

SULIT

SET A

NAMA : .....

TINGKATAN: .....

**PROGRAM GEMPUR KECEMERLANGAN**  
**SIJIL PELAJARAN MALAYSIA 2021**  
**ANJURAN BERSAMA**  
**MAJLIS PENGETUA SEKOLAH MALAYSIA NEGERI PERLIS**  
**DAN**  
**MAJLIS GURU CEMERLANG NEGERI PERLIS**

**SIJIL PELAJARAN MALAYSIA 2021**  
**CHEMISTRY**

**4541/2**

**Kertas 2**  
**November**  
**2 1/2 jam**

**Dua jam tiga puluh minit**

**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

1. Tulis **nama** dan **tingkatan** anda pada ruang yang disediakan.
2. Kertas soalan ini adalah dalam dwibahasa.
3. Soalan dalam bahasa Melayu mendahului soalan yang sepadan dalam bahasa Inggeris.
4. Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Melayu atau bahasa Inggeris.
5. Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.

| Untuk Kegunaan Pemeriksa |        |              |                  |
|--------------------------|--------|--------------|------------------|
| Kod 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                   |        |              |                  |

Kertas soalan ini mengandungi 30 halaman bercetak.

**Bahagian A**  
**Section A**

[60 markah]

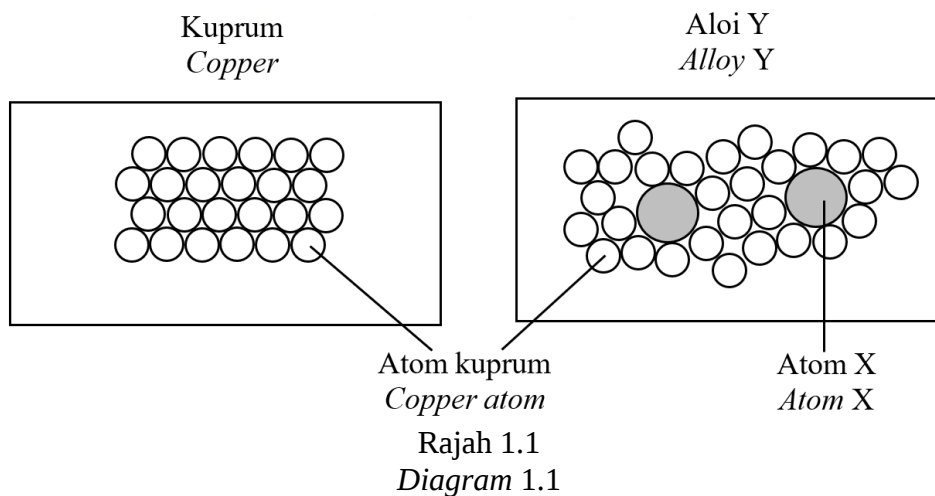
[60 marks]

Jawab **semua** soalan dalam bahagian ini.

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

- 1 Rajah 1.1 menunjukkan susunan atom dalam kuprum tulen dan aloi Y. Y ialah aloi bagi kuprum.

*Diagram 1.1 shows the arrangement of atoms in pure copper and alloy Y. Y is an alloy of copper.*



- (a) (i) Nyatakan nama atom X.  
*State the name of atom X.*

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

- (ii) Terangkan mengapa aloi Y lebih keras daripada logam tulennya?  
*Explain why alloy Y is harder than its pure metal?*

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

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- (b) Rajah 1.2 menunjukkan peralatan makmal yang diperbuat daripada kaca.  
*Diagram 1.2 shows the laboratory glassware made of glass.*



Rajah 1.2  
*Diagram 1.2*

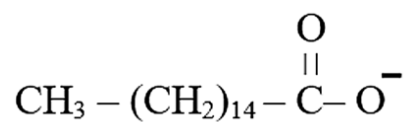
- (i) Nyatakan komponen utama kaca.  
*State the main component of glass.*

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

- (ii) Berikan **satu** sebab kenapa kaca borosilikat adalah kaca yang paling sesuai digunakan untuk membuat peralatan makmal.  
*State **one** reason why borosilicate glass is most suitable to use to make laboratory glassware?*

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

- 2 Rajah 2.1 menunjukkan formula struktur satu anion sabun.  
*Diagram 2.1 shows the structural formula of a soap anion.*



Rajah 2.1  
 Diagram 2.1

- (a) (i) Bulatkan pada bahagian anion sabun yang larut dalam air pada Rajah 2.1.  
*Circle the part of the soap anion that is soluble in water in the Diagram 2.1.*  
 [1 markah]  
 [1 mark]

- (ii) Namakan bahagian anion sabun yang larut dalam minyak.  
*Name the part of the soap anion that is soluble in grease.*

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

- (b) Rajah 2.2 menunjukkan sejenis kosmetik yang menggunakan nanoteknologi.  
*Diagram 2.2 shows a type of cosmetic that utilises nanotechnology.*



Rajah 2.2  
 Diagram 2.2

- (i) Nyatakan **satu** kelebihan penggunaan nanoteknologi dalam kosmetik dalam Rajah 2.2.  
*State **one** advantage of nanotechnology application in the cosmetic in Diagram 2.2.*

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

- (ii) Merkuri digunakan dengan meluas dalam produk kosmetik.  
Nyatakan **satu** kesan sampingan penggunaan merkuri dalam produk kosmetik.  
*Mercury is widely used in cosmetic products.*  
*State **one** side effect of mercury in cosmetic products.*

.....

.....

[1 markah]

[1 mark]

- (c) Nyatakan **satu** aplikasi nanoteknologi dalam kehidupan selain dari kosmetik.  
*State **one** application of nanotechnology in daily life other than in cosmetics.*

.....

.....

[1 markah]

[1 mark]

- 3 Jadual 1 menunjukkan bilangan proton dan bilangan neutron dalam atom R, S dan T.  
*Table 1 shows the number of protons and the number of neutrons in atom R, S and T.*

| Atom<br><i>Atom</i> | Bilangan proton<br><i>Number of protons</i> | Bilangan neutron<br><i>Number of neutrons</i> |
|---------------------|---------------------------------------------|-----------------------------------------------|
| R                   | 11                                          | 12                                            |
| S                   | 11                                          | 13                                            |
| T                   | 12                                          | 12                                            |

Jadual 1  
*Table 1*

- (a) Nyatakan tiga zarah subatom.  
*State three subatomic particles of an atom.*

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

- (b) (i) Apakah yang dimaksudkan dengan isotop?  
*What is meant by isotope?*

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

- (ii) Atom-atom yang manakah merupakan isotop?  
*Which atoms are isotopes?*

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

- (iii) Nyatakan isotop yang digunakan untuk merawat penyakit kanser.  
*State the isotope that is used to treat cancer diseases.*

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

- (c) (i) Tuliskan susunan elektron bagi atom T.  
*Write the electron arrangement of atom T.*

.....  
[1 markah]

[1 mark]

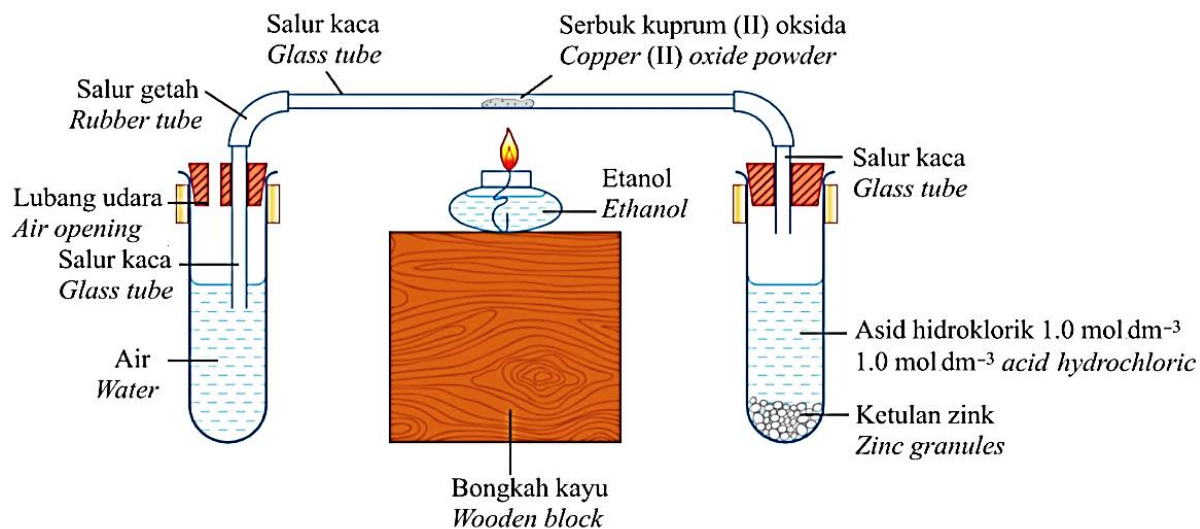
- (ii) Apakah elektron valens bagi atom R?  
*What is the valence electron of atom R?*

.....  
[1 markah]

[1 mark]

- 4 Rajah 3 menunjukkan susunan radas untuk menentukan formula empirik bagi kuprum(II) oksida.

Diagram 3 shows the apparatus set-up to determine the empirical formula of copper(II) oxide.



Rajah 3  
Diagram 3

Jadual 2 di bawah menunjukkan keputusan eksperimen ini.

Table 2 below shows the result of this experiment.

| Penerangan<br>Description                                       | Jisim (g)<br>Mass (g) |
|-----------------------------------------------------------------|-----------------------|
| Salur kaca<br>Glass tube                                        | 32.25                 |
| Salur kaca + kuprum(II) oksida<br>Glass tube + copper(II) oxide | 42.25                 |
| Salur kaca + kuprum<br>Glass tube + copper                      | 40.25                 |

Jadual 2  
Table 2

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

[1 markah]

[1 mark]

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SULIT

- (b) (i) Berdasarkan jadual di atas, hitung jisim bagi:  
*Based on the table above, calculate the mass of:*  
Kuprum:  
*Copper :.....*  
Oksigen:  
*Oxygen:.....*  
[2 markah]  
[2 marks]

- (ii) Hitung nisbah mol bagi atom kuprum kepada atom oksigen.  
[Jisim atom relatif: O = 16, Cu = 64]  
*Calculate the ratio of moles of copper atoms to oxygen atoms.*  
[Relative atomic mass: O = 16, Cu = 64]

[2 markah]  
[2 marks]

- (iii) Tentukan formula empirik bagi kuprum(II) oksida.  
*Determine the empirical formula of copper(II) oxide.*

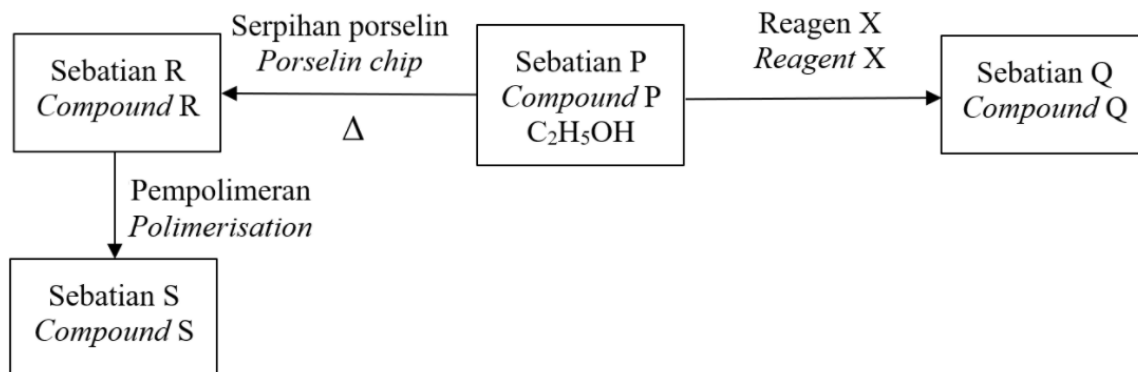
.....  
[1 markah]  
[1 mark]

- (c) Nyatakan bagaimana untuk menentukan bahawa tindak balas yang berlaku antara kuprum oksida dengan hidrogen telah lengkap.  
*State how to determine that the reaction between copper oxide with hydrogen has completed.*

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

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- 5 Rajah 4 menunjukkan carta alir bagi penukaran sebatian P kepada sebatian Q dan R.  
*Diagram 4 shows a flow chart of conversion of compound P to compound Q and R.*



Rajah 4  
*Diagram 4*

Apabila air bromin ditambah kepada sebatian R, warna perang air bromin dinyahwarnakan.  
*When bromine water is added to compound R, the brown bromine water is decolourised.*

- (a) (i) Namakan sebatian R.  
*Name a compound R.*

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

- (ii) Lukiskan formula struktur bagi sebatian R.  
*Draw a structural formula for compound R.*

[1 markah]  
[1 mark]

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- (b) Apabila campuran sebatian P, reagen X dan asid sulfurik dipanaskan secara perlahan-lahan ia akan menghasilkan sebatian Q. Sebatian Q juga dapat menukarkan warna kertas litmus biru kepada merah.

*When the mixture of compound P, reagent X and sulfuric acid is gently heated it will produce compound Q. Compound Q also turns the colour of blue litmus paper to red.*

- (i) Namakan reagen X.  
*Name the reagent X.*

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

- (ii) Nyatakan perubahan warna bagi reagen di 5(b)(i) semasa tindak balas berlaku.  
*State the colour change of the reagent at 5(b)(i) during the reaction.*

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

- (c) Sebatian R mengalami tindak balas pempolimeran untuk menghasilkan sebatian S.  
*Compound R undergoes a polymerisation reaction to produce compound S.*

- (i) Nyatakan nama sebatian S.  
*State the name of compound S.*

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

- (ii) Lukiskan formula struktur bagi S.  
*Draw the structural formula for S.*

[1 markah]  
[1 mark]

- (d) En. Hamid menghidap penyakit angin ahmar. Isterinya, Puan Rokiah mesti memastikan makanan yang disediakan tidak menjejaskan kesihatan suaminya.  
*Mr. Hamid suffered from a stroke. His wife, Madam Rokiah must ensure that the food prepared does not affect her husband's health.*

Jadual 3 menunjukkan maklumat tentang minyak Y dan Z.  
*Table 3 shows the information about oils Y and Z.*

| Jenis minyak<br><i>Type of oil</i>                                       | Y    | Z    |
|--------------------------------------------------------------------------|------|------|
| Peratusan lemak tepu (%)<br><i>Percentage of saturated fat (%)</i>       | 12.0 | 14.4 |
| Peratusan lemak tak tepu (%)<br><i>Percentage of unsaturated fat (%)</i> | 88.0 | 85.6 |

Jadual 3  
*Table 3*

Minyak masak manakah yang lebih sesuai digunakan oleh Puan Rokiah? Jelaskan jawapan anda.  
*Which oil is more suitable to be used by Madam Rokiah? Explain your answer.*

.....  
.....

[2 markah]  
[2 marks]

- 6 Jadual 4 menunjukkan nilai pH bagi larutan asid A dan asid B yang mempunyai kepekatan yang sama. Kedua-dua asid itu adalah asid monoprotik.  
*Table 4 shows the pH values for solutions of acid A and acid B which have the same concentration. Both of the acids are monoprotic acids.*

| Asid<br>Acid | Nilai pH<br>pH value |
|--------------|----------------------|
| A            | 1                    |
| B            | 4                    |

Jadual 4

Table 4

- (a) (i) Cadangkan nama bagi asid A dan asid B.  
*Suggest the names of acid A and acid B.*

A: .....

B: .....

[2 markah]

[2 marks]

- (ii) Terangkan mengapa dua larutan asid ini mempunyai nilai pH yang berbeza.  
*Explain why these two acid solutions have different pH values.*

.....

.....

.....

.....

[3 markah]

[3 marks]

- (iii) Hitung kemolaran bagi asid A.  
*Calculate the molarity of acid A.*

[1 markah]

[1 mark]

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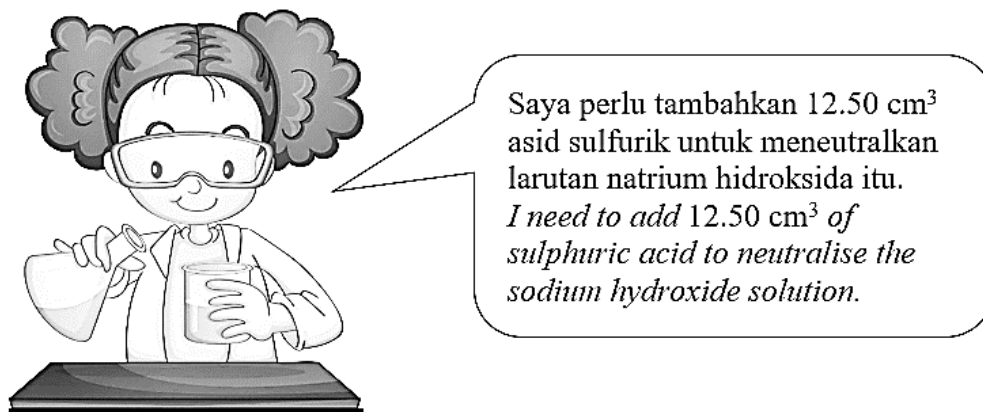
**SULIT**

- (b)  $25\text{ cm}^3$  asid A melengkapkan peneutralan  $50\text{ cm}^3$  larutan natrium hidroksida, NaOH. Dengan menggunakan asid A yang dinamakan di 6(a)(i), tulis persamaan kimia seimbang bagi tindak balas peneutralan itu.  
 *$25\text{ cm}^3$  of acid A completely neutralises  $50\text{ cm}^3$  of sodium hydroxide solution, NaOH. By using the named acid A at 6(a)(i), write a balanced chemical equation for the neutralisation reaction.*

.....  
[1 markah]

[1 mark]

- (c) Rajah 5 menunjukkan seorang murid sedang mencampurkan asid sulfurik yang sama kepekataannya dengan asid A kepada larutan natrium hidroksida yang sama di 6(b).  
*Diagram 5 shows a student adding sulphuric acid with the same concentration as acid A to the sodium hydroxide solution as in 6(b).*



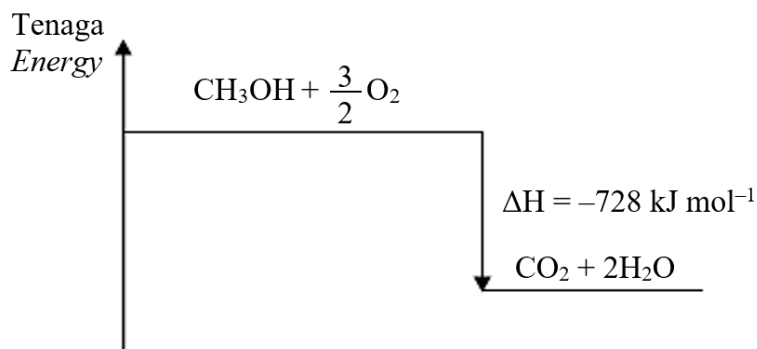
Rajah 5  
Diagram 5

Adakah murid itu menambahkan isi padu asid sulfurik dengan betul? Berikan sebab.  
*Does the student add the correct volume of the sulphuric acid? Give the reason.*

.....  
[2 markah]

[2 marks]

- 7 Rajah 6 menunjukkan gambar rajah aras tenaga bagi pembakaran metanol.  
*Diagram 6 shows the energy level diagram for the combustion of methanol.*



Rajah 6  
*Diagram 6*

- (a) Nyatakan **satu** maklumat yang boleh diperolehi daripada gambar rajah aras tenaga dalam Rajah 6.  
*State **one** information that can be obtained from the energy level diagram in Diagram 6.*

.....  
[1 markah]

[1 mark]

- (b) Lukis gambar rajah susunan radas yang berlabel bagi menentukan haba pembakaran metanol.  
*Draw a labelled diagram of the setup of apparatus to determine the heat of combustion of methanol.*

[2 markah]

[2 marks]

[Lihat halaman sebelah

**SULIT**

- (c) Haba yang terbebas daripada pembakaran lengkap 1.6 g metanol digunakan untuk memanaskan  $200 \text{ cm}^3$  air.

*Heat energy released from the complete combustion of 1.6 g methanol is used to heat  $200 \text{ cm}^3$  of water.*

- (i) Hitung tenaga haba yang dibebaskan dalam tindak balas ini.

*Calculate the heat energy released in the reaction.*

[Jisim molar metanol,  $\text{CH}_3\text{OH} = 32$ ]

[Molar mass of methanol,  $\text{CH}_3\text{OH} = 32$ ]

[2 markah]

[2 marks]

- (ii) Hitung perubahan suhu dalam tindak balas ini.

*Calculate the temperature change in the reaction.*

[Muatan haba tentu air:  $4.2 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1}$ ]

[Specific heat capacity of water:  $4.2 \text{ J g}^{-1} \text{ }^\circ\text{C}^{-1}$ ]

[1 markah]

[1 mark]

[Lihat halaman sebelah

**SULIT**

- (d) Nilai haba pembakaran metanol yang diperoleh daripada eksperimen biasanya lebih rendah daripada nilai teori.  
Cadangkan **satu** langkah berjaga-jaga yang perlu diambil untuk memperoleh keputusan yang lebih tepat.

*The value of the heat of combustion of methanol obtained from the experiment is always less than the theoretical value.*

*Suggest **one** precaution step that should be taken in order to get a more accurate result.*

.....  
[1 markah]

[1 mark]

- (e) Jadual 5 menunjukkan formula molekul dan haba pembakaran propanol dan butanol.  
*Table 5 shows the molecular formula and heat of combustion of propanol and butanol.*

| Alkohol<br><i>Alcohol</i>   | Formula molekul<br><i>Molecular formula</i> | Haba pembakaran/ $\text{kJ mol}^{-1}$<br><i>Heat of combustion/ <math>\text{kJ mol}^{-1}</math></i> |
|-----------------------------|---------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Propanol<br><i>Propanol</i> | $\text{C}_3\text{H}_7\text{OH}$             | -2016                                                                                               |
| Butanol<br><i>Butanol</i>   | $\text{C}_4\text{H}_9\text{OH}$             | -2678                                                                                               |

Jadual 5

Table 5

Berdasarkan maklumat dalam Jadual 5, terangkan mengapa terdapat perbezaan nilai haba pembakaran antara propanol dan butanol.

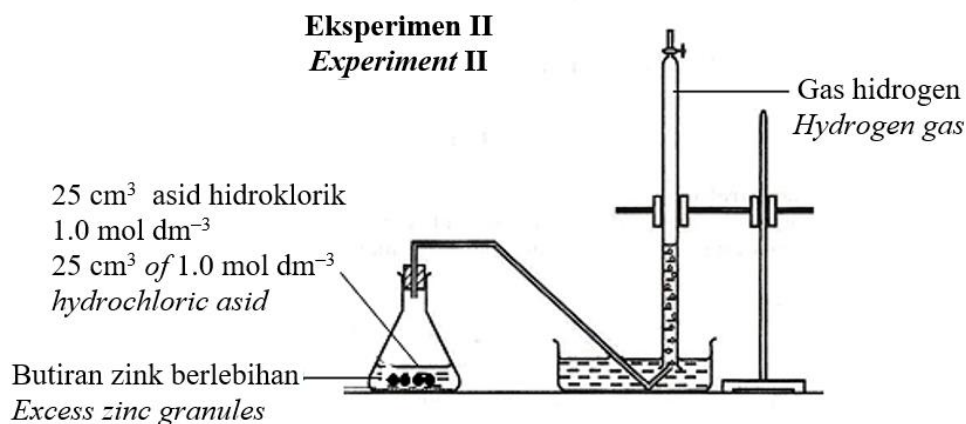
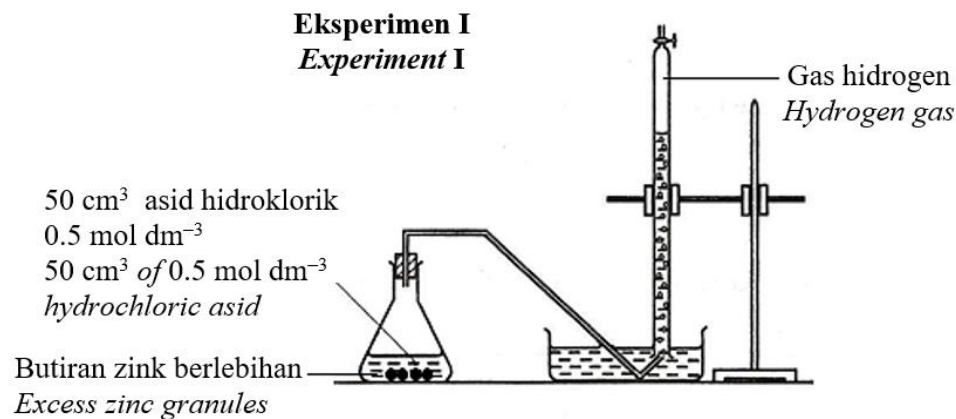
*Based on the information in Table 5, explain why there is a difference in the value of heat of combustion between propanol and butanol.*

.....  
.....  
.....  
[3 markah]

[3 marks]

- 8 Rajah 7 menunjukkan dua eksperimen untuk mengkaji satu faktor yang mempengaruhi kadar tindak balas antara zink dan asid hidroklorik.

*Diagram 7 shows two experiments to investigate one factor that affects the rate of reaction between zinc and hydrochloric acid.*



Rajah 7  
Diagram 7

- (a) Bagaimanakah kadar tindak balas ditentukan dalam eksperimen ini?  
*How to determine the rate of reaction in this experiment?*

.....

.....

[1 markah]

[1 mark]

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- (b) Isipadu maksimum gas hidrogen yang terbebas dalam Eksperimen I ialah  $V \text{ cm}^3$ .  
*The maximum volume of hydrogen gas released in Experiment I is  $V \text{ cm}^3$ .*

- (i) Berapakah isipadu gas hidrogen yang dibebaskan dalam Eksperimen II berbanding Eksperimen I? Terangkan.

*What is the volume of hydrogen gas released in Experiment II compared to Experiment I? Explain.*

.....

.....

[2 markah]

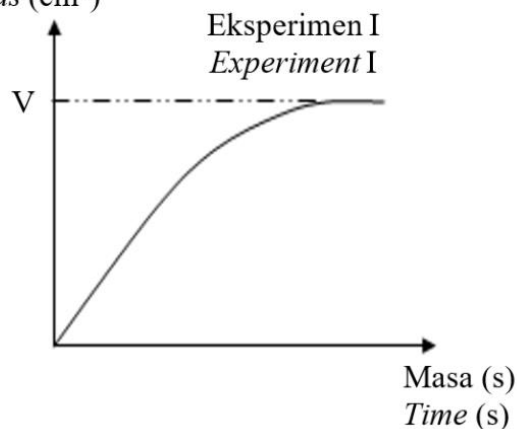
[2 marks]

- (ii) Graf isipadu gas melawan masa untuk Eksperimen I dilakarkan seperti ditunjukkan dalam Graf 1.1.

*The graph for the volume of gas against time for Experiment I is sketched as shown in Graph 1.1.*

Isi padu gas hidrogen ( $\text{cm}^3$ )

*Volume of hydrogen gas ( $\text{cm}^3$ )*



Graf 1.1

Graph 1.1

Lakarkan lengkung untuk Eksperimen II di atas paksi yang sama dalam Graf 1.1.  
*Sketch the curve for Experiment II on the same axes in Graph 1.1.*

[1 markah]

[1 mark]

- (c) (i) Berdasarkan Rajah 7, eksperimen manakah mempunyai kadar tindak balas yang lebih tinggi?

*Based on Diagram 7, which experiment has a higher rate of reaction?*

.....  
[1 markah]

[1 mark]

- (ii) Merujuk kepada teori perlanggaran, terangkan bagaimana kadar tindak balas dalam Eksperimen I dan Eksperimen II berbeza.

*Referring to the collision theory, explain how the rate of reaction in Experiment I and Experiment II are different.*

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

[3 markah]

[3 marks]

- (d) Jadual 6 menunjukkan tiga eksperimen yang telah dijalankan oleh seorang pelajar.

*Table 6 shows three experiments carried out by a student.*

| <b>Eksperimen</b><br><i>Experiment</i> | <b>Bahan tindak balas</b><br><i>Reactants</i>                                                                                                                                                                         |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A                                      | Ketulan kalsium karbonat berlebihan dan 25 cm <sup>3</sup> asid hidroklorik 1.0 mol dm <sup>-3</sup> .<br><i>Excess calcium carbonate chips and 25 cm<sup>3</sup> of 1.0 mol dm<sup>-3</sup> hydrochloric acid.</i>   |
| B                                      | Ketulan kalsium karbonat berlebihan dan 25 cm <sup>3</sup> asid hidroklorik 0.5 mol dm <sup>-3</sup> .<br><i>Excess calcium carbonate chips and 25 cm<sup>3</sup> of 0.5 mol dm<sup>-3</sup> hydrochloric acid.</i>   |
| C                                      | Ketulan kalsium karbonat berlebihan dan 100 cm <sup>3</sup> asid hidroklorik 0.5 mol dm <sup>-3</sup> .<br><i>Excess calcium carbonate chips and 100 cm<sup>3</sup> of 0.5 mol dm<sup>-3</sup> hydrochloric acid.</i> |

Jadual 6

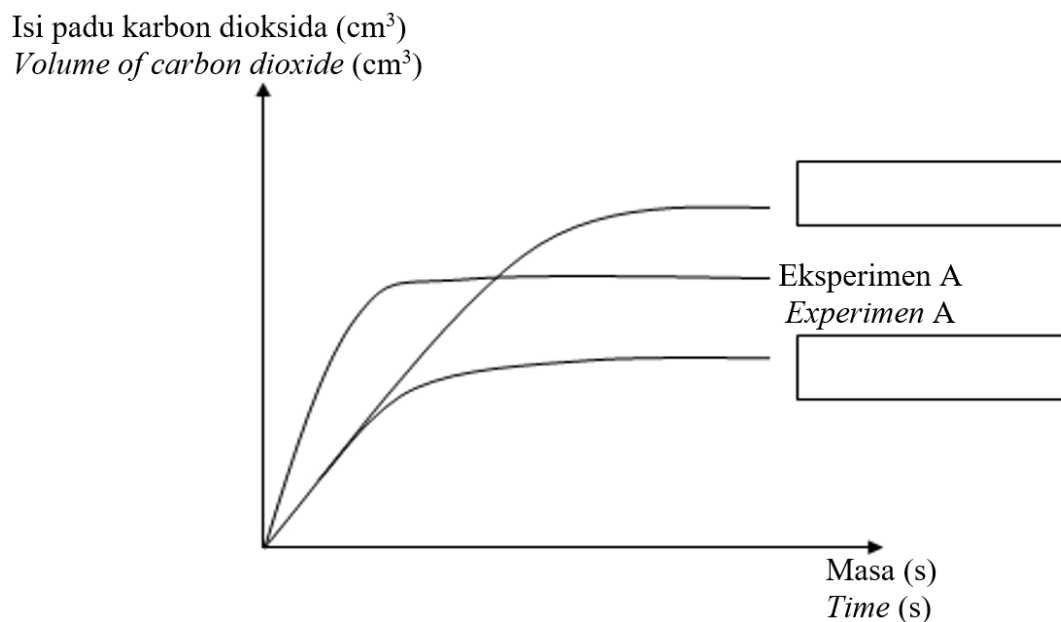
Table 6

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Berdasarkan Jadual 6, tentukan lengkung manakah mewakili Eksperimen B dan C dalam Graf 1.2 di bawah. Tuliskan jawapan anda dalam kotak yang disediakan.

Based on Table 6, determine which curves represent the Experiment B and C in Graph 1.2 below. Write your answers in the boxes provided.



Graf 1.2  
Graph 1.2

[2 markah]  
[2 marks]

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**Bahagian B**  
**Section B**

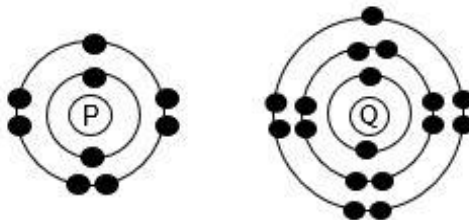
[20 markah]

[20 marks]

Jawab mana-mana **satu** soalan dalam bahagian ini.

*Answer any **one** question in this section.*

- 9 Rajah 8.1 menunjukkan susunan elektron bagi unsur P dan Q .  
*Diagram 8.1 shows the electron arrangement of element P and Q.*

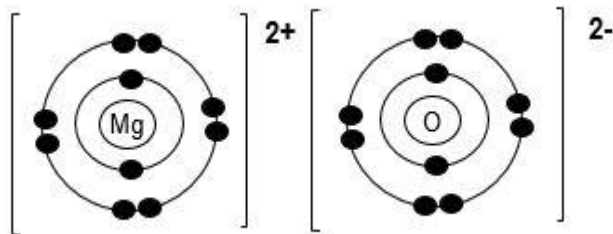


Rajah 8.1  
*Diagram 8.1*

- (a) (i) Nyatakan kedudukan unsur P di dalam Jadual Berkala Unsur.  
Berikan alasan bagi jawapan anda.  
*State the position of element P in the Periodic Table of Elements.*  
*Give reason for your answer.*
- [4 markah]  
[4 marks]
- (ii) Unsur Q bertindak balas dengan wul besi panas membentuk pepejal perang.  
Tuliskan persamaan kimia untuk menunjukkan tindak balas yang berlaku.  
*Element Q reacts with hot iron wool to form brown solid.*  
*Write the chemical equation to show the reaction occurred.*
- [2 markah]  
[2 marks]
- (iii) Unsur P dan Q mempunyai sifat kimia yang sama tetapi menunjukkan kereaktifan berbeza dalam tindak balas kimia.  
Bandingkan kereaktifan unsur P dan Q. Terangkan jawapan anda.  
*Elements P and Q have the same chemical properties but show different reactivity in chemical reactions.*  
*Compare the reactivity of element P and Q. Explain your answer.*
- [4 markah]  
[4 marks]

[Lihat halaman sebelah

- (b) Rajah 8.2 menunjukkan susunan elektron bagi magnesium oksida.  
*Diagram 8.2 shows the electron arrangement of magnesium oxide.*



Rajah 8.2  
*Diagram 8.2*

- (i) Huraikan pembentukan ikatan kimia di antara unsur magnesium dan oksigen dalam magnesium oksida.  
*Describe the formation of the chemical bond between elements of magnesium and oxygen in the magnesium oxide.*

[6 markah]

[6 marks]

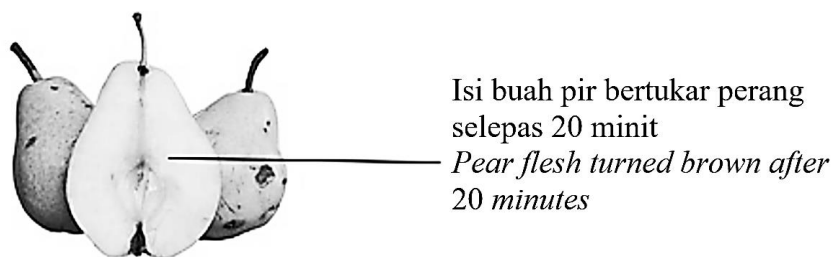
- (ii) Magnesium oksida wujud sebagai pepejal pada suhu bilik.  
Terangkan mengapa?  
*Magnesium oxide exists as solid at room temperature.*  
*Explain why?*

[4 markah]

[4 marks]

- 10 (a) Rajah 9.1 menunjukkan situasi tindak balas redoks yang berlaku dalam kehidupan seharian.

*Diagram 9.1 shows the situation of a redox reaction that occurs in daily life.*



Rajah 9.1  
Diagram 9.1

Berdasarkan perubahan yang ditunjukkan dalam Rajah 9.1, nyatakan jenis tindak balas yang berlaku dan keadaan yang menyebabkan perubahan tersebut.

Cadangkan **satu** cara untuk mengurangkan perubahan tersebut.

*Based on the changes shown in the Diagram 9.1, state the type of reaction and the condition caused the changes.*

*Suggest **one** method to slow down the changes.*

[3 markah]

[3 marks]

- (b) Iodin boleh diekstrak dari rumpai laut melalui tindak balas redoks berikut.  
*Iodine can be extracted from seaweed through the following redox reaction.*



- (i) Berdasarkan persamaan yang diberikan, tentukan:

- nombor pengoksidaan bagi oksigen dalam hidrogen peroksida,  $\text{H}_2\text{O}_2$ .
- agen pengoksidaan dan agen penurunan. Jelaskan jawapan anda dari segi pemindahan elektron.

*Based on the equation given, determine:*

- the oxidation number of oxygen in hydrogen peroxide,  $\text{H}_2\text{O}_2$ .
- the oxidising agent and reducing agent. Explain your answer in terms of transfer of electrons.

[5 markah]

[5 marks]

- (ii) Tuliskan setengah persamaan bagi tindak balas pengoksidaan dan tindak balas penurunan.

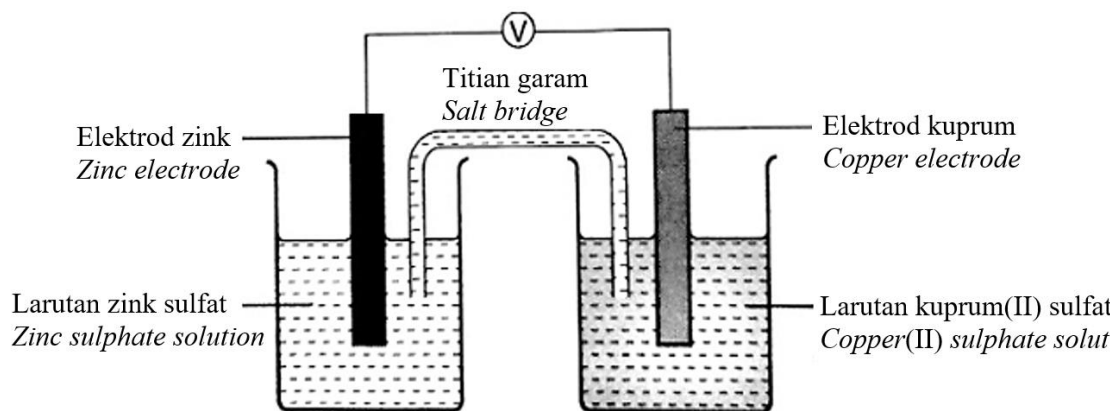
*Write the half equations for the oxidation reaction and reduction reaction.*

[2 markah]

[2 marks]

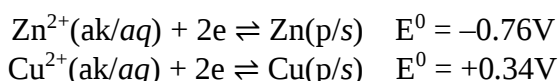
[Lihat halaman sebelah

- (c) Rajah 9.2 menunjukkan susunan radas bagi satu sel kimia.  
*Diagram 9.2 shows an apparatus set-up for a chemical cell.*



Rajah 9.2  
 Diagram 9.2

- (i) Dengan merujuk kepada keupayaan elektrod piawai,  $E^0$  setengah sel berikut:  
*With reference to the following standard electrode potential of a half-cell,  $E^0$ :*



kenal pasti terminal negatif dan terminal positif bagi sel kimia tersebut. Jelaskan jawapan anda.  
*identify the negative and positive terminals of the chemical cell. Explain your answer.*

[4 markah]

[4 marks]

- (ii) tuliskan notasi sel dan hitungkan voltan sel bagi sel kimia tersebut.  
*write the cell notation and calculate the voltage of the chemical cell.*

[2 markah]

[2 marks]

[Lihat halaman sebelah

**SULIT**

- (d) Jadual 7 menunjukkan keputusan bagi dua eksperimen untuk mengkaji penyesaran logam dari larutan garamnya.

*Table 7 shows results of two experiments to study the displacement of a metal from its salt solution.*

| Set Set | Eksperimen<br><i>Experiment</i>                                                                                                                                                                                                                                                                              | Pemerhatian<br><i>Observation</i>                                                                                                                                                                                                                                                                            |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| I       | Satu jalur logam Y dimasukkan ke dalam tabung uji yang mengandungi $2.0 \text{ cm}^3$ larutan X nitrat $0.1 \text{ mol dm}^{-3}$ .<br><i>A strip of Y metal is added into a test tube containing <math>2.0 \text{ cm}^3</math> of <math>0.1 \text{ mol dm}^{-3}</math> X nitrate solution.</i>               | <ul style="list-style-type: none"> <li>Larutan tanpa warna bertukar menjadi biru.<br/><i>The colourless solution turns blue.</i></li> <li>Jalur logam Y menipis.<br/><i>The Y metal strip becomes thinner.</i></li> <li>Pepejal kelabu berkilat terenap.<br/><i>A shiny grey solid deposited.</i></li> </ul> |
| II      | Satu jalur logam Y dimasukkan ke dalam tabung uji yang mengandungi $2.0 \text{ cm}^3$ larutan magnesium nitrat $0.1 \text{ mol dm}^{-3}$<br><i>A strip of Y metal is added into a test tube containing <math>2.0 \text{ cm}^3</math> of <math>0.1 \text{ mol dm}^{-3}</math> magnesium nitrate solution.</i> | <ul style="list-style-type: none"> <li>Tiada perubahan<br/><i>No changes</i></li> </ul>                                                                                                                                                                                                                      |

Jadual 7  
Table 7

- (i) Berdasarkan Jadual 7, namakan ion yang membentuk larutan berwarna biru dan cadangkan logam Y dan larutan X nitrat.  
*Based on Table 7, name the ion that formed the blue solution and suggest a suitable Y metal and X nitrate solution .*
- (ii) Tuliskan persamaan ion bagi tindak balas redoks yang berlaku.  
*Write the ionic equation for the redox reaction that takes place.*

[4 markah]  
[4 marks]

**Bahagian C**  
**Section C**

[20 markah]

[20 marks]

Jawab **semua** soalan dalam bahagian ini.

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

- 11 (a) Jadual 8 menunjukkan pemerhatian apabila magnesium bertindak balas dengan hidrogen klorida di dalam pelarut X dan pelarut Y.  
*Table 8 shows the observation when magnesium reacts with hydrogen chloride in solvent X and solvent Y.*

| <b>Bahan</b><br><i>Substance</i>                                     | <b>Pelarut</b><br><i>Solvent</i> | <b>Pemerhatian</b><br><i>Observation</i>        |
|----------------------------------------------------------------------|----------------------------------|-------------------------------------------------|
| Magnesium + hidrogen klorida<br><i>Magnesium + hydrogen chloride</i> | X                                | Gelembung gas<br><i>Bubbles of gas</i>          |
| Magnesium + hidrogen klorida<br><i>Magnesium + hydrogen chloride</i> | Y                                | Tiada gelembung gas<br><i>No bubbles of gas</i> |

Jadual 8

Table 8

- (i) Berdasarkan Jadual 8, cadangkan nama pelarut X dan pelarut Y.  
Jelaskan pemerhatian.

*Based on Table 8, suggest the name of solvent X and solvent Y.*

*Explain the observations.*

[7 markah]

[7 marks]

- (ii) Tindak balas antara magnesium dan hidrogen klorida dalam pelarut X menghasilkan larutan garam yang mengandungi ion klorida.

Huraikan satu ujian pengesahan bagi ion klorida.

*Reaction between magnesium and hydrogen chloride in solvent X produces a salt solution containing chloride ions.*

*Describe one confirmatory test for chloride ion.*

[3 markah]

[3 marks]

[Lihat halaman sebelah

**SULIT**

(b) Anda dibekalkan dengan tiga bahan kimia, iaitu:

- larutan natrium karbonat
- asid sulfurik cair
- larutan zink klorida

Dengan menggunakan ketiga-tiga bahan kimia itu, huraikan bagaimana anda menyediakan garam zink sulfat dalam makmal.

Dalam huraian anda, sertakan:

- prosedur
- persamaan kimia bagi tindak balas yang terlibat.

*You are given three chemicals, which are:*

- *sodium carbonate solution*
- *dilute sulphuric acid*
- *zinc chloride solution*

*By using all the three chemicals, describe how to prepare zinc sulphate salt in the laboratory.*

*In your description, include:*

- *procedure*
- *chemical equations of the reactions involved.*

[10 markah]

[10 marks]

**KERTAS SOALAN TAMAT**  
**END OF QUESTION PAPER**

[Lihat halaman sebelah

**SULIT**

# THE PERIODIC TABLE OF ELEMENTS

|   |          |
|---|----------|
| 1 | <b>H</b> |
|   | Hydrogen |
| 1 |          |

|    |           |
|----|-----------|
| 10 | <b>Ne</b> |
|    | Neon      |
| 20 |           |

Proton number  
Symbol  
Name of element  
Relative atomic mass

|   |           |
|---|-----------|
| 3 | <b>Li</b> |
|   | Lithium   |
| 7 |           |

|   |           |
|---|-----------|
| 4 | <b>Be</b> |
|   | Beryllium |
| 9 |           |

|    |           |
|----|-----------|
| 11 | <b>Na</b> |
|    | Sodium    |
| 23 |           |

|    |           |
|----|-----------|
| 12 | <b>Mg</b> |
|    | Magnesium |
| 24 |           |

|    |           |
|----|-----------|
| 19 | <b>K</b>  |
|    | Potassium |
| 39 |           |

|    |           |
|----|-----------|
| 20 | <b>Ca</b> |
|    | Calcium   |
| 40 |           |

|    |           |
|----|-----------|
| 37 | <b>Rb</b> |
|    | Rubidium  |
| 86 |           |

|    |           |
|----|-----------|
| 38 | <b>Sr</b> |
|    | Strontium |
| 88 |           |

|     |           |
|-----|-----------|
| 55  | <b>Cs</b> |
|     | Cesium    |
| 133 |           |

|     |           |
|-----|-----------|
| 56  | <b>Ba</b> |
|     | Barium    |
| 137 |           |

|     |           |
|-----|-----------|
| 87  | <b>Fr</b> |
|     | Francium  |
| 223 |           |

|     |           |
|-----|-----------|
| 88  | <b>Ra</b> |
|     | Radium    |
| 226 |           |

|     |           |
|-----|-----------|
| 89  | <b>Ac</b> |
|     | Actinium  |
| 227 |           |

|     |              |
|-----|--------------|
| 104 | <b>Unq</b>   |
|     | Unnilquadium |
| 257 |              |

|     |              |
|-----|--------------|
| 105 | <b>Unp</b>   |
|     | Unnilpentium |
| 260 |              |

|     |             |
|-----|-------------|
| 106 | <b>Unh</b>  |
|     | Unnilhexium |
| 263 |             |

|     |              |
|-----|--------------|
| 107 | <b>Uns</b>   |
|     | Unnilseptium |
| 262 |              |

|     |             |
|-----|-------------|
| 108 | <b>Uno</b>  |
|     | Unniloctium |
| 265 |             |

|     |             |
|-----|-------------|
| 109 | <b>Une</b>  |
|     | Unnilennium |
| 266 |             |

|     |           |
|-----|-----------|
| 77  | <b>Ir</b> |
|     | Iridium   |
| 192 |           |

|     |           |
|-----|-----------|
| 78  | <b>Pt</b> |
|     | Platinum  |
| 195 |           |

|     |           |
|-----|-----------|
| 79  | <b>Au</b> |
|     | Gold      |
| 197 |           |

|     |           |
|-----|-----------|
| 80  | <b>Hg</b> |
|     | Mercury   |
| 201 |           |

|     |           |
|-----|-----------|
| 81  | <b>Tl</b> |
|     | Thallium  |
| 204 |           |

|     |           |
|-----|-----------|
| 82  | <b>Pb</b> |
|     | Lead      |
| 207 |           |

|     |           |
|-----|-----------|
| 83  | <b>Bi</b> |
|     | Bismuth   |
| 209 |           |

|     |           |
|-----|-----------|
| 84  | <b>Po</b> |
|     | Polonium  |
| 210 |           |

|     |           |
|-----|-----------|
| 85  | <b>At</b> |
|     | Astatine  |
| 210 |           |

|     |           |
|-----|-----------|
| 86  | <b>Rn</b> |
|     | Radon     |
| 222 |           |

|     |           |
|-----|-----------|
| 87  | <b>La</b> |
|     | Lanthanum |
| 139 |           |

|    |          |
|----|----------|
| 89 | <b>Y</b> |
|    | Yttrium  |
| 89 |          |

|    |           |
|----|-----------|
| 90 | <b>Zr</b> |
|    | Zirconium |
| 91 |           |

|    |           |
|----|-----------|
| 91 | <b>Nb</b> |
|    | Niobium   |
| 93 |           |

|    |            |
|----|------------|
| 92 | <b>Mo</b>  |
|    | Molybdenum |
| 96 |            |

|    |            |
|----|------------|
| 93 | <b>Tc</b>  |
|    | Technetium |
| 98 |            |

|     |           |
|-----|-----------|
| 94  | <b>Ru</b> |
|     | Ruthenium |
| 101 |           |

|     |           |
|-----|-----------|
| 95  | <b>Rh</b> |
|     | Rhodium   |
| 103 |           |

|     |           |
|-----|-----------|
| 96  | <b>Pd</b> |
|     | Palladium |
| 106 |           |

|     |           |
|-----|-----------|
| 97  | <b>Ag</b> |
|     | Silver    |
| 108 |           |

|     |           |
|-----|-----------|
| 98  | <b>Cd</b> |
|     | Cadmium   |
| 112 |           |

|     |           |
|-----|-----------|
| 99  | <b>In</b> |
|     | Indium    |
| 115 |           |

|     |           |
|-----|-----------|
| 100 | <b>Sn</b> |
|     | Tin       |
| 119 |           |

|     |           |
|-----|-----------|
| 101 | <b>Sb</b> |
|     | Antimony  |
| 122 |           |

|     |           |
|-----|-----------|
| 102 | <b>Te</b> |
|     | Tellurium |
| 128 |           |

|     |          |
|-----|----------|
| 103 | <b>I</b> |
|     | Iodine   |
| 127 |          |

|     |           |
|-----|-----------|
| 104 | <b>Xe</b> |
|     | Xenon     |
| 131 |           |

|     |           |
|-----|-----------|
| 105 | <b>Br</b> |
|     | Bromine   |
| 80  |           |

|     |           |
|-----|-----------|
| 106 | <b>Kr</b> |
|     | Krypton   |
| 84  |           |

|     |           |
|-----|-----------|
| 107 | <b>Sr</b> |
|     | Strontium |
| 88  |           |

|     |           |
|-----|-----------|
| 108 | <b>Rb</b> |
|     | Rubidium  |
| 86  |           |

|     |          |
|-----|----------|
| 109 | <b>Y</b> |
|     | Yttrium  |
| 89  |          |

|     |           |
|-----|-----------|
| 110 | <b>Zr</b> |
|     | Zirconium |
| 91  |           |

|     |           |
|-----|-----------|
| 111 | <b>Nb</b> |
|     | Niobium   |
| 93  |           |

|     |            |
|-----|------------|
| 112 | <b>Mo</b>  |
|     | Molybdenum |
| 96  |            |

|     |            |
|-----|------------|
| 113 | <b>Tc</b>  |
|     | Technetium |
| 98  |            |

|     |           |
|-----|-----------|
| 114 | <b>Ru</b> |
|     | Ruthenium |
| 101 |           |

|     |           |
|-----|-----------|
| 115 | <b>Rh</b> |
|     | Rhodium   |
| 103 |           |

|     |           |
|-----|-----------|
| 116 | <b>Pd</b> |
|     | Palladium |
| 106 |           |

|     |           |
|-----|-----------|
| 117 | <b>Ag</b> |
|     | Silver    |
| 108 |           |

|     |           |
|-----|-----------|
| 118 | <b>Cd</b> |
|     | Cadmium   |
| 112 |           |

|     |           |
|-----|-----------|
| 119 | <b>In</b> |
|     | Indium    |
| 115 |           |

|     |           |
|-----|-----------|
| 120 | <b>Sn</b> |
|     | Tin       |
| 119 |           |

|     |           |
|-----|-----------|
| 121 | <b>Sb</b> |
|     | Antimony  |
| 122 |           |

|     |           |
|-----|-----------|
| 122 | <b>Te</b> |
|     | Tellurium |
| 128 |           |

|     |          |
|-----|----------|
| 123 | <b>I</b> |
|     | Iodine   |
| 127 |          |

|     |           |
|-----|-----------|
| 124 | <b>Xe</b> |
|     | Xenon     |
| 131 |           |

|     |           |
|-----|-----------|
| 125 | <b>Cs</b> |
|     | Cesium    |
| 133 |           |

|     |           |
|-----|-----------|
| 126 | <b>Ba</b> |
|     | Barium    |
| 137 |           |

|     |           |
|-----|-----------|
| 127 | <b>La</b> |
|     | Lanthanum |
| 139 |           |

|     |          |
|-----|----------|
| 128 | <b>Y</b> |
|     | Yttrium  |
| 89  |          |

|     |           |
|-----|-----------|
| 129 | <b>Zr</b> |
|     | Zirconium |
| 91  |           |

|     |           |
|-----|-----------|
| 130 | <b>Nb</b> |
|     | Niobium   |
| 93  |           |

|     |            |
|-----|------------|
| 131 | <b>Mo</b>  |
|     | Molybdenum |
| 96  |            |

|     |            |
|-----|------------|
| 132 | <b>Tc</b>  |
|     | Technetium |
| 98  |            |

|     |           |
|-----|-----------|
| 133 | <b>Ru</b> |
|     | Ruthenium |
| 101 |           |

|     |           |
|-----|-----------|
| 134 | <b>Rh</b> |
|     | Rhodium   |
| 103 |           |

|     |           |
|-----|-----------|
| 135 | <b>Pd</b> |
|     | Palladium |
| 106 |           |

|     |           |
|-----|-----------|
| 136 | <b>Ag</b> |
|     | Silver    |
| 108 |           |

|     |           |
|-----|-----------|
| 137 | <b>Cd</b> |
|     | Cadmium   |
| 112 |           |

|     |           |
|-----|-----------|
| 138 | <b>In</b> |
|     | Indium    |
| 115 |           |

|     |           |
|-----|-----------|
| 139 | <b>Sn</b> |
|     | Tin       |
| 119 |           |

|     |           |
|-----|-----------|
| 140 | <b>Sb</b> |
|     | Antimony  |
| 122 |           |

|     |           |
|-----|-----------|
| 141 | <b>Te</b> |
|     | Tellurium |
| 128 |           |

|     |          |
|-----|----------|
| 142 | <b>I</b> |
|     | Iodine   |
| 127 |          |

|     |           |
|-----|-----------|
| 143 | <b>Xe</b> |
|     | Xenon     |
| 131 |           |

|     |           |
|-----|-----------|
| 144 | <b>Cs</b> |
|     | Cesium    |
| 133 |           |

|     |           |
|-----|-----------|
| 145 | <b>Ba</b> |
|     | Barium    |
| 137 |           |

|     |           |
|-----|-----------|
| 146 | <b>La</b> |
|     | Lanthanum |
| 139 |           |

|     |          |
|-----|----------|
| 147 | <b>Y</b> |
|     | Yttrium  |
| 89  |          |

|     |           |
|-----|-----------|
| 148 | <b>Zr</b> |
|     | Zirconium |
| 91  |           |

|     |           |
|-----|-----------|
| 149 | <b>Nb</b> |
|     | Niobium   |
| 93  |           |

|     |            |
|-----|------------|
| 150 | <b>Mo</b>  |
|     | Molybdenum |
| 96  |            |

|     |            |
|-----|------------|
| 151 | <b>Tc</b>  |
|     | Technetium |
| 98  |            |

|     |           |
|-----|-----------|
| 152 | <b>Ru</b> |
|     | Ruthenium |
| 101 |           |

|     |           |
|-----|-----------|
| 153 | <b>Rh</b> |
|     | Rhodium   |
| 103 |           |

|     |           |
|-----|-----------|
| 154 | <b>Pd</b> |
|     | Palladium |
| 106 |           |

|     |           |
|-----|-----------|
| 155 | <b>Ag</b> |
|     | Silver    |
| 108 |           |

|     |           |
|-----|-----------|
| 156 | <b>Cd</b> |
|     | Cadmium   |
| 112 |           |

|     |           |
|-----|-----------|
| 157 | <b>In</b> |
|     | Indium    |
| 115 |           |

|     |           |
|-----|-----------|
| 158 | <b>Sn</b> |
|     | Tin       |
| 119 |           |

|     |           |
|-----|-----------|
| 159 | <b>Sb</b> |
|     | Antimony  |
| 122 |           |

|     |           |
|-----|-----------|
| 160 | <b>Te</b> |
|     | Tellurium |
| 128 |           |

|     |          |
|-----|----------|
| 161 | <b>I</b> |
|     | Iodine   |
| 127 |          |

|     |           |
|-----|-----------|
| 162 | <b>Xe</b> |
|     | Xenon     |
| 131 |           |

|     |           |
|-----|-----------|
| 163 | <b>Cs</b> |
|     | Cesium    |
| 133 |           |

|     |           |
|-----|-----------|
| 164 | <b>Ba</b> |
|     | Barium    |
| 137 |           |

|     |           |
|-----|-----------|
| 165 | <b>La</b> |
|     | Lanthanum |
| 139 |           |

|     |          |
|-----|----------|
| 166 | <b>Y</b> |
|     | Yttrium  |
| 89  |          |

|     |           |
|-----|-----------|
| 167 | <b>Zr</b> |
|     | Zirconium |
| 91  |           |

|     |           |
|-----|-----------|
| 168 | <b>Nb</b> |
|     | Niobium   |
| 93  |           |

|     |            |
|-----|------------|
| 169 | <b>Mo</b>  |
|     | Molybdenum |
| 96  |            |

|     |            |
|-----|------------|
| 170 | <b>Tc</b>  |
|     | Technetium |
| 98  |            |

|     |           |
|-----|-----------|
| 171 | <b>Ru</b> |
|     | Ruthenium |
| 101 |           |

|     |           |
|-----|-----------|
| 172 | <b>Rh</b> |
|     | Rhodium   |
| 103 |           |

|     |           |
|-----|-----------|
| 173 | <b>Pd</b> |
|     | Palladium |
| 106 |           |

|     |           |
|-----|-----------|
| 174 | <b>Ag</b> |
|     | Silver    |
| 108 |           |

|     |           |
|-----|-----------|
| 175 | <b>Cd</b> |
|     | Cadmium   |
| 112 |           |

|     |           |
|-----|-----------|
| 176 | <b>In</b> |
|     | Indium    |
| 115 |           |

|     |           |
|-----|-----------|
| 177 | <b>Sn</b> |
|     | Tin       |
| 119 |           |

|     |           |
|-----|-----------|
| 178 | <b>Sb</b> |
|     | Antimony  |
| 122 |           |

|     |           |
|-----|-----------|
| 179 | <b>Te</b> |
|     | Tellurium |
| 128 |           |

|     |          |
|-----|----------|
| 180 | <b>I</b> |
|     | Iodine   |
| 127 |          |

|     |           |
|-----|-----------|
| 181 | <b>Xe</b> |
|     | Xenon     |
| 131 |           |

|     |           |
|-----|-----------|
| 182 | <b>Cs</b> |
|     | Cesium    |
| 133 |           |

|     |           |
|-----|-----------|
| 183 | <b>Ba</b> |
|     | Barium    |
| 137 |           |

|     |           |
|-----|-----------|
| 184 | <b>La</b> |
|     | Lanthanum |
| 139 |           |

|     |          |
|-----|----------|
| 185 | <b>Y</b> |
|     | Yttrium  |
| 89  |          |

|     |           |
|-----|-----------|
| 186 | <b>Zr</b> |
|     | Zirconium |
| 91  |           |

|     |           |
|-----|-----------|
| 187 | <b>Nb</b> |
|     | Niobium   |
| 93  |           |

|     |            |
|-----|------------|
| 188 | <b>Mo</b>  |
|     | Molybdenum |
| 96  |            |

|     |            |
|-----|------------|
| 189 | <b>Tc</b>  |
|     | Technetium |
| 98  |            |

|     |           |
|-----|-----------|
| 190 | <b>Ru</b> |
|     | Ruthenium |
| 101 |           |

|     |           |
|-----|-----------|
| 191 | <b>Rh</b> |
|     | Rhodium   |
| 103 |           |

|     |           |
|-----|-----------|
| 192 | <b>Pd</b> |
|     | Palladium |
| 106 |           |

|     |           |
|-----|-----------|
| 193 | <b>Ag</b> |
|     | Silver    |
| 108 |           |

|     |           |
|-----|-----------|
| 194 | <b>Cd</b> |
|     | Cadmium   |
| 112 |           |

|     |           |
|-----|-----------|
| 195 | <b>In</b> |
|     | Indium    |
| 115 |           |

|     |           |
|-----|-----------|
| 196 | <b>Sn</b> |
|     | Tin       |
| 119 |           |

|     |           |
|-----|-----------|
| 197 | <b>Sb</b> |
|     | Antimony  |
| 122 |           |

|     |           |
|-----|-----------|
| 198 | <b>Te</b> |
|     | Tellurium |
| 128 |           |

|     |          |
|-----|----------|
| 199 | <b>I</b> |
|     | Iodine   |
| 127 |          |

|     |           |
|-----|-----------|
| 200 | <b>Xe</b> |
|     | Xenon     |
| 131 |           |

Reference: Chang, Raymond (1991). Chemistry. McGraw-Hill, Inc.

**MAKLUMAT UNTUK CALON  
INFORMATION FOR CANDIDATES**

1. Kertas peperiksaan ini mengandungi tiga bahagian : **Bahagian A**, **Bahagian B** dan **Bahagian C**.  
*This question paper consists of three sections: Section A, Section B and Section C.*
2. Jawab **semua** soalan dalam **Bahagian A**. Jawapan anda bagi **Bahagian A** hendaklah ditulis pada ruang yang disediakan dalam kertas soalan.  
*Answer all questions in Section A. Write your answers for Section A in the spaces provided in this question paper.*
3. Jawab mana-mana **satu** soalan daripada **Bahagian B** dan jawab **semua** soalan dalam **Bahagian C**. Tulis jawapan anda bagi **Bahagian B** dan **Bahagian C** dalam helaian tambahan yang dibekalkan oleh pengawas peperiksaan. Anda boleh menggunakan persamaan, rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda.  
*Answer any one question from Section B and answer all questions from Section C. Write your answers for Section B and Section C on the 'helaian tambahan' provided by the invigilators. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answers.*
4. Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.  
*The diagrams in the questions are not drawn to scale unless stated.*
5. Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.  
*Marks allocated for each question or sub-part of a question are shown in brackets.*
6. Tunjukkan kerja mengira. Ini membantu anda mendapatkan markah.  
*Show your working. It may help you to get marks.*
7. Jika anda hendak menukar jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baharu.  
*If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.*
8. Jadual Berkala Unsur disediakan di halaman 29.  
*The Periodic Table of Elements is provided on page 29.*
9. Anda dibenarkan menggunakan kalkulator saintifik.  
*You may use a scientific calculator.*
10. Anda dinasihati supaya mengambil masa 90 minit untuk menjawab soalan dalam **Bahagian A**, 30 minit untuk **Bahagian B** dan 30 minit untuk **Bahagian C**.  
*You are advised to spend 90 minutes to answer questions in Section A, 30 minutes for Section B and 30 minutes for Section C.*
11. Ceraikan **Bahagian B** dan **Bahagian C** daripada kertas soalan ini. Ikat helaian tambahan bersama-sama kertas soalan ini dan serahkan kepada pengawas peperiksaan pada akhir peperiksaan.  
*Detach Section B and Section C from this question paper. Tie the "helaian tambahan" together with this question paper and hand in to the invigilator at the end of the examination.*