KEMENTERIAN
PENDIDIKAN
MALAYSIA
Jabatan Pendidikan Negeri Terengganu

MENDEPANI PENDIDIKAN GLOBAL

MODUL
PERKEMBANGAN PEMBELAJARAN
SPM 2021

MPP 3

SAINS
KERTAS 2

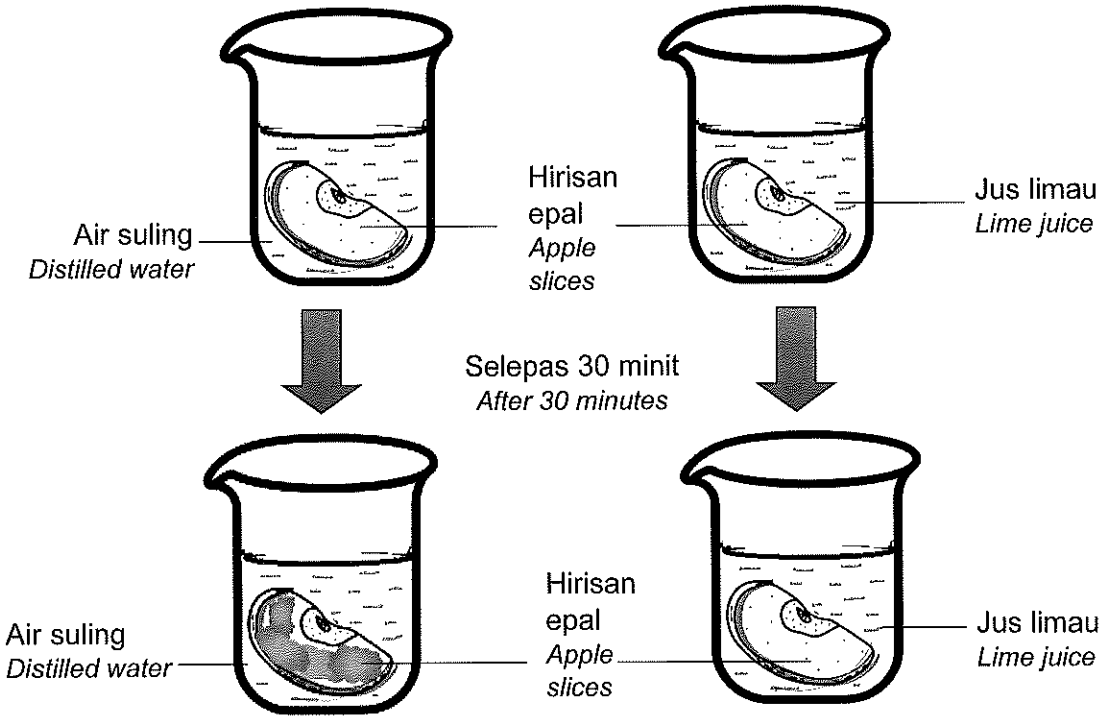
Nama :.....

Kelas :.....

DISEDIAKAN OLEH PANEL AKRAM NEGERI TERENGGANU

BAHAGIAN A
SECTION A
[20 markah/*marks*]
Jawab **semua** soalan
*Answer **all** question*

1 Rajah 1 menunjukkan eksperimen untuk mengkaji pengoksidaan hirisan buah epal dengan menggunakan larutan yang berbeza.
Diagram 1 shows an experiment to study the oxidation of apple slices using different solutions.



Rajah 1/*Diagram 1*

Keputusan eksperimen dicatatkan pada Jadual 1.
The results of the experiment are recorded in Table 1.

Jenis larutan ***Type of solution***	**Warna hirisan epal diawal eksperimen** ***Colour of apple slices at the beginning of experiment***	**Warna hirisan epal selepas 30 minit** ***Colour of apple slices after 30 minutes***
Air suling *Distilled Water*	Putih *White*	.....
Jus limau *Lime juice*	Putih *White*	Putih *White*

Jadual 1/*Table 1*

(a) Berdasarkan Rajah 1, tulis pemerhatian anda dalam Jadual 1.
Based on Diagram 1, write your observation in Table 1.

[1 *markah/mark*]

(b) Nyatakan **satu** inferens dari pemerhatian di Jadual 1.
*State **one** inference from the observations in Table 1.*

.....
[1 *markah/mark*]

(c) Apakah faktor yang ditetapkan dalam eksperimen ini?
What is the factor being fixed in this experiment?

.....
[1 *markah/mark*]

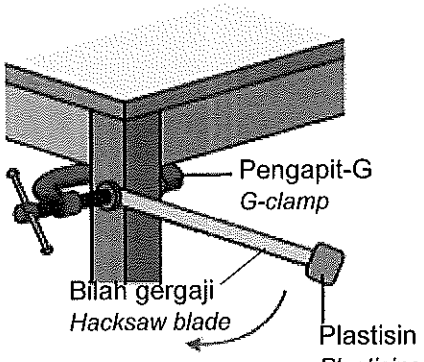
(d) Perubahan warna pada hirisan epal disebabkan oleh pengoksidaan.
Nyatakan definisi secara operasi bagi pengoksidaan.
The color change on apple slices is due to oxidation.
State the operational definition for oxidation.

.....
[1 *markah/mark*]

(e) Mengapa pengambilan vitamin C digalakkan dalam menu harian terutama pada tempoh pandemik covid 19?
Why is vitamin C intake recommended in the daily menu especially during the covid 19 pandemic period?

.....
[1 *markah/mark*]

2 Rajah 2 menunjukkan satu eksperimen untuk mengkaji hubungan antara jisim dengan inersia.
Diagram 2 shows an experiment to study the relationship between mass and inertia.



Rajah 2/*Diagram 2*

Keputusan yang diperolehi direkodkan di dalam Jadual 2.
The results obtained are recorded in Table 2.

Jisim Plastisin (g) *Mass of plasticine (g)*	30	40	50	60	70
Masa untuk 10 ayunan (s) *Time for 10 oscillations (s)*	4.0	4.8	5.5	6.2	6.6

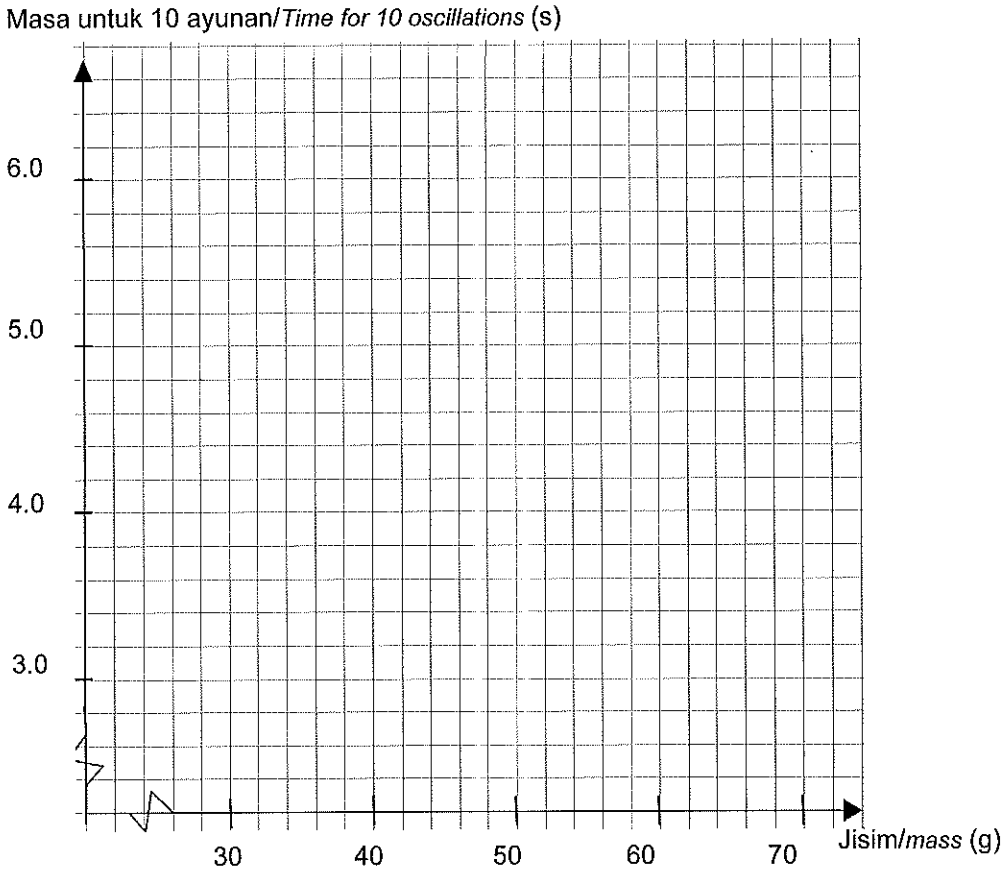
Jadual 2/*Table 2*

(a) Apakah faktor yang diubah dalam eksperimen ini?
What is the factor being changed in this experiment?

.....

[1 *markah/mark*]

(b) Berdasarkan data dalam Jadual 2, lukis graf masa untuk 10 ayunan melawan jisim.
Based on the data in Table 2, draw a graph of time for 10 oscillations against mass.



[2 *markah/marks*]

(c) Berdasarkan graf, ramalkan masa untuk 10 ayunan jika jisim plastisin bertambah menjadi 80g.
Based on the graph, predict the time for 10 oscillations if the mass of plasticine increases to 80g.

.....

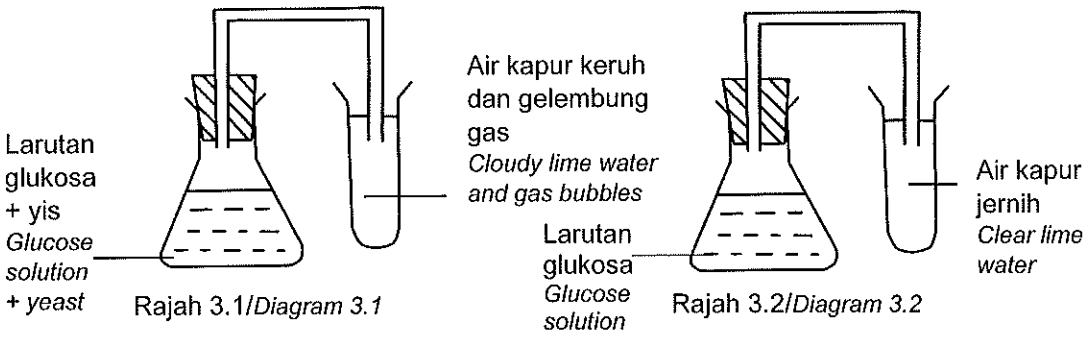
[1 *markah/mark*]

(d) Mengapa lori treler memerlukan lebih masa untuk berhenti berbanding kereta apabila kedua-dua pemandu kenderaan ini menekan brek dengan mengejut pada kelajuan yang sama?
Why does a trailer truck need more time to stop than a car when both drivers of these vehicles hit the brakes suddenly at the same speed?

.....

[1 *markah/mark*]

3 Rajah 3.1 dan Rajah 3.2 menunjukkan susunan radas bagi eksperimen untuk mengkaji proses penapaian.
Diagram 3.1 and Diagram 3.2 show the apparatus set-up for an experiment to study the fermentation process.



Rajah 3.1/*Diagram 3.1* Rajah 3.2/*Diagram 3.2*

(a) Nyatakan **satu** inferens berdasarkan pemerhatian anda pada Rajah 3.1
*State **one** inference based on your observation in Diagram 3.1*

.....

[1 *markah/mark*]

(b) Apakah faktor yang diubah dalam eksperimen ini?
What is the factor being changed in this experiment?

.....

[1 *markah/mark*]

(c) Ramalkan apa yang berlaku jika bahan dalam Rajah 3.1 dipanaskan sebelum eksperimen.
Predict what happens if the substance in Diagram 3.1 is heated before the experiment.

.....

[1 *markah/mark*]

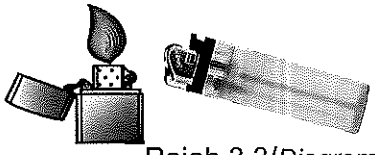
(d) Berdasarkan eksperimen ini, nyatakan definisi secara operasi bagi yis.
Based on this experiment, state the operational definition for yeast.

.....

.....

[1 *markah/mark*]

(e) Rajah 3.3 menunjukkan satu kegunaan alkohol.
Diagram 3.3 shows one use of alcohol.



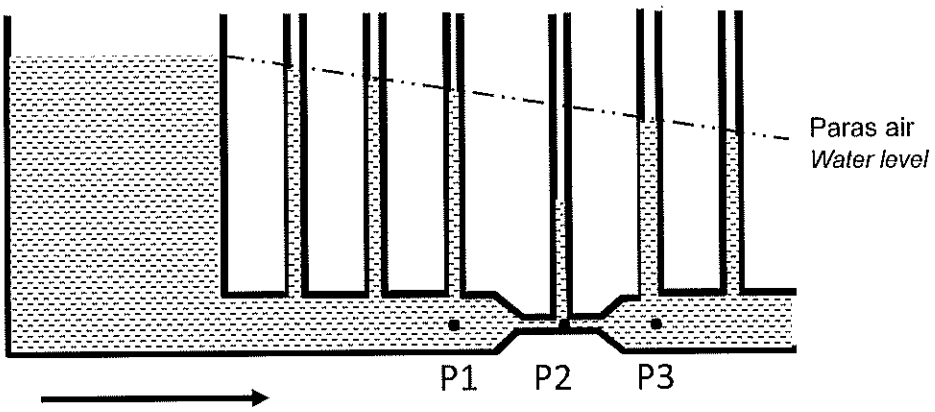
Rajah 3.3/*Diagram 3.3*

Mengapakah alkohol digunakan dalam alat di atas?
Why is alcohol used in the above device?

.....

[1 *markah/mark*]

4 Rajah 4.1 menunjukkan aras air yang dihasilkan pada Tiub Venturi.
Diagram 4.1 shows the water level produced in Venturi Tube.



Rajah 4.1/*Diagram 4.1*

(a) Nyatakan **satu** pemerhatian berdasarkan eksperimen dalam Rajah 4.1
*State **one** observation based on the experiment in Diagram 4.1*

.....
[1 *markah/mark*]

(b) Tuliskan **satu** inferens bagi pemerhatian pada 4(a).
*Write **one** inference for the observation in 4(a).*

.....
[1 *markah/mark*]

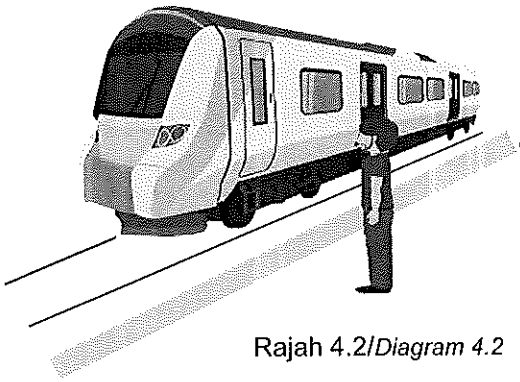
(c) Apakah pemboleh ubah bergerak balas dalam eksperimen di atas?
What is the responding variable in the experiment above?

.....
[1 *markah/mark*]

(d) Nyatakan **satu** hipotesis bagi eksperimen ini.
*State **one** hypothesis for this experiment.*

.....
[1 *markah/mark*]

(e) Rajah 4.2 menunjukkan sebuah kereta api.
Diagram 4.2 shows a train.



Rajah 4.2/*Diagram 4.2*

Berdasarkan Prinsip Bernoulli, kenapakah anda dilarang berdiri melepasi garisan keselamatan ketika kereta api sedang bergerak?
Based on the Bernoulli's Principle, why are you prohibited from standing beyond the safety line while the train is moving?

.....

[1 *markah/mark*]

BAHAGIAN B
SECTION B

[38 markah/*marks*]

Jawab **semua** soalan dalam bahagian ini.

*Answer **all** questions in this section.*

5 Hormon mempunyai peranan yang penting dalam setiap fungsi tubuh. Oleh itu, kadar rembesan hormon mesti seimbang dengan fungsinya.

Hormones play an important role in every function of the body. Therefore, the rate of hormone secretion must be balanced with its function.

(a) Apakah yang dimaksudkan dengan hormon?

What is the meaning of hormone?

.....

[1 *markah/mark*]

(b) Maklumat di bawah menunjukkan satu keratan akhbar tentang masalah hormon.

The information below shows a newspaper clipping of a hormonal problem.

Berdasarkan maklumat di atas, apakah kelenjar yang terlibat?

Based on the above information, what is the gland involved?

.....

[1 *markah/mark*]

(c) Pasangan ibu bapa mengharapkan anak-anak mereka mengalami pertumbuhan yang normal. Namun terdapat segelintir kanak-kanak mengalami masalah tumbesaran seperti di atas.
Cadangkan bagaimanakah ibu bapa dapat mengatasi masalah ini.

Parents expect their child to experience normal growth. However, there are some children who have growth problem as above.
Suggest how parents can overcome this problem.

.....

.....

[2 *markah/marks*]

(d) Murid A dan B dikejar oleh anjing liar semasa berjalan kaki pulang dari sekolah. Murid A dapat menyelamatkan diri dengan berlari laju manakala murid B didapati terkejut dan pengsan di tempat kejadian. Terangkan mengapa situasi yang dialami oleh murid A dan B berbeza.
Student A and B was chased by a stray dog while walking home from school. Student A managed to save himself by running fast while student B was found shocked and fainted at the scene. Explain why the situations experienced by student A and B are different.

.....

.....

[2 *markah/marks*]

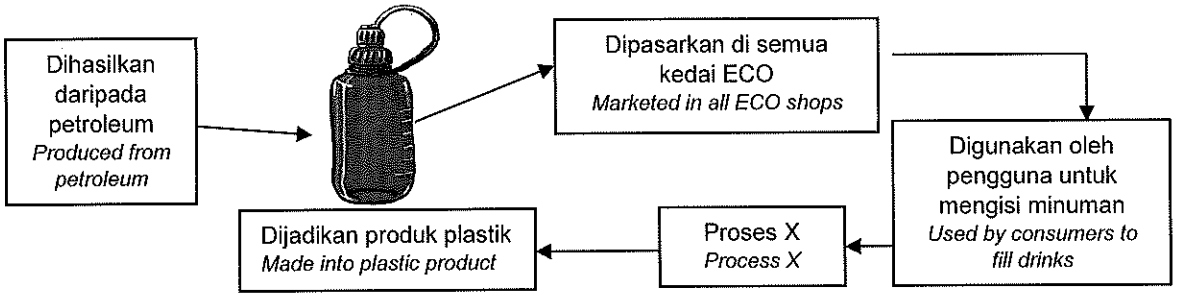
6 Semenjak plastik ditemui pada 5 Februari 1907, pelbagai produk dihasilkan dengan menggunakan plastik. Kebergantungan kepada plastik memberikan impak positif dan juga negatif.
Since plastic was discovered on 5th February 1907, various products have been produced using plastic. Dependence on plastics has both positive and negative impacts.

(a) Apakah mikroplastik?
What is microplastic?

.....

[1 *markah/mark*]

(b) Rajah 6.1 menunjukkan kitar hayat suatu produk.
Diagram 6.1 shows the life cycle of a product.



Rajah 6.1/*Diagram 6.1*

Apakah proses X?
What is process X?

.....

[1 *markah/mark*]

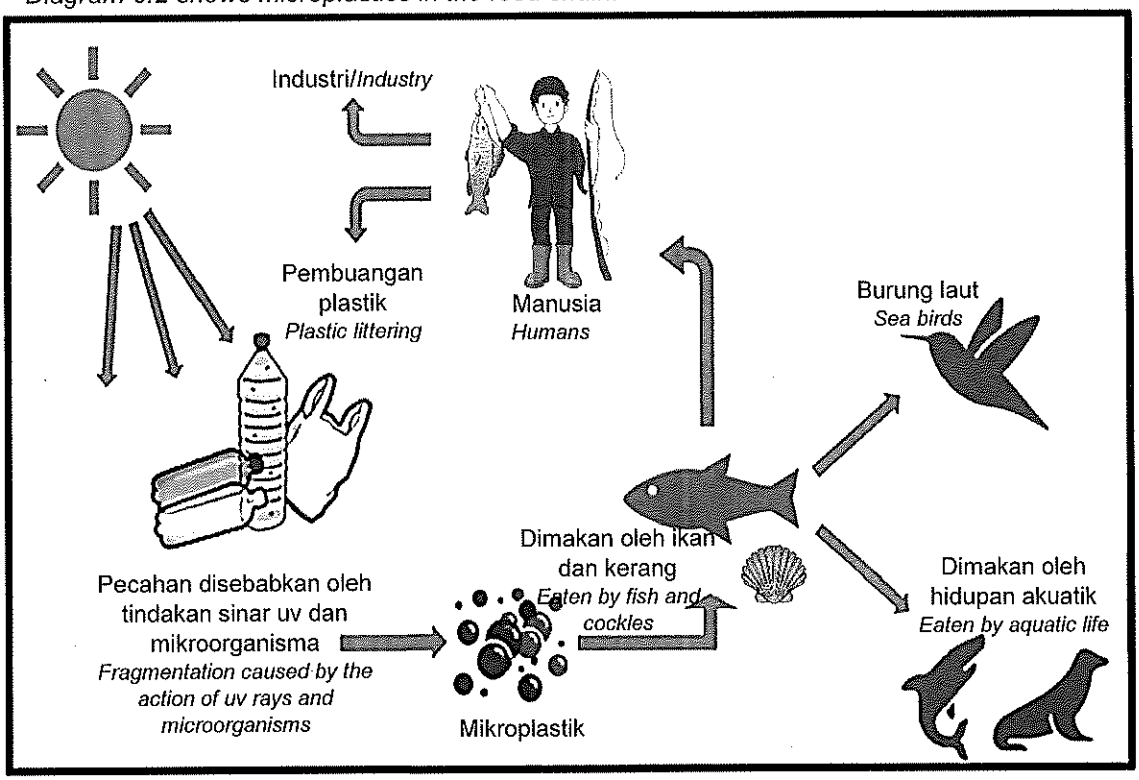
(c) Sesetengah produk plastik ini biasanya dibuang oleh pengguna dan dibakar di udara. Dengan menggunakan contoh yang sesuai, nyatakan bagaimana sisa plastik boleh diubah suai supaya ianya menjadi bahan baru yang lebih bernilai tinggi.
Some of these plastic products are usually discarded by consumers and burned in the air. Using a suitable example, state how plastic waste can be modified into a new product with higher value.

.....

.....

[2 *markah/marks*]

(c) Rajah 6.2 menunjukkan mikroplastik dalam rantaian makanan.
Diagram 6.2 shows microplastics in the food chain.



Rajah 6.2/*Diagram 6.2*

Berdasarkan Rajah 6.2, huraikan bagaimana mikroplastik boleh menyebabkan masalah kesihatan kepada manusia.
Based on Diagram 6.2, describe how microplastics can cause health problems to humans.

.....

.....

[2 *markah/marks*]

7 Orbit satelit yang mengelilingi Bumi dikelaskan kepada lima jenis mengikut ketinggian orbit (altitud).
The orbits of satellites which circle Earth are grouped into five types according to orbital height (altitude).

(a) Namakan **satu** contoh jenis orbit satelit.
*Name **one** example of a type of satellite orbit.*

.....

[1 *markah/mark*]

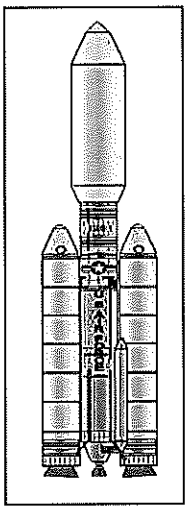
(b) Satelit telah berjaya menghasilkan peningkatan dalam produktiviti sebilangan besar industri jualan secara atas talian. Bagaimana seorang penghantar produk jualan boleh tiba ke suatu lokasi pelanggannya mengikut tempoh pesanan?
Satellite has succeeded in increasing the productivity of a number of online sales industries. How can a shipper of a sales product arrive at a customer's location according to the order period?

.....

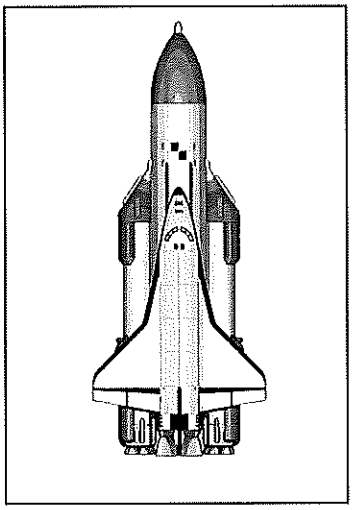
.....

[2 *markah/marks*]

(c) Rajah 7.1 dan Rajah 7.2 menunjukkan dua jenis kenderaan pelancar ke orbit.
Diagram 7.1 and Diagram 7.2 show two types of launch vehicles into orbit.



Rajah 7.1/*Diagram 7.1*



Rajah 7.2/*Diagram 7.2*

Banding bezakan kedua-dua kenderaan pelancar tersebut.
Compare and contrast the two launch vehicles.

.....

.....

[2 *markah/marks*]

(d) Negara Malaysia telah berjaya mencipta satu satelit baru. Satelit tersebut telah di hantar ke Orbit Tinggi Bumi dengan menggunakan kaedah Pemindahan Hohmann. Wajarkan mengapa kaedah pemindahan tersebut dipilih.
Malaysia has successfully created a new satellite. The satellite has been send to High Earth Orbit using the Hohmann Transfer method. Justify why the transfer method was chosen.

.....

[1 *markah/mark*]

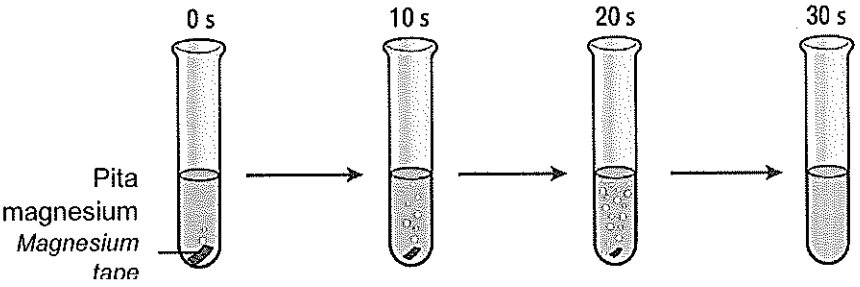
8 Tindak balas kimia merupakan satu proses pertukaran bahan tindak balas untuk menghasilkan hasil tindak balas yang melibatkan kadar tindak balas.
A chemical reaction is a process of reactant changes into product that involves the rate of reaction.

(a) Takrifkan kadar tindak balas.
Define the rate of reaction.

.....

[1 *markah/mark*]

(b) Rajah 8.1 menunjukkan keputusan eksperimen seorang murid untuk menentukan kadar tindak balas 0.5 g logam magnesium dengan asid hidroklorik cair. Tindak balas lengkap berlaku selama 30 saat.
Diagram 8.1 shows the result of a student's experiment to determine the rate of reaction of 0.5g of magnesium with dilute hydrochloric acid. The complete reaction takes 30 seconds.



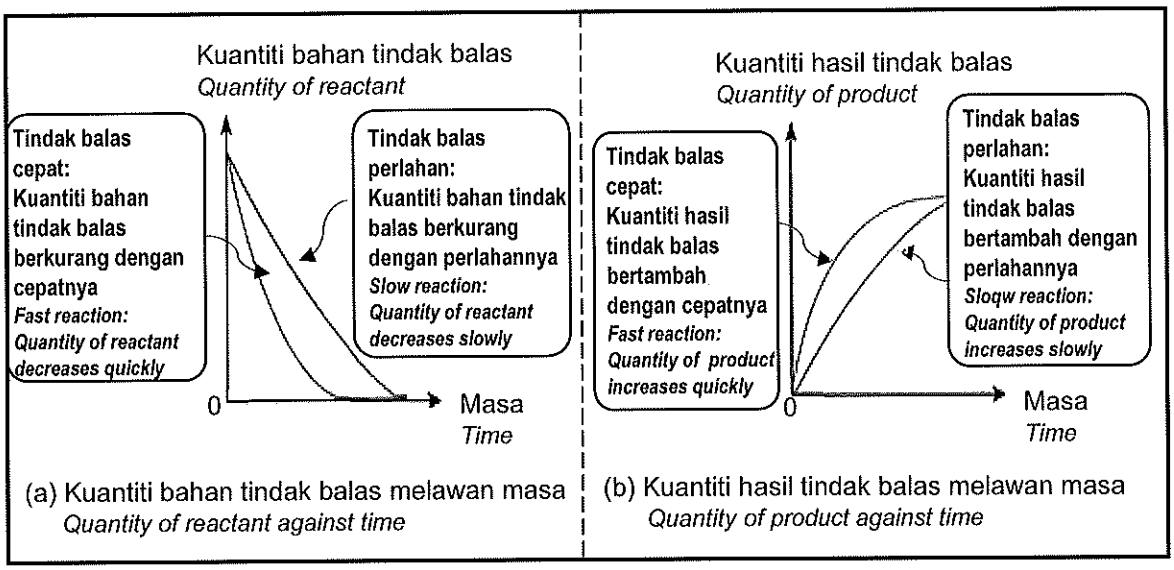
Rajah 8.1/*Diagram 8.1*

Tentukan kadar tindak balas pada Rajah 8.1.
Determine the rate of reaction in Diagram 8.1

.....gs^{-1}

[2 *markah/marks*]

(c) Rajah 8.2 menunjukkan graf -graf perubahan kuantiti bahan tindak balas dan kuantiti hasil tindak balas melawan masa.
Diagram 8.2 shows graphs of changes in quantities of reactant and product against time.



Rajah 8.2/*Diagram 8.2*

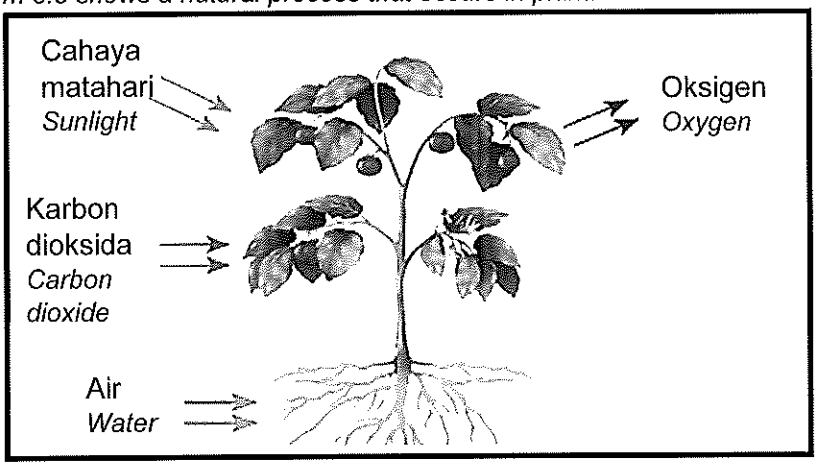
Berdasarkan graf-graf pada Rajah 8.2, Banding bezakan tindak balas cepat dan tindak balas perlahan.
Based on the graphs in Diagram 8.2, compare and contrast fast reaction and slow reaction.

.....

.....

[2 *markah/marks*]

(d) Rajah 8.3 menunjukkan satu proses semulajadi yang berlaku dalam tumbuhan.
Diagram 8.3 shows a natural process that occurs in plant.



Rajah 8.3/*Diagram 8.3*

Proses dalam Rajah 8.3 ialah tindak balas perlahan. Wajarkan.
The process in Diagram 8.3 is a slow reaction. Justify it.

.....

[1 *markah/mark*]

9 Rajah 9 menunjukkan dua jenis kerusi yang yang dicadangkan untuk digunakan di makmal sekolah.
Diagram 9 shows two types of chairs proposed for use in the school laboratory.

Kerusi X
Chair X

Kerusi Y
Chair Y

Rajah 9/*Diagram 9*

(a) Nyatakan satu faktor yang mempengaruhi kestabilan objek.
State one factor that affects the stability of an object.

.....
[1 *markah/mark*]

(b) Cadangkan satu cara untuk menambahkan kestabilan kerusi X.
Suggest one way to increase the stability of chair X.

....
[1 *markah/mark*]

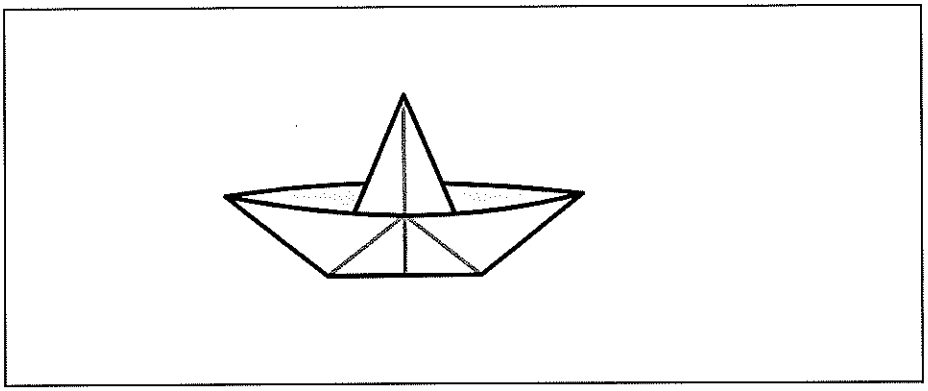
(e) Semua pelajar kelas berkenaan diminta memilih kerusi yang sesuai untuk digunakan di makmal sekolah. Kerusi yang menjadi pilihan ialah kerusi **Y**.
Pada pendapat anda, apakah kelebihan dan kekurangan jika kerusi **Y** dipilih sebagai kerusi makmal?
All students in the class were asked to choose a suitable chair to be used in the school laboratory. The chair of choice is ***Y****.*
In your opinion, what is the advantage and disadvantage if chair Y is chosen as the laboratory chair?

.....

.....
[2 *markah/marks*]

(f) Satu pertandingan perlumbaan kapal kertas akan diadakan di peringkat daerah. Semasa sesi persediaan, kapal kertas yang hendak diuji telah terbalik ketika melalui selekoh tajam dan dimasuki oleh air.
A paper vessel racing competition will be held at the district level. During the preparation session, the paper vessel to be tested was overturned while going through at a sharp turn and was soaked with water.

Anda diminta mengubahsuai satu kapal kertas yang akan digunakan oleh sekolah anda semasa pertandingan nanti. Anda dibekalkan dengan satu kapal kertas, dua kiub polistrin 2 x 4 cm, 10 cm lidi penyapu dan pita selofan.
Lakarkan rekaan anda beserta label dan terangkan bagaimana rekaan anda berfungsi.
You are required to modify a paper vessel that will be used by your school during the competition. You are supplied with one paper vessel, two 2 x 4 cm polystyrene cubes, 10 cm skewer and cellophane tape.

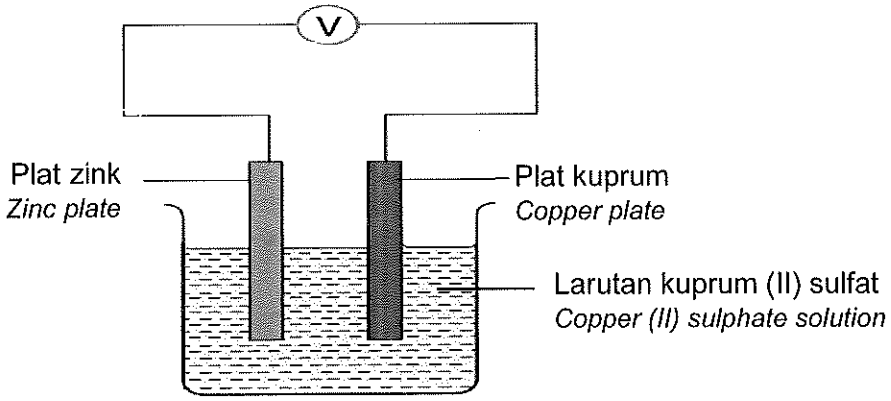


.....

.....

[3 *markah/marks*]

10 Rajah 10 menunjukkan sel kimia ringkas.
Diagram 10 shows a simple chemical cell.



Rajah 10/*Diagram 10*

(a) Berdasarkan Rajah 10, plat manakah yang berfungsi sebagai katod?
Based on Diagram 10, which plate functions as a cathode?

.....

[1 *markah/mark*]

(b) Cadangkan bahan lain yang boleh kamu ambil di dapur rumah kamu jika bekalan larutan kuprum (II) sulfat tidak dapat disediakan di makmal.
Suggest another substance that you can take from your kitchen if copper (II) sulphate cannot be provided in the laboratory.

.....

[1 *markah/mark*]

(c) Sel ringkas menghasilkan arus elektrik daripada tindakbalas kimia dalam elektrolit. Adakah anda bersetuju jika sel ini digunakan dalam situasi terdesak seperti terputus bekalan elektrik di rumah? Nyatakan alasan utk menyokong pendapat anda.
A simple cell produce electrical current from chemical reactions in electrolytes. Do you agree if this cell is used in a desperate situations such as power outage at home? Give reason to support your opinion.

.....

.....

[2 *markah/marks*]

(d) Tindak balas kimia boleh menghasilkan tenaga elektrik.
Anda diminta oleh guru untuk menghasilkan satu set sel kimia ringkas dengan menggunakan wayar penyambung, mentol, buah lemon, paku besi dan satu radas lain. Labelkan lakaran anda dan berikan konsep berkaitan jawapan anda.
Chemical reactions can produce electrical energy.
You are asked by your teacher to produce a set of simple chemical cell using connecting wires, a bulb, a lemon, an iron nail and another apparatus.
Label your sketch and give a concept related to your answer.

.....

.....

.....

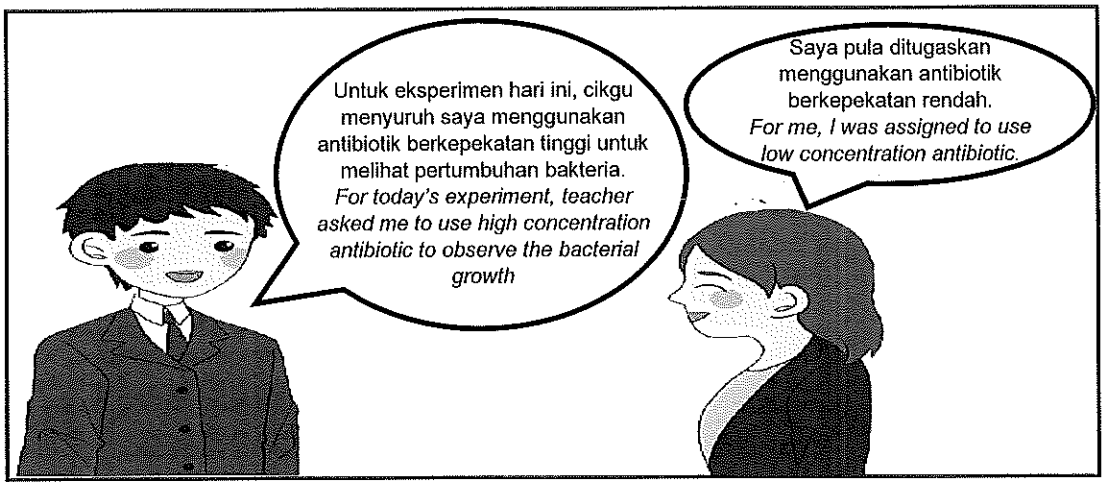
[3 *markah/marks*]

BAHAGIAN C
SECTION C

[22 markah/*marks*]

Jawab **Soalan 11** dan mana-mana **satu** daripada **Soalan 12** atau **Soalan 13.**
*Answer **Question 11** and any **one** of **Question 12** or **Question 13.***

11 Kaji perbualan di bawah.
Study the conversation below.



(a) Nyatakan pernyataan masalah daripada perbualan di atas.
State the problem statement from the conversation above.

[1 *markah/mark*]

(b) Nyatakan hipotesis daripada perbualan di atas.
State a hypothesis from the above conversation.

[1 *markah/mark*]

(c) Berdasarkan maklumat perbualan di atas, cadangkan satu eksperimen untuk menyiasat kesan kepekatan antibiotik ke atas pertumbuhan bakteria dengan menggunakan agar-agar nutrien, kultur bakteria, ceper antibiotik kepekatan tinggi, ceper antibiotik kepekatan rendah, pita selofan dan piring petri.
Based on the information in the conversation above, suggest one experiment to study the effect of antibiotic concentration on bacterial growth using nutrient agar, bacterial culture, high concentration antibiotic disc, low concentration antibiotic disc, cellophane tape and petri dishes.

Huraian anda haruslah mengandungi kriteria berikut :
Your description must include the following criteria:

(i) Tujuan eksperimen
Aim of the experiment [1 *markah/mark*]

(ii) Mengenal pasti pemboleh ubah
Identification of variables

[2 *markah/marks*]

(iii) Prosedur atau kaedah
Procedure or method [4 *markah/marks*]

(iv) Penjadualan data
Tabulation of data [1 *markah/mark*]

12 Banyak benda di sekeliling kita diperbuat daripada aloi.
Many objects around us are made of alloys.

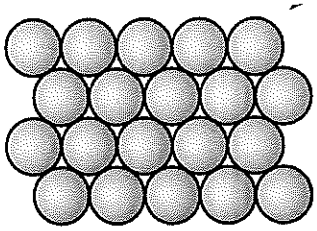
(a) Apakah aloi dan **satu** contoh aloi yang digunakan dalam kehidupan harian?
*What is an alloy and **one** example of an alloy used in daily life?*

[2 *markah/marks*]

(b) Nyatakan perbezaan antara logam tulen dan aloi.
State the difference between pure metal and alloy.

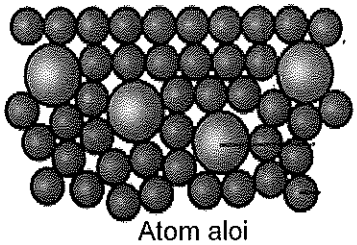
[2 *markah/marks*]

(c) Rajah 12.1 dan Rajah 12.2 menunjukkan susunan atom dalam logam tulen dan aloi.
Diagram 12.1 and Diagram 12.2 show the arrangement of atoms in a pure metal and an alloy.



Atom logam tulen
Pure metal atoms

Rajah 12.1/*Diagram 12.1*



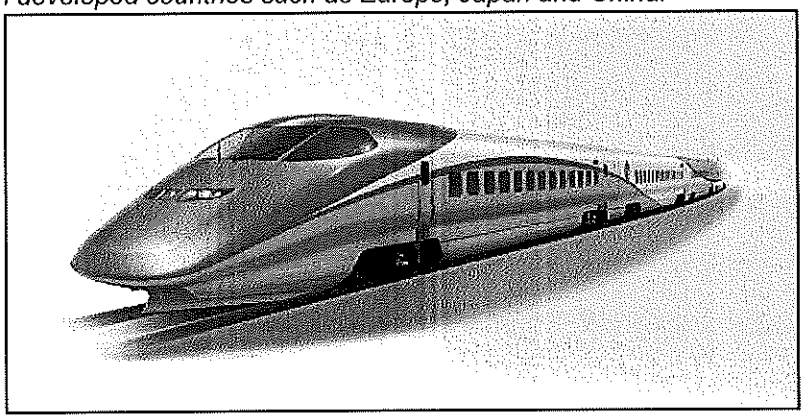
Atom aloi
Alloy atoms

Rajah 12.2/*Diagram 12.2*

Berdasarkan Rajah 12.1 dan 12.2, terangkan bagaimana logam tulen boleh dijadikan aloi dan mengapa aloi lebih keras?
Based on Diagram 12.1 and 12.2, expalain how pure metal can be made into alloy and why alloy is harder?

[4 *markah/marks*]

(d) Aloi superkonduktor digunakan dalam pembuatan landasan keretapi berkuasa tinggi terutama di negara-negara maju seperti negara Eropah, Jepun dan China.
Superconductor alloys are used in the construction of the railway track of high-powered train especially in developed countries such as Europe, Japan and China.



Rajah 12.3/*Diagram 12.3*

Bincangkan kekuatan dan kelemahan penggunaan aloi superkonduktor seperti Rajah 12.3 di Malaysia.
Discuss the strengths and weaknesses of the use of superconductor alloys as in Diagram 12.3 in Malaysia.

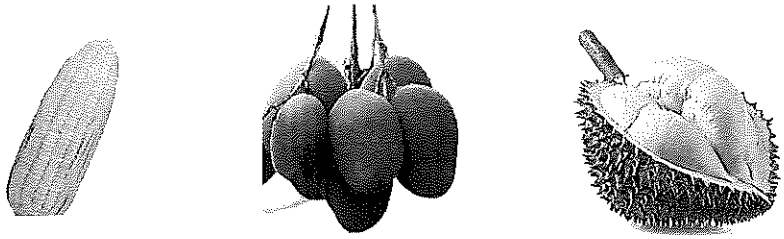
[4 *markah/marks*]

13 Salah satu cara meningkatkan kualiti dan kuantiti pengeluaran makanan negara ialah penggunaan baka yang bermutu.
One of the ways to increase the quality and quantity of national food production is the use of quality breeds.

(a) Nyatakan **dua** ciri baka bermutu.
*State **two** characteristics of quality breeds.*

[2 *markah/marks*]

(b) Rajah 13.1 menunjukkan contoh baka bermutu dari hasil pertanian.
Diagram 13.1 show examples of high quality of breeds from agriculture products.

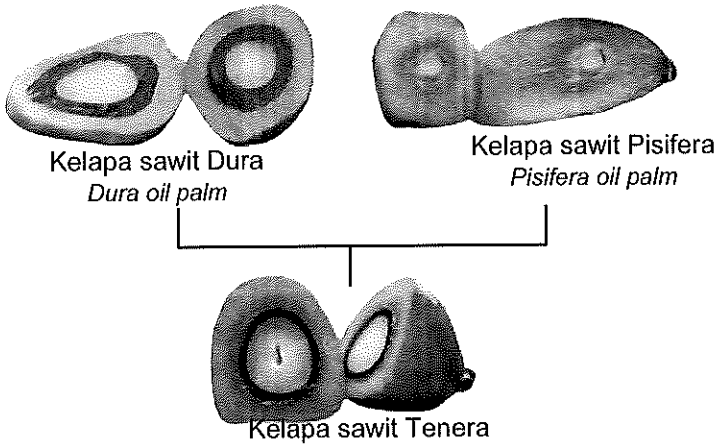


Rajah 13.1/*Diagram 13.1*

Bagaimanakah kaedah teknologi moden boleh menghasilkan hasil pertanian seperti Rajah 13.1?
How can modern technology produce agricultural products such as in Diagram 13.1?

[2 *markah/marks*]

(c) Rajah 13.2 menunjukkan penghasilan baka bermutu kelapa sawit jenis Tenera.
Diagram 13.2 shows the production of quality breed of Tenera type oil palm.



Rajah 13.2/*Diagram 13.1*

Berdasarkan Rajah 13.2, bagaimana ciri-ciri daripada kelapa sawit Dura dan kelapa sawit Pisifera boleh menghasilkan ciri terbaik kepada Tenera?
Based on Diagram 13.2, how do the characteristics of Dura oil palm and Pisifera oil palm produce the best characteristics in Tenera?

[4 *markah/marks*]

(c) Bincangkan dan nilai kesan kelebihan dan kekurangan penggunaan racun serangga dan kawalan biologi dalam bidang pertanian.
Discuss and evaluate the advantages and disadvantages of the use of pesticide and biological control in agriculture.

[4 *markah/marks*]

KERTAS SOALAN TAMAT
END OF QUESTION PAPER

RUANGAN JAWAPAN
BAHAGIAN C
ANSWER SPACE
SECTION C

RUANGAN JAWAPAN
BAHAGIAN C
ANSWERING SPACE
SECTION C

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