

Nama :

Kelas :

Kimia
Kertas 2
Oktober
2024
2 ½ jam

**MAKTAB RENDAH SAINS MARA****PEPERIKSAAN AKHIR SIJIL PENDIDIKAN MRSMA 2024****KIMIA****Kertas 2****Dua jam tiga puluh minit****JANGAN BUKA KERTAS PEPERIKSAAN INI SEHINGGA DIBERITAHU**

1. Tuliskan **nama** dan **kelas** 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 yang disediakan 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.**

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		100	

Kertas peperiksaan ini mengandungi 43 halaman bercetak dan 1 halaman tidak bercetak

[Lihat halaman sebelah

For
Examiner's
Use

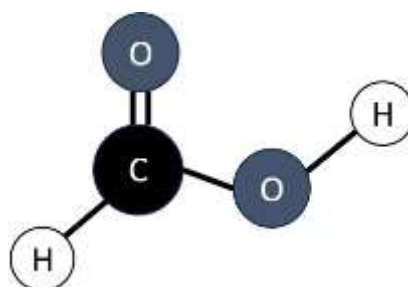
Bahagian A

[60 markah]

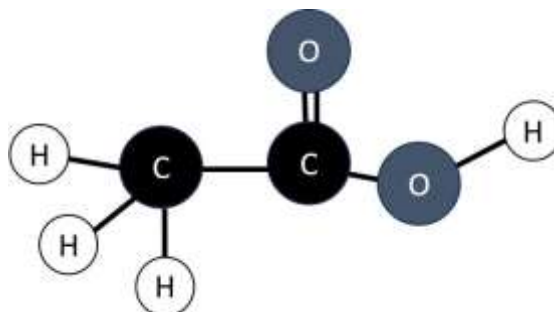
Jawab **semua** soalan.

- 1 Rajah 1 menunjukkan lukisan model molekul bagi dua ahli siri homolog asid karboksilik.

Diagram 1 shows the drawing of molecular models for two members of carboxylic acid homologous series.



Asid metanoik
Methanoic acid



Asid etanoik
Ethanoic acid

Rajah 1
Diagram 1

- (a) (i) Apakah yang dimaksudkan dengan formula molekul?
What is meant by molecular formula?

.....
.....

[1 markah]

1(a)(i)	
	1

- (ii) Namakan semua unsur yang hadir dalam kedua-dua asid.
Name all elements present in both acids.

.....

.....

[1 markah]

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Use*

1(a)(ii)

1

- (iii) Nyatakan formula molekul bagi asid metanoik.
State the molecular formula of methanoic acid.

.....

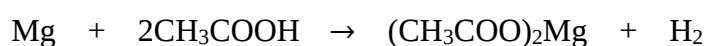
[1 markah]

1(a)(iii)

1

- (b) Persamaan kimia berikut menunjukkan tindak balas antara magnesium dengan asid etanoik.

The following chemical equation shows a reaction between magnesium and ethanoic acid.



Nyatakan satu maklumat kualitatif dan satu maklumat kuantitatif yang boleh diperolehi daripada persamaan kimia tersebut.

State one qualitative and one quantitative information that can be obtained from the chemical equation.

.....

.....

.....

[2 markah]

1(b)

2

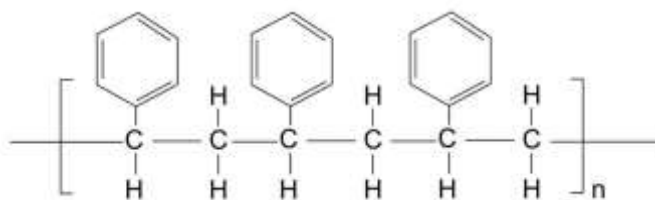
Total A1

5

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For
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- 2 Rajah 2 menunjukkan formula struktur polimer A.
Diagram 2 shows a structural formula of polymer A.



Rajah 2
Diagram 2

- (a) (i) Apakah yang dimaksudkan dengan polimer?
What is meant by polymer?

2(a)(i)

1

.....
.....

[1 markah]

- (ii) Lukiskan formula struktur monomer bagi polimer A.
Draw structural formula of the monomer for polymer A.

2(a)(ii)

1

[1 markah]

- (iii) Namakan jenis tindak balas pempolimeran untuk menghasilkan polimer A.
Name the type of polymerisation reaction to produce polymer A.

2(a)(iii)

1

.....
[1 markah]

- (b) Pernyataan berikut menunjukkan ciri-ciri sejenis polimer.
The following statement shows the characteristics of a polymer.

- Terurai atau hangus apabila dipanaskan
Disintegrate or burn when heated
- Tidak dapat dikitar semula
Cannot be recycled

- (i) Nyatakan jenis polimer yang mempunyai ciri-ciri di atas.
State the type of polymer that has the above characteristics.

.....
[1 markah]

2(b)(i)	
	1

- (ii) Berikan satu kegunaan polimer tersebut.
Give one use of the polymer.

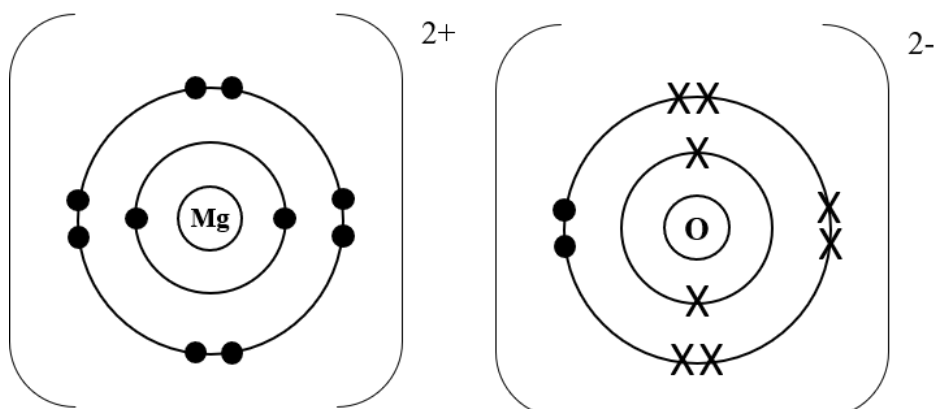
.....
[1 markah]

2(b)(ii)	
	1

Total A2	
	5

For
Examiner's
Use

- 3 Rajah 3 menunjukkan susunan elektron bagi sebatian P.
Diagram 3 shows electron arrangement for compound P.



Rajah 3
Diagram 3

- (a) Tuliskan susunan elektron bagi atom magnesium.
Write the electron arrangement for magnesium atom.

3(a)	
	1

.....
[1 markah]

- (b) Nyatakan jenis ikatan dalam sebatian P.
State the type of bond in compound P.

3(b)	
	1

.....
[1 markah]

- (c) Tuliskan persamaan kimia bagi pembentukan sebatian P.
Write the chemical equation for the formation of compound P.

3(c)	
	2

.....
[2 markah]

- (d) Hitung isi padu gas oksigen yang diperlukan pada keadaan bilik untuk bertindak balas dengan 0.5 mol magnesium.
[1 mol gas menempati 24 dm³ pada keadaan bilik]

Calculate the volume of oxygen gas needed at room condition to react with 0.5 mol magnesium.

[1 mol of gas occupies 24 dm³ at room condition]

*For
Examiner's
Use*

[2 markah]

3(d)	
	2

Total A3	
	6

For
Examiner's
Use

- 4
- Jadual 1 menunjukkan maklumat komposisi bagi kaca R dan S yang digunakan dengan meluas dalam kehidupan seharian.
Table 1 shows the information of composition for glass R and S that are widely used in daily life.

Jenis kaca Type of glass	Komposisi Composition
R	Bahan Z, natrium karbonat, kalsium karbonat Substance Z, sodium carbonate, calcium carbonate
S	Bahan Z, natrium karbonat, kalsium karbonat, boron oksida, aluminium oksida Substance Z, sodium carbonate, calcium carbonate, boron oxide, aluminium oxide

Jadual 1
Table 1

- (a)
- (i)

Nyatakan bahan Z.
State substance Z.

4 (a)(i)	
	1

.....
[1 markah]

- (ii)
- Nyatakan jenis kaca R dan S.
State the type of glass R and S.

4 (a)(ii)	
	2

R :
S :
[2 markah]

- (b) Rajah 4 menunjukkan bekas yang boleh digunakan oleh Puan Saloma untuk menyimpan jeruk mangga.

Diagram 4 shows the containers that can be used by Puan Saloma to store the pickled mango.



Balang kaca
Glass jar



Bekas logam
Metal container

Rajah 4
Diagram 4

Pilih satu bekas yang sesuai untuk menyimpan jeruk mangga supaya tahan lebih lama. Wajarkan jawapan anda.

Choose one suitable container to store the pickled mango so that it will last longer. Justify your answer.

.....
.....

[2 markah]

- (c) Dalam penghasilan gentian kaca, kaca dipanaskan sehingga cair dan dilalukan kepada lubang-lubang yang halus.

Cadangkan bagaimana sifat gentian kaca dapat diperkukuhkan untuk membentuk gentian optik. Nyatakan satu sifat gentian optik.

In the production of glass fibre, the glass is heated until it melts and is passed through fine holes.

Suggest how the properties of glass fibre can be strengthened to form optical fibre. State one property of optical fibre.

.....
.....

[2 markah]

*For
Examiner's
Use*

4 (b)	
	2

4 (c)	
	2

Total A4	
	7

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- 5 Rajah 5.1 menunjukkan seorang pelajar sedang menyidai pakaian basah.
Diagram 5.1 shows a student was hanging wet clothes.



Rajah 5.1
Diagram 5.1

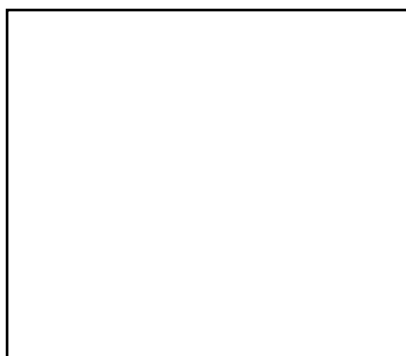
- (a) (i) Namakan proses yang terlibat bagi perubahan keadaan jirim air dalam Rajah 5.1.
Name the process involved in changing the state of matter of water in Diagram 5.1.

5 (a)(i)

1

.....
[1 markah]

- (ii) Lukiskan susunan zarah-zarah air sebelum dan selepas proses yang dinamakan di 5(a)(i).
Draw the arrangement of water particles before and after the process named in 5(a)(i).



Sebelum
Before



Selepas
After

[2 markah]

5 (a)(ii)

2

(iii) Nyatakan perubahan daya tarikan antara zarah semasa proses dalam 5(a)(i) berlaku.

State the change in attraction force between particles as the process in 5(a)(i) takes place.

*For
Examiner's
Use*

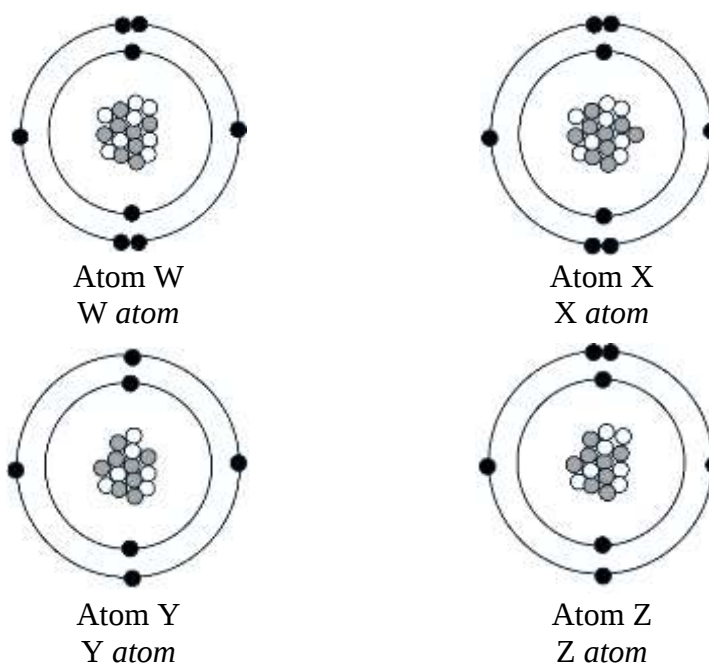
5 (a)(iii)

1

[1 markah]

(b) Rajah 5.2 menunjukkan model atom James Chadwick bagi atom W, X, Y dan Z.

Diagram 5.2 shows the atomic model of James Chadwick for atoms W, X, Y and Z.



Kekunci : ● = Proton ○ = Neutron ● = Elektron
Key Electron

Rajah 5.2
Diagram 5.2

Berdasarkan Rajah 5.2, pilih dua atom yang merupakan isotop. Terangkan jawapan anda.

Based on Diagram 5.2, choose two atoms which are isotopes. Explain your answer.

.....

.....

.....

[2 markah]

5(b)

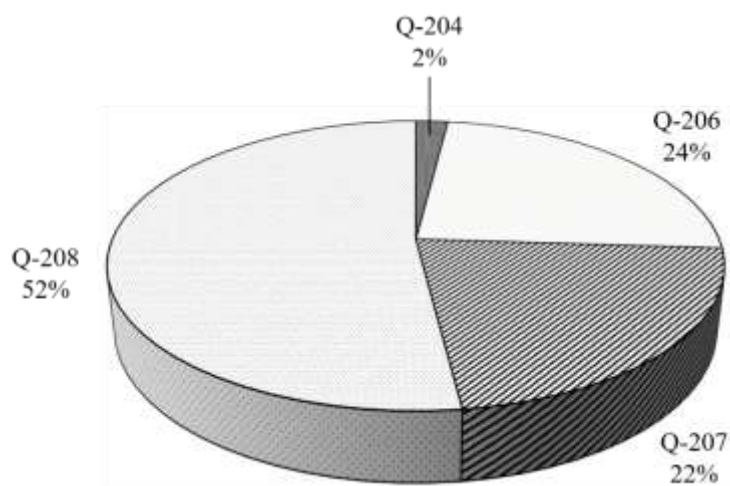
4

[Lihat halaman sebelah

For
Examiner's
Use

- (c) Rajah 5.3 menunjukkan maklumat tentang kelimpahan semula jadi isotop Q.

Diagram 5.3 shows the information about natural abundance of Q isotopes.



Rajah 5.3
Diagram 5.3

Hitung jisim atom relatif Q.

Calculate the relative atomic mass of Q.

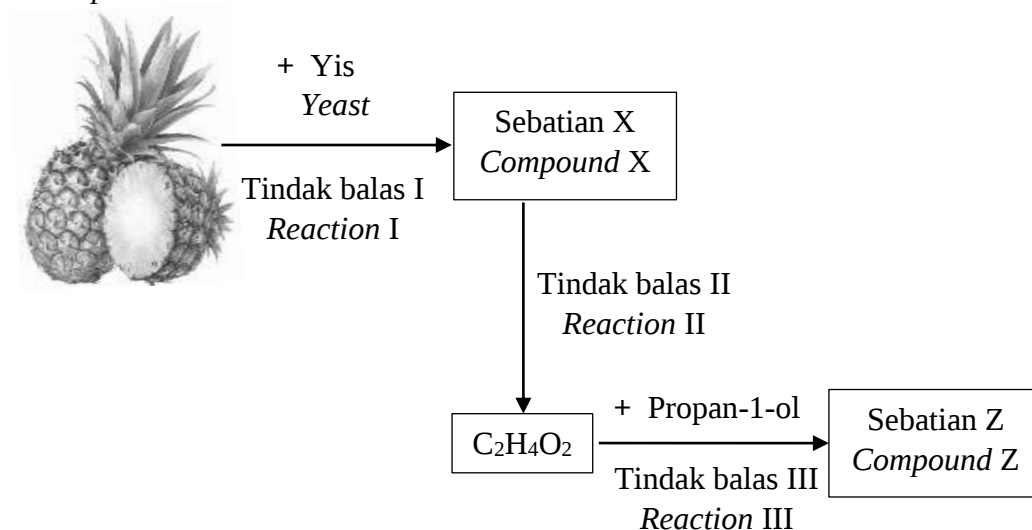
5(c)	
	2

[2 markah]

Total A5	
	8

- 6 Rajah 6.1 menunjukkan carta alir bagi beberapa siri tindak balas untuk menghasilkan sebatian Z.

Diagram 6.1 shows the flow chart for a series of reaction to produce compound Z.



Rajah 6.1
Diagram 6.1

- (a) (i) Namakan Tindak balas I.
Name Reaction I.

.....

[1 markah]

6 (a)(i)	
	1

- (ii) Tuliskan formula kimia bagi sebatian X.
Write the chemical formula for compound X.

.....

[1 markah]

6 (a)(ii)	
	1

- (b) (i) Cadangkan satu reagen yang sesuai bagi menjalankan Tindak balas II.
Suggest a suitable reagent to carry out Reaction II.

.....

[1 markah]

6 (b)(i)	
	1

- (ii) Nyatakan satu pemerhatian berdasarkan cadangan anda di 6(b)(i).
State one observation based on your suggestion in 6(b)(i).

.....

[1 markah]

6 (b) (ii)	
	1

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Use

For
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Use

- (c) Propan-1-ol ditambahkan dalam Tindak balas III untuk menghasilkan sebatian Z yang mempunyai bau manis buah-buahan.
Propan-1-ol is added in Reaction III to produce compound Z that has sweet and fruity smell.

- (i) Propan-1-ol adalah salah satu isomer bagi propanol.
Kenal pasti bilangan isomer bagi propanol.

*Propan-1-ol is one of the isomers for propanol.
Identify the number of isomers for propanol.*

6(c)(i)	
	1

.....

[1 markah]

- (ii) Lukiskan formula struktur dan namakan sebatian Z.
Draw the structural formula and name compound Z.

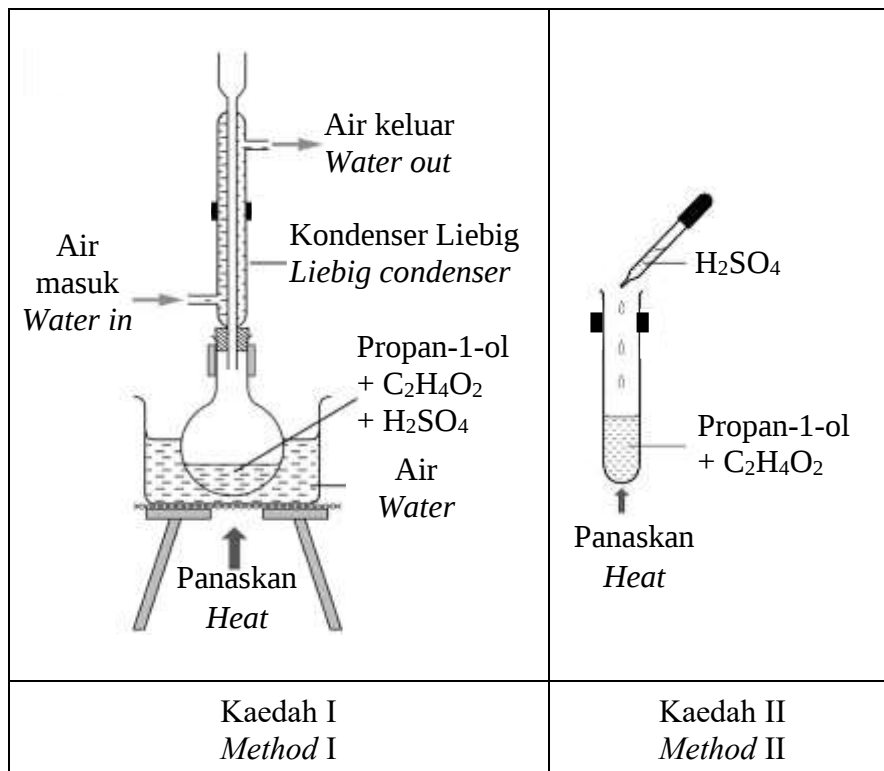
6(c)(ii)	
	2

[2 markah]

- (iii) Rajah 6.2 menunjukkan dua kaedah yang boleh digunakan untuk menjalankan Tindak balas III.

Diagram 6.2 shows two methods that can be used to carry out Reaction III.

*For
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Use*



Rajah 6.2
Diagram 6.2

Kaedah I adalah lebih sesuai digunakan berbanding Kaedah II. Wajarkan penggunaan Kaedah I dan terangkan jawapan anda.

Method I is more suitable to be used compared to Method II. Justify the use of Method I and explain your answer.

.....
.....

[2 markah]

6(c)(iii)

2

Total A6

9

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SULIT

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Use

- 7 Jadual 2 menunjukkan maklumat tentang susunan elektron atom D, E dan G. Huruf D, E dan G tidak mewakili simbol sebenar atom.

Table 2 shows the informations about electron arrangement for atom D, E and G. The letters D, E and G do not represent the actual symbol of the atoms.

Atom <i>Atom</i>	Susunan elektron <i>Electron arrangement</i>
D	2.8.1
E	2.8.7
G	2.8.8.1

Jadual 2

Table 2

- (a) (i) Nyatakan maksud elektron valens.
State the meaning of valence electrons.

7 (a)(i)	
	1

.....

[1 markah]

- (ii) Terangkan perbezaan saiz atom D dan atom E.
Explain the difference in size of atom D and atom E.

7 (a)(ii)	
	2

.....

.....

.....

[2 markah]

- (b) Gas unsur E dialirkan ke dalam air untuk menghasilkan suatu larutan. Ramalkan pemerhatian apabila sehelai kertas litmus biru dicelupkan ke dalam larutan tersebut.

Gas of element E is channelled into water to produce a solution.

Predict the observation when a blue litmus paper is dipped into the solution.

7 (b)	
	1

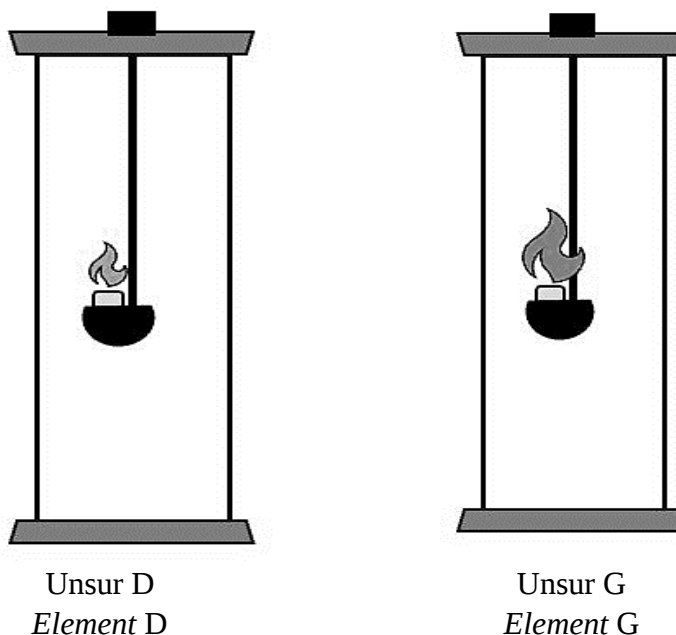
.....

.....

[1 markah]

- (c) Rajah 7 menunjukkan pemerhatian apabila unsur D dan unsur G bertindak balas dengan gas oksigen.

Diagram 7 shows the observations when element D and G react with oxygen gas.



Rajah 7
Diagram 7

- (i) Saiz nyalaan unsur G lebih besar berbanding unsur D. Terangkan perbezaan bagi pemerhatian ini.

Size of flame for element G is bigger than element D. Explain the difference in the observation.

.....

.....

.....

.....

[2 markah]

- (ii) Tuliskan persamaan kimia bagi tindak balas unsur G dan oksigen.
Write the chemical equation for reaction between element G and oxygen.

.....

[2 markah]

*For
Examiner's
Use*

7 (c)(i)	
	2

7(c)(ii)	
	2

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For
Examiner's
Use

- (iii) Hitung jisim sebatian yang terbentuk apabila 0.1 mol unsur G bertindak balas lengkap dengan oksigen.
[Jisim atom relatif: O = 16, G = 39]

Calculate the mass of compound formed when 0.1 mol of element G reacts completely with oxygen.

[Relative atomic mass: O = 16, G = 39]

7(c)(iii)	
	2

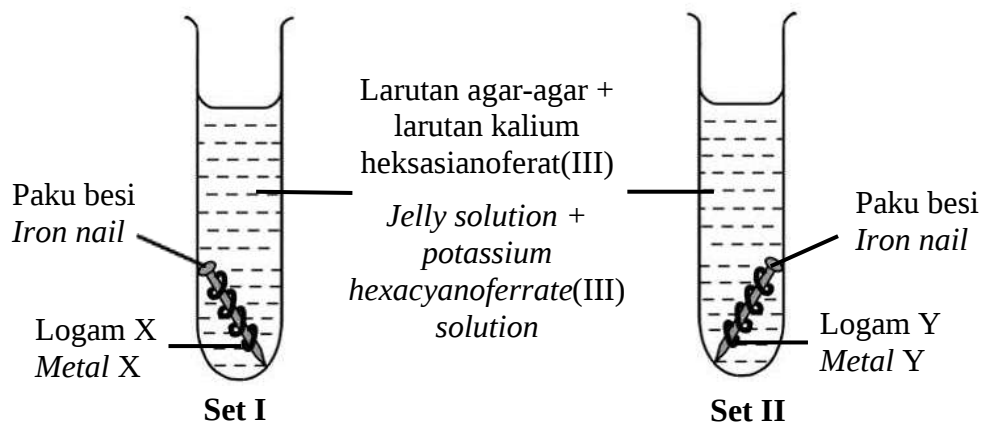
[2 markah]

Total A7	
	10

- 8 Rajah 8.1 menunjukkan susunan radas untuk mengkaji kesan logam X dan logam Y terhadap pengaratan paku besi.

Diagram 8.1 shows the apparatus set-up to investigate the effect of metal X and metal Y on rusting of iron nail.

For
Examiner's
Use



Rajah 8.1
Diagram 8.1

Keputusan eksperimen selepas tiga hari ditunjukkan dalam Jadual 3.
The results of the experiment after three days is shown in Table 3.

Set	Pasangan logam Pair of metals	Pemerhatian Observation
I	Fe dan X Fe and X	Tompok biru terbentuk Blue spots formed
II	Fe dan Y Fe and Y	Tiada perubahan No change

Jadual 3
Table 3

- (a) (i) Pengaratan besi merupakan suatu tindak balas redoks.
Apakah maksud tindak balas redoks?

*Rusting of iron is a redox reaction.
What is meant by redox reaction?*

.....
.....

[1 markah]

8 (a)(i)

1

For
Examiner's
Use

8 (a)(ii)	
	2

- (ii) Berdasarkan pemerhatian dalam Jadual 3, cadangkan logam X dan logam Y berpandukan Siri Keupayaan Elektrod Piawai yang disediakan di halaman 41.

Based on observation in Table 3, suggest metal X and metal Y according to the Standard Electrode Potential provided on page 41.

Logam X:
Metal X

Logam Y:
Metal Y

[2 markah]

- (iii) Terangkan pemerhatian yang diperoleh dalam Set II.
Explain the observation obtained in Set II.

8(a)(iii)	
	1

.....
.....

[1 markah]

- (iv) Susunkan logam Fe, X dan Y berdasarkan keelektropositifan dalam tertib menaik.

Arrange metal Fe, X and Y in ascending order of electropositivity.

8(a)(iv)	
	1

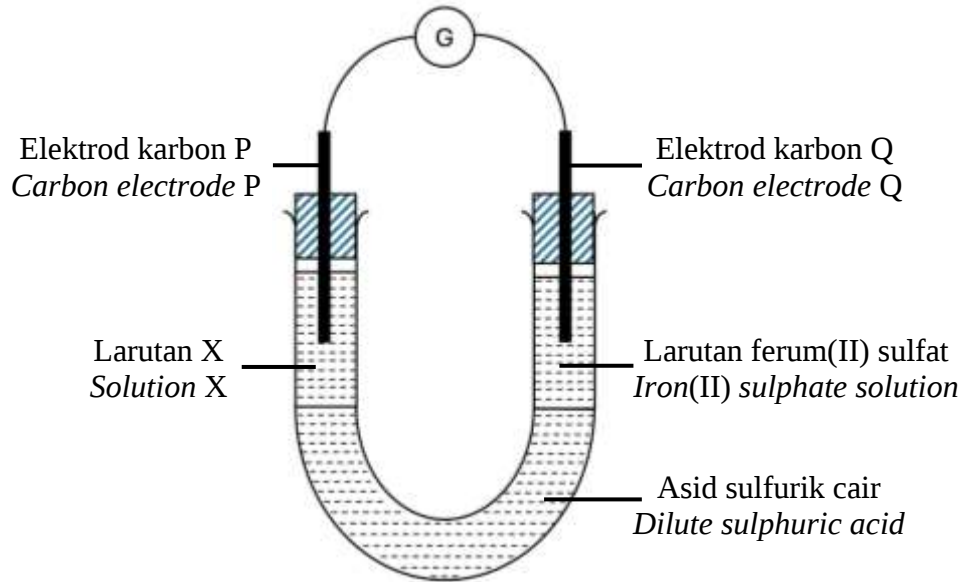
.....

[1 markah]

- (b) Rajah 8.2 menunjukkan susunan radas bagi eksperimen untuk mengkaji pemindahan elektron pada suatu jarak.

Diagram 8.2 shows an apparatus set-up of an experiment to investigate the transfer of electrons at a distance.

*For
Examiner's
Use*



Rajah 8.2
Diagram 8.2

Berdasarkan Rajah 8.2,
Based on Diagram 8.2,

- (i) Cadangkan larutan X.
Suggest solution X.

.....
[1 markah]

8(b)(i)	
	1

- (ii) Tulis setengah persamaan bagi tindak balas di elektrod P.
Write the half-equation for the reaction at electrode P.

.....
[2 markah]

8(b)(ii)	
	2

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Use

8(b)(iii)	
	2

- (iii) Huraikan secara ringkas ujian kimia untuk mengenal pasti kehadiran ion yang terhasil di elektrod karbon Q.

Explain briefly the chemical test to identify the presence of ions formed at the carbon electrode Q.

.....

.....

.....

[2 markah]

Total A8	
	10

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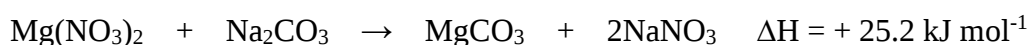


Bahagian B

[20 markah]

Bahagian ini mengandungi dua soalan. Jawab satu soalan.

- 9 Persamaan termokimia bagi dua tindak balas adalah seperti berikut:
Thermochemical equation for the two reactions are as follows:

Tindak balas I:**Reaction I****Tindak balas II:****Reaction II**

- (a) (i) Apakah yang diwakili oleh simbol ΔH dan kenal pasti jenis tindak balas bagi Tindak balas I dan Tindak balas II. Bandingkan perubahan tenaga semasa pemutusan ikatan dan pembentukan ikatan semasa tindak balas berlaku bagi Tindak balas I dan Tindak balas II.

What is represented by ΔH and identify the type of reaction for Reaction I and Reaction II. Compare the change of energy during the bond breaking and the bond formation as the reactions take place for Reaction I and Reaction II.

[4 markah]

- (ii) Lukis gambar rajah aras tenaga bagi Tindak balas I. Ramalkan haba tindak balas bagi Tindak balas I jika larutan natrium karbonat digantikan dengan larutan kalium karbonat. Terangkan jawapan anda.

Draw the energy level diagram for Reaction I.

Predict the heat of reaction for Reaction I if sodium carbonate solution is replaced with potassium carbonate solution. Explain your answer.

[4 markah]

- (iii) Hitungkan nilai bahan api bagi metana.
[Jisim atom relatif : H = 1, C = 12]

Calculate the fuel value for methane.

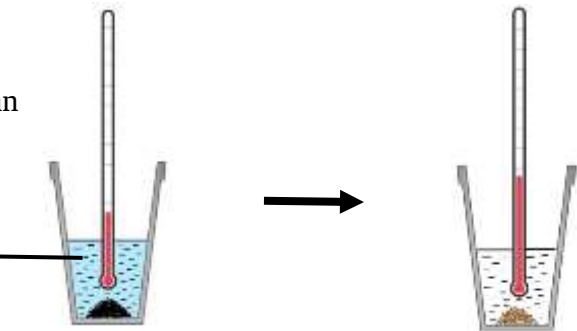
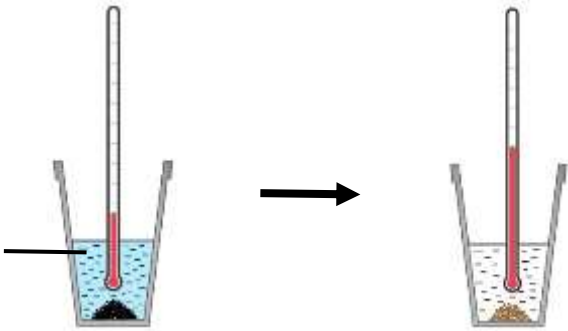
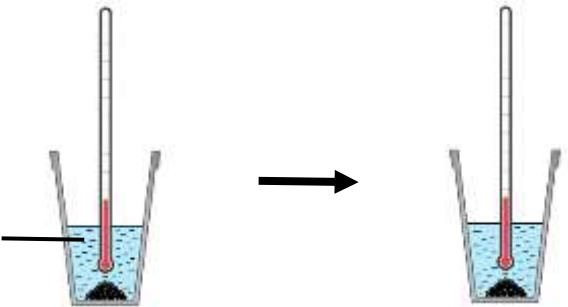
[Relative atomic mass : H = 1, C = 12]

[2 markah]

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- (b) Rajah 9 menunjukkan tiga eksperimen yang dijalankan oleh seorang pelajar untuk mengkaji haba penyesaran bagi tindak balas antara larutan kuprum(II) klorida dengan logam zink, X dan Y berlebihan.

Diagram 9 shows three experiments carried out by a student to investigate the heat of displacement for the reaction between copper(II) chloride solution with excess zinc, X and Y metals.

Eksperimen Experiment	
Set I Zink + 50 cm ³ larutan kuprum(II) klorida 0.1 mol dm ⁻³ Zinc + 50 cm ³ of 0.1 mol dm ⁻³ copper(II) chloride solution	 Suhu awal = 28 °C Suhu tertinggi = 35 °C Initial temperature = 28 °C Highest temperature = 35 °C
Set II X + 50 cm ³ larutan kuprum(II) klorida 0.1 mol dm ⁻³ X + 50 cm ³ of 0.1 mol dm ⁻³ copper(II) chloride solution	 Suhu awal = 28 °C Suhu tertinggi = 36 °C Initial temperature = 28 °C Highest temperature = 36 °C
Set III Y + 50 cm ³ larutan kuprum(II) klorida 0.1 mol dm ⁻³ Y + 50 cm ³ of 0.1 mol dm ⁻³ copper(II) chloride solution	 Suhu awal = 28 °C Suhu tertinggi = 28 °C Initial temperature = 28 °C Highest temperature = 28

Rajah 9
Diagram 9

- (i) Berdasarkan Set I, hitung haba penyesaran bagi tindak balas ini. Berikan satu sebab mengapa cawan polisterina digunakan dalam eksperimen ini berbanding bikar.
[Diberi muatan haba tentu larutan, $c = 4.2 \text{ J g}^{-1} \text{ }^{\circ}\text{C}^{-1}$,
ketumpatan larutan ialah 1.0 g cm^{-3}]

Based on Set I, calculate the heat of displacement for this reaction. Give a reason why polystyrene cup is used in the experiment instead of a beaker.

[Given specific heat capacity of solution, $c = 4.2 \text{ J g}^{-1} \text{ }^{\circ}\text{C}^{-1}$, density of solution is 1.0 g cm^{-3}]

[4 markah]

- (ii) Berdasarkan Rajah 9, cadangkan logam X dan Y berpandukan Siri Keupayaan Elektrod Piawai yang disediakan di halaman 41. Terangkan perbezaan pemerhatian bagi:

- Set I dan II
- Set I dan III

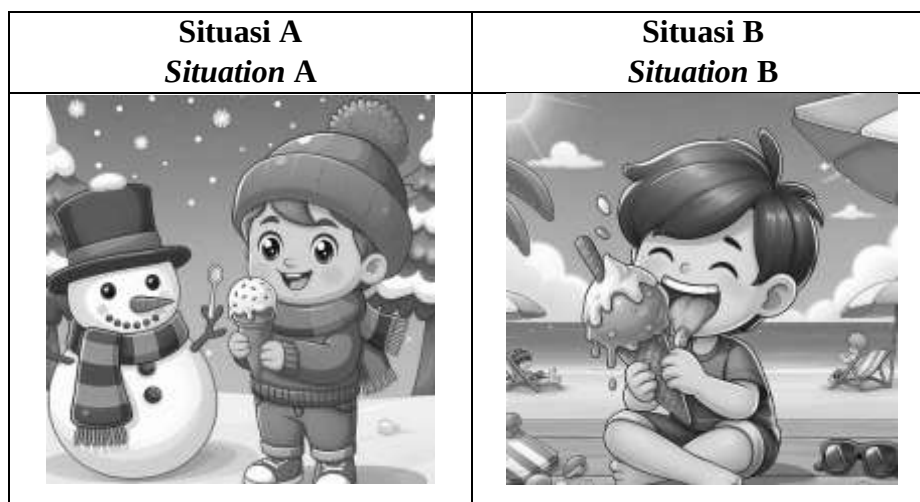
Based on Diagram 9, suggest metal X and Y according to the Standard Electrode Potential Series provided on page 41.

Explain the difference in observation for:

- Set I and II
- Set I and III

[6 markah]

- 10 Rajah 10 menunjukkan aiskrim dalam Situasi A dan Situasi B.
Diagram 10 shows the ice cream in Situation A and Situation B.



Rajah 10
Diagram 10

- (a) Berdasarkan Rajah 10, bandingkan masa yang diambil untuk aiskrim mencair dalam kedua-dua situasi. Nyatakan faktor yang terlibat dan terangkan bagaimana faktor tersebut mempengaruhi masa yang diambil.

Based on Diagram 10, compare the time taken for the ice cream to melt in the two situations. State the factor involved and explain how the factor affects the time taken.

[3 markah]

- (b) Jadual 4 menunjukkan tiga set eksperimen yang dijalankan untuk mengkaji faktor-faktor yang mempengaruhi kadar tindak balas.

Table 4 shows three sets of experiment that are carried out to investigate the factors affecting the rate of reaction.

Set	Bahan tindak balas <i>Reactants</i>	Masa yang diambil untuk mengumpul 40 cm ³ gas (s) <i>Time taken to collect 40 cm³ of gas (s)</i>
I	50 cm ³ asid sulfurik 1.0 mol dm ⁻³ + serbuk zink berlebihan <i>50 cm³ of 1.0 mol dm⁻³ sulphuric acid + excess zinc powder</i>	30
II	50 cm ³ asid hidroklorik 1.0 mol dm ⁻³ + serbuk zink berlebihan <i>50 cm³ of 1.0 mol dm⁻³ hydrochloric acid + excess zinc powder</i>	60
III	50 cm ³ asid hidroklorik 1.0 mol dm ⁻³ + ketulan zink berlebihan <i>50 cm³ of 1.0 mol dm⁻³ hydrochloric acid + excess zinc granules</i>	120

Jadual 4

Table 4

- (i) Berdasarkan Jadual 4, hitung kadar tindak balas bagi Set I, II dan III. Susun kadar tindak balas bagi semua set dalam tertib menaik.

Based on Table 4, calculate the rate of reaction for Set I, II and III. Arrange the rate of reaction of all sets in ascending order.

[4 markah]

- (ii) Pada paksi yang sama lakarkan graf isi padu gas hidrogen melawan masa bagi Set I, II dan III apabila semua asid lengkap bertindak balas.

Sketch the graph for the volume of hydrogen gas against time for Set I, II and III on the same axes when all the acids react completely.

[3 markah]

[Lihat halaman sebelah

(iii) Berdasarkan Jadual 4, bandingkan kadar tindak balas antara:

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

Bagi setiap perbandingan, terangkan perbezaan dalam kadar tindak balas dengan merujuk kepada teori perlanggaran

Based on Table 4, compare the rate of reaction between:

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

For each comparison, explain the difference in the rate of reaction with the reference to the collision theory.

[10 markah]

No. soalan :

[illegible]

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This image shows a full page of white paper with horizontal dashed lines, typical of primary-ruled notebook 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 white paper with horizontal dashed lines, typical of primary-ruled notebook 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** Rajah 11.1 menunjukkan perbualan antara Hazriq dan Iqbal melalui satu aplikasi telefon pintar.

Diagram 11.1 shows a conversation between Hazriq and Iqbal via a smartphone application.



Rajah 11.1
Diagram 11.1

[Lihat halaman sebelah
SULIT

- (a) (i) Apakah yang dimaksudkan dengan nilai pH?
What is meant by pH value?

[1 markah]

- (ii) Hitung kepekatan ion hidroksida yang terdapat dalam cecair peluntur dalam Rajah 11.1.

Calculate the concentration of hydroxide ion present in the bleaching liquid in Diagram 11.1.

[2 markah]

- (b) Jadual 5 menunjukkan nilai pH bagi asid hidroklorik, asid sulfurik dan asid etanoik dengan kemolaran yang sama.

Table 5 shows the pH value of hydrochloric acid, sulphuric acid and ethanoic acid with the same molarity.

Asid <i>Acid</i>	Kemolaran <i>Molarity</i> (mol dm ⁻³)	Nilai pH <i>pH value</i>
Asid hidroklorik <i>Hydrochloric acid</i>	0.01	2.0
Asid sulfurik <i>Sulphuric acid</i>	0.01	1.7
Asid etanoik <i>Ethanoic acid</i>	0.01	5.0

Jadual 5

Table 5

Berdasarkan Jadual 5, terangkan perbezaan nilai pH bagi ketiga-tiga asid.

Based on Table 5, explain the difference in pH values for the three acids.

[5 markah]

- (c) Hazimah dikehendaki menyediakan 250 cm³ larutan natrium karbonat 0.2 mol dm⁻³ daripada larutan piawai 2.0 mol dm⁻³ dengan menggunakan kaedah pencairan.

Hitung isi padu larutan piawai yang diperlukan untuk menghasilkan larutan tersebut.

Hazimah is required to prepare 250 cm³ of 0.2 mol dm⁻³ of sodium carbonate solution from 2.0 mol dm⁻³ standard solution using dilution method.

Calculate the volume of standard solution required to produce the solution.

[2 markah]

- (d) (i) Rajah 11.2 menunjukkan ladang nanas Encik Ahmad yang terletak berhampiran kilang yang membebaskan gas sulfur dioksida.

Diagram 11.2 shows Mr. Ahmad's pineapple plantation that is located near a factory that releases sulphur dioxide gas.



Rajah 11.2
Diagram 11.2

Beliau mendapati tanamannya tidak membesar dengan baik. Nyatakan sebab bagi situasi ini dan cara mengatasinya.

He found that his plants did not grow well. State the reason for this situation and how to overcome it.

[2 markah]

- (ii) Rajah 11.3 menunjukkan garam Epsom yang boleh digunakan dalam penghasilan produk kosmetik.

Diagram 11.3 shows Epsom salt that can be used to produce cosmetic products.



Rajah 11.3
Diagram 11.3

Maklumat berikut menunjukkan tiga bahan yang dapat digunakan untuk menghasilkan garam Epsom.

The following information shows three substances that can be used to produce Epsom salt.

- Asid sulfurik
Sulphuric acid
- Magnesium nitrat
Magnesium nitrate
- Natrium karbonat
Sodium carbonate

Huraikan satu eksperimen untuk menghasilkan garam Epsom di dalam makmal. Tuliskan persamaan kimia bagi tindak balas yang terlibat.

Describe an experiment to produce Epsom salt in the laboratory. Write the chemical equations involved in the reactions.

[8 markah]

No. soal : 11

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[illegible]

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[illegible]

KERTAS PEPERIKSAAN TAMAT

KEUPAYAAN ELEKTROD PIAWAI, E^0
STANDARD ELECTRODE POTENTIAL, E^0

Tindak Balas Sel Setengah <i>Half-cell Reactions</i>	E^0 / V (298 K)
$\text{Li}^+ + \text{e}^- \rightleftharpoons \text{Li}$	- 3.04
$\text{K}^+ + \text{e}^- \rightleftharpoons \text{K}$	- 2.92
$\text{Ca}^{2+} + 2\text{e}^- \rightleftharpoons \text{Ca}$	- 2.87
$\text{Na}^+ + \text{e}^- \rightleftharpoons \text{Na}$	- 2.71
$\text{Mg}^{2+} + 2\text{e}^- \rightleftharpoons \text{Mg}$	- 2.38
$\text{Al}^{3+} + 3\text{e}^- \rightleftharpoons \text{Al}$	- 1.66
$\text{Zn}^{2+} + 2\text{e}^- \rightleftharpoons \text{Zn}$	- 0.76
$\text{Fe}^{2+} + 2\text{e}^- \rightleftharpoons \text{Fe}$	- 0.44
$\text{Sn}^{2+} + 2\text{e}^- \rightleftharpoons \text{Sn}$	- 0.14
$\text{Pb}^{2+} + 2\text{e}^- \rightleftharpoons \text{Pb}$	- 0.13
$2\text{H}^+ + 2\text{e}^- \rightleftharpoons \text{H}_2$	0.00
$\text{Cu}^{2+} + 2\text{e}^- \rightleftharpoons \text{Cu}$	+ 0.34
$\text{O}_2 + 2\text{H}_2\text{O} + 4\text{e}^- \rightleftharpoons 4\text{OH}^-$	+ 0.40
$\text{I}_2 + 2\text{e}^- \rightleftharpoons 2\text{I}^-$	+ 0.54
$\text{Fe}^{3+} + \text{e}^- \rightleftharpoons \text{Fe}^{2+}$	+ 0.77
$\text{NO}_3^- + 2\text{H}^+ + \text{e}^- \rightleftharpoons \text{NO}_2 + \text{H}_2\text{O}$	+ 0.81
$\text{Ag}^+ + \text{e}^- \rightleftharpoons \text{Ag}$	+ 0.80
$\text{Br}_2 + 2\text{e}^- \rightleftharpoons 2\text{Br}^-$	+ 1.07
$\text{MnO}_2 + 4\text{H}^+ + 2\text{e}^- \rightleftharpoons \text{Mn}^{2+} + 2\text{H}_2\text{O}$	+ 1.23
$\text{O}_2 + 4\text{H}^+ + 4\text{e}^- \rightleftharpoons 2\text{H}_2\text{O}$	+ 1.23
$\text{Cr}_2\text{O}_7^{2-} + 14\text{H}^+ + 6\text{e}^- \rightleftharpoons 2\text{Cr}^{3+} + 7\text{H}_2\text{O}$	+ 1.33
$\text{Cl}_2 + 2\text{e}^- \rightleftharpoons 2\text{Cl}^-$	+ 1.36
$\text{MnO}_4^- + 8\text{H}^+ + 5\text{e}^- \rightleftharpoons \text{Mn}^{2+} + 4\text{H}_2\text{O}$	+ 1.52
$\text{H}_2\text{O}_2 + 2\text{H}^+ + 2\text{e}^- \rightleftharpoons 2\text{H}_2\text{O}$	+1.77
$\text{F}_2 + 2\text{e}^- \rightleftharpoons 2\text{F}^-$	+2.87

[Lihat halaman sebelah

JADUAL BERKALA UNSUR

1 H Hydrogen 1																	2 He Helium 4
3 Li Lithium 7	4 Be Beryllium 9															9 F Flourin 19	10 Ne Neon 20
11 Na Natrium 23	12 Mg Magnesium 24															17 Cl Klorin 35	18 Ar Argon 40
19 K Kalium 39	20 Ca Kalsium 40	21 Sc Skandium 45	22 Ti Titanium 48	23 V Vanadium 51	24 Cr Kromium 52	25 Mn Mangan 55	26 Fe Feram 56	27 Co Kobalt 59	28 Ni Nikel 59	29 Cu Kuprum 64	30 Zn Zink 65	31 Ga Gallium 70	32 Ge Germanium 73	33 As Arsenik 75	34 Se Selenium 79	35 Br Bromin 80	36 Kr Krypton 84
37 Rb Rubidium 86	38 Sr Strontium 88	39 Y Itrium 89	40 Zr Zirkonium 91	41 Nb Niobium 93	42 Mo Molibdenum 96	43 Tc Teknarium 98	44 Ru Rutenium 101	45 Rh Rodium 103	46 Pd Paladium 106	47 Ag Argentum 108	48 Cd Kadmium 112	49 In Indium 115	50 Sn Stanium 119	51 Sb Antimoni 122	52 Te Telurium 128	53 I Iodin 127	54 Xe Xenon 131
55 Cs Sesium 133	56 Ba Barium 137	57 – 71 Lantanida	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 Aurum 197	80 Hg Mercuri 201	81 Tl Thallium 204	82 Pb Plumbum 207	83 Bi Bismut 209	84 Po Polonium 210	85 At Astatin 210	86 Rn Radon 222
87 Fr Francium 223	88 Ra Radium 226	89 – 103 Aktinida	104 Rf Rutherfordium 257	105 Db Dubnium 260	106 Sg Seiborgium 263	107 Bh Bohrium 262	108 Hs Hassium 265	109 Mt Meitnerium 266	110 Ds Darmstadtium 281	111 Rg Roentgenium 280	112 Cn Kopernisium 285	113 Nh Nihonium 286	114 Fl Flerovium 289	115 Mc Moscovium 288	116 Lv Livermorium 293	117 Ts Tennessine 294	118 Og Oganesson 294
57 La Lanthanum 139	58 Ce Sesium 140	59 Pr Praseodimium 141	60 Nd Neodimium 144	61 Pm Prometrium 147	62 Sm Samarium 150	63 Eu Europium 152	64 Gd Gadolium 157	65 Tb Terbium 159	66 Dy Dysprosium 163	67 Ho Holmium 165	68 Er Erbium 167	69 Tm Thulium 169	70 Yb Iterbium 173	71 Lu Lutetium 175			
89 Ac Aktinium 227	90 Th Torium 232	91 Pa Protaktinium 231	92 U Uranium 238	93 Np Neptunium 237	94 Pu Plutonium 244	95 Am Americium 243	96 Cm Kuriun 247	97 Bk Berkelium 247	98 Cf Kalifornium 249	99 Es Einsteinium 254	100 Fm Fermium 253	101 Md Mendelievium 256	102 No Nobelium 254	103 Lr Lawrensium 257			



THE PERIODIC TABLE OF ELEMENTS

1 H Hydrogen 1												2 He Helium 4																									
3 Li Lithium 7		4 Be Beryllium 9												9 F Fluorine 19																							
11 Na Sodium 23		12 Mg Magnesium 24												17 Cl Chlorine 35																							
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 Zinc 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 Mo Molybdenum 96		43 Tc Technetium 98		44 Ru Ruthenium 101		45 Rh Rhodium 103		46 Pd Palladium 106		47 Ag Silver 108		48 Cd Cadmium 112		49 In Indium 115		50 Sn Tin 119		51 Sb Antimony 122		52 Te Tellurium 128		53 I Iodine 127		54 Xe Xenon 131			
55 Cs Cesium 133		56 Ba Barium 137		57 – 71 Lanthanide		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 – 103 Actinide		104 Rf Rutherfordium 257		105 Db Dubnium 260		106 Sg Seaborgium 263		107 Bh Bohrium 262		108 Hs Hassium 265		109 Mt Meitnerium 266		110 Ds Darmstadtium 281		111 Rg Roentgenium 280		112 Cn Copernicium 285		113 Nh Nihonium 286		114 Fl Flerovium 289		115 Mc Moscovium 288		116 Lv Livermorium 293		117 Ts Tennessine 294		118 Og Oganesson 294			

10	Proton number
Ne	Symbol
Neon	Name of element
20	Relative atomic mass