



KEMENTERIAN PENDIDIKAN

PENTAKSIRAN DIAGNOSTIK AKADEMIK SEKOLAH BERASRAMA PENUH 2026

PEPERIKSAAN PERCUBAAN SIJIL PELAJARAN MALAYSIA

KIMIA

4541/2

Kertas 2

Ogos 2026

2 ½ jam

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

Arahan:

1. Tuliskan **nama dan tingkatan** anda pada ruang yang disediakan.
2. Kertas peperiksaan ini mengandungi **tiga** bahagian: **Bahagian A, Bahagian B dan Bahagian C.**
3. Jawapan hendaklah ditulis pada ruang jawapan yang disediakan di dalam kertas peperiksaan ini.
4. Kertas peperiksaan ini ditulis dalam dwibahasa.
5. Jawapan boleh ditulis dalam bahasa Melayu atau bahasa Inggeris.
6. Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.
7. Kerja mengira anda mesti ditunjukkan.
8. **Kertas peperiksaan ini** hendaklah diserahkan kepada pengawas peperiksaan pada akhir peperiksaan.

Untuk Kegunaan Pemeriksa			
Bahagian	Soalan	Markah penuh	Markah diperoleh
A	1	5	
	2	5	
	3	6	
	4	7	
	5	8	
	6	9	
	7	10	
	8	10	
B	9	20	
	10	20	
C	11	20	
Jumlah			

NAMA : _____

TINGKATAN : _____

Kertas soalan ini mengandungi 36 halaman bercetak

Bahagian A

[60 markah]

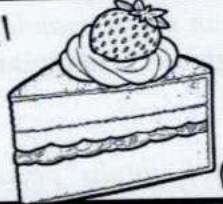
Jawab semua soalan.

- 1 Rajah 1 menunjukkan poster tentang bahan tambah makanan yang terdapat dalam dua jenis kek span yang dikeluarkan oleh sebuah bakeri.
 Diagram 1 shows a poster about food additives in two types of sponge cake produced by a bakery.

Sedap & Berkhasiat
Delicious & Wholesome

NIKMATI KEPUASAN TANPA RASA BERSALAH!
 ENJOY GUILT-FREE INDULGENCE!

DUA KEK SPAN YANG SEDAP.
 DIBUAT DENGAN BAHAN-BAHAN BERKUALITI.
 TWO DELICIOUS SPONGE CAKES.
 MADE WITH QUALITY INGREDIENTS.

 Kek span Y Sponge cake Y	 Kek span Z Sponge cake Z
• Tepung serbaguna Multipurpose flour • Gula pasir Coarse sugar • Lecitin Lecithin	• Tepung badam Almond flour • Stevia Stevia • Lecitin Lecithin



Rajah/ Diagram 1

- (a) Nyatakan satu faedah menambah bahan tambah makanan ke dalam makanan.
 State one benefit of adding food additives into the food.

[1 markah/ mark]

- (b) Nyatakan fungsi lecitin dalam kedua-dua kek.
 State the function of lecithin in both cakes.

[1 markah/ mark]

- (c) Apakah yang membezakan penambahan stevia berbanding gula pasir di dalam kek span Z?

What makes it different of adding stevia over coarse sugar in the diet sponge cake Z?

.....
[1 markah/ mark]

- (d) Nyatakan satu bahan tambah makanan lain yang boleh ditambah ke dalam kek span Y semasa pembuatan kek itu dan fungsinya.

State one other food additive that can be added to sponge cake Y during the production of the cake and its function.

Bahan tambah makanan:

Food additive

.....
[1 markah/ mark]

Fungsi:

Function

.....
[1 markah/ mark]

- 2 Rajah 2.1 menunjukkan hidangan makanan dan minuman pada waktu minum petang.
Diagram 2.1 shows the foods and drinks during afternoon tea.

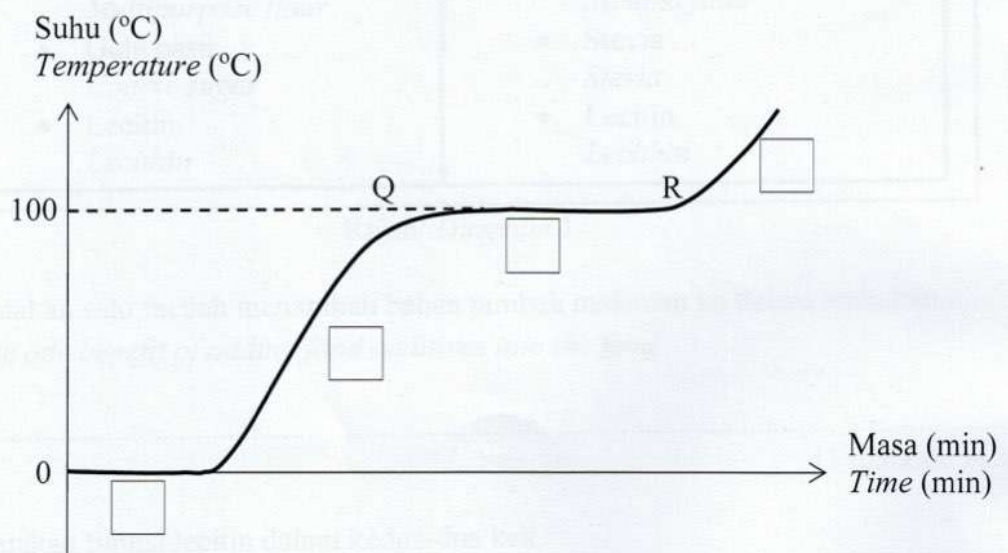


Rajah/ Diagram 2.1

- (a) Bahan J diletakkan ke dalam gelas untuk menyejukkan minuman.
Apakah keadaan jirim bagi J?
Substance J is placed in a glass to cool the drink.
What is the state of matter of J?

[1 markah/ mark]

- (b) Rajah 2.2 menunjukkan lengkung pemanasan apabila J dipanaskan sehingga suhu 105°C .
Diagram 2.2 shows the heating curve when J is heated to the temperature of 105°C .



Rajah/ Diagram 2.2

Berdasarkan Rajah 2.2,
Based on Diagram 2.2,

- (i) terangkan mengapa suhu kekal malar dari titik Q ke titik R.
explain why the temperature remains constant from point Q to point R.

.....

.....

.....

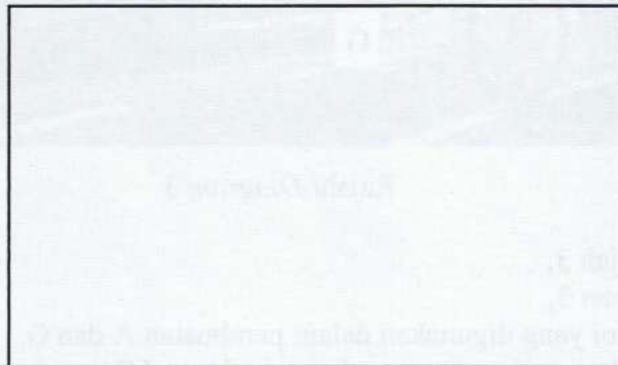
.....

[2 markah/ marks]

- (ii) tandakan (✓) pada keadaan jirim bahan L.
mark (✓) on the state of matter of substance L.

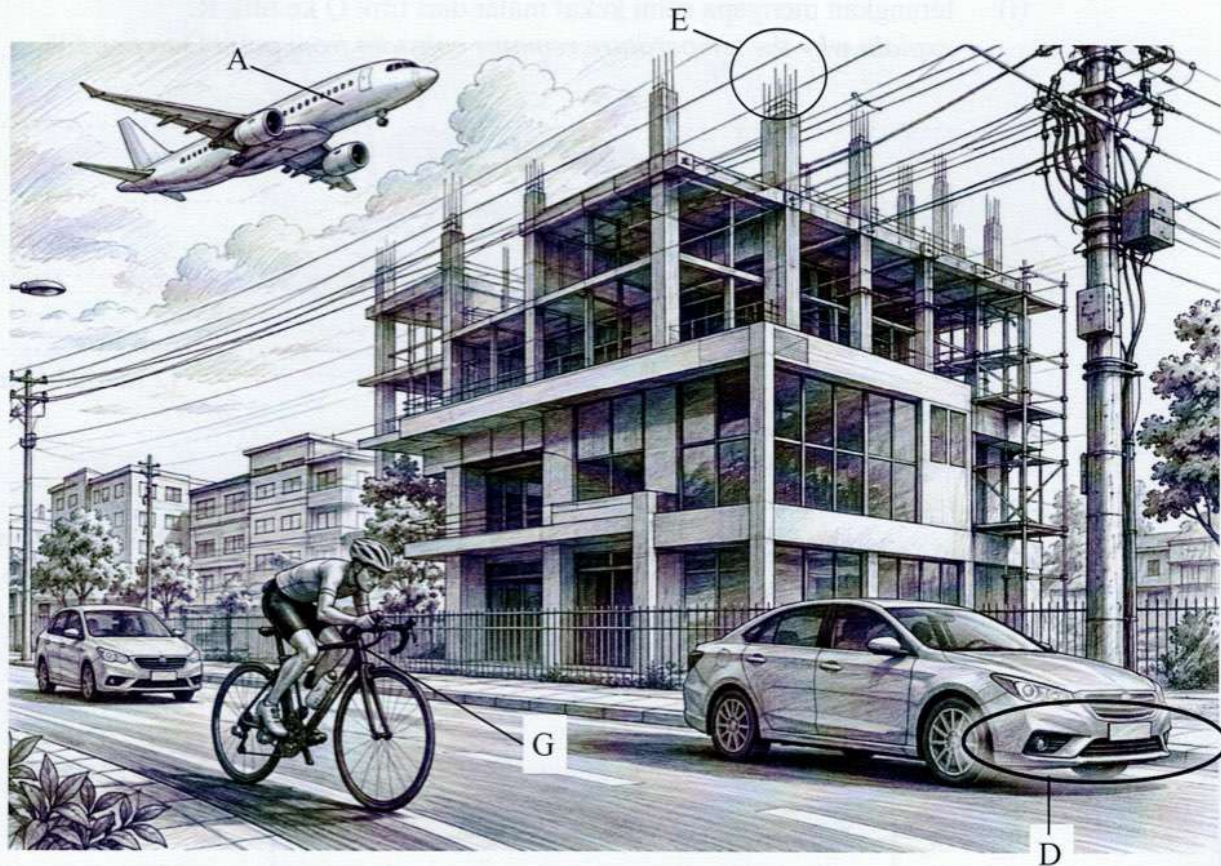
[1 markah/ mark]

- (c) Lukiskan susunan zarah bagi M.
Draw the arrangement of particle for M.



[1 markah/ mark]

- 3 Rajah 3 menunjukkan beberapa kegunaan aloi dan bahan komposit dalam kehidupan harian.
Diagram 3 shows several uses of alloys and composite materials in daily life.



Rajah/ Diagram 3

- (a) Berdasarkan Rajah 3,
Based on Diagram 3,
 (i) nyatakan aloi yang digunakan dalam pembuatan A dan G.
state the alloy used in the manufacture of A and G.

[1 markah/ mark]

- (ii) nyatakan bahan komposit D dan bahan matriksnya.
state the composite material D and its matrix substance.

Bahan komposit:
Composite materials

Bahan matriks:
Matrix substance

[2 markah/ marks]

- (b) E merupakan aloi yang menggantikan besi bagi pembinaan bangunan.
Cadangkan E. Berikan satu sebab mengapa E digunakan berbanding besi.
Apakah yang boleh dilakukan untuk memperkukuhkan lagi bangunan dengan menggunakan E sebagai bahan pengukuhan?
E is an alloy replacing iron in the building construction.
Suggest E. Give a reason why E is used instead of iron.
What can be done to strengthen the building by using E as strengthening substance?

.....

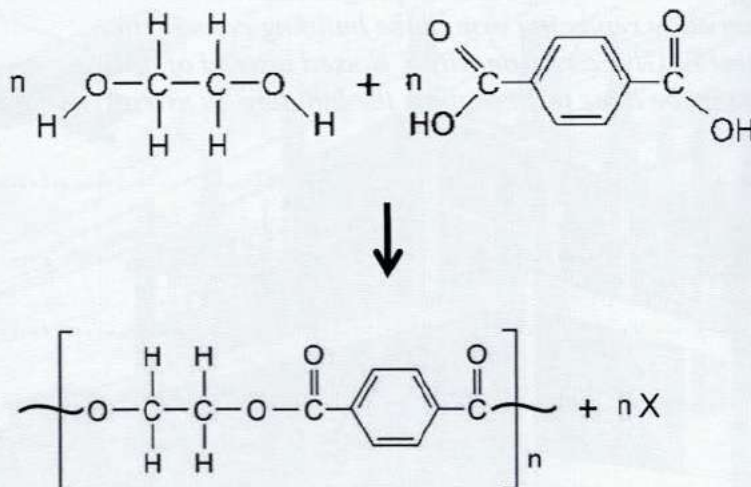
.....

.....

.....

[3 markah/ marks]

- 4 Rajah 4.1 menunjukkan tindak balas pempolimeran terilena.
Diagram 4.1 shows the polymerisation reaction of terylene.



Rajah/ Diagram 4.1

- (a) (i) Apakah jenis tindak balas pempolimeran bagi terilena?
What is the type of polymerisation for terylene?

.....
 [1 markah/ mark]

- (ii) Tindak balas pempolimeran itu akan menghasilkan terilena dan X.
 Nyatakan nama X.
The polymerisation reaction will produce terylene and X.
State the name of X.

.....
 [1 markah/ mark]

- (iii) Nyatakan satu ciri bagi monomer-monomer yang terlibat dalam tindak balas pempolimeran itu.
State one characteristic of monomers involved in the polymerisation reaction.

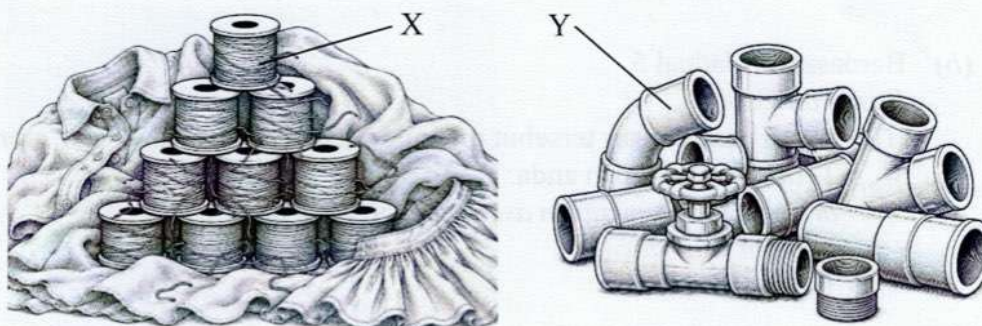
.....
 [1 markah/ mark]

- (b) Rajah 4.2 menunjukkan dua jenis polimer sintetik.
Diagram 4.2 shows two types of synthetic polymer.

Polimer A Polymer A	$\left[\begin{array}{cc} \text{H} & \text{Cl} \\ & \\ -\text{C} & - & \text{C}- \\ & \\ \text{H} & \text{H} \end{array} \right]_n$
Polimer B Polymer B	$\left[\begin{array}{cccccccccccccccccccc} \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{O} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{O} \\ & & & & & & & & & & & & & & & & & \\ -\text{N} & -\text{C} & -\text{C} & -\text{C} & -\text{C} & -\text{C} & -\text{C} & -\text{N} & -\text{C} & -\text{C} & -\text{C} & -\text{C} & -\text{C} & -\text{C} & -\text{C} & -\text{C} & -\text{C} & -\text{C}- \\ & & & & & & & & & & & & & & & & & \\ \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} & \text{H} \end{array} \right]_n$

Rajah/ Diagram 4.2

Rajah 4.3 menunjukkan dua produk yang diperbuat daripada polimer A atau polimer B.
Diagram 4.3 shows two products made from either polymer A or polymer B.



Rajah/ Diagram 4.3

- (i) Berdasarkan Rajah 4.2 dan Rajah 4.3, pilih polimer yang sesuai digunakan sebagai:
Based on Diagram 4.2 and Diagram 4.3, choose the suitable polymer to be used as:

X : Y :
 [2 markah/ marks]

- (ii) Terangkan sebab bagi pemilihan polimer tersebut bagi setiap produk.
Explain the reason for the selection of the polymer for each product.

X:
 Y:
 [2 markah/ marks]

- 5 Jadual 5 menunjukkan maklumat bagi beberapa oksida unsur Kala 3 dalam Jadual Berkala Unsur.

Table 5 shows the information about few oxides of element of Period 3 in the Periodic Table of Elements.

Unsur <i>Element</i>	Formula oksida <i>Formula of oxide</i>	Keadaan fizik <i>Physical state</i>
X	XO ₂	Gas <i>Gas</i>
Y	Y ₂ O ₃	Pepejal <i>Solid</i>
Z	Z ₂ O	Pepejal <i>Solid</i>

Jadual/ Table 5

- (a) Mengapakah unsur-unsur itu berada dalam Kala 3?
Why are the elements are located in Period 3?

[1 markah/ mark]

- (b) Berdasarkan Jadual 5,
Based on Table 5,

- (i) susun unsur-unsur tersebut mengikut tertib pertambahan saiz atom.
Terangkan jawapan anda.
arrange the elements in ascending order of atomic size.
Explain your answer.

[3 markah/ marks]

- (ii) cadangkan unsur yang boleh membentuk oksida asid dan oksida amfoterik.
suggest the element that can form acidic oxide and amphoteric oxide.

Oksida asid :
Acidic oxide

Oksida amfoterik :
Amphoteric oxide

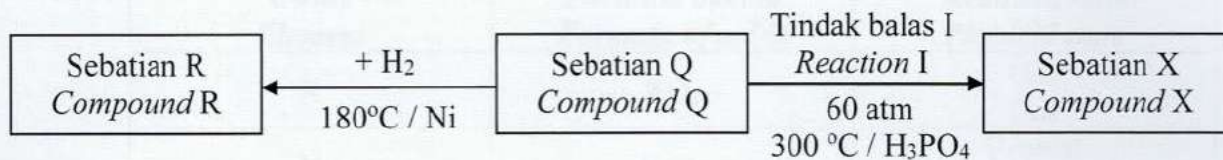
[2 markah/ marks]

- (c) Lukiskan rajah susunan elektron bagi sebatian Z_2O .
[Nombor proton: O = 8]
Draw the electron arrangement diagram for Z_2O compound.
[Number of proton: O = 8]

[2 markah/ marks]

- 6 Rajah 6.1 menunjukkan tindak balas kimia yang melibatkan sebatian hidrokarbon Q yang mempunyai tiga atom karbon.

Diagram 6.1 shows reaction involving hydrocarbon compound Q that has three carbon atoms.



Rajah/ Diagram 6.1

- (a) Nyatakan unsur-unsur yang terdapat dalam sebatian Q.

State the elements found in compound Q.

.....
[1 markah/ mark]

Berdasarkan Rajah 6.1,

Based on Diagram 6.1,

- (b) nyatakan nama Tindak balas I.

state the name of Reaction I.

.....
[1 markah/ mark]

- (c) Sebatian Q dan sebatian R digunakan untuk memanaskan air dalam bekas kuprum. Didapati terdapat lapisan hitam di bahagian bawah bekas kuprum selepas pemanasan itu.

Compounds Q and R are used to heat water in a copper can.

It is found that there is black layer at the bottom of the copper can after heating.

- (i) Sebatian manakah yang menghasilkan lapisan hitam yang lebih banyak?

Which compound produces more black layer?

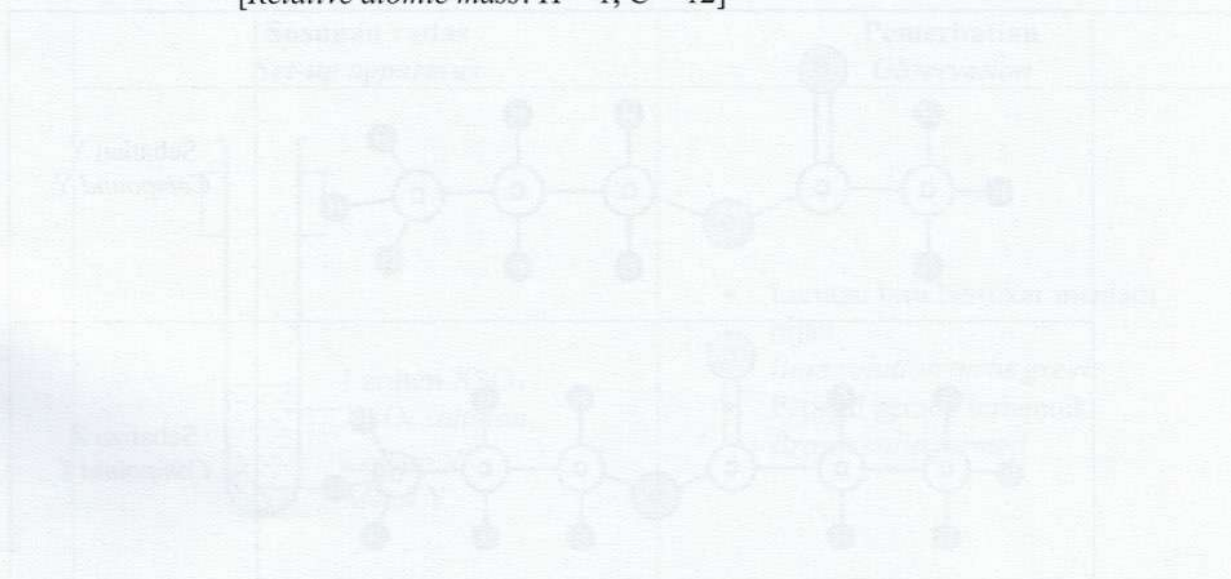
.....
[1 markah/ mark]

- (ii) Terangkan jawapan anda. Sokong jawapan anda dengan menunjukkan langkah pengiraan.

[Jisim atom relatif: $H = 1$, $C = 12$]

Explain your answer. Support your answer by showing the calculation steps.

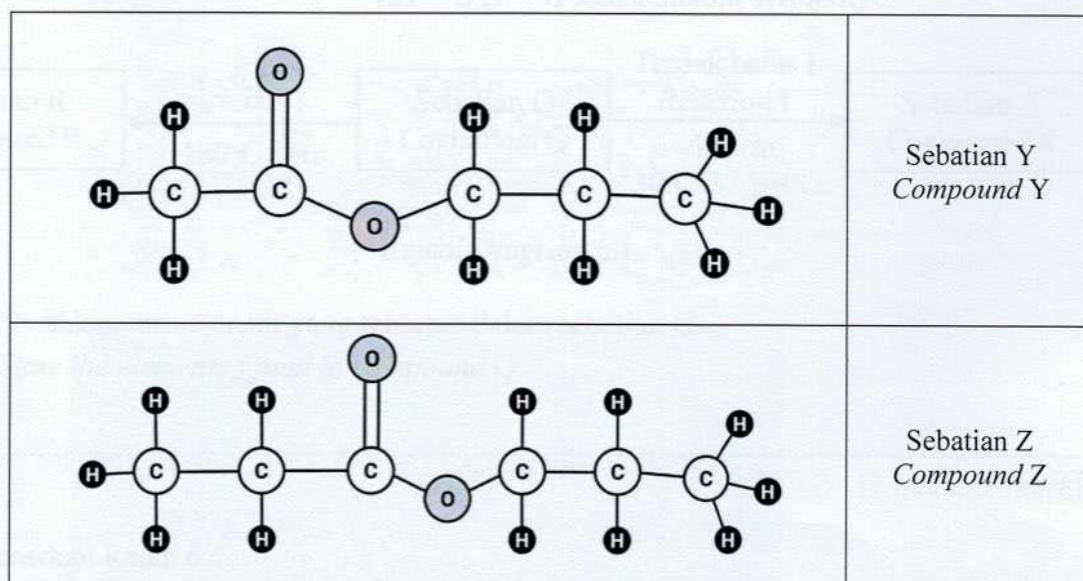
[Relative atomic mass: $H = 1$, $C = 12$]



[3 markah/ marks]

- (d) Rajah 6.2 menunjukkan model molekul bagi hasil tindak balas antara sebatian X dengan dua sebatian kimia berbeza.

Diagram 6.2 shows the molecular model for the products from the reaction between compound X with two different chemical compound.



Rajah/ Diagram 6.2

Kenal pasti nama sebatian Y, sebatian Z dan nyatakan kumpulan berfungsi bagi sebatian Z.

Identify the name of compound Y, compound Z and state the functional group for compound Z

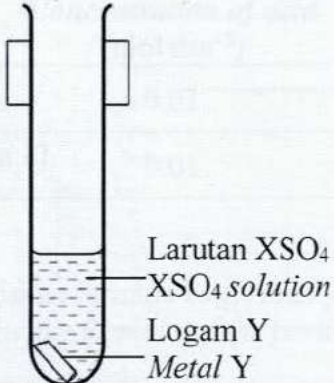
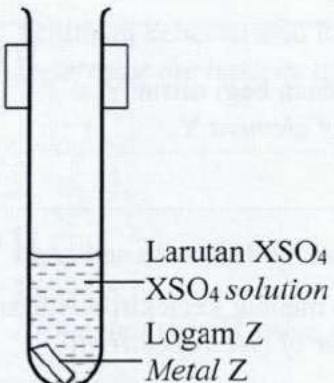
Sebatian Y:
Compound Y

Sebatian Z:
Compound Z

Kumpulan berfungsi sebatian Z:
Functional group of compound Z

[3 markah/ marks]

- 7 Rajah 7 menunjukkan susunan radas bagi mengkaji tindak balas penyesaran logam daripada larutan garamnya. Tindak balas penyesaran adalah contoh tindak balas redoks.
Diagram 7.1 shows the apparatus set-up to investigate the displacement reaction from its salt solution. Displacement reaction is an example of redox reaction.

Susunan radas <i>Set-up apparatus</i>	Pemerhatian <i>Observation</i>
 Larutan XSO₄ XSO₄ solution Logam Y Metal Y Set I	- Larutan biru bertukar menjadi hijau <i>Blue solution turns green</i> - Pepejal perang terbentuk <i>Brown solid formed</i>
 Larutan XSO₄ XSO₄ solution Logam Z Metal Z Set II	- Larutan biru tidak berubah warna <i>Blue colour of solution remains</i> - Tiada perubahan pada logam Z <i>No change on metal Z</i>

Rajah/ Diagram 7

- (a) Apakah dua proses yang berlaku serentak dalam tindak balas redoks?
What are two processes that occur simultaneously in redox reaction?

.....
 [1 markah/ mark]

- (b) Berdasarkan pemerhatian dalam Rajah 7, kenal pasti larutan XSO_4 , logam Y dan logam Z.
Based on the observation in Diagram 7, identify solution XSO_4 , metal Y and metal Z.

Larutan XSO_4 :
Solution XSO_4

Logam Y :
Metal Y

Logam Z :
Metal Z

[3 markah/ marks]

- (c) Berdasarkan Set I,
Based on Set I,

(i) nyatakan peranan larutan XSO_4 .
state the role of the XSO_4 solution.

.....
[1 markah/ mark]

(ii) tuliskan setengah persamaan bagi tindak balas yang berlaku kepada XSO_4 .
write the half equation for the reaction that occurs on XSO_4 .

.....
[1 markah/ mark]

(iii) nyatakan perubahan nombor pengoksidaan bagi unsur Y.
state the change in oxidation number of element Y.

.....
[1 markah/ mark]

- (d) Susunkan logam X, Y dan Z mengikut tertib menaik keelektropositifan.
Arrange metal X, Y and Z in ascending order of electropositivity.

.....
[1 markah/ mark]

- (e) Jika eksperimen dalam Set II diulang, cadangkan satu modifikasi yang boleh dilakukan supaya larutan biru berubah menjadi tidak berwarna.
Berikan satu sebab.

*If the experiment in Set II is repeated, suggest a modification that can be done so that the blue solution turns to colourless.
Give one reason.*

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

- 8 Jadual 8 menunjukkan maklumat tentang dua asid, asid Q dan asid R yang digunakan dalam tindak balas peneutralan antara asid itu dan 25.0 cm^3 larutan natrium hidroksida 0.01 mol dm^{-3} .

Table 8 shows information of two acids, Q and R that are used in the neutralisation reaction between the acid and 25.0 cm^3 of 0.01 mol dm^{-3} sodium hydroxide solution.

Asid <i>Acid</i>	Kepekatan asid (mol dm^{-3}) <i>Concentration of acid</i> (mol dm^{-3})	Kepekatan ion hidrogen (mol dm^{-3}) <i>Concentration of hydrogen ion</i> (mol dm^{-3})	Nilai pH <i>pH value</i>
Q	0.01	y	2.0
R	0.01	$2y$	1.7

Jadual/ Table 8

- (a) Tuliskan formula bagi zarah yang bertanggungjawab untuk menunjukkan sifat asid.
Write the formula of the particle that is responsible to show acidic property.

.....
[1 markah/ mark]

- (b) Asid R diwakili oleh formula H_2A .
Acid R is represented by formula H_2A .

- (i) Tentukan kebesan asid R.
Determine the basicity of acid R.

.....
[1 markah/ mark]

- (ii) Buktikan nilai pH bagi asid Q dan asid R adalah seperti yang ditunjukkan dalam Jadual 8.
Prove that the pH value of acid Q and R are as shown in Table 8.

.....
[2 markah/ marks]

- (iii) Hitungkan isi padu asid R yang digunakan dalam tindak balas itu.
Calculate the volume of acid R used in the reaction.

Volume of acid R (cm ³)	Volume of acid Q (cm ³)	Volume of sodium hydroxide solution (cm ³)
10.0	10.0	10.0
20.0	20.0	20.0
30.0	30.0	30.0
40.0	40.0	40.0
50.0	50.0	50.0
60.0	60.0	60.0
70.0	70.0	70.0
80.0	80.0	80.0
90.0	90.0	90.0
100.0	100.0	100.0

[3 markah/ marks]

- (c) Seorang murid menggunakan isi padu asid Q yang sama seperti isi padu asid R yang diperoleh dalam 8(b)(iii) untuk meneutralkan larutan natrium hidroksida.
Adakah anda bersetuju dengan tindakan murid itu? Terangkan jawapan anda.
A student used the same volume of acid Q as the volume of acid R obtained in 8(b)(iii) to neutralise sodium hydroxide solution. Do you agree with the student's action? Explain your answer.

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

[3 markah/ marks]

Bahagian B

[20 markah]

Bahagian ini mengandungi **dua** soalan. Jawab **satu** soalan.

- 9 (a) Jadual 9.1 menunjukkan jisim dua garam yang larut dalam 100 cm^3 air pada suhu air berbeza.
Table 9.1 shows the mass of two salts that dissolve in 100 cm^3 of water at different temperatures of water.

Suhu ($^{\circ}\text{C}$) <i>Temperature ($^{\circ}\text{C}$)</i>	Jisim natrium nitrat (g) <i>Mass of sodium nitrate (g)</i>	Jisim magnesium sulfat (g) <i>Mass of magnesium sulphate (g)</i>
0.0	73.0	27.0
20.0	88.0	35.0
40.0	104.0	46.0
60.0	124.0	56.0
80.0	148.0	67.0
100.0	180.0	79.0

Jadual/ Table 9.1

- (i) Nyatakan maksud garam dan nama satu garam sulfat yang larut dalam air selain daripada magnesium sulfat.

State the meaning of salt and the name of one sulphate salt that is soluble in water other than magnesium sulphate.

[2 markah/ marks]

Berdasarkan Jadual 9.1,

Based on Table 9.1,

- (ii) nyatakan bahan-bahan kimia yang boleh digunakan untuk menyediakan garam nitrat itu.

state the chemical substances that can be used to prepare the nitrate salt.

[2 markah/ marks]

- (iii) bandingkan perbezaan keterlarutan bagi kedua-dua garam itu dalam air dan ramalkan jisim garam nitrat yang larut dalam air pada 50.0°C .
Nyatakan hubungan antara suhu dan keterlarutan garam.

Compare the difference in the solubility of both salts in water and predict the mass of nitrate salt that dissolves in water at 50.0°C .

State the relationship between temperature and the solubility of salt.

[3 markah/ marks]

- (b) Jadual 9.2 menunjukkan maklumat tentang bahan tindak balas dan keadaan bagi penyediaan garam magnesium sulfat. Tiga set eksperimen dijalankan untuk mengkaji faktor-faktor yang mempengaruhi kadar tindak balas.

Table 9.2 shows information about the reactants and the condition for the preparation of magnesium sulphate salt. Three sets of experiments were conducted to study factors that affect the rate of reaction.

Set	Bahan tindak balas <i>Reactants</i>		Keadaan <i>Condition</i>
I	1.5 g magnesium <i>1.5 g of magnesium</i>	50 cm ³ asid sulfurik 0.5 mol dm ⁻³ <i>50 cm³ of 0.5 mol dm⁻³ sulphuric acid</i>	70.0 °C
II	1.5 g magnesium <i>1.5 g of magnesium</i>	50 cm ³ asid sulfurik 0.5 mol dm ⁻³ <i>50 cm³ of 0.5 mol dm⁻³ sulphuric acid</i>	Suhu bilik <i>Room temperature</i>
III	1.5 g magnesium <i>1.5 g of magnesium</i>	50 cm ³ asid sulfurik 1.0 mol dm ⁻³ <i>50 cm³ of 1.0 mol dm⁻³ sulphuric acid</i>	Suhu bilik <i>Room temperature</i>

Jadual/ Table 9.2

Berdasarkan Jadual 9.2,

Based on Table 9.2,

- (i) tuliskan persamaan kimia bagi tindak balas yang berlaku dalam Set I. Hitungkan jisim magnesium yang tidak bertindak balas dalam set itu. [Jisim atom relatif: Mg = 24]

write the chemical equation for the reaction that occurs in Set I.

Calculate the mass of the unreacted magnesium in the set.

[Relative atomic mass: Mg = 24]

[6 markah/ marks]

- (ii) nyatakan faktor yang mempengaruhi kadar tindak balas bagi set eksperimen berikut:

- Set I dan Set II
- Set II dan Set III

Bandingkan kadar tindak balas bagi Set II dan Set III. Terangkan jawapan anda berdasarkan Teori Perlanggaran.

state the factor that affects the rate of reaction for the following sets of experiments:

- Set I and Set II
- Set II and Set III

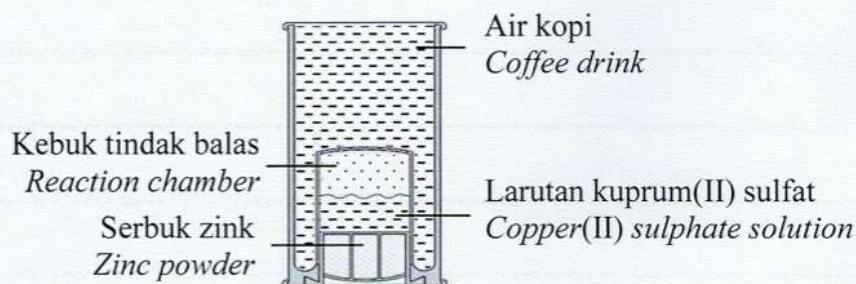
Compare the rate of reaction for Set II and Set III. Explain your answer based on Collision Theory.

[7 markah/ marks]

- 10 Tin pemanas sendiri membolehkan pengguna untuk menikmati makanan dan minuman panas apabila tindak balas yang berlaku di dalam tin itu membebaskan haba. Rajah 10.1 menunjukkan keratan rentas tin pemanas sendiri dan bahan-bahan tindak balas bagi meningkatkan suhu minuman yang terkandung di dalamnya.

Self-heating can allow consumers to enjoy hot food and drinks when a reaction occurs in the can releases heat.

Diagram 10.1 shows the cross section of a self-heating can and reactants to increase the temperature of the drinks in it.



Rajah/ Diagram 10.1

Satu eksperimen dijalankan dengan menggunakan bahan tindak balas yang sama seperti yang terkandung dalam tin pemanas sendiri itu.

Rajah 10.2 menunjukkan susunan radas bagi menyiasat kesan kepekatan larutan tersebut terhadap perubahan suhu campuran.

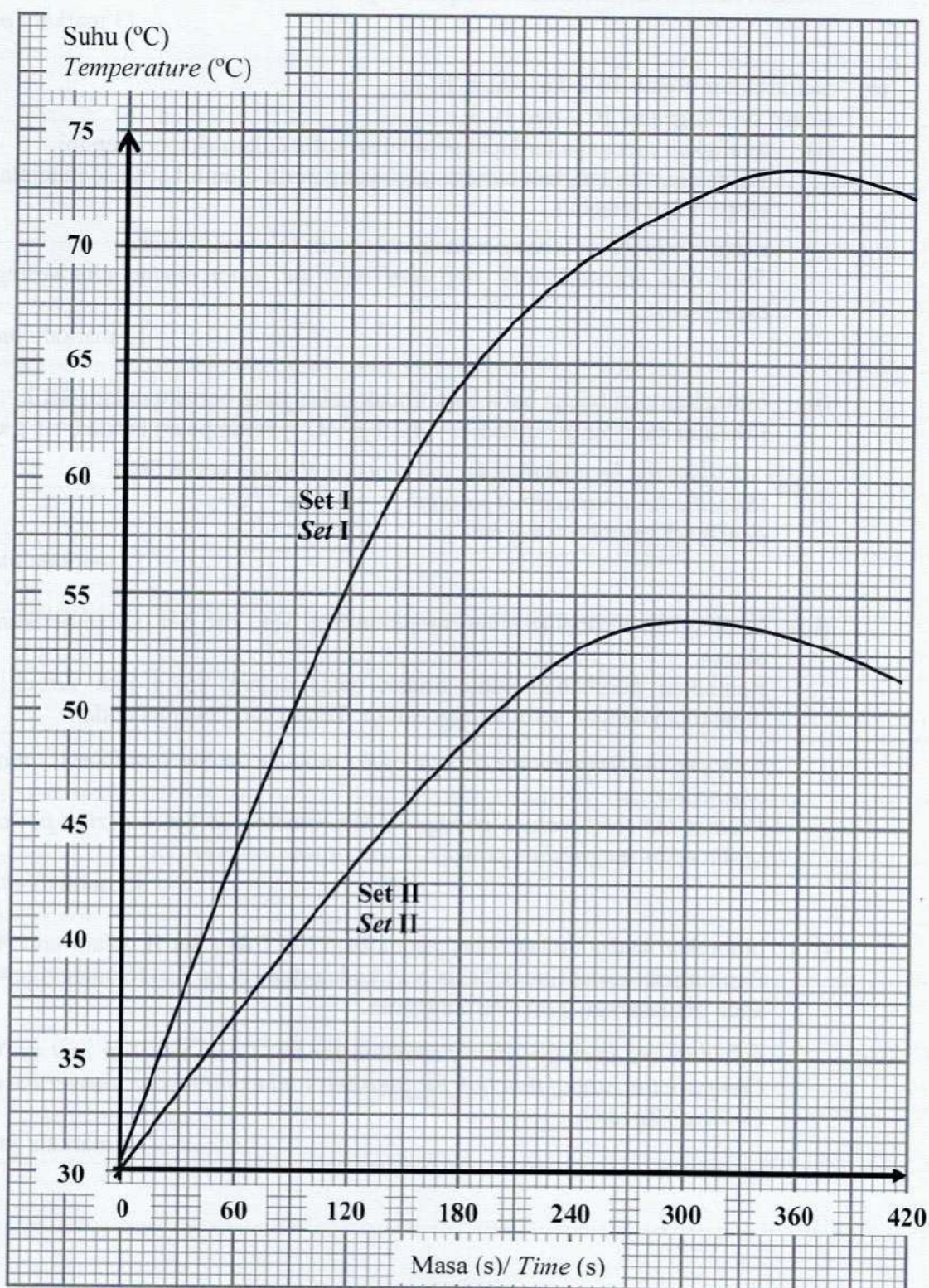
An experiment is conducted by using the same reactants as in the self-heating can. Diagram 10.2 shows the apparatus set-up to investigate the effect of concentration of the solution on the temperature change of the mixture.

Set	Susunan radas Apparatus set-up
I	Serbuk zink berlebihan Excess zinc powder 50 cm³ larutan kuprum(II) sulfat 1.0 mol dm⁻³ 50 cm³ of 1.0 mol dm⁻³ copper(II) sulphate solution Cawan polistirena Polystyrene cup
II	Serbuk zink berlebihan Excess zinc powder 50 cm³ larutan kuprum(II) sulfat 0.5 mol dm⁻³ 50 cm³ of 0.5 mol dm⁻³ copper(II) sulphate solution Cawan polistirena Polystyrene cup

Rajah/ Diagram 10.2

Rajah 10.3 menunjukkan graf suhu campuran melawan masa bagi kedua-dua set eksperimen tersebut.

Diagram 10.3 shows the graph of temperature of the mixture against time for both sets of experiments.



Rajah/ Diagram 10.3

- (a) Nyatakan jenis tindak balas yang berlaku apabila bahan tindak balas dalam tin pemanas sendiri membebaskan haba. Tuliskan persamaan kimia bagi tindak balas ini.

State the type of reaction that occurs when the reactants in the self-heating can releases heat. Write the chemical equation for the reaction.

[3 markah/ mark]

- (b) Berdasarkan Rajah 10.2 dan Rajah 10.3,
Based on Diagrams 10.2 and 10.3,

- (i) terangkan mengapa terdapat perubahan suhu dalam eksperimen ini.
Nyatakan satu langkah berjaga-jaga yang perlu diambil semasa menjalankan eksperimen tersebut.

explain why there is temperature change in this experiment.

State one precautionary step that must be taken during conducting the experiment.

[3 markah/ marks]

- (ii) hitungkan perubahan haba bagi tindak balas yang berlaku dalam Set I.
[Muatan haba tentu larutan, $c = 4.2 \text{ J g}^{-1} \text{ }^{\circ}\text{C}^{-1}$; ketumpatan larutan = 1 g cm^{-3}]

calculate the heat change for the reaction that occurs in Set I.

*[Specific heat capacity of solution, $c = 4.2 \text{ J g}^{-1} \text{ }^{\circ}\text{C}^{-1}$;
density of solution = 1 g cm^{-3}]*

[2 markah/ marks]

- (iii) bandingkan perubahan suhu campuran bagi Set I dan Set II, dan berikan satu alasan.

Ramalkan perubahan suhu tindak balas dalam Set I jika serbuk zink digantikan dengan serbuk magnesium. Terangkan jawapan anda.

compare the temperature change of the mixture for Set I and Set II, and give one reason.

Predict the temperature change of the reaction in Set I if zinc powder is replaced by magnesium powder. Explain your answer.

[5 markah/ marks]

- (iv) hitungkan kadar tindak balas purata bagi Set I dan Set II dalam unit $^{\circ}\text{C s}^{-1}$. Bandingkan kadar tindak balas bagi kedua-dua set itu dan terangkan jawapan anda berdasarkan Teori Perlanggaran.

calculate the average rate of reaction for Set I and Set II in unit of $^{\circ}\text{C s}^{-1}$. Compare the rate of reaction for both sets and explain your answer based on Collision Theory.

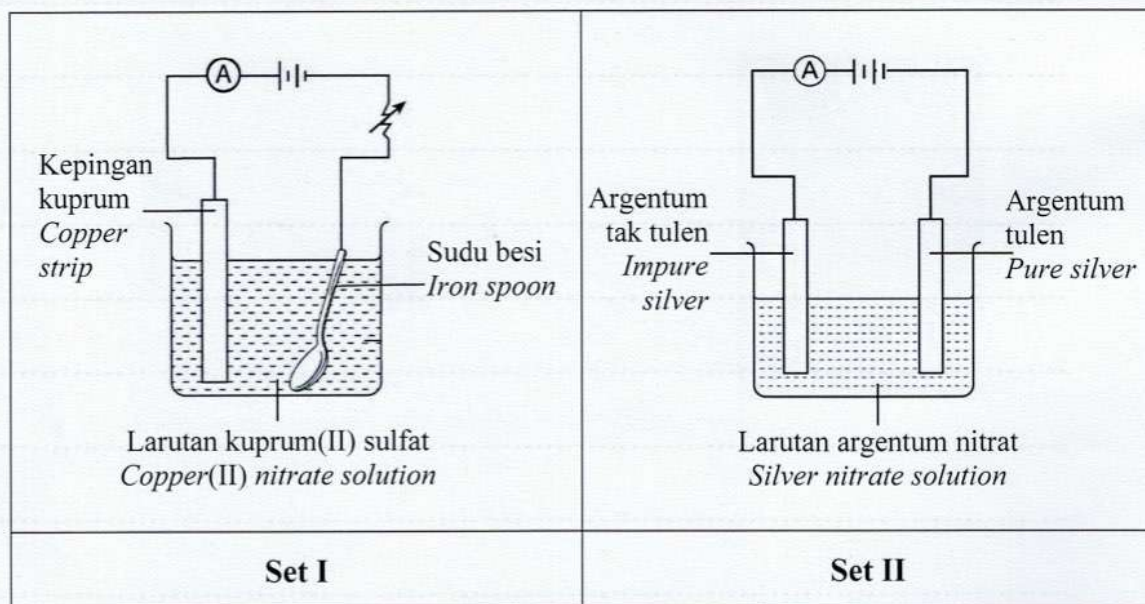
[7 markah/ marks]

Bahagian C

[20 markah]

Soalan ini mesti dijawab

- 11 (a) Rajah 11.1 menunjukkan susunan radas bagi dua set sel elektrolisis.
 Diagram 11.1 shows the set up apparatus of two sets of electrolytic cell.



Rajah/ Diagram 11.1

Jadual 11 menunjukkan sebahagian daripada tindak balas sel setengah.
 Table 11 shows some of the half-cell equations.

Tindak balas sel setengah Half-cell equations	E° / V (298K)
$O_2 + 2H_2O + 4e^- \rightleftharpoons 4OH^-$	+ 0.40
$Cu^{2+} + 2e^- \rightleftharpoons Cu$	+ 0.34
$2H^+ + 2e^- \rightleftharpoons H_2$	0.00
$Ag^+ + e^- \rightleftharpoons Ag$	+ 0.80
$NO_3^- + 4H^+ + 3e^- \rightleftharpoons NO + 2H_2O$	+ 0.96

Jadual/ Table 11

- (i) Nyatakan maksud elektrolisis.
 State the meaning of electrolysis.

[1 markah/ mark]

Berdasarkan Rajah 11.1 dan Jadual 11,
Based on Diagram 11.1 and Table 11,

- (ii) bandingkan dan terangkan pemerhatian bagi tindak balas yang berlaku di katod bagi Set I dan Set II.

compare and explain the observations for the reaction occur at cathode for Set I and Set II.

[4 markah/ marks]

- (iii) lakarkan graf kepekatan ion Cu^{2+} melawan masa bagi Set I.
Berikan satu alasan bagi graf yang dilakar.

*sketch the graph of concentration of Cu^{2+} ions against time for Set I.
Give one reason for the graph sketched.*

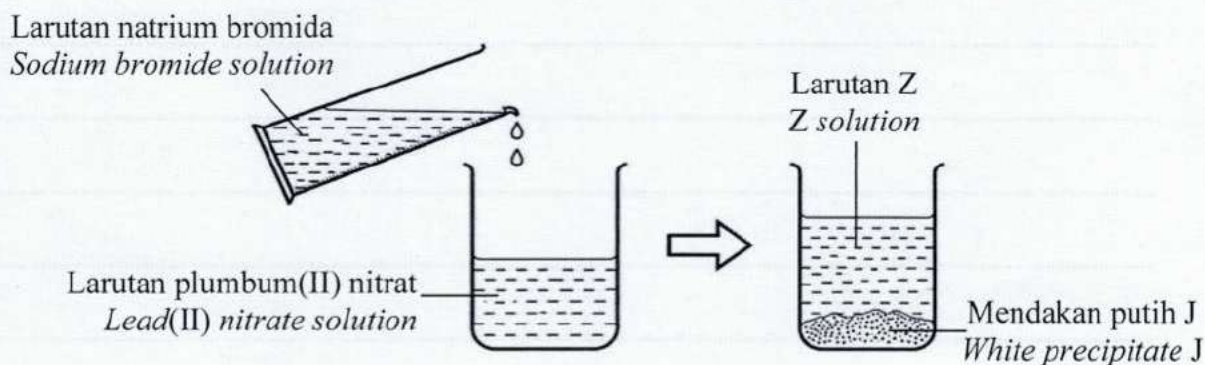
[3 markah/ marks]

- (b) Dalam satu eksperimen lain, sekumpulan murid mencampurkan dua larutan berbeza untuk membentuk mendakan putih J.

Rajah 11.2 menunjukkan susunan radas bagi eksperimen itu.

In another experiment, a group of pupils mixed two different solutions to form white precipitate J.

Diagram 11.2 shows the apparatus set-up for the experiment.



Rajah/ Diagram 11.2

- (i) Kenal pasti mendakan J dan larutan Z.
Kemudian tuliskan persamaan kimia bagi tindak balas itu.

Identify precipitate J and solution Z.

Then write the chemical equation of the reaction.

[4 markah/ marks]

- (ii) Murid-murid itu dikehendaki untuk menguraikan mendakan putih J yang terhasil di dalam Rajah 11.2 kepada unsur-unsur jujuknya. Huraikan prosedur yang perlu dijalankan bagi proses penguraian itu di dalam makmal. Sertakan persamaan setengah di anod dan katod dalam huraian anda.

The pupils are required to decompose the white precipitate J formed in Diagram 11.2 into its constituent elements. Describe the procedure that must be carried out for the decomposition process in the laboratory. In your description, include the half equation at anode and cathode.

[8 markah/ marks]