

Logo sekolah

Nama sekolah

NAMA :

KELAS :

PEPERIKSAAN PERCUBAAN SPM TAHUN 2026

KIMIA

4541/2

Kertas 2

JULAI

$2\frac{1}{2}$ jam



Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

MAKLUMAT UNTUK CALON

1. Tulis **nama** dan **kelas** anda pada ruang yang disediakan.
2. Kertas soalan 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 adalah 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.

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			

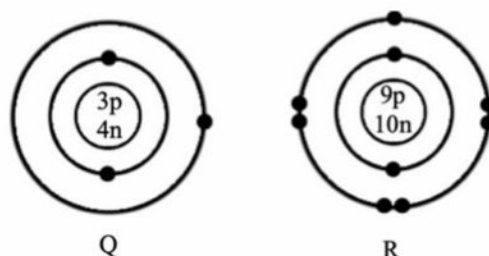
Kertas peperiksaan ini mengandungi 35 halaman bercetak

Bahagian A

[60 markah]

Jawab semua soalan.

- 1 Rajah 1 menunjukkan struktur atom bagi unsur Q dan R.
Diagram 1 shows the atomic structure of element Q and R.



Rajah 1 / Diagram 1

Berdasarkan Rajah 1,
Based on Diagram 1,

- (a) (i) nyatakan bilangan elektron valens bagi atom Q.
state the number of valence electron in atom Q.

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

- (ii) nyatakan nombor nukleon bagi atom Q.
state the nucleon number of atom Q.

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

- (b) Tuliskan perwakilan piawai bagi atom R dalam bentuk ${}^A_Z\text{X}$.
Write the standard representation of atom R in the form of ${}^A_Z\text{X}$.

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

- (c) Takat didih bagi R ialah -180°C .
 Nyatakan susunan zarah dan pergerakan zarah pada suhu bilik.
*The boiling point of R is -180°C .
 State the arrangement of particles and movement of particles at room temperature.*

.....

 [2 markah / 2 marks]



- 2 (a) Rajah 2.1 menunjukkan dua jenis jongkong emas.
Diagram 2.1 shows two types of gold bars.

	
Jongkong emas 24K 24K gold bar Mengandungi 99.9% emas <i>Contains 99.9% gold</i>	Jongkong emas 22K 22K gold bar Mengandungi 91.7% emas dan 8.3% kuprum <i>Contains 91.7% gold and 8.3% copper</i>

Rajah 2.1 / *Diagram 2.1*

- (i) Nyatakan maksud aloi.
State the meaning of alloy.

.....
.....

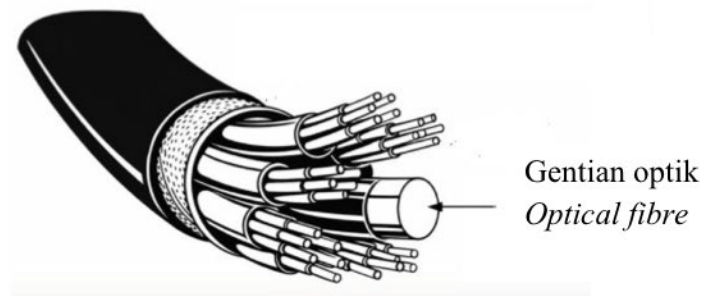
[1 markah / 1 mark]

- (ii) Pilih jongkong emas yang paling sesuai untuk menghasilkan cincin emas.
Beri **satu** sebab.
Choose the gold bar that is most suitable for making a gold ring.
Give **one** reason.

.....
.....

[2 markah / 2 marks]

- (b) Rajah 2.2 menunjukkan gentian optik yang digunakan untuk penghantaran data.
Diagram 2.2 shows an optical fibre that can be used for data transmission.



Rajah 2.2 / Diagram 2.2

Terangkan bagaimana gentian optik menghantar data dan maklumat.
Explain how the optical fibre sends data and information.

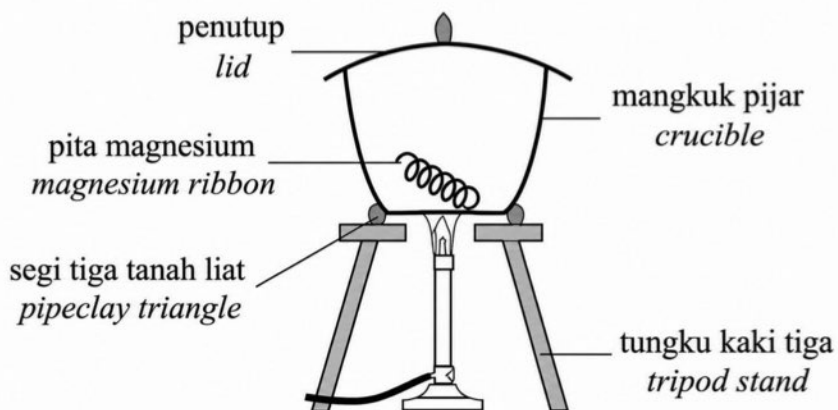
.....

.....

.....

[2 markah / 2 marks]

- 3 Rajah 3 menunjukkan susunan radas untuk menentukan formula empirik magnesium oksida.
Diagram 3 shows the set-up of apparatus to determine the empirical formula of magnesium oxide.



Rajah 3 / Diagram 3

- (a) Apakah maksud formula empirik?
What is the meaning of empirical formula?

.....

[1 markah / 1 mark]

- (b) Jadual 1 menunjukkan keputusan eksperimen itu:
Table 1 shows the results of the experiment:

Perkara <i>Description</i>	Jisim (g) <i>Mass (g)</i>
Mangkuk pijar + penutup <i>Crucible + lid</i>	21.45
Mangkuk pijar + penutup + magnesium <i>Crucible + lid + magnesium</i>	23.85
Mangkuk pijar + penutup + magnesium oksida <i>Crucible + lid + magnesium oxide</i>	25.45

Jadual 1/ Table 1



Berdasarkan Jadual 1, tentukan formula empirik magnesium oksida.

[Jisim atom relatif: Mg = 24, O = 16]

Based on Table 1, determine the empirical formula of magnesium oxide.

[Relative atomic mass: Mg = 24, O = 16]

[4 markah / 4 marks]

- (c) Mengapakah penutup mangkuk pijar perlu dibuka sekali sekala semasa eksperimen dijalankan?

Why does the lid of the crucible need to be opened from time to time during the experiment?

.....

.....

[1 markah / 1 mark]

- 4 Jadual 2 menunjukkan susunan elektron dan takat didih bagi unsur fluorin, klorin dan bromin. *Table 2 shows the electron arrangement and boiling points of element fluorine, chlorine and bromine.*

Unsur <i>Element</i>	Susunan elektron <i>Electron arrangement</i>	Takat didih (°C) <i>Boiling point (°C)</i>
Fluorin / <i>Fluorine</i>	2.7	-101
Klorin / <i>Chlorine</i>	2.8.7	-7
Bromin / <i>Bromine</i>	2.8.18.7	114

Jadual 2 / *Table 2*

- (a) Nyatakan kumpulan bagi unsur-unsur dalam Jadual 2.
State the group of the elements in Table 2.

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

- (b) Berdasarkan Jadual 2, terangkan perubahan takat didih bagi ketiga-tiga unsur itu.
Based on Table 2, explain the change in boiling points for the three elements.

.....
.....
.....
.....
[3 markah / 3 marks]

- (c) (i) Unsur klorin bertindak balas dengan ferum untuk menghasilkan pepejal perang.
Cadangkan nama bagi pepejal perang tersebut.
Element chlorine reacts with iron to form a brown solid.
Suggest the name of the brown solid.

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

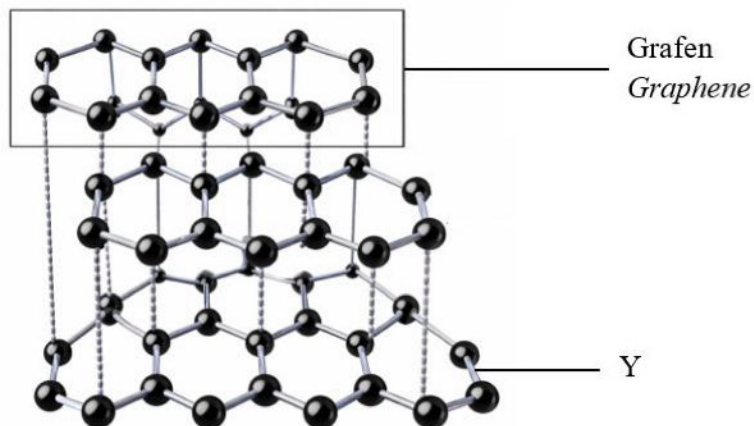
- (ii) Tuliskan persamaan kimia bagi tindak balas tersebut.
Write a chemical equation for the reaction.

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



- 5 (a) Rajah 4.1 menunjukkan struktur grafit dan helaian grafen di dalamnya. Grafen merupakan bahan yang penting dalam bidang nanoteknologi.

Diagram 4.1 shows the structure of graphite and the graphene sheets in it. Graphene is an important material in the field of nanotechnology.



Rajah 4.1 / Diagram 4.1

- (i) Apakah maksud nanoteknologi?
What is the meaning of nanotechnology?

.....
.....

[1 markah / 1 mark]

- (ii) Namakan ikatan Y yang terdapat dalam helaian grafen.
Name the bond Y that is present in the graphene sheet.

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

- (iii) Grafen digunakan untuk membuat kain kalis air yang popular dalam kalangan penyelam dan perenang. Berikan **satu** sebab.
*Graphene is used to make waterproof fabric that is popular among divers and swimmers. Give **one** reason.*

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

- (b) Kaedah Olahan Larutlesapan Tapak Pelupusan dengan menggunakan prinsip elektrolisis merupakan pendekatan Teknologi Hijau yang boleh digunakan untuk mengolah air sisa.

Landfill Leachate Treatment Method by using the electrolysis principle is a Green Technology approach that can be used to treat wastewater.

- (i) Nyatakan nama proses yang digunakan.
State the name of the process that is used.

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

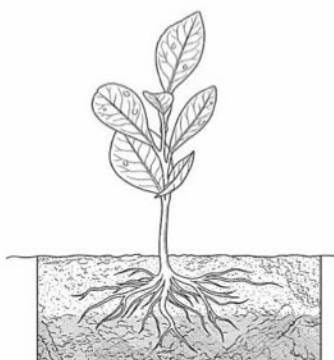
- (ii) Dengan menggunakan bahan-bahan yang disediakan, lukis gambar rajah susunan radas untuk menjalankan proses yang dinyatakan di (b)(i) di dalam makmal.
By using the materials provided, draw an apparatus set-up to conduct the process stated in (b)(i) in the laboratory.

Elektrod karbon	Sisa air	Sel kering	Bikar	Wayar
<i>Carbon electrodes</i>	<i>Waste water</i>	<i>Dry cell</i>	<i>Beaker</i>	<i>Wire</i>

[2 markah / 2 marks]

- (iii) Rajah 4.2 menunjukkan keadaan tanaman dua orang petani yang berbeza. Kedua-dua ladang mereka terletak berhampiran kawasan perindustrian.

Diagram 4.2 shows the condition of the crops of two different farmers. Both of their farms are located near the industrial area.

	
Petani A menggunakan air sungai yang tidak dirawat untuk pengairan tanaman. <i>Farmer A uses untreated river water for crop irrigation.</i>	Petani B menggunakan air sungai yang telah dirawat untuk pengairan tanaman. <i>Farmer B uses treated river water for crop irrigation.</i>

Rajah 4.2 / Diagram 4.2

Berdasarkan Rajah 4.2, terangkan perbezaan keadaan tanaman kedua-dua petani tersebut.

Based on Diagram 4.2, explain the difference in the condition of crops between the two farmers.

.....

.....

.....

[2 markah / 2 marks]



- 6 Rajah 5.1 menunjukkan lateks yang dikumpulkan oleh penoreh getah di ladang getah pada awal pagi.

Diagram 5.1 shows the latex collected by a rubber tapper from the rubber estate early in the morning.



Rajah 5.1 / Diagram 5.1

- (a) Getah asli yang terdapat dalam lateks ialah polimer semula jadi yang terdiri daripada monomer yang berulang.

Natural rubber found in latex is a natural polymer composed of repeating monomers.

- (i) Namakan monomer getah asli.

Name the monomer of natural rubber.

.....

[1 markah / 1 mark]

- (ii) Terangkan mengapa penggumpalan lateks berlaku apabila dibiarkan terdedah kepada udara.

Explain why the coagulation takes place by leaving the latex exposed to the air.

.....

.....

.....

.....

[3 markah / 3 marks]

- (iii) Cadangkan satu bahan yang boleh ditambahkan ke dalam lateks supaya lateks kekal dalam keadaan cecair.

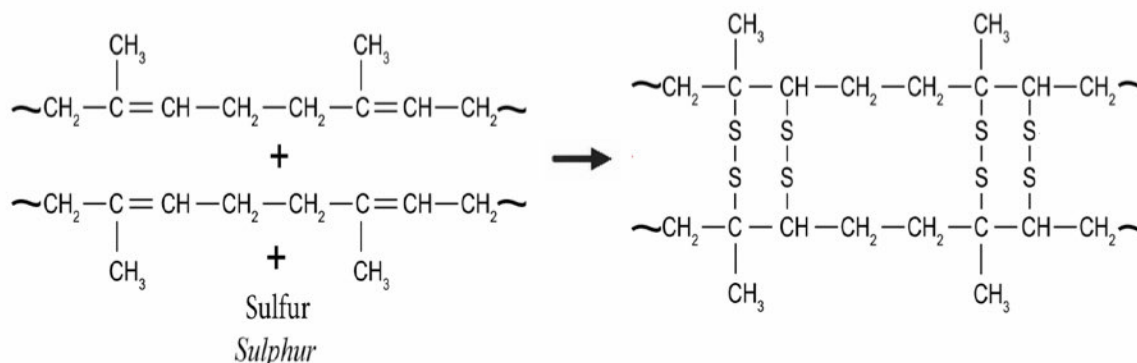
Suggest one substance that can be added to latex so that it remains in liquid form.

.....

[1 markah / 1 mark]

- (b) Rajah 5.2 menunjukkan struktur molekul getah asli selepas mengalami suatu proses untuk menambahbaik sifat-sifatnya.

Diagram 5.2 shows the molecular structure of natural rubber after undergoing a process to enhance its properties.



Rajah 5.2 / Diagram 5.2

- (i) Namakan proses yang berlaku.

Name the process that occurred.

.....

[1 markah / 1 mark]

- (ii) Terangkan bagaimana proses yang terlibat di (b)(i) meningkatkan kekenyalan getah asli.

Explain how the process involved in (b)(i) improved the elasticity of natural rubber.

.....

.....

.....

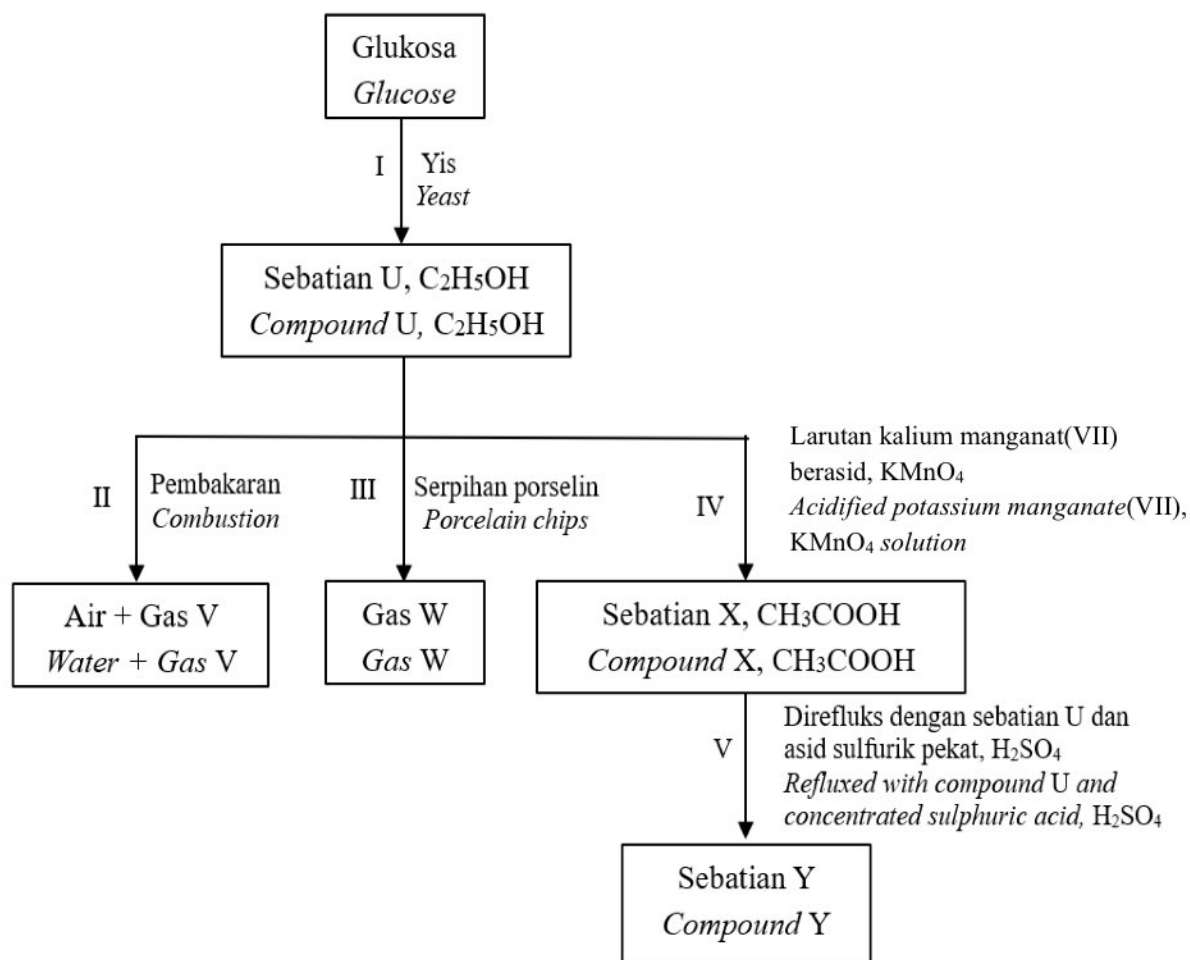
.....

.....

[3 markah / 3 marks]



- 7 Rajah 6 menunjukkan satu siri tindak balas melibatkan sebatian U, C_2H_5OH .
Diagram 6 shows a series of reactions involving compound U, C_2H_5OH .



Rajah 6 / Diagram 6

- (a) Nyatakan nama bagi tindak balas I.
State the name of reaction I.

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

- (b) Kenal pasti gas V.
Identify gas V.

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

- (c) (i) Tuliskan persamaan kimia yang seimbang bagi tindak balas III.
Write a balanced chemical equation for reaction III.

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

- (ii) Lukis formula struktur bagi gas W.
Draw the structural formula of gas W.

[1 markah / 1 mark]

- (d) (i) Nyatakan perubahan warna bagi larutan kalium manganat(VII) berasid dalam tindak balas IV.
State the color change of the acidified potassium manganate(VII) solution in reaction IV.

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

- (ii) Berdasarkan Rajah 6, banding beza formula molekul sebatian U dengan sebatian X yang terhasil daripada tindak balas IV.
Based on Diagram 6, compare and contrast the molecular formula of compound U and compound that is produced from reaction IV.

.....
.....
.....
.....
.....
.....
.....
[3 markah / 3 marks]

- (e) Sebatian Y digunakan dalam industri makanan. Wajarkan penggunaan sebatian Y.
Compound Y is used in the food industry. Justify the usage of compound Y.

.....

.....

.....

.....

[2 markah / 2 marks]

- 8 Persamaan termokimia bagi pembakaran lengkap etanol, $\text{C}_2\text{H}_5\text{OH}$ ditunjukkan di bawah.
The thermochemical equation for the complete combustion of ethanol, $\text{C}_2\text{H}_5\text{OH}$ is shown below.



- (a) Nyatakan jenis tindak balas berdasarkan persamaan termokimia di atas.
State the type of reaction based on the above thermochemical equation.

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

- (b) Lukis gambar rajah aras tenaga bagi tindak balas di atas.
Draw the energy level diagram for the above reaction.

Tenaga
Energy



[1 markah / 1 mark]

- (c) Tentukan kenaikan suhu bagi 200 cm^3 air di dalam bekas kuprum apabila 0.84 g etanol terbakar dengan lengkap.
[Jisim atom relatif: $\text{H} = 1$, $\text{C} = 12$, $\text{O} = 16$; Muatan haba tentu air = $4.2 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1}$]
Determine the temperature increase of 200 cm^3 of water in the copper can when 0.84 g of ethanol is burnt completely.
[Relative atomic mass: $\text{H} = 1$, $\text{C} = 12$, $\text{O} = 16$;
Specific heat capacity of water = $4.2 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1}$]

[3 markah / 3 marks]



- (d) Eksperimen diulangi dengan menggantikan etanol dengan propanol. Jisim propanol yang sama digunakan untuk memanaskan 200 cm^3 air di bawah keadaan yang sama. Ramalkan perubahan suhu air tersebut. Jelaskan jawapan anda.

The experiment is repeated by replacing ethanol with propanol. The same mass of propanol is used to heat 200 cm^3 of water under the same conditions.

Predict the temperature change of the water. Explain your answer.

.....

.....

[2 markah / 2 marks]

- (e) Amir tergelincir di dapur dan menyebabkan pergelangan kakinya bengkak dan sakit. Dia memerlukan pek penyejuk untuk melegakan kesakitan tersebut. Sebagai seorang pelajar kimia, cadangkan bahan-bahan yang sesuai yang boleh didapati di rumah dan nyatakan kaedah untuk menyediakan pek penyejuk itu.

Amir slipped in the kitchen causing his ankle to become swollen and painful. He needs a cold pack to relieve the pain. As a chemistry student, suggest suitable materials available at home and state the method to prepare the cold pack.

.....

.....

.....

.....

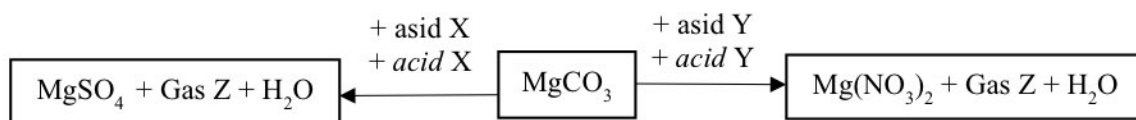
[3 markah / 3 marks]

Bahagian B

[20 markah]

Bahagian ini mengandungi dua soalan. Jawab satu soalan.

- 9 (a) Rajah 7.1 menunjukkan tindak balas bagi garam magnesium karbonat.
Diagram 7.1 shows the reactions of magnesium carbonate salt.



Rajah 7.1 / Diagram 7.1

- (i) Nyatakan definisi bagi garam. Berdasarkan Rajah 7.1, kenal pasti asid X, asid Y dan gas Z. Huraikan satu ujian kimia untuk menentusahkan kehadiran gas Z.

State the definition of salt. Based on Diagram 7.1, identify acid X, acid Y and gas Z. Describe a chemical test to verify the presence of gas Z.

[6 markah / 6 marks]

- (ii) Rajah 7.2 menunjukkan nilai pH bagi asid X dan asid Y dengan kepekatan 0.1 mol dm^{-3}

Diagram 7.2 shows the pH values of acid X and acid Y with a concentration of 0.1 mol dm^{-3} .



Rajah 7.2/ Diagram 7.2

Berdasarkan Rajah 7.2, banding dan terangkan mengapa terdapat perbezaan dalam nilai pH yang diperolehi.

Based on Diagram 7.2, compare and explain why there are differences in the pH value obtained.

[4 markah / 4 marks]

- (b) Jadual 3 menunjukkan maklumat bagi dua set eksperimen dengan menggunakan asid hidroklorik dengan magnesium untuk menyiasat faktor yang mempengaruhi kadar tindak balas.

Table 3 shows the information for two sets of experiments by using hydrochloric acid and magnesium to investigate the factor that affects the rate of reaction.

Set Set	Bahan tindak balas <i>Reactants</i>	Masa untuk mengumpul gas (s) <i>Time to collect gas (s)</i>
I	Serbuk magnesium berlebihan + 50 cm ³ asid hidroklorik 1.0 mol dm ⁻³ pada 50.0°C <i>Magnesium powder in excess + 50 cm³ of 1.0 mol dm⁻³ hydrochloric acid at 50.0°C</i>	30
II	Serbuk magnesium berlebihan + 50 cm ³ asid hidroklorik 1.0 mol dm ⁻³ pada 35.0°C <i>Magnesium powder in excess + 50 cm³ of 1.0 mol dm⁻³ hydrochloric acid at 35.0°C</i>	60

Jadual 3 / Table 3

Berdasarkan Jadual 3,
Based on Table 3,

- (i) tuliskan persamaan ion bagi tindak balas antara magnesium dengan asid hidroklorik. Hitungkan isi padu gas yang terhasil pada keadaan bilik.
[1 mol gas menempati 24 dm³ pada keadaan bilik]

write the ionic equation for the reaction between magnesium and hydrochloric acid. Calculate the volume of gas produced at room condition.
[1 mol of gas occupies 24 dm³ at room condition]

[5 markah / 5 marks]

- (ii) Bandingkan kadar tindak balas antara Set I dan Set II berdasarkan teori perlanggaran.
Compare the rate of reaction between Set I and Set II based on collision theory.

[5 markah / 5 marks]



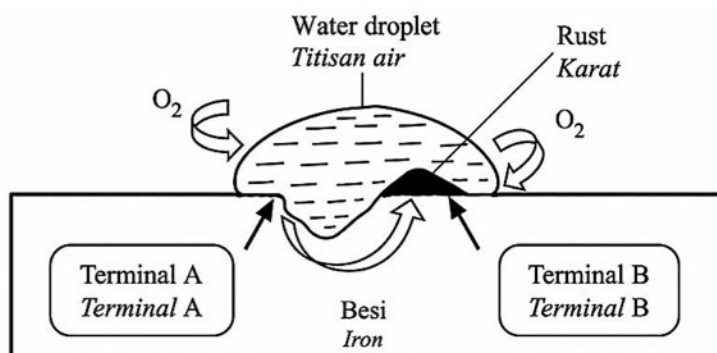
This image shows a full page of white paper with horizontal dashed lines, typical of primary school writing paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

This image shows a full page of a handwriting practice worksheet. It consists of multiple sets of three horizontal dashed lines, providing a guide for letter height and placement. The lines are evenly spaced across the entire page, leaving ample room for writing practice. There is no text or other markings on the page.

[illegible]

- 10 (a) Besi ialah logam yang mudah berkarat. Pengaratan besi merupakan satu contoh tindak balas redoks. Rajah 8.1 menunjukkan mekanisme pengaratan besi.

Iron is a metal that rusts easily. The rusting of iron is an example of a redox reaction. Diagram 8.1 shows the mechanism of rusting of iron.



Rajah 8.1 / Diagram 8.1

Berdasarkan Rajah 8.1,
Based on Diagram 8.1,

- (i) nyatakan jenis tindak balas yang berlaku pada terminal A dan terminal B.
state the type of reaction that occurs at terminal A and terminal B.

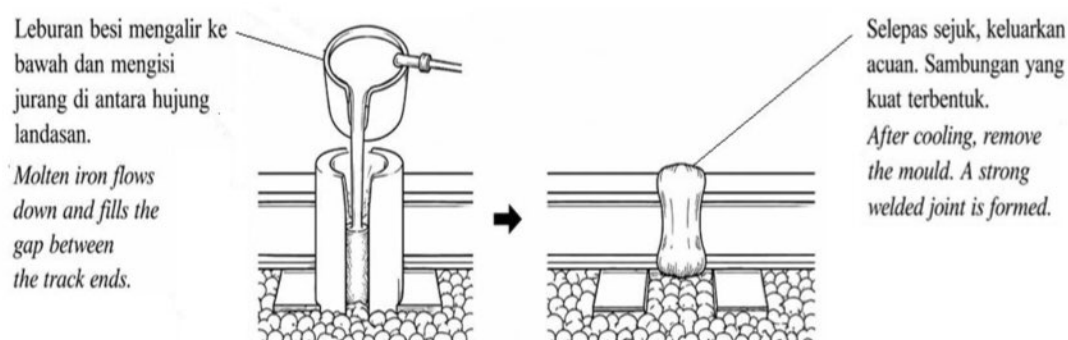
[2 markah / 2 marks]

- (ii) tulis setengah persamaan bagi tindak balas yang berlaku pada terminal A dan terminal B.
write the half equations for the reactions that occur at terminal A and terminal B.

[2 markah / 2 marks]

- (b) Dalam tindak balas termit, aluminium, Al yang lebih reaktif akan menurunkan ferum(III) oksida, Fe_2O_3 untuk menghasilkan leburan besi, Fe dan aluminium oksida, Al_2O_3 . Tindak balas ini sangat berguna bagi menghasilkan leburan besi dalam kuantiti yang kecil untuk mengimpal landasan kereta api seperti yang ditunjukkan dalam Rajah 8.2.

In a thermite reaction, a more reactive aluminium, Al will reduce the iron(III) oxide, Fe_2O_3 to produce molten iron, Fe and aluminium oxide, Al_2O_3 . This reaction is highly useful for producing molten iron in small quantities to weld railway tracks as shown in Diagram 8.2.



Rajah 8.2 / Diagram 8.2

- (i) Tuliskan persamaan kimia untuk tindak balas yang berlaku.
Write the chemical equation for the reaction that occurs.

[2 markah / 2 marks]

- (ii) Hitungkan jisim ferum(III) oksida yang diperlukan untuk menghasilkan 168 g leburan besi bagi kerja mengimpal landasan kereta api.
[Jisim atom relatif: O = 16, Fe = 56]

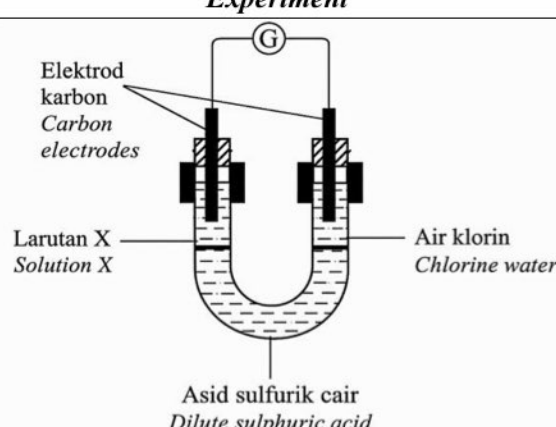
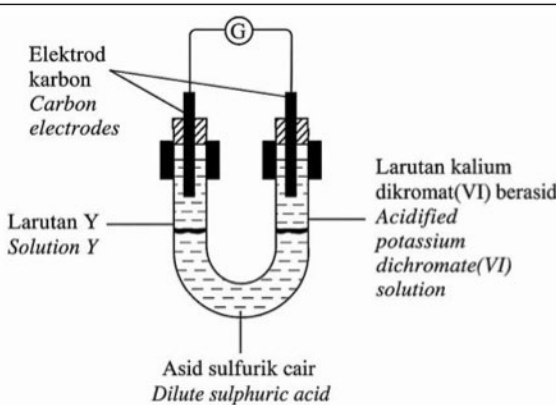
Calculate the mass of iron(III) oxide required to produce 168 g of molten iron for welding railway tracks.

[Relative atomic mass: O = 16, Fe = 56]

[4 markah / 4 marks]

- (c) Dua set eksperimen dijalankan untuk mengkaji tindak balas redoks dari segi pemindahan elektron pada suatu jarak. Keputusan eksperimen ditunjukkan dalam Jadual 4.

Two sets of experiments are carried out to study the redox reaction in terms of electron transfer at a distance. The results of the experiment are shown in Table 4.

Set Set	Eksperimen Experiment	Pemerhatian Observation
I	 Elektrod karbon Carbon electrodes Larutan X Solution X Air klorin Chlorine water Asid sulfurik cair Dilute sulphuric acid	Bagi larutan X: Larutan hijau bertukar menjadi perang. Apabila larutan natrium hidroksida ditambahkan, mendakan perang terbentuk. <i>For solution X: Green solution turns brown. When sodium hydroxide solution is added, a brown precipitate is formed.</i>
II	 Elektrod karbon Carbon electrodes Larutan Y Solution Y Larutan kalium dikromat(VI) berasid Acidified potassium dichromate(VI) solution Asid sulfurik cair Dilute sulphuric acid	Bagi larutan Y: Larutan tidak berwarna bertukar menjadi perang. Apabila larutan kanji ditambahkan, warna biru tua terbentuk. <i>For solution Y: A colourless solution turns brown. When starch solution is added, a dark blue colouration is formed.</i>

Jadual 4 / Table 4

- (i) Berdasarkan pemerhatian dalam Jadual 4, cadangkan larutan X dan larutan Y.
Based on the observation in Table 4, suggest solution X and solution Y.
- (ii) Dalam setiap set eksperimen,
- kenal pasti bahan yang dioksidakan,
Berikan sebab kepada jawapan anda dari segi perubahan nombor pengoksidaan.
 - nyatakan agen pengoksidaan dan agen penurunan.

For each set of experiments,

- *identify the substance that is oxidised.
Give reason to your answer in terms of change in oxidation number.*
- *state the oxidizing agent and reducing agent.*

[10 markah / 10 marks]



This image shows a full page of white paper with horizontal dashed lines, typical of primary school handwriting practice paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

[illegible]

This image shows a full page of white paper with horizontal dashed lines, typical of primary school handwriting practice paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Bahagian C
[20 markah]

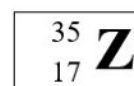
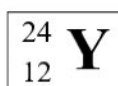
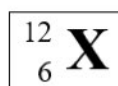
Soalan ini mesti dijawab.

- 11 (a)** Jadual 5 menunjukkan maklumat bagi sebatian A dan sebatian B.
Table 5 shows information for compound A and compound B.

Sebatian A <i>Compound A</i>	- Takat lebur dan takat didih yang tinggi <i>High melting point and boiling point</i> - Boleh mengkonduksikan elektrik dalam keadaan leburan dan larutan akueus <i>Can conduct electricity in molten or aqueous solution</i>
Sebatian B <i>Compound B</i>	- Takat lebur dan takat didih yang rendah <i>Low melting point and boiling point</i> - Tidak boleh mengkonduksikan elektrik dalam semua keadaan <i>Cannot conduct electricity in all states</i>

Jadual 5 / *Table 5*

Rajah 9.1 menunjukkan perwakilan piawai bagi unsur X, Y dan Z.
Diagram 9.1 shows the standard representation of elements X, Y and Z.



Rajah 9.1 / *Diagram 9.1*

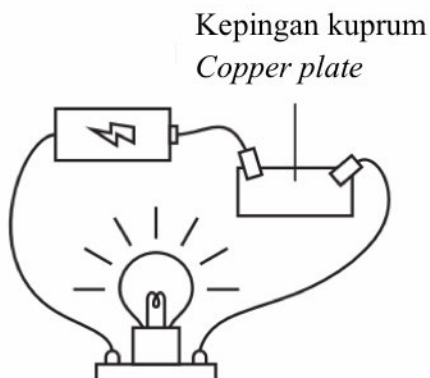
Berdasarkan Jadual 5 dan Rajah 9.1, pilih unsur yang boleh bertindak balas untuk membentuk sebatian A dan sebatian B. Kenal pasti jenis ikatan dalam sebatian A dan sebatian B. Terangkan pembentukan ikatan dalam sebatian A dan tulis formula sebatian A.

Based on Table 5 and Diagram 9.1, choose the elements that can react to form compound A and compound B. Identify the types of bonds in compound A and compound B. Explain the formation of bond in compound A and write the formula of compound A.

[10 markah / 10 marks]

- (b) Rajah 9.2 menunjukkan pemerhatian untuk mengkaji kekonduksian elektrik bagi kuprum.

Diagram 9.2 shows the observation to study the electrical conductivity of copper.



Rajah 9.2 / Diagram 9.2

Dengan menggunakan konsep ikatan logam, huraikan bagaimana kuprum dapat mengalirkan tenaga elektrik.

By using the concept of metallic bond, describe how copper can conduct electricity.

[3 markah / 3 marks]

- (c) Sebatian ion dan sebatian kovalen mempunyai keterlarutan yang berbeza dalam air dan aseton. Dengan memberi satu contoh sebatian ion dan satu contoh sebatian kovalen yang sesuai, huraikan satu eksperimen untuk mengkaji keterlarutan sebatian-sebatian tersebut dalam air dan aseton. Dalam huraian anda, sertakan

- Prosedur
- Pemerhatian

Ionic compounds and covalent compounds have different solubilities in water and acetone. By giving one suitable example of an ionic compound and one suitable example of a covalent compound, describe an experiment to study the solubility of these compounds in water and acetone. In your description, include:

- Procedure
- Observation

[7 markah / 7 marks]



This image shows a full page of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page, typical of notebook or legal stationery. There are no margins, text, or other markings on the page.

This image shows a full page of primary-ruled paper. It features approximately 20 horizontal dashed lines spaced evenly down the page, providing a guide for handwriting practice. The paper is otherwise blank, with no margins, text, or other markings.

[illegible]


IKUTI SAYA DI TELEGRAM
@exercise_students
UNTUK ANALISIS SPM 2026 !

PERIODIC TALBE OF ELEMENTS

PERIODIC TABLE OF ELEMENTS

1 H Hydrogen 1																	2 He Helium 4				
3 Li Lithium 7	4 Be Beryllium 9															5 B Boron 11	6 C Karbon 12	7 N Nitrogen 14	8 O Oxygen 16	9 F Fluorine 19	10 Ne Neon 20
11 Na Sodium 23	12 Mg Magnesium 24															13 Al Aluminium 27	14 Si Silicon 28	15 P Phosphorus 31	16 S Sulphur 32	17 Cl Chlorine 35	18 Ar Argon 40
19 K Potassium 39	20 Ca Calcium 40	21 Sc Scandium 45	22 Ti Titanium 48	23 V Vanadium 51	24 Cr Chromium 52	25 Mn Manganese 55	26 Fe Iron 56	27 Co Cobalt 59	28 Ni Nickel 59	29 Cu Copper 64	30 Zn Zink 65	31 Ga Gallium 70	32 Ge Germanium 73	33 As Arsenic 75	34 Se Selenium 79	35 Br Bromine 80	36 Kr Krypton 84				
37 Rb Rubidium 86	38 Sr Strontium 88	39 Y Yttrium 89	40 Zr Zirconium 91	41 Nb Niobium 93	42 Mb Molybdenum 96	43 Tc Technetium 98	44 Ru Ruthenium 101	45 Rh Rhodium 103	46 Pd Palladium 106	47 Ag Argentum 108	48 Cd Cadmium 112	49 In Indium 115	50 Sn Tin 119	51 Sb Antimoni 122	52 Te Tellurium 128	53 I Iodin 127	54 Xe Xenon 131				
55 Cs Caesium 133	56 Ba Barium 137	57 La Lanthanum 139	72 Hf Hafnium 179	73 Ta Tantalum 181	74 W Tungsten 184	75 Re Rhenium 186	76 Os Osmium 190	77 Ir Iridium 192	78 Pt Platinum 195	79 Au Gold 197	80 Hg Mercury 201	81 Tl Thallium 204	82 Pb Lead 207	83 Bi Bismuth 209	84 Po Polonium 210	85 At Astatine 210	86 Rn Radon 222				
87 Fr Francium 223	88 Ra Radium 226	89 Ac Actinium 227	104 Rf Rutherfordium 257	105 Db Dubium 262	106 Sg Seaborgium 266	107 Bh Bohrium 264	108 Hs Hassium 269	109 Mt Meitnerium 278	110 Ds Darmstadtium 281	111 Rg Roentgenium 280	112 Cn Copernicium 285	113 Nh Nihonium 286	114 Fl Flerovium 289	115 Mc Moscovium 289	116 Lv Livermorium 293	117 Ts Tennessine 294	118 Og Oganesson 294				
		58 Ce Cerium 140	59 Pr Praseo- dinium 141	60 Nd Neodymium 144	61 Pm Promethium 147	62 Sm Samarium 150	63 Eu Europium 152	64 Gd Gadolinium 157	65 Tb Terbium 159	66 Dy Dysprosium 163	67 Ho Holmium 165	68 Er Erbium 167	69 Tm Thulium 169	70 Yb Ytterbium 173	71 Lu Lutetium 175						
		90 Th Thorium 232	91 Pa Protactinium 231	92 U Uranium 238	93 Np Neptunium 237	94 Pu Plutonium 244	95 Am Americium 243	96 Cm Curium 247	97 Bk Berkelium 247	98 Cf Californium 249	99 Es Einsteinium 254	100 Fm Fermium 253	101 Md Mendelevium 256	102 No Nobelium 254	103 Lr Lawrencium 257						

