(b) Diagram 7.3 shows the stages of secondary growth in a dicotyledonous stem.
Rajah 7.3 menunjukkan peringkat-peringkat bagi pertumbuhan sekunder batang dikotiledon

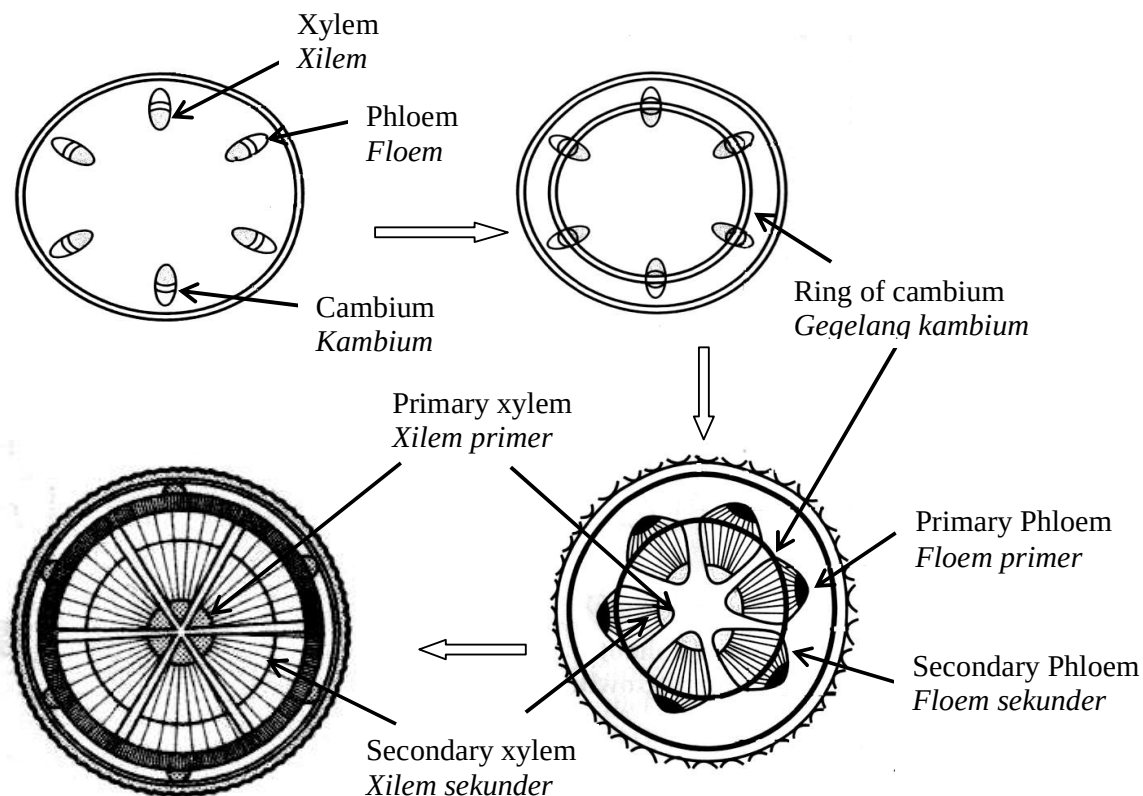


Diagram 7.3
Rajah 7.3

- (ii) Explain the process of secondary growth in dicotyledonous stem.
Terangkan proses pertumbuhan sekunder di dalam batang tumbuhan dikotiledon.

[5 marks]
 [5 marks]

8. Diagram 8.1 shows the distribution zones of mangrove trees K and L found in Kuala Kedah.
Rajah 8.1 menunjukkan taburan zon-zon pokok bakau K dan L yang didapati di Kuala Kedah

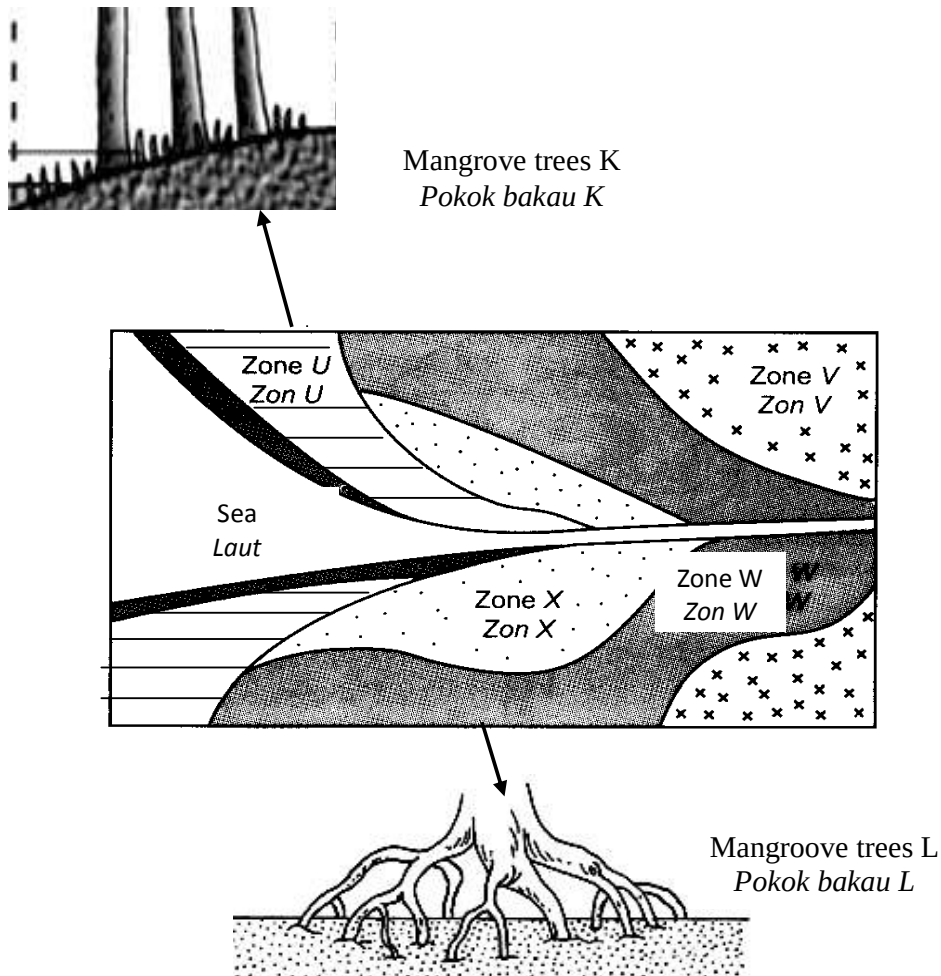


Diagram 8.1
Rajah 8.1

- (a) (i) Explain how mangrove trees K able to survive in zone U.
Terangkan bagaimana pokok bakau K sesuai hidup di zon U

[6 marks]

[6 markah]

- (ii) Mangrove tree L is a successor of mangrove tree K.
Pokok bakau L adalah tumbuhan penyesar kepada pokok bakau K

Explain how the process of succession occurs.
Terangkan bagaimana proses sesaran berlaku

[4 marks]

[4 markah]

- (b) Diagram 8.2 shows a section of a river that flows through rural and urban areas.
Rajah 8.2 menunjukkan satu bahagian sungai yang mengalir melalui kawasan luar bandar dan bandar

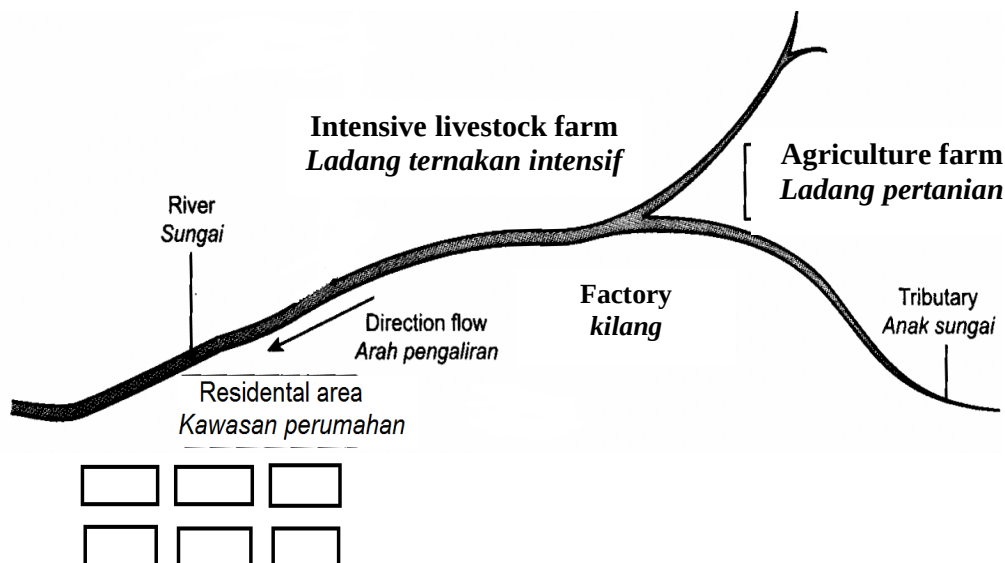


Diagram 8.2
Rajah 8.2

People live in residential area complained that the river water has turned green and many fishes die.

Penduduk di kawasan perumahan itu mengemukakan masalah tentang air sungai yang bertukar ke warna hijau dan banyak ikan yang mati.

Explain the phenomenon.

Terangkan kejadian tersebut

[10 marks]

[10 markah]

9. Diagram 9.1 shows a food pyramid.
Rajah 9.1 menunjukkan satu pyramid makanan.



Diagram 9.1
Rajah 9.1

- (a) Explain why ice cream, butter cake are placed at level 4 in the food pyramid
Terangkan kenapa ais krim, kek mentega, diletakkan pada aras 4 dalam pyramid makanan.
[6 marks / markah]
- (b) Explain the importance of consuming food from level 2 in our daily diet.
Terangkan kepentingan mengambil makanan dari aras 2 dalam gizi harian kita.
[4 marks / markah]

Diagram 9.2 show a few examples of fresh food and processed food.
Rajah 9.2 menunjukkan beberapa contoh makanan segar dan makanan diproses

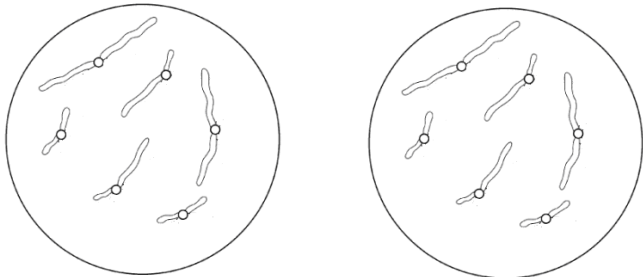


Diagram 9.2
Rajah 9.2

- (c) 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]

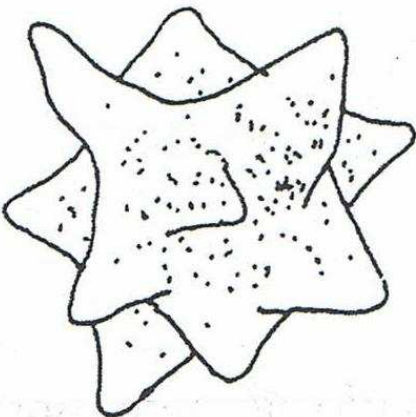
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No		Mark Scheme	Sub mark	Total mark
2 (a)	(i)	Prophase	1	
	(ii)	E	1	
	(iii)	 Daughter Cell 1 Daughter Cell II	2	4
(b)		P1- mitosis increases the number of cells in organism during growth P2- mitosis important for replacing dead / worn out / damaged cells. P3- Injured organ can be repaired P4- Some organism can regenerate lost parts of their bodies/ reproduction through Mitosis P5- mitosis ensures that new cells that are formed will have exactly the same genetic information and characteristic as it parent cell. Any 3 correct	1 1 1 1 1 Max3	 3
(c)	(i)	P1-When cell divides through uncontrolled mitosis P2- caused by severe disruptions to the mechanism that controls the cell cycle / give example // mutation P3- cancerous cells will be formed P4-Cancer cells compete with surrounding normal cells to obtain nutrients (and energy) for growth P5-Cancer cells will grow to form tumour, an abnormal mass of cells // Cancerous cell undergoes mitosis to produce more cancerous cells. P6- tumour can spread/expand and destroy neighbouring cells. Any 3 correct	1 1 1 1 1 1 Max3	

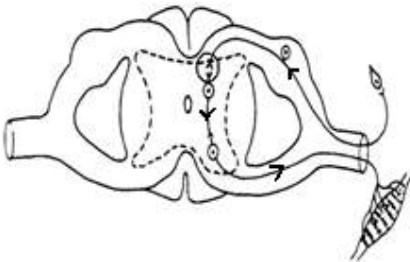
	(ii)	F1 : Expose to radiation/ x-ray/ example	1	
		E1: Consist/ carry high level of energy	1	
		E2: Destroy/disrupt the chromosome structure	1	
		Or other suitable example	Max2	5
		Total		12

No	Mark Scheme	Sub	Total
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			mark	mark
3(a)	(i)	Red blood cell/erythrocyte	1	
	(ii)	Transport oxygen to body cell	1	2
(b)	(i)		2	
	(ii)	P1-Salt solution is hypertonic P2- Osmosis occur P3- Water from erythrocyte diffuse out P4- erythrocyte(become) crenated/ shrink	1 1 1 1 Max3	5
(c)	(i)	Phospholipid bilayer	1	
	(ii)	Lipid/protein	1	
	(iii)	P1- Detergent dissolve the lipid in the plasma membrane. P2- Plasma membrane disintegrate/destroyed P3- Cytoplasm (of red blood cell) mix into the solution P4- Cell P is haemolysed Any 3 correct	1 1 1 1 Max3	5
		Total		12

No	Mark scheme	Sub	Total
----	-------------	-----	-------

			mark	mark
4	(a)	Able to draw the arrow on neurons correctly 	1	1
(b)	(i)	Able to name the structures of X, Y and Z X - Afferent neurone Y- Interneurone Z- Efferent neurone	1 1 1	3
	(ii)	Able to differentiate afferent neuron and efferent neurone X – Afferent neurone P1 - Transmit impulses from the receptor to central nervous system P2- The cell body is located in the middle of the neurone P3- Has long dendron P4-Has short axon Y- Efferent neurone P5-Transmit impulses from the central nervous system to the effector P6- The cell body is located at the end of the neurone P7- Has short dendron P8-Has long axon Any 4 Ps	1 1 1 1 1 1 1 1 Max4	4
c)	(i)	Able to state structure P Synapse	1	1

	(ii)	Able to name the chemical substances that released through P neurotransmitter / acetylcholine/noradrenaline/dopamine/serotonin	1	1
	(iii)	Able to explain the diseases related to nervous system F – Alzhemeir`s disease P1- lack of acetylcholine P2- brain shrinkage P3- show loss of intelligence/loss of memory/ mild confusion/poor concentration any 2 OR F2 – Parkinson disease P4 – Lack of neurotransmitter / dopamine // hardening of cerebral arteries P5 – tremors / weakness of the muscle / muscle cannot function Any 2	1 1 1 1	2
		Total		12

No	Mark Scheme	Sub	Total
----	-------------	-----	-------



			mark	mark
5(a)		Able to state the genotype of the polydactyl man and the normal woman.		
	(i)	Dd	1	
	(ii)	dd	1	2
(b)		Able to state the possible genotype and phenotype of the child		
	(i)	Dd or dd	1	
	(ii)	Polydactyl // or normal (any one correct correspondingly)	1	2
(c)		Able to draw the schematic diagram		
	(i)	Parent genotype Gamete Offspring Genotype Phenotype Blood group	1	
	(ii)	Able to give the percentage of the offspring having blood group O 0%	1	4

(d)	(i)	Able to state the types of variation (i) - Discontinuous variation - Continuous variation	1 1													
	(ii)	Able to explain one difference														
	<table border="1"><thead><tr><th>Discontinuous variation</th><th>Continuous variation</th></tr></thead><tbody><tr><td>1. There is no gradual change between the two extreme characteristics //The characteristics fall into distinct categories / no intermediates</td><td>There is complete range of measurements (for a particular characteristic) // differences between individuals are slight with intermediates/ gradual change</td></tr><tr><td>2. Graph consists of separate bar charts //Do not give a normal distribution</td><td>The graph has a normal distribution/ bell shaped curve</td></tr><tr><td>3. It is normally controlled by a single gene</td><td>A large number of genes are usually involved</td></tr><tr><td>4. Is described as qualitative/ characteristics can be either present or absent</td><td>Is described as quantitative/ characteristics can be measured</td></tr><tr><td>5. It is not influenced by environmental conditions.</td><td>It is influenced by environmental conditions.</td></tr></tbody></table>		Discontinuous variation		Continuous variation	1. There is no gradual change between the two extreme characteristics //The characteristics fall into distinct categories / no intermediates	There is complete range of measurements (for a particular characteristic) // differences between individuals are slight with intermediates/ gradual change	2. Graph consists of separate bar charts //Do not give a normal distribution	The graph has a normal distribution/ bell shaped curve	3. It is normally controlled by a single gene	A large number of genes are usually involved	4. Is described as qualitative/ characteristics can be either present or absent	Is described as quantitative/ characteristics can be measured	5. It is not influenced by environmental conditions.	It is influenced by environmental conditions.	
	Discontinuous variation	Continuous variation														
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4. Is described as qualitative/ characteristics can be either present or absent	Is described as quantitative/ characteristics can be measured															
5. It is not influenced by environmental conditions.	It is influenced by environmental conditions.															
Any pair of difference		2														
Total		4														

			12	
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SKEMA ESEI

No	Criteria	Marks	
6(a)	<i>Able to explain the cellular respiration process that occurs in P and Q correctly</i> <i>Sample answer</i> Process P F1 - aerobic respiration. P1 - glucose is completely oxidized/breakdown in the presence of oxygen P2 - the quantity of energy produced is higher Any 2 Process Q F2 - Anaerobic respiration P3 - glucose is not completely oxidized// the glucose molecules breakdown partially (into lactic acid) P4 - the quantity of energy produced is lower Any 2	1 1 1 1 1 1 1 Any 2	Max 4
6(b)	<i>Able to explain how during vigorous activity the body regulates the content of carbon dioxide in the blood</i> <i>Sample answer:</i> P1 - During vigorous exercise, carbon dioxide is produced and increased in the respiring cells. P2 - Higher concentration of carbon dioxide in blood results in decrease in blood pH// increase acidity. P3 - The drop in pH is detected by the central chemoreceptors (in the medulla oblongata) P4 - The central chemoreceptors generate the nerve impulses P5 - The nerve impulse is sent to the respiratory centre P6 - The respiratory generate the new impulse. P7 - The impulses is sent to the diaphragm and the intercostal muscles P8 - Cause respiratory muscle to contract and relax faster P9 - As a result, the breathing rate increase (causes) P10 - More carbon dioxide is eliminated from the body, P11 - the carbon dioxide concentration of the blood return to normal level Any 6	1 1 1 1 1 1 1 1 1 1 1 1 Any 6	Max 6



6(c)(i)	P1 - When the mouth opens, the floor of the buccal cavity is lowered. Increase the volume/ space of the buccal cavity P2 - This lowers the pressure in buccal cavity . P3 - Water with dissolved oxygen is drawn into the mouth. P4 - When the mouth closes, the floor of buccal cavity is raised. P5 - Water flow through the lamellae and gaseous exchange between the blood capillaries and water takes place. P6 - Oxygen diffuses from the flowing water through the gill lamellae into the blood capillaries. P7 - Carbon dioxide diffuses from the blood capillaries via the gill lamellae into the flowing water. Any 4	1 1 1 1 1 1 1	Max 4
6(c)(ii)	P1 - Both/fish and human have thin/one cell thick walls P2 - Gases can diffuse easily across the thin wall P3 - Human have a large number of alveolus while fish have a large number of filaments.// both structure X are exist in large numbers P4 - To increase surface area for exchange of gases P5 - Both structure X and Y/alveolus and gills are surrounded by a network of blood capillaries. P6 - To facilitate efficient exchange of and transport of respiratory gases/oxygen and carbon dioxide. P7 - To facilitate efficient exchange of and transport of respiratory gases/oxygen and carbon dioxide. Any 6	1 1 1 1 1 1 1	Max 6
Total			20



No	Criteria	Marks	
7(a)	FSH (Follicle – stimulating hormone) P1 - From day 1 to day 5, pituitary gland starts to secrete FSH P2 - FSH stimulates the development of follicle P3 - And stimulates the tissue of ovary to secrete oestrogen Oestrogen P4 - From day 5 to day 13, concentration of oestrogen continue to increase P5 - Oestrogen causes the repair and heal of the endometrium lining P6 - Endometrium lining becomes thicker and (filled with blood vessels) LH (Luteinising Hormone) P7 - On day 13, the LH level increases P8 - Causing ovulation / Graafian follicle releases secondary oocyte. P9 - LH causes the formation of corpus luteum P10 - Corpus luteum secretes progesterone Progesterone P11 - Progesterone maintains the thickening of endometrium for implantation P12 - Progesterone inhibits the secretion of FSH and LH P13 - If the secondary oocyte is not fertilised by a sperm, corpus luteum disintegrate / progesterone decreases P14 - Endometrium lining begins to breakdown and menstruation starts Any 8 P	1 1 1 1 1 1 1 1 1 1 1 1 1 1	Max 8
7(b)(i)	Growing of pollen tube process P1- Sugary/sucrose solution stimulate the growing of pollen tube P2 - pollen tube grows down the style towards the ovule P3 - The generative nucleus divides to form two male gametes nuclei P4 - Leading the front is the nucleus tube Double fertilization P6 - Pollen tube penetrate the micropyle to reach the egg cell P7 - Nucleus tube disintegrate P8 - one of male nucleus fuses with egg cell to form a diploid zygote P9 - other male gamete nucleus fuses with the two polar nuclei forming a triploid nucleus. P10 - which later develops into the endosperm P11 - the synergid cells and the antipodal cells disintegrate Any 7 P	1 1 1 1 1 1 1 1 1 1	Max 7

7(b)(ii)	Secondary growth of dicotyledonous stem P1 - Secondary growth of dicotyledonous stem involves vascular cambium and cork cambium P2 - Vascular cambium divides actively by mitosis. P3 - To form ring of cambium / new cells P4 – Cells at inner layer will form secondary xylem P5 – Cells from outer layer will form secondary phloem P6 – Cork cambium divides by mitosis to form new cells P7 – The new cells at the inner layer form parenchyma P8 – The new cells at the outer layer form cork (tissue) Any 5 P	1 1 1 1 1 1 1 1	Max 5
Total			20



No	Criteria	Marks	
8	Able to explain how mangrove trees K able to survive in zone U.		
(a)(i)	Sample answer F1 : Mangroove trees K are Avicennia sp./ Sonneratia sp. P1 : have long underground cable roots that P2 : support them in the soft and muddy soil P3 : have thin, vertical breathing roots/ pneumatophores(which project above the water around the trees). P4: gaseous exchange / breathing P5 : the root cells also have a higher osmotic pressure P6 : prevent water lost from cells (in the sea water) P7 : Salt water that enters the root cells is excreted through hydrotodes (the pore in the epidermis of the leaves) P8 : Able to germinate while still being attach to the parent tree / vivipary P9 : which increase the chances of survival of the seedlings Any 6	1 1 1 1 1 1 1 1 1 1	Max 6
(a)(ii)	Able to explain how the process of succession occurs in mangrove tree L. Sample answer P1 : Pneumatophore of pioneer sp / Avicennia sp / Sonneratia sp traps/ collect muds / organic substances/ sediments P2 : Increase the thickness of the soil / land become higher P3 : As time pass by the soil becomes more dense/ compact and firm/ drier P4 : The condition favours the growth of Rhizophora sp. P5 : The Rhizophora sp. replaces the pioneer species. Any 4	1 1 1 1 1	Max 4
(b)	Able to explain eutrophication. Sample answer F1 : Eutrophication occur P1 : Farmers use fertilizers that usually contains nitrates/phosphate P2: Fertilizer/animal waste/silage which contain nitrate/phosphate may washed out in water when it rains/leaching/run into the river. P3: Increase the nutrient content in the river P4 : Algae in the river grow faster (when they are supplied with extra nitrate/(phosphate)/ Algal bloom P5: (they may grow so much) that they completely cover the water. P6: block the sunlight to reach the plants in the water. P7: Rate of photosynthesis decrease/ not occur P8 : The aquatic plants die P9 : Bacteria decomposed dead plant P10: Population of bacteria increase P11: oxygen in the water used up by the bacteria P12: Dissolve oxygen also reduced/ BOD increase P13: Caused aquatic plants and fish die	1 1 1 1 1 1 1 1 1 1 1 1 1	Max

	Any 10		10
TOTAL			20

No	Criteria	Marks	
9 (a)	P1 : Food at level 4 should only be taken in smallest amount / ratio. P2 : Ice cream contain a lot of sugar. P2 : Sugar has high energy value. P3 : Excessive sugar in the body will lead to obesity / diabetes. P4 : Butter cake contain a lot of lipid. P5 : Lipid has high energy value. P6 : Excessive lipid will form adipose tissue in the body // increase cholesterol level in body. P7 : (Excessive lipid will) lead to heart attack / cardiovascular disease / stroke. Any 6 P	1 1 1 1 1 1 1 1 1	Max 6
9(b)	P1 : Food at level 2 contains a lot of water, vitamins, minerals and roughage / fibre. P2 : Water is important in all cell activities / physiological / biochemical processes in our body. P3 : Body need enough vitamins to preserve / maintain health // Any suitable example of vitamin and the related function P4 : Body need enough minerals to preserve / maintain health and growth // Any suitable example of mineral and the related function. P5 : Roughage is necessary in the diet to stimulate peristalsis / to prevent constipation. Any 4 P	1 1 1 1 1	Max 4
9(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	1 1 1 1 1 1 1	

	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	Max 10
Total			20



SULIT
4551/3
BIOLOGY
KERTAS/PAPER 3
18 OGOS 2011
1½ jam

MAJLIS KEBANGSAAN PENGETUA – PENGETUA
SEKOLAH MENENGAH
NEGERI KEDAH DARUL AMAN

PEPERIKSAAN PERCUBAAN SPM 2011

BIOLOGY

Paper 3

One hour and thirty minutes

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

- 1. Kertas soalan ini adalah dalam dwibahasa.*
- 2. Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Melayu.*
- 3. Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*

Kertas soalan ini mengandungi 10 halaman bercetak.

4551/3

[Lihat sebelah
SULIT



1. Diagram 1.1 shows dark winged moth and light winged moth live in a forest habitat. The wing colour of the insects provides effective camouflage against the tree trunk.

Rajah 1.1 menunjukkan kupu-kupu berkepak gelap dan kupu-kupu berkepak cerah yang hidup dalam suatu habitat belukar.

Warna sayap serangga ini dapat memberi kesan penyamaran di atas batang pokok..



Unpolluted tree trunk
Batang pokok tidak tercemar

Polluted tree trunk
Batang pokok tercemar

Diagram 1.1 / Rajah 1.1

Diagram 1.2 shows an industrial which area has been set up near to the forest. Plants which are near to the industrial area are badly affected. Leaves and trunk are covered by the smoke and soot released by the factories.

The population of the moths are also affected.

Rajah 1.2 menunjukkan satu kawasan perindustrian telah dibina berdekatan dengan belukar itu. Tumbuhan yang berdekatan dengan kawasan perindustrian telah teruk terjejas. Daun dan batang pokok dilitupi oleh asap dan jelaga yang dibebaskan oleh kilang-kilang. Populasi kupu-kupu juga turut terjejas.

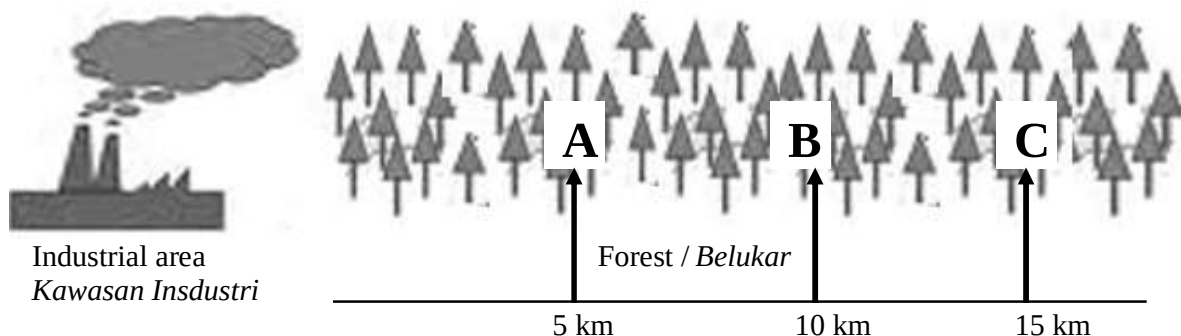


Diagram 1.2 / Rajah 1.2

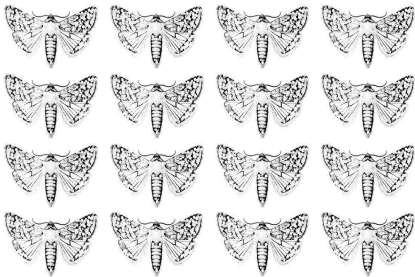
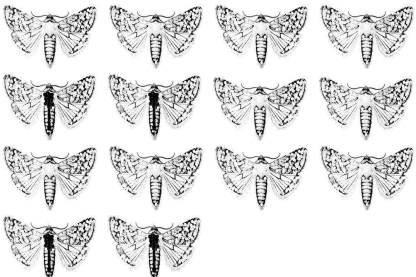
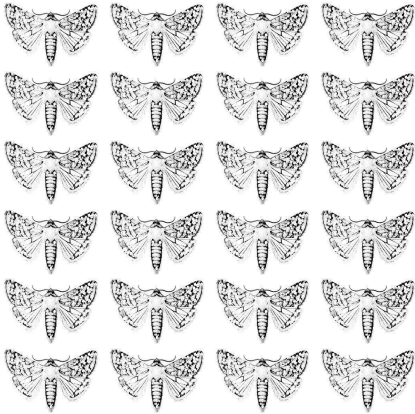
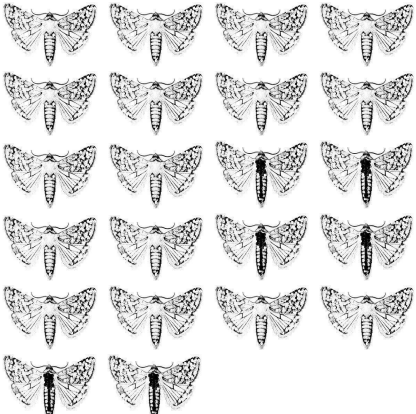
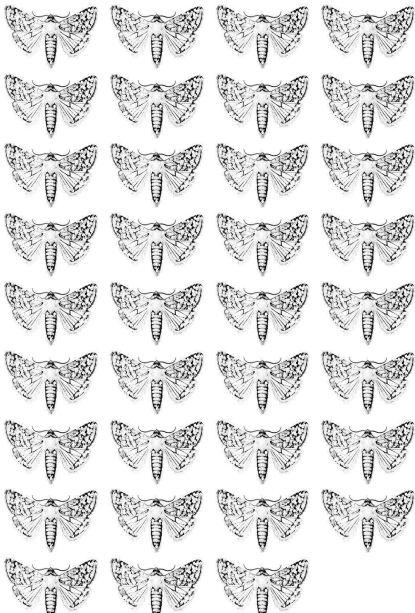
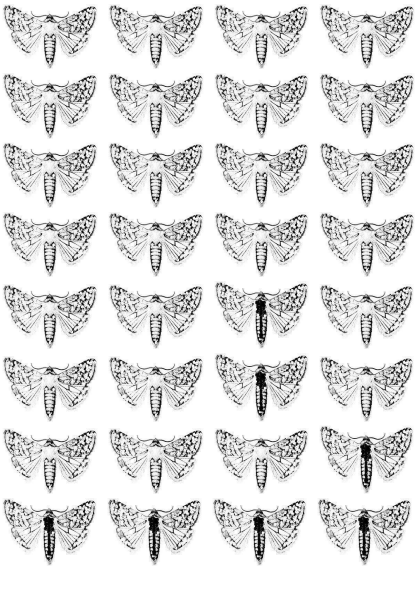
A group of students carried out an experiment to investigate the effect of air pollution on the population of light winged moth in the forest.

The population of the light winged moth is estimated in three different sites, A, B and C by using ' Capture-mark-release and recapture ' method. The results of the experiment are shown in Table 1.

Sekumpulan pelajar telah menjalankan satu eksperimen untuk mengkaji kesan pencemaran udara ke atas populasi kupu-kupu bersayap cerah yang hidup dalam belukar.

Populasi kupu-kupu berkepak cerah dianggar dalam tiga tapak berbeza, iaitu A, B dan C dengan menggunakan kaedah tangkapan, penandaan, pembebasan dan tangkapan semula.

eksperi

Site Tapak	Number of Light Winged Moth Captured <i>Bilangan Kupu-kupu Bersayap Cerah yang Ditangkap</i>		Number of moth captured <i>Bilangan kupu-kupu yang ditangkap</i>
	First Capture (X) <i>Tangkapan Pertama (X)</i>	Second Capture / Recapture (Y) <i>Tangkapan Kedua / Semula (Y)</i>	
A			X = Y =
B			X = Y =
C			X = Y =



Unmarked light winged moth
Kupu-kupu bersayap cerah yang tak bertanda



Marked light winged moth
Kupu-kupu bersayap cerah yang bertanda

Table 1 / Jadual 1

- (a) Record the number of moth captured, X and Y in Table 1.

Kira bilangan kupu-kupu yang ditangkap, X dan Y dalam Jadual 1.

[3 marks / markah]

- (b)(i) State two different observation from Table 1.

Nyatakan dua pemerhatian yang berbeza dari Jadual 1.

Observation 1 / *Pemerhatian 1 :*

.....

.....

.....

Observation 2 / *Pemerhatian 2 :*

.....

.....

.....

[3 marks / markah]

- (ii) State the inferences from the observations in 1(b)(i)

Nyatakan inferens dari pemerhatian di 1(b)(i)

Inference from observation 1 / *Inferens dari pemerhatian 1:*

.....

.....

.....

Inference from observation 2 / *Inferens dari pemerhatian 2:*

.....

.....

.....

[3 marks / markah]

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

Variable <i>Pembolehubah</i>	Method to handle the variable <i>Cara mengendalikan pembolehubah</i>
Manipulated Variable <i>Pembolehubah Dimanipulasikan</i> 	
Responding Variable <i>Pembolehubah Bergerak Balas</i> 	
Constant Variable <i>Pembolehubah Dimalarkan</i> 	

Table 2 / Jadual 2

[3 marks / markah]

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

.....

.....

.....

[3 marks / markah]



(e)(i) Construct a table to record all the data collected in this experiment.

Your table should have the following data.

Bina satu jadual untuk merekodkan semua data yang dikutip dalam eksperimen ini.

Jadual anda hendaklah mengandungi data-data berikut ;

- Name of the site
Nama tapak
- Distance from the industrial area
Jarak dari kawasan industri
- Number of moth in the first capture
Bilangan kupu-kupu dalam tangkapan pertama
- Number of moth in the second capture (recapture)
Bilangan kupu-kupu dalam tangkapan kedua (semula)
- Number of marked moth in second capture
Bilangan kupu-kupu bertanda dalam tangkapan kedua
- Estimated population of the moth
Populasi anggaran kupu-kupu

$$\text{Estimated population} = \frac{(\text{Number in the first captured}) \times (\text{Number in the recaptured})}{(\text{Number marked in the recapture})}$$

$$\text{Populasi Anggaran} = \frac{(\text{Bilangan dalam tangkapan pertama}) \times (\text{Bilangan dalam tangkapan semula})}{(\text{Bilangan yang bertanda dalam tangkapan semula})}$$

[3 marks / markah]

- (ii) Use the data in (e)(i), draw the graph of the estimated population of the light winged moth against the distance from the Industrial zone.
Gunakan data dari (e)(i), lukiskan graf populasi anggaran kupu-kupu bersayap cerah terhadap jarak dari kawasan industri.

[3 marks / markah]

Use the graph paper provided by school

- (f) Based on the graph in (e)(ii), explain the relationship between the estimated population of the light winged moth and the distance from the industrial area.
Berdasarkan graf di (e)(ii), terangkan perhubungan antara populasi anggaran kupu-kupu bersayap cerah dengan jarak dari kawasan industri.

.....

.....

.....

.....

[3 marks / markah]

- (g) State the operational definition for estimated population of light winged moth.
Nyatakan definisi secara operasi bagi populasi anggaran kupu-kupu bersayap cerah.

.....

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.....

.....

[3 marks / markah]

- (h) Another group of students repeat the above experiment to investigate the effect of air pollution on the estimated population of the dark winged moth.
Results show that at Site B, the estimated population of dark winged moth is 68.
Predict the estimated population of dark winged moth at Site A.
Explain your prediction.
*Sekumpulan pelajar lain mengulangi eksperimen di atas untuk mengkaji kesan pencemaran udara ke atas populasi anggaran bagi kupu-kupu bersayap gelap.
Keputusan menunjukkan di Tapak B, populasi anggaran kupu-kupu bersayap hitam ialah 68.
Ramalkan populasi anggaran kupu-kupu bersayap hitam di Tapak A.
Terangkan ramalan anda.*

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.....

.....

.....

[3 marks / markah]



- (i) The following is a list of biotic and abiotic factors affecting the population of moths.
Berikut ialah senarai factor-faktor biosis dan abiosis yang mempengaruhi populasi kupu-kupu.

Smoke, Bird, temperature, tree, ant, light intensity.
Asap, burung, suhu, pokok, semut, keamatan cahaya

Classify these factors in Table 3.

Klasifikasikan factor-faktor ini dalam Jadual 3.

Biotic Factors <i>Faktor biosis</i>	Abiotic Factors <i>Faktor abiosis</i>

[3 marks / markah]

- 2 A baker is making bread in his bakery shop. During the preparations, he found that when he added yeast to the wheat flour and kneaded them, it becomes elastic and stretchable like a balloon. When he added more sugar, the dough will double its size. *Seorang tukang roti membuat roti di kedai rotinya. Semasa penyediaan roti, dia mendapati apabila dia menambahkan yis ke dalam tepung gandum dan mengulinya, doh akan menjadi lebih elastik dan liat seperti belon. Apabila ditambahkan dengan lebih banyak gula, doh akan menjadi lebih besar.*



Based on the above situation, plan a laboratory experiment to study the effect of glucose concentration on the rate of anaerobic respiration in yeast.

Berdasarkan situasi di atas, rancangkan eksperimen makmal untuk mengkaji kesan kepekatan glukosa ke atas kadar respirasi anaerobik dalam yis.

The planning of your experiment must include the following aspects:

Perancangan eksperimen anda mesti merangkumi aspek berikut :

- Problem statement
Penyataan masalah
- Hypothesis
Hipotesis
- Variables
Pembolehubah
- List of apparatus and materials
Senarai alat radas
- Experimental procedure
Prosedur eksperimen
- Presentation of data
Persembahan data

[17 marks]

[17 markah]

END OF QUESTION PAPER



PAPER 3 PERCUBAAN 2011

1 (a) Able to record all 6 readings for the number of moth captured correctly.

Site	Number of Moth Captured	
A	X = 16	Y = 14
B	X = 24	Y = 22
C	X = 35	Y = 32

1 (b) (i) Able to state two different observations correctly

Sample answers

1. At site A, The number of moth in the first captured is 16, and the number of moth captured in the second captured is 14
2. At site C, The number of moth captured is the highest compared to the number of moth captured at site A and site B.
3. The further the distance from the industrial area, the higher the number of moth captured.
4. The number of moth captured increases with the distance from the industrial area.

1 (b) (ii) Able to make two inferences correctly.

P1: Infer on the degree of air pollution.

- Longer distance from the industrial area
- The tree trunks are less covered by smoke and soot.

P2: Infer on the importance of camouflage.

P3: Infer on the result of predation.

Any 2 P's

Sample answers

- (1) At site A, the tree trunks are covered by more smoke and soot, light winged moths are more easily spotted / not being camouflaged / be seen by the predators. More light winged moths have been eaten / killed by the predators.
 - (2) At site C, the tree trunks are covered by less smoke and soot, less light winged moths can be seen by predators / light winged moths are camouflaged by the tree trunks. Less light winged moths eaten / killed by the predators / more light winged moths manage to survive.
 - (3) The further the distance from the industrial area, the tree trunks are less polluted / less covered by smoke. The light winged moths are well camouflaged, less moths are killed / eaten by predators.
 - (4) The population of light winged moths increase because there are well camouflaged by the unpolluted tree trunks, less moths are killed / eaten by predators.
- 1 (c) Able to state all 3 variables and methods to handle variables correctly.

Variables	Method to handle the variable
Manipulated variable Distance from the industrial area. // Degree of pollution // Degree of camouflage	Capture the moths at different fixed distance from the industrial area / different degree of pollution / different degree of camouflage.
Responding variable The number of moths captured (in the first and second capture)	Count and record the number of moths captured (in the first and second capture)
Constant variable The place/area of the first and second capture. // The type of moth in the first and second capture	Fix the place / area for the first and second capture. // Fix the type of moth captured in the first and second capture.

1 (d) Able to state hypothesis correctly

P1: Manipulated variable

P2: Responding variable

P3: Relationship

Sample answers:

1. As the distance nearer to the industrial area, the number the moths captured decrease.
2. When the environment is not able to camouflage the moths, the number of moths captured decrease.
3. As the environment is more polluted by the smoke, the number of moths captured decrease.

1(e) (i)Able to construct a table and record all data correctly

Site	Distance from the Industrial Area	Number of the moths in the first capture	Number of the moths in the second capture	Number of marked moths in the second capture	Estimated population of the light winged moth
A	5 km	16	14	4	56
B	10 km	24	22	6	88
C	15 km	35	32	7	160

Criteria:

(T) Able to state all 6 titles with units correctly

(D) Able to record all data correctly

(C) Able to calculate the estimated population of light winged moth correctly .

1 (e) (ii) Able to plot graph correctly

Criteria:

- (P) Able to draw both axes with uniform scale.
- (T) Able to plot all 3 points
- (B) Able to draw a line through all 3 points only.

1 (f) Able to state and explain the relationship between estimated population of the light winged moth and the distance from the industrial area.

Criteria:

- R: Relationship (1 m)
- E1: Tree trunk less polluted / covered by smoke / soot
- E2: Light winged moths are well camouflaged
// less light winged moths eaten / killed by the predators.

Sample answers:

1. The further the distance from the industrial area, the higher the estimated population of the light winged moth. This is because the tree trunks are less polluted / covered by smoke / soot, the moths are well camouflaged.

1 (g) Able to the operational definition of estimated population of light winged moth.

Criteria:

- P1: Estimated population of light winged moths is calculated from the number of moth in the first capture and second capture.
- P2: The first capture and second capture are carried out at the same place / site.
- P3: The number of moth captured is influenced by the distance from the industrial area / degree of pollution / the effect of camouflage // correct hypothesis.

1 (h) Able to predict the estimated population of dark winged moth at Site A.

Criteria:

P: correct prediction : more than 68 (1m)

E1: the tree trunks are more polluted / covered by smoke / soot

E2: provide better camouflage for the dark winged moth.

E3: dark winged moths are not easily seen by predators.

Any TWO E's (2m)

1 (i) Able to classify the biotic and abiotic factors.

Biotic Factor	Abiotic factor
Bird Tree Ant	Temperature Smoke Light intensity

All correct : 3 marks

4 – 5 correct : 2 marks

2 – 3 correct : 1 mark



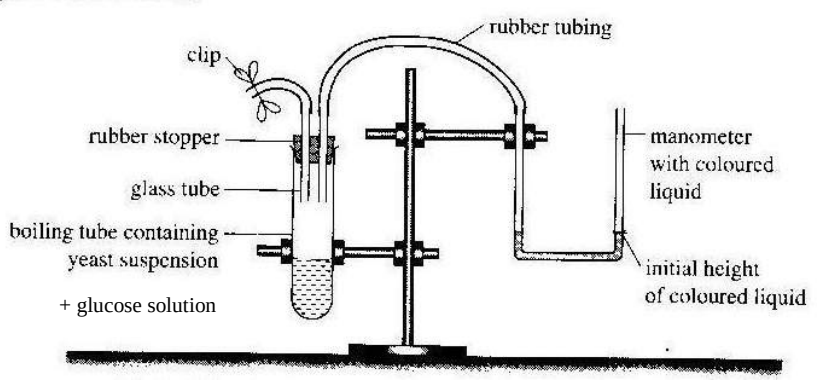
Question 2

	Explanation	Score
2(i)	Able to state problem statement relating the manipulated variable with the responding variable correctly. P1- manipulated variable The concentration of glucose P2-responding variable The rate of anaerobic respiration in yeast P3-question form (What / how does ...?) <i>Sample answer:</i> - How does the concentration of glucose (P1) affects the rate of anaerobic respiration in yeast (P2) ? (P3) - What is the effect of the concentration of glucose (P1) on the rate of anaerobic respiration in yeast (P2)? (P3)	3 P1+P2+P3
	Able to state problem statement inaccurately <i>Sample answer:</i> - What is the effect of the concentration of glucose on respiration? no P2 - The rate of anaerobic respiration in yeast is affected by the concentration of glucose (no P3)	2 P1+P2/ P1+P3/ P2+P3
	Able to state the idea <i>Sample answer :</i> The concentration of glucose affects the yeast (no P2 + P3)	1 P1/P2/P3
	No response or wrong response	0

	Explanation	Score
2(ii)	Able to state the hypothesis by relating manipulated variable to the responding variable correctly (P1+P2+H) P1- manipulated variable The concentration of glucose P2- responding variable The rate of anaerobic respiration in yeast H-relationship <i>Sample answer:</i> 1. The higher the concentration of glucose, the higher the rate of anaerobic respiration in yeast 2. As the concentration of glucose increases, the rate of anaerobic respiration in yeast increases.	3 P1+P2+H
	Able to state any two criteria correctly or inaccurate hypothesis <i>Sample answer:</i> 1. The concentration of glucose (P1) affects the rate of anaerobic respiration in yeast (P2) (no H)	2 P1+P2/ P1+H/ P2+H
	Able to draw the idea of hypothesis <i>Sample answer:</i> 1. The glucose concentration affects the respiration (noP2+H)	1 P1/P2/H
	No response or wrong response	0

	Explanation	Score
2(iii)	Able to state all the three variables correctly <i>Sample answers</i> 1. Manipulated variable The concentration of glucose 2. Responding variable The rate of anaerobic respiration in yeast 3. Constant variable The temperature / the volume of yeast suspension	3
	Able to state any two variables correctly	2
	Able to state any one variable correctly	1
	No response or incorrect response	0

	Explanation	Score																																		
2(iv)	Able to list all materials and apparatus correctly to make a functional experiment and able to get the data	3																																		
	<table><tr><td>Experiment by using manometer</td><td>Experiment by counting the number of air bubbles</td></tr><tr><td>MATERIALS (M) yeast suspension glucose solution paraffin oil vaselin</td><td>MATERIALS(M) yeast suspension glucose solution paraffin oil vaselin limewater / distilled water</td></tr><tr><td colspan="2">notes : yeast and glucose are compulsory (2M) – if not complete no marks will be given</td></tr><tr><td>APPARATUS (A) boiling tube manometer / capillary tube rubber tubing stopwatch marker/ thread stoppers measuring cylinder retort stand</td><td>APPARATUS (A) boiling tube test tube delivery tube stopwatch stoppers measuring cylinder</td></tr><tr><td>Notes :<table><tr><td>Score</td><td>Material (M)</td><td>Apparatus (A)</td></tr><tr><td>3</td><td>4M</td><td>8A</td></tr><tr><td>2</td><td>3M</td><td>5A</td></tr><tr><td>1</td><td>2M</td><td>1A</td></tr></table></td><td>Notes :<table><tr><td>Score</td><td>Material (M)</td><td>Apparatus (A)</td></tr><tr><td>3</td><td>5M</td><td>6A</td></tr><tr><td>2</td><td>3M</td><td>5A</td></tr><tr><td>1</td><td>2M</td><td>1A</td></tr></table></td></tr></table>		Experiment by using manometer	Experiment by counting the number of air bubbles	MATERIALS (M) yeast suspension glucose solution paraffin oil vaselin	MATERIALS(M) yeast suspension glucose solution paraffin oil vaselin limewater / distilled water	notes : yeast and glucose are compulsory (2M) – if not complete no marks will be given		APPARATUS (A) boiling tube manometer / capillary tube rubber tubing stopwatch marker/ thread stoppers measuring cylinder retort stand	APPARATUS (A) boiling tube test tube delivery tube stopwatch stoppers measuring cylinder	Notes : <table><tr><td>Score</td><td>Material (M)</td><td>Apparatus (A)</td></tr><tr><td>3</td><td>4M</td><td>8A</td></tr><tr><td>2</td><td>3M</td><td>5A</td></tr><tr><td>1</td><td>2M</td><td>1A</td></tr></table>	Score	Material (M)	Apparatus (A)	3	4M	8A	2	3M	5A	1	2M	1A	Notes : <table><tr><td>Score</td><td>Material (M)</td><td>Apparatus (A)</td></tr><tr><td>3</td><td>5M</td><td>6A</td></tr><tr><td>2</td><td>3M</td><td>5A</td></tr><tr><td>1</td><td>2M</td><td>1A</td></tr></table>	Score	Material (M)	Apparatus (A)	3	5M	6A	2	3M	5A	1	2M	1A
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3	5M	6A																																		
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	Able to list 3 materials and any 5 apparatus related to the experiment (3M + 5A)	2																																		
	Able to list 2 materials and any 1 apparatus related to the experiment (2M + 1A)	1																																		
	Wrong response or no response	0																																		

	Explanation	Score
2(v)	Able to describe the steps of the experiment procedure or method correctly Sample answer:  S1. Three boiling tubes A, B and C are labeled. S2. The boiling tubes are filled with 5 ml of yeast suspension. S3. Glucose solution of 5% concentration is heated to remove dissolved oxygen. The solution is left to cool. S4. 10 ml of the 5% concentration of the boiled glucose solution is added to boiling tube A. S5. A thin layer of paraffin oil is added to cover the content of the boiling tubes. S6. A stopper is connected with a rubber tubing to a manometer which is filled with coloured liquid. S7. Vaseline is used to make sure all the joints of the apparatus are airtight S8. The initial height of coloured liquid is marked and recorded in a table. S9. The stopwatch is started and the apparatus set-up is left for ten minutes. S10. After 10 minutes, the final height of coloured liquid is measured and recorded in the table. S11. Repeat step 3 – 9 by changing the concentration of glucose solution from 5% to 10% in boiling tube B and 30% of glucose solution in boiling tube C. S12. The rate of anaerobic respiration in yeast is calculated by using formula $= \frac{\text{the final height} - \text{the initial height (the coloured liquid)}}{10} \frac{(\text{mm})}{(\text{min})}$ S13. Graph of the rate of anaerobic respiration in yeast against the concentration of glucose is plotted . K1: Steps 1 / 2 / 3 / 5 / 8 / 9 (Preparation of material and apparatus) K2: Step 2 / 4 / 9 / 10 (Operating fixed variable) K3: Steps 8 / 9 / 10 / 12 / 13 (Operating responding variable) K4: Step 11 (Operating manipulated variable) K5: Step 3 / 5 / 7 (Precautions)	3 K1+K2+ K3+ K4+K5 (5K)

	Notes: 1. At least 4 K1 2. K2, K3, K4 and K5 at least one Able to state all the 5K	
	Able to state any 3K – 4K correctly	2
	Able to state any 2K correctly	1
	Wrong response or no response or only 1K	0

	Explanation	Score																						
2(vi)	Able to construct a table to record data with units - All titles with units (1m) - Manipulated variables (1m) - Data is not required <table><tr><th rowspan="2">Boiling tubes</th><th rowspan="2">Concentration of glucose solution</th><th colspan="2">The height of coloured liquid in the manometer (mm)</th><th rowspan="2">The rate of anaerobic respiration in yeast (mm min⁻¹)</th></tr><tr><th>Initial height</th><th>Final height</th></tr><tr><td>A</td><td>5%</td><td></td><td></td><td></td></tr><tr><td>B</td><td>10%</td><td></td><td></td><td></td></tr><tr><td>C</td><td>30%</td><td></td><td></td><td></td></tr></table>	Boiling tubes	Concentration of glucose solution	The height of coloured liquid in the manometer (mm)		The rate of anaerobic respiration in yeast (mm min ⁻¹)	Initial height	Final height	A	5%				B	10%				C	30%				2
Boiling tubes	Concentration of glucose solution			The height of coloured liquid in the manometer (mm)			The rate of anaerobic respiration in yeast (mm min ⁻¹)																	
		Initial height	Final height																					
A	5%																							
B	10%																							
C	30%																							
	Able to present a table with at least two titles correctly	1																						
	No response or wrong response	0																						

Sample Answer:**Problem Statement:**

What is the effect of the concentration of glucose on the rate of anaerobic respiration in yeast ?

3m

Hypothesis:

The higher the concentration of glucose, the higher the rate of anaerobic respiration in yeast

3m

Variables:**Manipulated variable**

The concentration of glucose

3m

Responding variable

The rate of anaerobic respiration in yeast/ the changes in height of coloured liquid



Constant variable

The temperature / the volume of yeast suspension

Apparatus / materials :

yeast suspension *, glucose solution *, paraffin oil, vaselin , boiling tube, manometer , capillary tube , rubber tubing, stopwatch , marker/ thread, stoppers, measuring cylinder, retort stand

3m

Procedure:

1. Three boiling tubes A, B and C are labeled.
2. The boiling tubes are filled with 5 ml of yeast suspension.
3. Glucose solution of 5% concentration is heated to remove dissolved oxygen. The solution is left to cool.
4. Boiling tube A is added with 10 ml of the 5% of the boiled glucose solution.
5. A thin layer of paraffin oil is added to cover the content of the boiling tubes.
6. A rubber tubing is connected from a stopper to a manometer which is filled with coloured liquid.
7. Vaselin is used to make sure all the joints of the apparatus are airtight
8. The initial height of coloured liquid is marked and recorded in a table.
9. The stopwatch is started and the apparatus set-up is left for ten minutes.
10. After 10 minutes, the final height of coloured liquid is measured and recorded in the table.
11. Repeat step 3 – 9 by changing the concentration of glucose solution from 5% to 10% in boiling tube B and 30% of glucose solution in boiling tube C.
12. The rate of anaerobic respiration in yeast is calculated by using formula

$$= \frac{\text{the final height} - \text{the initial height (the coloured liquid)}}{10} \text{ (mm)} \text{ (min)}$$
13. Graph of the rate of anaerobic respiration in yeast against the concentration of glucose is plotted .

3m

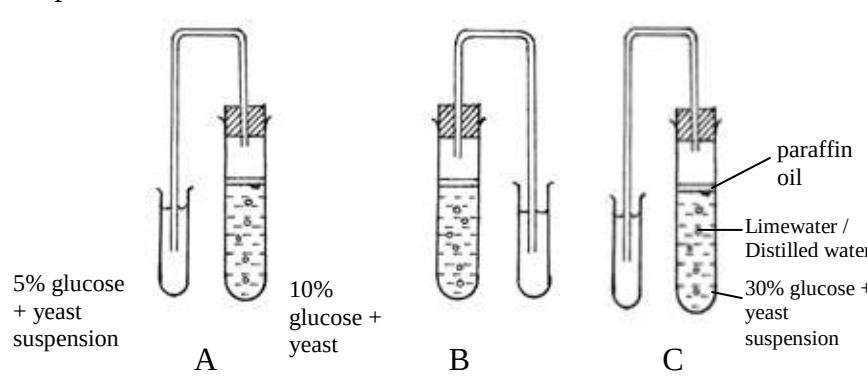
Presentation of data :

Boiling tubes	Concentration of glucose solution	The height of coloured liquid in the manometer (mm)		The rate of anaerobic respiration in yeast (mm min ⁻¹)
		Initial height	Final height	
A	5%			
B	10%			
C	30%			

2m

Total = 17 marks

Experiment by counting the number of air bubbles

	Explanation	Score
2(v)	Able to describe the steps of the experiment procedure or method correctly <i>Sample answer:</i>  S1. Three boiling tubes A, B and C are labeled. S2. The boiling tubes are filled with 5 ml of yeast suspension. S3. Glucose solution of 5% concentration is heated to remove dissolved oxygen. The solution is left to cool. S4. 10 ml of the 5% concentration of the boiled glucose solution is added to boiling tube A. S5. A thin layer of paraffin oil is added to cover the content of the boiling tubes . S6. A stopper is connected with a delivery tube to a test tube . S7. The end of the delivery tube is placed into the test tube that contain 10 ml of limewater/ distilled water. S8. Vaseline is used to make sure all the joints of the apparatus are airtight S9. The stopwatch is started and the number of air bubbles released in 20 minutes are counted and recorded in a table. S10. The rate of anaerobic respiration in yeast is calculated by using the formula = $\frac{\text{the number of air bubbles released}}{20 \text{ minutes}}$ S11. Repeat step 3 – 9 by changing the concentration of glucose solution from 5% to 10% in boiling tube B and 30% of glucose solution in boiling tube C. K1: Steps 1 / 2 / 3 / 5 / 6 / 7 (Preparation of material and apparatus) K2: Step 2 / 4 (Operating fixed variable) K3: Steps 9 / 10 (Operating responding variable) K4: Step 11 (Operating manipulated variable) K5: Step 3 / 5 / 8 (Precautions) Notes: - At least 4 K1 - K2, K3, K4 and K5 at least one Able to state all the 5K	3 K1+K2+K3+K4+K5 (5K)
	Able to state any 3K – 4K correctly	2
	Able to state any 2K – 3K correctly	1

	Wrong response or no response or only 1K	0																
	Explanation	Score																
2(vi)	Able to construct a table to record data with units - All titles with units (1m) - Manipulated variables (1m) - Data is not required <table><tr><td>Boiling tubes</td><td>Concentration of glucose solution</td><td>The number of air bubbles released in 20 minutes</td><td>The rate of anaerobic respiration in yeast (min⁻¹)</td></tr><tr><td>A</td><td>5%</td><td></td><td></td></tr><tr><td>B</td><td>10%</td><td></td><td></td></tr><tr><td>C</td><td>30%</td><td></td><td></td></tr></table>	Boiling tubes	Concentration of glucose solution	The number of air bubbles released in 20 minutes	The rate of anaerobic respiration in yeast (min ⁻¹)	A	5%			B	10%			C	30%			2
Boiling tubes	Concentration of glucose solution	The number of air bubbles released in 20 minutes	The rate of anaerobic respiration in yeast (min ⁻¹)															
A	5%																	
B	10%																	
C	30%																	
	Able to present a table with at least two titles correctly	1																
	No response or wrong response	0																

Problem Statement:

What is the effect of the concentration of glucose on the rate of anaerobic respiration in yeast ? 3m

Hypothesis:

The higher the concentration of glucose, the higher the rate of anaerobic respiration in yeast 3m

Variables:**Manipulated variable**

The concentration of glucose

3m

Responding variable

The rate of anaerobic respiration in yeast/ the number of air bubbles released in 20 minutes

Constant variable

The temperature / the volume of yeast suspension

Apparatus / materials :

yeast suspension *, glucose solution *, paraffin oil, vaselin, boiling tube, manometer, capillary tube, rubber tubing, stopwatch, marker/ thread, stoppers, measuring cylinder, retort stand

3m

Procedure:

1. Three boiling tubes A, B and C are labeled.
2. The boiling tubes are filled with 5 ml of yeast suspension.
3. Glucose solution of 5% concentration is heated to remove dissolved oxygen. The solution is left to cool.
4. 10 ml of the 5% concentration of the boiled glucose solution is added to boiling tube A.
5. A thin l

3m



6. A stopper is connected with a delivery tube to the boiling tube .
7. The end of the delivery tube is placed into the test tube that contain 2ml of lime water/ universal indicator.
8. Vaseline is used to make sure all the joints of the apparatus are airtight
9. The stopwatch is started and the number of air bubbles released in 20 minutes are counted and recorded in a table.
10. The rate of anaerobic respiration in yeast is calculated by using the formula

$$= \frac{\text{the number of air bubbles released}}{20 \text{ minutes}}$$
11. Repeat step 3 – 9 by changing the concentration of glucose solution from 5% to 10% in boiling tube B and 30% of glucose solution in boiling tube C.

Presentation of data :

Boiling tubes	Concentration of glucose solution	The number of air bubbles released in 20 minutes	The rate of anaerobic respiration in yeast (min ⁻¹)
A	5%		
B	10%		
C	30%		

2m

Total = 17 marks