



- (c) Element Q reacts with sodium to form a compound.  
What is the chemical formula of the compound formed?  
*Unsur Q bertindak balas dengan natrium membentuk satu sebatian.*  
*Apakah formula kimia sebatian yang terbentuk.*

.....  
[1 mark]

- (d) (i) Between element P and Q, which is more reactive?  
*Antara unsur P dan Q, yang manakah lebih reaktif?*

.....  
[1 mark]

- (ii) Explain your answer in (d) (i).  
*Terangkan jawapan anda di (d) (i).*

.....  
.....  
.....  
.....  
[3 marks]

- (e) State the name of one element that has the same chemical properties other than element P and Q.  
*Nyatakan nama bagi satu unsur yang mempunyai sifat kimia yang sama selain daripada unsur P dan Q.*

.....  
[1 mark]

- 2 (a) Diagram 2.1 shows the cleansing action of cleaning agent **A** in hard water on a piece of greasy cloth.  
*Rajah 2.1 menunjukkan tindakan cucian agen pencuci **A** dalam air liat terhadap sehelai kain kotor.*

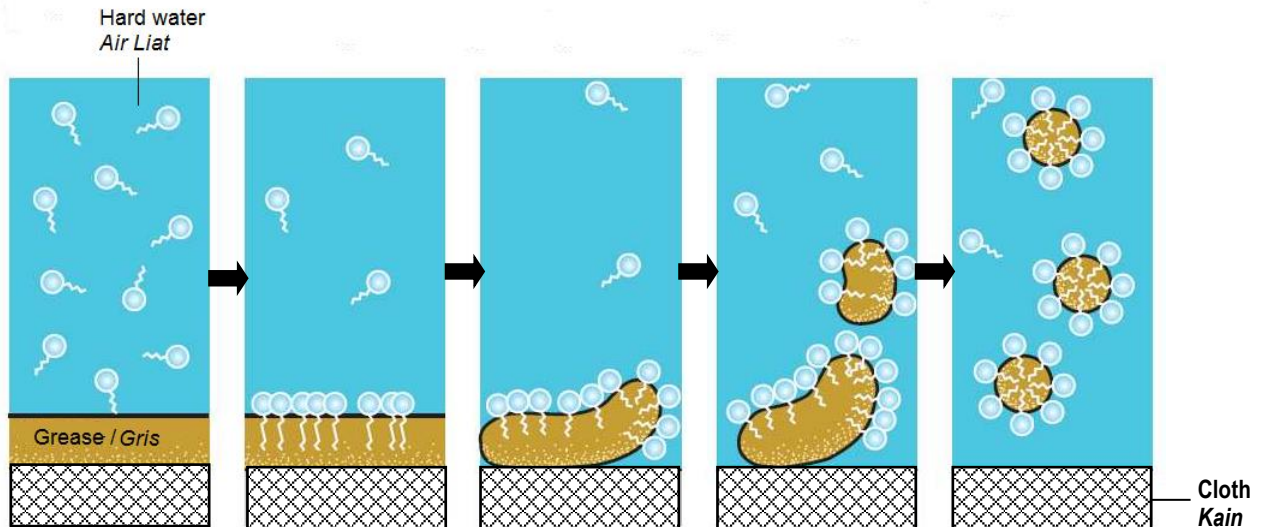


Diagram 2.1 / Rajah 2.1

- (i) What is hard water?  
*Apakah air liat?*

..... [1 mark]

- (ii) State the type of cleaning agent **A**.  
*Nyatakan jenis agen pencuci **A**.*

..... [1 mark]

- (iii) Based on Diagram 2.1, it is observed that cleaning agent **A** is effective in removing grease on the cloth in hard water. Explain the observation.  
*Berdasarkan Rajah 2.1, dapat diperhatikan agen pencuci **A** berkesan menyingkirkan gris pada kain dalam air liat. Terangkan pemerhatian tersebut.*

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

- (b) Table 2 shows the information of two different food additives, **X** and **Y**.  
*Jadual 2 menunjukkan maklumat bagi dua bahan tambah makanan yang berbeza, X dan Y.*

<b>Food Additive</b> <i>Bahan tambah makanan</i>	<b>Information</b> <i>Maklumat</i>
<b>X</b>	Added to soft drink to sweeten it. <i>Ditambah kepada minuman ringan supaya ia menjadi manis.</i>
<b>Y</b>	Added to pickled chilli to provide an acidic condition or to slow down the growth of microorganisms. <i>Ditambah kepada jeruk cili untuk menyediakan keadaan yang berasid atau melambatkan pertumbuhan mikroorganisma.</i>

Table 2 / *Jadual 2*

- (i) Suggest the food additives, **X** and **Y**.  
*Cadangkan bahan tambah makanan, X dan Y.*

**X** : .....

**Y** : .....

[2 marks]

- (ii) One of the food additives above is not suitable for a diabetic patient. Suggest another food additive that can give the same sweetness but has lower calorie content.  
*Satu daripada bahan tambah makanan di atas tidak sesuai bagi pesakit diabetes.*  
*Cadangkan satu bahan tambah makanan yang lain yang dapat memberi kemanisan yang sama tetapi mempunyai kandungan kalori yang lebih rendah.*

.....

[1 mark]

- (c) Diagram 2.2 shows the structural formula of two types of analgesic that is aspirin and paracetamol.

*Rajah 2.2 menunjukkan formula struktur bagi dua jenis analgesik iaitu aspirin dan parasetamol.*

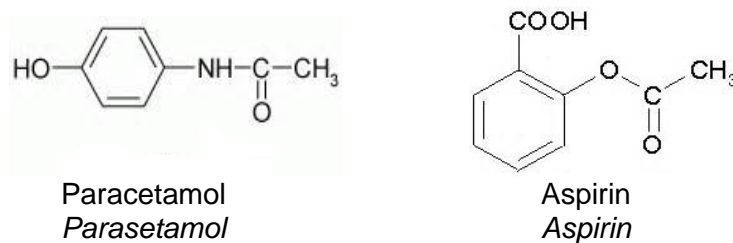


Diagram 2.2 / *Rajah 2.2*

State which analgesic is more suitable for children and gastric patient.

Explain your answer based on the formula structure in Diagram 2.2.

*Nyatakan analgesik manakah yang lebih sesuai untuk kanak-kanak dan pesakit gastrik.*

*Terangkan jawapan anda berdasarkan formula struktur dalam Rajah 2.2.*

.....

.....

.....

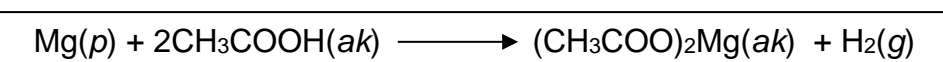
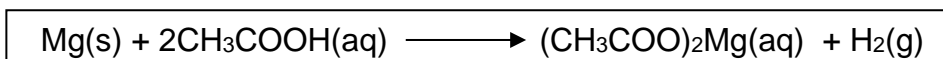
[2 marks]

- 3 (a) Table 3 shows the molecular formula for two members of carboxylic acid.  
*Jadual 3 menunjukkan formula molekul bagi dua ahli bagi asid karboksilik.*

Member of carboxylic acid <i>Ahli asid karboksilik</i>	<b>Methanoic acid</b> <b><i>Asid metanoik</i></b>	<b>Ethanoic acid</b> <b><i>Asid etanoik</i></b>
Molecular formula <i>Formula molekul</i>	HCOOH	CH <sub>3</sub> COOH

Table 3 / *Jadual 3*

- (i) What is the meaning of molecular formula?  
*Apakah yang dimaksudkan dengan formula molekul?*
- .....
- .....
- [1 mark]
- (ii) State the name of the elements presents in both acids.  
*Nyatakan nama bagi unsur-unsur yang hadir dalam kedua-dua asid.*
- .....
- [1 mark]
- (iii) Calculate the molar mass of methanoic acid.  
*Hitungkan jisim molar bagi asid metanoik.*  
 [Relative atomic mass; H = 1 , C = 12 , O = 16]  
 [Jisim atom relatif; H = 1 , C = 12 , O = 16]
- [1 mark]
- (iv) The chemical equation for the reaction between magnesium with ethanoic acid is as below:



Give **three** information that can be interpreted from the chemical equation.

*Persamaan kimia bagi tindak balas antara magnesium dengan asid etanoik adalah seperti di bawah.*

Berikan **tiga** maklumat yang dapat ditafsir daripada persamaan kimia itu.

.....

.....

.....

[3 marks]

- (b) Diagram 3 shows the apparatus set up for the reaction between magnesium carbonate powder and sulphuric acid.

*Rajah 3 menunjukkan susunan radas bagi tindak balas antara serbuk magnesium karbonat dengan asid sulfurik.*

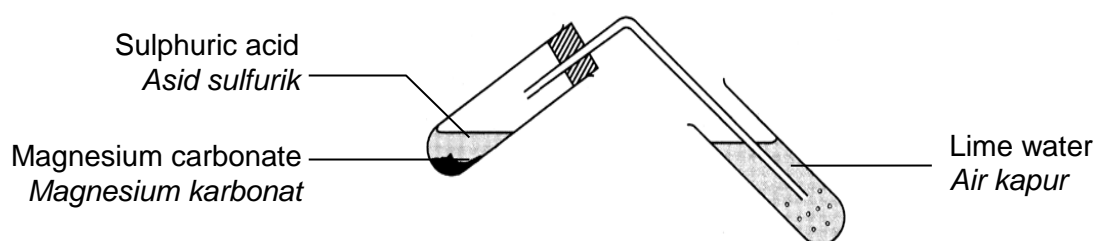


Diagram 3 / Rajah 3

- (i) Write the chemical equation for the reaction.  
*Tuliskan persamaan kimia bagi tindak balas itu.*

.....

[1 mark]

- (ii) Calculate the volume of the gas released at room conditions if 5 cm<sup>3</sup> of 2.0 mol dm<sup>-3</sup> sulphuric acid is reacted with excess magnesium carbonate powder.

*Hitung isipadu gas yang terbebas pada keadaan bilik jika 5 cm<sup>3</sup> asid sulfurik 2.0 mol dm<sup>-3</sup> bertindak balas dengan serbuk magnesium karbonat berlebihan.*

[Molar volume of gas at room conditions = 24.0 dm<sup>3</sup> mol<sup>-1</sup>]

[Isipadu molar gas pada keadaan bilik = 24.0 dm<sup>3</sup> mol<sup>-1</sup>]

[3 marks]

- 4 Diagram 4 shows the apparatus set-up for the titration of  $25.0 \text{ cm}^3$  of  $0.5 \text{ mol dm}^{-3}$  sodium hydroxide, NaOH solution with  $0.4 \text{ mol dm}^{-3}$  of hydrochloric acid, HCl, using indicator X.

*Rajah 4 menunjukkan susunan radas bagi pentitratan antara  $25.0 \text{ cm}^3$  larutan natrium hidroksida, NaOH  $0.5 \text{ mol dm}^{-3}$  dengan asid hidroklorik, HCl  $0.4 \text{ mol dm}^{-3}$ , menggunakan penunjuk X*

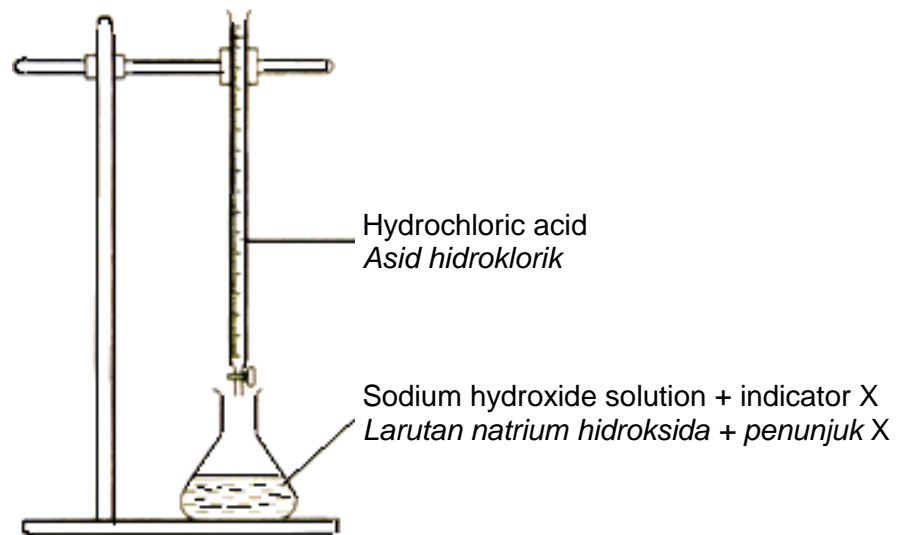


Diagram 4 / Rajah 4

- (a) Suggest one suitable substance for indicator X.  
*Cadangkan satu bahan yang sesuai untuk penunjuk X.*

..... [1 mark]

- (b) State the colour change of the solution in the conical flask when the end point of titration is reached used indicator in (a)  
*Nyatakan perubahan warna bagi larutan dalam kelalang kon itu apabila takat akhir penitratan dicapai menggunakan penunjuk di (a).*

.....



[1 mark]

- (c) State the type of reaction that occurs in the conical flask.  
*Nyatakan jenis tindak balas yang berlaku dalam kelalang kon itu.*

.....  
[1 mark]

- (d) Write a balanced chemical equation for the reaction occurs.  
*Tulis persamaan kimia yang seimbang bagi tindak balas yang berlaku.*

.....  
[2 marks]

- (e) Calculate the volume of hydrochloric acid used to neutralise the sodium hydroxide solution.  
*Hitung isipadu asid hidroklorik yang digunakan bagi meneutralkan larutan natrium hidroksida itu.*

[2 marks]

- (f) Table 4 shows the observations of two sets of experiment; I and II when hydrogen chloride in two different states are tested with blue litmus paper.  
*Jadual 4 menunjukkan pemerhatian bagi dua set eksperimen; I dan II apabila hidrogen klorida dalam dua keadaan berlainan diuji dengan kertas litmus biru.*

Set	State of hydrogen chlorida <i>Keadaan hidrogen klorida</i>	Observation on blue litmus paper <i>Pemerhatian pada kertas litmus biru</i>
I	Hydrogen chloride in water <i>Hidrogen klorida dalam air</i>	Blue to red <i>Biru kepada merah</i>
II	Hydrogen chloride in propanone <i>Hidrogen klorida dalam propanon</i>	No change <i>Tiada perubahan</i>

Table 4 / *Jadual 4*

- (i) State the name of the ion which is responsible for changing the colour of blue litmus paper to red.  
*Nyatakan nama bagi ion yang menyebabkan perubahan pada warna kertas litmus biru kepada merah.*

.....  
[1 mark]

- (ii) Explain the difference in observation between Set I and Set II.  
*Terangkan perbezaan pemerhatian antara Set I dengan Set II.*

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

- 5 Two experiments are conducted to investigate the factor that affects the rate of reaction for Experiment I and Experiment II respectively.  
*Dua eksperimen telah dijalankan untuk mengkaji faktor yang mempengaruhi kadar tindak balas masing-masing bagi Eksperimen I dan Eksperimen II.*

Experiment I : 3 g zink granules + 25 cm<sup>3</sup> 1.0 mol dm<sup>-3</sup> of hydrochloric acid

*Eksperimen I : 3 g ketulan zink + 25 cm<sup>3</sup> asid hidroklorik 1.0 mol dm<sup>-3</sup>*

Experiment II : 3 g zink powder + 25 cm<sup>3</sup> 1.0 mol dm<sup>-3</sup> of hydrochloric acid

*Eksperimen II : 3 g serbuk zink + 25 cm<sup>3</sup> asid hidroklorik 1.0 mol dm<sup>-3</sup>*

Table 5.1 and Table 5.2 show the result obtained from Experiment I and Experiment II.  
*Jadual 5.1 dan Jadual 5.2 menunjukkan keputusan yang diperoleh daripada Eksperimen I dan Eksperimen II.*

Experiment I  
*Eksperimen I*

Time (s) <i>Masa (s)</i>	0	20	40	60	80	100	120	140	160
Volume of gas released (cm <sup>3</sup> ) <i>Isipadu gas yang terbebas (cm<sup>3</sup>)</i>	0.00	6.50	12.50	17.80	23.50	27.20	31.80	35.00	35.00

Table 5.1 / *Jadual 5.1*

Experiment II  
*Eksperimen II*

Time (s) <i>Masa (s)</i>	0	20	40	60	80	100	120	140	160
Volume of gas released (cm <sup>3</sup> ) <i>Isipadu gas yang terbebas (cm<sup>3</sup>)</i>	0.00	8.50	15.50	21.00	26.80	31.50	35.00	35.00	35.00

Table 5.2 / *Jadual 5.2*

[Lihat halaman sebelah  
SULIT

- (a) (i) State the name the gas released from both experiment.  
Nyatakan namakan gas yang terbebas daripada kedua-dua eksperimen.

.....  
[1 mark]

- (ii) Describe a chemical test to verify the gas in (a) (i).  
Huraikan satu ujian kimia untuk mengesahkan gas di (a) (i).

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

- (b) (i) Referring to Table 5.1 and Table 5.2; calculate the average rate of reaction for Experiment I and Experiment II.  
Merujuk kepada Jadual 5.1 dan Jadual 5.2; hitungkan kadar tindak balas purata untuk Eksperimen I dan Eksperimen II.

Experiment I / Eksperimen I

Experiment II / Eksperimen II

.....

[2 marks]

- (ii) Compare the rate of reaction of Experiment I and Experiment II.  
Bandingkan kadar tindak balas bagi Eksperimen I dan Eksperimen II.

.....  
[1 mark]

- (iii) Explain your answer in (b) (ii) referring to the collision theory.  
Terangkan jawapan anda di (b) (ii) dengan merujuk teori perlanggaran.

.....  
.....  
.....  
[3 marks]

- (c) Sketch the graph of the volume of gas produced against time for both experiments on the same axis.  
Lakarkan graf isipadu gas yang terbebas melawan masa bagi kedua-dua eksperimen pada paksi yang sama.

- 6 (a) Diagram 6 shows the set-up of apparatus to determine the heat of combustion of ethanol. [2 marks]  
*Rajah 6 menunjukkan susunan radas untuk menentukan haba pembakaran etanol.*

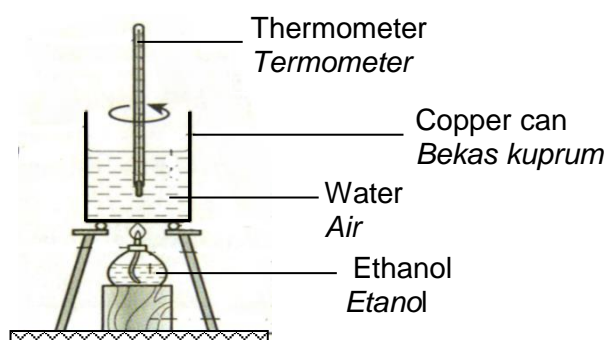


Diagram 6 / Rajah 6

The result of the experiment is as follows :  
*keputusan eksperimen adalah seperti berikut :*

Mass of lamp and ethanol before burning (g) <i>Jisim pelita dan etanol sebelum pembakaran (g)</i>	142.78
Mass of lamp and ethanol after burning (g) <i>Jisim pelita dan etanol selepas pembakaran (g)</i>	141.86
Initial temperature of water (°C) <i>Suhu awal air (°C)</i>	27.0
Highest temperature of water (°C) <i>Suhu tertinggi air (°C)</i>	57.0
Volume of water (cm <sup>3</sup> ) <i>Isipadu air (cm<sup>3</sup>)</i>	200

- (i) What is meant by heat of combustion?  
*Apakah yang dimaksudkan dengan haba pembakaran?*

.....  
 .....

[1 mark]

- (ii) Calculate the heat of combustion of ethanol.  
*Hitungkan haba pembakaran etanol.*  
 [Given that molar mass of ethanol =  $46 \text{ g mol}^{-1}$ , specific heat capacity of water =  $4.2 \text{ J g}^{-1} \text{ }^{\circ}\text{C}^{-1}$ ]  
 [Diberi jisim molar etanol =  $46 \text{ g mol}^{-1}$ , muatan haba tentu air =  $4.2 \text{ J g}^{-1} \text{ }^{\circ}\text{C}^{-1}$ ]

[3 marks]

- (b) Table 6 shows the reactants and the heat of neutralisation for Reaction 1 and Reaction 2.

*Jadual 6 menunjukkan bahan-bahan tindak balas dan haba peneutralan bagi Tindak balas 1 dan Tindak balas 2.*

Reaction <i>Tindak balas</i>	Reactants <i>Bahan-bahan tindak balas</i>	$\Delta H / \text{kJ mol}^{-1}$
1	HCl + NaOH	- 57.3
2	CH <sub>3</sub> COOH + NaOH	- 53.7

Table 6 / *Jadual 6*

- (i) Explain the difference of the heat of neutralisation between Reaction 1 and Reaction 2.  
*Terangkan perbezaan haba peneutralan antara Tindak balas 1 dengan Tindak balas 2.*

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

[2 marks]

- (ii) 0.1 mol hydrochloric acid reacts with 0.1 mol sodium hydroxide solution in Reaction 1. The total volume of mixture is  $100 \text{ cm}^3$ . Calculate the change of temperature.  
*0.1 mol asid hidroklorik bertindak balas dengan 0.1 mol larutan natrium hidroksida dalam Tindak balas 1. Jumlah isipadu campuran ialah  $100 \text{ cm}^3$ . Hitungkan perubahan suhu.*  
 [Given that specific heat capacity of solution =  $4.2 \text{ J g}^{-1} \text{ }^{\circ}\text{C}^{-1}$ ]  
 [Diberi muatan haba tentu larutan =  $4.2 \text{ J g}^{-1} \text{ }^{\circ}\text{C}^{-1}$ ]

[2 marks]

- (iii) Draw an energy level diagram for the neutralisation reaction in Reaction 2.  
*Lukiskan gambar rajah aras tenaga bagi tindak balas peneutralan dalam Tindak balas 2.*

[3 marks]

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

[20 marks]  
[20 markah]

Answer any **one** question from this section.  
*Jawab mana-mana **satu** soalan daripada bahagian ini.*

- 7 (a) Epsom salt is scientifically known as magnesium sulphate is used as a natural remedy to relieve muscle pain. In laboratory, the salt can be made in a number of methods such as:
- I. Adding a metal to an acid
  - II. Adding an oxide metal to an acid
- For each of the method above, state the name of the substances needed to prepare magnesium sulphate.

*Garam Epsom yang dikenali secara saintifik sebagai magnesium sulfat merupakan satu penawar semulajadi untuk melegakan sakit otot. Di dalam makmal, garam tersebut boleh dihasilkan melalui beberapa kaedah seperti :*

- I. Menambahkan logam kepada asid*
- II. Menambahkan oksida logam kepada asid*

*Bagi setiap kaedah di atas, nyatakan nama bagi bahan-bahan yang diperlukan untuk menyediakan magnesium sulfat.*

[4 marks]

- (b) Diagram 7.1 shows the conversion of salt X to solid Y and gas Z. Salt X is a green solid which insoluble in water while solid Y produced is a black solid.
- Rajah 7.1 menunjukkan pertukaran garam X kepada pepejal Y dan gas Z. Garam X merupakan pepejal hijau yang tak larut dalam air manakala pepejal Y yang terhasil berwarna hitam.*

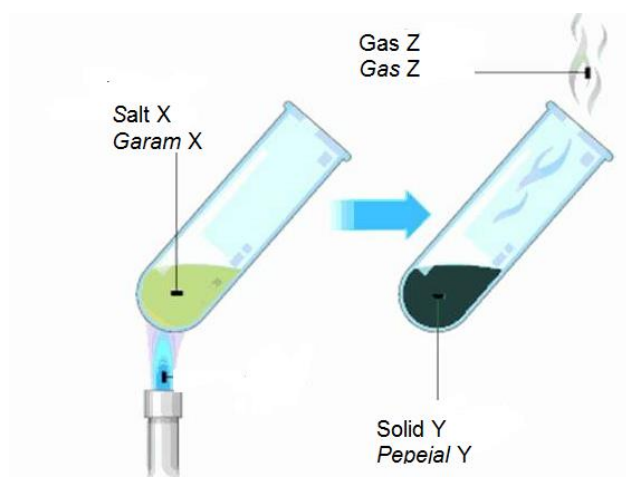


Diagram 7.1 / Rajah 7.1

- (i) Based on Diagram 7.1, identify salt X, solid Y and gas Z.  
Describe a chemical test for gas Z.  
*Berdasarkan Rajah 7.1, kenal pasti garam X, pepejal Y dan gas Z.  
Huraikan ujian kimia bagi gas Z.*
- (ii) Diagram 7.2 shows the reaction between solid Y and nitric acid.  
*Rajah 7.2 menunjukkan tindak balas antara pepejal Y dan asid nitrik.*

[5 marks]

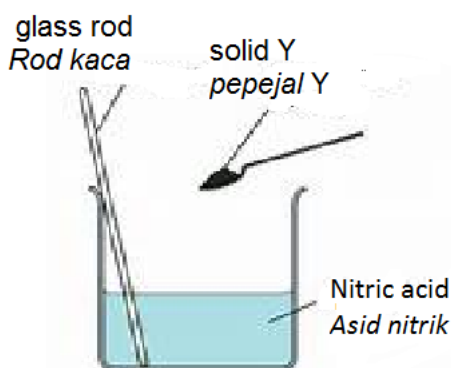


Diagram 7.2 / Rajah 7.2

Name the product formed from the reaction.  
Describe briefly a chemical test to verify the anion and cation in solution formed.  
*Namakan hasil yang terbentuk daripada tindak balas itu.  
Huraikan secara ringkas ujian kimia untuk mengesahkan kation dan anion dalam larutan yang terhasil.*

[6 marks]



- (iii) If 50 cm<sup>3</sup> of 1.0 mol dm<sup>-3</sup> nitric acid reacts with excess solid Y, write the chemical equation for the reaction and calculate the mass of the product formed.

[Molar mass of the product = 188 g mol<sup>-1</sup>]

*Jika 50 cm<sup>3</sup> asid nitrik 1.0 mol dm<sup>-3</sup> bertindak balas dengan pepejal Y berlebihan, tulis persamaan kimia bagi tindak balas itu dan hitung jisim hasil tindak balas yang terbentuk.*

*[Jisim molar hasil tindak balas = 188 g mol<sup>-1</sup>]*

[5 marks]

- 8 (a) Table 8 shows esters and their flavours.  
*Jadual 8 menunjukkan ester dan perisanya.*

<b>Ester</b> <i>Ester</i>	<b>Flavour</b> <i>Perisa</i>
Ethyl butanoate <i>Etil butanoat</i>	Pineapple <i>Nanas</i>
Methyl propanoate <i>Metil propanoat</i>	Apple <i>Epal</i>
Pentyl butanoate <i>Pentil butanoat</i>	Banana <i>Pisang</i>

Table 8 / *Jadual 8*

Ahmad wants to produce ester in a laboratory that has a pineapple flavour. State the alcohol and the carboxylic acid to be used for preparing the ester. Write the chemical equation to prepare the ester.

Calculate the mass of the alcohol will be used to get 1.16 g of the ester

[Relative atomic mass: H = 1, C = 12, O = 16]

*Ahmad ingin menyediakan ester di dalam makmal sekolah yang perisa nanas.*

*Nyatakan alkohol dan asid karboksilik yang akan diguna untuk menyediakan ester itu.*

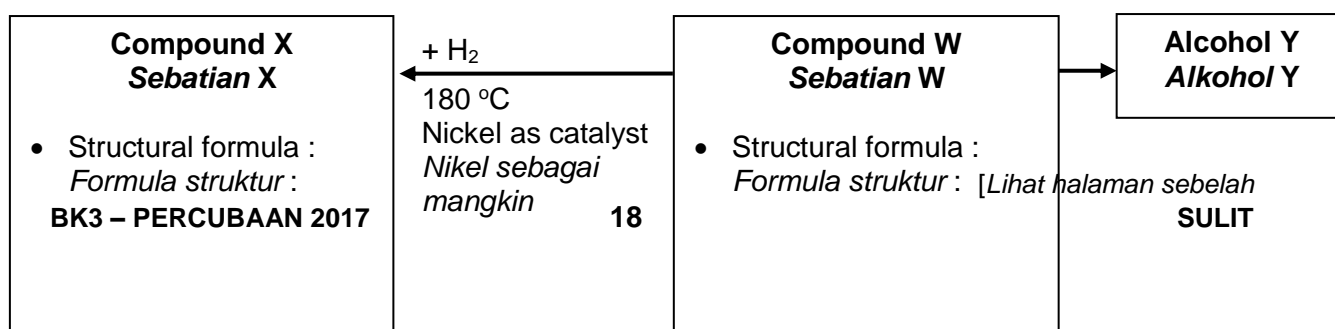
*Hitung jisim alkohol yang akan digunakan bagi mendapatkan 1.16 g ester itu.*

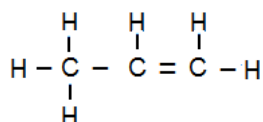
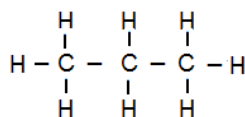
*[Jisim atom relatif: H = 1, C = 12, O = 16]*

[6 marks]

- (b) Diagram 8 shows how the compound X and the alcohol Y formed from the compound W and structural formula, melting and boiling point and electrical conductivity of compound W and compound X.

*Rajah 8 menunjukkan bagaimana sebatian X dan alkohol Y terbentuk daripada Sebatian W dan formula struktur, takat lebur dan takat didih serta kekonduksian elektrik bagi sebatian W dan sebatian X.*





- (i) Compare and contrast between compound W and compound X in terms of
- Type of hydrocarbon
  - Physical properties
  - Reaction with bromine water
  - Sootiness of flame when burning

Explain each of your comparisons.

*Banding dan bezakan antara sebatian W dan sebatian X dari segi*

- *Jenis hidrokarbon*
- *Sifat-sifat fizik*
- *Tindak balas dengan air bromin*
- *Kejelagaan nyalaan apabila dibakar*

*Terangkan setiap perbandingan anda.*

[8 marks]

- (ii) Draw the structural formula of alcohol Y and name the alcohol.  
State the optimum condition for producing of alcohol Y from compound W.  
Write the chemical equation involved.

*Lukis formula struktur bagi alkohol Y dan namakan alkohol itu.*

*Nyatakan keadaan yang optimum bagi menghasilkan alkohol Y daripada sebatian W.*

*Tuliskan persamaan kimia yang terlibat.*

[6 marks]

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

[20 marks]  
[20 markah]

Answer any **one** question from this section.  
*Jawab mana-mana **satu** soalan daripada bahagian ini.*

- 9 (a) Table 9.1 shows the observation of Experiment I and Experiment II.  
*Jadual 9.1 menunjukkan pemerhatian bagi Eksperimen I dan Eksperimen II.*

Experiment <i>Eksperimen</i>	Reactants <i>Bahan-bahan tindak balas</i>	Observation <i>Pemerhatian</i>
I	Zinc + Copper(II) sulphate solution <i>Zink + Larutan kuprum(II) sulfat</i>	The blue colour of copper(II) sulphate solution turns to colourless. <i>Warna biru larutan kuprum(II) sulfat menjadi tidak warna.</i>
II	Silver + Copper sulphate(II) solution <i>Argentum + Larutan kuprum(II) sulfat</i>	The blue colour of copper(II) sulphate solution remain unchanged. <i>Warna biru larutan kuprum(II) sulfat kekal tidak berubah.</i>

Table 9.1 / *Jadual 9.1*

Explain why there are differences on observation in Experiment I and Experiment II.  
Write the ionic equation for the reaction in Experiment I.

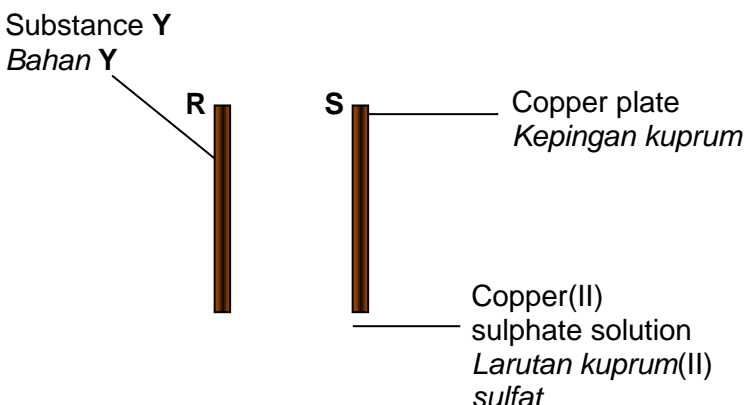
Terangkan mengapa terdapat perbezaan pada pemerhatian dalam Eksperimen I dan Eksperimen II.

Tuliskan persamaan ion bagi tindak balas dalam Eksperimen I.

[4 marks]

- (b) Table 9.2 shows the apparatus set-up and the observations for electrolysis of copper(II) sulphate solution using different type of electrodes.  
*Jadual 9.2 menunjukkan susunan radas dan pemerhatian bagi proses elektrolisis larutan kuprum(II) sulfat menggunakan jenis elektrod yang berbeza.*

Set	Apparatus set-up <i>Susunan Radas</i>	Observation <i>Pemerhatian</i>
I	<p>Substance X <i>Bahan X</i></p> <p>P</p> <p>Q</p> <p>Carbon rod <i>Rod karbon</i></p> <p>Copper(II) sulphate solution <i>Larutan kuprum(II) sulfat</i></p>	<p><u>At electrode P</u> :</p> <p>Bubbles of gas released</p> <p><u>Pada elektrod P</u> :</p> <p><i>Gelembung-gelembung gas terbebas</i></p> <hr/> <p><u>At electrode Q</u> :</p> <p>Brown solid is deposited</p> <p><u>Pada elektrod Q</u> :</p> <p><i>Pepejal perang terenap</i></p> <hr/> <p><u>Electrolyte</u> :</p> <p>Blue colour of copper(II) sulphate solution becomes paler</p> <p><u>Elektrolit</u> :</p> <p><i>Warna biru larutan kuprum(II) sulfat menjadi semakin pucat</i></p>
II		<p><u>At electrode R</u> :</p> <p>Copper plate becomes thinner</p> <p><u>Pada elektrod R</u> :</p> <p><i>Kepingan kuprum menipis</i></p>

	<p><u>At electrode S :</u> Brown solid is deposited</p> <p><u>Pada elektrod S :</u> Pepejal perang terenalap</p>
<p><u>Electrolyte :</u> Blue colour of copper(II) sulphate solution unchanged.</p> <p><u>Elektrolit :</u> Warna biru larutan kuprum(II) sulfat tidak berubah</p>	

Jadual 9.2 / Table 9.2

- (i) Suggest the substance **X** and substance **Y**.  
*Cadangkan bahan X dan bahan Y.*
- (ii) By using Set I or Set II, explain how the product formed at anode.  
*Dengan menggunakan Set I atau Set II, terangkan bagaimana hasil terbentuk di anod.*

[6 marks]

- (c) Diagram 9 shows the change that occurs to an iron bracelet when it's electroplated with gold.

*Rajah 9 menunjukkan perubahan yang berlaku kepada gelang besi apabila disadurkan dengan emas.*

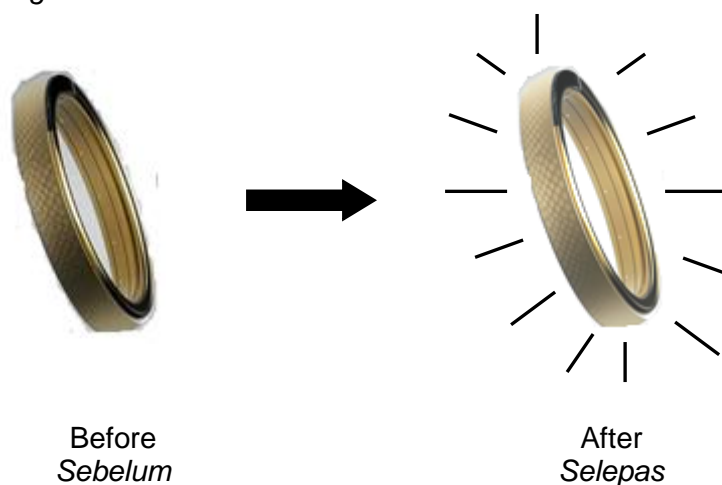


Diagram 9 / Rajah 9

By using the same method, describe an experiment to electroplate an iron key with silver or copper.

*Menggunakan kaedah yang sama, huraikan satu eksperimen untuk menyadurkan kunci besi dengan argentum atau kuprum.*

Your description should include the following :

*Huraian anda haruslah mengandungi perkara berikut :*

- Apparatus set-up  
*Susunan radas*
- Procedure  
*Prosedur*
- Observation at the iron key and silver or copper  
*Pemerhatian pada kunci besi dan argentum atau kuprum*
- Half equations involved.  
*Setengah persamaan yang terlibat.*

[10 marks]

- 10 (a) Diagram 10 shows the chemical equations of two reactions:  
*Rajah 10 menunjukkan persamaan kimia bagi dua tindak balas:*

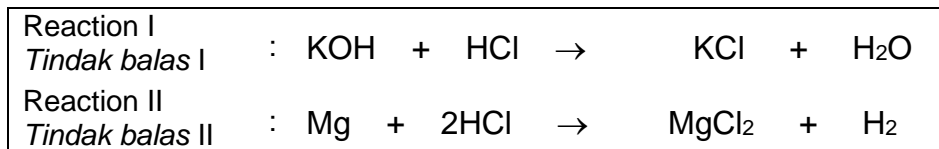


Diagram 10 / *Rajah 10*

Which reaction is a redox reaction?

Explain your answer in terms of change in oxidation number.

*Tindak balas yang manakah ialah tindak balas redoks?*

*Terangkan jawapan anda dari segi perubahan dalam nombor pengoksidaan.*

[4 marks]

- (b) Table 10 shows the reactants and observations of two redox reactions.

*Jadual 10 menunjukkan bahan-bahan tindak balas dan pemerhatian bagi dua tindak balas redoks.*

<b>Redox Reaction</b> <i>Tindak balas Redoks</i>	<b>Reactants</b> <i>Bahan-bahan tindak balas</i>	<b>Observation</b> <i>Pemerhatian</i>

<b>X</b>	Iron(II) sulphate solution + Substance <b>P</b> <i>Larutan ferum(II) sulfat + Bahan P</i>	The solution changes in colour from pale green to yellow. <i>Larutan berubah warna daripada hijau pucat kepada kuning.</i>
<b>Y</b>	Iron(III) sulphate solution + Substance <b>Q</b> <i>Larutan ferum(III) sulfat + Bahan Q</i>	The solution changes in colour from brown to pale green. <i>Larutan berubah warna daripada perang kepada hijau pucat.</i>

Table 10 / Jadual 10

Suggest substance **P** and substance **Q**.

Explain the observation for reaction X and reaction Y in terms of electron transfer.

*Cadangkan bahan P dan bahan Q.*

*Terangkan pemerhatian bagi tindak balas X dan tindak balas Y dari segi pemindahan elektron.*

[6 marks]

(c)

The electric current is produced by the transfer of electron at a distance from a reducing agent to an oxidizing agent in a chemical reaction.

*Arus elektrik terhasil oleh pemindahan elektron pada satu jarak daripada agen penurunan kepada agen pengoksidaan dalam suatu tindak balas kimia.*

By naming any suitable oxidizing agent and reducing agent, describe an experiment to prove the statement above.

*Dengan menamakan sebarang agen pengoksidaan dan agen penurunan yang sesuai, huraikan satu eksperimen untuk membuktikan kenyataan di atas.*

Your description must include the following;

*Penerangan anda mesti mengandungi perkara-perkara berikut;*

- Diagram of the apparatus set-up  
*Gambar rajah susunan radas*
- Procedure of the experiment  
*Prosedur eksperimen*
- Observations

*Pemerhatian*

- Half equations  
*Setengah persamaan*

[10 marks]

**END OF QUESTION PAPER  
KERTAS SOALAN TAMAT**