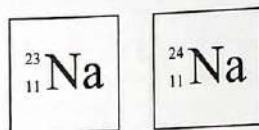


**Bahagian A**  
**Section A**

[60 markah]  
[60 marks]

Jawab semua soalan dalam bahagian ini.  
Answer all questions in this section.

- 1 Rajah 1 menunjukkan perwakilan piawai bagi dua isotop atom natrium.  
Diagram 1 shows the standard representation of two isotopes of sodium atoms.



Rajah 1  
Diagram 1

- (a) Nyatakan maksud isotop.  
State the meaning of isotopes.

1(a)

1
---

[1 markah]  
[1 mark]

- (b) Tentukan bilangan proton bagi atom natrium-23.  
Determine the number of protons of sodium-23 atom.

1(b)

1
---

[1 markah]  
[1 mark]

- (c) Nyatakan satu kegunaan  $^{24}_{11}\text{Na}$  dalam kehidupan harian.  
State one use of  $^{24}_{11}\text{Na}$  in daily life.

1(c)

1
---

[1 markah]  
[1 mark]

- (d) Lukis struktur atom bagi  $^{24}_{11}\text{Na}$ .  
Draw the atomic structure of  $^{24}_{11}\text{Na}$ .

[2 markah]  
[2 marks]

1(d)

2
---

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>
Keluli <i>Steel</i>	Ferum + W <i>Iron + W</i>
Kaca plumbum <i>Lead crystal glass</i>	X + Plumbum(II) oksida <i>X + Lead(II) oxide</i>

Jadual 2  
*Table 2*

- (a) Kenal pasti W dan X.  
*Identify W and X.*

W : .....

X : .....

[2 markah]  
[2 marks]

- (b) Keluli adalah lebih keras daripada besi.  
Terangkan bagaimana kehadiran unsur W mempengaruhi sifat keluli.  
*Steel is harder than iron.*  
*Explain how the presence of element W affects the properties of steel.*

.....

.....

[2 markah]  
[2 marks]

- (c) Nyatakan satu sifat bagi kaca plumbum.  
*State one property of lead crystal glass.*

.....

[1 markah]  
[1 mark]

Total  
A2

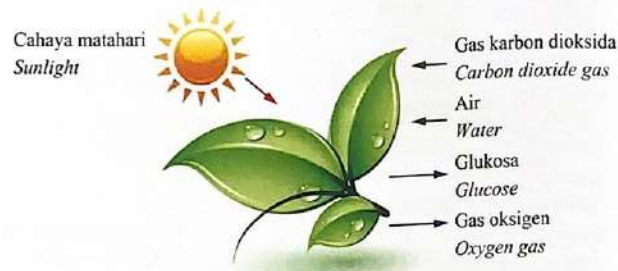
5

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| Lihat halaman sebelah

- 3 Rajah 3 menunjukkan proses fotosintesis untuk penghasilan glukosa dalam tumbuhan hijau.  
*Diagram 3 shows the photosynthesis process for the formation of glucose in green plants.*



Rajah 3  
Diagram 3

- (a) Tulis formula empirik bagi glukosa.  
*Write the empirical formula of glucose.*

3(a)  

1
---

[1 markah]  
[1 mark]

- (b) Nyatakan **satu** perbezaan antara formula empirik dan formula molekul.  
*State **one** difference between empirical formula and molecular formula.*

3(b)  

1
---

[1 markah]  
[1 mark]

- (c) Tulis persamaan kimia yang seimbang bagi proses fotosintesis.  
*Write a balanced chemical equation of photosynthesis process.*

3(c)  

2
---

[2 markah]  
[2 marks]

- (d) Berapakah peratus jisim karbon dalam glukosa?  
[Jisim atom relatif: H = 1, C = 12, O = 16]  
*What is the percentage of mass of carbon in glucose?*  
[Relative atomic mass: H = 1, C = 12, O = 16]

3(d)  
[2 markah]  
[2 marks]  

2
---

- 4 Jadual 4 menunjukkan bilangan proton bagi atom unsur T, U, V dan W. Huruf yang digunakan bukan simbol sebenar bagi unsur itu. Table 4 shows the number of proton of atoms of elements T, U, V and W. The letters used are not the actual symbols of the elements.

Unsur Element	Bilangan proton Number of proton
T	1
U	8
V	11
W	18

Jadual 4  
Table 4

- (a) (i) Unsur manakah merupakan logam alkali?  
Which element is an alkali metal?

4(a)(i)

[1 markah]  
[1 mark]

- (ii) Tulis persamaan kimia apabila unsur di 4(a)(i) bertindak balas dengan air.  
Write a chemical equation when element in 4(a)(i) reacts with water.

4(a)(ii)

[2 markah]  
[2 marks]

- (b) Unsur T bertindak balas dengan unsur U untuk membentuk satu sebatian. Apakah formula bagi sebatian yang terbentuk?

4(b)

Element T reacts with element U to form a compound.  
What is the formula of the compound formed?

[1 markah]  
[1 mark]

- (c) Unsur U bertindak balas dengan unsur V untuk membentuk satu sebatian.  
Element U reacts with element V to form a compound.

- (i) Lukis susunan elektron bagi sebatian yang terbentuk.  
Draw the electron arrangement of the compound formed.

4(c)(i)

[2 markah]  
[2 marks]

- (ii) Nyatakan satu sifat bagi sebatian tersebut.  
State one property of the compound.

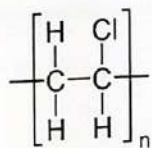
4(c)(ii)

[1 markah]  
[1 mark]

Total  
A4

- 5 Rajah 5.1 menunjukkan satu produk yang dihasilkan daripada polimer X dan formula strukturnya.

Diagram 5.1 shows a product made of polymer X and its structural formula.



Polimer X  
Polymer X

Rajah 5.1  
Diagram 5.1

- (a) Apakah maksud polimer?  
What is the meaning of polymer?

5(a)

	1
--	---

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

- (b) Lukis formula struktur bagi monomer yang membentuk polimer X.  
Draw the structural formula of the monomer that forms polymer X.

5(b)

	1
--	---

[1 markah]  
[1 mark]

- (c) Nyatakan **satu** cara polimer X menyebabkan pencemaran alam sekitar.  
State **one** way polymer X causes environmental pollution.

5(c)

	1
--	---

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

- (d) Rajah 5.2 menunjukkan lateks didedahkan dalam udara untuk suatu jangka masa yang lama.

Diagram 5.2 shows latex is exposed in air for a long period of time.



Rajah 5.2  
Diagram 5.2

- (i) Apakah yang akan berlaku pada lateks?  
Terangkan jawapan anda.  
What will happen to latex?  
Explain your answer.

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

5(d)(i)

	4
--	---

[4 markah]  
[4 marks]

- (ii) Namakan bahan kimia yang digunakan untuk mencegah proses di 5(d)(i).  
Name the chemical used to prevent the process in 5(d)(i).

.....

5(d)(ii)

	1
--	---

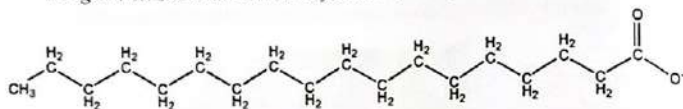
[1 markah]  
[1 mark]

Total  
A5

	8
--	---



- 6 (a) Rajah 6.1 menunjukkan formula struktur satu anion sabun.  
Diagram 6.1 shows the structural formula of a soap anion.



Rajah 6.1  
Diagram 6.1

- (i) Bulatkan pada bahagian anion sabun yang larut dalam air pada Rajah 6.1.  
Circle the part of the soap anion that is soluble in water on Diagram 6.1.  
[1 markah]  
[1 mark]

6(a)(i)  
1

- (ii) Sabun tidak berkesan sebagai agen pembersih dalam air liat.  
Terangkan.  
Soap is not effective as a cleaning agent in hard water.  
Explain.

6(a)(ii)  
2

- (iii) Sabun boleh membentuk buih dengan air.  
Apakah fungsi buih?  
Soap can form foam with water.  
What is the function of foam?

6(a)(iii)  
1

[1 markah]  
[1 mark]

- (b) Rajah 6.2 menunjukkan label satu bungkusan makanan.  
Diagram 6.2 shows a label of a pack of food.



Rajah 6.2  
Diagram 6.2

Berdasarkan maklumat tersebut,  
Based on the information,

- (i) namakan sebatian yang digunakan sebagai penstabil.  
name the compound which is used as a stabiliser.

[1 markah]  
[1 mark]

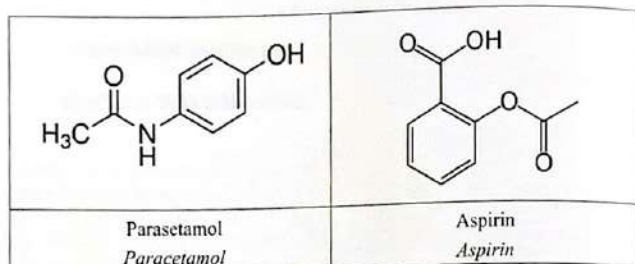
6(b)(i)  
1

- (ii) apakah yang akan berlaku kepada ais krim apabila sebatian dalam 6(b)(i) tidak ditambahkan?  
what will happen to ice cream when the compound in 6(b)(i) is not added?

[1 markah]  
[1 mark]

6(b)(ii)  
1

- (c) Rajah 6.3 menunjukkan formula struktur bagi dua contoh analgesik.  
*Diagram 6.3 shows the structural formulae of two examples of analgesic.*



Rajah 6.3  
*Diagram 6.3*

- (i) Seorang pesakit yang menghadapi demam memaklumkan kepada doktor bahawa beliau juga menghadapi gastrik.  
Berdasarkan Rajah 6.3, jika anda adalah doktor tersebut, ubat manakah yang akan anda preskripsikan?

Terangkan jawapan anda.

*A patient who is suffering from fever informs the doctor that she also has gastric.*

*Based on Diagram 6.3, if you are the doctor, which medicine will you prescribe?*

*Explain your answer.*

6(c)(i)

2

[2 markah]  
[2 marks]

- (ii) Ada kalanya doktor juga preskripsikan streptomisin kepada pesakit ini. Pesakit perlu menghabiskan ubat tersebut seperti yang telah dipreskripsikan oleh doktor.

Jelaskan mengapa.

*Sometimes the doctor also prescribes this patient with streptomycin. The patient has to finish up the medicine accordingly to the prescription.*

*Explain why.*

6(c)(ii)

1

[1 markah]  
[1 mark]

Total  
A6

9

7 Jadual 7 menunjukkan persamaan termokimia bagi Eksperimen I dan Eksperimen II.  
Table 7 shows the thermochemical equations of Experiment I and Experiment II.

Eksperimen Experiment	Persamaan termokimia Thermochemical equation
I	$\text{NaOH} + \text{X} \rightarrow \text{NaX} + \text{H}_2\text{O} \quad \Delta H = -57.3 \text{ kJ mol}^{-1}$
II	$\text{NaOH} + \text{Y} \rightarrow \text{NaY} + \text{H}_2\text{O} \quad \Delta H = -51.5 \text{ kJ mol}^{-1}$

Jadual 7  
Table 7

(a) Berdasarkan Jadual 7, cadangkan asid X dan asid Y.  
Based on Table 7, suggest acid X and acid Y.

Asid X : .....  
Acid X

Asid Y : .....  
Acid Y

[2 markah]  
[2 marks]

(b) Haba peneutralan bagi Eksperimen I adalah lebih tinggi berbanding dengan Eksperimen II, terangkan perbezaan nilai haba peneutralan untuk dua eksperimen ini.

Heat of neutralisation of Experiment I is higher than Experiment II, explain the difference in the value of heat of neutralisation of these two experiments.

.....  
.....

[2 markah]  
[2 marks]

(c) Dalam Eksperimen I, 50 cm<sup>3</sup> larutan natrium hidroksida 1.0 mol dm<sup>-3</sup> ditambahkan kepada 50 cm<sup>3</sup> asid X 1.0 mol dm<sup>-3</sup>.

In Experiment I, 50 cm<sup>3</sup> of 1.0 mol dm<sup>-3</sup> sodium hydroxide solution is added into 50 cm<sup>3</sup> of 1.0 mol dm<sup>-3</sup> acid X.

(i) Hitung haba yang dibebaskan dalam tindak balas itu.  
Calculate the heat released in the reaction.

[2 markah]  
[2 marks]

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(ii) Hitung perubahan suhu bagi tindak balas.  
[Muatan haba tentu larutan = 4.2 J g<sup>-1</sup> °C<sup>-1</sup>, ketumpatan larutan = 1 g cm<sup>-3</sup>]  
Calculate the temperature change of the reaction.  
[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>]

[1 markah]  
[1 mark]

(iii) Eksperimen I diulang dengan menambahkan 100 cm<sup>3</sup> larutan natrium hidroksida 1.0 mol dm<sup>-3</sup> kepada 100 cm<sup>3</sup> asid X 1.0 mol dm<sup>-3</sup>.  
Apakah perubahan suhu untuk tindak balas itu?

Experiment I is repeated by adding 100 cm<sup>3</sup> of 1.0 mol dm<sup>-3</sup> sodium hydroxide solution to 100 cm<sup>3</sup> of 1.0 mol dm<sup>-3</sup> acid X.

What is the temperature change of the reaction?

[1 markah]  
[1 mark]

(d) Lukis gambar rajah aras tenaga bagi tindak balas dalam Eksperimen II.  
Draw an energy level diagram for the reaction in Experiment II.

7(d)

2

Total  
A7



[2 markah]  
[2 marks]

[ Lihat halaman sebelah

10



- 8 Jadual 8 menunjukkan penyediaan natrium klorida dan kuprum(II) sulfat melalui Eksperimen I dan Eksperimen II.  
Table 8 shows the preparation of sodium chloride and copper(II) sulphate through Experiment I and Experiment II.

Eksperimen Experiment	Bahan Materials
<p>I</p>  <p>Asid hidroklorik <i>Hydrochloric acid</i></p> <p>Larutan natrium hidroksida + fenolftalein <i>Sodium hydroxide solution + phenolphthalein</i></p>	<p>40 cm<sup>3</sup> asid hidroklorik 0.5 mol dm<sup>-3</sup> + 40 cm<sup>3</sup> larutan natrium hidroksida 0.5 mol dm<sup>-3</sup> + fenolftalein 40 cm<sup>3</sup> of 0.5 mol dm<sup>-3</sup> hydrochloric acid + 40 cm<sup>3</sup> of 0.5 mol dm<sup>-3</sup> sodium hydroxide solution + phenolphthalein</p>
<p>II</p>  <p>Kuprum(II) oksida berlebihan <i>Excess copper(II) oxide</i></p> <p>Asid sulfurik <i>Sulphuric acid</i></p> <p>Panaskan <i>Heat</i></p>	<p>Kuprum(II) oksida berlebihan + 40 cm<sup>3</sup> asid sulfurik 0.5 mol dm<sup>-3</sup> <i>Excess copper(II) oxide +</i> 40 cm<sup>3</sup> of 0.5 mol dm<sup>-3</sup> sulphuric acid</p>

Jadual 8  
Table 8

- (a) Apakah tindak balas yang berlaku dalam Eksperimen I?  
*What is the reaction that take place in Experiment I?*

8(a)

1
---

[1 markah]  
[1 mark]

- (b) Berdasarkan Eksperimen I,  
*Based on Experiment I,*

- (i) nyatakan **satu** pemerhatian.  
*state one observation.*

8(b)(i)

1
---

[1 markah]  
[1 mark]

- (ii) asid hidroklorik dalam Eksperimen I digantikan dengan asid sulfurik dengan kepekatan yang sama. Ramalkan isi padu asid sulfurik yang diperlukan untuk tindak balas yang lengkap.

*hydrochloric acid in Experiment I is replaced with sulphuric acid of the same concentration. Predict the volume of sulphuric acid required for a complete reaction.*

8(b)(ii)

1
---

[1 markah]  
[1 mark]

(c) Berdasarkan Eksperimen II,  
*Based on Experiment II,*

(i) terangkan mengapa kuprum(II) oksida berlebihan ditambahkan.  
*explain why excess copper(II) oxide is added.*

8(c)(i)

1
---

[1 markah]  
[1 mark]

(ii) tulis persamaan kimia bagi tindak balas ini.  
*write a chemical equation of this reaction.*

8(c)(ii)

2
---

[2 markah]  
[2 marks]

(iii) hitung jisim maksimum garam yang diperoleh.  
[Jisim atom relatif: Cu = 64, S = 32, O = 16]  
*calculate the maximum mass of salt obtained.*  
[Relative atomic mass: Cu = 64, S = 32, O = 16]

8(c)(iii)

2
---

[2 markah]  
[2 marks]

(d) Amin ingin mengulangi Eksperimen II dengan menggantikan serbuk kuprum(II) oksida dengan serbuk kuprum.

Pada pendapat anda, adakah Amin membuat keputusan yang betul? Terangkan jawapan anda.

*Amin wishes to repeat Experiment II by replacing copper(II) oxide powder with copper powder.*

*In your opinion, do Amin makes a correct decision? Explain your answer.*

8(d)

2
---

[2 markah]  
[2 marks]

Total  
A8

10
----

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

[20 markah]  
[20 marks]

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

- 9 Jadual 9 menunjukkan maklumat bagi Eksperimen I dan Eksperimen II untuk mengkaji kadar tindak balas antara zink karbonat dengan dua asid, P dan Q.

Table 9 shows the information for Experiment I and Experiment II to study the rate of reaction of zinc carbonate with two acids, P and Q.

Eksperimen Experiment	Bahan tindak balas Reactants	Hasil tindak balas Products
I	0.625 g zink karbonat dengan 50 cm <sup>3</sup> asid P 2.0 mol dm <sup>-3</sup> 0.625 g of zinc carbonate and 50 cm <sup>3</sup> of 2.0 mol dm <sup>-3</sup> acid P	Zink nitrat, air dan gas S Zinc nitrate, water and gas S
II	0.625 g zink karbonat dengan 50 cm <sup>3</sup> asid Q 2.0 mol dm <sup>-3</sup> 0.625 g of zinc carbonate and 50 cm <sup>3</sup> of 2.0 mol dm <sup>-3</sup> acid Q	Zink sulfat, air dan gas S Zinc sulphate, water and gas S

Jadual 9  
Table 9

- (a) (i) Merujuk kepada Eksperimen I dan Eksperimen II, nyatakan:
- Maksud kadar tindak balas
  - Faktor yang mempengaruhi kadar tindak balas
  - Namakan asid P dan asid Q

Referring to Experiment I and Experiment II, state:

- The meaning of rate of reaction
- Factor that affects the rate of reaction
- Name the acid P and acid Q

[4 markah]  
[4 marks]

- (ii) Kenal pasti gas S.

Huraikan ujian kimia untuk mengesahkan gas S.

Identify gas S.

Describe the chemical test to verify gas S.

[3 markah]  
[3 marks]

- (iii) Tulis persamaan kimia bagi tindak balas antara asid Q dengan zink karbonat dan hitung isi padu maksimum gas S yang dihasilkan dalam Eksperimen II.  
[Jisim atom relatif: Zn = 65, O = 16, C = 12 dan 1 mol bagi sebarang gas menempati 24 dm<sup>3</sup> pada keadaan bilik]

Write the chemical equation for the reaction of acid Q with zinc carbonate and calculate the maximum volume of gas S produced in Experiment II.

[Relative atomic mass: Zn = 65, O = 16, C = 12 and 1 mol of any gas occupies 24 dm<sup>3</sup> at room conditions]

[5 markah]  
[5 marks]

- (b) (i) Lakarkan graf isi padu maksimum gas S melawan masa bagi Eksperimen I dan Eksperimen II atas paksi yang sama.

Sketch a graph of the maximum volume of gas S against time for Experiment I and Experiment II on the same axis.

[3 markah]  
[3 marks]

- (ii) Berdasarkan graf di 9(b)(i), bandingkan kadar tindak balas antara Eksperimen I dan Eksperimen II.

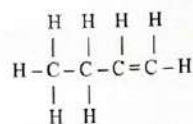
Terangkan jawapan anda menggunakan teori perlanggaran.

Based on the graph in 9(b)(i), compare the rate of reaction between Experiment I and Experiment II.

Explain your answer using collision theory.

[5 markah]  
[5 marks]

- 10 (a) Rajah 10.1 menunjukkan formula struktur bagi butena.  
Diagram 10.1 shows a structural formula of butene.



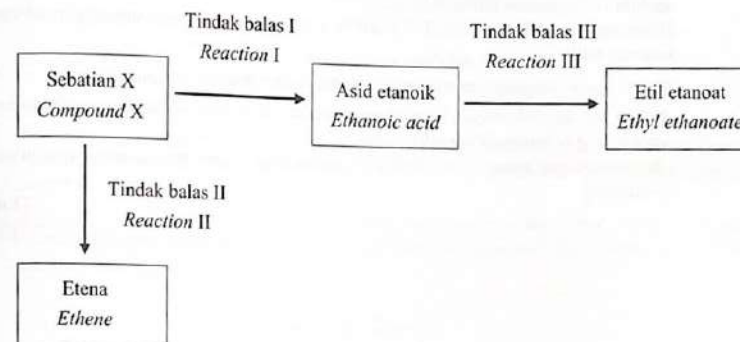
Rajah 10.1  
Diagram 10.1

Lukis formula struktur bagi dua lagi isomer bagi butena dan namakan setiap isomernya mengikut penamaan IUPAC.

Draw the structural formulae for another two isomers of butene and name each isomer according to the IUPAC nomenclature.

[4 markah]  
[4 marks]

- (b) Rajah 10.2 menunjukkan penukaran bagi beberapa sebatian organik.  
Diagram 10.2 shows the conversions of several organic compounds.



Rajah 10.2  
Diagram 10.2

- (i) Nyatakan nama, siri homolog, formula molekul dan kumpulan berfungsi bagi sebatian X.

State the name, homologous series, molecular formula and functional group of compound X.

[4 markah]  
[4 marks]

- (ii) Nyatakan nama bagi Tindak balas I, Tindak balas II dan Tindak balas III.

State the name for Reaction I, Reaction II and Reaction III.

[3 markah]  
[3 marks]

- (iii) Tulis persamaan kimia bagi Tindak balas I dan Tindak balas II.

Write chemical equation for Reaction I and Reaction II.

[4 markah]  
[4 marks]



- (c) Butena terbakar lengkap dalam oksigen menghasilkan air dan gas karbon dioksida. Tulis persamaan kimia seimbang dan hitung isi padu gas karbon dioksida yang terhasil apabila 1.12 g butena terbakar lengkap. [Jisim atom relatif: C = 12, H = 1 dan 1 mol bagi sebarang gas menempati 24 dm<sup>3</sup> pada keadaan bilik]

*Butene burnt completely in oxygen to produce water and carbon dioxide gas.*

*Write a balanced chemical equation and calculate the volume of carbon dioxide gas produced when 1.12 g of butene is completely burnt.*

*[Relative atomic mass: C = 12, H = 1 and 1 mol of any gas occupies 24 dm<sup>3</sup> at room conditions]*

[5 markah]

[5 marks]

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

[20 markah]

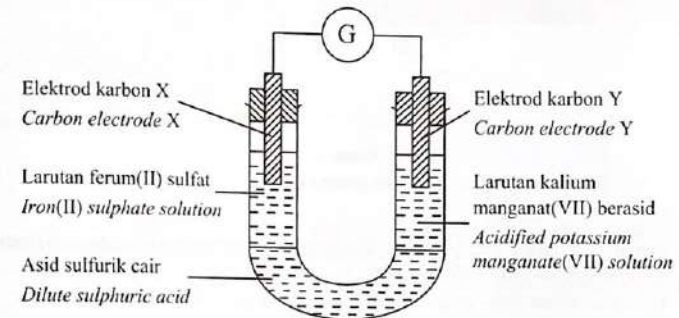
[20 marks]

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]

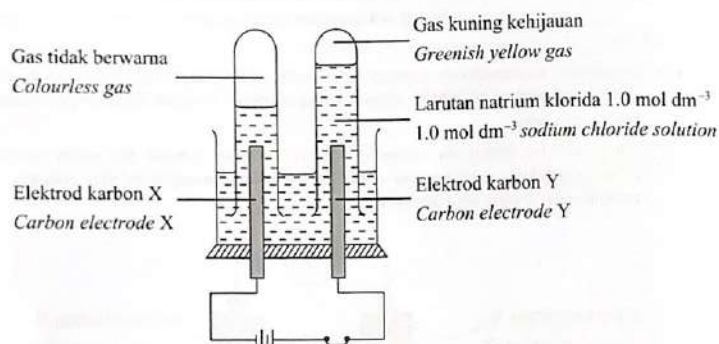
- (ii) nyatakan fungsi larutan ferum(II) sulfat dan larutan kalium manganat(VII) berasid. Tulis setengah persamaan bagi tindak balas yang berlaku di elektrod karbon Y.  
*state the function of iron(II) sulphate solution and acidified potassium manganate(VII) solution. Write the half equation for the 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 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:

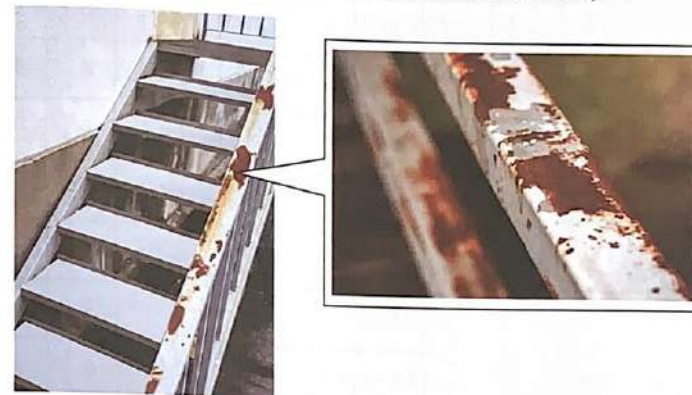
- Ions that attracted to electrodes
- Ions that are selectively discharged and the reason ions are selectively discharged at electrodes
- Half equations for the reaction occurs at electrodes

[10 markah]

[10 marks]

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

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



Rajah 11.3  
Diagram 11.3

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

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

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

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

[5 markah]

[5 marks]

KERTAS PEPERIKSAAN TAMAT  
END OF QUESTION PAPER