

MAJLIS PENGETUA SEKOLAH MALAYSIA
NEGERI PAHANG

PEPERIKSAAN PERCUBAAN SPM 2012

BIOLOGY
Tingkatan 5

Kertas 1

Satu jam lima belas minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU
DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO

1. Kertas soalan ini adalah dalam dwibahasa.
2. Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Melayu.

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

- 1 This question paper consists of 50 questions.

Kertas soalan ini mengandungi 50 soalan.

- 2 Answer all questions.

Jawab semua soalan.

Kertas soalan ini mengandungi 24 halaman bercetak



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

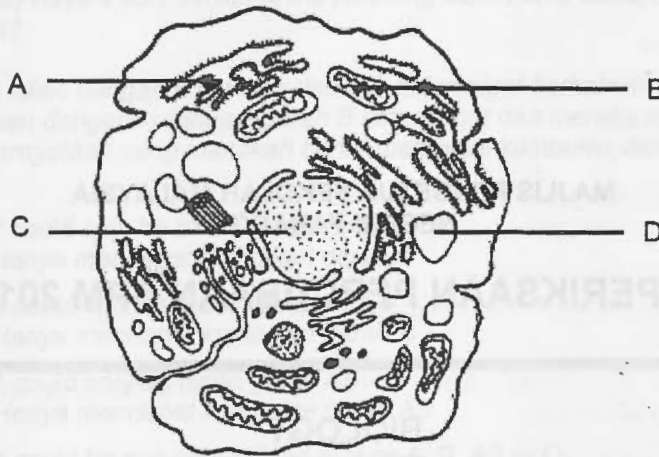


Diagram 1 / Rajah 1

Which of the organelles A, B, C or D is the site of cellular respiration?
Di antara organel A, B, C atau D yang manakah adalah tapak respirasi sel?

2. Diagram 2 shows one specialised cell.
Rajah 2 menunjukkan satu sel yang khusus.



Diagram 2 / Rajah 2

What is the function of the cell in Diagram 2?
Apakah fungsi sel dalam Rajah 2?

- A Produce energy during cellular respiration.
Menghasilkan tenaga semasa respirasi sel
- B Brings impulse from spinal cord to the muscles
Membawa impuls dari saraf tunjang ke otot
- C Produce electrical signal when stimuli detected
Menghasilkan isyarat elektrik bila rangsangan dikesan
- D Change the electrical signal to the chemical signal
Menukarkan isyarat elektrik kepada isyarat kimia

- 3 Diagram 3 shows the cell organisation in multicellular organism.
Rajah 3 menunjukkan organisasi sel dalam organisma multisel.

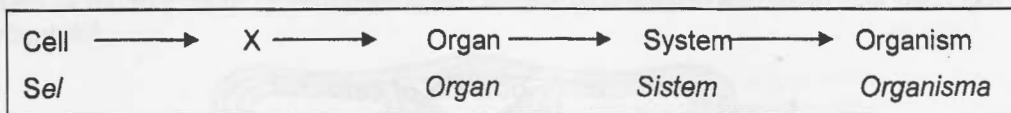


Diagram 3 / Rajah 3

Which part of the body can be represented by X?
Apakah bahagian badan yang boleh diwakili oleh R?

- | | |
|---|--|
| <p>A Ligament Ligamen</p> <p>C Epithelium Epitelium</p> | <p>B Heart Jantung</p> <p>D Skin Kulit</p> |
|---|--|
- 4 Diagram 4 shows the synthesis of extracellular enzymes.
Rajah 4 menunjukkan sintesis enzim luar sel.

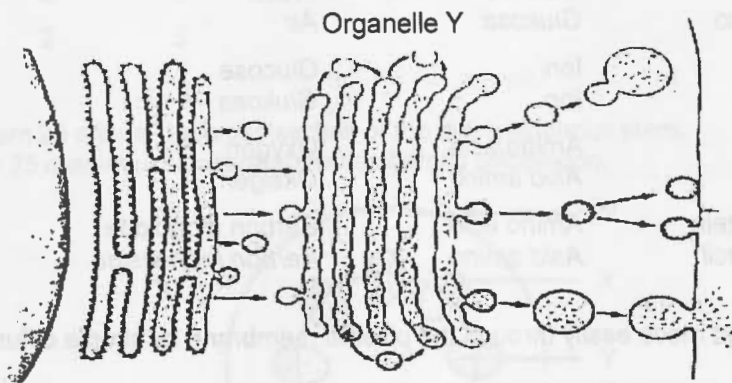


Diagram 4 / Rajah 4

Which of the following is the function of organelle Y?
Yang manakah di antara berikut merupakan fungsi organel Y?

- I synthesis of proteins / sintesis protein
- ii modifying of proteins / ubahsuai protein
- III sorting protein / sisih protein
- IV packaging of proteins / bungkus protein

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

- 5 Diagram 5 shows three substances P, Q and R passing through the plasma membrane of a cell.

Rajah 5 menunjukkan tiga bahan P, Q dan R merentasi membran plasma sel.

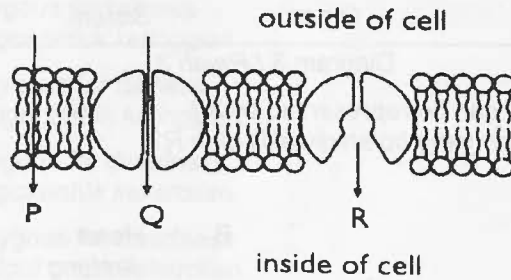


Diagram 5 / Rajah 5

What substances are P, Q and R likely to be?

Apakah bahan yang mewakili P, Q dan R?

| | P | Q | R |
|---|---------------------------------------|---------------------------------|--|
| A | Amino acid <i>Asid amino</i> | Glucose <i>Glukosa</i> | Water <i>Air</i> |
| B | Oxygen <i>Oksigen</i> | Ion <i>Ion</i> | Glucose <i>Glukosa</i> |
| C | Glucose <i>Glukosa</i> | Amino acid <i>Asid amino</i> | Oxygen <i>Oksigen</i> |
| D | Small protein <i>Protein kecil</i> | Amino acid <i>Asid amino</i> | Carbon monoxide <i>Karbon monoksida</i> |

- 6 Molecules that can move easily through the plasma membrane by simple diffusion
Include

Molekul-molekul yang mudah bergerak merentasi membran plasma melalui resapan ringkas termasuklah

- I water / *air*
- II oxygen / *oksigen*
- III carbon dioxide / *karbon dioksida*
- IV fat-soluble vitamins / *vitamin larut-lemak*

A I and II only

B II and IV only

C I, II and III only

D I, II, III and IV only

- 7 Diagram 6 shows the shape of a stalk of mustard green when put in certain type of solution

Rajah 6 menunjukkan bentuk batang sawi yang diletakkan dalam jenis larutan tertentu.

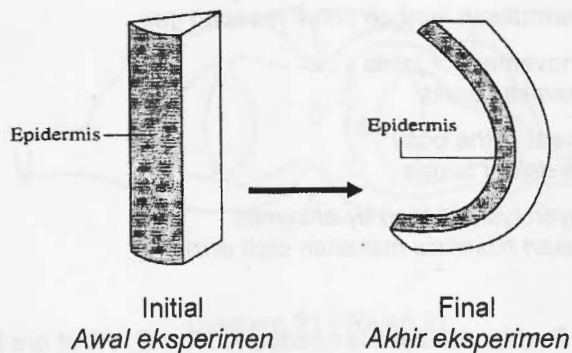


Diagram 6 / Rajah 6

Which of the following is the correct type of solution?

Di antara berikut yang manakah merupakan jenis larutan yang betul?

- | | | | |
|---|-------------------------|---|-------------------------|
| A | Hypertonic / hipertonik | B | Isotonic / isotonik |
| C | Hypotonic / hipotonik | D | Supertonic / supertonik |

8

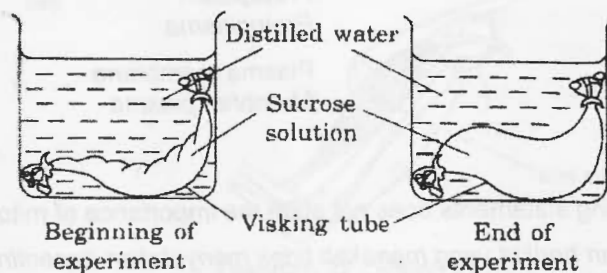


Diagram 7 / Rajah 7

What is the process that takes place in Diagram 7?

Proses apakah yang berlaku di dalam Rajah 7?

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

9 Which of the following is **not** a function of water?
 Di antara berikut yang manakah **bukan** fungsi bagi air?

- A. Provides a moist surface for the diffusion of gases
 Menyediakan permukaan lembab untuk resapan gas
- B. Facilitates the movement of joints
 Membantu pergerakan sendi
- C. An insulator of heat in the body
 Penebat haba di dalam badan
- D. Facilitates the hydrolysis of food by enzymes
 Membantu tindakan hidrolisis makanan oleh enzim

10 Lipid is needed to form P while cellulose is needed to form Q. What are P and Q ?
 Lipid diperlukan untuk membentuk P manakala selulosa diperlukan untuk membentuk Q.
 Apakah P dan Q?

| | <u>Compound P / Sebatian P</u> | <u>Compound Q / Sebatian Q</u> |
|----|--|--|
| A. | Protoplasm <i>Protoplasma</i> | Cell wall <i>Dinding sel</i> |
| B. | Plasma membrane <i>Membran plasma</i> | Cell wall <i>Dinding sel</i> |
| C. | Cell wall <i>Dinding sel</i> | Protoplasm <i>Protoplasma</i> |
| D. | Cell wall <i>Dinding sel</i> | Plasma membrane <i>Membran plasma</i> |

11 Which of the following statements does not state the importance of mitotic cell division?

Di antara pernyataan berikut yang manakah tidak menyatakan kepentingan pembahagian sel mitosis?

- A. Replace dead cells
 Menggantikan sel-sel yang mati
- B. Produce gamete cells
 Menghasilkan sel-sel gamet
- C. Repair damaged cells
 Memperbaiki sel-sel yang rosak
- D. Increase the number of cells
 Menambah bilangan sel-sel



- 12 Diagram 8 below shows the rate of enzyme hydrolysis reaction, R and S in the human body.
Rajah 8 di bawah menunjukkan kadar tindak balas hidrolisis enzim, R dan S dalam badan manusia.

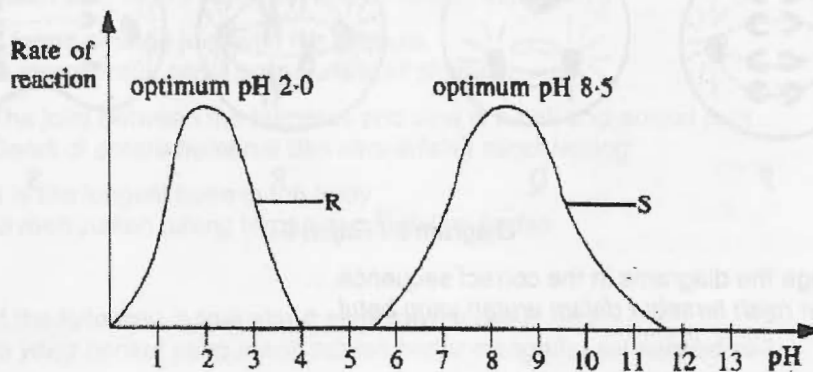


Diagram 8 / Rajah 8

- Which of the following is true about enzymes R and S?
Yang mana di antara berikut adalah benar mengenai enzim R dan S?

| Enzyme R Enzim R | Enzyme S Enzim S |
|---|---|
| A Secreted in the stomach <i>Dirembeskan dalam perut</i> | Secreted into the duodenum <i>Dirembeskan ke dalam duodenum</i> |
| B The active site changes at pH more than 4 <i>Tapak aktif berubah pada pH lebih daripada 4</i> | The active site changes at pH more than 7 <i>Tapak aktif berubah pada pH lebih daripada 7</i> |
| C R is trypsin <i>R adalah tripsin</i> | S is lipase <i>S adalah lipase</i> |
| D Synthesized in the rough in the endoplasmic reticulum <i>Disintesis dalam retikulum endoplasma kasar</i> | Synthesized in the smooth endoplasmic reticulum <i>Disintesis dalam retikulum endoplasma licin</i> |

- 13 Which of the following plant structures undergoes meiosis?
Di antara struktur tumbuhan berikut yang manakah menjalani meiosis?

- | | |
|---|---|
| A Leaves: <i>Daun</i> | B Flowers <i>Bunga</i> |
| C Pollen grains <i>Butir debunga</i> | D Epidermal cells <i>Sel epidermis</i> |

14 Diagram 9 shows the different stages of mitosis.
Rajah 9 menunjukkan peringkat-peringkat yang berbeza dalam mitosis.

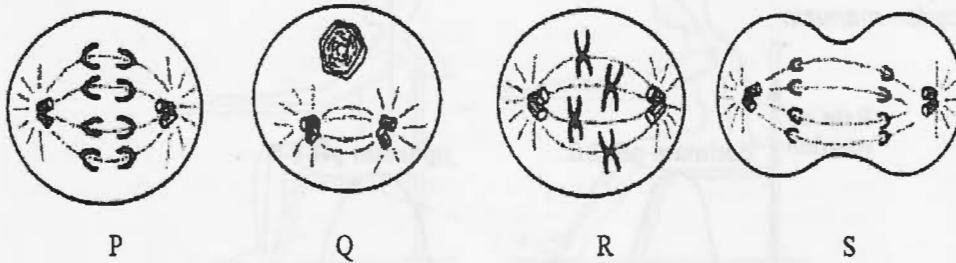
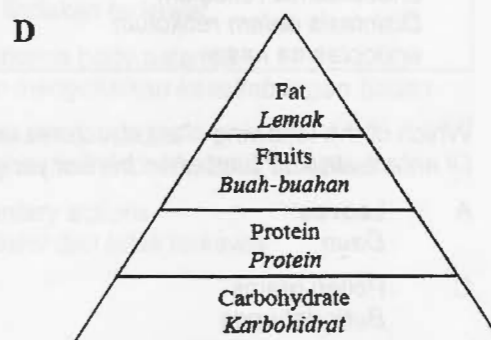
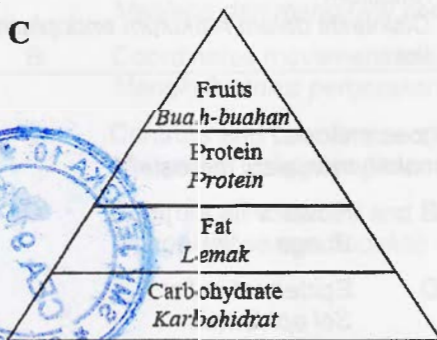
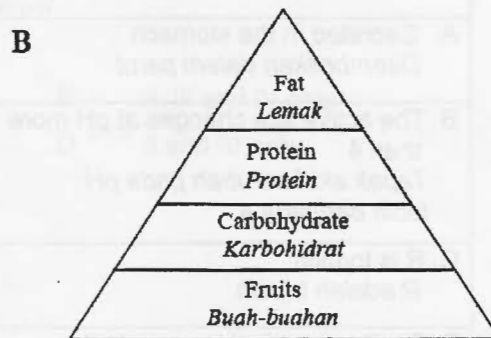
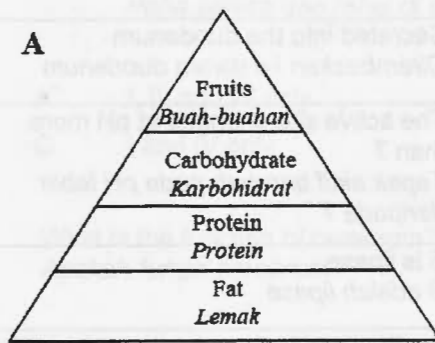


Diagram 9 / Rajah 9

Arrange the diagrams in the correct sequence.
Susun rajah tersebut dalam urutan yang betul.

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

15 Which of the following food pyramids fulfill the needs of a growing child?
Di antara piramid makanan berikut, yang manakah memenuhi keperluan seorang kanak-kanak yang sedang membesar?



- 16 Diagram 10 shows the structure of a villus. Nutrients that can be found in X are
 Rajah 10 menunjukkan struktur vilus. Nutrien yang boleh ditemui di dalam X adalah

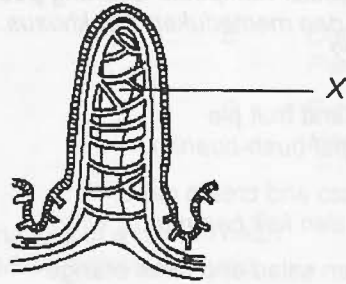


Diagram 10 / Rajah 10

- I glucose / glukosa
 II vitamin D / vitamin D
 III vitamin C / vitamin C
 IV fatty acids / asid lemak
- A I, II and III only
 B I, III and IV only
 C II and IV only
 D I, II, III and IV
- 17 In which part of the large intestine shown in the Diagram 11 are haemorrhoids found?
 Di bahagian usus besar yang manakah dalam Rajah 11 buasir boleh ditemui?

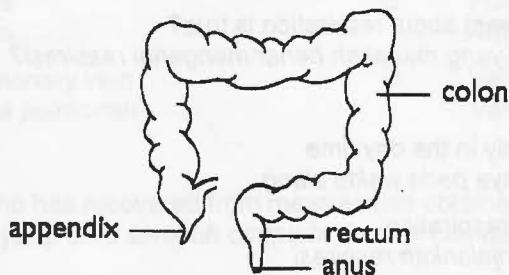


Diagram 11 / Rajah 11

- A Anus / Anus
 B Colon / Kolon
 C Rectum / Rektum
 D Appendix / Apendiks



- 18 Gall bladder stores bile. A patient in hospital has had the structure removed and needs a special diet. Which menu would be most suitable for this patient?

Pundi hempedu menyimpan cecair hempedu. Seorang pesakit di hospital terpaksa membuang pundi berkenaan dan memerlukan diet khusus. Menu yang manakah paling sesuai untuk pesakit tersebut?

- A Fish in cheese sauce and fruit pie
Ikan bersos keju dan pai buah-buahan
- B Sausages, boiled potato and cream cake
Sosej, kentang rebus dan kek berkrim
- C Skinless chicken, green salad and fresh orange
Ayam tanpa kulit, salad sayuran hijau dan oren segar
- D Fried fish, potato chips and rice
Ikan goreng, kerepek kentang dan nasi

- 19 Which of the following are true about anaerobic respiration in animal?
Di antara berikut yang manakah benar tentang respirasi anaerobik dalam haiwan?

- A $C_6H_{12}O_6 \rightarrow 2C_3H_6O_3 + \text{energy / tenaga}$
- B $C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2 + \text{energy / tenaga}$
- C $6CO_2 + 6H_2O + \text{energy / tenaga} \rightarrow C_6H_{12}O_6 + 6O_2$
- D $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + \text{energy / tenaga}$

- 20 Which of the following statement about respiration is true?
Di antara pernyataan berikut yang manakah benar mengenai respirasi?

- A Respiration occurs only in the day time
Respirasi berlaku hanya pada waktu siang
- B Only plants carry out respiration
Hanya tumbuhan menjalankan respirasi
- C Internal respiration involves the oxidation of food
Respirasi dalaman melibatkan pengoksidaan makanan
- D Respiration occurs only at night
Respirasi berlaku hanya pada malam hari



- 21 A student exhaled air several times onto a piece of dry cobalt chloride paper. He noticed that the paper changed from blue to pink. Another piece of dry cobalt chloride paper that have been placed in an open Petri dish remained blue for the duration of the experiment (one minute)

What is the conclusion of the experiment?

Seorang pelajar menghembuskan nafasnya beberapa kali ke atas sehelai kertas kobalt klorida kontang. Beliau mendapati kertas tersebut bertukar warna daripada biru kepada merah jambu. Sehelai lagi kertas kobalt klorida kontang yang diletakkan di dalam piring Petri yang terbuka kekal biru sepanjang tempoh masa eksperimen (satu minit)
 Apakah kesimpulan daripada eksperimen?

- A Exhaled air contains more oxygen than inhaled air
Udara hembusan mengandungi lebih oksigen daripada udara tarikan nafas.
- B Exhaled air contains more carbon dioxide than inhaled air
Udara hembusan mengandungi lebih karbon dioksida daripada udara tarikan nafas
- C Exhaled air contains more water vapour than inhaled air
Udara hembusan mengandungi lebih wap air daripada udara tarikan nafas.
- D Exhaled air contains more heat energy than inhaled air
Udara hembusan mengandungi lebih tenaga haba daripada udara tarikan nafas.
- 22 Diagram 12 shows the apparatus used in an experiment to study the respirations in yeast.
Rajah 12 menunjukkan radas yang digunakan dalam eksperimen mengkaji proses respirasi oleh yis.

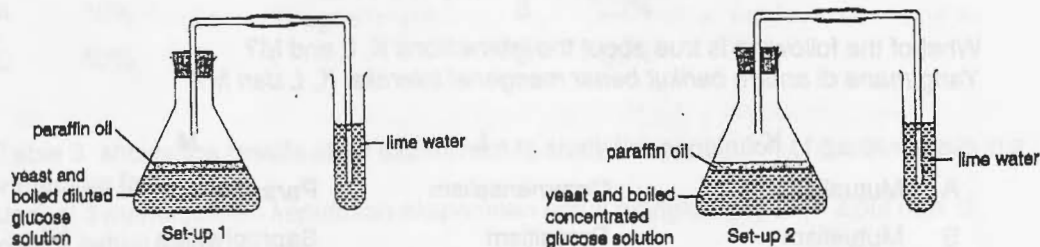


Diagram 12 / Rajah 12

The results obtained are shown in the table.
Keputusan yang diperolehi ditunjukkan dalam jadual.

| Set-up | Results / Keputusan |
|--------|---|
| 1 | Ethanol produced <i>Etanol dihasilkan</i> |
| 2 | No ethanol produced <i>Tiada etanol dihasilkan</i> |

What conclusion can be drawn from the results?

Apakah kesimpulan yang boleh dibuat daripada keputusan tersebut?

- A Yeast breaks down glucose completely at a high glucose concentration
Yis menguraikan glukosa dengan lengkap pada kepekatan glukosa yang tinggi
- B Yeast respire aerobically at a high glucose concentration
Yis berespirasi secara aerobik pada kepekatan glukosa yang tinggi
- C Yeast is killed by dehydration at a high glucose concentration
Yis mati disebabkan oleh kepekatan glukosa yang tinggi
- D Yeast cannot respire anaerobically at a high glucose concentration
Yis tidak dapat berespirasi secara aerobik pada kepekatan glukosa yang tinggi

- 23 Diagram 13 shows three different types of interactions between organisms.
Rajah 13 menunjukkan tiga jenis interaksi di antara organisma.

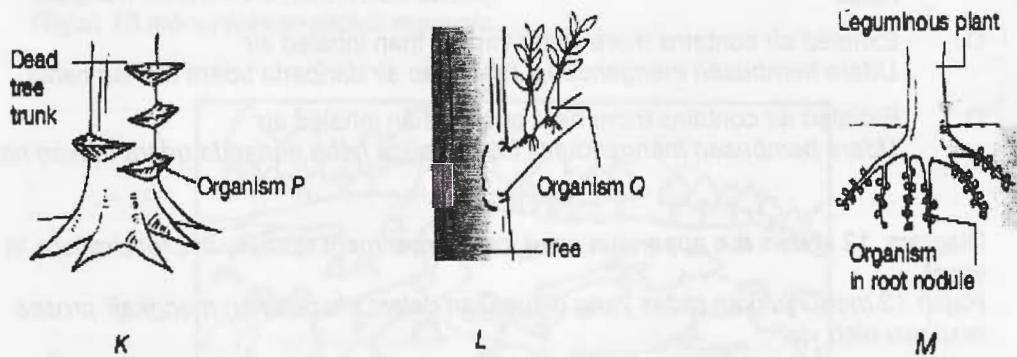


Diagram 13 / Rajah 13

What of the following is true about the interactions K, L and M?

Yang mana di antara berikut benar mengenai interaksi K, L dan M?

- | | K | L | M |
|---|--------------|--------------|--------------|
| A | Mutualism | Commensalism | Parasitism |
| B | Mutualism | Parasitism | Saprophytism |
| C | Saprophytism | Commensalism | Mutualism |
| D | Parasitism | Commensalism | Mutualism |



24 Which of the following are the uses of microorganisms in biotechnology?
 Yang mana antara berikut kegunaan mikroorganisma dalam bioteknologi?

- I Food processing
Pemprosesan makanan
- II Waste treatment
Rawatan kumbahan
- III Production of bioplastics
Penghasilan bioplastik
- IV Production of energy from biomass
Penghasilan tenaga daripada biojisim

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

25 Diagram 14 shows the total energy transferred through four trophic levels.
 Rajah 14 menunjukkan pemindahan tenaga menerusi empat aras tropik.

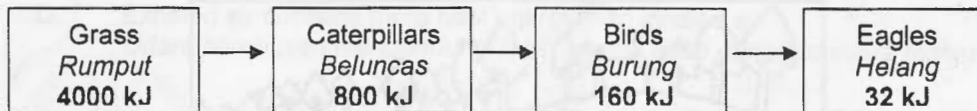


Diagram 14 / Rajah 14

What percentage of energy is lost from the producer to the tertiary consumer?
 Berapa peratus tenaga yang hilang daripada pengeluar kepada pengguna tertier?

- A 10%
- B 20%
- C 80%
- D 99%

26 Table 3 shows the results of an experiment to study the population of garden snails in a vegetable farm.

Jadual 3 menunjukkan keputusan eksperimen untuk mengkaji populasi siput babi di dalam kebun sayur

| Capture Tangkapan | Number of garden snails captured Bilangan siput babi yang ditangkap | |
|----------------------|--|----------------------------------|
| First Pertama | 100 were marked 100 ditandakan | |
| Second Kedua | 40 marked 40 bertanda | 80 unmarked 80 tidak bertanda |

Table 3 / Jadual 3

What is the approximate population of the snails in the farm?
Apakah anggaran populasi siput di dalam kebun?

- A. 20
B. 150
C. 300
D. 520

27 Which of the following gases causes acid rain?
Di antara berikut gas yang mana menyebabkan hujan asid?

- A Oxygen gases
Gas oksigen
B Sulphur dioxide
Sulfur dioksida
C Nitrogen gases
Gas nitrogen
D Carbon monoxide
Karbon monoksida

28 Diagram 15 shows a man-made activity.
Rajah 15 menunjukkan aktiviti manusia.

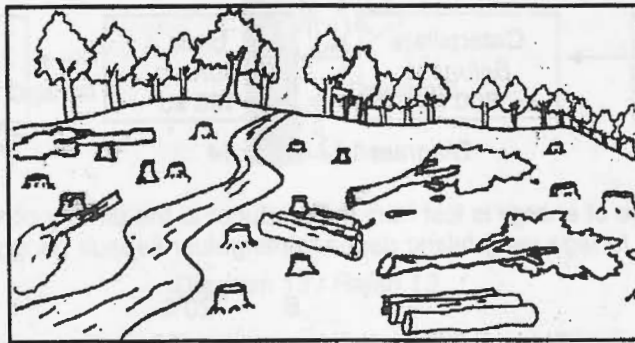


Diagram 15 / Rajah 15

What is the effect of this activity to the environment?
Apakah kesan daripada aktiviti tersebut ke atas persekitaran?

- I Flash flood
Banjir kilat
II Erosion
Hakisan
III Global warming
Pemanasan global
IV Thinning of the ozone layer
Penipisan lapisan ozon

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

29 The amount of carbon dioxide in the atmosphere can be reduced by
Jumlah karbon dioksida dalam atmosfera boleh dikurangkan melalui

- | | |
|--|--|
| A Respiration. <i>Respirasi</i> | B Combustion. <i>Pembakaran</i> |
| C Photosynthesis. <i>Fotosintesis</i> | D Exhalation. <i>Hembusan nafas</i> |

30 Diagram 16 shows the structure of a human heart.
Rajah 16 menunjukkan struktur jantung manusia.

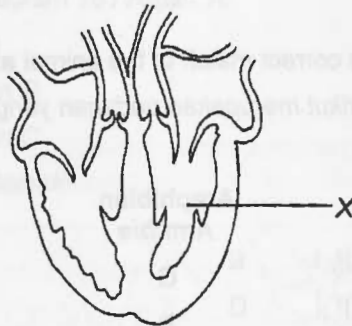


Diagram 16 / Rajah 16

Blood in X originates from
Darah dalam X berasal dari

- | | |
|--|--|
| A. Aorta <i>Aorta</i> | B. Pulmonary artery <i>Arteri pulmonari</i> |
| C. Pulmonary vein <i>Vena pulmonari</i> | D. Vena cava <i>Vena cava</i> |

31 A person who has recovered from measles has obtained
Seseorang yang baru sembuh daripada demam campak memperoleh

- | |
|--|
| A natural active immunity <i>keimunan aktif semulajadi</i> |
| B acquired active immunity <i>keimunan aktif buatan</i> |
| C natural passive immunity <i>keimunan pasif semulajadi</i> |
| D acquired passive immunity <i>keimunan pasif buatan</i> |

32 Diagram 17 shows three different blood circulatory systems P, Q and R.
Rajah 17 menunjukkan tiga sistem peredaran darah P, Q dan R.

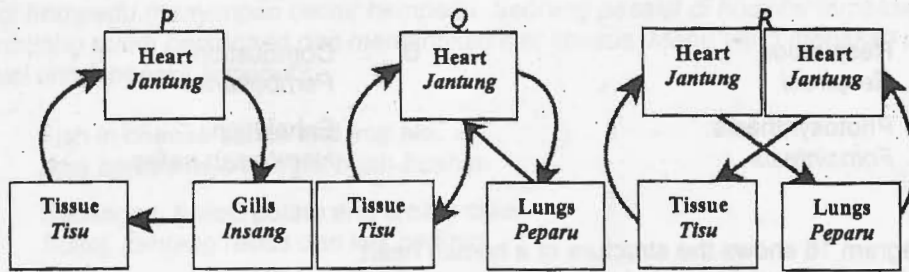


Diagram 17 / Rajah 17

Which of the following is a correct match of the animal and its circulatory system?

Yang manakah antara berikut merupakan padanan yang betul bagi haiwan dan sistem peredarannya?

| | Human Manusia | Amphibian Amfibia | Fish Ikan |
|---|------------------|----------------------|--------------|
| A | P | Q | R |
| B | P | R | Q |
| C | R | P | Q |
| D | R | Q | P |

33 Diagram 18 shows a human vertebra.
Rajah 18 menunjukkan vertebra manusia.

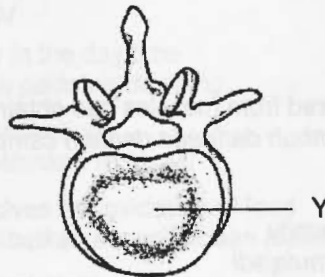


Diagram 18 / Rajah 18

What is structure Y?
Apakah struktur Y?

A Centrum
Sentrum

C Transverse process
Cuaran melintang

B Spinous process
Cuaran spina

D Transverse foramen
Foramen melintang

34 Which of the following statements is true concerning the humerus?
 Di antara pernyataan berikut yang mana adalah benar berkaitan humerus?

- A One of the tendons of the bicep muscles are attached to it
 Salah satu tendon dari otot bicep melekat kepadanya
- B It forms a hinge joint with the scapula
 Ia membentuk sendi engsel dengan skapula
- C The joint between the humerus and ulna is a ball-and-socket joint
 Sendi di antara humerus dan ulna adalah sendi lesung
- D It is the longest bone in the body
 Ia merupakan tulang terpanjang di dalam badan

35 Which of the following is true about aerenchyma cell ?
 Di antara yang berikut yang mana adalah benar mengenai sel aerenkima?

- A Contains a large vacuole
 Mengandungi vakuol yang besar
- B Provides mechanical support for plants
 Memberikan sokongan mekanikal kepada tumbuhan
- C Has large air spaces between the cells
 Mempunyai ruang udara yang besar di antara sel-sel
- D Has thickened walls and is always turgid
 Mempunyai dinding yang tebal dan sentiasa segh

36 Diagram 19 shows a knee joint .
 Rajah 19 menunjukkan sendi lutut.

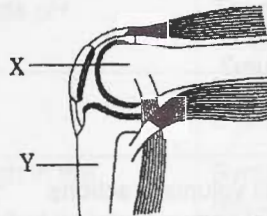


Diagram 19 / Rajah 19

Which of the following tissues joins X to Y?
 Di antara berikut tisu yang mana menghubungkan X dan Y?

- | | |
|-----------------------|----------------------|
| A Ligament Ligamen | B Tendon Tendon |
| C Adipose Adipos | D Cartilage Rawan |

37

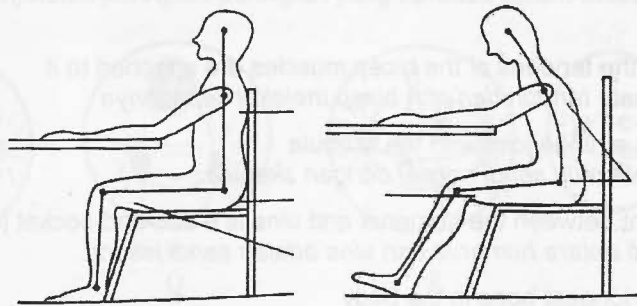


Diagram 20 / Rajah 20

Based on the Diagram 20, what are the characteristics of a good posture when sitting?
 Berdasarkan Rajah 20, apakah ciri-ciri postur yang baik ketika duduk?

- I The back and hips are bent forward
Bahagian belakang dan pinggul membongkok ke hadapan
- II The vertebral column is nearly parallel to the axis of the body
Turus vertebra hampir selari dengan paksi tubuh
- III The shoulder and the back are straight and perpendicular to the hips
Bahu dan bahagian belakang lurus dan seranjang dengan pinggul
- IV The thigh is comfortable and relax on the chair
Paha selesa dan rehat di atas kerusi

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

38 What is the function of cerebrum?
 Apakah fungsi serebrum?

- A. Initiates and controls all voluntary actions
Menjana dan mengawal semua tindakan terkawal
- B. Coordinates movement and maintains body balance
Mengkoordinasi pergerakan dan mengekalkan keseimbangan badan
- C. Controls and coordinates all involuntary actions
Mengawal dan mengkoordinasi semua tindakan tidak terkawal
- D. Controls all voluntary and involuntary actions
Mengawal semua tindakan terkawal dan tidak terkawal



- 39 Diagram 21 shows a nerve pathway involved in a reflex action. Which structure is an efferent neurone?

Rajah 21 menunjukkan laluan saraf yang terlibat dalam tindakan refleks. Struktur yang manakah merupakan neuron eferen?

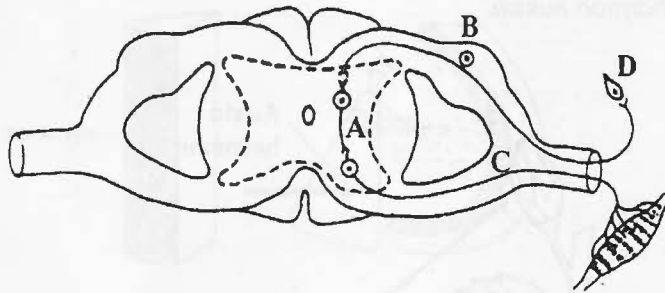


Diagram 21 / Rajah 21

- 40 Diagram 22 shows part of the nervous system, including a reflex arc. A bee stings a finger, as shown. What are the sudden effects of this sting?

Rajah 22 menunjukkan sebahagian sistem saraf, termasuk arka reflex dan seekor lebah yang sedang menyengat jari.. Apakah kesan serta merta sengatan tersebut?

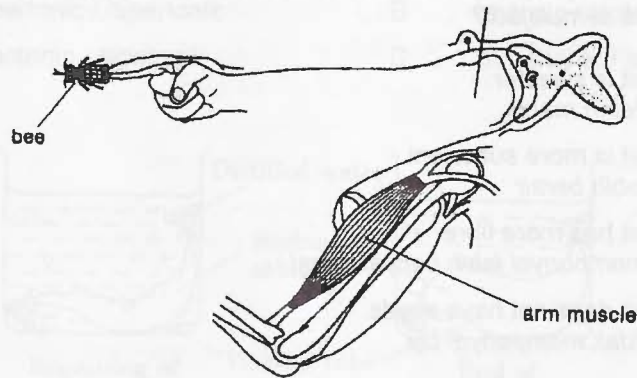


Diagram 22 / Rajah 22

| | Paint felt Kesakitan yang dirasakan | Arm moved Lengan dialihkan |
|---|--|-------------------------------|
| A | No Tidak | No Tidak |
| B | No Tidak | Yes Ya |
| C | Yes Ya | No Tidak |
| D | Yes Ya | Yes Ya |

A

No
TidakNo
Tidak

B

No
TidakYes
Ya

C

Yes
YaNo
Tidak

D

Yes
YaYes
Ya

- 41 Diagram 23 shows a method of producing fruits from flowering plants using an auxin hormone.
Rajah 23 menunjukkan kaedah penghasilan buah daripada tumbuhan berbunga dengan menggunakan hormon auksin.

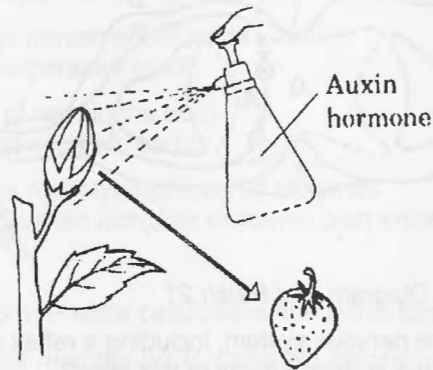


Diagram 23 / Rajah 23

How is the fruit produced by this method different from the fruit produced naturally?
Bagaimanakah buah yang dihasilkan melalui kaedah ini berbeza daripada buah yang dihasilkan secara semulajadi?

- A. The fruit is sweeter.
Buah lebih manis
- B. The fruit is more succulent
Buah lebih berair
- C. The fruit has more fibre.
Buah mempunyai lebih banyak serat
- D. The fruit does not have seeds.
Buah tidak mempunyai biji
- 42 Which of the following **does not** occur in spermatogenesis?
*Yang mana di antara berikut **tidak berlaku** dalam proses spermatogenesis?*
- A. Spermatogonia divide by meiosis to form primary spermatocytes.
Spermatogonia membahagi secara meiosis untuk membentuk spermatosit primer.
- B. Interstitial cells in the testis produce testosterone.
Sel interstis di dalam testis menghasilkan testosteron
- C. Spermatids undergo differentiation to form spermatozoa.
Spermatid mengalami pembezaan membentuk spermatozoa.
- D. Spermatocytes undergo meiotic division.
Spermatosit mengalami pembahagian meiosis.

- 43 Diagram 24 shows the female reproductive system. In which parts are the eggs and the zygote formed?
 Rajah 24 menunjukkan system pembiakan wanita. Di bahagian manakah telur dan zigot terbentuk?

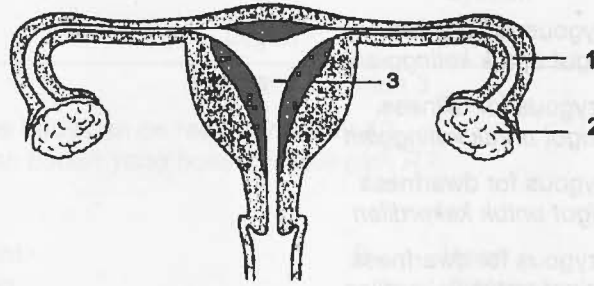


Diagram 24 / Rajah 24

| | Eggs Telur | Zygote Zigot |
|---|---------------|-----------------|
| A | 1 | 2 |
| B | 1 | 3 |
| C | 2 | 1 |
| D | 2 | 3 |

- 44 Diagram 25 shows the cross section of the dicotyledonous stem.
 Rajah 25 menunjukkan keratan rentas batang dikotiledon.

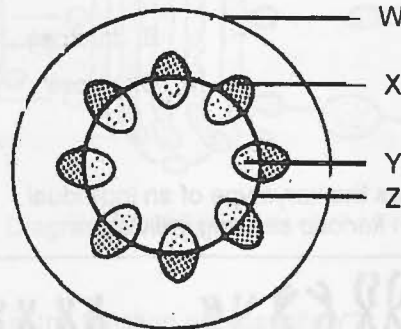


Diagram 25 / Rajah 25

Which part develops into secondary tissue after the plant undergoes secondary growth?
 Bahagian mana yang berkembang menjadi tisu sekunder selepas tumbuhan menjalani pertumbuhan sekunder?

- | | |
|------------|------------|
| A. W and X | B. X and Y |
| C. W and Y | D. Y and Z |

- 45 If **T** represents the allele for tallness and **t** the allele for dwarfness, then an individual with **Tt** is
 Jika **T** mewakili alel untuk ketinggian dan alel **t** untuk kekerdilan, individu dengan **Tt** adalah

- A. homozygous for tallness
 homozigot untuk ketinggian
- B. heterozygous for tallness
 heterozigot untuk ketinggian
- C. homozygous for dwarfness
 homozigot untuk kekerdilan
- D. heterozygous for dwarfness
 heterozigot untuk kekerdilan

- 46 Diagram 26 shows a DNA nucleotide.
 Rajah 26 menunjukkan satu nukleotida DNA.

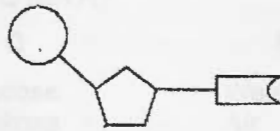


Diagram 26 / Rajah 26

The sugar found in DNA is
 Gula yang terdapat dalam DNA adalah

- A. deoxyribose
 C. glucose
- B. fructose
 D. ribose
- 47 Diagram 27 below shows the karyotype of an individual.
 Rajah 27 menunjukkan kariotip seorang individu.

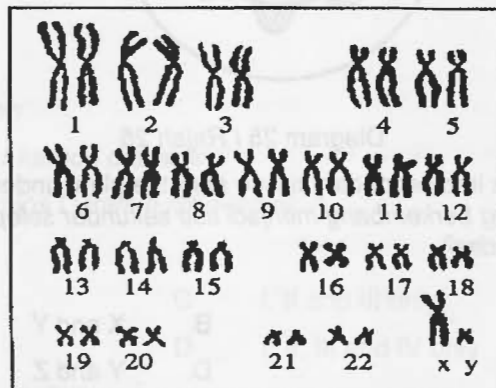


Diagram 27 / Rajah 27



The individual is a
Individu ialah seorang

- A Normal man
Lelaki normal
- B Normal woman
Perempuan normal
- C Man with Down Syndrome
Lelaki dengan sindrom Down
- D Woman with Down Syndrome
Perempuan dengan sindrom Down

48 Diagram 28 shows the inheritance of albinism within a family. A are dominant alleles while a are recessive alleles.

Rajah 28 menunjukkan pewarisan sifat albinism di dalam keluarga. A adalah dominan manakala a adalah alel resesif.

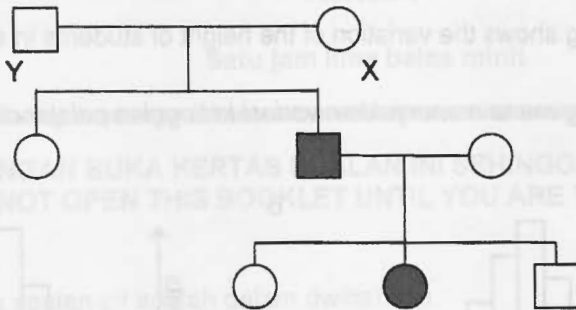


Diagram 28 / Rajah 28

Key / Kekunci :

- | | | | |
|--|--|--|--|
| | Normal male <i>Lelaki normal</i> | | Albino male <i>Lelaki albino</i> |
| | Normal female <i>Perempuan normal</i> | | Albino female <i>Perempuan albino</i> |

What are the genotip for X and Y?
Apakah genotip X dan Y?



- | | |
|----------|----------|
| <u>X</u> | <u>Y</u> |
| A | AA |
| B | Aa |
| C | AA |
| D | Aa |
| | aa |
| | aa |

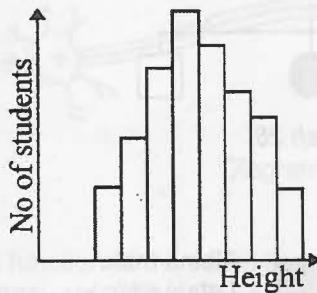
- 49 A man heterozygous for blood group A marries a woman heterozygous for blood group B and they have a son. Which of the following statements about the child's blood group is correct?

Seorang lelaki dengan kumpulan darah A heterozigot berkahwin dengan seorang perempuan dengan kumpulan darah B heterozigot dan mereka mendapat seorang anak lelaki. Pemyataan yang manakah benar mengenai kumpulan darah anak mereka?

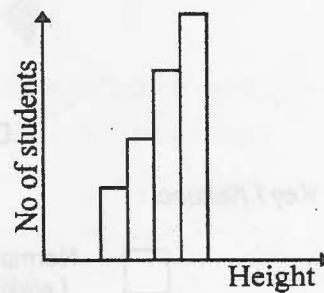
- A It could only be blood group A
Hanya mendapat kumpulan darah A
- B It could only be blood group A or B
Hanya mendapat kumpulan darah B
- C It could only be blood group AB
Hanya mendapat kumpulan darah AB
- D It could be any of the blood groups A, B, AB or O
Boleh mendapat mana-mana kumpulan darah A, B, AB atau O
- 50 Which of the following shows the variation of the height of students in a class of form 5?

Di antara berikut yang mana menunjukkan variasi ketinggian pelajar di dalam kelas tingkatan 5?

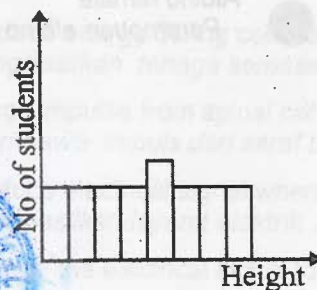
A



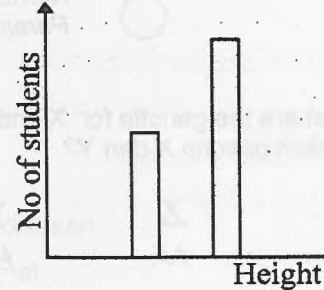
B



C



D



NAMA :

TINGKATAN :

MAJLIS PENGETUA SEKOLAH MALAYSIA
NEGERI PAHANG

PEPERIKSAAN PERCUBAAN SPM 2012

BIOLOGY
Tingkatan 5
Kertas 2
Dua jam tiga puluh minit

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.
3. Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau bahasa Melayu.
4. Calon dikehendaki membaca maklumat di halaman kertas soalan ini.

| <i>Untuk Kegunaan Pemeriksa</i> | | | |
|---------------------------------|--------|--------------|-------------------|
| Bahagian | Soalan | Markah Penuh | Markah diperolehi |
| A | 1 | 12 | |
| | 2 | 12 | |
| | 3 | 12 | |
| | 4 | 12 | |
| | 5 | 12 | |
| B | 6 | 20 | |
| | 7 | 20 | |
| | 8 | 20 | |
| | 9 | 20 | |
| Jumlah | | | |

Kertas soalan ini mengandungi 20 halaman bercetak



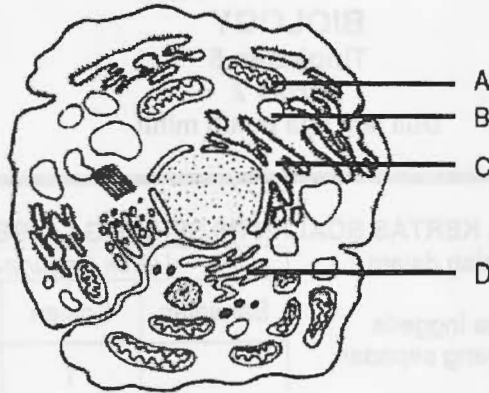
Section A
Bahagian A

[60 marks]
[60 markah]

For
Examiner's
Use

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

1. Diagram 1(a) shows a type of cell.
Rajah 1(a) menunjukkan sejenis sel



(a) State the type of cell shown in diagram 1(a)
Nyatakan jenis sel yang ditunjukkan dalam rajah 1(a)

[1 mark]

1(a)

| |
|---|
| 1 |
|---|

(b) Name the structure labelled A, B, C and D.
Namakan struktur yang berlabel A, B, C dan D

A: _____ C: _____
B: _____ D: _____

[4 marks]

1(b)

| |
|---|
| 4 |
|---|

(c) State the function of structure labelled A and D
Nyatakan fungsi struktur yang berlabel A dan D

A: _____
D: _____

[2 marks]

1(c)

| |
|---|
| 2 |
|---|



For Examiner's Use

1(d)

| | |
|--|---|
| | 2 |
|--|---|

(d) Give one example of cells which contain abundance of organelle A. Explain your answer.
 Berikan satu contoh sel yang mengandungi banyak organel A. Terangkan jawapan anda.

[2 marks]

1(e)

| | |
|--|---|
| | 3 |
|--|---|

(e) Explain what would happen to the production of insulin, if structure C is absent in the cell of pancreas?
 Terangkan apakah yang akan berlaku kepada penghasilan insulin, sekiranya struktur C tiada dalam sel pancreas?

[3 marks]

TOTAL A1

| | |
|--|----|
| | 12 |
|--|----|



2 Diagram 2 (a) shows two individuals, P and Q, in two different situations. P is in a vigorous activity while Q is at rest. Processes of R and S occur in a human muscle cell.

For
Examiner's
Use

Rajah 2 menunjukkan dua individu, P dan Q, dalam dua situasi yang berbeza. P sedang melakukan satu aktiviti cergas manakala Q berada dalam keadaan rehat. Proses R dan S berlaku dalam satu sel otot manusia.

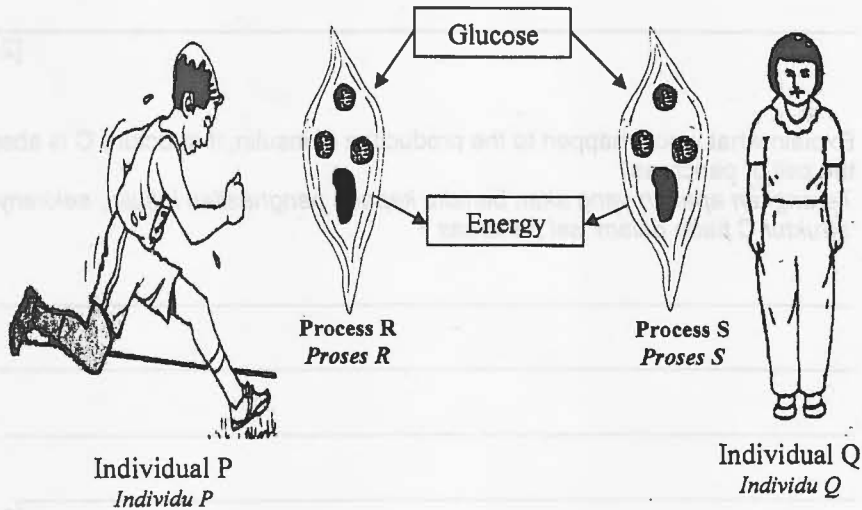


Diagram 2(a) / Rajah 2(a)

(a) Based on diagram 2(a), name the processes R and S.
Berdasarkan Rajah 2, namakan proses R dan S.

Process / Proses R:

Process / Proses S:

[2 marks]

2(a)

| |
|---|
| 2 |
|---|

(b) Write the equation of process S
Tuliskan persamaan bagi proses S

[2 marks]

2(b)

| |
|---|
| 2 |
|---|



For
Examiner's
Use

2(c)

| | |
|--|---|
| | 2 |
|--|---|

- (c) Explain two differences between process R and process S.
Terangkan perbezaan diantara proses R dan proses S.

[2 marks]

- (d) Diagram 2(b)(i) shows fish respiratory structure and diagram 2 (b)(ii) shows mammal respiratory structure.
Rajah 2(b)(i) menunjukkan struktur pernafasan ikan dan rajah 2(b)(ii) menunjukkan struktur pernafasan mamalia

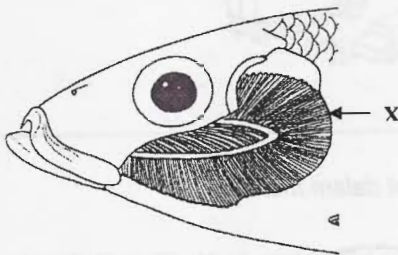


Diagram 2 (b)(i)

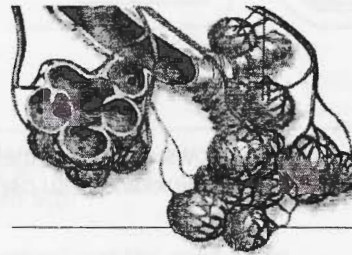


Diagram 2(b)(ii)

2(d)(i)

| | |
|--|---|
| | 1 |
|--|---|

- (i) What is X?
Apakah X?

[1 mark]

- (ii) State two characteristics of X, which makes it a good respiratory structure for fish.
Nyatakan dua ciri-ciri struktur X, yang menjadikan ia struktur pernafasan yang baik bagi ikan.

[2 marks]

2(d)(ii)

| | |
|--|---|
| | 2 |
|--|---|



(iii)

Explain three adaptations for structures shown in diagram 2 (b)(ii) to carry out its function efficiently.

Terangkan tiga adaptasi yang terdapat pada struktur yang ditunjukkan dalam rajah 2(b)(ii) dalam menjalankan fungsinya dengan berkesan.

[3 marks]

For Examiner's Use

2(d)(iii)

| |
|---|
| 3 |
|---|

TOTAL A2

| |
|----|
| 12 |
|----|

3

Diagram 3(a) shows a stage of meiosis

Rajah 3(a) menunjukkan suatu peringkat dalam meiosis

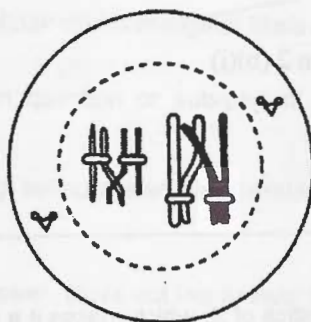


Diagram 3(a)
Rajah 3(a)

(a) What is the importance of meiosis process?
Apakah kepentingan proses meiosis?

[1 mark]

3(a)

| |
|---|
| 1 |
|---|

(b) Name the organ in plant which undergoes meiosis process.
Namakan organ dalam tumbuhan yang menjalankan proses meiosis.

[1 mark]

3(b)

| |
|---|
| 1 |
|---|



For
Examiner's
Use
3(c)(i)

| |
|---|
| 1 |
|---|

c (i) State the phases of meiosis as shown in Diagram 3(a)
Nyatakan fasa meiosis yang ditunjukkan dalam Rajah 3(a)

_____ [1 mark]

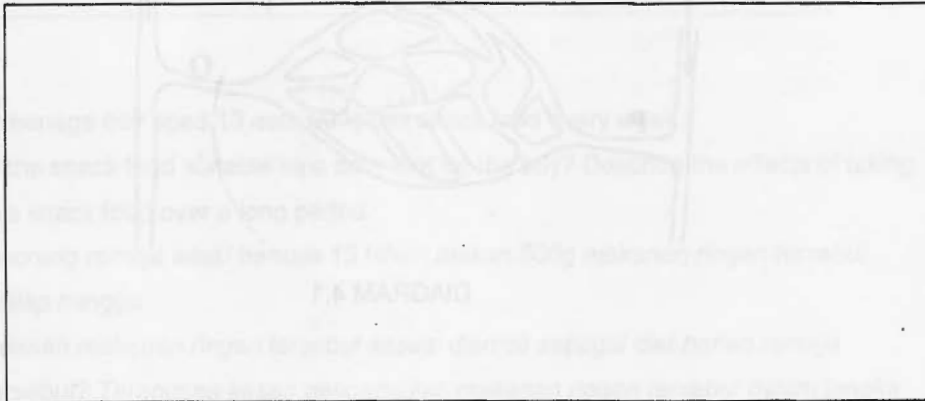
(ii) Name and describe the important process occur in the diagram 3(a)
Nama dan huraikan proses penting yang berlaku dalam Rajah 3(a)

[3 mark]

3(c)(ii)

| |
|---|
| 3 |
|---|

(d) For an animal cell where $2n=4$, draw the cell to show the metaphase I in meiosis.
Suatu sel haiwan yang, $2n=4$, lukiskan sel tersebut pada peringkat metafasa I dalam meiosis.



[2 marks]

3(d)

| |
|---|
| 2 |
|---|

(e) Explain the events during metaphase I which contribute to variation in organism
Huraikan peristiwa semasa metafasa I yang menyumbang kepada variasi dalam organisma

[2 marks]

- (f) Uncontrolled meiosis leads to gametes produced with an abnormal number of chromosomes. Name two diseases caused by uncontrolled meiosis
Meiosis tidak terkawal menyebabkan penghasilan gamet yang mempunyai bilangan kromosom yang tidak normal. Nama dua jenis penyakit yang disebabkan oleh proses meiosis tidak terkawal.

[2 marks]

For Examiner's Use

3(f)

| |
|---|
| 2 |
|---|

TOTAL A3

| |
|----|
| 12 |
|----|

- (4) Diagram 4 shows a part of the circulatory system in human.
Rajah 4 menunjukkan satu bahagian sistem peredaran dalam manusia

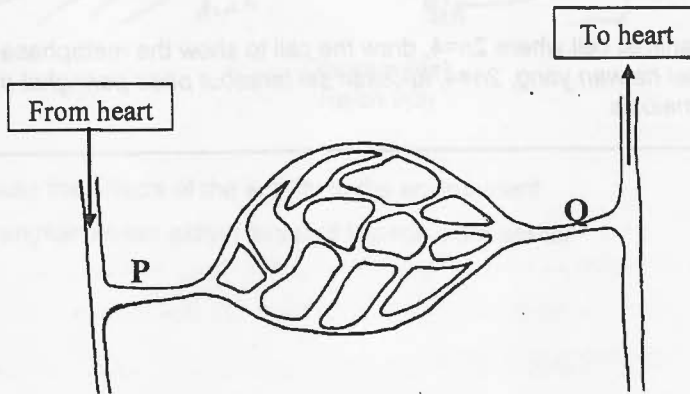


DIAGRAM 4.1

- (a) What happens to the blood pressure as the blood flow from P to Q ?
Apakah yang berlaku kepada tekanan darah apabila darah mengalir daripada P ke Q ?

[1 mark]

4(a)

| |
|---|
| 1 |
|---|

For
Examiner's
Use
4(b)

| |
|---|
| 2 |
|---|

(b) Explain why is important for P to have thick wall.
Terangkan mengapa penting bagi P untuk mempunyai dinding yang tebal

[2 marks]

4(c)

| |
|---|
| 2 |
|---|

(c) Explain how nearby muscle at Q prevent the back flow of blood.
Terangkan bagaimana otot berdekatan Q menghalang aliran berbalik darah.

[2 marks]

4(d)

| |
|---|
| 3 |
|---|

(d) Explain how the structure of capillaries allow substances to pass from them to the surrounding efficiently.
Terangkan bagaimana struktur kapilari membenarkan bahan-bahan di dalamnya melaluinya untuk ke luar persekitaran dengan cekap.

[3 marks]

(e) Our normal blood pressure is 120/80 mmHg. Explain what is the measurement represent?
Tekanan darah normal adalah 120/80 mmHg. Terangkan apakah yang diwakili oleh ukuran tersebut?

[4 marks]

4(d)

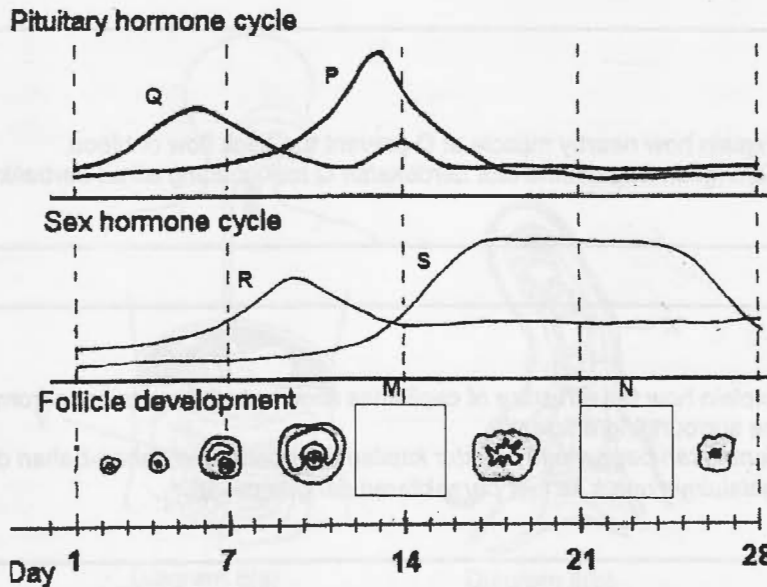
| |
|---|
| 4 |
|---|

TOTAL
A4

| |
|----|
| 12 |
|----|

- (5) Diagram 5 shows the changes of four types of hormone which control the menstrual cycle and follicle development in the ovaries.
Rajah 5 menunjukkan perubahan empat jenis hormon yang mengawal kitar haid dan perkembangan folikel dalam ovari.

For
Examiner's
Use



- (a) Based on Diagram 5 name the hormone labeled P and R.
Berdasarkan Rajah 5, namakan hormon yang berlabel P and R.

P: _____
 R: _____

[2 marks]

5(a)

| |
|---|
| 2 |
|---|

- (b) Complete the follicle development in boxes M and N in the Diagram 5.
Lengkapkan perkembangan folikel dalam petak M dan K pada Rajah 5.

[2 marks]

5(b)

| |
|---|
| 2 |
|---|

- (c) Based on the Diagram 5, explain the relationship between the structure M and the level of hormone S.
Berdasarkan Rajah 5, terangkan hubungan di antara aras hormon S dengan struktur M.

[3 marks]

5(c)

| |
|---|
| 3 |
|---|

(d) If fertilization occurred, the level of hormones S is maintained and the pregnancy is proceed. Explain the importance of hormone S.
Jika persenyawaan telah berlaku, aras hormone S dikekalkan dan kehamilan terus berlaku. Terangkan kepentingan hormon S

[3 marks]

For Examiner's Use

5(d)

| |
|---|
| 3 |
|---|

(e) If the sperm counts of a husband are too low, artificial insemination can be carried out to overcome this infertility problem. Discuss the appropriate technique should be used.
Jika jumlah sperma suami terlalu rendah, teknik pernianian beradas boleh digunakan untuk mengatasi masalah ketidaksuburan ini. Bincangkan teknik yang sesuai digunakan.

[2 marks]

5(e)

| |
|---|
| 2 |
|---|

TOTAL A4

| |
|----|
| 12 |
|----|



Section B
Bahagian B

[40 marks]
[40 markah]

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

6. Diagram 6(a) shows human kidney.
Rajah 6(a) menunjukkan ginjal manusia

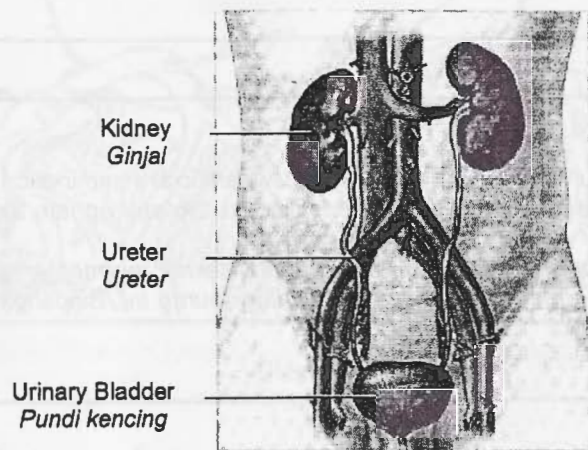


Diagram 6(a)
Rajah 6(a)

- a) Describe the role of hormone in regulation of blood osmotic pressure by kidney
Terangkan peranan hormon dalam mengawalatur tekanan osmotik darah oleh ginjal

[10 marks]
[10 markah]



- b) Diagram 6(b) shows the direction of growth of the plumule and the radicle of a seedling which is placed in a horizontal position during germination.

Rajah 6(b) menunjukkan arah pertumbuhan plumul dan radikel biji benih yang diletakkan secara mendatar semasa percambahan.

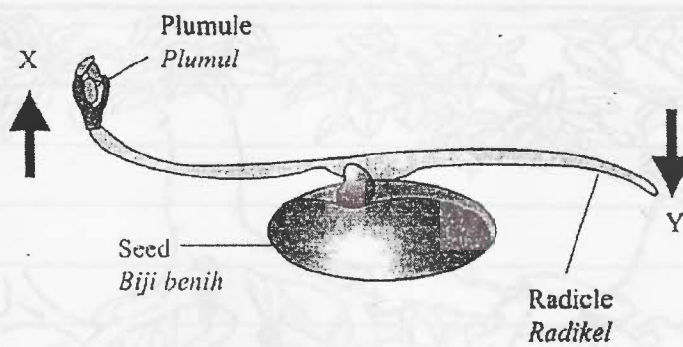


Diagram 6(b)
Rajah 6(b)

- i) State the type of response of the plumule and the radicle. Explain the importance of the responses to the plant.

Nyatakan jenis gerakbalas oleh plumul dan radikel. Terangkan kepentingan gerakbalas tersebut kepada tumbuhan.

[4marks]
[4 markah]

- ii) Base on diagram 6(b), explain why the plumule grows towards direction X and the radicle grows towards direction Y.

Merujuk kepada rajah 6(b), huraikan mengapa plumul tumbuh ke arah X dan radikel tumbuh ke arah Y.

[6marks]
[6 markah]



7. Diagram 7(a) shows mangrove plants colonise muddy river banks which later develop into a mangrove swamp forest.

Rajah 7(a) menunjukkan tumbuhan paya bakau mengkoloni tebing berlumpur sungai yang akhirnya berkembang menjadi hutan paya bakau.

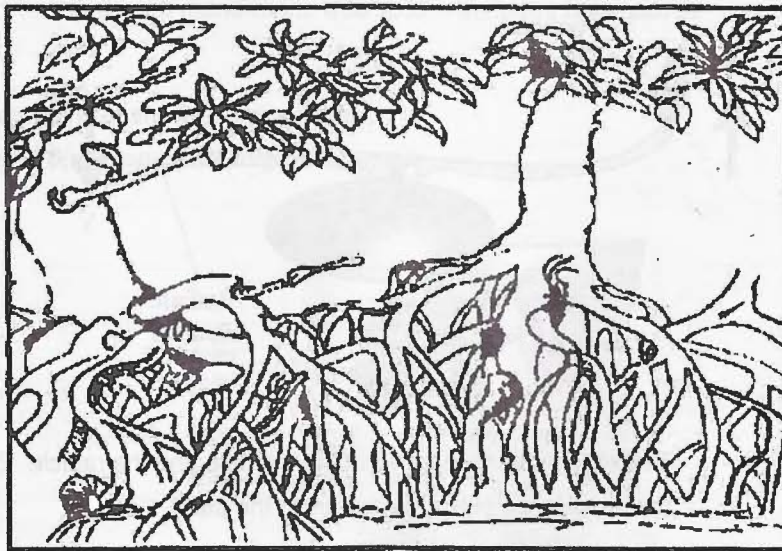


Diagram 7(a)
Rajah 7(a)

- a) Explain how the mangrove species are adapted to overcome the problems encountered during process of colonisation.

Terangkan bagaimana spesies tumbuhan paya bakau disesuaikan untuk mengatasi masalah yang dihadapi semasa proses pengkolonian.

[10 marks]
[10 markah]



- (b) The graphs in Diagram 7(b) show a relationship between *Paramecium aurelia* and *Paramecium caudatum*. Graph A - the paramecium species are cultured separately in a different petri dish. Graph B - both paramecium species are cultured in the same petri dish.

Graf dalam Rajah 7(b) menunjukkan perhubungan di antara *Paramecium aurelia* dan *Paramecium caudatum*. Graf A - kedua-dua spesies paramecium dikultur dalam piring petri berasingan. Graf B - kedua-dua paramecium dikultur bersama dalam satu piring petri.

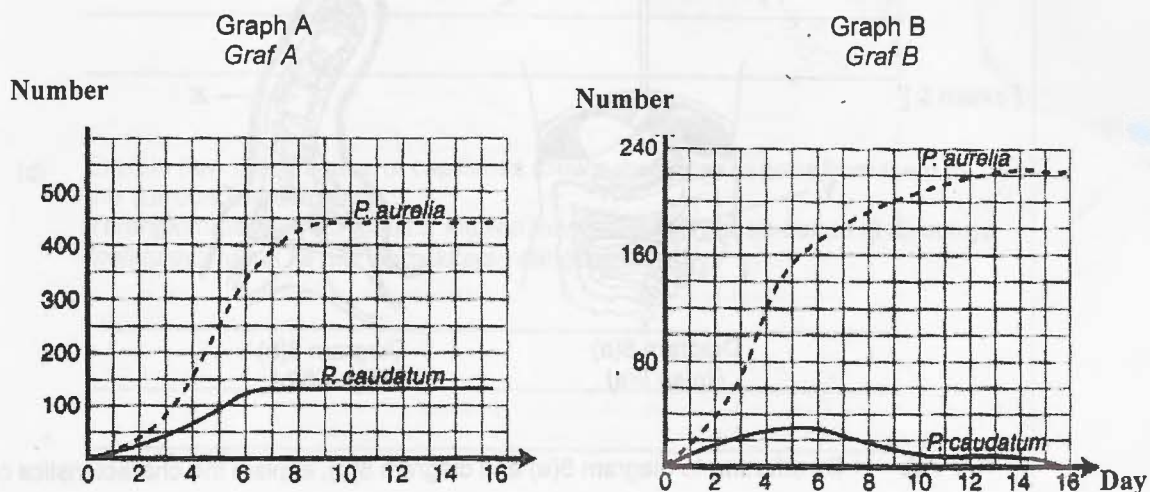


Diagram 7(b)
Rajah 7(b)

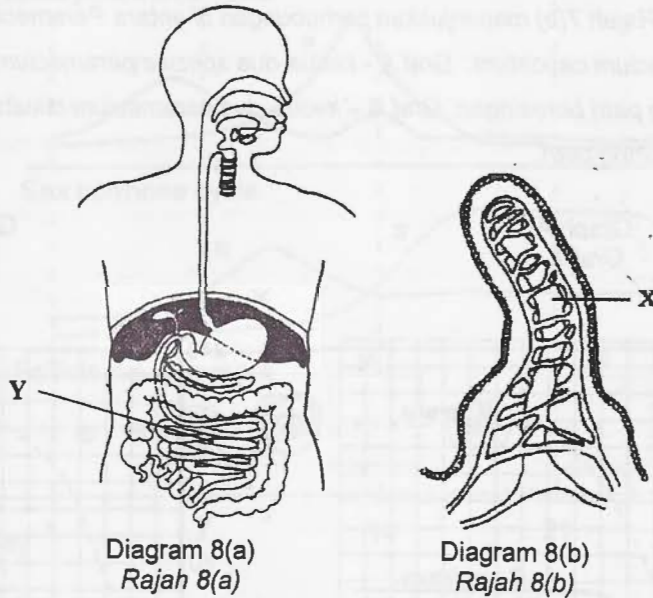
Identify the type of relationship between the two species of paramecium and explain the graphs.

Kenalpasti jenis perhubungan di antara dua spesis paramecium dan terangkan kedua-dua graf.

[10 marks]
[10 markah]



8. Diagram 8(a) and diagram 8(b) show parts of human digestive system.
Rajah 8(a) dan rajah 8(b) menunjukkan sebahagian daripada sistem pencernaan manusia.



- a) By referring to diagram 8(a) and diagram 8(b), explain the characteristics of structure X and structure Y as a major site of nutrient absorption in human digestive system.

Dengan merujuk kepada rajah 8(a) dan rajah 8(b), huraikan ciri-ciri yang terdapat pada struktur X dan struktur Y sebagai bahagian utama dalam penyerapan nutrien dalam sistem pencernaan manusia.

[6 marks]
 [6 markah]

- b) Halmie takes fried chicken at lunch. Explain the absorption and assimilation process of lipid content in the fried chicken.

Halmie mengambil ayam goreng semasa makan tengah hari. Huraikan proses penyerapan dan asimilasi lemak yang terkandung dalam ayam goreng tersebut.

[8 marks]
 [8 markah]

- (c) Table 1 shows the results of an analysis on a snack food such as fried chicken nugget.

Jadual 1 menunjukkan keputusan analisis makanan ringan seperti nuget ayam goreng.

| Content Kandungan | Mass for 100g of fried chicken nugget (g) Jisim bagi 100g nugget ayam goreng (g) |
|------------------------------------|---|
| Carbohydrate Karbohidrat | 10.5 |
| Protein Protein | 20.1 |
| Lipid Lemak | 25.3 |
| Fibre Serat | 2.5 |
| Sodium chloride Natrium klorida | 0.7 |

A teenage boy aged 13 eats 500g this snack food every week.

Is the snack food suitable as a daily diet for the boy? Describe the effects of taking this snack food over a long period.

Seorang remaja lelaki berusia 13 tahun makan 500g makanan ringan tersebut setiap minggu.

Adakah makanan ringan tersebut sesuai diambil sebagai diet harian remaja tersebut? Terangkan kesan pengambilan makanan ringan tersebut dalam jangka masa yang lama.

[6 marks]
[6 markah]



9. (a) Diagram 9(a) shows a human activity on a forest in a developing country..
 Rajah 9(a) menunjukkan suatu aktiviti manusia ke atas sebuah hutan di sebuah negara membangun.

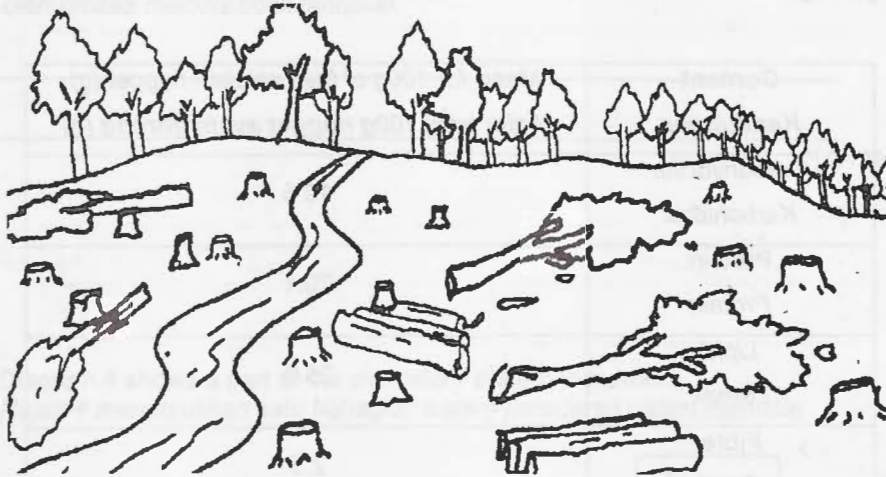


Diagram 9(a)
 Rajah 9(a)

Discuss the effects of the activity to the environment.

Bincangkan kesan aktiviti tersebut kepada alam sekitar

[10 marks]
 [10 markah]



- b) Diagram 9(b) shows evidences of development, urbanization and industrial practices. It is needed to develop the rises of human population
Rajah 9(b) menunjukkan bukti-bukti pembangunan , urbanisasi dan aktiviti-aktiviti perkilangan. Ia merupakan keperluan apabila populasi manusia meningkat.

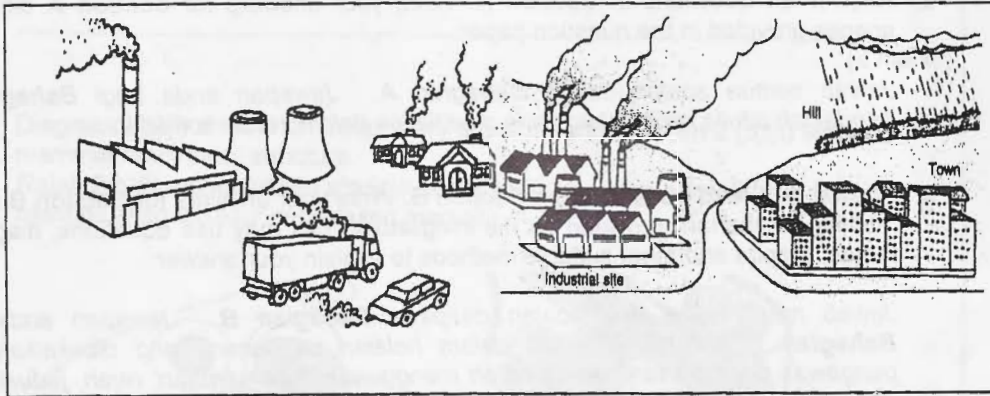


Diagram 9(b)
 Rajah 9(b)

Justify the effects of unplanned development into the ecosystem.

Justifikasikan kesan pembangunan yang tidak terancang terhadap ekosistem.

[10 marks]
 [10 markah]

END OF QUESTION PAPER
 KERTAS SOALAN TAMAT



4551/3
BIOLOGY
Kertas 3
Sept 2012
1 ½ JAM

4551/3

NAMA :

TINGKATAN :

MAJLIS PENGETUA SEKOLAH MALAYSIA
NEGERI PAHANG

PEPERIKSAAN PERCUBAAN SPM 2012

BIOLOGY
Tingkatan 5
Kertas 3
Satu jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. Kertas soalan ini mengandungi dua soalan. Jawab **semua** soalan.
2. Tulis jawapan anda dalam ruangan yang disediakan.
3. Anda hendaklah menyerahkan kertas tulis dan kertas graf tambahan, jika digunakan bersama-sama dengan kertas soalan.
4. Penggunaan kalkulator saintifik yang tidak boleh diprogramkan adalah dibenarkan.
5. Calon dikehendaki membaca arahan di halaman 2.

| Soalan | Markah penuh | Markah diperolehi |
|--------|--------------|-------------------|
| 1 | 33 | |
| 2 | 17 | |
| Jumlah | | |

Kertas soalan ini mengandungi 11 halaman bercetak



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[Lihat halaman sebelah]

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**INFORMATION FOR CANDIDATES
MAKLUMAN UNTUK CALON**

1. This question paper consists of two question: **Question 1** and **Question 2**
*Kertas soalan ini mengandungi dua soalan: **Soalan 1** dan **Soalan 2***
2. Answer all questions. Write your answer for **Question 1** in the spaces provided in this question paper.
*Jawab semua soalan. Jawapan anda bagi **Soalan 1** hendaklah ditulis pada ruang yang disediakan dalam kertas soalan ini.*
3. Show your working, it may help you to get marks.
Tunjukkan kerja mengira, ini membantu anda mendapatkan markah.
4. The diagrams in the questions are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.
5. The marks allocated for each question or sub-part of a question are shown in brackets.
Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.
6. If you wish to change your answer, cross out the answer that you have done. Than write down the new answer.
Jika anda hendak menukar jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.
7. You may use a non-programmable scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan.
8. You are advised to spend 45 minutes to answer **Question 1** and 45 minutes for **Question 2**.
*Anda dinasihatkan supaya mengambil masa 45 minit untuk menjawab **Soalan 1** dan 45 minit untuk menjawab **Soalan 2**.*

| Score | Description |
|-------|---|
| 3 | Excellent : The best response |
| 2 | Satisfactory : An average response |
| 1 | Weak : An inaccurate response |
| 0 | No response or wrong response |

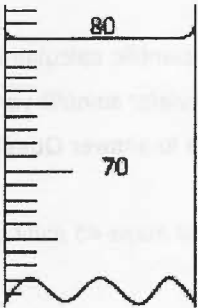
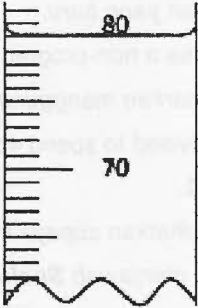


Answer all questions.
Jawab semua soalan.

1. An experiment to study osmoregulation in human was carried out by relating the volume of water intake to the volume of urine produced. Four groups of students which are group P, group Q, group R and group S were given different volume of plain water to drink. After one hour, each student in the group urinated and collected their urine in a measuring cylinder. The volume of urine produced is recorded in Table 1.

Satu eksperimen untuk mengkaji pengosmokawalaturan dalam manusia telah dijalankan dengan mengaitkan isipadu air yang diminum dengan isipadu air kencing yang dihasilkan. Empat kumpulan murid iaitu kumpulan P, kumpulan Q, kumpulan R dan kumpulan S telah diberi air kosong yang berbeza isi padu untuk diminum. Selepas satu jam, setiap murid dalam kumpulan membuang air kecil dan mengumpulkan air kencing mereka di dalam silinder penyukat.

Isipadu air kencing yang dihasilkan direkodkan dalam jadual 1.

| Group Kumpulan | Volume of water intake, ml Isipadu air yang diminum, ml | Volume of urine produced, ml Isipadu air kencing yang dihasilkan, ml | | |
|-------------------|--|---|--|-------------------|
| | | Student 1 Pelajar 1 | Student 2 Pelajar 2 | Average Purata |
| P | 100 |  |  | ----- |



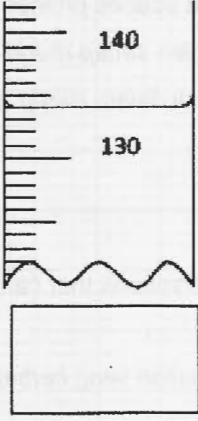
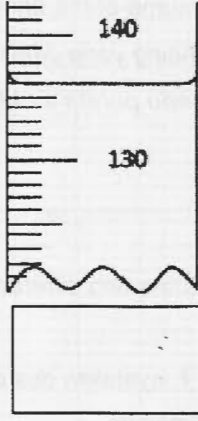
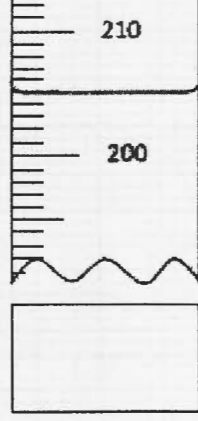
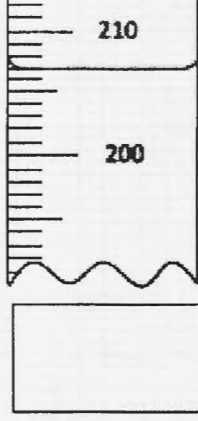
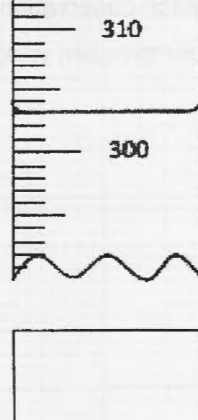
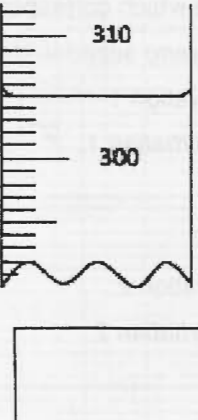
| | | | | |
|---|-----|---|--|--|
| Q | 200 |  |  | |
| R | 300 |  |  | |
| S | 400 |  |  | |

Table 1
Jadual 1

For
Examiner's
use

- (a) Record the volume of the urine produced by each student in group P, Q, R and S and the average volume of the urine in the spaces provided in Table 1.

Rekod isipadu air kencing yang dihasilkan oleh setiap murid dalam kumpulan P, Q, R and S serta isipadu purata air kencing di dalam ruang yang disediakan di Jadual 1

[3 marks]
[3 markah]

1(a)

- (b) (i) Based on Table 1, state two different observations that can be made in this experiment.

Berdasarkan Jadual 1, nyatakan dua pemerhatian yang berbeza yang boleh dibuat dalam eksperimen ini.

Observation 1:

Pemerhatian 1:

.....
.....

Observation 2:

Pemerhatian 2:

.....
.....

[3 marks]
[3 markah]

1(b)(i)

- (ii) State the inference which corresponds to each observation in (b) (i).

Nyatakan inferens yang sepadan dengan pemerhatian yang di (b)(i).

Inference for observation 1:

Inferens untuk pemerhatian 1:

.....
.....

Inference for observation 2:

Inferens untuk pemerhatian 2:

.....
.....

[3 marks]
[3 markah]

1(b)(ii)

For
Examiner's
use

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

| Variables <i>Pembolehubah</i> | Method to handle the variable <i>Cara mengendalikan pembolehubah</i> |
|---|---|
| Manipulated variable <i>Pembolehubah dimanipulasi</i> | |
| Responding variable <i>Pembolehubah bergerakbalas</i> | |
| Constant variable <i>Pembolehubah dimalarkan</i> | |

Table 2
Jadual 2

[3 marks]
[3 markah]

1(c)

(d) State the hypothesis for this experiment.

Nyatakan hipotesis bagi eksperimen ini.

1(d)

[3 marks]
[3 markah]

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

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

Your table should contain the following titles:

Jadual anda hendaklah mengandungi tajuk-tajuk berikut:

- Volume of water intake
Isipadu air yang diminum
- Volume of urine produced by each student
Isipadu air kencing yang dihasilkan oleh setiap pelajar
- Average volume of urine produced
Purata isipadu air kencing yang dihasilkan

For
Examiner's
use



[3 marks]
[3 markah]

1(e)(i)

For
Examiner's
use

1(e)(ii)

- (ii) Use the graph paper provided to answer this part of question.
Using the data in 1(e)(i), draw the graph of average volume of urine produced against the volume of water intake.
Gunakan kertas graf yang disediakan untuk menjawab soalan bahagian ini. Menggunakan data 1(e)(i), lukiskan graf isipadu air kencing yang dihasilkan melawan isipadu air yang diminum.

[3 marks]
[3 markah]

- (f) Based on the graph in 1 (e) (ii) , explain the relationship between the volume of water intake to the average volume of urine produced.
Berdasarkan graf di 1(e)(ii), terangkan perhubungan antara isipadu air yang diminum dengan purata isipadu air kencing yang dihasilkan.

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

[3 marks]
[3 markah]

- (g) Another group of student is given 100 ml of plain water which is added with 10g of table salt .
Predict the average volume of urine produced after one hour.
Explain your prediction.
Sekumpulan pelajar lain telah diberi 100 ml air kosong yang dicampurkan dengan 10g garam .Ramalkan purata isipadu air kencing yang dihasilkan selepas satu jam. Terangkan ramalan anda.

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

[3 marks]
[3 markah]

1(g)



(h) Based on the results from the experiment, what can be deduced about osmoregulation?

Berdasarkan keputusan eksperimen ini, apakah yang dapat dirumuskan tentang pengosmokawalaturan?

.....

[3 marks]
 [3 markah]

For
 Examiner's
 use

1(h)

(i) The following is a list of materials and apparatus used in another experiment to study osmoregulation.

Berikut ialah senarai bahan dan radas yang digunakan dalam satu eksperimen yang lain bagi mengkaji pengosmokawalaturan.

Cup, Beaker, Measuring cylinder, Student, Stopwatch, Mineral water
Cawan, Bikar, Silinder penyukat, Pelajar-pelajar, Jam randik, Air mineral

Classify the apparatus and materials into their respective variables in Table 3.

Kelaskan bahan dan radas tersebut kepada pembolehubah-pembolehubah yang sewajarnya di dalam jadual 3.

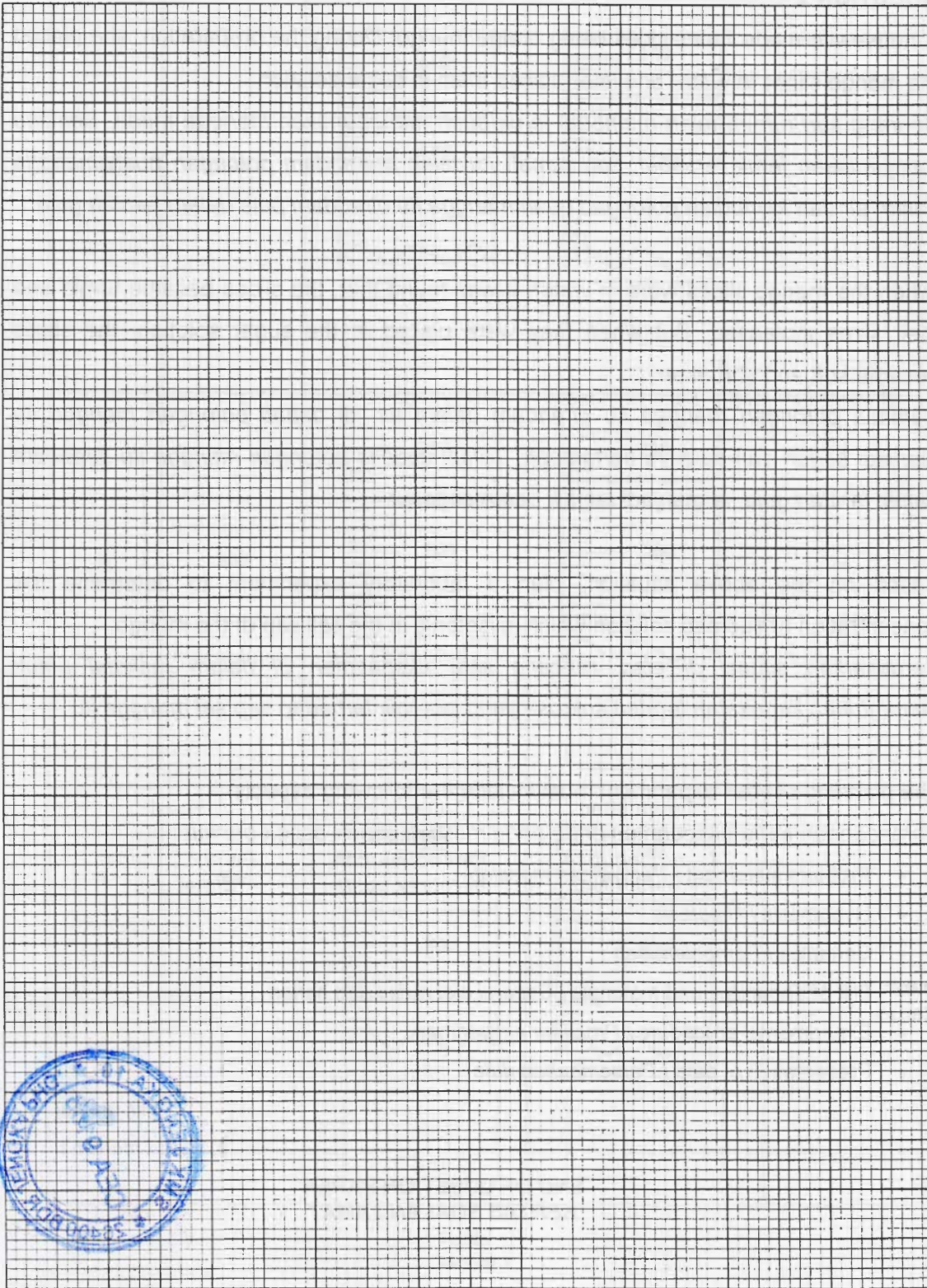
| | Manipulated Variable <i>Pembolehubah Dimanipulasi</i> | Responding Variable <i>Pembolehubah bergerak balas</i> | Fixed variable <i>Pembolehubah dimalarkan</i> |
|------------------------------------|--|---|--|
| Apparatus/Material Radas/ Bahan | | | |
| | | | |
| | | | |

Table 3
 Jadual 3

[3 marks]
 [3 markah]

1(i)

Total 1



QUESTION 2

A housewife made fruit pickles using unripe mango. During the preparation, she placed the mango slices in water and later placed them in sugar solution.

Seorang suri rumah telah membuat jeruk buah menggunakan mangga muda. Semasa menyediakan jeruk tersebut, suri rumah itu telah merendam potongan buah mangga dalam air dan kemudian potongan buah mangga itu direndam pula dalam larutan gula.

When the mango slices were in water, it was found that, the slices became turgid and their sizes increased. But when they were placed in the sugar solution, the slices became soft and shrunken.

Semasa potongan mangga itu direndam dalam air, di dapati potongan mangga itu menjadi segah dan saiznya bertambah. Tetapi apabila potongan mangga itu direndam dalam larutan gula, ia menjadi lembik dan mengecut.

Based on the above situation, plan a laboratory experiment to determine the concentration of sucrose solution which is isotonic to the cell sap of the mango.

Berdasarkan situasi di atas, rancang satu eksperimen di dalam makmal untuk menentukan kepekatan larutan sukrosa yang isotonik terhadap sap sel mangga itu.

The planning of your experiment must include the following aspects:

Perancangan kerja eksperimen anda perlu meliputi aspek-aspek berikut:

- Problem statement / *Pernyataan masalah*
- Hypothesis / *Hipotesis*
- Variables / *Pembolehubah*
- List of apparatus and materials / *Senarai alat radas dan bahan*
- Experimental procedure / *Prosedur eksperimen*
- Presentation of data / *Persembahan data*

[17 marks]

[17 markah]

**END OF QUESTION PAPER
KERTAS SOALAN TAMAT**



MAJLIS PENGETUA SEKOLAH MALAYSIA
NEGERI PAHANG

PEPERIKSAAN PERCUBAAN SPM 2012

JAWAPAN BIOLOGI KERTAS 1

| NO. | JAWAPAN | NO. | JAWAPAN |
|-----|---------|-----|---------|
| 1. | B | 26. | C |
| 2. | B | 27. | B |
| 3. | A | 28. | A |
| 4. | D | 29. | C |
| 5. | B | 30. | C |
| 6. | D | 31. | A |
| 7. | C | 32. | D |
| 8. | A | 33. | A |
| 9. | C | 34. | A |
| 10. | B | 35. | C |
| 11. | B | 36. | A |
| 12. | A | 37. | B |
| 13. | C | 38. | A |
| 14. | B | 39. | C |
| 15. | D | 40. | B |
| 16. | C | 41. | D |
| 17. | C | 42. | B |
| 18. | C | 43. | C |
| 19. | A | 44. | B |
| 20. | C | 45. | B |
| 21. | C | 46. | A |
| 22. | C | 47. | A |
| 23. | C | 48. | B |
| 24. | D | 49. | D |
| 25. | D | 50. | A |

4551/2

Percubaan SPM

Biology

Kertas 2

2½ jam

BIOLOGI

KERTAS 2

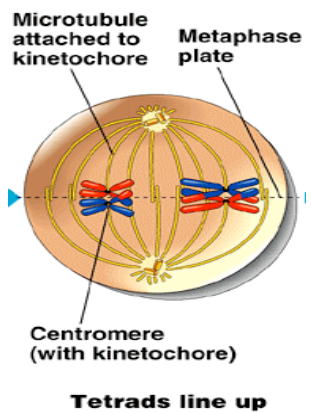
PERATURAN PEMARKAHAN

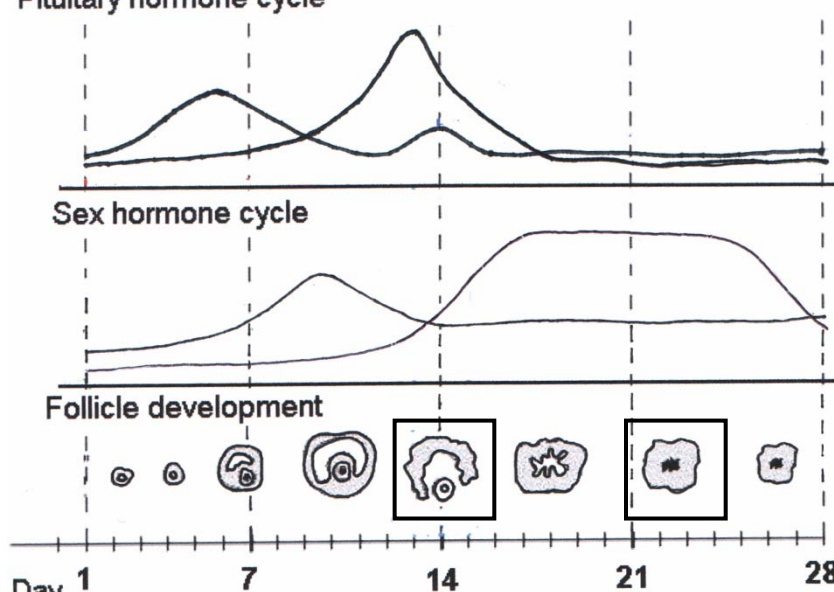
UNTUK KEGUNAAN PEMERIKSA SAHAJA

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| SOALAN | | MARKAH | | |
|---------------|----|--|------------------|---|
| 1 | a) | Animal cell | 1 | 1 |
| | b) | A: Mitochondrion B: Vacuole//Lysosome C: Rough Endoplasmic Reticulum D: Smooth Endoplasmic Reticulum | 1 1 1 1 | 4 |
| | c) | A: Generate/Produce energy // Site for cellular respiration D: Synthesis of lipid | 1 1 | 2 |
| | d) | Muscle cell For contraction of muscle OR Sperm To swim toward ovum for fertilization | 1 1 1 1 | 2 |
| | e) | P1: Synthesized protein cannot be transport to Golgi apparatus P2: Therefore protein cannot be modify into insulin P3 : Insulin will not be produced | 1 1 1 | 3 |
| JUMLAH | | | 12 | |

| | | | | | |
|--------------------|---|---|--------------------------------|----------------------------------|-----------------------|
| 2 | a) | Process R : Anaerobic respiration Process S : Aerobic respiration | 1 1 | 2 | |
| | b) | Reactant : Glucose + Oxygen → Product: Carbon dioxide + water + 2898kJ | 1 1 | 2 | |
| | c) | | R | S | 1 1 1 1 1 |
| | | D1 | Absent of oxygen | Present of oxygen | |
| | | D2 | Glucose is partially oxidized | Glucose is completely oxidized | |
| | | D3 | Produce lactic acid | Do not produce lactic acid | |
| | | D4 | Produce less energy/150kJ/2ATP | Produce more energy/2898kJ/36ATP | |
| Any two "D" | | | | | |
| d) | i) gills | | 1 | 1 | |
| | ii) P1 : have lamella and filament to increase total surface area P2: numerous blood capillaries for efficient transport of respiratory gases | | 1 1 | 2 | |
| | iii) P1 : thin membrane/one cell thick for easily diffusion of respiratory gases P2 : moist surface for respiratory gases easily dissolve P3 : numerous blood capillaries for efficient transport of respiratory gases | | 1 1 1 | 3 | |
| JUMLAH | | | 12 | | |

| | | | | |
|---|----|---|------------------|-----------|
| 3 | a) | To produce gamete | 1 | 1 |
| | b) | Anther // Ovary | 1 | 1 |
| | c) | i) Prophase I | 1 | 1 |
| | | ii) F: Crossing over P1: Exchange of segment of DNA between non sister chromatid P2: to produce variation in gametes | 3 | 3 |
| | d) |  <p>The diagram illustrates a cell in the metaphase stage of meiosis I. Two pairs of homologous chromosomes (tetrads) are aligned at the equatorial metaphase plate. Microtubules from the spindle poles are attached to the kinetochores of the centromeres. Labels indicate: 'Microtubule attached to kinetochore', 'Metaphase plate', 'Centromere (with kinetochore)', and 'Tetrads line up'.</p> | 2 | 2 |
| | e) | F: Independent assortment P1: homologous chromosomes pairing up randomly and produce new genetic combination during Metaphase 1 | 1 1 | 2 |
| | f) | Down's Syndrom Klinefelter's Syndrom Turner's Syndrom | 1 1 1 | 2 |
| 4 | a) | Blood pressure increase | 1 | 1 |
| | b) | F : withstand the high pressure of blood E1: (thick wall) have muscles that can contracts and relax E2: control blood flow (to cell according to the body's need) | 1 1 1 | 2 |
| | c) | F : nearby muscles contract and relax//nearby muscles squeeze the vein E: push blood back towards the heart. | 1 1 | 2 |
| | d) | F1: the walls of capillaries are only one cell thick E1: substances do not have very far to diffuse through them E2: increase TSA for diffusion to occur | 1 1 1 | 3 |
| | e) | F1: 120: refers systolic pressure E1: (peak of pressure) that contracting ventricles F2: 80 refers to diastolic pressure E2: (the lowest arteriole blood pressure)when ventricles are relaxing | 1 1 1 1 | 4 |
| | | JUMLAH | | 12 |

| | | | | |
|---|----|---|-----------------------|-----------|
| 5 | a) | P : LH / Luteinising hormone R : Oestrogen | 1 1 | 2 |
| | b) | <p>Pituitary hormone cycle</p>  <p>The figure consists of three vertically stacked graphs sharing a common x-axis representing days from 1 to 28. Vertical dashed lines are drawn at days 1, 7, 14, 21, and 28. The top graph, 'Pituitary hormone cycle', shows two curves: one with a peak at day 14 and another with a peak at day 21. The middle graph, 'Sex hormone cycle', shows two curves: one with a peak at day 14 and another with a peak at day 21. The bottom graph, 'Follicle development', shows a sequence of seven follicle stages from left to right, with the stages at day 14 and day 21 highlighted by boxes.</p> <p>Sex hormone cycle</p> <p>Follicle development</p> <p>Day 1 7 14 21 28</p> | 2 | 2 |
| | c) | P1: After ovulation, M / corpus luteum secretes S / progesterone P2: the level of S/ progesterone increases to maintain the thickness of the endometrium. P3: When the M / corpus luteum degenerates, the level of S/ progesterone decreases, the endometrium begin to disintegrates | 1 1 1 | 3 |
| | d) | P1: To inhibit the secretion of FSH and LH from pituitary gland P2: No development of follicle / secondary oocyte P3: Then the secretion of oestrogen is reduced P4: Repair/ rejuvenation of endometrium is not happened P5: Hence no new early embryo develops. | 1 1 1 1 1 | 3 |
| | e) | P1: The sperms are collected from the husband / taken from sperm banks. P2: And inserted directly into the Fallopian tube of the wife during ovulation phase. | 1 1 | 2 |
| | | JUMLAH | | 12 |

| Item | Criteria | Marks | |
|--------|--|--|----------------------|
| 6(a) | <p>Able to explain the role of hormone in regulation of blood osmotic pressure</p> <p>When someone takes more salt in his/her meal;</p> <ol style="list-style-type: none"> 1. Increase in blood osmotic pressure is detected by the receptor 2. Receptor triggers impulse 3. and the impulse are sent to pituitary gland 4. Pituitary gland secretes ADH into the blood stream 5. ADH stimulates the wall of distal convoluted tubule and collecting duct to become more permeable to water 6. Water will be reabsorbed into the blood stream 7. Blood osmotic pressure decreases back to normal <p>When blood osmotic pressure of a person decrease;</p> <ol style="list-style-type: none"> 8. When he/her drink too much 9. Adrenal gland at kidney will be stimulate to secrete aldosterone 10. Aldosterone will increase the permeability of distal convoluted tubule and collecting duct to become more permeable to salt 11. Salt will be absorbed into the blood stream 12. Blood osmotic pressure increases back to normal | <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>Any</p> <p>10</p> | <p>Max</p> <p>10</p> |
| 6(b)i | <p>Able to state the type of response and its importance to the plant</p> <p><u>Plumule</u> : Positive Phototropism // Negative Geotropism Importance : Enable plant to get maximum sunlight for photosynthesis</p> <p><u>Radicle</u> : Positive Geotropism // Negative Phototropism Importance : Enable roots to get/absorb water for photosynthesis</p> | <p>1</p> <p>1</p> <p>1</p> <p>1</p> | <p>4</p> |
| 6(b)ii | <p>Able to explain the direction of growth in plumule and radicle.</p> <p><u>Plumule</u></p> <ol style="list-style-type: none"> 1. Auxin stimulates/promote cell elongation at the shoot tip 2. More auxin is distributed at the darker/lower side of the shoot compare to the bright/upper side 3. So at the darker/lower side the rate of cell elongation is higher than the bright /upper side 4. The shoot grows/bend towards light/away from the gravity <p><u>Radicle</u></p> <ol style="list-style-type: none"> 5. High concentration of auxin inhibits cell elongation at radical/root tip 6. More auxin is distributed at the lower/darker side of the root compare to the upper/bright side 7. So at the lower/darker side of the root tip the rate of cell elongation is slower than the brighter/upper side 8. So the root grows/bends downward toward gravity/ away from light | <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>Any 6</p> | <p>6</p> |
| | Total marks | | 20 |

| Item | Criteria | | Marks | |
|---|---|--|-----------------------|---|
| 7(a) | Problems faced by mangrove plants (Fact) | Adaptive characteristics of mangrove plants (Explanation) | | |
| 1 | Soft muddy soil/substrate | <ul style="list-style-type: none"> Highly branched root system to support themselves. Eg. <u>Avicennia</u> have long/underground/horizontals cable/ roots | 1 1 | 2 |
| 2 | Waterlogged conditions of the soil/ Very little oxygen for root respiration | <ul style="list-style-type: none"> (<u>Avicennia</u>) have breathing roots /pneumatophores /Gaseous exchange occurs through pores/ lenticels. | 2 | 2 |
| 3 | The high content of salt/salinity makes the water in the soil hypertonic compared to the cell sap of the root cells/ Water diffuse out from plant/ the root cells by osmosis// dehydration | <ul style="list-style-type: none"> Cell sap of (the root) cells are hypertonic compared to the soil water The root does not lose water but seawater enters the root cells instead/ Excess salt in the plant is eliminated by the salt glands | 1 1 | 2 |
| 4 | Excessive exposure to sunlight/ intense heat// High rate of transpiration. | <ul style="list-style-type: none"> The leaves (of mangrove trees) have a thick cuticle/ sunken stomata to reduce transpiration/ the leaves are thick /succulent to store water. | 2 | 2 |
| 5 | High mortality rate//low survival rate of seedlings | <ul style="list-style-type: none"> Have viviparous seedling // the seeds are able to germinate while still attached to the mother plant. | 2 | 2 |
| One fact and one explanation = 2 marks | | | | |
| 7b | Able to Identify the type of competition and explain the graph curves | | | |
| | Graph A | | | |
| | <ul style="list-style-type: none"> Intraspecific competition Competition between the same species of <u>Paramecium</u> Competing for the same niche, food /nutrient/space At the end of experiment the population of <u>Paramecium aurelia</u> is higher compared to the population of <u>Paramecium caudatum</u> Showing that <u>P. aurelia</u> are more adapted to the environment | | 1 1 1 1 1 | |
| | | | Any 5 | 5 |

| | | | |
|--|---|-----------------------|-----------|
| | <p>Graph B</p> <ul style="list-style-type: none"> • Interspecific competition • Competition between different species of Paramecium • Competing for the same niche, nutrient, space • At the end of the experiment, the population of <u>P aurelia</u> increase whereas <u>P caudatum</u> decreases. • Showing that <u>P aurelia</u> are more adaptable/stronger compared to <u>P caudatum</u> | 1 1 1 1 1 | 5 |
| | Total marks | Any 5 | 20 |

| Item | Criteria | Marks | |
|------|--|--|----------|
| 8(a) | <p>Able to explain the characteristics of structure X an Y.</p> <p>Structure X F1: Being almost 6 meter long E1: For maximum absorbtion of nutrient</p> <p>F2: Highly folded E2: To increase the rate of nutrient absorption</p> <p>F3: Having finger like projections called villi over its surface E3: To increase total surface area for eccient absorption</p> <p>Structure Y F4: Have microvilli E4: To increase the surface area for absorption</p> <p>F5: Have thin walls : one cell thick E5: So that digested food can be absorb rapidly</p> <p>F6: Have rich supply of blood capillary E6: To transport glucose, amino acid and water soluble vitamin efficiently</p> <p>F7: Have lacteals E7: To absorb fatty acid and glycerol/water soluble vitamin efficiently</p> <p>F+E = 1 mark Any 6 F+E</p> | 1 1 1 1 1 1 | Max 6 |

| | | | |
|------|--|--|------------------|
| 8(b) | <p>Able to explain the absorption and assimilation of lipids.</p> <p>Absorption</p> <ol style="list-style-type: none"> 1. Digestion of lipid produce fatty acid and glycerol 2. Absorption of lipid occur at ileum 3. At ileum there are villi which have lacteal 4. Fatty acid and glycerol are absorbed into lacteal 5. In the lacteal condensation of fatty acid and glycerol forms lipid 6. The lipids then transported via the subclavian vein into the blood stream <p>Assimilation</p> <ol style="list-style-type: none"> 7. In the cells lipid is use as a main component of plasma membrane 8. Lipid also is use as a main component of some hormone and vitamins 9. Excess lipid will be stored underneath the skin as adipose tissue | <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>Any 8</p> | <p>Max 8</p> |
| 8(c) | <p>Able to describe the effects of taking snack food over a long time.</p> <p>F: Not suitable.</p> <p>P1: The snack contains high fat and protein</p> <p>P2: The intake of high fat regularly may lead to obesity</p> <p>P3: Saturated fat in the snack may deposited in the wall of artery</p> <p>P4: The narrow lumen of artery leads to arteriosclerosis</p> <p>P5: Soon the teenager faces high blood pressures</p> <p>P6: If arteriosclerosis occurs at coronary artery the teenager may have heart attack</p> <p>P7: Excessive intake of protein may cause kidney problem</p> <p>P8: The snack contains lack of fiber</p> <p>P9: This may lead to constipation</p> <p>F + 5 P</p> | <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> | <p>Max 6</p> |
| | Total marks | | 20 |

| Item | Criteria | Marks | |
|--------------------|---|---|-----------|
| 9(a) | <p>Able to discuss the effects of the activity to the environment.</p> <ol style="list-style-type: none"> 1. The diagram shows human activity which are deforestation 2. Deforestation is the main cause for increasing CO₂ amount in air 3. This lead to greenhouse effect phenomenon 4. Forest play an important role as carbon sink of the earth which absorb vast amount of carbon dioxide for photosynthesis 5. Greenhouse effect phenomenon promotes global warming. 6. As the temperature of world is increasing, severe climatic change/drought occur in certain country/melting of ice at Artic/Antartic 7. Forest also act as water catchments area where rain water is absorbed and released back as water vapour to the atmosphere 8. Deforestation will cause soil erosion, because there are no more root to hold the soil. 9. Deforestation damage the water catchment area and leads to flash flood 10. Landslides occur at slope area when there are no more root to hold the ground 11. Deforestation also cause loss of biodiversity by 12. destruction of natural habitat 13. that leads to extinction of many animal and species 14. There also destruction of recreational sites <p style="text-align: right;">Any 10</p> | <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> | <p>10</p> |
| (b) | <p>Able to justify the effects of unplanned development.</p> <p>F1 : Industries / factories / vehicle contribute to air pollution</p> <p>P1 : smoke / fine solid particles can cause respiratory problem</p> <p>P2 : oxides of nitrogen / sulphur dioxide dissolve in rain to produce acid rain</p> <p>P3 : (acid rain) causing the soil become acidic / unsuitable for cultivation of crops / leaching of mineral / corrosion of metal</p> <p>P4 : Increase Carbon dioxide in atmosphere causes the greenhouse effect / global warming</p> <p>F2 : Industrial / domestic / agricultural activities produce waste to contribute water pollution</p> <p>P5 : Agrochemical / pesticides / insecticides used by farmer flow into the river / lead to the poisoning of aquatic organism</p> <p>P6 : Agricultural run-offs contain excess nitrates / phosphates lead to eutrophication</p> <p>P7 : (eutrophication) causes the BOD value will increase thus may harm the aquatic organisms</p> <p>P8 : Effluents from electronics factories contain heavy metals / mercury / cadmium kill the aquatic organism / disturb food chain</p> <p>F3 : Discharged of hot water from industries / glass building cause thermal pollution</p> <p>P9 : Increase the water temperature in the river causing died aquatic organisms / increase the atmosphere temperature</p> <p style="text-align: right;">Any 3 F and any 7 P</p> | <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> | <p>10</p> |
| Total marks | | 1 | 20 |

4551/3

Percubaan SPM

Biology

Kertas 3

1½ jam

BIOLOGI
KERTAS 3
PERATURAN PEMARKAHAN
UNTUK KEGUNAAN PEMERIKSA SAHAJA

<http://edu.joshuatly.com/>
<http://fb.me/edu.joshuatly>

| Questions | Marking Criteria | Score | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------|--|-----------|----------------------------|------------------------------|--|--------------------------------------|--------------------------------------|-----------|---|-----|----|----|----|---|-----|-----|-----|-----|---|-----|-----|-----|-----|---|-----|-----|-----|-----|-----------------|
| 1 (a) | <p>Able to record all 12 data for the volume of urine produced and the average volume of urine produced correctly.</p> <p><u>Sample answers:</u></p> <table border="1" data-bbox="370 432 1297 686"> <thead> <tr> <th rowspan="2">Group</th> <th rowspan="2">Volume of water intake, m/</th> <th colspan="2">Volume of urine produced, m/</th> <th rowspan="2">Average volume of urine produced, ml</th> </tr> <tr> <th>Student 1</th> <th>Student 2</th> </tr> </thead> <tbody> <tr> <td>P</td> <td>100</td> <td>80</td> <td>80</td> <td>80</td> </tr> <tr> <td>Q</td> <td>200</td> <td>134</td> <td>136</td> <td>135</td> </tr> <tr> <td>R</td> <td>300</td> <td>205</td> <td>207</td> <td>206</td> </tr> <tr> <td>S</td> <td>400</td> <td>303</td> <td>305</td> <td>304</td> </tr> </tbody> </table> | Group | Volume of water intake, m/ | Volume of urine produced, m/ | | Average volume of urine produced, ml | Student 1 | Student 2 | P | 100 | 80 | 80 | 80 | Q | 200 | 134 | 136 | 135 | R | 300 | 205 | 207 | 206 | S | 400 | 303 | 305 | 304 | <p>3</p> |
| Group | Volume of water intake, m/ | | | Volume of urine produced, m/ | | | Average volume of urine produced, ml | | | | | | | | | | | | | | | | | | | | | | |
| | | Student 1 | Student 2 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P | 100 | 80 | 80 | 80 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Q | 200 | 134 | 136 | 135 | | | | | | | | | | | | | | | | | | | | | | | | | |
| R | 300 | 205 | 207 | 206 | | | | | | | | | | | | | | | | | | | | | | | | | |
| S | 400 | 303 | 305 | 304 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Able to record 8 - 11 data correctly | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Able to record 4 – 7 data correctly | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Able to record only 0 - 3 data or not able to respond / wrong response. | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| (b)(i) | <p>Able to state two different observations correctly based on two criteria: C1- Volume of water intake C2 – Volume of urine produced // Average volume of urine produced</p> <p>Sample answers:</p> <ol style="list-style-type: none"> When the volume of water intake is 100 ml /200 ml /300 ml /400m, the average volume of urine produced is 80ml / 135 ml / 206 ml /304 ml. When the volume of water intake is 100 ml /200 ml /300 ml /400ml , the volume of urine produced is 80 / 134 ml / 136 ml / 205 ml / 207ml / 303 ml / 305ml. The average volume of urine produced in Group P is lower / smaller than that in Group Q / R / S // The average volume of urine produced in Group S is higher than that in Group P / Q / R. | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | <p>Able to state one correct observation and one inaccurate observation .</p> <p>Sample answer (inaccurate):</p> <ol style="list-style-type: none"> When the volume of water intake is 100 ml /200 ml /300 ml /400ml, the average volume of urine produced is the least / less / high / the highest. | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| | | |
|---------|--|----------|
| | <p>Able to state only one correct observation or two observation at idea level.</p> <p>Sample answer (idea level):</p> <ol style="list-style-type: none"> 1. The volume / average volume of urine produced is different. 2. The volume of water intake affects the (average) volume of urine Produced. | 1 |
| | <p>No response or incorrect response or two inaccurate observation or one idea only.</p> | 0 |
| (b)(ii) | <p>Able to make two accurate inferences based on two criteria: C1 – more / less (amount) of water reabsorbed C2 – higher / lower osmotic pressure // permeability of kidney / tubule to water increases / decreases // more / less ADH / aldosterone secreted to kidney tubule</p> <p>Sample answer: (For observation 1 and 2 in sample answers) 1. More/high/much/ (amount) of water reabsorbed due to high osmotic pressure // vice versa (For observation 3 in sample answers) 2. More / higher (amount) of water reabsorbed due to higher osmotic pressure in water intake of Group P compared to Group Q/R/S.</p> | 3 |
| | <p>Able to state one correct inference and one inaccurate inference or able to state two inaccurate inferences.</p> <p>Sample answer (inaccurate):</p> <ol style="list-style-type: none"> 1. More/high/much/ (amount) of water reabsorbed // inversely. 2. Higher / high / lower / low osmotic pressure. 3. Less / more ADH is secreted to the kidney tubule. | 2 |
| | <p>Able to state one correct inference or two inferences at idea level.</p> <p>Sample answer for idea level:</p> <ol style="list-style-type: none"> 1. ADH is secreted. 2. Salt reabsorbed. 3. Water reabsorbed. | 1 |
| | <p>No response or inaccurate responses.</p> | 0 |

Summary of scoring for 1(b)(i) and 1(b)(ii) :

| Score | Correct | Inaccurate | Idea | Wrong |
|-------|---------|------------|------|-------|
| 3 | 2 | - | - | - |
| 2 | 1 | 1 | - | - |
| | - | 2 | - | - |
| 1 | 1 | - | 1 | |
| | - | - | 2 | - |
| | 1 | - | - | 1 |
| | - | 1 | 1 | - |
| 0 | - | 1 | - | 1 |
| 0 | - | - | 1 | 1 |

(c) Able to state all 3 variables and methods to handle each variable correctly.

3

| Variables | Method to handle the variable |
|--|---|
| <p>Manipulated variable</p> <p>Volume of water intake</p> | <p>(The students) drink different volume of (plain) water intake// Change the volume of water (from 100 ml to 200 ml and 400 ml)</p> |
| <p>Responding variable</p> <p>Volume of urine produce (after one hour)// average volume of urine produce</p> | <p>Measure and record the volume of urine produced by using a measuring cylinder././</p> <p>Calculate the (average) volume of urine produced by using formula:</p> $\frac{\text{Volume of urine produced by student 1} + \text{student 2}}{2}$ |
| <p>Constant variable</p> <p>Number of students in each group // Time taken to collect/measure/record the urine//type of water</p> | <p>Fix the number of student // Fix the time taken taken (to collect/measure/record the urine) at one hour/ use only plain water.</p> |

| | | |
|-----|---|----------|
| | Able to state 4 – 5 ticks | 2 |
| | Able to state 2 – 3 ticks | 1 |
| | No response or incorrect respons or 1 tick only | 0 |
| (d) | <p>Able to state the hypothesis relating the manipulated variable and the responding variable correctly based on three criteria:</p> <p>P1 : manipulated variable (Volume of water intake) P2 : responding variable (Volume of urine produced) H : relationship</p> <p>Sample answer P1 + P2 + H</p> <p>1. As the volume of water intake increases, the volume of urine produced Increase. // vice versa.</p> | 3 |
| | <p>Able to state a hypothesis based on any two criteria.</p> <p>Sample answer : P1 + P2 // P1/P2 + H</p> <p>1. The volume of urine produced depends on the volume of water intake. 2. Different group of students has different volume of urine produced.</p> | 2 |
| | <p>Able to state a hypothesis based on any one criterion or at idea level.</p> <p>Sample answer 1. Volume of urine produced is different.</p> | 1 |
| | No response or incorrect response | 0 |

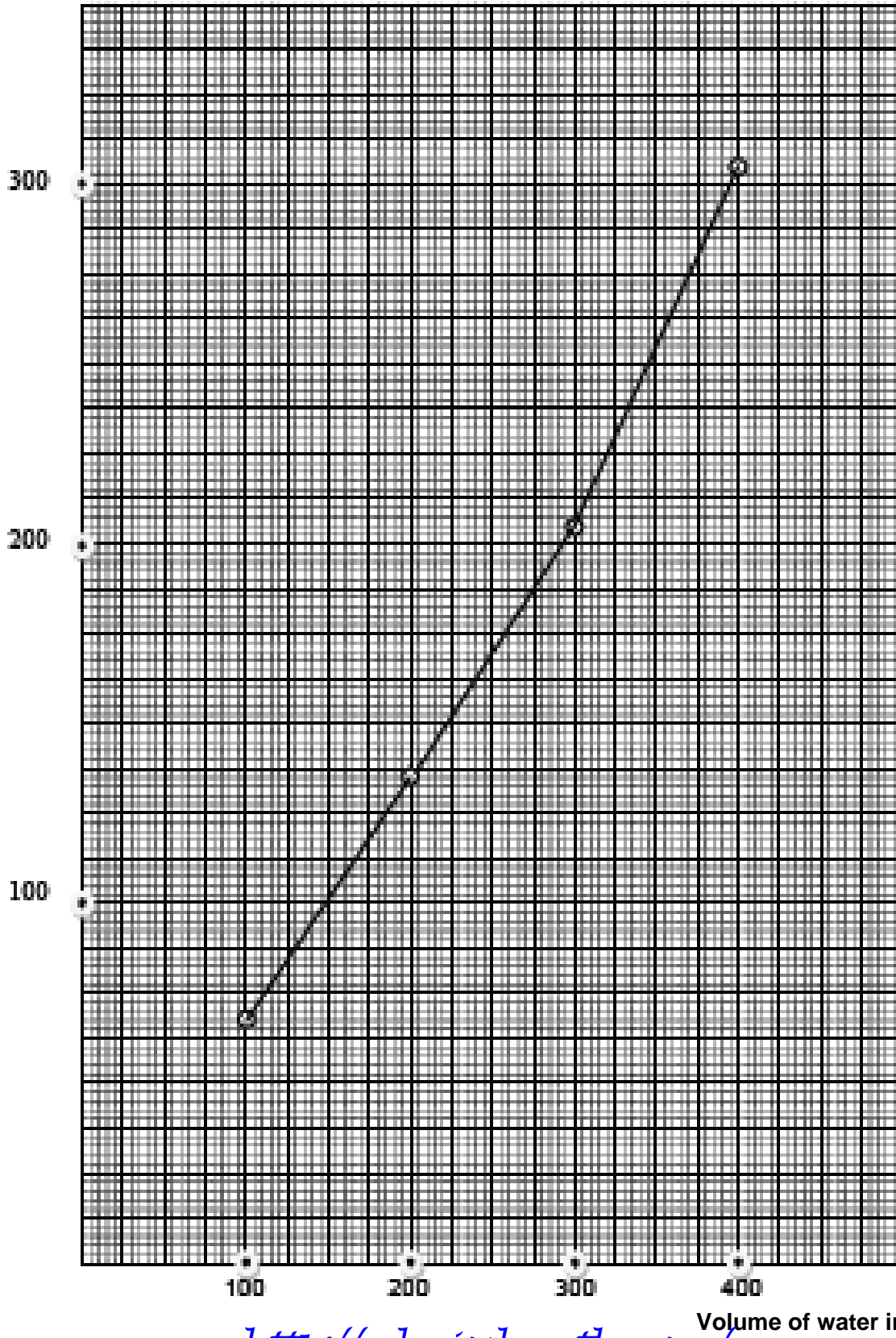
| <p>(e)(i)</p> | <p>Able to construct a table correctly with the following aspects: T : Titles with correct units - 1 mark D : Data - 1 mark C : Average volume of urine produced - 1 mark</p> <p>Sample answer :</p> <div style="text-align: center;"> <p>Title, T</p> <table border="1" style="margin: auto;"> <thead> <tr> <th rowspan="2">Volume of water intake, ml</th> <th colspan="2">Volume of urine produced,ml</th> <th rowspan="2">Average volume of urine produced, ml</th> </tr> <tr> <th>Student 1</th> <th>Student 2</th> </tr> </thead> <tbody> <tr> <td>100</td> <td>80</td> <td>80</td> <td>80</td> </tr> <tr> <td>200</td> <td>134</td> <td>136</td> <td>135</td> </tr> <tr> <td>300</td> <td>205</td> <td>207</td> <td>206</td> </tr> <tr> <td>400</td> <td>303</td> <td>305</td> <td>304</td> </tr> </tbody> </table> <p style="text-align: center;">Data, D</p> <p style="text-align: right;">C – Calculation</p> </div> | Volume of water intake, ml | Volume of urine produced,ml | | Average volume of urine produced, ml | Student 1 | Student 2 | 100 | 80 | 80 | 80 | 200 | 134 | 136 | 135 | 300 | 205 | 207 | 206 | 400 | 303 | 305 | 304 | |
|----------------------------|---|----------------------------|--------------------------------------|--|--------------------------------------|-----------|-----------|-----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Volume of water intake, ml | Volume of urine produced,ml | | Average volume of urine produced, ml | | | | | | | | | | | | | | | | | | | | | |
| | Student 1 | Student 2 | | | | | | | | | | | | | | | | | | | | | | |
| 100 | 80 | 80 | 80 | | | | | | | | | | | | | | | | | | | | | |
| 200 | 134 | 136 | 135 | | | | | | | | | | | | | | | | | | | | | |
| 300 | 205 | 207 | 206 | | | | | | | | | | | | | | | | | | | | | |
| 400 | 303 | 305 | 304 | | | | | | | | | | | | | | | | | | | | | |
| | <p>Any two correct aspect 2</p> | 2 | | | | | | | | | | | | | | | | | | | | | | |
| | <p>Any one aspect correct 1</p> | 1 | | | | | | | | | | | | | | | | | | | | | | |
| | <p>No response or incorrect respons</p> | 0 | | | | | | | | | | | | | | | | | | | | | | |
| <p>(e)(ii)</p> | <p>Able to draw the graph of average volume of urine produced against volume of water intake based on the following aspects :</p> <p>P (paksi) : title of x-axis and y-axis - 1 mark T (Titik) : four points plotted correctly - 1 mark B (bentuk) : all points connected smoothly - 1 mark</p> <p>All three correct aspects</p> | 3 | | | | | | | | | | | | | | | | | | | | | | |
| | <p>Any two correct aspects</p> | 2 | | | | | | | | | | | | | | | | | | | | | | |
| | <p>Any one aspect correct</p> | 1 | | | | | | | | | | | | | | | | | | | | | | |
| | <p>No response or incorrect response</p> | 0 | | | | | | | | | | | | | | | | | | | | | | |

| | | |
|-----|---|----------|
| (f) | Able to explain the relationship between the volume of water intake to the volume of urine produced based on the following criteria. R1 : Relationship – The higher the volume of water intake, the higher the (average) volume of urine produced R2 : Osmotic pressure decreases R3 : Less water reabsorbed (from the kidney) // less ADH is produced // Kidney tubules become less permeable to water Sample answer : The higher the volume of water intake, the higher the (average) volume of urine produced because the osmotic pressure decreases. Thus, less water reabsorbed from the kidney. | 3 |
| | Able to explain the relationship using any two aspects. | 2 |
| | Able to explain the relationship using one aspect only. | 1 |
| | No response or incorrect response. | 0 |
| (g) | Able to predict and explain the volume of urine produced based on the following criteria: P1 : Prediction – volume of urine less than 80 ml // any value less than 80 ml P2 : Explanation - Osmotic pressure of increases P3 : More water reabsorbed (from the kidney) Sample answer Volume of urine in less than 80 ml // 75 ml Because the osmotic pressure increases, so more water reabsorbed (from the kidney) | 3 |
| | Able to predict and explain the volume of urine produced based on any two criteria: | 2 |
| | Able to predict and explain the volume of urine produced based on any one criteria: | 1 |
| | No response or incorrect response | 0 |
| (h) | Able to define osmoregulation operationally based on the following criteria. D1 : A process that causes D2 : (Average) volume of urine produced by the students / group A,B,C and D after one hour D3 : after taking different volume of water // depends on the volume of water intake // the higher the volume of water intake, the higher the volume of urine produced. | 3 |

| | <p>Sample answer : Osmoregulation is the process that causes the (average) volume of urine produced by the students / group P,Q,R and S after one hour. The average volume of urine produced depends on the volume of water intake.</p> | | | | | | | | | |
|-----------------------|--|------------------------------|--|----------------------|----------------|-----------------------|--|------------------------------|--|----------|
| | Any two criteria stated 2 | 2 | | | | | | | | |
| | Any one criteria stated 1 | 1 | | | | | | | | |
| | No response or incorrect response | 0 | | | | | | | | |
| (i) | <p>Able to classify apparatus and materials into their respective variables.</p> <p><u>Sample answer.</u></p> <table border="1"> <thead> <tr> <th></th> <th>Manipulated Variable</th> <th>Responding Variables</th> <th>Fixed Variable</th> </tr> </thead> <tbody> <tr> <td>Apparatus / Materials</td> <td>cup Beaker // Measuring cylinder</td> <td>Measuring cylinder // beaker</td> <td>stopwatch students mineral water</td> </tr> </tbody> </table> <p>All 6 corrects</p> | | Manipulated Variable | Responding Variables | Fixed Variable | Apparatus / Materials | cup Beaker // Measuring cylinder | Measuring cylinder // beaker | stopwatch students mineral water | 3 |
| | Manipulated Variable | Responding Variables | Fixed Variable | | | | | | | |
| Apparatus / Materials | cup Beaker // Measuring cylinder | Measuring cylinder // beaker | stopwatch students mineral water | | | | | | | |
| | 1 - 2 wrongs | 2 | | | | | | | | |
| | 3 - 4 wrongs | 1 | | | | | | | | |
| | 5 - 6 wrongs | 0 | | | | | | | | |

e(i) Sample answer

Average volume of urine , produced, ml



<http://edu.joshuatly.com/>
<http://fb.me/edu.joshuatly>

QUESTION 2

| Aspect | | Marks | Notes on scoring |
|---|--|-------|--|
| KB061201 Problem statement | <p>Able to state a problem statement relating manipulated variable to the responding variable correctly based on criteria:</p> <p>P1: Manipulated variable (different concentration of sucrose solution)</p> <p>P2: Responding variable (the mass of mango tissue)</p> <p>P3: Relationship in question form (what is the effect of...? // Does the..... affect?)</p> <p>Sample answers:</p> <ol style="list-style-type: none"> 1. What is the effect of different concentration of sucrose solution on the mass of mango tissue? 2. Does the different concentration of sucrose solution affect the mass of mango tissue? | 3 | P1 +P2 + R |
| | <p>Able to state a problem statement inaccurately based on any two criteria.</p> <p>Sample answers:</p> <ol style="list-style-type: none"> 1. What is the effect of different concentration of sucrose solution on the mass of mango tissue. (No R) 2. What can affect the mass of mango tissue ? (No P1) 3. What is the effect of different concentration of sucrose solution on mango tissue? (No P2) 4. Can sucrose solution affect the mass of mango tissue? (No P1) | 2 | P1 and P2 only OR P1/P2 and R only |

| | | | |
|----------------------------|---|---|--|
| | <p>Able to state a problem statement based on any one criteria at idea level.</p> <ol style="list-style-type: none"> 1. Does sucrose solution affect the mango tissue? (No P1 and P2) 2. Does the mass of mango tissue affected by sucrose solution. (No P1 and R) 3. What is the factor that affect the mass of mango tissue. (No P1 and R) 4. Does different concentration of sucrose solution affect the mango tissue. (No P2 and R) | 1 | |
| | No response / wrong response | 0 | |
| KB061202 Hypothesis | <p>Able to state a hypothesis by relating the manipulated variable to the responding variable correctly based on criteria:</p> <p>P1: Manipulated variable (concentration of sucrose solution)</p> <p>P2: Responding variable (the mass of mango tissue)</p> <p>P3: Relationship between P1 and P2.</p> <p>Sample answer:</p> <ol style="list-style-type: none"> 1. As/When the concentration of sucrose solution increases/decreases, the mass of mango tissue decreases/increases. | 3 | <p>P1 + P2 + R R:....increase/ decrease..... decrease / increase</p> |
| | <p>Able to state a hypothesis inaccurately correctly based on any two criteria:</p> <p>Sample answers:</p> <ol style="list-style-type: none"> 1. As/When the concentration of sucrose solution increase, the mango tissue decrease (no P2) 2. As/When the sucrose solution increase, the mass of mango tissue decrease.(No P1) 3. The concentration of sucrose solution influence/affect the mass of mango tissue. | 2 | <p>P1 + P2 only P1/P2 + R only</p> |

| | | | |
|---|---|---|-----------|
| | <p>Able to state a hypothesis at idea level based on any one criterion:</p> <p>Sample answers:</p> <ol style="list-style-type: none"> 1. Sucrose solution influence/affect the mass of mango tissue.(P2 only) 2. Concentration of sucrose solution influence/affect the mango tissue.(P1 only) 3. Sucrose solution influence/affect the mango tissue.(idea) | 1 | |
| | No response / wrong response / R only. | 0 | |
| KB061203 Variables | <p>Able to state all three variables correctly.</p> <p>Sample answers:</p> <ul style="list-style-type: none"> • Manipulated variable: Concentration of sucrose solution • Responding variable: The change in mass of the mango tissue • Constant variable: Initial mass of the mango tissue // volume of sucrose solution | 3 | |
| | Able to state any two variables correctly | 2 | |
| | Able to state any one variable correctly | 1 | |
| | No response / wrong response | 0 | |
| KB061204 Apparatus and materials | <p>Able to list all the apparatus and materials correctly.</p> <p>Apparatus(A) : Petri dish, electronic balance*, knife, cork borer, stopwatch</p> <p>Materials (M) : Mango tissue*, sucrose solution*, filter paper</p> | 3 | 4A + 3 M |
| | 3A + 3M including *- compulsory apparatus and materials | 2 | 3A + 3M |
| | 1-2A + 2M including *- compulsory apparatus and materials | 1 | 1-2A + 2M |
| | 1A + 1M / no response / wrong response | 0 | |

| | | | |
|---|--|---|--|
| KB061205 Procedure | Able to describe the steps of the experiment procedure or method correctly based on the following criteria: K1: how to set up the apparatus (at least 4 steps) K2: how to operate the control variable (any one) K3: how to operate the responding variable (any one) K4: how to operate the manipulated variable (any one) K5: precaution steps (any one) All 5K | 3 | |
| | 3 – 4 K | 2 | |
| | 2 K | 1 | |
| | 1K or wrong response / no response | 0 | |
| KBO61206 Presentatio n of data | Able to present all the data with the units correctly based on criteria: Titles and units : 1 mark <ul style="list-style-type: none"> • Manipulated variable – concentration of the sucrose solution (%) • Operating responding variable – initial mass and final mass of the mango strip (g) • Responding variable – differences in mass of the mango strip (g) Data : 1 mark <ul style="list-style-type: none"> • At least four different concentration of sucrose solution | | |

| | | | | | | |
|----|---------------------------------------|-----------------------------|-------|---|--|---|
| | Sample answer: | | | 2 | | |
| | Concentration of sucrose solution (%) | Mass of the mango strip (g) | | | | Difference in mass of the mango strip (g) |
| | | Initial | Final | | | |
| | 2 | | | | | |
| | 4 | | | | | |
| | 6 | | | | | |
| | 8 | | | | | |
| 10 | | | | | | |

Sample answer for procedure

| No | Steps | Criteria |
|----|---|------------|
| 1 | Five petri dishes is prepared and labelled A,B,C,D and E | K1 |
| 2 | A cork borer is used to obtain five cylindrical strips of mango. | K1 |
| 3 | Each mango strip is cut and weighed so that all the strips have the same mass and its initial mass is recorded. | K1, K2 |
| 4 | Each petri dish is filled with 20 ml sucrose solution of concentration 2%, 4%, 6%, 8% and 10% respectively. | K1, K2, K4 |
| 5 | One mango strip is immersed into each petri dish and leaves it for 15 minutes. | K1 |
| 6 | After 15 minutes, each mango strip is taken out and wipe it dry with a filter paper | K1, K5 |
| 7 | Electronic balance is used to weigh each mango strip and its final mass is recorded. | K1, K3 |
| 8 | Results are recorded in a table. | K1 |