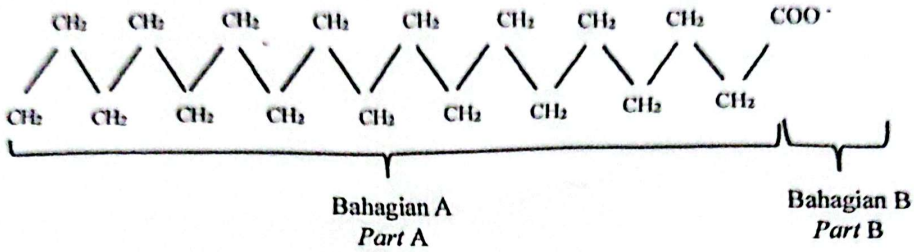
Bahagian A

[60 markah]

Jawab **semua** soalan.

1 Rajah 1.1 menunjukkan formula struktur bagi anion sabun. Sabun boleh dihasilkan daripada tindak balas peneutralan antara asid lemak dan alkali.
Diagram 1.1 shows the structural formula of soap anion. Soap can be provided from the neutralisation reaction of fatty acid and alkali.



Rajah 1.1
Diagram 1.1

(a) Berdasarkan Rajah 1.1,
Based on Diagram 1.1,

(i) Namakan proses untuk menghasilkan sabun.
Name of the process to produce soap.

.....

[1 *markah*]
[1 *mark*]

(ii) Kenal pasti bahagian yang larut dalam air.
Identify the part that dissolves in water.

.....

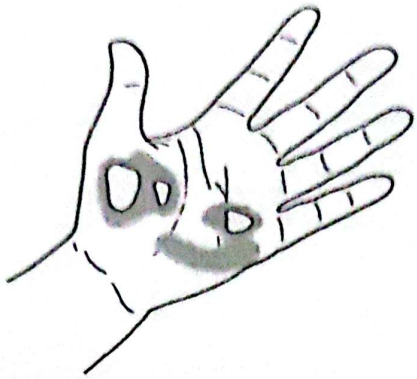
[1 *markah*]
[1 *mark*]

(iii) Nyatakan satu sumber asid lemak.
Identify one source of fatty acid.

.....

[1 *markah*]
[1 *mark*]

(b) Rajah 1.2 di bawah menunjukkan keadaan tangan Hisham yang melecur sewaktu ingin menyalakan unggun api ketika perkhemahan.
Diagram 1.2 below shows the condition of Hisham's hand which was burned while trying to light a bonfire during camping.



Rajah 1.2
Diagram 1.2

(i) Nyatakan satu ubat tradisional yang boleh digunakan untuk merawat kecederaan tersebut.
State a traditional medicine that can be used to treat the injuries.

.....

[1 *markah*]
[1 *mark*]

(ii) Nyatakan kesan selepas rawatan tersebut.
State the effect after the treatment.

.....

[1 *markah*]
[1 *mark*]

2 Jadual 1 menunjukkan maklumat sebahagian daripada unsur yang terdapat dalam Kala 3 Jadual Berkala Unsur
Table 1 shows information about some of the elements found in Period 3 of the Periodic Table of Elements

Unsur *Element*	**A**	**B**	**C**	**D**	**E**	**F**
Susunan Elektron *Electron Arrangement*	2.8.1	2.8.2	2.8.3	2.8.6	2.8.7	2.8.8

Jadual 1
Table 1

Berdasarkan Jadual 1 ,
Based on Table 1,

(a) Apakah yang dimaksudkan dengan kala?
What is the meaning of period?

.....

[1 *markah*]
[1 *mark*]

(b) Jelaskan mengapa unsur-unsur tersebut terletak pada Kala 3?
Explain why the elements are located at Period 3?

.....

[1 *markah*]
[1 *mark*]

(c) Nyatakan satu unsur logam.
State one metal element.

.....

[1 *markah*]
[1 *mark*]

(d) Namakan unsur F.
Name element F.

.....

[1 *markah*]
[1 *mark*]

(e) Atom unsur E boleh membentuk anion. Tuliskan formula anion tersebut.
Atom of element E can form anion. Write the formula of the anion.

.....

[1 *markah*]
[1 *mark*]

3 Rajah 3.1 menunjukkan tiga keadaan jirim, P, Q dan R bagi air.
Diagram 3.1 shows three states of matter, P, Q and R for water.

Rajah 3.1
Diagram 3.1

(a) Namakan proses perubahan daripada keadaan P kepada Q.
Name the process changes from state P to state Q.

.....

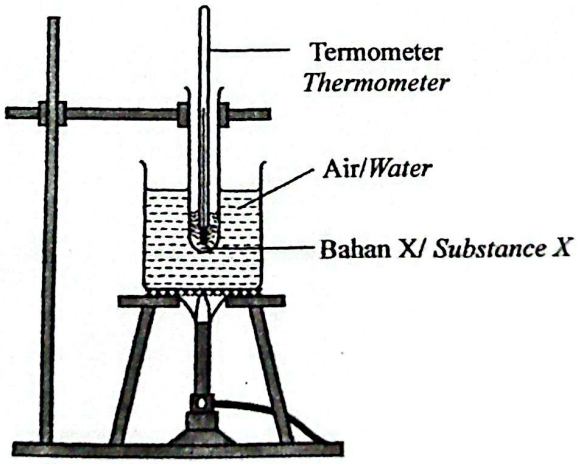
[1 *markah*]
[1 *mark*]

(b) Nyatakan susunan zarah pada keadaan R.
State the particle arrangement at state R.

.....

[1 *markah*]
[1 *mark*]

(c) Rajah 3.2 menunjukkan susunan radas untuk menentukan takat lebur bahan X.
Diagram 3.2 shows the arrangement of the apparatus to determine the melting point of substance X.



Rajah 3.2
Diagram 3.2

Berdasarkan Rajah 3.2,
Based on Diagram 3.2,

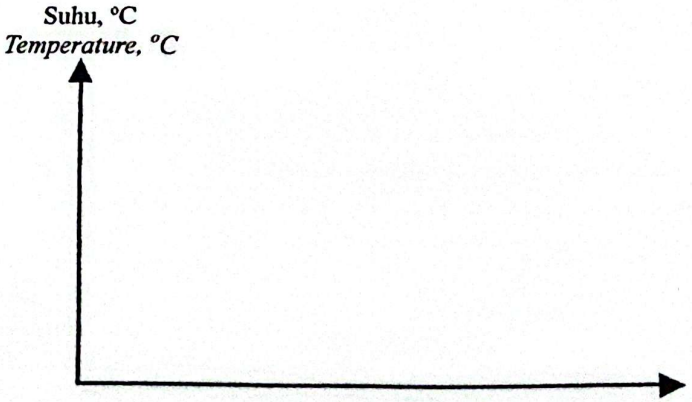
(i) Bahan X didapati tidak melebur walaupun air telah mendidih. Jelaskan mengapa. Cadangkan satu bahan yang boleh menggantikan air.
Substance X was found not to melt even though after the water is boiled. Explain why. Suggest a substance that can replace water.

.....

.....

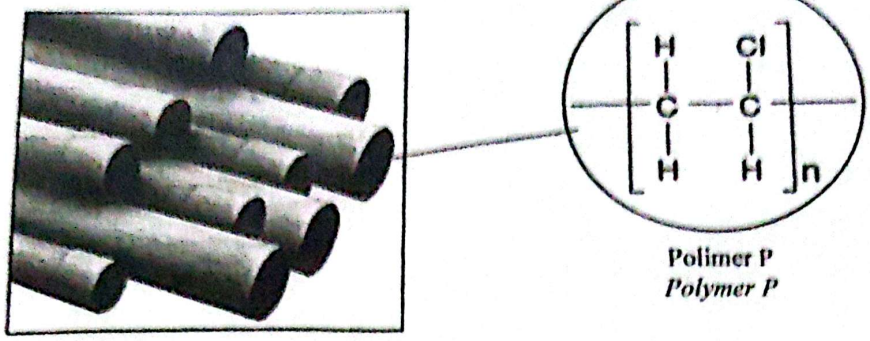
[2 *markah*]
[2 *marks*]

(ii) Lakarkan lengkung pemanasan bagi bahan X. Pada graf tersebut, cadangkan suhu takat leburnya.
Sketch the heating curved for substance X. On the graph, suggest the temperature of the melting point.



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

4 Rajah 4.1 di bawah menunjukkan beberapa batang paip yang diperbuat daripada bahan polimer P.
Diagram 4.1 below shows the pipe rods that are made of from polymer P



Polimer P
Polymer P

Rajah 4.1
Diagram 4.1

(a) Berdasarkan Rajah 4.1,
Based on the above Diagram 4.1,

(i) Nyatakan maksud polimer.
State the meaning of polymer.

.....

.....

[1 *markah*]
[1 *mark*]

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

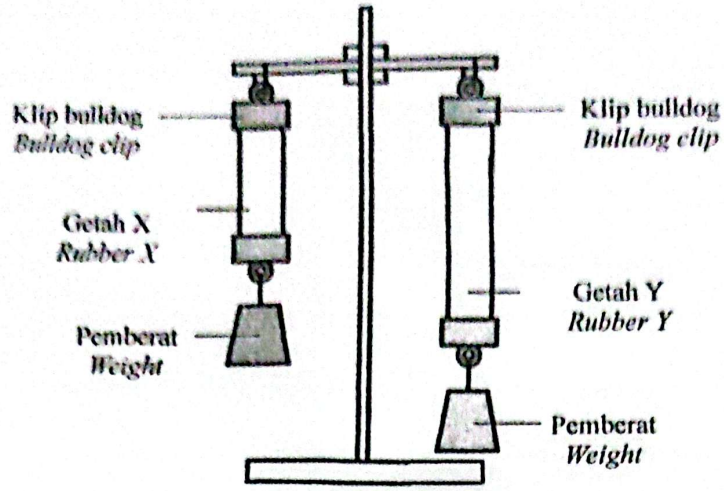
[1 *markah*]
[1 *mark*]

(iii) Pembakaran polimer P akan menghasilkan gas toksik. Nyatakan satu cara supaya penggunaan polimer lebih lestari.
The disposal of pipe rods by burning will produce a toxic gas. State the way so that the use of the polymer is more sustainable.

.....

[1 *markah*]
[1 *mark*]

(b) Rajah 4.2 menunjukkan susunan radas untuk membezakan getah tervulkan dan getah tidak tervulkan.
Diagram 4.2 shows the apparatus set-up to differentiate the vulcanised rubber and unvulcanised rubber.



Rajah 4.2
Diagram 4.2

Berdasarkan Rajah 4.2,
Based on the Diagram 4.2,

(i) Kenal pasti getah X dan getah Y.
Identify rubber X and rubber Y.

X :..... *Y*:.....

[1 *markah*]
[1 *mark*]

(ii) Rajah 4.3 menunjukkan polimer bagi getah.
Diagram 4.3 shows polymer of rubber.

$$\sim CH_2 - \underset{\displaystyle CH_3}{\underset{|}{C}} = CH - CH_2 - CH_2 - \underset{\displaystyle CH_3}{\underset{|}{C}} = CH - CH_2 \sim$$

Rajah 4.3
Diagram 4.3

Lukiskan struktur polimer bagi getah X.
Draw the structure of the polymer for rubber X.

[3 *markah*]
[3 *marks*]

5 (a) Rajah 5.1 menunjukkan objek yang diperbuat daripada sejenis aloi.
Diagram 5.1 shows an object that is made from an alloy.

Rajah 5.1
Diagram 5.1

Berdasarkan Rajah 5.1,
Based on Diagram 5.1,

(i) Nyatakan nama bagi aloi Z.
State the name of alloy Z.

.....

[1 *markah*]
[1 *mark*]

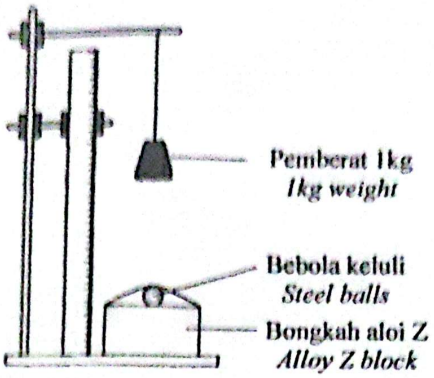
(ii) Lukis susunan atom bagi aloi Z.
Draw the arrangement of atom in alloy Z.

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

(iii) Dalam pembuatan aloi Z, 90% logam tulen X dan 10% logam Y perlu dicampurkan. Jika Amir ingin menyediakan piala berjisim 500 g, berapakah jisim logam Y yang diperlukan?
In alloy Z manufactured, 90% of pure metal X and 10% metal Y are mixed. If Amir wants to prepare 500 g of trophy, what is the mass of metal Y required?

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

(b) Rajah 5.2 menunjukkan susunan radas yang digunakan dalam eksperimen untuk membandingkan kekerasan antara aloi Z dan logam tulennya, logam X.
Diagram 5.2 shows apparatus set-up used in experiment to compare the hardness between alloy Z and its pure metal, metal X



Rajah 5.2
Diagram 5.2

Jadual 2 menunjukkan diameter lekuk antara dua jenis bongkah.
Table 2 shows the diameter of the dent between two types of blocks.

Jenis bongkah *Block type*	**Diameter lekuk (cm)** *Diameter of the dent (cm)*
Logam X *Metal X*	1.2
Aloi Z *Alloy Z*	0.6

Jadual 2
Table 2

Berdasarkan Jadual 2, tentukan bongkah yang manakah lebih keras. Terangkan jawapan anda.
Based on Table 2, determine which block is harder. Explain your answer.

.....

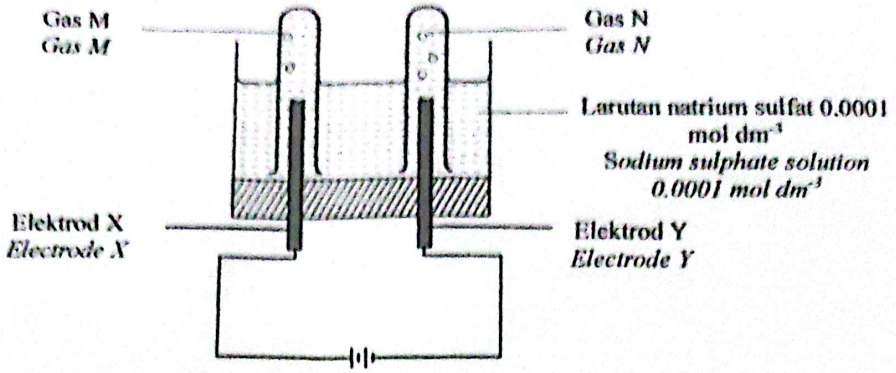
.....

.....

.....

[3 *markah*]
[3 *marks*]

6 Rajah 6.1 menunjukkan satu sel elektrolisis yang diisi dengan larutan natrium sulfat sebagai elektrolit.
Diagram 6.1 shows an electrolysis cell that fill up with sodium sulphate solution as an electrolyte.



Rajah 6.1
Diagram 6.1

Jadual 3 menunjukkan nilai keupayaan elektrod piawai sel setengah bagi beberapa bahan.
Table 3 shows the values of standard electrode potential for the half-cells of some substances.

Tindak Balas Sel Setengah *Reaction of half-cell*	**E° (V) (298 K)**
$Na^+ + e \rightleftharpoons Na$	-2.71
$O_2 + 2H_2O + 4e \rightleftharpoons 4OH^-$	+0.40
$2H^+ + 2e \rightleftharpoons H_2$	0.00
$S_2O_8^{2-} + 2e \rightleftharpoons 2SO_4^{2-}$	+2.01

Jadual 3
Table 3

Berdasarkan Rajah 6.1,
Based on Diagram 6.1,

(a) Apakah maksud elektrolit?
What is the meaning of electrolyte?

.....

[1 markah]
[1 mark]

(b) Tuliskan semua ion yang hadir dalam larutan elektrolit.
Write the formula of all ions that present in the electrolyte solution.

.....

[1 markah]
[1 mark]

(c) Nyatakan anod dan katod bagi sel tersebut.
State the anode and cathode for the cell.

Anod/ *Anode* : .....

Katod/ *Cathode*: .....

[1 markah]
[1 *mark*]

(d) Nyatakan ion-ion yang bergerak ke:
State the ions that moves to:

Anod/ *Anode* : .....

Katod/ *Cathode*: .....

[2 markah]
[*2 marks*]

(e) Kenal pasti ion yang dioksidakan dalam sel tersebut. Terangkan jawapan anda.
Identify ion that oxidised in the cell. Explain your answer.

.....

.....

[2 markah]
[*2 marks*]

(f) Tuliskan setengah persamaan bagi tindak balas pengoksidaan yang berlaku di (e).
Write the half equation for the oxidation reaction that occurred in (e).

.....

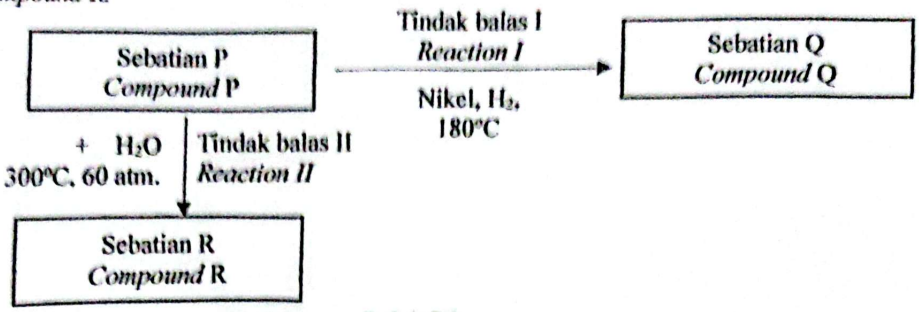
[1 markah]
[*1 mark*]

(g) Tuliskan setengah persamaan bagi tindak balas penurunan yang berlaku dalam sel tersebut.
Write the half equation for the reducing reaction that occurred in the cell.

.....

[1 markah]
[*1 mark*]

7 Rajah 7.1 menunjukkan sebatian P yang melalui dua jenis tindak balas untuk menghasilkan sebatian Q dan sebatian R.
Diagram 7.1 shows compound P that undergo two types of reaction to produce compound Q and compound R.



Rajah 7.1
Diagram 7.1

Berdasarkan Rajah 7.1,
Based on Diagram 7.1,

(a) Nyatakan siri homolog bagi sebatian Q.
State the homologous series of compounds Q.

.....

[1 markah]
[1 *mark*]

(b) Namakan tindak balas I.
Name reaction I.

.....

[1 markah]
[*1 mark*]

(c) Tuliskan persamaan kimia yang seimbang bagi tindak balas I.
Write a balanced chemical equation for reaction I.

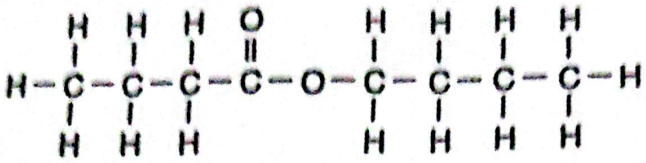
.....

[2 markah]
[*2 marks*]

(d) Lukiskan formula struktur bagi sebatian R.
Draw the structural formula of compound R.

[1 markah]
[*1 mark*]

(c) Rajah 7.2 menunjukkan formula struktur bagi suatu ester yang berbau buah-buahan. Ia terhasil apabila sebatian R bertindak balas dengan asid karboksilik.
Diagram 7.2 shows a structural formula for an ester that has a fruity odor. It produces when compound R reacts with carboxylic acid.



Rajah 7.2
Diagram 7.2

Berdasarkan Rajah 7.2,
Based on Diagram 7.2,

(i) Namakan sebatian R tersebut.
Name the compound R.

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

(ii) Kenal pasti asid karboksilik dalam pembentukan ester tersebut.
Identify the carboxylic acid in the formation of the ester.

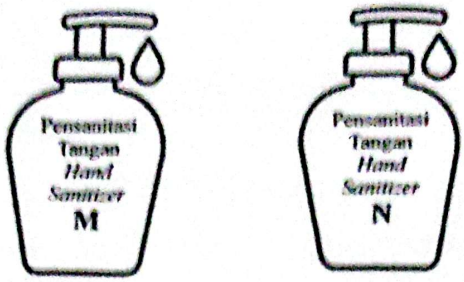
.....
[1 markah]
[*1 mark*]

(iii) Namakan ester tersebut.
Name the ester.

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

[Lihat halaman sebelah
SULIT

(f) Rajah 7.3 menunjukkan dua jenis pensanitasi tangan yang mengandungi peratusan alkohol yang berbeza.
Diagram 7.3 shows two types of hand sanitizers that contains different percentage of alcohol.



75% kandungan alkohol
75% alcohol

55% kandungan alkohol
55% alcohol

Rajah 7.3
Diagram 7.3

Berdasarkan Rajah 7.3, pilih pensanitasi tangan yang akan anda gunakan. Wajarkan pilihan anda.
Based on Diagram 7.3, choose which hand sanitizer will you use. Justify your answer.

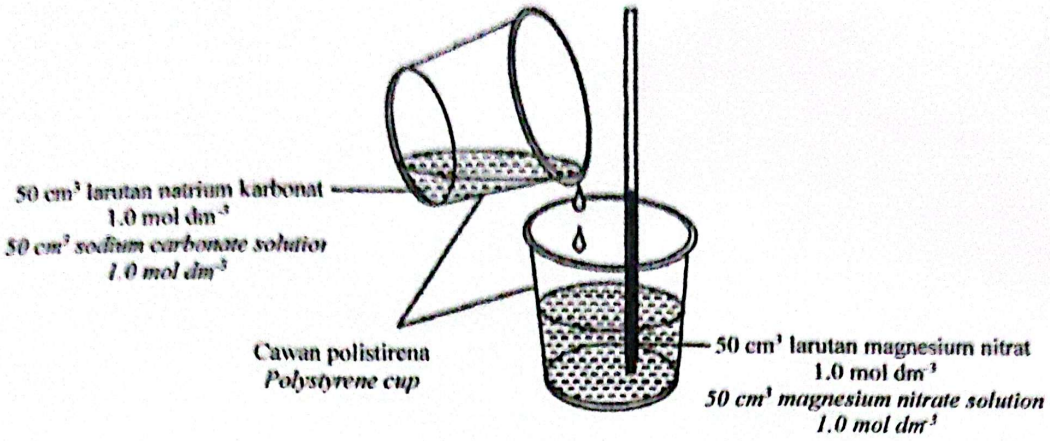
.....

.....

.....

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

8 Rajah 8.1 menunjukkan susunan radas untuk menentukan haba pemendakan bagi magnesium karbonat.
Diagram 8.1 shows the apparatus set up to determine the heat of precipitation for magnesium carbonate.



Rajah 8.1
Diagram 8.1

Jadual 4 menunjukkan keputusan yang diperoleh.
Table 4 show the results obtained.

Penerangan *Description*	**Suhu °C** *Temperature °C*
Suhu awal larutan magnesium nitrat *Initial temperature of magnesium nitrate solution*	27.0
Suhu awal larutan natrium karbonat *Initial temperature of natrium carbonate solution*	28.0
Suhu terendah campuran *Lowest temperature of the mixture*	25.0

Jadual 4
Table 4

Berdasarkan Rajah 8.1 dan Jadual 4,
Based on Diagram 8.1 and Table 4,

(a) Nyatakan maksud haba pemendakan.
State the meaning of heat of precipitation.

.....

[1 markah]
[*1 mark*]

(b) Namakan mendakan yang terbentuk.
Name the precipitate formed

.....

[1 markah]
[*1 mark*]

(c) Nyatakan perubahan suhu dan jenis tindak balas yang berlaku.
State the temperature change and the type of reaction occurred

.....

[2 markah]
[*2 marks*]

(d) Hitung.
Calculate.

(i) perubahan haba yang berlaku dalam tindak balas itu.
[Muatan haba tentu bagi larutan, c = 4.2 J g^{-1} $°C^{-1}$;
Ketumpatan larutan = 1 g cm^{-3}]

the heat change occured in the reaction.
[*Specific heat capacity of solution*, c = 4.2 J g^{-1} $°C^{-1}$;
Density of solution = 1 g cm^{-3}]

[1 *markah*]
[*1 mark*]

(ii) haba pemendakan bagi magnesium karbonat.
the heat of precipitation of magnesium carbonate.

[2 *markah*]
[2 *mark*]

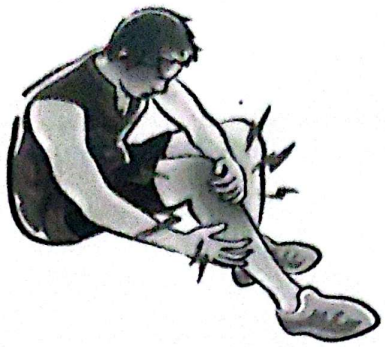
(e) Eksperimen itu diulangi dengan menggunakan 50 cm^3 larutan kalium karbonat 1.0 mol dm^{-3} bagi menggantikan larutan natrium karbonat.
Didapati haba pemendakan masih sama. Terangkan dapatan tersebut.

The experiment was repeated using 50 cm^3 of potassium carbonate solution 1.0 mol dm^{-3} to replace the sodium carbonate solution.
It's found that the value of heat of precipitation still the same. Explain the finding.

.....

[1 markah]
[*1 mark*]

(f) Rajah 8.2 menunjukkan seorang atlet sedang mengalami bengkak lutut.
Figure 8.2 shows an athlete experiencing knee swelling.



Rajah 8.2
Diagram 8.2

Cadangkan satu kaedah untuk membantu atlet itu meredakan kesakitan. Terangkan tindakan anda.
Suggest a method to help the player to relieve the pain. Explain your action.

.....

.....

.....

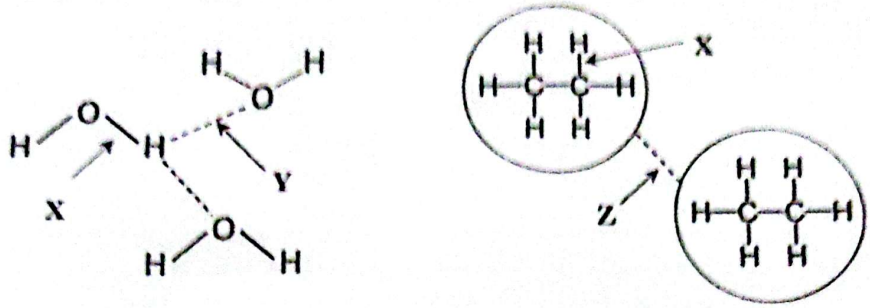
[2 *markah*]
[2 *marks*]

Bahagian B

[20 markah]

Bahagian ini mengandungi dua soalan. Jawab satu soalan.

9 (a) Rajah 9.1 menunjukkan molekul-molekul air dan molekul etana. Kedua-duanya merupakan sebatian kovalen.
Diagram 9.1 shows water molecules and ethane molecules. Both are covalent compounds.



Molekul air
Water molecule

Molekul etana
Ethane molecule

Rajah 9.1
Diagram 9.1

Jadual 5 menunjukkan takat didih air dan etana.
Table 5 shows boiling point of water and ethane.

Sebatian *Compound*	**Takat didih (°C)** *Boiling point* (°C)
Air, H_2O *Water*, H_2O	100
Etana, C_2H_6 *Ethane*, C_2H_6	-89

Jadual 5
Table 5

Berdasarkan Rajah 9.1,
Based on Diagram 9.1,

(i) Berdasarkan Rajah 9.1, namakan X dan Y.
Based on Diagram 9.1, name X and Y.

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

(ii) Berdasarkan Jadual 5, terangkan mengapa takat didih air dan etana berbeza?
Based on Diagram 5, explain why boiling points of water and ethane are different?

[4 *markah*]
[4 *marks*]

(b) Rajah 9.2 menunjukkan perwakilan piawai bagi atom unsur-unsur P, Q dan R.
Diagram 9.2 shows the standard representation of atoms of element P, Q and R.

$^{12}_{6}P$ $^{23}_{11}Q$ $^{16}_{8}R$

Rajah 9.2
Diagram 9.2

(i) Unsur P bertindak balas dengan unsur R untuk membentuk sebatian A. Unsur Q bertindak balas dengan unsur R membentuk sebatian B.
Terangkan bagaimana sebatian A dan sebatian B terbentuk.

Element P react with element R to form compound A. Element Q react with element R to form compound B.
Explain how compound A and compound B is formed.

[8 markah]
[*8 marks*]

(ii) Lukiskan gambar rajah susunan elektron bagi sebatian A dan sebatian B.
Draw a diagram of the electron arrangement of compound A and compound B.

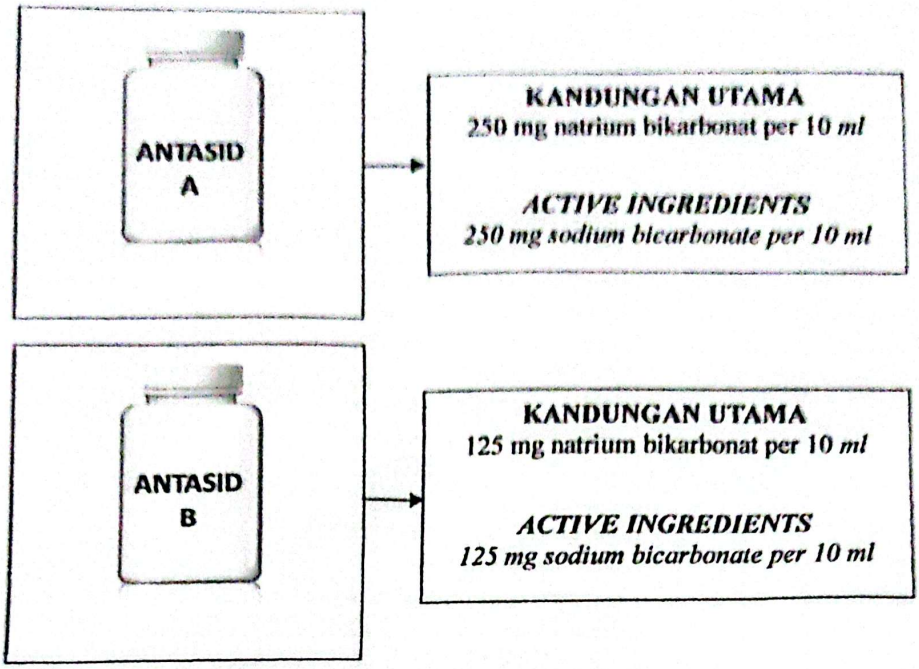
[4 markah]
[*4 marks*]

(iii) Bandingkan kekonduksian elektrik sebatian A dan sebatian B. Terangkan perbezaan tersebut.
Compare the electrical conductivity of compound A and compound B. Explain the difference.

[2 markah]
[*2 marks*]

10 (a) Rajah 10 di bawah menunjukkan dua jenis antasid yang boleh melegakan senak dan pedih ulu hati akibat asid berlebihan di dalam perut.

Diagram 10 shows two types of antacid which can relieve indigestion and heartburn causing of excess acid in the stomach.



Rajah 10
Diagram 10

Berdasarkan Rajah 10,
Based on Diagram 10,

(i) Namakan jenis tindak balas yang berlaku antara asid dalam perut dan natrium bikarbonat.

Name the reaction between stomach acid and sodium bicarbonate.

[1 markah]
[*1 mark*]

(ii) Hafiz mengidap sakit gastrik. Ubat yang manakah lebih cepat berkesan untuk merawat gastriknya?

Hafiz has gastric. Which medicine is quickly effective to treat his gastric?

[1 markah]
[*1 mark*]

(b) Jadual 6 menunjukkan maklumat tentang bahan tindak balas dan masa yang di ambil untuk mengumpulkan 50 cm^3 gas X dalam tiga eksperimen untuk mengkaji faktor yang mempengaruhi suatu kadar tindak balas. Gas X yang terhasil mengeruhkan air kapur.

Table 6 shows information about reactants and time taken to collect 50 cm^3 gas X in three experiments to study the factors that affect the rate of reaction. Gas X produced turns the lime water cloudy.

Eksperimen *Experiment*	Bahan tindak balas *Reactans*	Suhu (°C) *Temperature (°C)*	Masa untuk mengumpul 50 cm^3 gas (s) *Time to collect 50 cm^3 of gas (s)*
I	Ketulan kalsium karbonat berlebihan dan 30 cm^3 asid hidroklorik 0.5 mol dm^{-3} *Excess calcium carbonate chips and 30 cm^3 hydrochloric acid 0.5 mol dm^{-3}*	35	50
II	Ketulan kalsium karbonat berlebihan dan 30 cm^3 asid hidroklorik 0.5 mol dm^{-3} *Excess calcium carbonate chips and 30 cm^3 hydrochloric acid 0.5 mol dm^{-3}*	45	30
III	Ketulan kalsium karbonat berlebihan dan 30 cm^3 asid hidroklorik 1.0 mol dm^{-3} *Excess calcium carbonate chips and 30 cm^3 hydrochloric acid 1.0 mol dm^{-3}*	35	20

Jadual 6
Table 6

Berdasarkan maklumat dalam Jadual 6,
Based on information in Table 6,

(i) Nyatakan maksud kadar tindak balas.
State the meaning of rate of reaction.

[1 markah]
[*1 mark*]

(ii) Namakan gas X.
Name gas X.

[1 markah]
[*1 mark*]

(iii) Nyatakan satu faktor yang mempengaruhi kadar tindak balas.
State one factor that affect the rate of reaction.

[1 markah]
[*1 mark*]

(iv) Tuliskan persamaan kimia bagi tindak balas antara kalsium karbonat dan asid hidroklorik.

Write the chemical equation for the chemical reaction between calcium carbonate and hydrochloric acid.

[2 markah]
[*2 marks*]

(v) Bandingkan kadar tindak balas antara

- Eksperimen I dan II
- Eksperimen II dan III

Terangkan jawapan anda dengan merujuk kepada Teori Perlanggaran.

Compare the rate of reaction between

- *Experiment I dan II*
- *Experiment II dan III*

Explain your answer with reference to Collision Theory.

[10 markah]
[*10 marks*]

(vi) Hitungkan kadar tindak balas purata bagi Eksperimen I, II dan III.
Calculate the average rate of reaction for Experiment I, II and III.

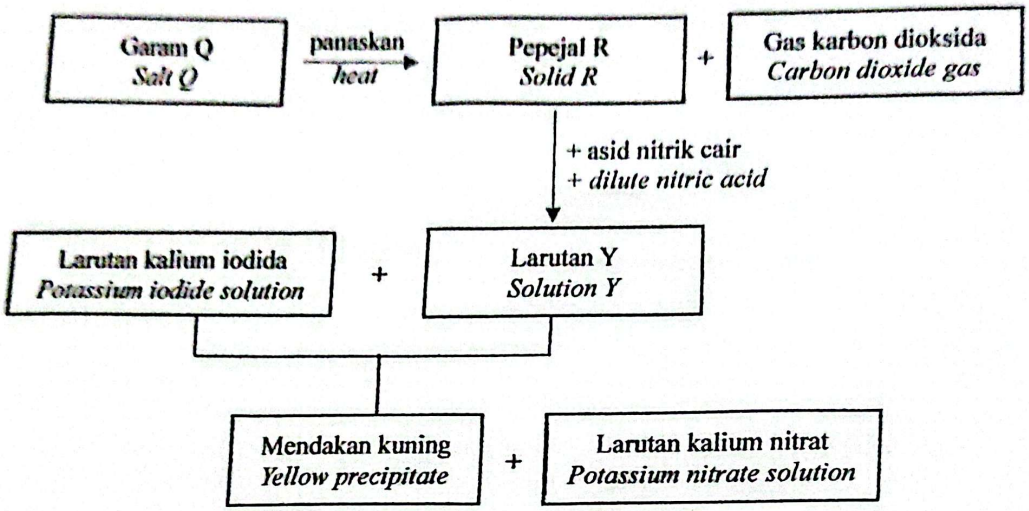
[3 markah]
[*3 marks*]

Bahagian C

[20 markah]

Soalan ini **mesti** *dijawab.*

11 Rajah 11 menunjukkan siri tindak balas bagi garam Q. Apabila garam Q dipanaskan dengan kuat, pepejal R yang terbentuk adalah suatu oksida logam yang berwarna perang apabila panas dan bertukar kuning apabila sejuk.
Diagram 11 shows the reaction series of salt Q. When salt Q is strongly heated, the solid R formed is an oxide metal is brown when hot and turns a yellow when cold.



Rajah 11
Diagram 11

Berdasarkan Rajah 11,
Based on Diagram 11,

(a) (i) Kenal pasti garam Q, larutan Y dan mendakan Z.
Identify salt Q, solution Y and precipitate Z.

[3 *markah*]
[3 *marks*]

(ii) Huraikan satu ujian kimia untuk mengesahkan anion dalam larutan Y.
Describe a chemical test to verify the anion in solution Y.

[5 *markah*]
[5 *marks*]

(b) Gas karbon dioksida adalah suatu gas tanpa warna dan tanpa bau. Namakan satu bahan uji untuk menentusahkan gas tersebut. Apakah jangkaan pemerhatian di akhir ujian gas. Lukiskan gambar rajah susunan radas yang sesuai untuk ujian tersebut.

Carbon dioxide gas is a colorless and odorless gas. Name a test substance to confirm the gas. What is the expected observation at the end of the gas test? Draw a suitable apparatus set up diagram for the test.

[4 *markah*]
[4 *marks*]

(c) (i) Tindak balas antara larutan kalium iodida dan larutan Y menghasilkan mendakan kuning. Namakan tindak balas tersebut.
Reaction between potassium iodide solution and Y solution produces a yellow precipitate. Name the reaction.

[1 *markah*]
[1 *mark*]

(ii) Tuliskan persamaan kimia seimbang bagi tindak balas tersebut.
Write the balanced chemical equation for the reaction.

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

(iii) Huraikan kaedah untuk anda mendapatkan hablur garam kalium nitrat. Nyatakan warna hablur yang terbentuk.
Describe the method for you to obtain potassium nitrate salt crystals. State the color of the crystals formed.

[5 *markah*]
[5 *marks*]

KERTAS SOALAN TAMAT