

# MODUL PINTAS TINGKATAN LIMA

**2 JAM 30 MINIT**

## ARAHAN :

1. Jangan Buka Kertas Peperiksaan Ini Sehingga Diberitahu.
2. Tulis nombor kad pengenalan, angka giliran, nama, tingkatan anda pada petak yang disediakan.
3. Kertas peperiksaan ini adalah dalam dwibahasa.
4. Soalan dalam bahasa Melayu mendahului soalan yang sepadan dalam bahasa Inggeris.
5. Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Melayu atau bahasa Inggeris.
6. Calon dikehendaki membaca maklumat di halaman belakang kertas peperiksaan ini.

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			

NO. KAD PENGENALAN

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ANGKA GILIRAN

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NAMA : .....

TINGKATAN : .....

Kertas peperiksaan ini mengandungi 30 halaman bercetak dan 2 halaman tidak bercetak.



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

[60 markah]

[60 marks]

Jawab **semua** soalan dalam bahagian ini.

*Answer all questions in this section.*

- 1 Jadual 1 menunjukkan nombor proton dan nombor nukleon bagi tiga atom. Huruf yang digunakan bukan simbol sebenar bagi atom-atom itu. Gunakan huruf tersebut untuk menjawab soalan berikut.

*Table 1 shows the proton number and nucleon number of three atoms. The letters used are not the actual symbols of the atoms. Use the letters to answer the following questions.*

Atom <i>Atom</i>	Nombor proton <i>Proton number</i>	Nombor nukleon <i>Nucleon number</i>
T	11	23
U	11	24
V	12	24

Jadual 1

*Table 1*

- (a) Apakah yang dimaksudkan dengan nombor nukleon?

*What is meant by the nucleon number?*

.....

[1 markah]

[1 mark]

- (b) Nyatakan bilangan neutron bagi atom V.

*State the number of neutrons for atom V.*

.....

[1 markah]

[1 mark]

1(a)

	1
--	---

1(b)

	1
--	---



- (c) Nyatakan sepasang isotop. Terangkan jawapan anda.

*State a pair of isotopes. Explain your answer.*

.....

.....

[2 markah]

[2 marks]

1(c)

	2
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- (d) Nyatakan **satu** kegunaan atom U dalam kehidupan harian.

*State **one** use of atom U in daily life.*

.....

[1 markah]

[1 mark]

1(d)

	1
--	---

Total  
A1

	5
--	---

- 2 Jadual 2 menunjukkan dua jenis bahan buatan dalam industri.  
*Table 2 shows two types of manufactured substances in industry.*

Bahan <i>Substance</i>	Komposisi <i>Composition</i>
Aloi X <i>Alloy X</i>	Kuprum, stanum <i>Copper, tin</i>
Komposit Y <i>Composite Y</i>	Konkrit, aloi Z <i>Concrete, alloy Z</i>

Jadual 2  
*Table 2*

- (a) (i) Namakan aloi X.  
*Name the alloy X.*

[1 markah]  
[1 mark]

- (ii) Terangkan mengapa aloi X lebih keras daripada logam tulen.  
*Explain why alloy X is harder than pure metal.*

[2 markah]  
[2 marks]

- (b) Namakan bahan komposit Y dan aloi Z.  
*Name the composite material Y and alloy Z.*

Y: .....

Z: .....

[2 markah]  
[2 marks]

Total  
A2

5

4541/2



- 3 Sebatian karbon P mengandungi 6.67% hidrogen, 40.00% karbon dan 53.33% oksigen.

*Carbon compound P contains 6.67% hydrogen, 40.00% carbon and 53.33% oxygen.*

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

3(a)(i)

	1
--	---

[1 markah]

[1 mark]

- (ii) Hitungkan formula empirik bagi sebatian P.  
[Jisim atom relatif: C = 12, H = 1, O = 16]  
*Calculate the empirical formula of compound P.*  
[Relative atomic mass: C = 12, H = 1, O = 16]

3(a)(ii)

	3
--	---

[3 markah]

[3 marks]

- (b) Jisim molekul relatif bagi sebatian P ialah 180.  
Hitungkan formula molekul bagi sebatian P.  
*The relative molecular mass of compound P is 180.*  
*Calculate the molecular formula of compound P.*

3(b)

	2
--	---

[2 markah]

[2 marks]

Total  
A3

	6
--	---



- 4 Jadual 4 menunjukkan satu Kala bagi unsur dalam Jadual Berkala Unsur.  
*Table 4 shows a Period of elements in the Periodic Table of Elements.*

Unsur Element	$_{11}\text{Na}$	$_{12}\text{Mg}$	$_{13}\text{Al}$	$_{14}\text{Si}$	$_{15}\text{P}$	$_{16}\text{S}$	$_{17}\text{Cl}$	$_{18}\text{Ar}$
------------------	------------------	------------------	------------------	------------------	-----------------	-----------------	------------------	------------------

Jadual 4  
Table 4

- (a) Dalam Kala manakah unsur-unsur ini ditempatkan dalam Jadual Berkala Unsur?  
*In which Period are these elements placed in the Periodic Table of Elements?*

4(a)

1
---

[1 markah]  
[1 mark]

- (b) Tulis susunan elektron bagi ion magnesium,  $\text{Mg}^{2+}$ .  
*Write the electron arrangement of magnesium ion,  $\text{Mg}^{2+}$ .*

4(b)

1
---

[1 markah]  
[1 mark]

- (c) (i) Natrium dan sulfur membentuk oksidanya sendiri.  
Tulis formula bagi natrium oksida dan sulfur dioksida.  
*Sodium and sulphur form their own oxides.  
Write the formula of sodium oxide and sulphur dioxide.*

4(c)(i)

2
---

[2 markah]  
[2 marks]

- (ii) Nyatakan perbezaan sifat kimia antara dua oksida ini.  
*State the difference in chemical property between these two oxides.*

4(c)(ii)

1
---

[1 markah]  
[1 mark]



- (d) Lukis susunan elektron bagi sebatian yang terbentuk daripada atom magnesium dan atom klorin.

*Draw the electron arrangement of the compound formed from magnesium atom and chlorine atom.*

[2 markah]  
[2 marks]

4(d)

	2
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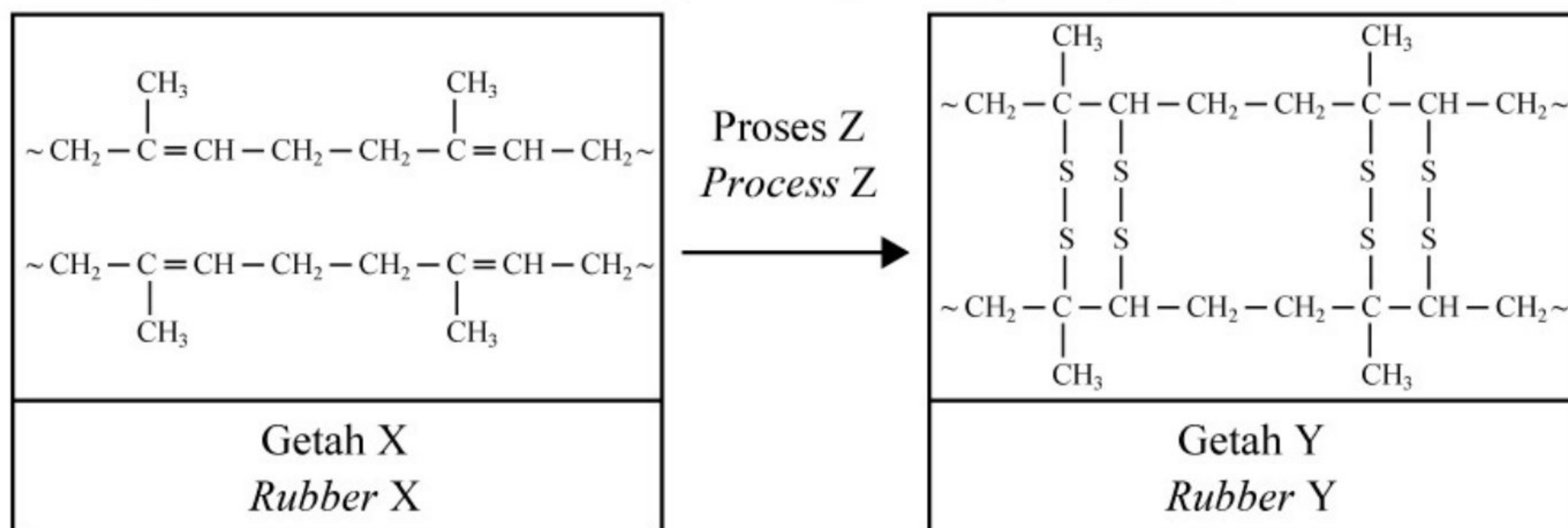
Total  
A4

	7
--	---



- 5 Rajah 5.1 menunjukkan formula struktur bagi dua jenis getah yang berbeza.

*Diagram 5.1 shows the structural formula of two different types of rubber.*



Rajah 5.1  
Diagram 5.1

- (a) (i) Nyatakan jenis Getah X dan Getah Y.  
*State the types of Rubber X and Rubber Y.*

X : .....

Y : .....

[2 markah]

[2 marks]

- (ii) Getah Y dapat dihasilkan daripada Getah X melalui satu Proses Z.  
Namakan Proses Z dan huraikan dengan ringkas bagaimana Proses Z dijalankan.

*Rubber Y can be produced from Rubber X through Process Z.*

*Name the Process Z and describe briefly how Process Z is carried out.*

.....

.....

.....

[2 markah]

[2 marks]

- (iii) Nyatakan **satu** perbezaan sifat bagi Getah X dan Getah Y.

*State **one** different characteristic between Rubber X and Rubber Y.*

.....

.....

[1 markah]

[1 mark]

5(a)(i)

	2
--	---

5(a)(ii)

	2
--	---

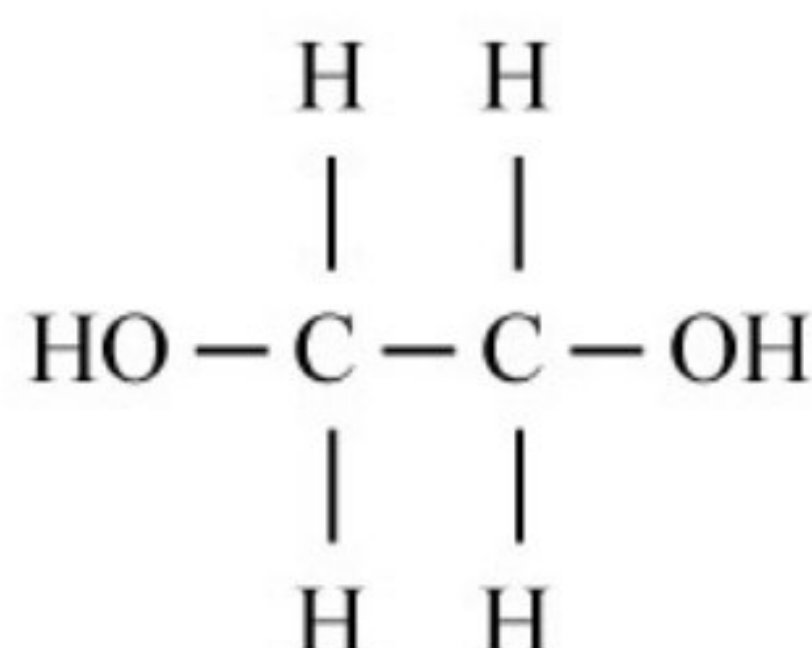
5(a)(iii)

	1
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- (b) Rajah 5.2 menunjukkan monomer bagi terilena.

*Diagram 5.2 shows the monomers for terylene.*



Rajah 5.2  
*Diagram 5.2*

- (i) Apakah jenis pempolimeran bagi terilena?

*What is the type of polymerisation for terylene?*

.....

[1 markah]

[1 mark]

- (ii) Lukis formula struktur bagi polimer terilena.

*Draw the structural formula for terylene polymer.*

5(b)(i)

	1
--	---

5(b)(ii)

[2 markah]

[2 marks]

	2
--	---

Total  
A5

	8
--	---



- 6 Rajah 6 menunjukkan pelbagai kosmetik di pasaran.  
*Diagram 6 shows various types of cosmetics found in the market.*



Rajah 6  
*Diagram 6*

- (a) (i) Nyatakan maksud kosmetik.  
*State the meaning of cosmetics.*

6(a)(i)

	1
--	---

.....

.....

[1 markah]  
[1 mark]

- (ii) Nyatakan **dua** bahan asas dalam pembuatan kosmetik.  
*State **two** basic ingredients in cosmetics production.*

6(a)(ii)

	2
--	---

.....

.....

[2 markah]  
[2 marks]



- (b) Terdapat kosmetik yang dikomersialkan mengandung bahan kimia terlarang yang boleh mengakibatkan kemudaran kepada pengguna.

*Some of the commercialized cosmetics contain banned chemicals that can cause harm to consumers.*

- (i) Nyatakan **dua** kesan penggunaan bahan kimia terlarang kepada pengguna.  
*State **two** effects of the use of banned chemicals substance to consumers.*

.....

.....

[2 markah]

[2 marks]

6(b)(i)

	2
--	---

- (ii) Cadangkan **satu** cara untuk mencegah keadaan di 6(b)(i) berlaku.  
*Suggest **one** method to prevent the situation in 6(b)(i) from happening.*

.....

.....

[1 markah]

[1 mark]

6(b)(ii)

	1
--	---



- (c) Jadual 6 menunjukkan tiga jenis sebatian kimia yang digunakan sebagai bahan tambah makanan.

*Table 6 shows three types of chemical compounds which are used as food additives.*

<b>Jenis bahan tambah makanan</b> <i>Types of food additives</i>	<b>Sebatian kimia</b> <i>Chemical compounds</i>	<b>Produk</b> <i>Products</i>
X	Asid benzoik <i>Benzoic acid</i>	Sos cili <i>Chilli sauces</i>
Y	Mononatrium glutamat <i>Monosodium glutamate</i>	Mi segera <i>Instant noodles</i>
Z	Asid askorbik <i>Ascorbic acid</i>	Marjerin <i>Margarine</i>

Jadual 6

Table 6

- (i) Terangkan bagaimana asid benzoik bertindak sebagai bahan tambah makanan X.

*Explain how benzoic acid acts as food additive X.*

6(c)(i)

1
---

.....

.....

[1 markah]

[1 mark]

- (ii) Apakah kesan sampingan mononatrium glutamat ke atas kesihatan manusia?

*What is the side effect of monosodium glutamate on human health?*

6(c)(ii)

1
---

.....

[1 markah]

[1 mark]

- (iii) Apakah fungsi bahan tambah makanan Z?

*What is the function of food additive Z?*

6(c)(iii)

1
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.....

[1 markah]

[1 mark]

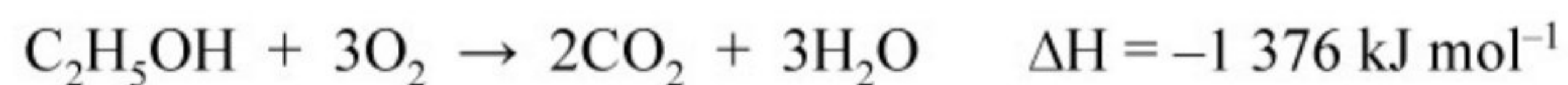
**Total**  
**A6**

9
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- 7 Pembakaran etanol dalam udara diwakili oleh persamaan berikut:

*Combustion of ethanol in air is represented by the equation below:*



- (a) Lukis gambar rajah berlabel menunjukkan susunan radas bagi menentukan haba pembakaran etanol dalam makmal.

*Draw a labelled diagram showing the set-up of apparatus to determine the heat of combustion of ethanol in a laboratory.*

[2 markah]  
[2 marks]

7(a)

2



- (b) Amin menjalankan satu eksperimen untuk menentukan haba pembakaran etanol. Dia mendapati 1.15 g etanol digunakan untuk meningkatkan suhu bagi 200 cm<sup>3</sup> air daripada 28.0 °C kepada 62.0 °C.

*Amin carried out an experiment to determine the heat of combustion of ethanol. He found that 1.15 g of ethanol is used to increase the temperature of 200 cm<sup>3</sup> of water from 28.0 °C to 62.0 °C.*

Hitungkan:

*Calculate:*

- (i) Haba yang dibebaskan daripada pembakaran etanol.  
[Muatan haba tentu larutan = 4.2 J g<sup>-1</sup> °C<sup>-1</sup>, ketumpatan larutan = 1 g cm<sup>-3</sup>]  
*The heat released from the combustion of ethanol.*  
[Specific heat capacity of solution = 4.2 J g<sup>-1</sup> °C<sup>-1</sup>, density of solution = 1 g cm<sup>-3</sup>]

7(b)(i)

	1
--	---

[1 markah]  
[1 mark]

- (ii) Bilangan mol etanol yang digunakan.  
[Jisim atom relatif: H = 1, C = 12, O = 16]  
*Number of moles of ethanol used.*  
[Relative atomic mass: H = 1, C = 12, O = 16]

7(b)(ii)

	1
--	---

[1 markah]  
[1 mark]

- (iii) Haba pembakaran etanol.  
*Heat of combustion of ethanol.*

7(b)(iii)

	1
--	---

[1 markah]  
[1 mark]

- (iv) Mengapakah nilai haba pembakaran yang didapati dalam eksperimen makmal lebih rendah daripada nilai teori?  
*Why is the value of heat of combustion obtained in laboratory experiment is lower than the theoretical value?*

7(b)(iv)

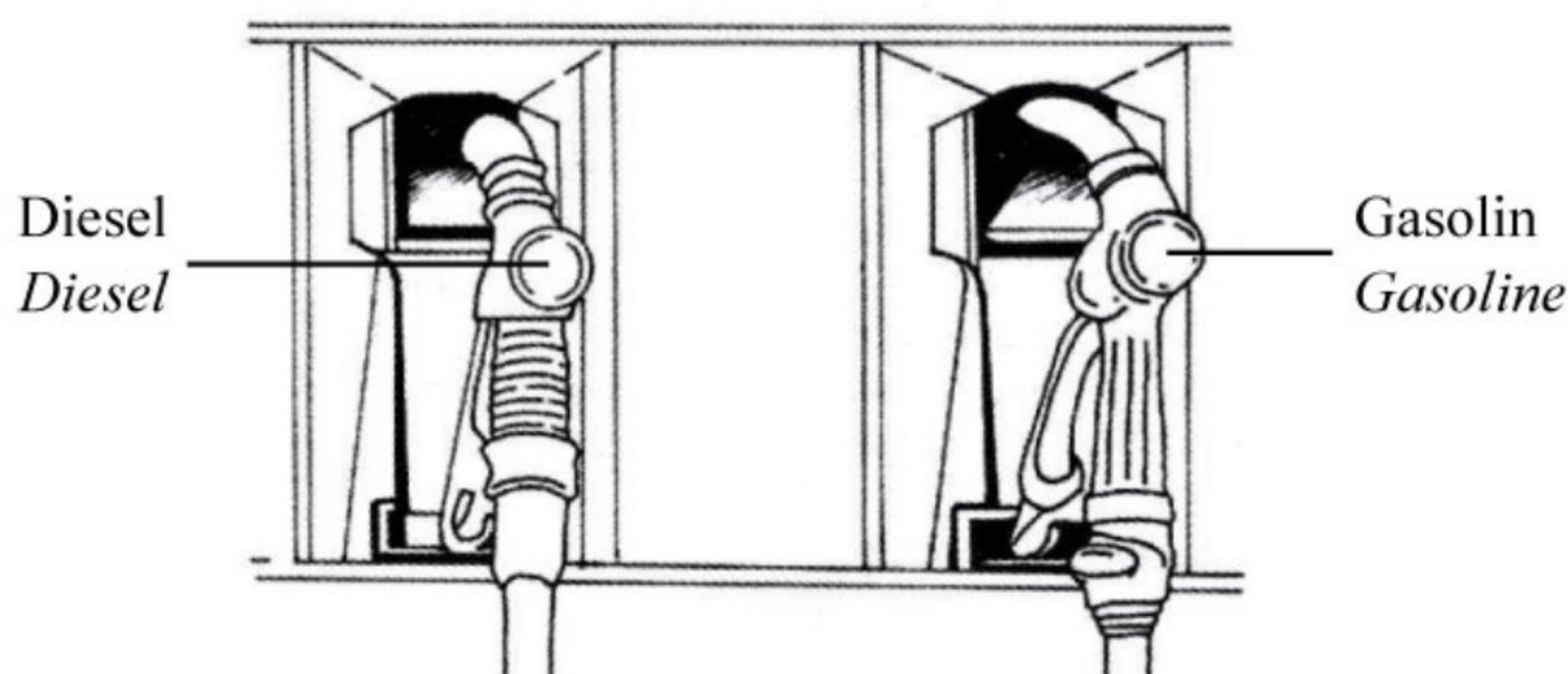
	1
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.....  
[1 markah]  
[1 mark]



- (c) Rajah 7 menunjukkan dua bahan api berlainan yang boleh diperolehi dengan mudah di stesen petrol.

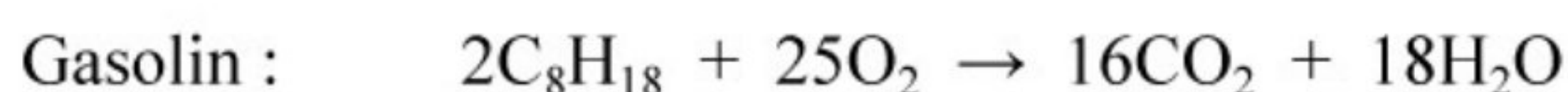
*Diagram 7 shows two different fuels that can easily obtained in petrol station.*



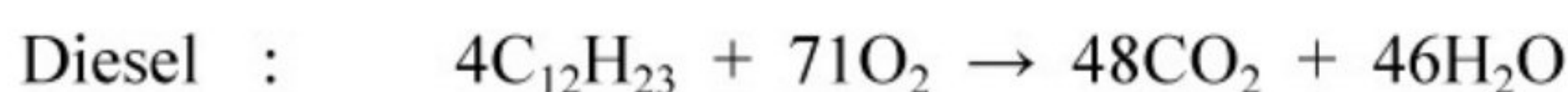
Rajah 7  
Diagram 7

Persamaan kimia berikut menunjukkan pembakaran lengkap gasolin,  $C_8H_{18}$  dan diesel,  $C_{12}H_{23}$ .

*The following chemical equation shows the complete combustion of gasoline,  $C_8H_{18}$  and diesel,  $C_{12}H_{23}$ .*



*Gasoline*



*Diesel*

- (i) Bandingkan nilai haba pembakaran bagi gasolin dan diesel.

*Compare the value of heat of combustion of gasoline and diesel.*

7(c)(i)

1
---

[1 markah]

[1 mark]

- (ii) Terangkan jawapan anda di 7(c)(i).

*Explain your answer in 7(c)(i).*

7(c)(ii)

3
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Total

A7

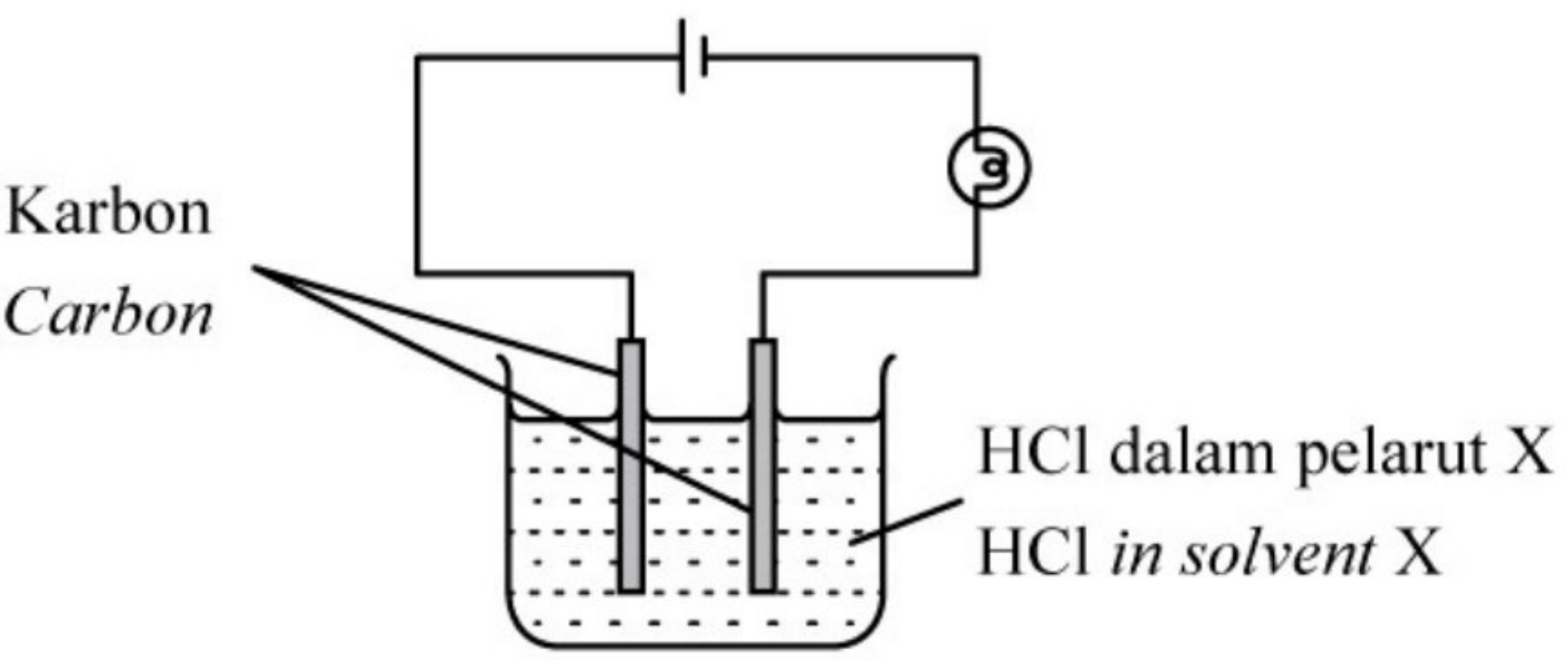
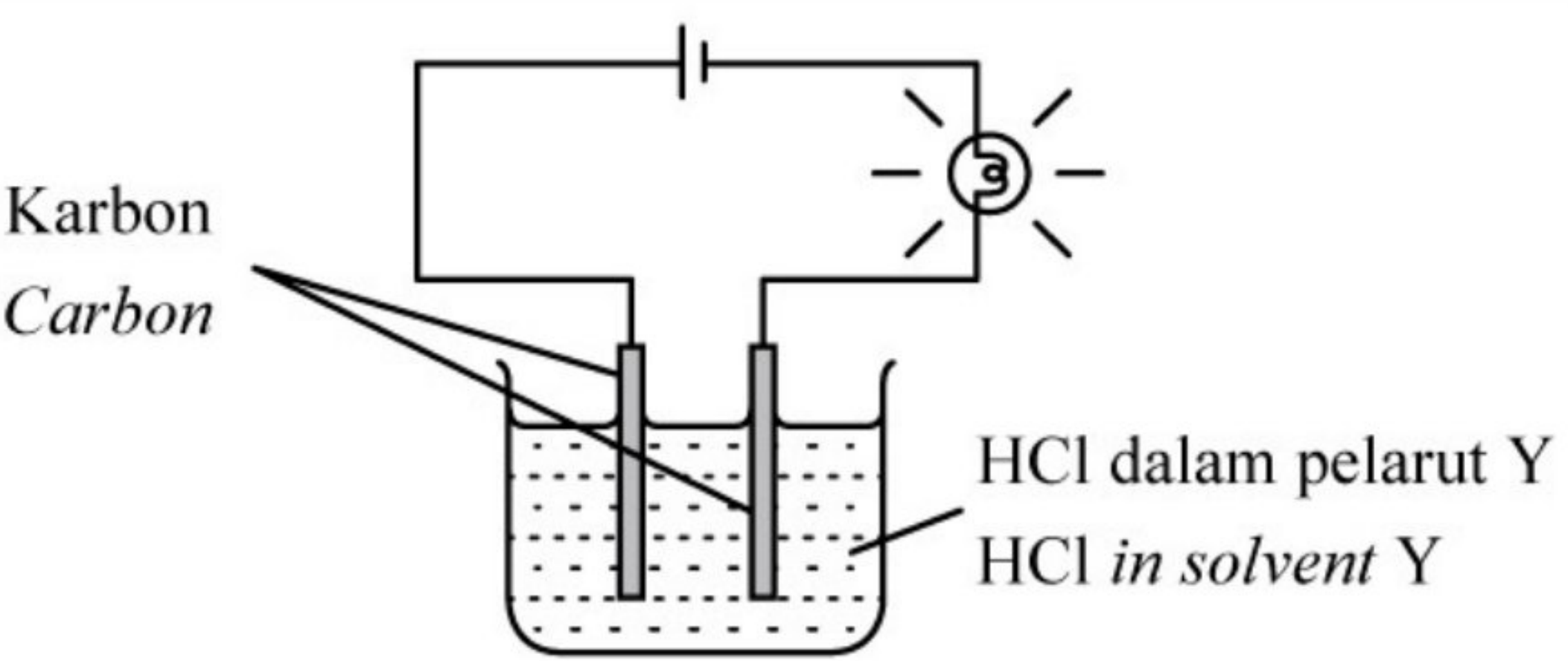
[3 markah]

[3 marks]

10
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- 8 Jadual 8 menunjukkan susunan radas dan pemerhatian bagi dua set eksperimen.  
*Table 8 shows the apparatus set-up and observation of two sets of experiment.*

Set Set	Susunan radas <i>Apparatus set-up</i>	Pemerhatian <i>Observation</i>
I	 <p>Karbon <i>Carbon</i></p> <p>HCl dalam pelarut X <i>HCl in solvent X</i></p>	<p>Mentol tidak menyala <i>The bulb does not light up</i></p>
II	 <p>Karbon <i>Carbon</i></p> <p>HCl dalam pelarut Y <i>HCl in solvent Y</i></p>	<p>Mentol menyala <i>The bulb light up</i></p>

Jadual 8  
*Table 8*

Berdasarkan Jadual 8,  
*Based on Table 8,*

- (a) (i) cadangkan pelarut Y.  
*suggest solvent Y.*

8(a)(i)

1
---

[1 markah]  
[1 mark]

- (ii) terangkan mengapa mentol dalam Set II menyala.  
*explain why the bulb in Set II lights up.*

8(a)(ii)

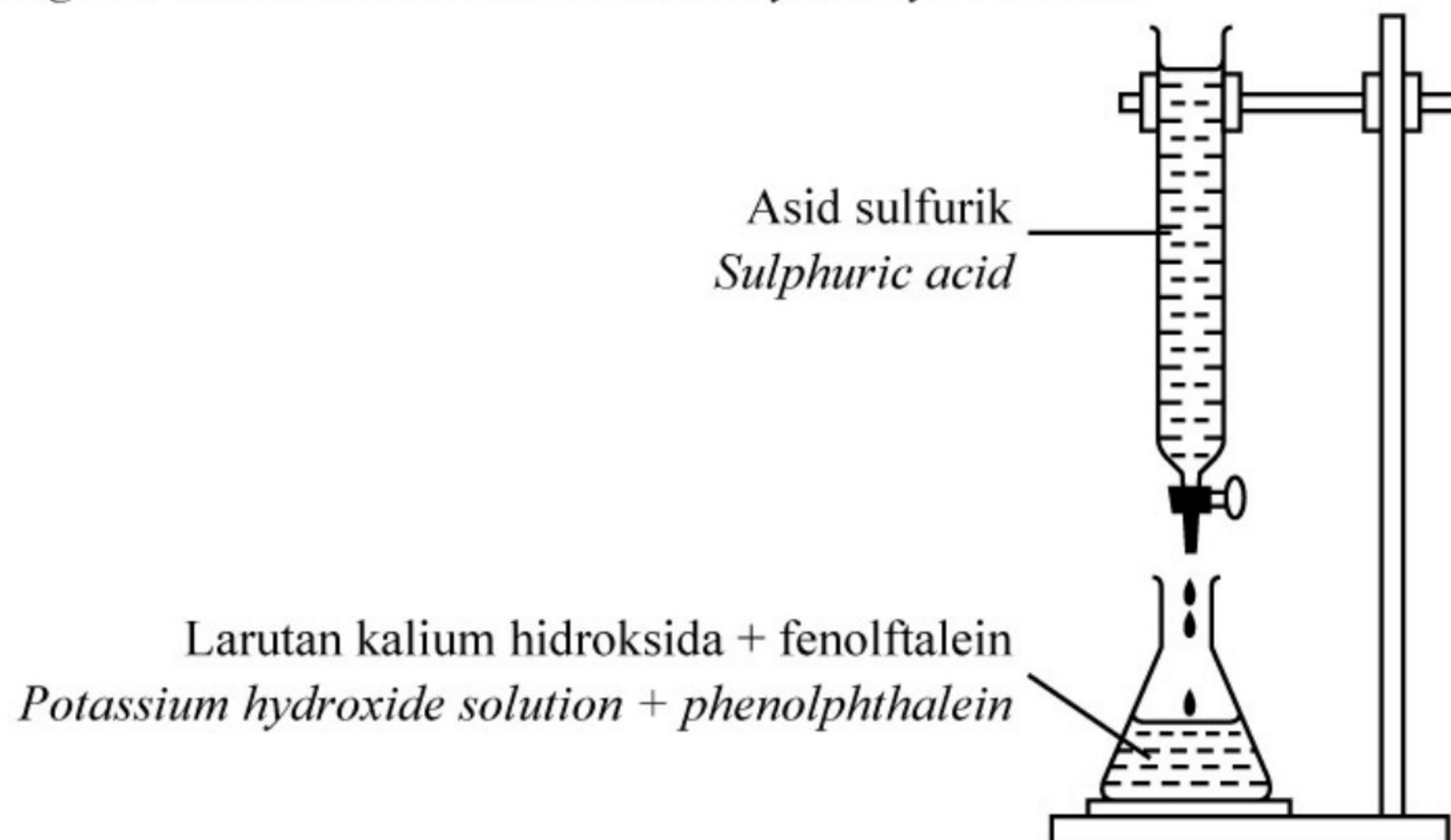
1
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[1 markah]  
[1 mark]



- (b) Rajah 8 menunjukkan kaedah pentitratan yang dijalankan oleh seorang murid.

*Diagram 8 shows titration method carry out by a student.*



Rajah 8  
Diagram 8

Berdasarkan Rajah 8,  
*Based on Diagram 8,*

- (i) tulis persamaan kimia seimbang bagi tindak balas peneutralan itu.  
*write a balanced chemical equation for the neutralisation reaction.*

8(b)(i)

	2
--	---

[2 markah]

[2 marks]

- (ii) 25 cm<sup>3</sup> asid sulfurik meneutralkan 50 cm<sup>3</sup> larutan kalium hidroksida 0.1 mol dm<sup>-3</sup>.

Hitungkan kemolaran asid sulfurik.

25 cm<sup>3</sup> of sulphuric acid neutralises 50 cm<sup>3</sup> of 0.1 mol dm<sup>-3</sup> potassium hydroxide solution.

Calculate the molarity of sulphuric acid.

8(b)(ii)

	3
--	---

[3 markah]

[3 marks]

[ Lihat halaman sebelah



- (iii) Huraikan ujian kimia untuk menentusahkan kehadiran anion dalam hasil tindak balas peneutralan itu.

*Describe chemical test to verify the presence of anion in the product of the neutralisation reaction.*

.....

.....

.....

.....

[3 markah]

[3 marks]

8(b)(iii)

3

Total  
A8

9

4541/2



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

[20 *markah*]  
[20 *marks*]

Jawab **satu** soalan dalam bahagian ini.  
*Answer one question in this section.*

- 9 (a) Rajah 9 menunjukkan dua situasi memanggang daging.  
*Diagram 9 shows two situation of grilling meat.*



Situasi A  
*Situation A*



Situasi B  
*Situation B*

Rajah 9  
*Diagram 9*

Berdasarkan Rajah 9, dalam situasi manakah daging akan masak dengan lebih cepat?  
Nyatakan faktor yang mempengaruhi kadar untuk memasak daging itu.

*Based on Diagram 9, in which situation meat will cook faster?*

*State the factor that affect the rate of cooking meat.*

[2 *markah*]  
[2 *marks*]



- (b) Sekumpulan murid telah menjalankan eksperimen untuk mengkaji faktor yang mempengaruhi kadar tindak balas antara kalsium karbonat dan asid hidroklorik. Jadual 9 menunjukkan maklumat bagi bahan tindak balas dan masa yang diambil untuk mengumpul  $50 \text{ cm}^3$  gas Y.

*A group of students carried out experiments to investigate the factor affecting the rate of reaction between calcium carbonate and hydrochloric acid. Table 9 shows the information of the reactants and time taken to collect  $50 \text{ cm}^3$  of gas Y.*

Set <i>Set</i>	Bahan tindak balas <i>Reactants</i>	Masa diambil / s <i>Time taken / s</i>
I	Serbuk kalsium karbonat berlebihan dan $50 \text{ cm}^3$ asid hidroklorik $1.0 \text{ mol dm}^{-3}$ <i>Excess calcium carbonate powder and <math>50 \text{ cm}^3</math> of <math>1.0 \text{ mol dm}^{-3}</math> hydrochloric acid</i>	25
II	Serbuk kalsium karbonat berlebihan dan $50 \text{ cm}^3$ asid hidroklorik $0.5 \text{ mol dm}^{-3}$ <i>Excess calcium carbonate powder and <math>50 \text{ cm}^3</math> of <math>0.5 \text{ mol dm}^{-3}</math> hydrochloric acid</i>	50

Jadual 9

Table 9

- (i) Nyatakan maksud kadar tindak balas.  
*State the meaning of rate of reaction.*
- [1 markah]  
[1 mark]
- (ii) Tulis persamaan kimia bagi tindak balas antara kalsium karbonat dan asid hidroklorik.  
Namakan gas Y yang terhasil.  
Hitungkan isi padu maksimum bagi gas Y yang terhasil dalam eksperimen Set I.  
[1 mol gas menempati  $24 \text{ dm}^3$  pada keadaan bilik]  
*Write chemical equation for the reaction between calcium carbonate and hydrochloric acid.*  
*Name the gas Y produced.*  
*Calculate the maximum volume of gas Y produced in experiment Set I.*  
[1 mol of gas occupies  $24 \text{ dm}^3$  at room condition]
- [6 markah]  
[6 marks]
- (iii) Hitungkan kadar tindak balas purata bagi eksperimen Set I dan eksperimen Set II.  
*Calculate the average rate of reaction for experiment Set I and experiment Set II.*
- [2 markah]  
[2 marks]



- (iv) Dengan menggunakan teori perlanggaran, terangkan perbezaan kadar tindak balas antara eksperimen Set I dan eksperimen Set II.

*By using the collision theory, explain the difference in the rate of reaction between experiment Set I and experiment Set II.*

[5 markah]

[5 marks]

- (v) Sekumpulan murid itu ingin mengulangi eksperimen Set I dengan meningkatkan suhu asid hidroklorik.

Terangkan bagaimana tindakan itu dapat mempengaruhi kadar tindak balas.

*The group of students wants to repeat the experiment Set I by increasing the temperature of hydrochloric acid.*

*Explain how the action can affect the rate of reaction.*

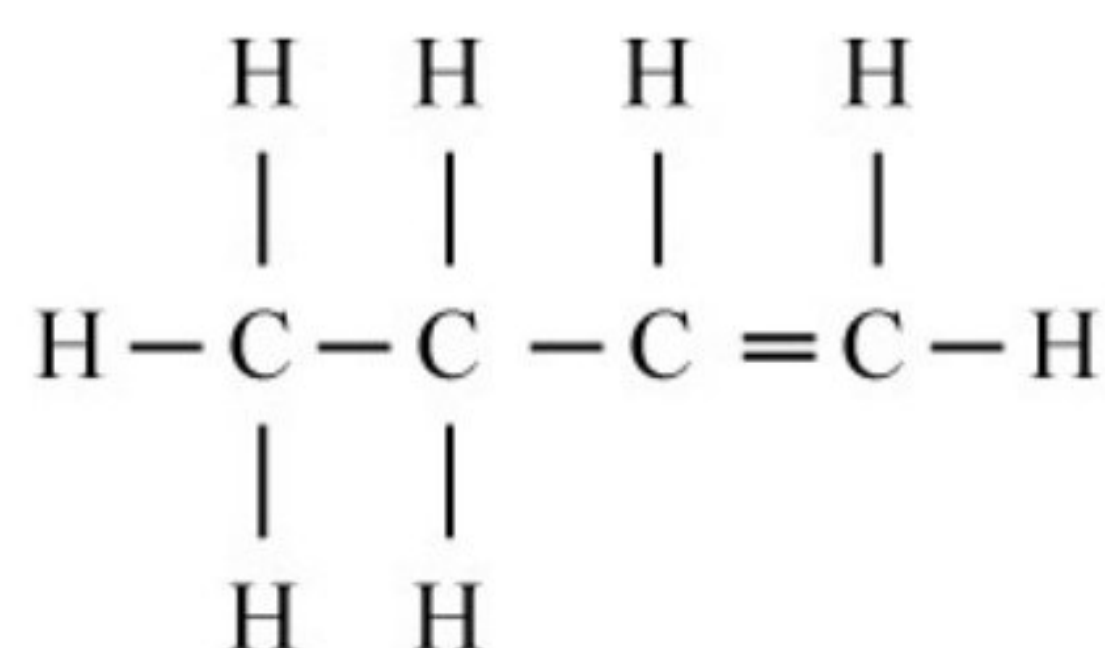
[4 markah]

[4 marks]



- 10 (a) Rajah 10.1 menunjukkan satu formula struktur bagi butena.

*Diagram 10.1 shows a structural formula of butene.*



Rajah 10.1

*Diagram 10.1*

- (i) Nyatakan maksud isomer.

*State the meaning of isomer.*

[1 markah]

[1 mark]

- (ii) Lukis formula struktur bagi dua lagi isomer bagi butena.

Namakan setiap isomer tersebut mengikut penamaan IUPAC.

*Draw the structural formulae for another two isomers of butene.*

*Name each isomer according to the IUPAC nomenclature.*

[4 markah]

[4 marks]

- (iii) Tulis persamaan kimia seimbang bagi pembakaran butena dalam oksigen yang berlebihan.

Jika 1 200 cm<sup>3</sup> gas butena digunakan, hitungkan isi padu gas oksigen yang diperlukan untuk pembakaran tersebut.

[1 mol gas menempati 24 cm<sup>3</sup> pada keadaan bilik]

*Write the balanced chemical equation for the combustion of butene in excess oxygen.*

*If 1 200 cm<sup>3</sup> butene gas is use, calculate the volume of oxygen gas needed for the combustion.*

[1 mol of gas occupies 24 cm<sup>3</sup> at room condition]

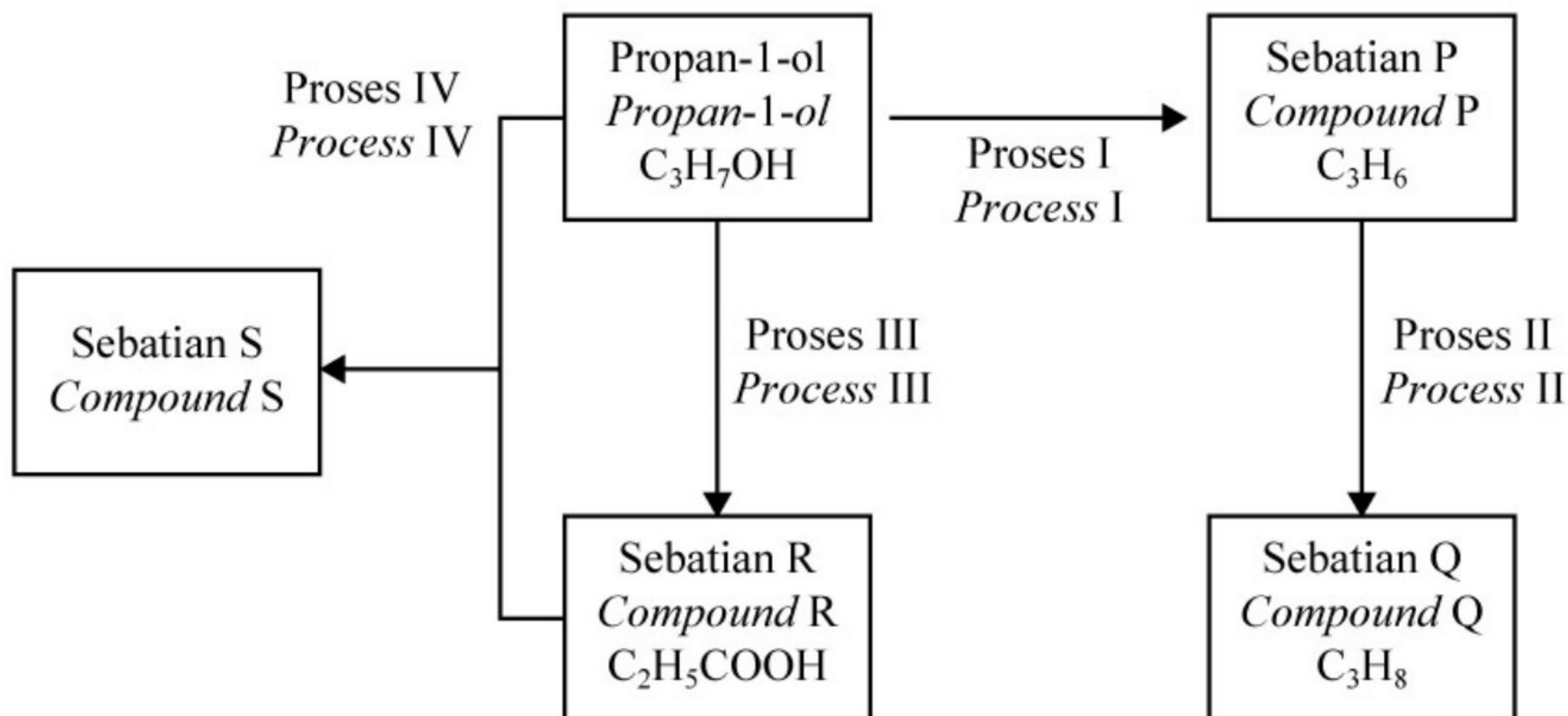
[5 markah]

[5 marks]



- (b) Rajah 10.2 menunjukkan carta alir pertukaran propan-1-ol kepada beberapa sebatian organik.

Diagram 10.2 shows a flow chart for the conversion of propan-1-ol to a few organic compounds.



Rajah 10.2  
Diagram 10.2

Nyatakan nama bagi Proses I, Proses II, Proses III dan Proses IV.

Kenal pasti siri homolog bagi Sebatian P, Sebatian Q, Sebatian R dan Sebatian S.

Lukis formula struktur bagi Sebatian P dan Sebatian S.

State the name for Process I, Process II, Process III and Process IV.

Identify the homologous series for Compound P, Compound Q, Compound R and Compound S.

Draw the structural formula for Compound P and Compound S.

[10 markah]

[10 marks]



**HALAMAN KOSONG**  
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**Bahagian C**  
**Section C**

[20 markah]

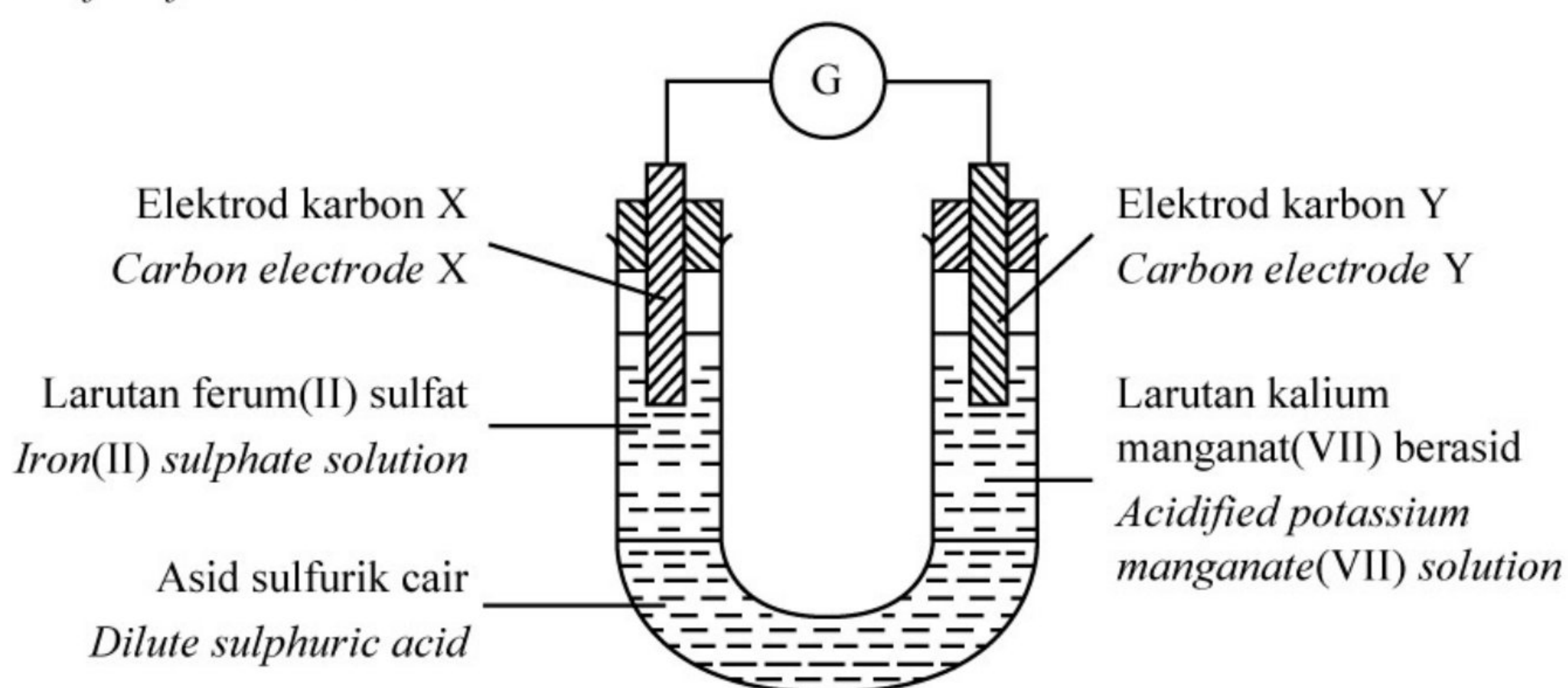
[20 marks]

Jawab **semua** soalan dalam bahagian ini.

Answer **all** question in this section.

- 11** (a) Rajah 11.1 menunjukkan susunan radas untuk menyiasat tindak balas redoks antara larutan ferum(II) sulfat dan larutan kalium manganat(VII) berasid melalui pemindahan elektron pada suatu jarak.

Diagram 11.1 shows the set-up of apparatus to investigate the redox reaction between iron(II) sulphate solution and acidified potassium manganate(VII) solution through the transfer of electrons at a distance.



Rajah 11.1

Diagram 11.1

Berdasarkan Rajah 11.1,

Based on Diagram 11.1,

- (i) nyatakan maksud tindak balas redoks.  
state the meaning of redox reaction.

[1 markah]

[1 mark]

- (ii) nyatakan fungsi larutan ferum(II) sulfat dan larutan kalium manganat(VII) berasid. Tulis setengah persamaan bagi tindak balas yang berlaku di elektrod karbon Y.

state the function of iron(II) sulphate solution and acidified potassium manganate(VII) solution.

Write the half equation for the reaction occurs at carbon electrode Y.

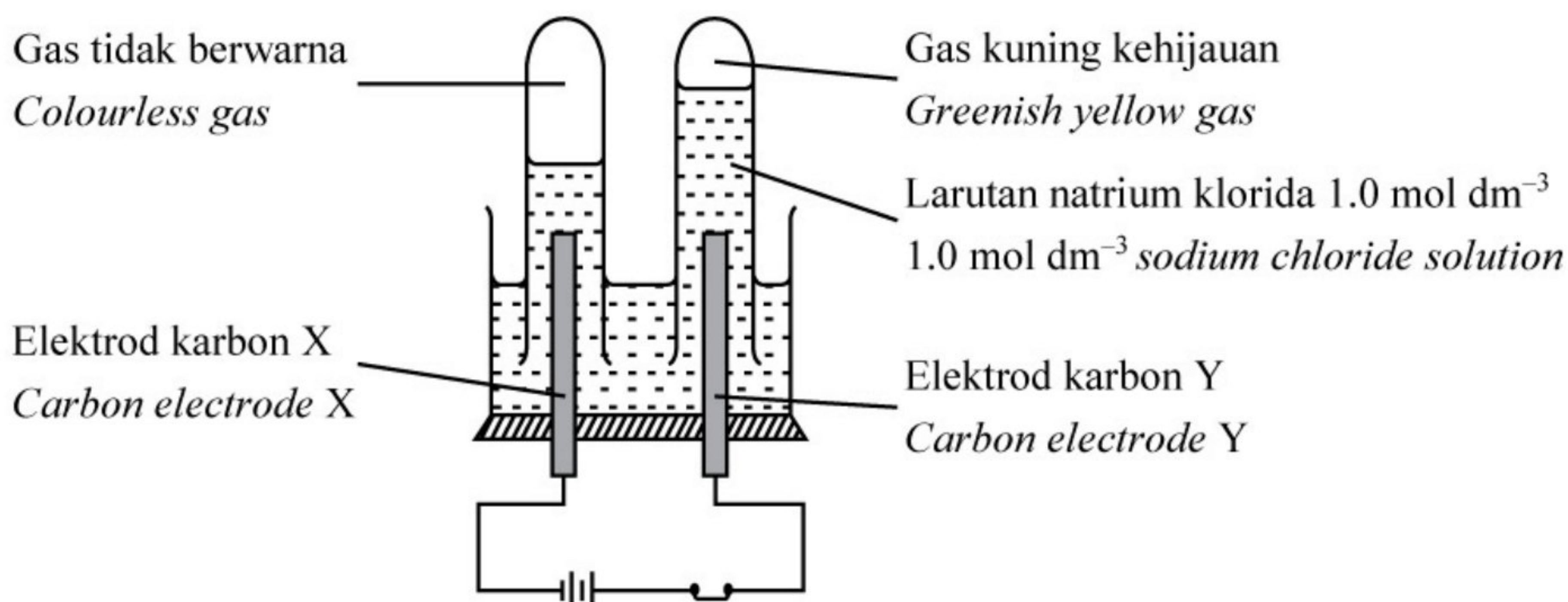
[4 markah]

[4 marks]



- (b) Rajah 11.2 menunjukkan susunan radas untuk elektrolisis larutan natrium klorida dengan menggunakan elektrod karbon.

*Diagram 11.2 shows the apparatus set-up for the electrolysis of sodium chloride solution by using carbon electrodes.*



Rajah 11.2  
Diagram 11.2

Berdasarkan Rajah 11.2, nyatakan faktor yang mempengaruhi hasil yang terbentuk pada elektrod karbon X dan elektrod karbon Y.

Terangkan tindak balas yang berlaku di elektrod karbon X dan elektrod karbon Y.

Penerangan anda hendaklah merangkumi:

- Ion-ion yang tertarik ke elektrod
- Ion yang dipilih untuk dinyahcas dan sebab ion tersebut dipilih untuk dinyahcas pada elektrod
- Setengah persamaan bagi tindak balas yang berlaku di elektrod

*Based on Diagram 11.2, state the factor that affect the products formed at carbon electrode X and carbon electrode Y.*

*Explain the reactions occur at carbon electrode X and carbon electrode Y.*

*Your explanation must include:*

- *Ions that attracted to electrodes*
- *Ions that are selectively discharged and the reason ions are selectively discharged at electrodes*
- *Half equations for the reaction occurs at electrodes*

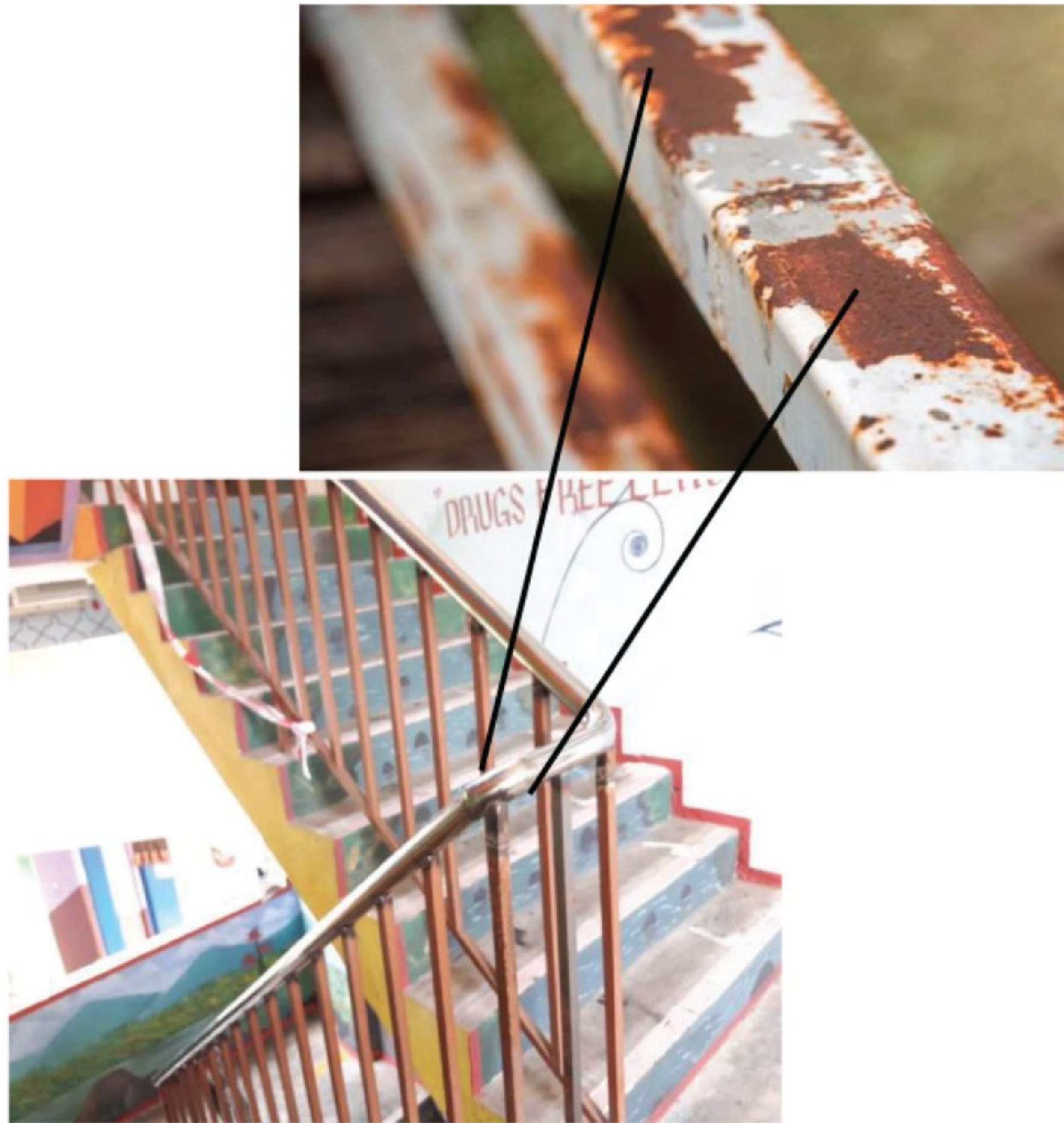
[10 markah]

[10 marks]



- (c) Rajah 11.3 menunjukkan selusur tangga yang diperbuat daripada besi di sekolah yang kelihatan berkarat.

*Diagram 11.3 shows the stair handrail made from iron in school that look rusty.*



Rajah 11.3  
*Diagram 11.3*

Sempena Minggu Kokurikulum, ahli-ahli Persatuan Kimia telah ditugaskan untuk menambah baik keadaan selusur tangga tersebut.

*In conjunction of Co-curricular Week, Chemistry Society members have been assigned to improve the condition of the stair handrail.*

Cadang dan terangkan cara untuk menyelesaikan tugas tersebut supaya selusur tangga itu kelihatan seperti baharu semula.

*Suggest and explain way to solve the task so that the stair handrail looks like new again.*

[5 markah]  
[5 marks]

**KERTAS PEPERIKSAAN TAMAT**  
**END OF QUESTION PAPER**



## 4541/2

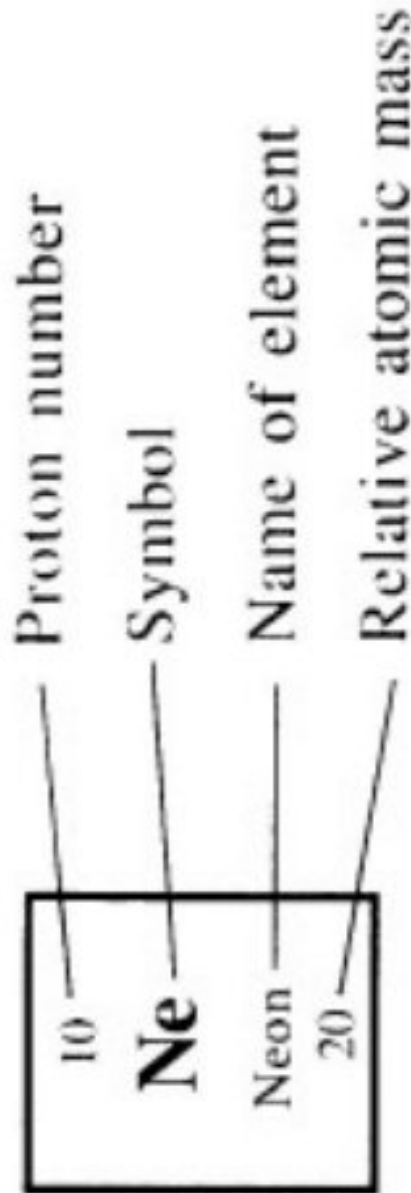
3 <b>Li</b> Lithium 7	4 <b>Be</b> Beryllium 9
11 <b>Na</b> Natrium 23	12 <b>Mg</b> Magnesium 24
19 <b>K</b> Kalium 39	20 <b>Ca</b> Kalsium 40
37 <b>Rb</b> Rubidium 86	38 <b>Sr</b> Strontium 88
55 <b>Cs</b> Sesium 133	56 <b>Ba</b> Barium 137
87 <b>Fr</b> Fransium 223	88 <b>Ra</b> Radium 226

58	<b>Ce</b>	59	<b>Pr</b>	60	<b>Nd</b>	61	<b>Pm</b>	62	<b>Sm</b>	63	<b>Eu</b>	64	<b>Gd</b>	65	<b>Tb</b>	66	<b>Dy</b>	67	<b>Ho</b>	68	<b>Er</b>	69	<b>Tm</b>	70	<b>Yb</b>	71	<b>Lu</b>
Serium		Praseo- dium		Neodimium		Prometium		Samarium		Europium		Gadolinium		Terbium		Disprosium		Holmium		Erbium		Tulium		Iterbium		Lutetium	
140		141		144		147		150		152		157		159		163		165		167		169		173		175	
90	<b>Th</b>	91	<b>Pa</b>	92	<b>U</b>	93	<b>Np</b>	94	<b>Pu</b>	95	<b>Am</b>	96	<b>Cm</b>	97	<b>Bk</b>	98	<b>Cf</b>	99	<b>Es</b>	100	<b>Fm</b>	101	<b>Md</b>	102	<b>No</b>	103	<b>Lr</b>
Torium		Proaktinium		Uranium		Neptunium		Plutonium		Amerisium		Kurium		Berkelium		Kalifornium		Einsteinium		Fermium		Mendele- vium		Nobelium		Lawrensium	
232		231		238		237		244		243		247		247		249		254		253		256		254		257	



THE PERIODIC TABLE OF ELEMENTS

<div><div>1</div><div>H</div><div>Hydrogen</div><div>1</div></div>		<div><div><div>10</div><div>Ne</div><div>Neon</div><div>20</div></div><div>Proton number</div><div>Symbol</div><div>Name of element</div><div>Relative atomic mass</div></div>																<div><div>2</div><div>He</div><div>Helium</div><div>4</div></div>																																					
<div><div>3</div><div>Li</div><div>Lithium</div><div>7</div></div>	<div><div>4</div><div>Be</div><div>Beryllium</div><div>9</div></div>																	<div><div>10</div><div>Ne</div><div>Neon</div><div>20</div></div>																																					
<div><div>11</div><div>Na</div><div>Sodium</div><div>23</div></div>	<div><div>12</div><div>Mg</div><div>Magnesium</div><div>24</div></div>																	<div><div>18</div><div>Ar</div><div>Argon</div><div>40</div></div>																																					
<div><div>19</div><div>K</div><div>Potassium</div><div>39</div></div>	<div><div>20</div><div>Ca</div><div>Calcium</div><div>40</div></div>	<div><div>21</div><div>Sc</div><div>Scandium</div><div>45</div></div>	<div><div>22</div><div>Ti</div><div>Titanium</div><div>48</div></div>	<div><div>23</div><div>V</div><div>Vanadium</div><div>51</div></div>	<div><div>24</div><div>Cr</div><div>Chromium</div><div>52</div></div>	<div><div>25</div><div>Mn</div><div>Manganese</div><div>55</div></div>	<div><div>26</div><div>Fe</div><div>Iron</div><div>56</div></div>	<div><div>27</div><div>Co</div><div>Cobalt</div><div>59</div></div>	<div><div>28</div><div>Ni</div><div>Nickel</div><div>59</div></div>	<div><div>29</div><div>Cu</div><div>Copper</div><div>64</div></div>	<div><div>30</div><div>Zn</div><div>Zinc</div><div>65</div></div>	<div><div>31</div><div>Ga</div><div>Gallium</div><div>70</div></div>	<div><div>32</div><div>Ge</div><div>Germanium</div><div>73</div></div>	<div><div>33</div><div>As</div><div>Arsenic</div><div>75</div></div>	<div><div>34</div><div>Se</div><div>Selenium</div><div>79</div></div>	<div><div>35</div><div>Br</div><div>Bromine</div><div>80</div></div>	<div><div>36</div><div>Kr</div><div>Krypton</div><div>84</div></div>	<div><div>37</div><div>Rb</div><div>Rubidium</div><div>86</div></div>	<div><div>38</div><div>Sr</div><div>Strontium</div><div>88</div></div>	<div><div>39</div><div>Y</div><div>Yttrium</div><div>89</div></div>	<div><div>40</div><div>Zr</div><div>Zirconium</div><div>91</div></div>	<div><div>41</div><div>Nb</div><div>Niobium</div><div>93</div></div>	<div><div>42</div><div>Mo</div><div>Molybdenum</div><div>96</div></div>	<div><div>43</div><div>Tc</div><div>Technetium</div><div>98</div></div>	<div><div>44</div><div>Ru</div><div>Ruthenium</div><div>101</div></div>	<div><div>45</div><div>Rh</div><div>Rhodium</div><div>103</div></div>	<div><div>46</div><div>Pd</div><div>Palladium</div><div>106</div></div>	<div><div>47</div><div>Ag</div><div>Silver</div><div>108</div></div>	<div><div>48</div><div>In</div><div>Indium</div><div>115</div></div>	<div><div>49</div><div>Cd</div><div>Cadmium</div><div>112</div></div>	<div><div>50</div><div>Sn</div><div>Tin</div><div>119</div></div>	<div><div>51</div><div>Sb</div><div>Antimony</div><div>122</div></div>	<div><div>52</div><div>Te</div><div>Tellurium</div><div>128</div></div>	<div><div>53</div><div>I</div><div>Iodine</div><div>127</div></div>	<div><div>54</div><div>Xe</div><div>Xenon</div><div>131</div></div>	<div><div>55</div><div>Cs</div><div>Cesium</div><div>133</div></div>	<div><div>56</div><div>Ba</div><div>Barium</div><div>137</div></div>	<div><div>57</div><div>La</div><div>Lanthanum</div><div>139</div></div>																	<div><div>86</div><div>Rn</div><div>Radon</div><div>222</div></div>
<div><div>87</div><div>Fr</div><div>Francium</div><div>223</div></div>	<div><div>88</div><div>Ra</div><div>Radium</div><div>226</div></div>	<div><div>89</div><div>Ac</div><div>Actinium</div><div>227</div></div>	<div><div>90</div><div>Th</div><div>Thorium</div><div>232</div></div>	<div><div>91</div><div>Pa</div><div>Protactinium</div><div>231</div></div>	<div><div>92</div><div>U</div><div>Uranium</div><div>238</div></div>	<div><div>93</div><div>Np</div><div>Neptunium</div><div>237</div></div>	<div><div>94</div><div>Pu</div><div>Plutonium</div><div>244</div></div>	<div><div>95</div><div>Am</div><div>Americium</div><div>243</div></div>	<div><div>96</div><div>Cm</div><div>Curium</div><div>247</div></div>	<div><div>97</div><div>Bk</div><div>Berkelium</div><div>247</div></div>	<div><div>98</div><div>Cf</div><div>Californium</div><div>249</div></div>	<div><div>99</div><div>Es</div><div>Einsteinium</div><div>254</div></div>	<div><div>100</div><div>Fm</div><div>Fermium</div><div>253</div></div>	<div><div>101</div><div>Md</div><div>Mendelevium</div><div>256</div></div>	<div><div>102</div><div>No</div><div>Nobelium</div><div>254</div></div>	<div><div>103</div><div>Lr</div><div>Lawrencium</div><div>257</div></div>																	<div><div>71</div><div>Lu</div><div>Lutetium</div><div>175</div></div>																						
																<div><div>69</div><div>Tm</div><div>Thulium</div><div>169</div></div>	<div><div>70</div><div>Yb</div><div>Ytterbium</div><div>173</div></div>	<div><div>71</div><div>Lu</div><div>Lutetium</div><div>175</div></div>																																					













**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.** Tulis jawapan anda bagi **Bahagian A** 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 **semua** soalan daripada **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 **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 **28** dan **29.**  
*The Periodic Table of Elements is provided on page **28** and **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.***