

NAMA:

TINGKATAN:



**MAJLIS PENGETUA SEKOLAH MALAYSIA (MPSM)
NEGERI PERAK**

**MODUL KECEMERLANGAN
TINGKATAN 5**

SET 1

SAINS

KERTAS 2

2 JAM 30 MINIT

JANGAN BUKA MODUL INI SEHINGGA DIBERITAHU

ARAHAN:

1. Modul ini adalah dalam dwibahasa.
2. Soalan dalam bahasa Melayu mendahului soalan yang sepadan dalam bahasa Inggeris.
3. Kertas soalan ini mengandungi tiga bahagian, iaitu Bahagian A, Bahagian B dan Bahagian C.
4. Jawab semua soalan dalam Bahagian A dan Bahagian B.
5. Bagi Bahagian C, jawab Soalan 11 dan sama ada Soalan 12 atau Soalan 13.
6. Jawapan hendaklah ditulis pada ruang jawapan yang disediakan di dalam modul ini.

Untuk Kegunaan Pemeriksa			
Bahagian	Soalan	Markah Penuh	Markah Diperoleh
A	1	5	
	2	5	
	3	5	
	4	5	
B	5	6	
	6	6	
	7	6	
	8	6	
	9	7	
	10	7	
C	11	10	
	12	12	
	13	12	
Jumlah			

Kertas modul ini mengandungi 40 halaman bercetak.

Bahagian A**[20 markah]***Jawab semua soalan.*

- 1 Jadual 1 menunjukkan bacaan nadi yang diperoleh apabila seorang murid selesai melakukan tiga jenis aktiviti fizikal yang berbeza selepas 10 minit.

Table 1 shows the pulse readings obtained when a student completed three different types of physical activity after 10 minutes.

Jenis aktiviti fizikal <i>Type of physical activity</i>	Kadar denyutan nadi (bpm) <i>Pulse rate (bpm)</i>
Berehat <i>Resting</i>	78
Berjalan <i>Walking</i>	100
Berlari <i>Running</i>	140

Jadual 1

Table 1

- (a) Berdasarkan Jadual 1, nyatakan
Based on Table 1, state

- i) pemboleh ubah yang dimalarkan
constant variable

.....
[1 markah/mark]

- ii) satu pemerhatian
one observation

.....
[1 markah/mark]

- iii) sebab kepada pemerhatian anda di 1(a)(ii)
reason of your observation in 1(a)(ii)

.....
[1 markah/mark]

- (b) Nyatakan hubungan antara jenis aktiviti fizikal dengan kadar denyutan nadi.

State the relationship between the type of physical activity and pulse rate.

.....

[1 markah/mark]

- (e) Berikut merupakan satu pernyataan berkaitan dengan eksperimen tersebut.

The following is a statement related to the experiment.

Aktiviti fizikal yang lebih cergas menyebabkan kadar denyutan nadi lebih tinggi.

More vigorous physical activity causes a higher heart rate.

Berdasarkan Jadual 1, buktikan pernyataan ini.

Based on Table 1, prove this statement.

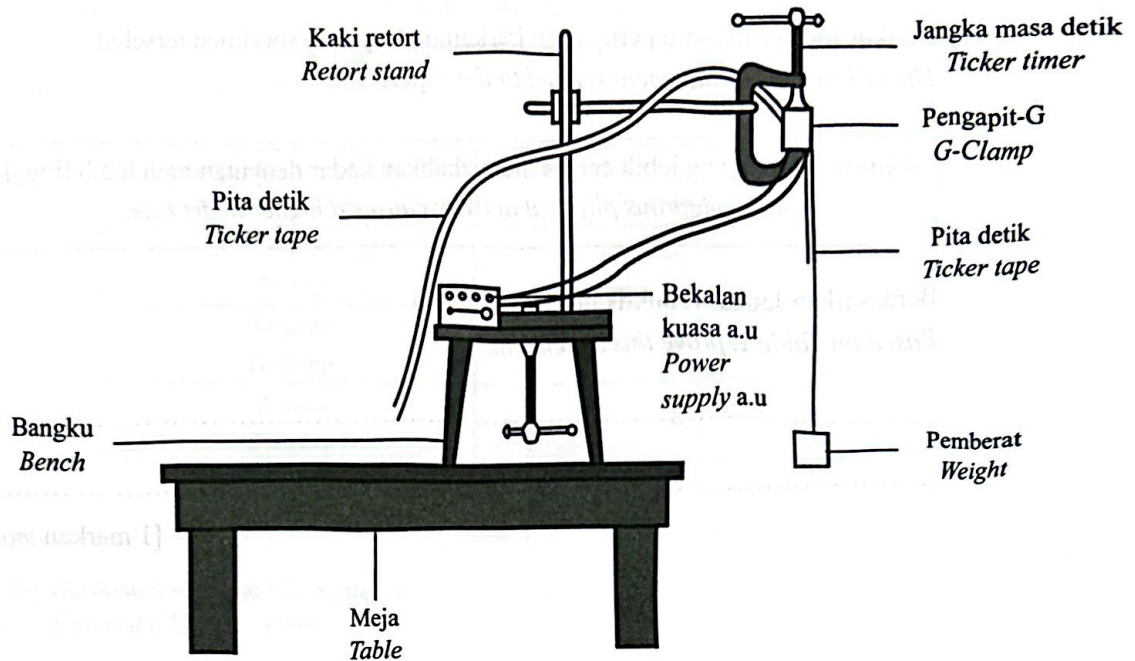
.....

.....

[1 markah/mark]

- 2 Rajah 2.1 menunjukkan susunan radas untuk menentukan pecutan graviti, g . Setiap pemberat dijatuhkan pada ketinggian 10 meter.

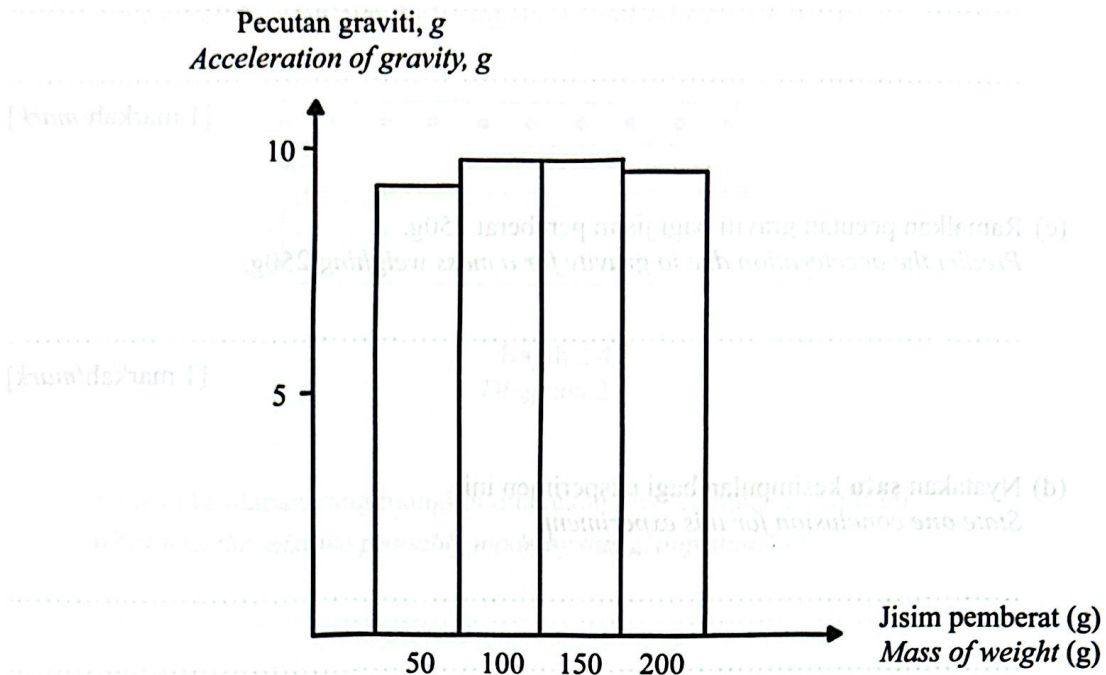
Diagram 2.1 shows the arrangement of the apparatus for determining the acceleration of gravity, g . Each weight is dropped from a height of 10 meters.



Rajah 2.1
Diagram 2.1

Keputusan eksperimen ditunjukkan dalam Rajah 2.2.

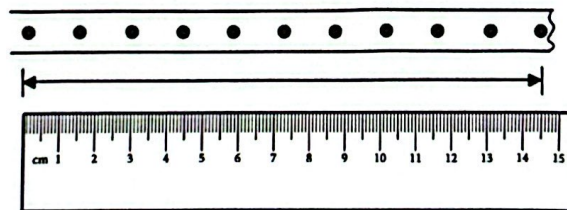
The result of the experiment is shown in Diagram 2.2.



Rajah 2.2
Diagram 2.2

- (a) Rajah 2.3 menunjukkan panjang keratan pita detik bagi 10 detik apabila pemberat 200g dilepaskan.

Diagram 2.3 shows the length of a section of ticker tape for 10 seconds when a 200g weight is released.



Rajah 2.3
Diagram 2.3

Ukur panjang pita detik tersebut.
Measure the length of ticker tape.

..... cm

[1 markah/mark]

- (b) Nyatakan **satu** cara mengawal faktor yang ditetapkan dalam eksperimen ini.
*State **one** way on how to control the fixed factors in this experiment.*

.....

.....

[1 markah/mark]

- (c) Ramalkan pecutan graviti bagi jisim pemberat 250g.
Predict the acceleration due to gravity for a mass weighing 250g.

.....

[1 markah/mark]

- (d) Nyatakan **satu** kesimpulan bagi eksperimen ini.
*State **one** conclusion for this experiment.*

.....

.....

[1 markah/mark]

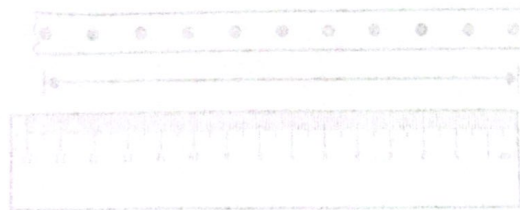
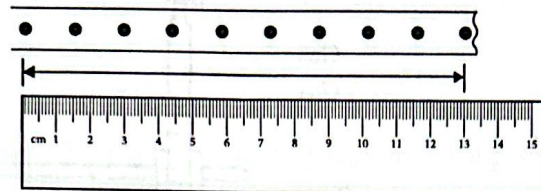


Diagram 2.3

- (e) Eksperimen ini diulang oleh sekumpulan murid yang lain. Rajah 2.4 menunjukkan panjang keratan pita detik yang diperoleh berbeza daripada Rajah 2.3.

Another group of students repeated this experiment. Diagram 2.4 shows the length of the thicker tape obtained was different from that in Diagram 2.3.



Rajah 2.4
Diagram 2.4

Apakah kesilapan yang mungkin dilakukan oleh kumpulan murid ini?

What was the mistake probably made by this group student?

.....

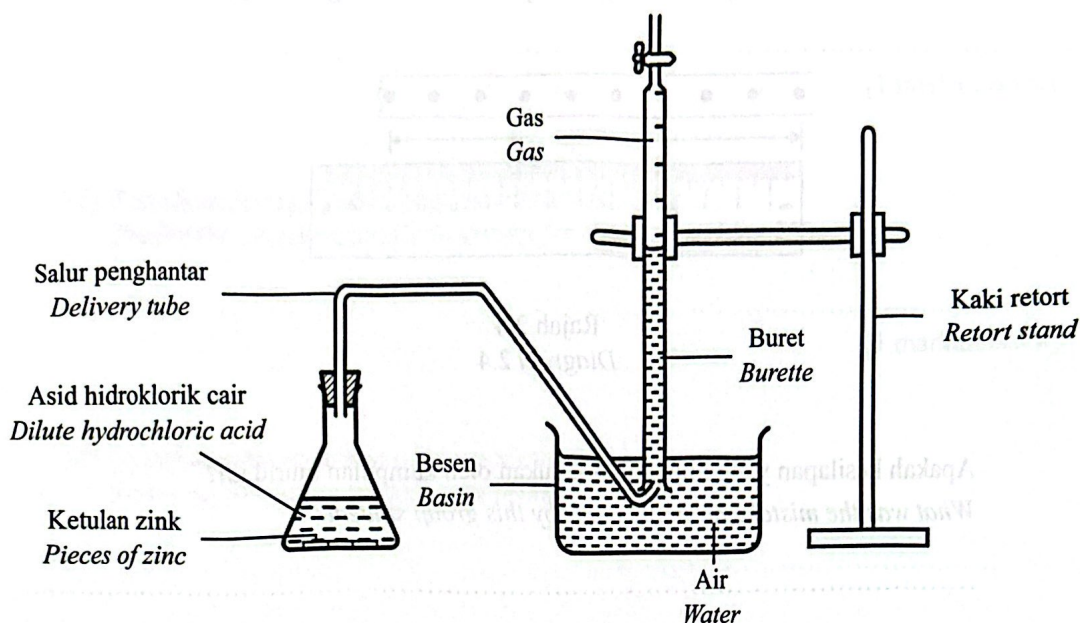
.....

[1 markah/mark]

Kesilapan Mistake	Apakah kesilapan yang mungkin dilakukan oleh kumpulan murid ini? What was the mistake probably made by this group student?	Kesilapan Mistake
.....		
.....		
.....		

- 3 Rajah 3 menunjukkan satu susunan radas bagi mengkaji faktor yang mempengaruhi kadar tindak balas.

Diagram 3 shows the apparatus set-up to study one factor that affects the rate of reaction.



Rajah 3
Diagram 3

Jadual 3 menunjukkan masa yang diambil untuk mengumpul 30.00 cm³ gas.

Table 3 shows the time taken to collect 30.00 cm³ gas.

Kehadiran mangkin <i>Presence of catalyst</i>	Jenis campuran <i>Type of mixture</i>	Masa yang diambil untuk mengumpul 30.00 cm ³ gas (s) <i>Time taken to collect 30.00 cm³ of gas (s)</i>
Tiada <i>Absence</i>	Ketulan zink + asid hidroklorik cair <i>Zink pieces + dilute hydrochloric acid</i>	160
Ada <i>Presence</i>	Ketulan zink + asid hidroklorik cair + larutan kuprum (II) sulfat <i>Zink pieces + dilute hydrochloric acid + copper (II) sulphate solution</i>	80

Jadual 3
Table 3

- (a) Berdasarkan Jadual 3, nyatakan **satu** cara mengawal pemboleh ubah bergerak balas bagi eksperimen ini.

*Based on Table 3, state **one** way on how to control the responding variable in this experiment.*

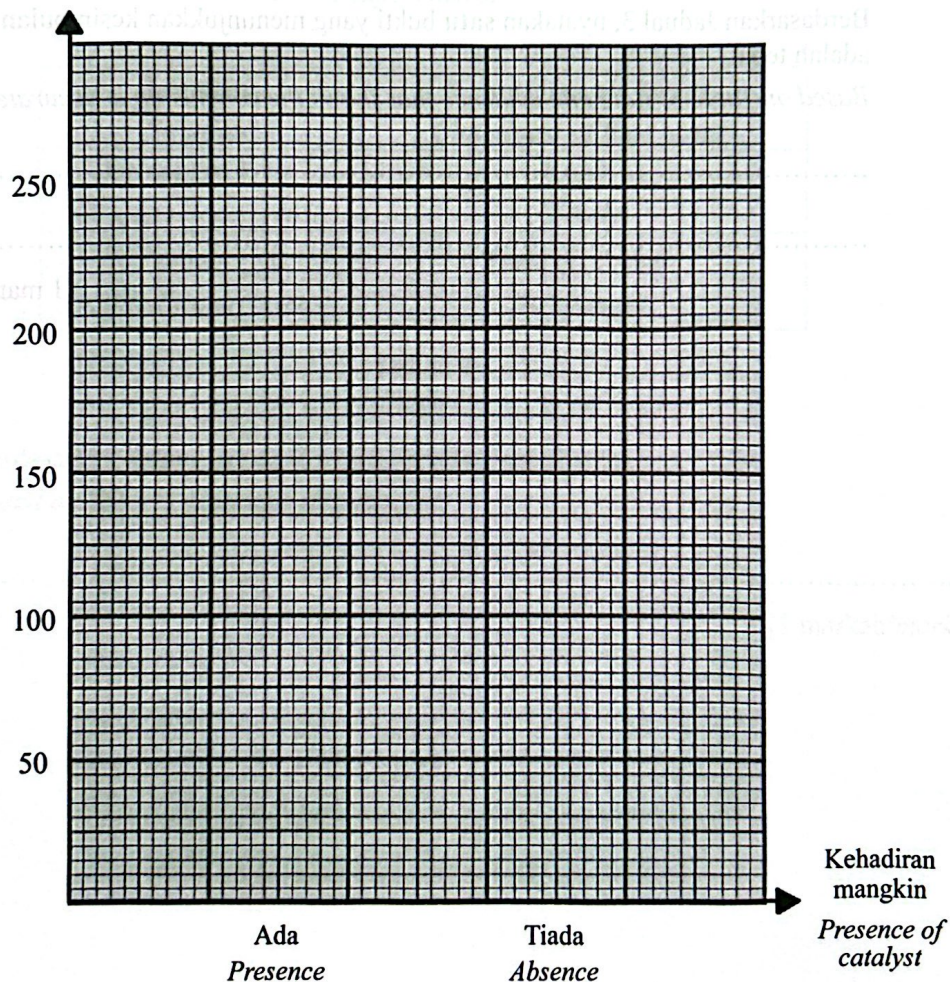
[1 markah/mark]

- (b) Berdasarkan Jadual 3, lukis carta palang bagi masa yang diambil untuk mengumpul 30.00 cm³ gas melawan kehadiran mangkin.

Based on Table 3, draw a bar chart of time taken to collect 30.00 cm³ gas against the presence of catalyst.

Masa yang diambil untuk mengumpul 30.00 cm³ gas

Time taken to collect 30.00 cm³ of gas



[2 markah/marks]

(c) Nyatakan **satu** hipotesis bagi eksperimen ini.

*State **one** hypothesis for this experiment.*

.....

.....

[1 markah/mark]

(d) Pernyataan berikut menunjukkan kesimpulan bagi eksperimen itu.

The following statement shows a conclusion for the experiment.

Kehadiran mangkin meningkatkan kadar tindak balas.

The presence of catalyst increases the rate of reaction.

Berdasarkan Jadual 3, nyatakan **satu** bukti yang menunjukkan kesimpulan tersebut adalah tepat.

*Based on Table 3, state **one** evidence that shows the conclusion is accurate.*

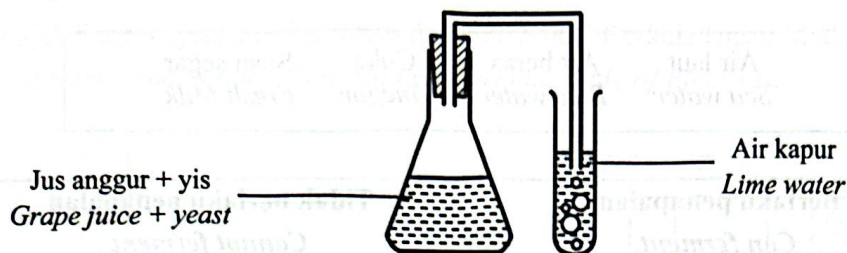
.....

.....

[1 markah/mark]

4 Rajah 4.1 menunjukkan satu eksperimen bagi proses penapaian.

Diagram 4.1 shows an experiment for fermentation process.



Rajah 4.1
Diagram 4.1

Jadual 4 menunjukkan keputusan bagi kedua-dua eksperimen.

Table 4 shows the results of two experiments.

Larutan Solution	Kekeruhan air kapur Cloudiness of lime water
Jus anggur + yis Grapes juice + yeast	Keruh Cloudy
Air suling + yis Distilled water + yeast	Tiada perubahan No changes

Jadual 4
Table 4

(a) Berdasarkan dalam Jadual 4, nyatakan satu pemerhatian.

Based on Table 4, state one observation.

.....
[1 markah/mark]

- (b) Kelaskan larutan di bawah kepada yang boleh berlaku penapaian dan yang tidak boleh berlaku penapaian.

Classify the solutions below into those that can ferment and those that cannot ferment.

Air laut Sea water	Air beras Rice water	Cuka Vinegar	Susu segar Fresh Milk
-----------------------	-------------------------	-----------------	--------------------------

Berlaku penapaian <i>Can ferment</i>	Tidak berlaku penapaian <i>Cannot ferment</i>

[2 markah/marks]

- (c) Berdasarkan Jadual 4, nyatakan definisi secara operasi bagi penapaian dari aspek apa yang diperhatikan dan dilakukan.

Based on Table 4, state operational definition for fermentation from the aspect of what is observed and what is done.

.....

.....

.....

[1 markah/mark]

- (d) Nyatakan satu langkah berjaga-jaga yang boleh diambil untuk mendapatkan data yang lebih tepat.

State one precaution step that can be taken to obtain more accurate data.

.....

[1 markah/mark]

[38 markah]

Bahagian B
[38 markah]

- 5 Rajah 5 menunjukkan sebahagian daripada Jadual Berkala Unsur Moden.**

Diagram 5 shows part of the Modern Periodic Table of Elements.

[illegible]

Rajah 5
Diagram 5

P, Q, R, S, T dan U ialah huruf-huruf yang digunakan bagi mewakili unsur dalam Jadual Berkala Unsur Moden.

P, Q, R, S, T and U are the letters used to represent elements in the Modern Periodic Table of Elements.

- (a) Nyatakan bagaimana unsur-unsur dalam Jadual Berkala Unsur Moden disusun?

State how elements in the Modern Periodic Table of Elements?

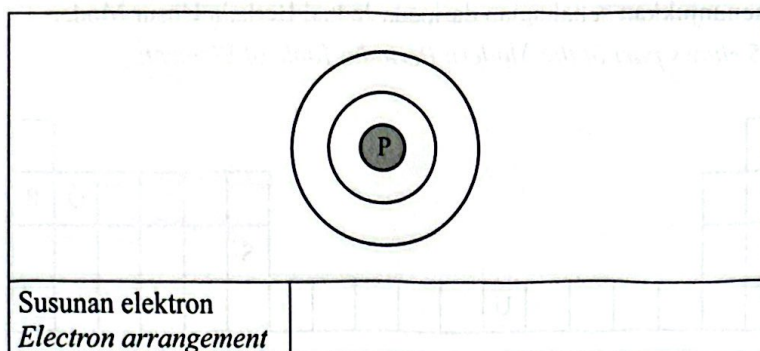
[1 markah/*mark*]

- (b) Nyatakan unsur-unsur yang berada dalam kumpulan yang sama.

State the elements which are located in the same group.

[1 markah/mark]

- (c) Lukis dan nyatakan susunan elektron bagi atom P.
Draw and state electron arrangement for atom P.



[2 markah/marks]

- (d) Berdasarkan Rajah 5, nyatakan dua perbezaan ciri antara unsur P dan R.
Based on Diagram 5, state two differences in characteristics between element P and R.

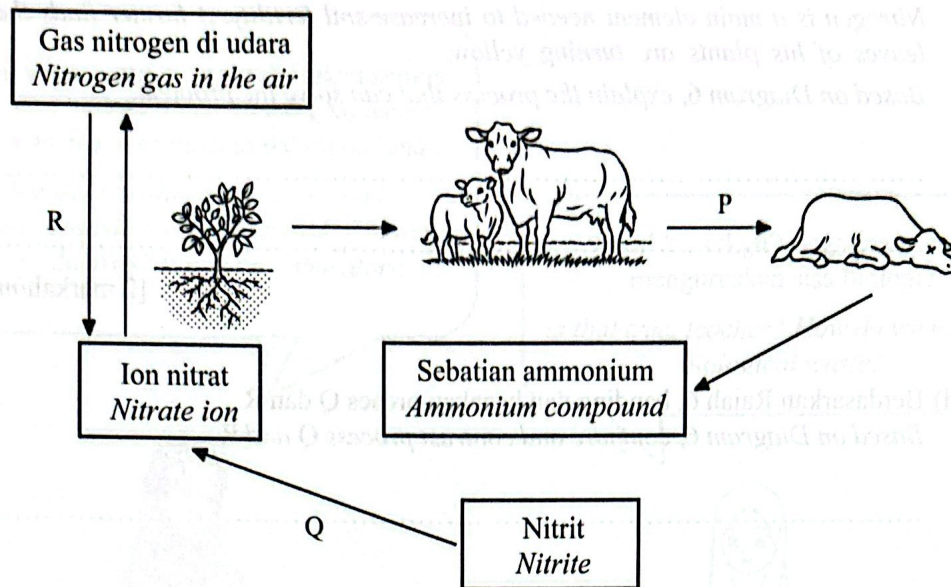
.....

.....

[2 markah/marks]

6 Rajah 6 menunjukkan kitar nitrogen.

Diagram 6 shows nitrogen cycle.



Rajah 6
Diagram 6

(a) Nyatakan **satu** mikroorganisma yang terlibat dalam kitar nitrogen.

State **one** microorganism that involved in nitrogen cycle.

.....
[1 markah/mark]

(b) Kitar nitrogen membantu mengekalkan keseimbangan gas nitrogen di dalam udara.

Berdasarkan Rajah 6, nyatakan proses P.

The nitrogen cycle helps to maintain nitrogen gas balance in the air.

Based on Diagram 6, state the process of P.

.....
[1 markah/mark]

- (c) Nitrogen merupakan unsur utama yang diperlukan untuk meningkatkan kesuburan tanah. Seorang petani mendapati daun tanamannya menjadi kekuningan. Berdasarkan Rajah 6, terangkan proses yang dapat mengatasi masalah tersebut.

Nitrogen is a main element needed to increase soil fertility. A farmer finds that the leaves of his plants are turning yellow.

Based on Diagram 6, explain the process that can solve the problem.

.....

.....

[2 markah/marks]

- (d) Berdasarkan Rajah 6, banding dan bezakan proses Q dan R.

Based on Diagram 6, compare and contrast process Q and R.

.....

.....

[2 markah/marks]

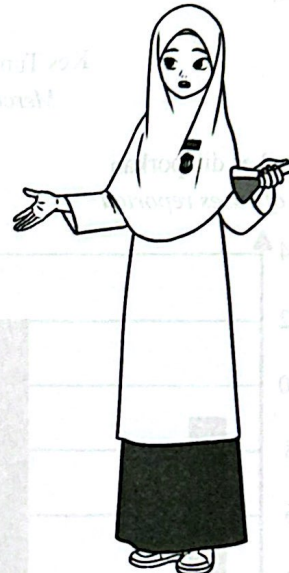
- 7 Rajah 7 menunjukkan perbualan antara seorang guru dengan murid dalam makmal sains.
Diagram 7 shows a conversation between a teacher with a student in a science laboratory.

Apakah yang kamu buang itu? Bukan semua bahan sisa biologi boleh dibuang ke dalam singki atau bakul sampah di dalam makmal.

What did you throw away? Not all biological waste can be disposed of in the sink or the trash bin in the laboratory.

Betul ke, cikgu? Bagaimana cara menguruskan sisa biologi?

Is that true, teacher? How do we manage biological waste?



Rajah 7
Diagram 7

- (a) Nyatakan satu contoh bahan sisa biologi.
State one example of biological waste.

[1 markah/mark]

- (b) Seorang murid telah selesai menjalankan eksperimen yang melibatkan pembedahan seekor katak.

Nyatakan **dua** langkah yang perlu dilakukan untuk menguruskan katak itu.

A student has completed an experiment involving surgery on a frog.

State two steps that need to be taken to manage the frog.

.....

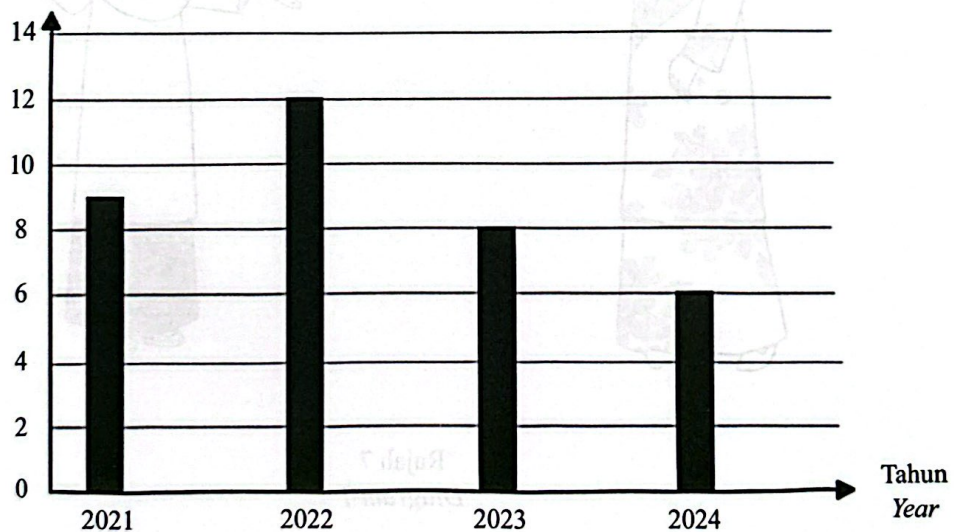
[2 markah/marks]

- (c) Graf menunjukkan data kes tumpahan merkuri di makmal sekolah dari tahun 2021 hingga 2024.

The graph shows data on mercury spill cases in school laboratories from 2021 to 2024.

Kes Tumpahan Merkuri di Sekolah Menengah
Mercury Spill Case at Secondary School

Bilangan kes dilaporkan
Number of cases reported



Terangkan pola bilangan kes tumpahan merkuri dilaporkan untuk tiga tahun terakhir.
Explain the pattern of reported mercury spill cases over the past three years.

.....

[2 markah/marks]

- (d) Seorang murid membersihkan matanya menggunakan air yang banyak setelah terkena bahan kimia.

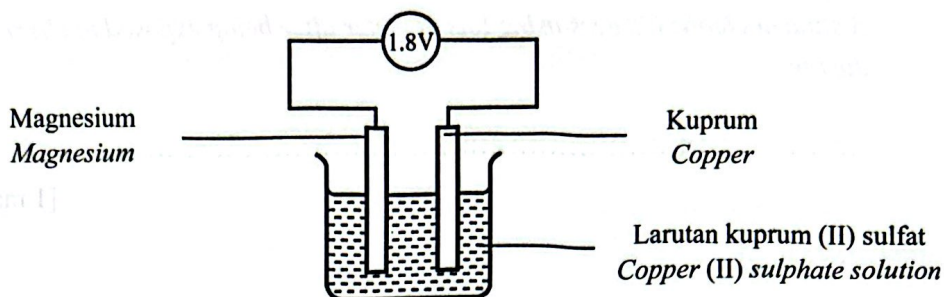
Wajarkan.

A student cleans his eyes using lots of water after being exposed to chemicals.

Justify.

[1 markah/mark]

- 8 Rajah 8.1 menunjukkan susunan radas bagi satu sel elektrokimia.
 Diagram 8.1 shows the apparatus set-up of an electrochemical cell.



Rajah 8.1
 Diagram 8.1

- (a) Nyatakan **satu** contoh sel elektrokimia.
 State **one** example of electrochemical cell.

.....

[1 markah/mark]

- (b) Seorang murid ingin menghasilkan sel elektrokimia seperti Rajah 8.1 dengan menggunakan bahan yang ada di rumahnya. Nyatakan **satu** bahan lain yang boleh menggantikan larutan kuprum (II) sulfat. Terangkan jawapan anda.
 A student wants to produce an electrochemical cell as in Diagram 8.1 by using materials available at home. State **one** other substance that may replace the copper (II) sulphate solution. Explain your answer.

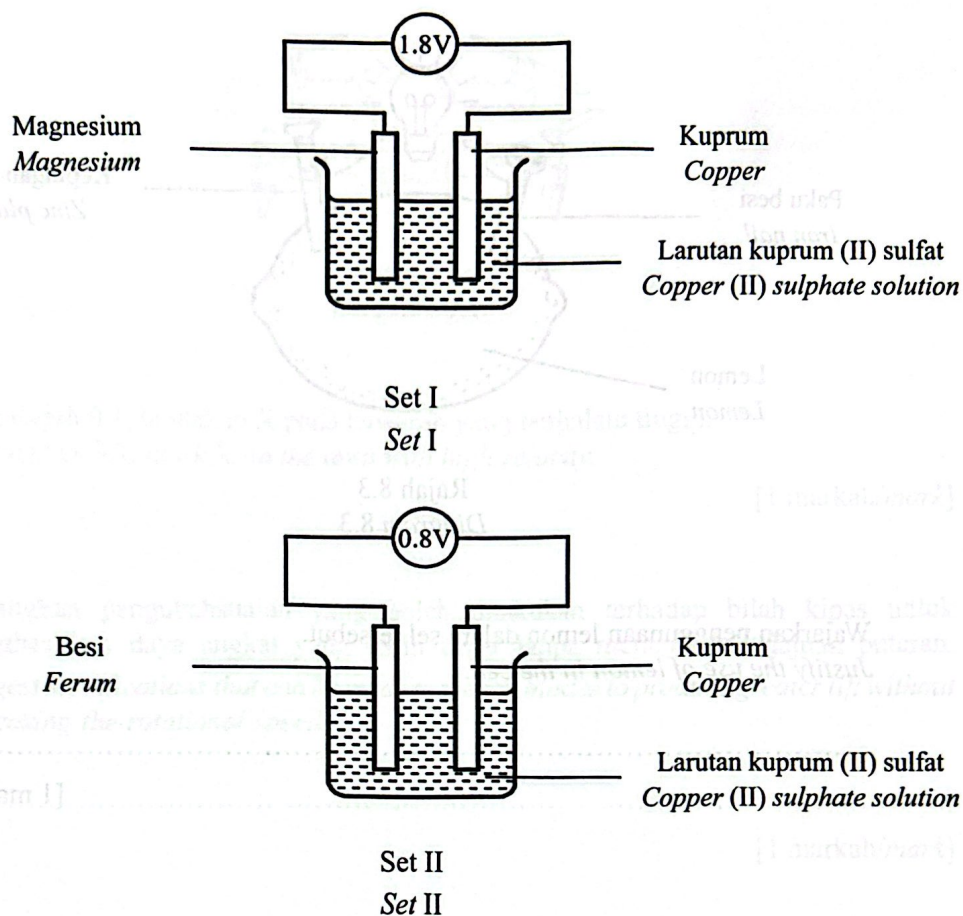
.....

.....

[2 markah/marks]

(c) Rajah 8.2 menunjukkan susunan radas apabila eksperimen diulang.

Diagram 8.2 shows the apparatus set-up when the experiment is repeated.



Rajah 8.2
Diagram 8.2

Berdasarkan Rajah 8.2,
Based on Diagram 8.2,

Banding dan bezakan Set I dan Set II dari segi bacaan voltan dan jarak pasangan logam.

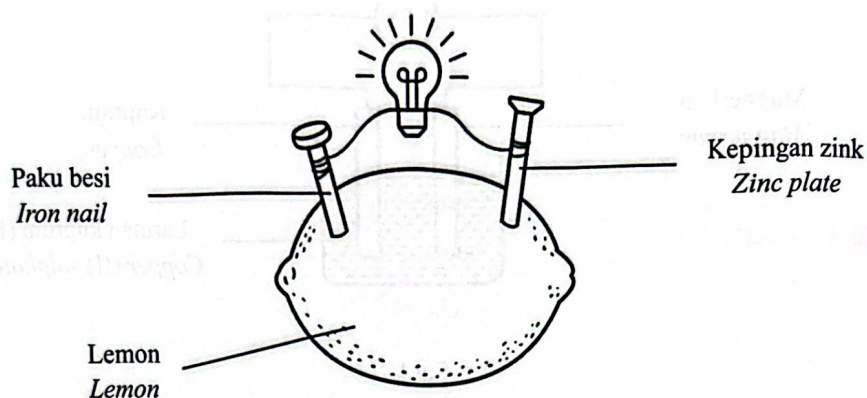
Compare and contrast Set I and Set II in terms of voltage readings and the distance of the metal pairs.

.....

.....

[2 markah/marks]

- (d) Rajah 8.3 menunjukkan satu sel kimia ringkas yang dibina oleh seorang murid.
 Diagram 8.3 shows a simple chemical cell built by a student.

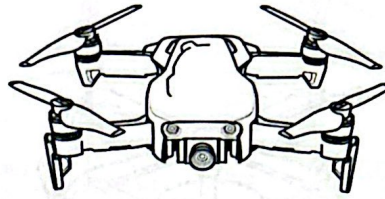


Rajah 8.3
 Diagram 8.3

Wajarkan penggunaan lemon dalam sel tersebut.
 Justify the use of lemon in the cell.

[1 markah/mark]

- 9 Rajah 9.1 menunjukkan sebuah alat yang sedang dinaikkan ke udara.
Diagram 9.1 shows a device being lifted into the air.



Rajah 9.1
 Diagram 9.1

- (a) Pada Rajah 9.1, tandakan X pada kawasan yang berhalaju tinggi.
In Diagram 9.1, mark X on the area with high velocity.

[1 markah/mark]

- (b) Cadangkan pengubahsuaian yang boleh dilakukan terhadap bilah kipas untuk menghasilkan daya angkat yang lebih besar tanpa menambah kelajuan putaran.
Suggest modifications that can be made to the fan blades to produce greater lift without increasing the rotational speed.

[1 markah/mark]

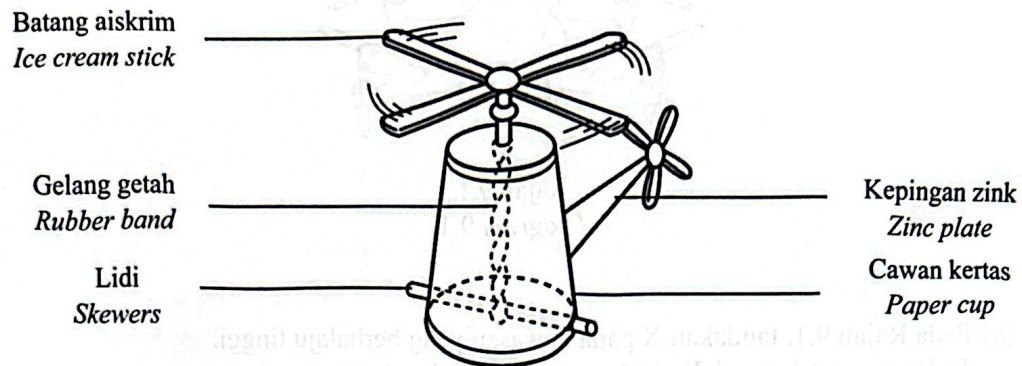
- (c) Penggunaan dron dalam sektor pertanian di Malaysia semakin meningkat.
 Nyatakan **dua** kelebihan penggunaan alat tersebut.

The use of drones in the agricultural sector in Malaysia is increasing.
State two advantages of using the device.

[2 markah/marks]

- (d) Rajah 9.2 menunjukkan sebuah model helikopter yang dihasilkan bagi satu pertandingan STEM sekolah.

Diagram 9.2 shows a helicopter model produced for school's STEM competition.



Rajah 9.2
Diagram 9.2

- (i) Terangkan bagaimanakah model ini berfungsi?
Explain how this model functions?

1.
2.

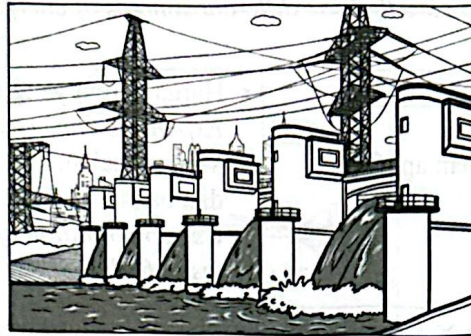
[2 markah/marks]

- (ii) Cadangkan **satu** peralatan dalam kehidupan harian yang menggunakan prinsip yang sama seperti model di atas.
*Suggest **one** equipment in daily life that uses the same principle as the model above.*

.....

[1 markah/mark]

- 10 Rajah 10.1 menunjukkan satu contoh sumber tenaga dalam sektor tenaga.
Diagram 10.1 shows an example of an energy source in the energy sector.



Rajah 10.1
 Diagram 10.1

- (a) Nyatakan sumber tenaga yang digunakan dalam Rajah 10.1.
State the source of energy used in Diagram 10.1.

.....
 [1 markah/mark]

- (b) Jadual 5.1 menunjukkan bil elektrik bagi rumah Encik Ahmad untuk tempoh tiga bulan.
Table 5.1 shows the electricity bill for Mr. Ahmad's house for a period of three months.

Januari <i>January</i>	Februari <i>February</i>	Mac <i>March</i>
RM 100	RM 150	RM 185

Jadual 5.1
 Table 5.1

Berdasarkan Jadual 5.1, cadangkan satu tindakan yang boleh dilakukan oleh beliau untuk mengurangkan bil bulanannya.

Based on Table 5.1, suggest one action he can take to reduce his monthly bill.

.....
 [1 markah/mark]

- (c) Jadual 5.2 menunjukkan dua buah kereta yang menggunakan sumber tenaga yang berbeza.

Table 5.2 shows two cars that use different sources of energy.

• Harga yang murah <i>Cheap price</i> • Menggunakan bahan api fosil <i>Use fossil fuels</i>	• Harga kereta yang mahal <i>Expensive car price</i> • Menggunakan kombinasi bateri dan bahan api fosil <i>Use combination of battery and fossil fuels</i>
Kereta X <i>Car X</i>	Kereta Y <i>Car Y</i>

Jadual 5.2

Table 5.2

Berdasarkan Jadual 5.2, pilih kereta yang paling sesuai untuk mengurangkan pencemaran alam sekitar.

Jelaskan.

Based on Table 5.2, choose the car that is most suitable for reducing environmental pollution.

Explain.

.....

.....

[2 markah/mark]

- (d) Rajah 10.3 menunjukkan bahan yang dibekalkan kepada setiap kumpulan dalam satu pertandingan inovasi Teknologi Hijau.

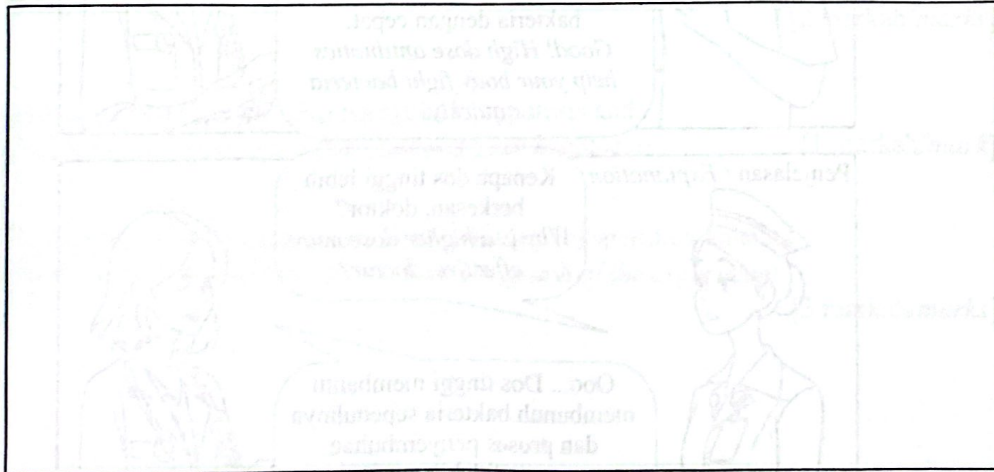
Diagram 10.3 shows the materials given to each group in a Green Technology innovation competition.

				
Paku tekan <i>Thumbtack</i>	Plastisin <i>Plasticine</i>	Gunting <i>Scissor</i>	Batang aiskrim <i>Ice cream sticks</i>	Kotak minuman <i>Drink box</i>

Rajah 10.3
Diagram 10.3

Berdasarkan Rajah 10.3, lakarkan dan label model kincir angin anda dalam ruangan yang disediakan serta terangkan fungsi model.

Based on Diagram 10.3, sketch and label your windmill model in the space provided and explain the function of the model.



Penerangan:
Explanation:

.....

.....

[3 markah/marks]

Bahagian C

[22 markah]

Jawab Soalan 11 dan sama ada Soalan 12 atau Soalan 13.

- 11 Rajah 11 menunjukkan perbualan antara dua orang pesakit dengan seorang doktor.
 Diagram 11 shows the conversation between two patients with a doctor.



Rajah 11
 Diagram 11

Berdasarkan perbualan dalam Rajah 11, rancang satu eksperimen dalam makmal dengan menggunakan larutan kultur bakteria *Bacillus* sp., agar-agar nutrien steril dan tiga ceper penisilin dengan kepekatan 10%, 20% dan 30% serta radas yang lain.

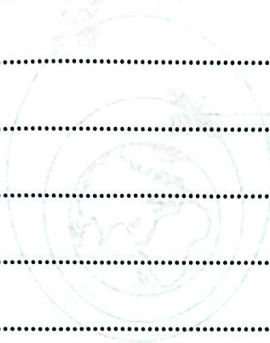
Perancangan anda perlu mengandungi aspek-aspek berikut:

Based on the conversation in Diagram 11, plan one experiment in the laboratory by using Bacillus sp. culture solution, sterile nutrient agar and three penicillin discs with concentration of 10%, 20% and 30% and other materials.

Your plan must contain the following aspects:

- (a) Pernyataan masalah
Problem statement [1 markah/mark]
- (b) Hipotesis
Hypothesis [1 markah/mark]
- (c) (i) Pemboleh ubah dimanipulasikan
Manipulated variable
(ii) Pemboleh ubah bergerak balas
Responding variable [2 markah/marks]
- (d) Lakaran susunan bahan dan radas yang berlabel
Sketching of the labelled materials and apparatus arrangement [2 markah/marks]
- (e) Jangkaan pemerhatian yang menyokong hipotesis anda
Prediction of observation that supports your hypothesis [1 markah/mark]
- (f) Tiga aspek yang diperlukan untuk melukis graf eksperimen tersebut
Three aspects that are needed to draw the graph of the experiment [3 markah/marks]

Blank handwriting practice paper with horizontal lines.



12 Satelit merupakan objek yang mengorbit Bumi.

A satellite is an object which orbits Earth.

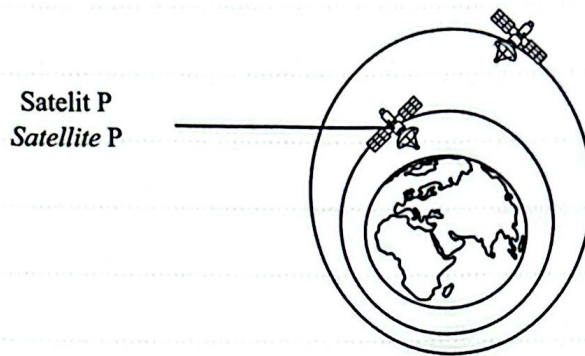
(a) Namakan dua jenis orbit satelit.

Name two types of satellite orbits.

[2 markah/marks]

(b) Rajah 12.1 menunjukkan dua satelit mengorbit Bumi pada ketinggian berbeza.

Diagram 12.1 shows two satellites orbiting Earth at different altitudes.



Rajah 12.1
Diagram 12.1

Nyatakan halaju bagi satelit P.

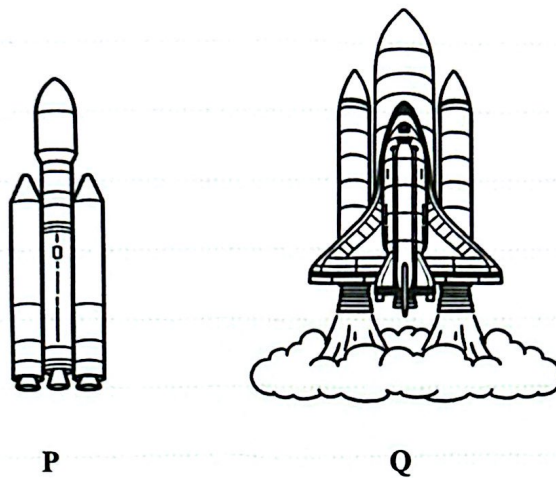
Jelaskan.

State the speeds for satellites P.

Explain.

[2 markah/marks]

- (c) Rajah 12.2 menunjukkan dua jenis kenderaan pelancar angkasa.
Diagram 12.2 shows two types of space launch vehicles.



Rajah 12.2
 Diagram 12.2

Banding bezakan kenderaan pelancar angkasa P dan Q.
 Nyatakan **satu** kesan perkembangan pesat dalam teknologi angkasa lepas.
Compare and contrast space launch vehicles P and Q.
*State **one** impact of rapid development in space technology.*

[4 markah/marks]

- (d) Sistem Penentu Sejagat (GPS) digunakan dalam kehidupan harian secara meluas.
 Wajarkan kegunaan dan kepentingan GPS.
Global Positioning System (GPS) is widely used in daily life.
Justify the uses and importances of GPS.

[4 markah/marks]

[Lihat halaman sebelah
 SULIT]

JAWAPAN SOALAN 12:

1.1. Bahan-bahan yang digunakan dalam pembuatan obat adalah bahan-bahan yang bersifat aktif, inaktif, dan adjuvan. Bahan-bahan tersebut dapat berasal dari alam, sintesis, atau kombinasi keduanya.

1.2. Bahan-bahan tersebut dapat dikelompokkan menjadi beberapa golongan, yaitu bahan aktif, bahan inaktif, dan adjuvan. Bahan aktif adalah bahan yang memiliki efek farmakologi, sedangkan bahan inaktif dan adjuvan adalah bahan yang tidak memiliki efek farmakologi.

1.3. Bahan-bahan tersebut dapat dikelompokkan menjadi beberapa golongan, yaitu bahan aktif, bahan inaktif, dan adjuvan. Bahan aktif adalah bahan yang memiliki efek farmakologi, sedangkan bahan inaktif dan adjuvan adalah bahan yang tidak memiliki efek farmakologi.

1.4. Bahan-bahan tersebut dapat dikelompokkan menjadi beberapa golongan, yaitu bahan aktif, bahan inaktif, dan adjuvan. Bahan aktif adalah bahan yang memiliki efek farmakologi, sedangkan bahan inaktif dan adjuvan adalah bahan yang tidak memiliki efek farmakologi.

1.5. Bahan-bahan tersebut dapat dikelompokkan menjadi beberapa golongan, yaitu bahan aktif, bahan inaktif, dan adjuvan. Bahan aktif adalah bahan yang memiliki efek farmakologi, sedangkan bahan inaktif dan adjuvan adalah bahan yang tidak memiliki efek farmakologi.

1.6. Bahan-bahan tersebut dapat dikelompokkan menjadi beberapa golongan, yaitu bahan aktif, bahan inaktif, dan adjuvan. Bahan aktif adalah bahan yang memiliki efek farmakologi, sedangkan bahan inaktif dan adjuvan adalah bahan yang tidak memiliki efek farmakologi.

1.7. Bahan-bahan tersebut dapat dikelompokkan menjadi beberapa golongan, yaitu bahan aktif, bahan inaktif, dan adjuvan. Bahan aktif adalah bahan yang memiliki efek farmakologi, sedangkan bahan inaktif dan adjuvan adalah bahan yang tidak memiliki efek farmakologi.

1.8. Bahan-bahan tersebut dapat dikelompokkan menjadi beberapa golongan, yaitu bahan aktif, bahan inaktif, dan adjuvan. Bahan aktif adalah bahan yang memiliki efek farmakologi, sedangkan bahan inaktif dan adjuvan adalah bahan yang tidak memiliki efek farmakologi.

- 13 Bahan antioksidan dapat menghalang tindakan radikal bebas terhadap tubuh badan manusia dan boleh didapati dalam pelbagai sumber.

Antioxidant substances can prevent the action of free radicals on the human body and can be found in various sources.

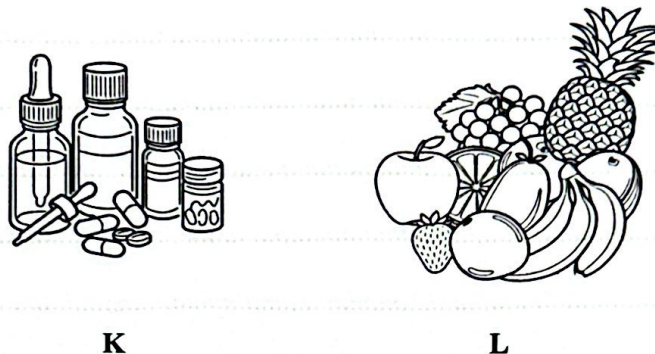
- (a) Nyatakan **dua** contoh bahan antioksidan.

State two examples of antioxidant substances.

[2 markah/marks]

- (b) Rajah 13 menunjukkan sumber bahan dan makanan yang mengandungi bahan antioksidan.

Diagram 13 shows sources of substances and food that contain antioxidant.



Rajah 13
Diagram 13

Berdasarkan Rajah 13,
Based on Diagram 13,

- (i) Nyatakan **dua** bentuk bahan K yang boleh didapati di pasaran.

State two forms of substances K that are available in the market.

[2 markah/marks]

- (ii) Huraikan empat kebaikan makanan L berbanding bahan K dari aspek:
Describe four advantages of food L compared to substances K in terms of:

- Harga
Price
- Dos pengambilan
Intake dosage
- Jangka hayat
Shelf life
- Ruang penyimpanan
Storage space

[4 markah/marks]

- (iii) Seorang wanita memilih untuk membeli suatu produk daripada bahan K yang tidak mengandungi bahan kimia tambahan, iaitu pemanis.
Wajarkan tindakan wanita tersebut terhadap kesihatannya.

A woman chooses to buy a product from substances K which does not contains added chemicals such as sweeteners.

Justify the woman's action in terms of her health.

[4 markah/marks]

JAWAPAN SOALAN 13:

1. What is the purpose of the study?

2. What are the research objectives?

3. What is the research methodology?

4. What are the results of the study?

5. What are the conclusions of the study?

6. What are the limitations of the study?

7. What are the implications of the study?

8. What are the future research directions?

9. What are the contributions of the study?

10. What are the key findings of the study?

11. What are the main results of the study?

12. What are the primary outcomes of the study?

13. What are the secondary outcomes of the study?

14. What are the tertiary outcomes of the study?

15. What are the quaternary outcomes of the study?

16. What are the quinary outcomes of the study?

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