

NAMA : _____

TINGKATAN: _____

JPP KIMIA PASIR GUDANG

PEPERIKSAAN PERCUBAAN SPM 2024

KIMIA
KERTAS 2
Ogos/Sept.
2 1/2 JAM

4541/2

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN SEHINGGA DIBERITAHU
DO NOT OPEN THIS QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO

MAKLUMAT KEPADA CALON
INFORMATION FOR CANDIDATES

1. Tuliskan nama dan Tingkatan anda pada ruang yang disediakan.
Write your name and class in the space provided.
2. Soalan adalah dalam Bahasa Melayu dan diikuti Bahasa Inggeris.
Questions are in Malay followed by English
3. Soalan terbahagi kepada 3 bahagian iaitu bahagian A, Bahagian B dan Bahagian C.
The question is divided into 3 parts, section A, section B and section C.
4. Anda perlu menjawab semua soalan Bahagian A pada ruangan yang disediakan.
You have to answer all the questions in section A in the space provided.
5. Jawab satu soalan daripada Bahagian B. Jawab semua soalan daripada Bahagian C. tulis jawapan anda bagi Bahagian B dan Bahagian C dalam helaian tambahan yang dibekalkan oleh pengawas peperiksaan.
Answer one question from Section B. Answer all questions from Section C. Write your answers for Section B and Section C on the additional sheet provided by the invigilator.
6. Pada muka surat 23 dilampirkan bersama Jadual Berkala Unsur
Periodic Table of Elements is attached on page 23.

<i>Untuk kegunaan pemeriksa</i>			
Kod Pemeriksa			
Bahagian	Soalan	Markah penuh	Markah diperolehi
A	1	5	
	2	5	
	3	6	
	4	7	
	5	8	
	6	9	
	7	10	
	8	10	
B	9	20	
	10	20	
C	11	20	
Jumlah		100	

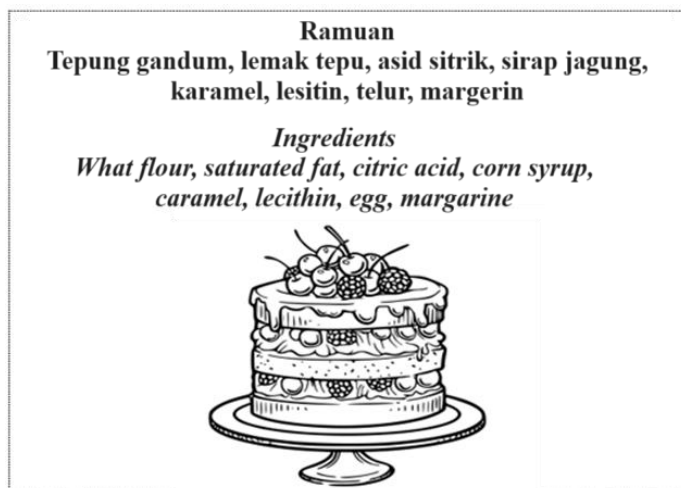
Kertas soalan ini mengandungi 25 halaman bercetak

Bahagian A
Section A

[60 markah]
[60 marks]

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

1. Rajah 1 menunjukkan ramuan bagi suatu kek.
Diagram 1 shows the ingredients of a cake.



Rajah 1/ Diagram 1

- (a) Lemak adalah satu bahan yang terdapat di dalam kek.
Nyatakan keadaan fizikal lemak tepu dalam suhu bilik.
Fat is an ingredient found in cake.
State the physical state of saturated fat at room temperature.
-
- [1 markah / mark]
- (b) Marjerin dihasilkan daripada lemak tak tepu yang ditukar menjadi lemak tepu melalui suatu tindak balas. Nyatakan nama tindak balas itu.
Margarine is produced from an unsaturated fat that is converted into saturated fat through a reaction. Name the reaction.
-
- [1 markah / mark]
- (c) Nyatakan jenis bahan tambah makanan bagi lesitin dan fungsinya
State the type of food additive for lecithin and its function

Jenis bahan tambah makanan:
Type of food additive
Fungsi :
Function

.....

[2 markah / marks]

- To ensure that the cake more delicious, a food additive is included in the cake. Write the name of the food additive.*

2. Rajah 2 menunjukkan sebahagian daripada Jadual Berkala Unsur. P, Q, R, S, T dan U bukan simbol sebenar unsur-unsur.

[illegible]Rajah 2 / *Diagram 2*

- What is the basic principle used in arranging the elements in the Periodic Table of Elements?*

[1 markah / 1 mark]

- State the position of element R in the Periodic Table of Elements.*

[1 markah / 1 mark]

- Arrange the atomic size of elements in Diagram 2 in descending order.

[1 markah / 1 mark]

- (d) Lukis susunan elektron bagi ion U.
Draw the electron arrangement of ion U.

[2 markah / 2 marks]

3. Metanol dengan formula CH_3OH ialah sebatian organik dengan takat lebur -97°C dan takat didih 65°C
Methanol with the formula CH_3OH is an organic compound with melting point of -97°C and boiling point of 65°C .

- (a) Nyatakan jenis zarah metanol.
State the type of particle of methanol.

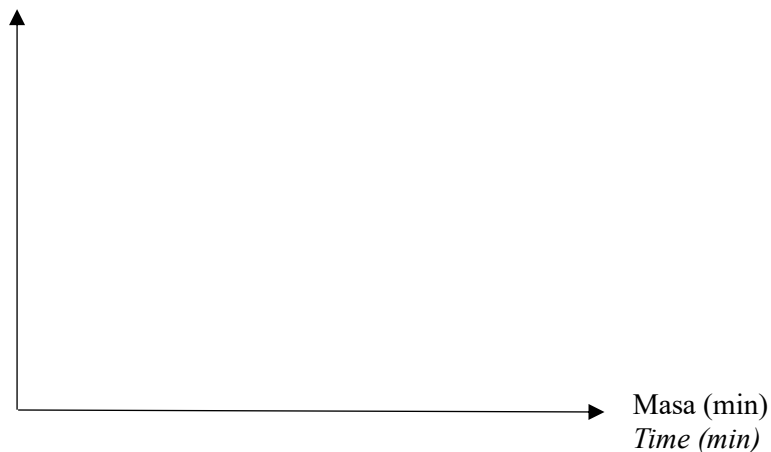
.....
[1 markah / 1 mark]

- (b) Nyatakan pergerakan zarah metanol pada 100°C .
State the movement of methanol particles at 100°C .

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

- (c) Lakarkan graf suhu melawan masa apabila metanol dipanaskan daripada suhu bilik kepada 100°C .
Sketch the graph of temperature against time when methanol is heated from room temperature to 100°C .

Suhu ($^\circ\text{C}$)
Temperature ($^\circ\text{C}$)



[2 markah / 2 marks]

- (d) (i) Takat didih dan takat lebur iodine ialah 184°C dan 114°C .
 Nadia menyejukkan iodine dari suhu 200°C ke suhu bilik. Namakan proses yang berlaku.
*Boiling and melting point of iodine is 184°C and 114°C .
 Nadia cools iodine from 200°C to the room temperature. Name the process involved.*

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

- (ii) Lukis susunan zarah iodine pada suhu 200°C .
Draw the arrangement of iodine particles at a temperature of 200°C .



[1 markah / 1 mark]

4. Nilon ialah sejenis polimer sintetik. Rajah 4.1 menunjukkan benang dan tali yang diperbuat daripada nilon.

Nylon is a type of synthetic polymer. Diagram 4.1 shows threads and ropes that are made from nylon.



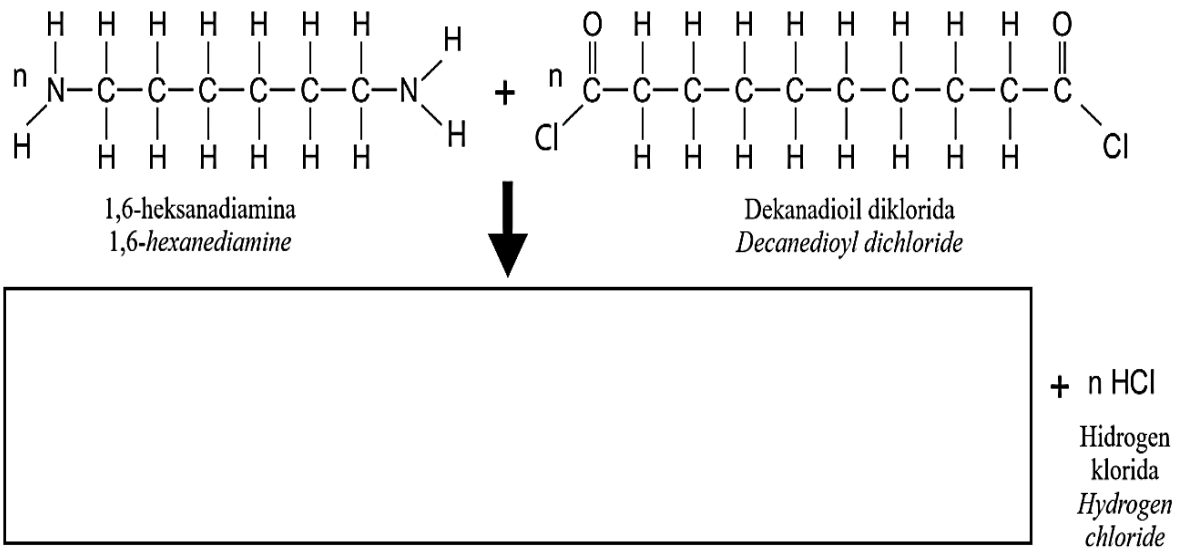
Rajah 4.1 / Diagram 4.1

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

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

- (b) Rajah 4.2 menunjukkan tindak balas pempolimeran untuk menghasilkan nilon.

Diagram 4.2 shows the polymerisation reaction to produce nylon.



- (i) Lukis formula struktur bagi nilon dalam kotak yang disediakan di atas.
Draw the structural formula of nylon in the box provided above. [1 markah / 1 mark]
- (ii) Nyatakan **satu** sifat nilon yang membolehkannya sesuai digunakan untuk membuat tali dan benang.
*State **one** property of nylon that makes it suitable to be used to make ropes and threads.*

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

- (c) Jadual 1 menunjukkan sifat-sifat bagi getah M dan getah N.

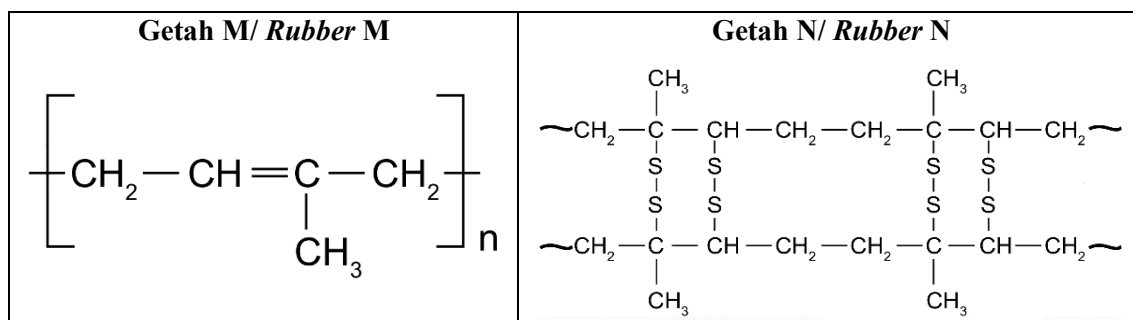
Table 1 shows the properties of rubber M and rubber N.

Getah M/ Rubber M	Getah N/ Rubber N
Kurang kenyal <i>Less elastic</i>	Lebih kenyal <i>More elastic</i>
Mudah dioksidakan <i>Easily oxidised</i>	Tidak mudah dioksidakan <i>Does not oxidised easily</i>

Jadual 1 / Table 1

Rajah 4.3 menunjukkan formula struktur bagi getah M dan getah N.

Diagram 4.3 shows the structural formula of rubber M and rubber N.



Rajah 4.3 / Diagram 4.3

Nyatakan **dua** sebab mengapa getah M mudah dioksidakan berbanding getah N.

*State **two** reasons why rubber M is easily oxidised compared to rubber N.*

.....

.....

.....

[2 markah / 2 marks]

- (d) Penggunaan barangan plastik yang tidak mampan dan pelupusan barangan plastik telah menyebabkan pencemaran terhadap alam sekitar seperti yang ditunjukkan dalam Rajah 4.4.
The unsustainable use and disposal of plastic products has caused pollution to the environment as shown in Diagram 4.4.



Rajah 4.4 / Diagram 4.4

Nyatakan **satu** kaedah dan terangkan bagaimana kaedah itu dapat mengurangkan masalah tersebut.

*State **one** method and explain how the method can reduce the problem.*

.....

.....

.....

[2 markah / 2 marks]

5. (a) Jadual 2 menunjukkan bahan buatan dalam industri.
Table 2 shows the manufactured substances in industry.

Jenis <i>Types</i>	Contoh <i>Examples</i>	Komponen <i>Components</i>
Kaca <i>Glass</i>	X	Silika <i>Silica</i>
Seramik termaju <i>Advanced ceramics</i>	Cakera pemotong <i>Cutting disc</i>	Silikon karbida <i>Silicon carbide</i>
Bahan komposit <i>Composite materials</i>	Gentian optik <i>Optical fibre</i>	Plastik, gentian kaca <i>Plastic, glass fibre</i>

Jadual 2 / Table 2

Namakan jenis kaca X.
Name the type of glass X.

.....

[1 markah / 1 mark]

- (b) Nyatakan dua sifat seramik termaju.
State two properties of advanced ceramics.

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

[2 markah / 2 marks]

- (c) Gentian optik telah menggantikan wayar kuprum bagi penghantaran maklumat dan data.
Optical fibre has replaced copper wire in the transmission of information and data.

- (i) Bagaimanakah gentian optik menghantar maklumat dan data?
How does optical fibres transmit information and data?

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

- (ii) Bandingkan penggunaan gentian optik dan wayar kuprum untuk membina rangkaian penyiaran TV kabel berdefinisi tinggi.
Compare the usage of optical fibres and copper wires in high definition cable TV network.

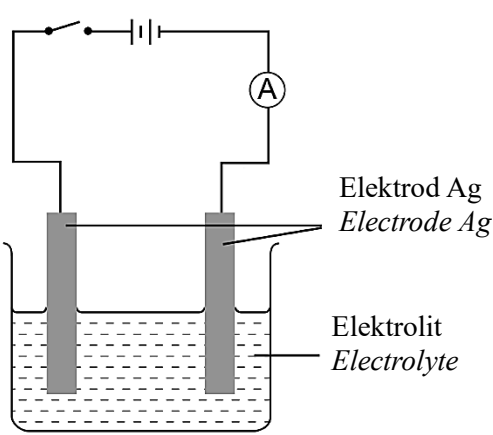
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[2 markah / 2 marks]

- (d) Ketulenan aloi emas diukur dalam unit karat (K). Emas 24 K merupakan emas tulen tanpa campuran logam lain manakala emas 18 K merupakan campuran yang terdiri daripada 18 bahagian emas dengan 6 bahagian logam kuprum mengikut jisim.
Hitungkan peratus komposisi mengikut jisim dalam 24 g emas 18 K
The purity of gold is measured in carats (K). 24 carat gold is pure gold without the addition of any other metal whereas 18 K gold is a mixture comprising of 18 units by mass of gold with 6 units by mass of copper.
Calculate the composition percentage by mass in 24 g of 18 K gold.

[2 markah / 2 marks]

6. (a) Jadual 3.1 menunjukkan susunan radas dan pemerhatian bagi satu proses elektrolisis.
Table 3.1 shows the apparatus set-up and observation for the electrolysis process.

Susunan radas <i>Apparatus set – up</i>	Pemerhatian <i>Observations</i>	
	Anod <i>Anode</i>	Elektrod menipis <i>Electrode becomes thinner</i>
	Katod <i>Cathode</i>	Pepejal kelabu berkilat terenap <i>Shiny grey solid is deposited</i>

Jadual 3.1/ Table 3.1

Jadual 3.2 menunjukkan nilai E^0 bagi beberapa sel setengah.
Table 3.2 shows the E^0 value for a few half-cells.

Tindak balas sel setengah <i>Half-cell equation</i>	Nilai E^0 (V) <i>E^0 value (V)</i>
$\text{Na}^+_{(\text{ak/aq})} + e \rightleftharpoons \text{Na}_{(\text{p/s})}$	-2.71
$2\text{H}^+_{(\text{ak/aq})} + 2e \rightleftharpoons \text{H}_{2(\text{g})}$	0.00
$\text{O}_{2(\text{g})} + 2\text{H}_2\text{O}_{(\text{ce/l})} + 4e \rightleftharpoons 4\text{OH}^-_{(\text{ak/aq})}$	+0.40
$\text{Ag}^+_{(\text{ak/aq})} + e \rightleftharpoons \text{Ag}_{(\text{p/s})}$	+0.80
$\text{NO}_3^-_{(\text{ak/aq})} + 4\text{H}^+_{(\text{ak/aq})} + 3e \rightleftharpoons \text{NO}_{(\text{g})} + 2\text{H}_2\text{O}_{(\text{ce/l})}$	+0.96
$\text{Cl}_{2(\text{g})} + 2e \rightleftharpoons 2\text{Cl}^-_{(\text{ak/aq})}$	+1.36

Jadual 3.2/ Table 3.2

- (i) Nilai keupayaan elektrod piawai, E^0 bagi sesuatu elektrod dapat diukur dengan menggandingkan elektrod tersebut dengan elektrod hidrogen piawai di bawah keadaan piawai. Nyatakan salah satu keadaan tersebut.
The value of standard electrode potential, E^0 of an electrode can be measured by pairing up the electrode to the standard hydrogen electrode under standard conditions. State one of the conditions.

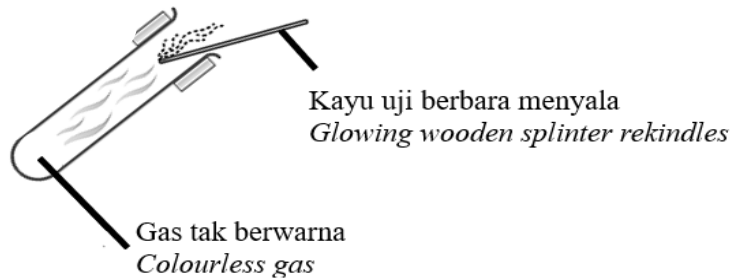
[1 markah/ mark]

- (ii) Berdasarkan pemerhatian dalam Jadual 3.1 dan nilai E^0 yang diberikan dalam Jadual 3.2, apakah elektrolit yang digunakan?
Based on the observation in Table 3.1 and E^0 value given in Table 3.2, what is the electrolyte used?

[1 markah/ mark]

- (iii) Eksperimen dalam Jadual 3.1 diulang dengan melakukan pengubahsuaian pada susunan radas dan gas yang terhasil di anod diuji seperti yang ditunjukkan dalam Rajah 6.1

Experiment in Table 3.1 is repeated by modifying the apparatus set-up and the gas collected at anode is tested as shown in Diagram 6.1.



Rajah 6.1/ Diagram 6.1

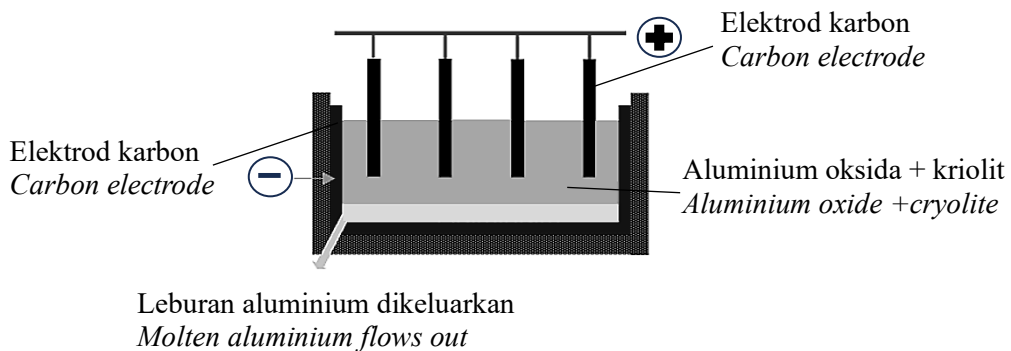
Sebagai seorang pelajar kimia, apakah pengubahsuaian yang telah dilakukan terhadap susunan radas dalam Jadual 3.1? Terangkan mengapa gas tersebut terhasil.

As a chemistry student, what modification that has been done to the apparatus set-up in Table 3.1? Explain why the gas is produced.

.....

[2 markah/ marks]

- (b) Rajah 6.2 menunjukkan proses pengekstrakan aluminium daripada aluminium oksida.
Diagram 6.2 shows the extraction process of aluminium from aluminium oxide.



Rajah 6.2/ Diagram 6.2

Adakah proses pengekstrakan tersebut sesuai dijalankan dalam industri? Wajarkan.

Is the extraction process suitable to be run in industry? Justify.

.....

[2 markah/ marks]

- (c) Hilmi mendapati kunci besinya telah berkarat. Dengan menggunakan pengetahuan tentang elektrolisis:

Hilmi found that his iron key rusted. By using the knowledge of electrolysis:

- (i) Cadangkan nama proses untuk menjadikan kunci besi tersebut lebih menarik dan tahan karat.

Suggest the name of the process to make the iron key looks more attractive and resistance to corrosion.

.....

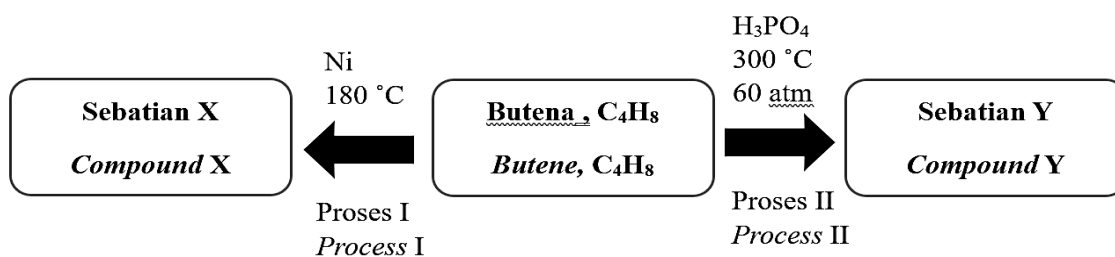
[1 markah/ mark]

- (ii) Lukiskan susunan radas yang sesuai bagi membantu Hilmi menjalankan proses tersebut di dalam makmal.

Draw a suitable apparatus set-up to help Hilmi carry out the process in the lab.

[2 markah/ marks]

7.



Rajah 7/ Diagram 7

Rajah 7 menunjukkan satu carta alir bagi satu siri perubahan yang berlaku ke atas beberapa siri homolog.

Diagram 7 shows a flow chart of a change series that happens to some homologous series.

- (a) (i) Apakah kumpulan berfungsi bagi butena?

What is the functional group of butene?

.....

[1 markah / mark]

- (ii) Lukis formula struktur bagi salah satu isomer bagi butena.
Draw structural formula for one isomer of butene.

[1 markah / mark]

- (iii) Proses I menghasilkan hidrokarbon tepu daripada butena.
Nyatakan formula am bagi sebatian X.
Process I produced saturated hydrocarbon from butene.
State the general formula of compound X.

.....
[1 markah / mark]

- (b) Sebatian Y bertindak balas dengan asid etanoik menghasilkan satu sebatian yang berbau manis seperti pisang atau epal.
Compound Y reacts with ethanoic acid to form a compound that has a sweet smell similar to banana or apple.

Berdasarkan kenyataan di atas,
Based on the description above,

- (i) Nyatakan nama sebatian Y
State the name of compound Y

.....
[1 markah / mark]

- (ii) Lukis formula struktur dan namakan sebatian berbau manis yang terhasil.
Draw the formula structure and name the sweet smell compound formed.

[2 markah / marks]



- (c) Butena dan sebatian X terbakar lengkap dalam oksigen menghasilkan gas karbon dioksida dan air. Namun begitu kejelagaan setiap pembakaran adalah berbeza disebabkan oleh peratus karbon per molekul yang berbeza.

Butene and compound X are completely burnt in oxygen and produce carbon dioxide gas and water. But every combustion produced a different level of sootiness due to the different percentage of carbon per molecule.

Berdasarkan pernyataan di atas,

Based on the description above,

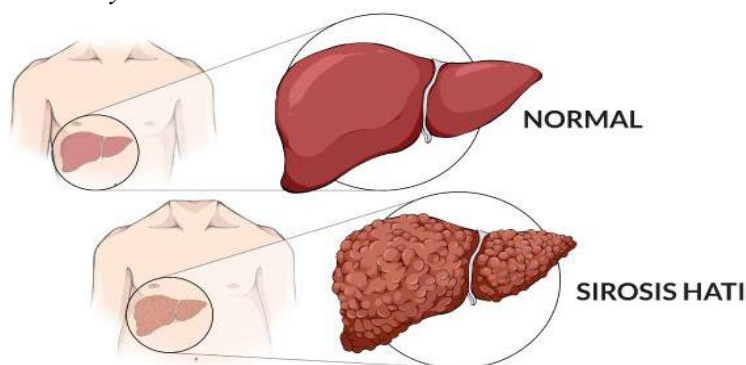
Hitung peratus karbon per molekul bagi butena dan sebatian X dan nyatakan bahan manakah lebih berjelaga.

Calculate the percentage of carbon per molecule for butene and compound X and state which substance is sootier.

[3 markah / marks]

- (d) Rajah 7.2 menunjukkan hati yang sihat dan hati yang mengalami sirosis akibat penyalahgunaan alkohol.

Diagram 7.2 shows a healthy liver and a liver with cirrhosis due to the alcohol abuse.



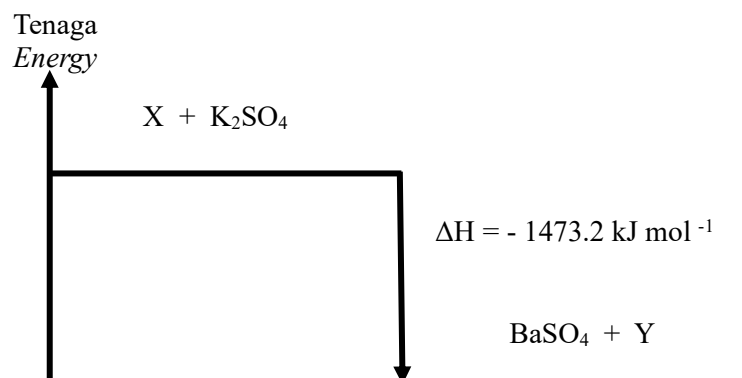
Rajah 7.2/ Diagram 7.2

Nyatakan satu kesan lain penyalahgunaan alkohol.

State another effect of alcohol abuse.

.....
[1 markah / mark]

8. Rajah 8 menunjukkan gambar rajah aras tenaga bagi pemendakan barium sulfat, BaSO₄.
 Diagram 8 shows the energy level diagram for the precipitation of barium sulphate, BaSO₄.



Rajah 8/ Diagram 8

- (a) (i) Apakah maksud haba pemendakan?
 What is the meaning of heat of precipitation?

.....

 [1 markah/ mark]

- (ii) Nyatakan satu maklumat yang boleh diperolehi daripada gambar rajah aras tenaga yang ditunjukkan dalam Rajah 8.
 State one information that can be obtained from the energy level diagram shown in Diagram 8.

.....
 [1 markah/ mark]

- (iii) Cadangkan nama larutan X.
 Suggest the name of solution X.

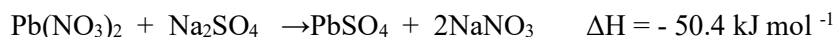
.....
 [1 markah/ mark]

- (iv) Berdasarkan jawapan anda di 8(a)(iii), tulis persamaan ion bagi tindak balas ini.
 Based on your answer in 8(a)(iii), write the ionic equation for this reaction.

.....
 [1 markah/ mark]

- (b) (i) Persamaan termokimia di bawah mewakili tindak balas antara larutan plumbum(II) nitrat dengan larutan natrium sulfat.

The thermochemical equation below represents the reaction between lead (II) nitrate solution and sodium sulphate solution.



Hitungkan kenaikan suhu apabila 25 cm³ plumbum(II) nitrat 1 mol dm⁻³ ditambah kepada 25 cm³ larutan natrium sulfat 1 mol dm⁻³.

[Muatan haba tentu larutan = 4.2 J g⁻¹ °C⁻¹, ketumpatan larutan = 1 g cm⁻³]

Calculate the increase in temperature when 25 cm³ of 1 mol dm⁻³ lead (II) nitrate solution is added to 25 cm³ of 1 mol dm⁻³ sodium sulphate solution.

[Specific heat capacity of solution = 4.2 J g⁻¹ °C⁻¹, density of solution = 1 g cm⁻³]

[3 markah/ marks]

- (ii) Eksperimen diulang dengan menggunakan isipadu larutan yang sama seperti dalam 8(b)(i) dan perubahan suhu, θ yang didapati berkurang kepada separuh. Cadangkan bagaimana anda boleh mendapatkan perubahan suhu baharu, θ tersebut.

Experiment is repeated by using the same volume of solution as in 8(b)(i) and the temperature change, obtained is reduced by half. Suggest how you can obtain the new temperature change, θ .

.....
.....

[1 markah/ mark]

- (c) Jadual 4 menunjukkan nilai bahan api metana dan oktana.

Table 4 shows fuel value of methane and octane.

Jenis bahan api <i>Type of fuel</i>	Metana <i>Methane</i>	Oktana <i>Octane</i>
Nilai bahan api (kJ g ⁻¹) <i>Fuel value (kJ g⁻¹)</i>	27.0	89.0
Takat didih (° C) <i>Boiling point (° C)</i>	- 161.6	125.6
Keadaan fizik pada suhu bilik <i>Physical state at room temperature</i>	Gas <i>Gas</i>	Cecair <i>Liquid</i>
Harga per liter (RM) <i>Price per litre (RM)</i>	2.05	4.84

Jadual 4/ Table 4

Bahan api manakah yang anda pilih untuk memasak dan wajarkan pilihan anda.

Which fuel would you choose for cooking and justify your choice.

.....

.....

[2 markah/ marks]

Bahagian B

Section B

[20 markah] [20 marks]

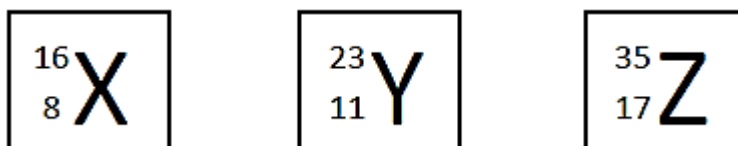
Jawab mana-mana **satu** soalan daripada bahagian ini.

*Answer any **one** question in this section*

9. (a) Apakah maksud ikatan logam?
What is the meaning of metal bonds?

[1 markah/1 marks]

- (b) Simbol atom bagi unsur X, Y dan Z ditunjukkan dalam Rajah 9.
The atomic symbols for the elements X, Y and Z are shown in Figure 9.



Rajah 9/ Diagram 9

- (i) Tuliskan susunan elektron bagi
- Atom X
 - Ion Z

Write the electron arrangement of

- Atom X
- Ion Z

[2 markah/2 marks]

- (ii) Y dan X boleh membentuk satu sebatian.
Huraikan bagaimana sebatian itu terbentuk dan lukiskan susunan elektron bagi sebatian tersebut.
Y and X can form a compound.
Describe how the compound is formed and draw the electron arrangement for the compound formed

[7 markah/ 7 marks]

- (c) Zamani dan rakan-rakannya menjalankan eksperimen bagi mengkaji sifat sebatian ion dan sebatian kovalen. Jadual 5 menunjukkan keputusan eksperimen tersebut
Zamani and his friends conducted an experiment to study the properties of ionic and covalent compounds. Table 5 shows the result of the experiment

Sebatian Compound	Keadaan Fizik Physical statement	Kekonduksian Elektrik Electrical conduction	Takat Lebur Melting point °C
Plumbum(II) bromida <i>Lead(II) bromide</i>	Pepejal <i>Solid</i>	Mentol tidak menyala <i>Bulb does not light up</i>	373 °C
	Leburan <i>Molten</i>	Mentol menyala <i>Bulb light up</i>	
Naftalena <i>Naphtalene</i>	Pepejal <i>Solid</i>	Mentol tidak menyala <i>Bulb does not light up</i>	80 °C
	Leburan <i>Molten</i>	Mentol tidak menyala <i>Bulb does not light up</i>	

Jadual 5/ Diagram 5

Berdasarkan maklumat di atas, huraikan perbezaan pada keputusan eksperimen tersebut.
Based on the above information, describe the differences in the results of the experiment.

[10 markah /10 marks]

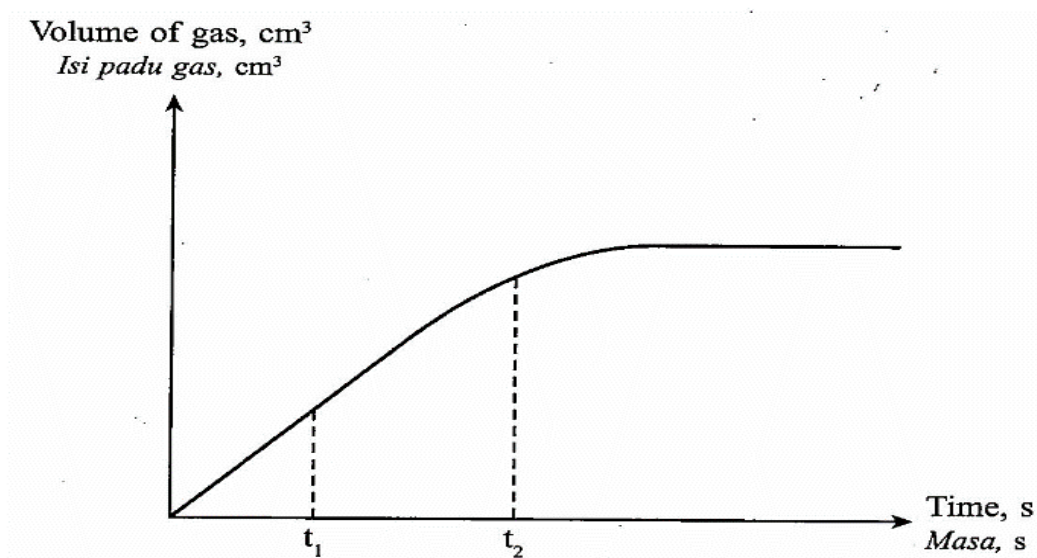
10. (a) Aiman menjalankan eksperimen untuk mengkaji penguraian hidrogen peroksida. Dia merekodkan isi padu gas oksigen yang terbebas. Pada minit yang ke-5, dia menambahkan satu spatula serbuk hitam ke dalam larutan hidrogen peroksida. Serbuk hitam yang digunakan dapat meningkatkan kadar penguraian hidrogen peroksida. Kenalpasti serbuk hitam itu dan nyatakan fungsi serbuk hitam yang digunakan.

Aiman conducted an experiment to study the decomposition of hydrogen peroxide. He records the volume of oxygen gas released. At the 5th minute, he adds one spatula full of black powder into the hydrogen peroxide solution. Black powder used is able to increase the rate of decomposition of hydrogen peroxide. Identify the black powder and state the function of the black powder used

[2 markah/ 2 marks]

- (b) Rajah 10 menunjukkan graf isi padu gas melawan masa bagi tindak balas antara magnesium karbonat berlebihan dan asid hidroklorik.

Diagram 10 shows a graph of volume of gas against time for the reaction between excess magnesium carbonate and hydrochloric acid.



Rajah 10/ Diagram 10

Bandingkan kadar tindak balas pada t_1 dan t_2

Berdasarkan graf, terangkan jawapan anda.

Compare the rate of reaction at t_1 and t_2 .

Based on the graph, explain your answer.

[3 markah/ 3 marks]

- (c) Tiga eksperimen dijalankan untuk mengkaji faktor yang mempengaruhi kadar tindak balas. Jadual 6 menunjukkan bahan tindak balas dan suhu asid hidroklorik yang digunakan
Three experiments are carried out to investigate the factors that affecting the rate of reaction. Table 6 shows the reactants and the temperature of hydrochloric acid used.

Eksperimen <i>Experiment</i>	Bahan tindak balas <i>Reactants</i>	Suhu asid hidroklorik (°C) <i>Temperature of hydrochloric acid (°C)</i>
I	Serpihan marmar berlebihan + 100 cm ³ asid hidroklorik 0.5 mol dm ⁻³ <i>Excess marble chips + 100 cm³ of 0.5 mol dm⁻³ hydrochloric acid</i>	30
II	Serpihan marmar berlebihan + 100 cm ³ asid hidroklorik 1.0 mol dm ⁻³ <i>Excess marble chips + 100 cm³ of 1.0 mol dm⁻³ hydrochloric acid</i>	30
III	Serpihan marmar berlebihan + 100 cm ³ asid hidroklorik 0.5 mol dm ⁻³ <i>Excess marble chips + 100 cm³ of 0.5 mol dm⁻³ hydrochloric acid</i>	50

Jadual 6/ Table 6

- (i) Tulis persamaan kimia yang seimbang bagi tindak balas dalam eksperimen I.
 Hitungkan isi pada gas yang dibebaskan.
Write a balance chemical equation for the reaction in Experiment I. Calculate the volume of the gas released.

[Isi padu molar gas pada keadaan bilik = 24.0 dm³ mol⁻¹]
[Molar volume of gas at room conditions = 24.0 dm³ mol⁻¹]

[5 markah/ 5 marks]

- (ii) Bandingkan kadar tindak balas antara:
Compare the rate of reaction between:

Eksperimen I dan II
Experiment I and II

Eksperimen I dan III
Experiment I and III

Terangkan jawapan anda dengan menggunakan Teori Perlanggaran
Explain your answer by using Collision Theory.

[10 markah/ 10 marks]

Bahagian C

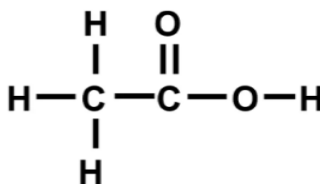
Section C

[20 markah] [20 marks]

Jawab **semua** soalan dalam bahagian ini.

*Answer **all** questions in this section.*

11. (a) Rajah 11. 1 menunjukkan formula struktur bagi asid etanoik.
Diagram 11.1 shows the structural formula of ethanoic acid.



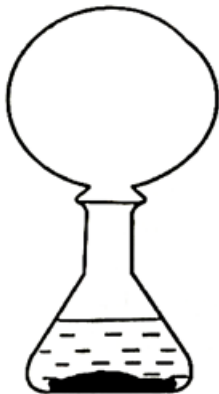
Rajah 11.1 / Diagram 11.1

- (i) Nyatakan kebesan asid etanoik dan terangkan.

State the basicity of ethanoic acid and explain.

[2 markah / 2 marks]

- (ii)

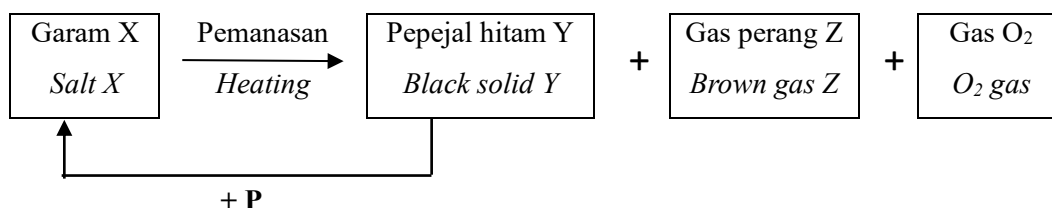
Eksperimen I / Experiment I	Eksperimen II / Experiment II
	
Asid etanoik glasial, CH_3COOH + Kalsium karbonat, CaCO_3 <i>Glacial ethanoic acid, CH_3COOH + calcium carbonate, CaCO_3</i>	Larutan asid etanoik, CH_3COOH + Kalsium karbonat, CaCO_3 <i>Ethanoic acid solution, CH_3COOH + Calcium carbonate, CaCO_3</i>

Rajah 11.2 / Diagram 11.2

Berdasarkan Rajah 11.2, terangkan perbezaan pemerhatian antara Eksperimen I dan II.
Based on Diagram 11.2, explain the differences in the observation between Experiment I and II.

[3 markah / 3 marks]

- (b) Rajah 11.3 menunjukkan satu carta alir tindak balas yang berlaku ke atas garam X.
Diagram 11.3 shows a flow chart of reaction that occurs on salt X.



Rajah 11.3 / Diagram 11.3

- (i) Berdasarkan Rajah 11.3, garam X boleh disediakan daripada tindak balas antara pepejal hitam Y dengan bahan P.

Kenalpasti garam X, pepejal hitam Y, gas perang Z dan namakan bahan P.

Based on Diagram 11.3, salt X can be prepared by the reaction between black solid Y and substance P.

Identify salt X, black solid Y, brown gas Z and name the substance P.

[4 markah / 4 marks]

- (ii) 9.4g garam X dipanaskan dan menghasilkan bahan Y, gas Z dan gas oksigen.
 Tulis persamaan kimia bagi tindak balas tersebut dan kira isipadu gas Z yang terhasil pada keadaan bilik.

[Jisim molar X = 188 g mol^{-1} ; 1 mol gas menempati 24 dm^3 pada keadaan bilik]

9.4g of X salt is heated and produced substances Y, Z gas and oxygen gas.

Write the chemical equation for the reaction and calculate the volume of Z gas produced at room temperature.

[Molar mass of X = 188 g mol^{-1} ; 1 mol of gas occupied 24 dm^3 at room condition]

[5 markah / 5 marks]

- (c) Rajah 11.4 menunjukkan artikel mengenai penggunaan asid hidroklorik dalam proses perlombongan logam.

Diagram 11.4 shows an article about the usage of hydrochloric acid in the process of metal mining.

Dalam perlombongan logam, asid hidroklorik digunakan untuk melarutkan mineral kuprum(II) oksida. Kuprum akan diekstrak daripada kuprum(II) klorida. Asid hidroklorik yang berlebihan perlu dirawat sebelum dilepaskan sebagai air sisa buangan kilang.

In metal mining, hydrochloric acid is used to leach copper (II) oxide minerals. Copper will be extracted from copper (II) chloride. Excess hydrochloric acid needs to be treated before it is discharged as the waste water from the factory.

Rajah 11.4 / Diagram 11.4

Dengan menggunakan pengetahuan anda tentang sifat kimia asid, cadangkan bahan kimia yang digunakan untuk merawat sisa bahan buangan tersebut dan namakan tindak balas yang terlibat. Tuliskan persamaan ion untuk mewakili tindak balas yang berlaku dan huraikan satu ujian kimia untuk mengesahkan ketidakhadiran asid di dalam air sisa buangan.

By using your knowledge on chemical properties of acid, suggest a chemical substance used to treat the waste and name the reaction involved.

Include an ionic equation to represent the reaction that occurred and describe a chemical test to verify the absence of acid in the waste water.

[6 markah / 6 marks]

KERTAS SOALAN TAMAT

END OF QUESTIONS PAPER

JADUAL BERKALA UNSUR

1	H
	Hidrogen
1	

10	Ne
	Neon
20	

Nombor proton
Simbol
Nama unsur
Jisim atom relatif

3	Li	4	Be
	Litium		Berilium
7		9	
11	Na	12	Mg
	Natrium		Magnesium
23		24	

H Hidrogen 1		10 Ne Neon 20 Nombor proton Simbol Nama unsur Jisim atom relatif										2 He Helium 4																			
3 Li Litium 7	4 Be Berilium 9	5 B Boron 11	6 C Karbon 12	7 N Nitrogen 14	8 O Oksigen 16	9 F Flourin 19	10 Ne Neon 20																								
11 Na Natrium 23	12 Mg Magnesium 24	13 Al Aluminium 27	14 Si Silikon 28	15 P Fosforus 31	16 S Sulfur 32	17 Cl Klorin 35	18 Ar Argon 40																								
19 K Kalium 39	20 Ca Kalsium 40	21 Sc Skandium 45	22 Ti Titanium 48	23 V Vanadium 51	24 Cr Kromium 52	25 Mn Mangan 55	26 Fe Feruim 56	27 Co Kobalt 59	28 Ni Nikel 59	29 Cu Kuprum 64	30 Zn Zink 65	31 Ga Galium 70	32 Ge Germanium 73	33 As Arsenik 75	34 Se Selenium 79	35 Br Bromin 80	36 Kr Kripton 84														
37 Rb Rubidium 86	38 Sr Strontium 88	39 Y Itrium 89	40 Zr Zirkonium 91	41 Nb Niobium 93	42 Mo Molibdenum 96	43 Tc Teknetium 98	44 Ru Rutenium 101	45 Rh Rodium 103	46 Pd Paladium 106	47 Ag Argentum 108	48 Cd Kadmium 112	49 In Indium 115	50 Sn Stanium 119	51 Sb Antimoni 122	52 Te Telurium 128	53 I Iodin 127	54 Xe Xenon 131														
55 Cs Sesium 133	56 Ba Barium 137	57 La Lantanum 139	58 Ce Selandium 140	59 Pr Praseodimium 141	60 Nd Neodimium 144	61 Pm Prometium 145	62 Sm Samarium 150	63 Eu Europium 152	64 Gd Gadolinium 157	65 Tb Terbium 159	66 Dy Dysprosium 163	67 Ho Holmium 165	68 Er Erbium 167	69 Tm Thulium 169	70 Yb Ytterbium 173	71 Lu Lutetium 175	72 Hf Hafnium 179	73 Ta Tantalum 181	74 W Tungsten 184	75 Re Rhenium 186	76 Os Osmium 190	77 Ir Iridium 192	78 Pt Platinum 195	79 Au Aurum 197	80 Hg Mercuri 201	81 Tl Taliun 204	82 Pb Plumbum 207	83 Bi Bismut 209	84 Po Polonium 210	85 At Astatin 210	86 Rn Radon 222