Chem Quest

2025

TINGKATAN 5

Jom A+ Kimia

SPM 2024

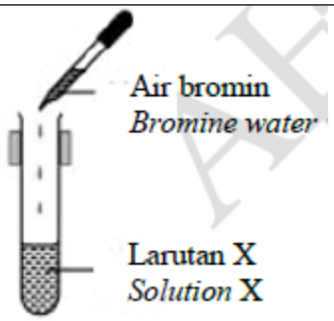
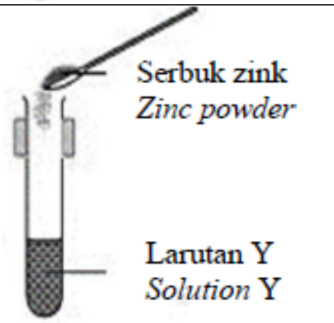
PERCUMA - TIDAK DIJUAL

[Johor – Batu Pahat – Muar – Pasir Gudang]
[Kedah – Kelantan – Negeri Sembilan]
[Perak - Pahang – Perlis – Putrajaya]
[Selangor- Terengganu MPP3]
[JUJ- Melaka – Sarawak = 19Set]

[Negeri–Daerah–Sekolah]

Nama : ..... Kelas : .....

[2024 JUJ Set2-05] Rajah 5.1 menunjukkan keputusan ujian kimia bagi dua set eksperimen. Tindak balas ini merupakan contoh tindak balas redoks.
Diagram 5.1 shows the result of the chemical test for two sets of experiment. This reaction is a sample of redox reaction.

Set *Set*	Bahan tindak balas *Reactants*	Pemerhatian *Observation*
I		Warna larutan X bertukar daripada hijau kepada perang. *The colour of solution X changes from green to brown.*
II		Warna larutan Y bertukar daripada perang kepada hijau. *The colour of solution Y changes from brown to green.*

(a) Apakah maksud tindak balas redoks?
What is meant by redox reaction?

.....

..... [1M]

(b) Berdasarkan Set I,/ *Based on Set I,*

(i) Cadangkan larutan X./ *Suggest solution X.*

..... [1M]

(ii) Tulis setengah persamaan bagi pengoksidaan dan penurunan.
Write half equation for oxidation and reduction.

Pengoksidaan : .....
Oxidation

Penurunan : .....
Reduction

[2M]

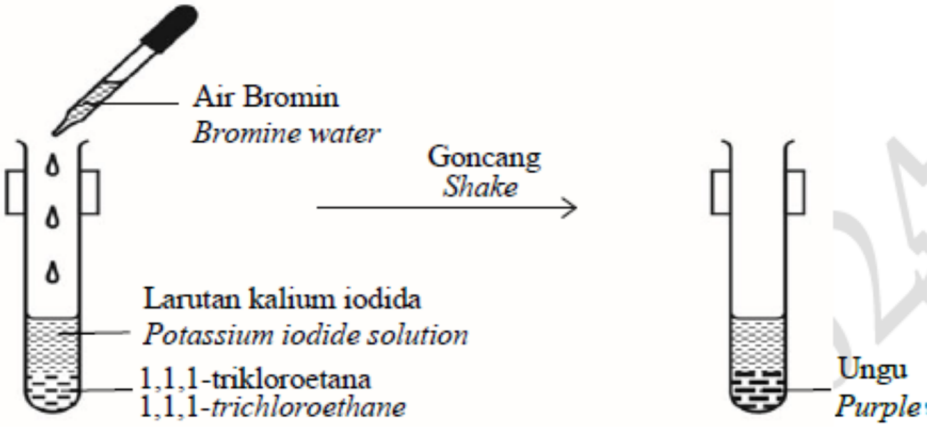
(c) Berdasarkan pemerhatian di Set II, terangkan secara ringkas ujian pengesahan bagi hasil tindak balas yang terbentuk.
Based on observation in Set II, describe briefly a confirmatory test for the product formed.

.....

.....

..... [2M]

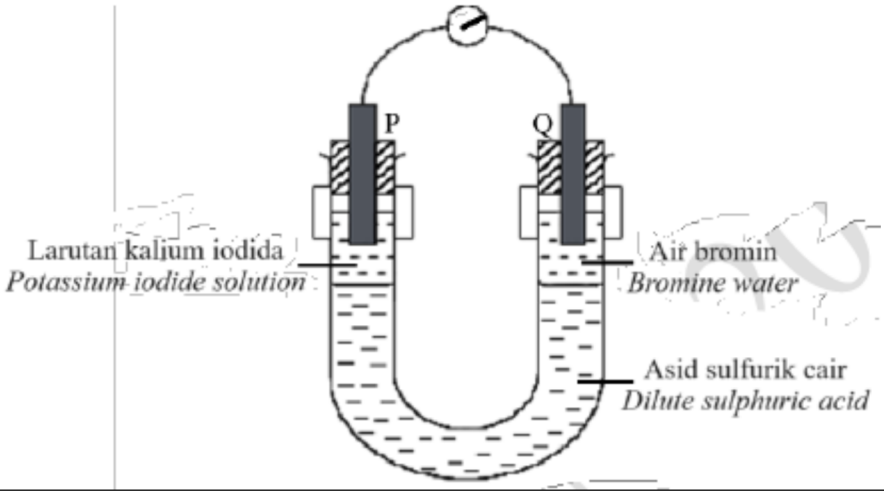
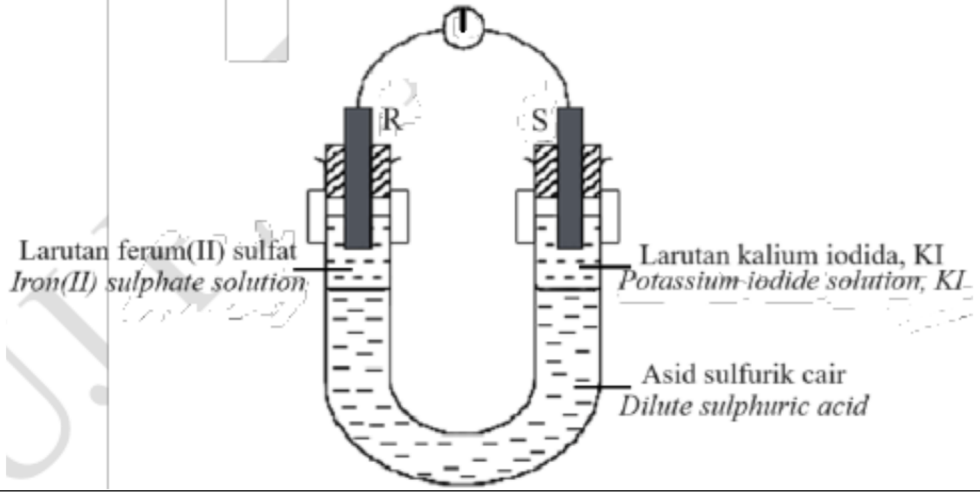
(d) Rajah 5.2 menunjukkan susunan radas untuk mengkaji penyesaran halogen daripada larutan halidanya oleh air bromin.
Diagram 5.2 shows an apparatus set-up to investigate the displacement of halogen from its halide solution by bromine water.



Tuliskan persamaan ion bagi tindak balas yang berlaku.
Write the ionic equation for the reaction occurs.

..... [2M]

[2024 JUJ Set1-07] (a) Rajah 7 menunjukkan susunan radas bagi 2 set eksperimen untuk mengkaji pemindahan elektron pada suatu jarak dalam tindak balas redoks.
Diagram 7 shows the apparatus set-up for 2 set of experiments to investigate the electron transfer at a distance in a redox reaction.

Set I	Jarum galvanometer terpesong *Galvanometer needle deflected* 
Set II	Jarum galvanometer tidak terpesong *Galvanometer needle not deflected* 

(i) Apakah fungsi asid sulfurik cair?
What is the function of dilute sulphuric acid?

..... [1M]

(ii) Terangkan perbezaan pemerhatian dalam Set I dan Set II.
Explain the differences in observation in Set I and Set II.

.....

.....

.....

.....

..... [3M]

(iii) Tulis setengah persamaan bagi tindak balas yang berlaku di terminal negatif dan terminal positif bagi Set I
Write half equation for reaction that occur at negative terminal and positive terminal for Set I.

Terminal negative : .....
Negative terminal

Terminal positif : .....
Positive terminal

[2M]

(iv) Nyatakan perubahan nombor pengoksidaan bagi air bromin dalam Set I
State the change in oxidation number of bromine water in Set I.

..... [1M]

(v) Cadangkan bahan lain yang boleh menggantikan larutan kalium iodida dalam Set II bagi membolehkan jarum galvanometer terpesong.
Suggest other substance that can replace potassium iodide solution in Set II to ensure the deflection of galvanometer needle.

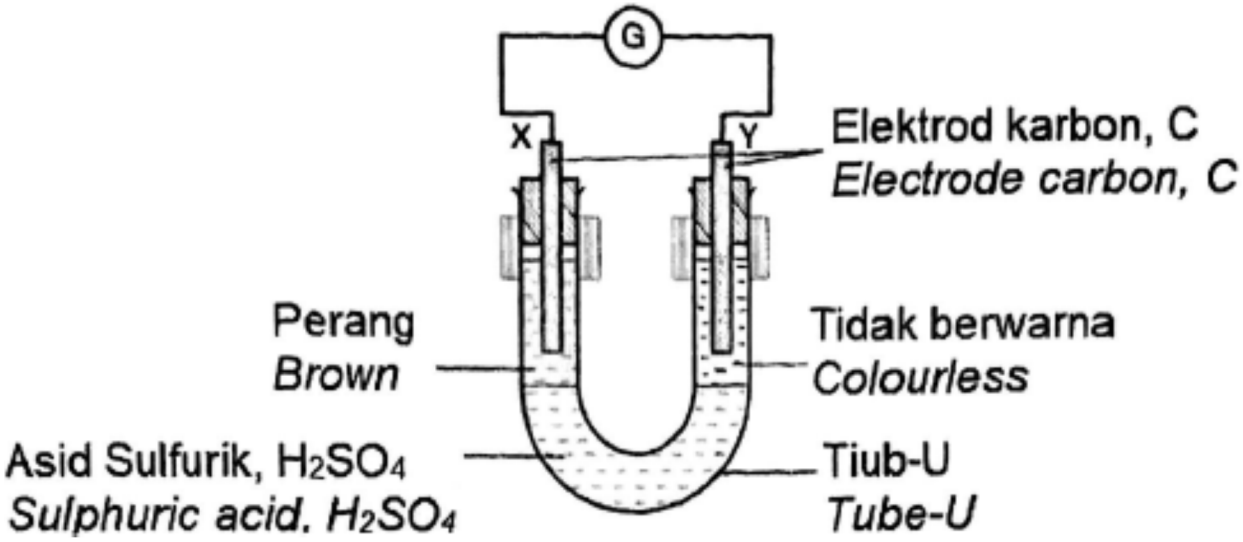
..... [1M]

(b) Siti bersiar-siar di pasar malam dan tertarik dengan jualan barangan perhiasan wanita yang diperbuat daripada besi. Adakah Siti patut membeli barang perhiasan tersebut? Wajarkan jawapan anda.
Siti walk around at night market and was attracted to the sale of women's jewellery made of iron. Should Siti buy the jewellery? Justify your answer.

.....

..... [2M]

[2024 Johor-06] Rajah 6 menunjukkan pemerhatian warna bahan yang terdapat pada kedua- dua lengan tiub-U untuk mengkaji pemindahan elektron dalam suatu jarak yang telah dijalankan selepas 30 minit.
Diagram 6 shows the observation of the colour of the material found on both arms of the U-tube to study electron transfer over a distance was carried out after 30 minutes.



Jadual 3 menunjukkan maklumat bahan yang digunakan semasa eksperimen tersebut.
Table 3 shows information about the materials used during the experiment.

Elektrod *Electrode*	Bahan *Substance*
X	Larutan ferum(II) sulfat *Iron(II) sulphate solution*
Y	Larutan kalium manganat(VII) berasid *Acidified potassium manganate(VII) solution*

(a) Nyatakan warna larutan kalium manganat(VII) berasid.
State the colour of acidified potassium manganate(VII) solution.

..... [1M]

(b) Nyatakan pemerhatian yang berlaku pada elektrod X.
State the observation that occur at electrode X.

..... [1M]

(c) Tentukan nombor pengoksidaan mangan dalam ion MnO_4^-
Determine the oxidation number of manganese in the MnO_4^- ion.

[2M]

(d) Tuliskan persamaan ion bagi tindak balas yang berlaku pada elektrod Y.
Write the ionic equation for the reaction that occurs at Y electrode.

..... [2M]

(e) Namakan bahan reagen lain yang boleh digunakan untuk mengantikan larutan ferum(II) sulfat supaya hasil yang sama berlaku pada elekrod X dan tuliskan persamaan ion keseluruhan bagi tindak balas tersebut.

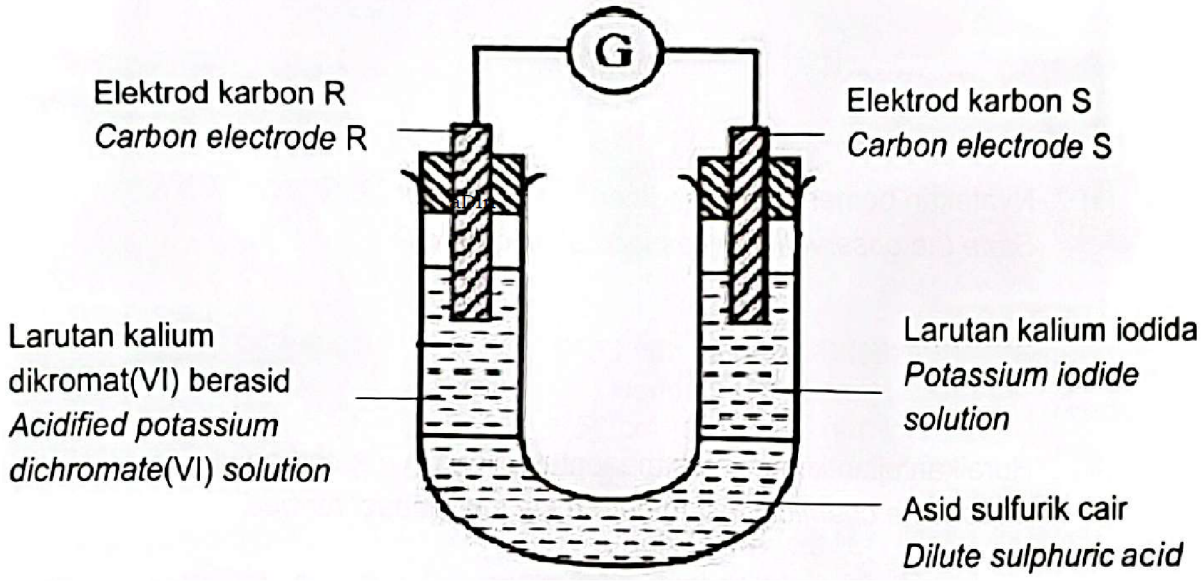
Name 2 reagent that can be used to replace the iron(ll) sulphate solution so that the same result can be produced at electrode X and write the overall ionic equation for the reaction.

.....

.....

..... [3M]

[2024 – Terengganu-07] Rajah 7 menunjukkan susunan radas eksperimen untuk menyiasat pemindahan elektron pada suatu jarak.
Diagram 7 shows the apparatus set-up for an experiment to investigate the transfer of electron at a distance.



(a) Nyatakan fungsi asid sulfurik cair

.....
[1 markah]

(b) Merujuk kepada tindak balas yang berlaku di elektrod R,
Refering to the reaction takes place at electrode R,

(i) Nyatakan perubahan warna bagi larutan kalium dikromat(VI) berasid.
State the colour change of acidified potassium dichromate (VI) solution.

..... [1M]

(ii) Nyatakan jenis tindak balas yang berlaku.
State the type of reaction occurred.

..... [1M]

(iii) Hitung nombor pengoksidaan kromium dalam ion dikromat(VI), $Cr_2O_7^{2-}$.
Calculate the oxidation number of chromium in dichromate (VI) ion, $Cr_2O_7^{2-}$.

[2M]

(c) Merujuk kepada tindak balas yang berlaku di elektrod S,
Refering to the reaction takes place at electrode S,

(i) Tulis setengah persamaan bagi tindak balas yang berlaku.
Write half equation for the reaction.

..... [1M]

(ii) Nyatakan pemerhatian yang berlaku di elektrod S.
State the observation take place at electrode S.

..... [1M]

(iii) Huraikan ujian kimia untuk menentukan hasil yang terbentuk
Describe a chemical test to determine the product formed.

.....

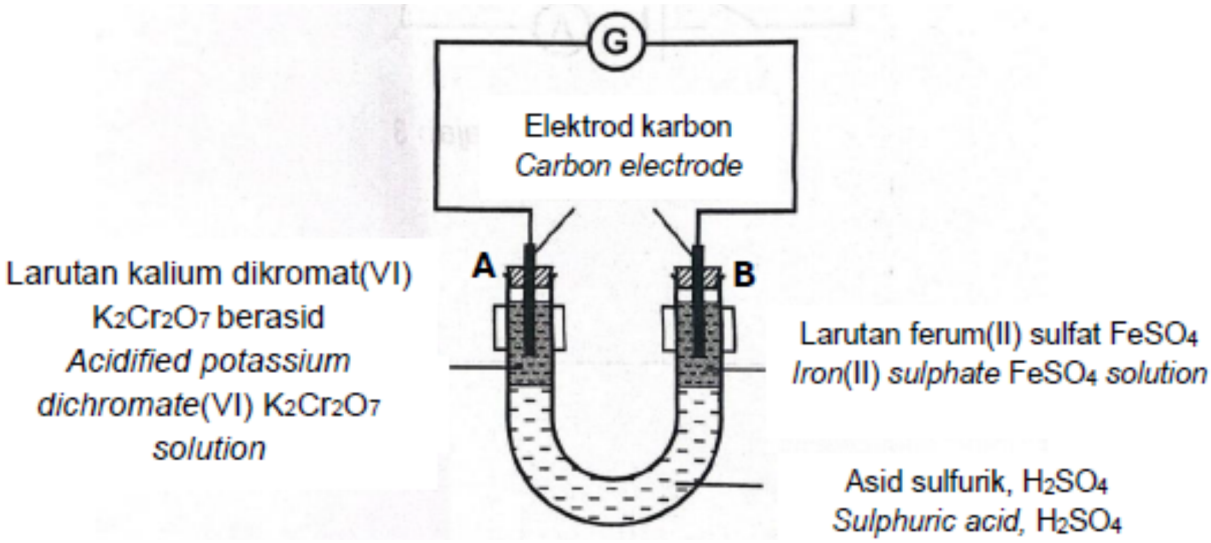
.....

..... [2M]

(d) Cadangkan satu bahan yang dapat menggantikan larutan kalium dikromat(VI) untuk mendapatkan hasil yang sama di elektrod S.
Suggest one substance that can replace acidified potassium dichromate(VI) solution in order to get the same product at electrode S.

..... [1M]

[2024-Kedah-07] Rajah 7 menunjukkan tiub-U berisi larutan ferum(II) sulfat, $FeSO_4$ dan larutan kalium dikromat(VI), $K_2Cr_2O_7$ berasid.
Diagram 7 shows a U-tube consisting iron(II) sulphate, $FeSO_4$ solution and acidifiedpotassium dichromate (VI), $K_2Cr_2O_7$ solution.



Berdasarkan Rajah 7,/ *Based on Diagram 7,*

(a) (i) Kenal pasti anod dan katod/ *Identify anode and cathode*

Anod / *Anode* : .....

Katod / *Cathode* : .....
[2M]

(ii) Tuliskan persamaan setengah untuk menyokong jawapan anda di 7(a)(i)
Write a half equation to support your answer in 7(a)(i)

Anod / *Anode* : .....

Katod / *Cathode* : .....
[3M]

(b) Kenal pasti agen penurunan dan cadangkan bahan lain yang boleh menggantikan agen penurunan tersebut.
Identify the reducing agent and suggest another substance that can replace the reducing agent.

.....

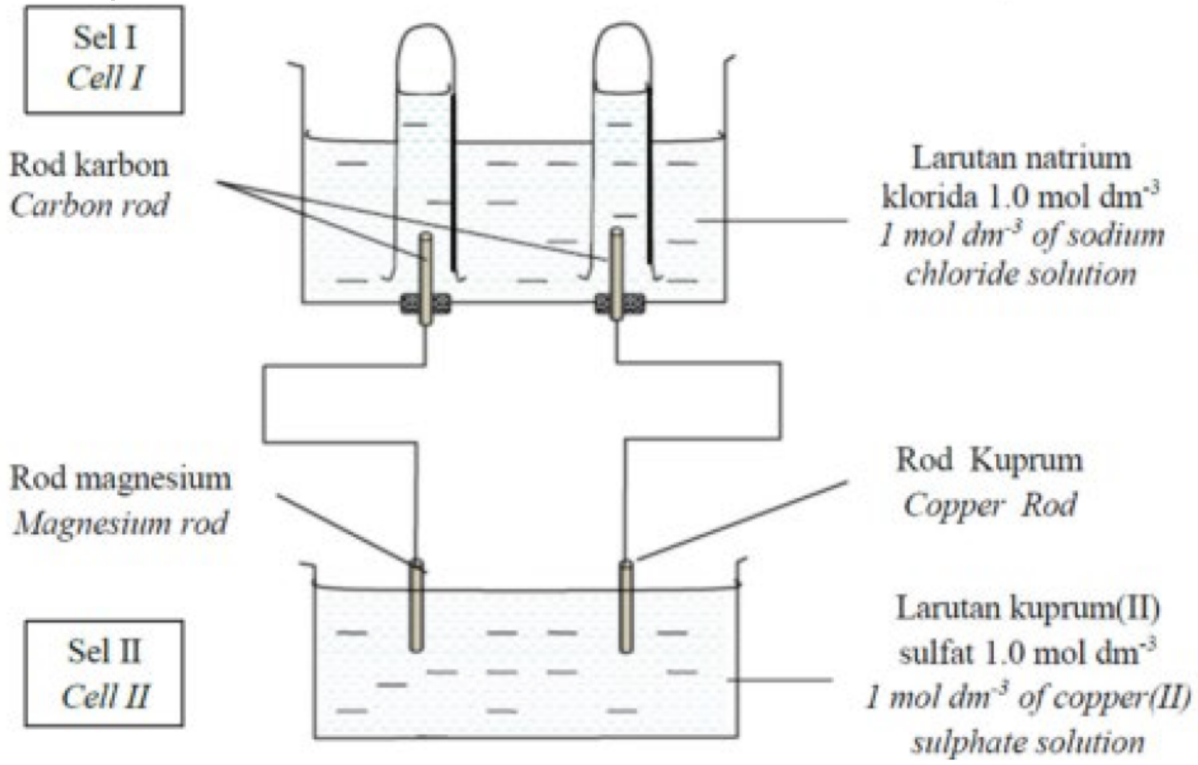
..... [2M]

(c) Tandakan arah pengaliran elektron pada Rajah 7.
Mark the direction of electron flow on Diagram 7.
[1M]

(d) Murid diminta menjalankan eksperimen yang sama tanpa menggunakan tiub-U. Lukis susunan radas bagi eksperimen tersebut dengan menggunakan radas yang sesuai.
Student asked to carry out the same experiment without using U-tube. Draw the apparatus set-up for the experiment by using a suitable apparatus.

[2M]

[2024 Johor Muar-07] Rajah 7 menunjukkan gabungan satu sel kimia dengan satu sel elektrolisis.
Diagram 7 shows the combination between a chemical cell and an electrolytic cell.



(a) Apakah maksud elektrolisis?/ *What is the meaning of electrolysis?*

..... [1M]

(b) Merujuk kepada Sel I,/ *Referring to Cell I,*

(i) nyatakan semua ion yang hadir dalam larutan natrium klorida.
state all the ions present in the sodium chloride solution.

..... [1M]

(ii) nyatakan pemerhatian di anod./ *state the observation at anode.*

..... [1M]

(c) Merujuk kepada Sel II dan keupayaan elektrod piawai, E° bagi setengah sel di bawah:
Referring to Cell II and standard electrode potential, E° of the half cell below:

$Mg^{2+}(ak) + 2c- \rightarrow Mg\ (p)$ $\quad E° = -2.38$ V
$Cu^{2+}(ak) + 2e- \rightarrow Cu(p)$ $\quad E° = +0.34$ V

kenal pasti terminal negatif dan terminal positif bagi sel tersebut.
identify the negative terminal and positive terminal of the cell.

(i) terminal negatif/ *negative terminal*

..... [1M]

(ii) terminal positif/ *positive terminal :*

..... [1M]

(d) (i) Ubahsuai Sel II di Rajah 7 supaya dapat berfungsi sebagai sel Daniell. Anda dibekalkan dengan bahan tambahan iaitu larutan magnesium sulfat 1.0 mol dm^{-3} dan larutan asid sulfurik 1.0 mol dm^{-3} beserta radas lain bersesuaian.
Modify Cell II in Diagram 7 so that it can function as a Daniell cell. You are supplied with additional materials which are magnesium sulphate solution 1.0 mol dm^{-3} and sulfuric acid solution 1.0mol dm^{-3} along with other appropriate apparatus.

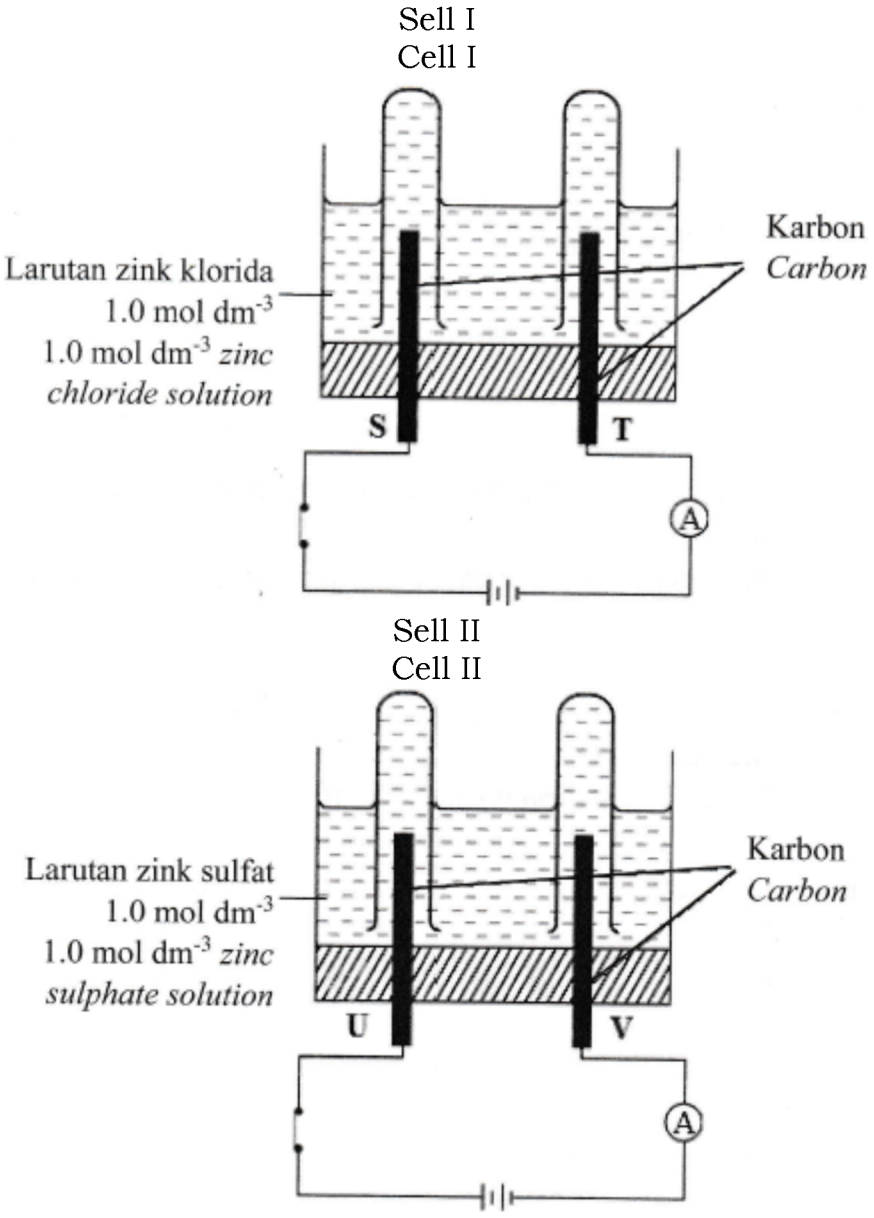
[2M]

(ii) tuliskan notasi sel dan hitungkan voltan sel bagi sel Daniell dalam (d)(i).
write the cell notation and calculate the cell voltage for Daniell cell in (d)(i).

Notasi sel :.....
Cell notation

Voltan sel :.....
Cell voltage [3M]

[2024 Negeri Sembilan-08] Rajah 8 menunjukkan elektrolisis bagi dua jenis elektrolit
Diagram 8 shows electrolysis of two types of electrolytes.



Diberi nilai keupayaan elektrod piawai seperti berikut.
Standard electrode potential are given as below.

$Cl_2 + 2e \rightarrow 2Cl^-$	$E^\circ = + 1.36$ V
$O_2 + 2H_2O + 4e \rightarrow 4OH^-$	$E^\circ = + 0.40$ V
$Zn^{2+} + 2e \rightarrow Zn$	$E^\circ = -0.76$ V
$2H^+ + 2e \rightarrow H_2$	$E^\circ = 0.00$ V

(a) Berdasarkan Rajah 8,/ *Based on Diagram 8,*

(i) Namakan semua anion yang hadir dalam larutan zink klorida.
Name all anion presents in zinc chloride solution.

..... [1M]

(ii) Tulis formula hasil yang terbentuk pada elektrod S.
Write the formula of the product formed at electrode S.

..... [1M]

(iii) Terangkan jawapan anda berdasarkan pemilihan ion yang dinyahcas di 8(a)(ii).
Explain your answer based on selection of ions to discharge in 8(a)(ii).

..... [1M]

(iv) Huraikan satu ujian bagi mengesahkan hasil yang terbentuk pada elektrod U.
Describe a confirmatory test for the product formed at electrode U.

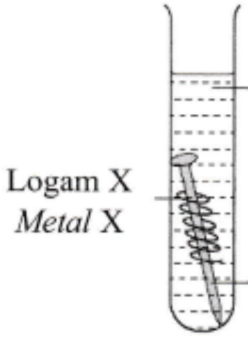
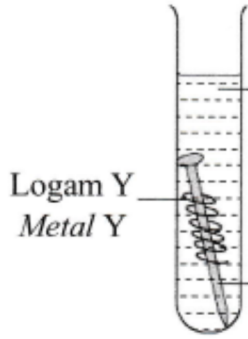
.....

.....

.....

..... [2M]

(b) Jadual 3 menunjukkan satu eksperimen untuk mengkaji kesan logam lain ke atas pengaratan paku besi.
Table 3 shows an experiment to determine the effect of other metals on rusting of iron nail.

Set	Eksperimen Experiment	Pemerhatian Observation
I	 Logam X *Metal X* Larutan agar-agar + larutan kalium heksasianoferat(III) + fenolftalein *Jelly solution + potassium hexacyanoferrate(III) solution + phenolphthalein* Paku besi *Iron nail*	Keamatan warna merah jambu yang tinggi terbentuk *High intensity of pink colour is formed* Tiada tompokan biru tua yang terbentuk *No dark blue spot is formed*
II	 Logam Y *Metal Y* Larutan agar-agar + larutan kalium heksasianoferat(III) + fenolftalein *Jelly solution + potassium hexacyanoferrate(III) solution + phenolphthalein* Paku besi *Iron nail*	Keamatan wama biru tua yang tinggi terbentuk *High intensity of dark blue colour is formed* Keamatan wama merah jambu yang rendah terbentuk *Low intensity of pink colour is formed*

Berdasarkan Jadual 3,/ *Based on Table 3,*

(i) Terangkan perbezaan dalam pemerhatian bagi Set I dan Set II.
Explain the difference in observation of Set I and Set II.

.....

.....

..... [2M]

(ii) Rajah 8 menunjukkan logam korban yang terdapat pada badan kapal.
Diagram 8 shows a sacrificial metal on the body of a ship.

Rajah 8
Diagram 8

Berdasarkan jawapan anda di 8(b)(i), pilih logam yang sesuai untuk dijadikan logam korban pada badan kapal. Terangkan jawapan anda.
Based on your answer in 8(b)(i), choose a metal that suitable to be used as sacrificial metal on the body of a ship. Explain you answer.

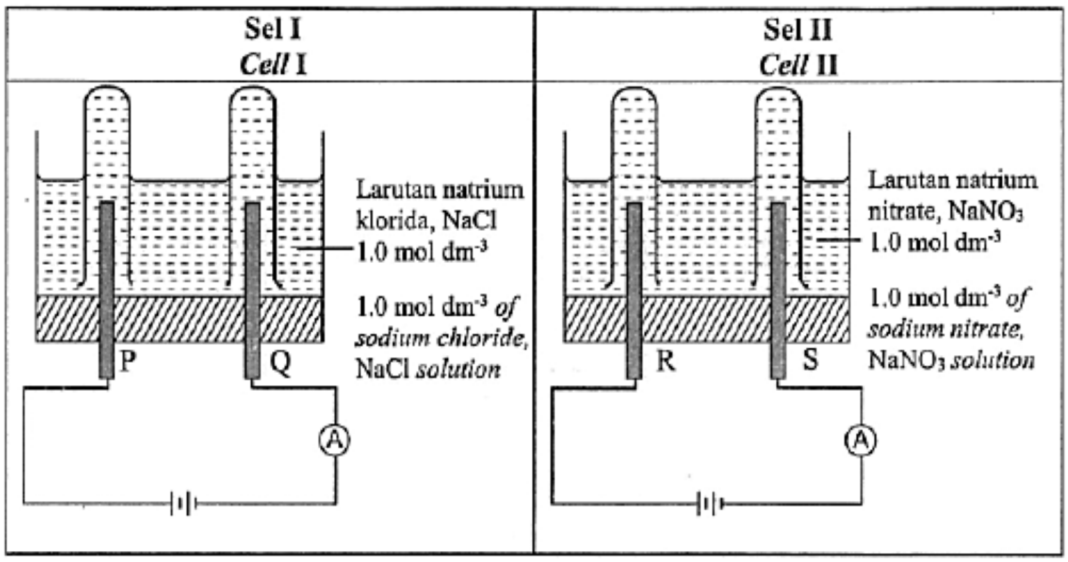
.....

.....

.....

..... [3M]

[2024 Johor Pasir Gudang-06] Rajah 6 menunjukkan elektrolisis larutan natrium klorida, NaCl dan natrium nitrat $NaNO_3$ dengan menggunakan elektrod-elektrod karbon.
Diagram 6 shows the electrolysis of sodium chloride, NaCl and sodium nitrate, $NaNO_3$ solution using carbon electrodes.



Rajah 6/ Diagram 6

Diberi nilai keupayaan elektrod piawai berikut.
Given the following standard electrode potential value.

$Na^+(ak/aq) + e^- \rightleftharpoons Na(p/s)$	E° = -2.71 V
$2H^+(ak/aq) + 2e^- \rightleftharpoons H_2(g)$	E° = 0.00 V
$O_2(g) + 2H_2O(ce/l) + 4e^- \rightleftharpoons 4OH^-(ak/aq)$	E° = +0.40 V
$Cl_2(g) + 2e^- \rightleftharpoons 2Cl^-(ak/aq)$	E° = +1.36 V
$NO_3^-(ak/aq) + 4H^+(ak/aq) + 3e \rightleftharpoons NO(g) + 2H_2O\ (ce/l)$	E° = +0.96V

(a) Berdasarkan Sel 1,/ *Based on Cell I ,*

(i) Nyatakan semua anion yang hadir dalam larutan natrium klorida, NaCl.
State all the anions present in sodium chloride, NaCl solution.

..... [1M]

(ii) Namakan hasil yang terbentuk pada elektrod P.
Name the product formed at electrode P.

..... [1M]

(iii) Terangkan jawapan anda di 6(a)(ii)./ *Explain your answer in 6(a)(ii).*

..... [1M]

(iv) Huraikan satu ujian kimia bagi menentusahkan hasil yang terbentuk pada elektrod P.
Describe a chemical test to verify the product formed at P electrode.

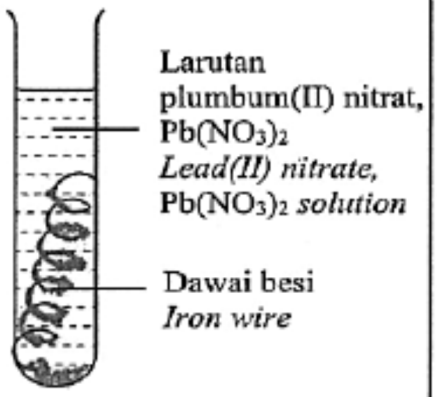
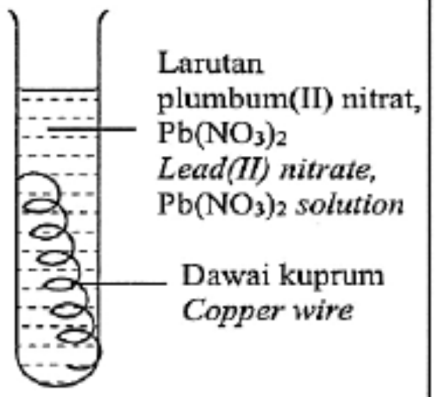
.....

..... [2M]

(b) Tulis setengah persamaan pengoksidaan dalam Sel II.
Write half equation for oxidation in Cell II.

..... [1M]

(c) Jadual 3 menunjukkan suatu eksperimen untuk mengkaji tindak balas penyesaran logam.
Table 3 shows an experiment to investigate the displacement of metal

Tabung uji *Test tube*	I	II
		
Pemerhatian *Observation*	Pepejal kelabu terbentuk *Grey solid formed*	Tiada perubahan *No changes*

Berdasarkan Jadual 3, terangkan perbezaan dalam pemerhatian di atas.
Based on Table 3, explain the difference in the observation above.

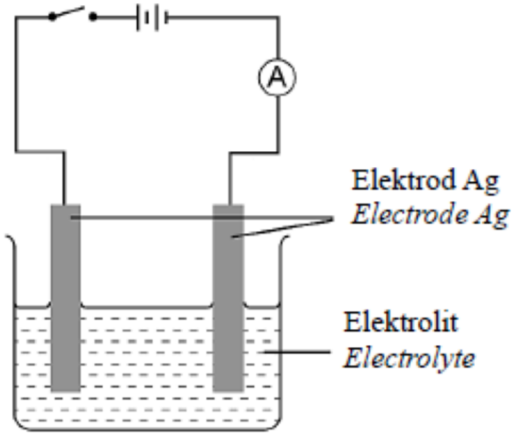
.....

.....

.....

..... [3M]

[2024 Johor Pasir Gudang-06] (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 *Apparatus set – up*	Pemerhatian *Observations*	
	Anod *Anode*	Elektrod menipis *Electrode becomes thinner*
	Katod *Cathode*	Pepejal kelabu berkilat terenap *Shiny grey solid is deposited*

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

Tindak balas sel setengah *Half-cell equation*	Nilai E° (V) E° *value* (V)
Na^{+}(ak/aq) + e− ⇌ Na(p/s)	-2.71
$2H^{+}$(ak/aq) + 2e− ⇌ H_2(g)	0.00
O_2(g) + $2H_2O$(ce/l) + 4e− ⇌ $4OH^{-}$(ak/aq)	+0.40
Ag+ (ak/aq) + e ⇌ Ag (p/s)	+0.80
NO_3- (ak/aq) + 4H+ (ak/aq) + 3e ⇌ NO (g) + $2H_2O$ (ce/l)	+0.96
Cl_2 (g) + 2e ⇌ 2Cl- (ak/aq)	+1.36

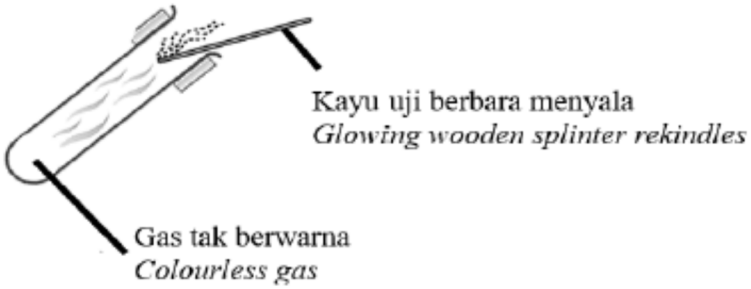
(i) Nilai keupayaan elektrod piawai, E^{θ} bagi sesuatu elektrod dapat diukur dengan menggandingkan elektrod tersebut dengan elektrod hidrogen piawai di bawah keadaan piawai. Nyatakan salah satu keadaan tersebut.
The value of standard electrode potential, E^{θ} of an electrode can be measured by pairing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

..... [1M]

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

..... [1M]

(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.



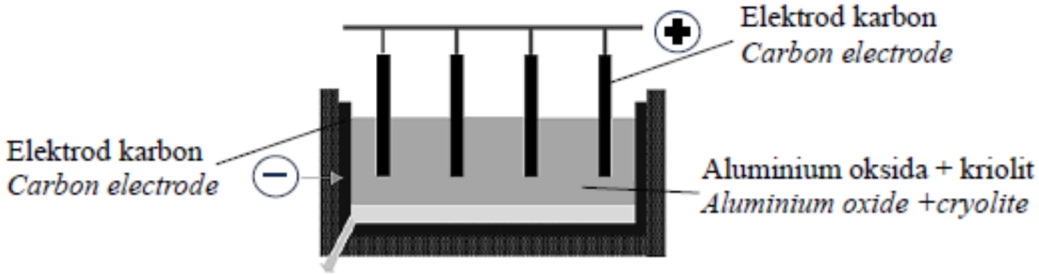
Sebagai seorang pelajar kimia, apakah pengubahsuaian yang telah dilakukan terhadap susunan radas dalam Jadual 3.1? Terangkan mengapa gas tersebut terhasil.
As a chemistry student, what modification that has been done to the apparatus set-up in Table 3.1? Explain why the gas is produced.

.....

.....

..... [2M]

(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.

.....

.....

..... [2M]

(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:

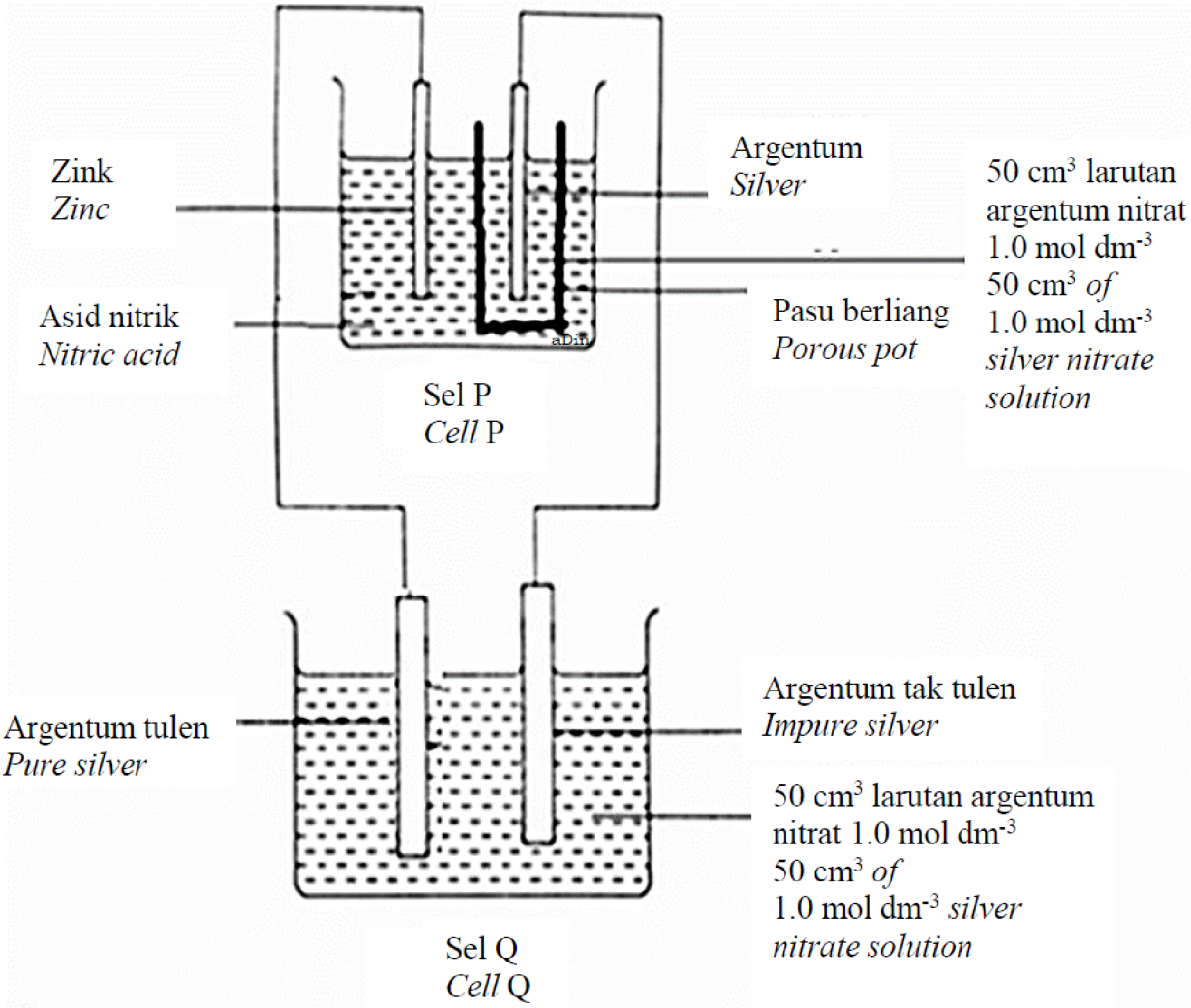
(i) Cadangkan nama proses untuk menjadikan kunci besi tersebut lebih menarik dan tahan karat.
Suggest the name of the process to make the iron key looks more attractive and resistance to corrosion.

..... [1M]

(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.

[2M

[2024-Sarawak-Set01-08] Rajah 7 menunjukkan susunan radas bagi penulenan argentum tak tulen.
Diagram 7 shows the apparatus set up to purify the impure silver.



Berdasarkan Rajah 7,/ *Based on Diagram 7,*

(a) Apakah fungsi pasu berliang?
What is the function of a porous pot?

..... [1M]

(b) Nyatakan anod dan katod pada Sel Q.
State the anode and cathode in Cell Q.

Anod / *Anode*:

.....

Katod / *Cathode*:

..... [2M]

(c) Nyatakan pemerhatian di katod pada Sel P.
State the observation at cathode of Cell P.

..... [1M]

(d) Hitung jisim maksimum argentum yang terenap pada sel P semasa penulenan.
[Jisim atom relatif: Ag =108]
Calculate the maximum mass of silver deposited at cell P during purifying.
[Relative atomic mass: Ag = 108]

[3M]

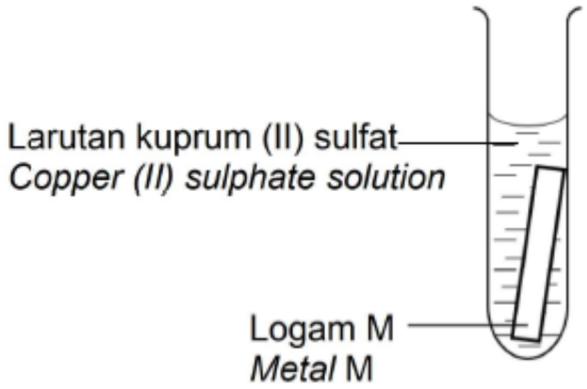
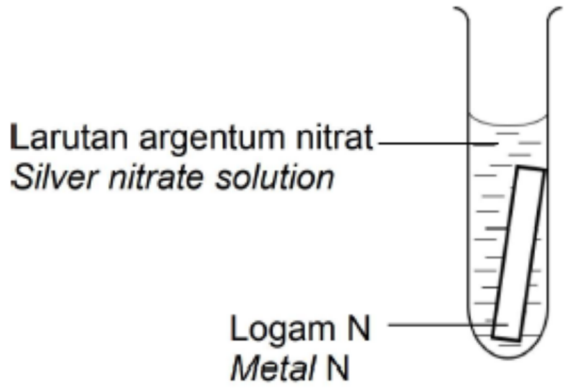
(e) Faridah mendapati kunci besinya telah berkarat. Dengan menggunakan pengetahuan tentang elektrolisis,
Faridah found out that her keys are rusted. By using the knowledge of electrolysis,

(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.

..... [1M]

(ii) Lukiskan susunan radas berlabel yang sesuai bagi membantu Faridah menjalankan proses tersebut di dalam makmal.
Draw a suitable labelled apparatus set-up to help Faridah carry out the process in the laboratory.

[2024 Kelantan-07] (a) Rajah 7.1 menunjukkan maklumat bagi dua tindak balas yang berbeza bagi mengkaji tindak balas redoks.
Diagram 7.1 shows information for two different reactions to study redox reactions.

Tindak balas *Reaction*	Susunan radas *Set-up apparatus*	Pemerhatian *Observation*
Set I		Larutan berwarna biru berubah menjadi tak berwarna. Enapan perang terenap pada kepingan logam M *Blue solution turns colourless.* *Brown deposits deposited on metal strip M*
Set II		Larutan tak berwarna berubah menjadi biru *Colourless solution turns to blue*

(i) Apakah maksud tindak balas redoks?/ *What does redox reaction mean?*

.....

..... [1M]

(ii) Berdasarkan Rajah 7.1, cadangkan nama bagi
Based on Diagram 7.1, suggest a name for

Logam M : .....
Metal M

Logam N : .....
Metal N

[2M]

(iii) Tuliskan setengah persamaan bagi tindak balas penurunan bagi
Write the half equation for the reduction reaction of

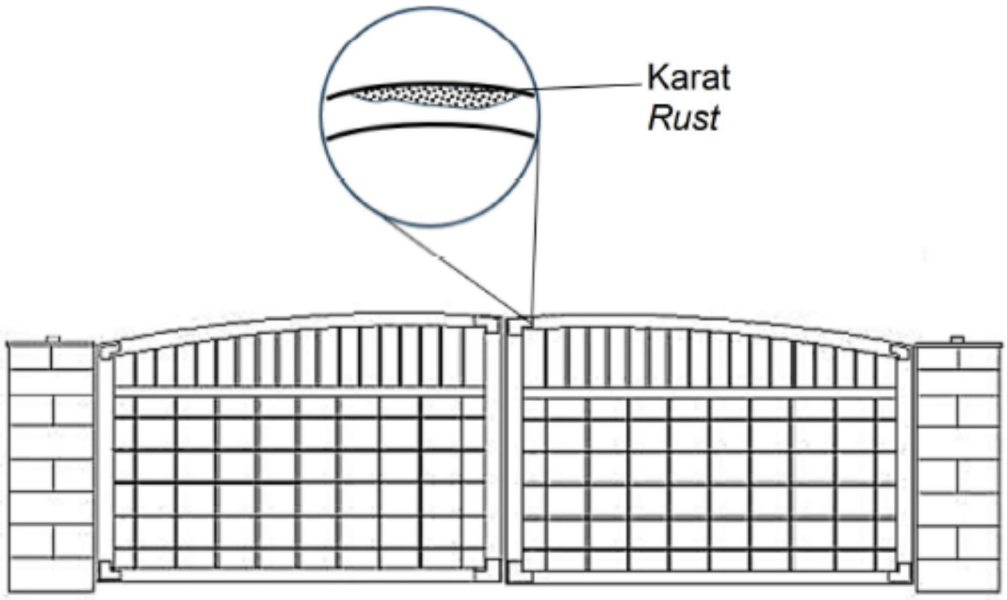
Set I : .....

Set II : ..... [2M]

(iv) Jika 10 cm^3 larutan kuprum(II) sulfat 1.0 mol dm^{-3} telah digunakan dalam Set I, hitungkan jisim enapan berwarna perang yang terhasil pada akhir tindak balas. [Jisim atom relatif: Cu=64]
If 10 cm^3 of a 1.0 mol dm^{-3} copper(II) sulfate solution were used in Set I, calculate the mass of the brown precipitate that resulted at the end of the reaction. [Relative atomic mass : Cu=64]

[3M]

(b) En. Ali mendapati pintu pagar rumahnya mudah berkarat kerana rumahnya berhampiran dengan pantai. Rajah 7.2 menunjukkan karat yang terbentuk pada pintu pagar rumahnya.
Mr. Ali found that the gate of his house rusted easily because his house was close to the beach. Diagram 7.2 shows the rust formed on the gate of his house.



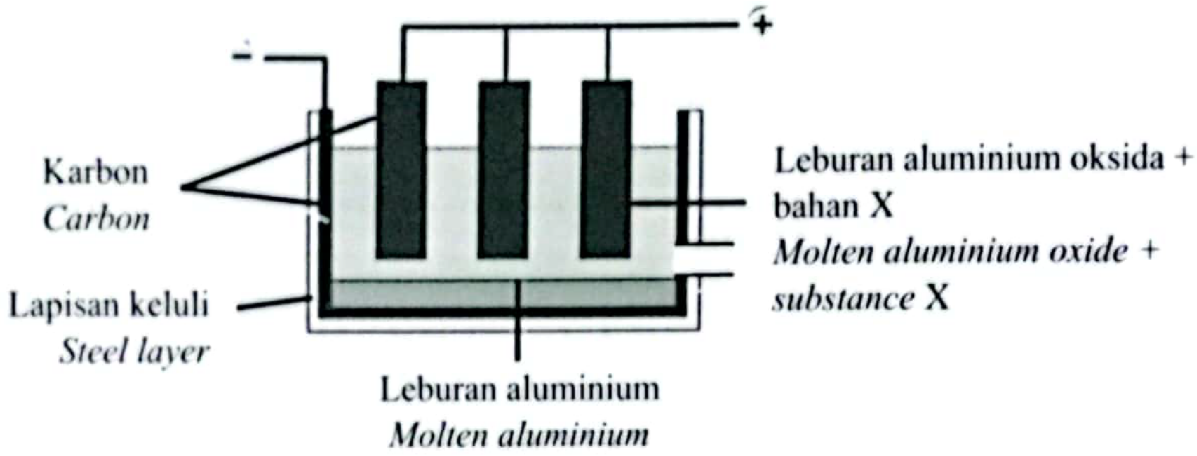
En. Ali mempunyai pilihan samada mengecat balik pagarnya yang berkarat atau menggantikannya dengan aloi. Sebagai pelajar kimia bantu En. Ali membuat pilihan dan wajarkan pilihan tersebut.
Mr. Ali has the option of repainting his rusted fence or replacing it with alloy. As a chemistry student help Mr. Ali made a choice and justified that choice.

.....

.....

..... [2M]

[2024 Perak – Set 1-06] Rajah 3 menunjukkan satu model susunan radas untuk pengekstrakan logam dalam industri.
Diagram 3 shows a model of apparatus set-up for the extraction of metal in the industry.



Berdasarkan Rajah 3,/ *Based on Diagram 3,*

(i) Namakan proses untuk mengekstrak logam daripada bijihnya.
Name the process to extract the metal from its ore.

..... [1M]

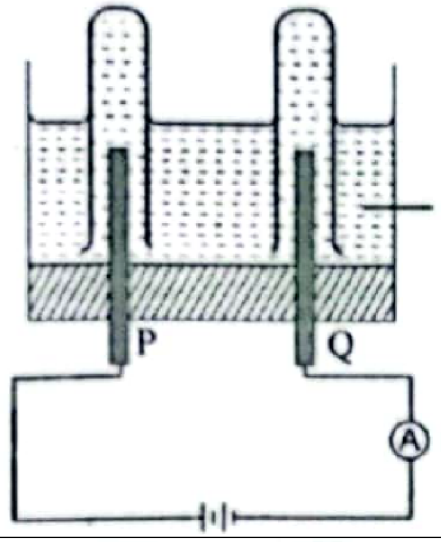
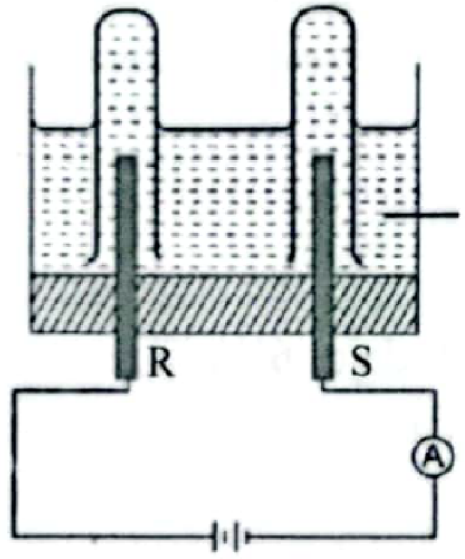
(ii) Bahan X ditambah untuk merendahkan takat lebur aluminium oksida. Apakah bahan X?
Substance X is added to lower the melting point of aluminium oxide. What is substance X?

..... [1M]

(iii) Nyatakan satu kegunaan logam yang diekstrakkan.
State one use of the extracted metal.

..... [1M]

(b) Rajah 4 menunjukkan susunan radas elektrolisis larutan kalium hidroksida dan larutan kalium klorida dengan menggunakan elektrod karbon.
Diagram 4 shows the apparatus set-up for the electrolysis of potassium hydroxide solution and potassium chloride solution using carbon electrodes.

Sel *Cell*	susunan radas *set-up of apparatus*
I	 Larutan kalium hidroksida, KOH 1.0 mol dm^{-3} 1.0 mol dm^{-3} *potassium hydroxide,* KOH *solution*
II	 Larutan kalium klorida, KCl 1.0 mol dm^{-3} 1.0 mol dm^{-3} *potassium chloride,* KCl *solution*

Jadual 5 menunjukkan nilai keupayaan elektrod piawai.
Table 5 shows the standard electrode potential value.

Persamaan setengah sel *Half-cell equations*	Keupayaan elektrod piawai, E°/ V(298 K) *Standard electrode potential, E°/ V(298 K)*
$K^+ + e \rightarrow K$	-2.92
$2H^+ + 2e \rightarrow H_2$	0.00
$O_2 + H_2O + 4e \rightarrow 4OH^-$	+0.40
$Cl_2 + 2e \rightarrow 2Cl^-$	+1.36

Jadual / *Table* 5

Berdasarkan Rajah 4 dan Jadual 5,/ *Based on Diagram 4 and Table 5,*

(i) Nyatakan semua kation yang hadir dalam kedua-dua sel elektrolisis
State all the cations that present in both electrolytic cells.

..... [1M]

(ii) Huraikan satu ujian kimia bagi menentusahkan hasil yang terbentuk pada elektrod Q dan S.
Describe a chemical test to verify the product fanned at electrode Q and S.

.....

.....

..... [2M]

(iii) Nyatakan nama hasil yang terbentuk pada elektrod R.
State the name of product formed at electrode R.

..... [1M]

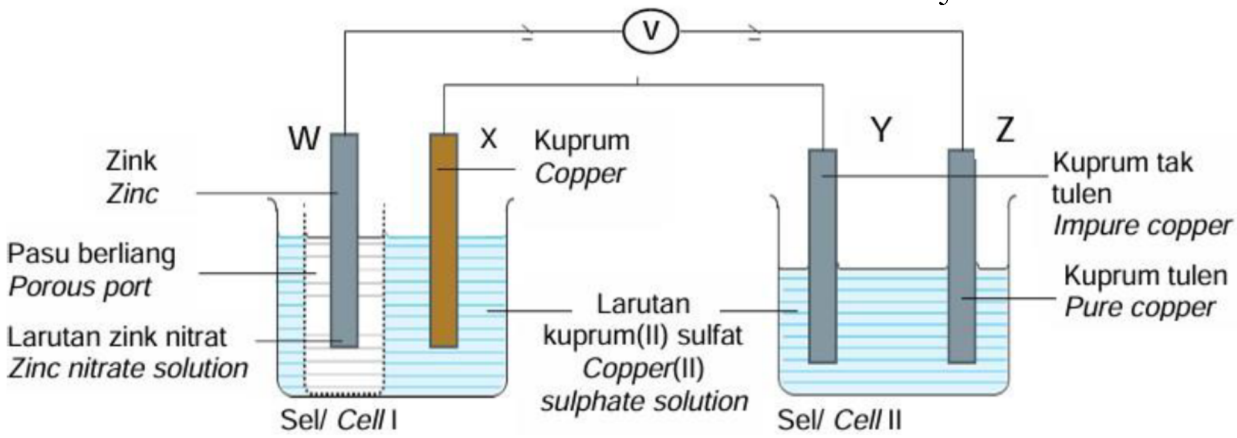
(iv)Terangkan jawapan anda di 6(i)(iii).
Explain your answer in 6(6)(iii).

.....

.....

..... [2M]

[2024 Putrajaya-04] (a) Rajah 3.1 menunjukkan susunan radas bagi menyiasat tindak balas redoks dalam Sel I dan Sel II. Sel I adalah sel kimia manakala Sel II adalah sel elektrolisis.
Diagram 3.1 shows the apparatus setup to investigate redox reaction in Cell I and Cell II. Cell I is a chemical cell and Cell II is an electrolysis cell.



Nilai E° bagi beberapa sel setengah ialah:
The E° value for a few half cells are:

Zn^{2+} (ak) + 2e− ⇌ Zn(p)	E° = -0.76 V
$2H^{+}$ (ak) + 2e− ⇌ H_2(g)	E° = 0.00 V
Cu^{2+} (ak) + 2e− ⇌ Cu(p)	E° = +0.34 V
O_2(g) + $2H_2O$(ce) + 4e− ⇌ $4OH^{-}$ (ak)	E° = +0.40 V
$S_2O_8^{2-}$ (ak) + 2e− ⇌ $2SO_4^{2-}$ (ak)	E° = +2.01 V

(i) Nyatakan maksud elektrolit./ *State the meaning for electrolyte?*

.....

..... [1M]

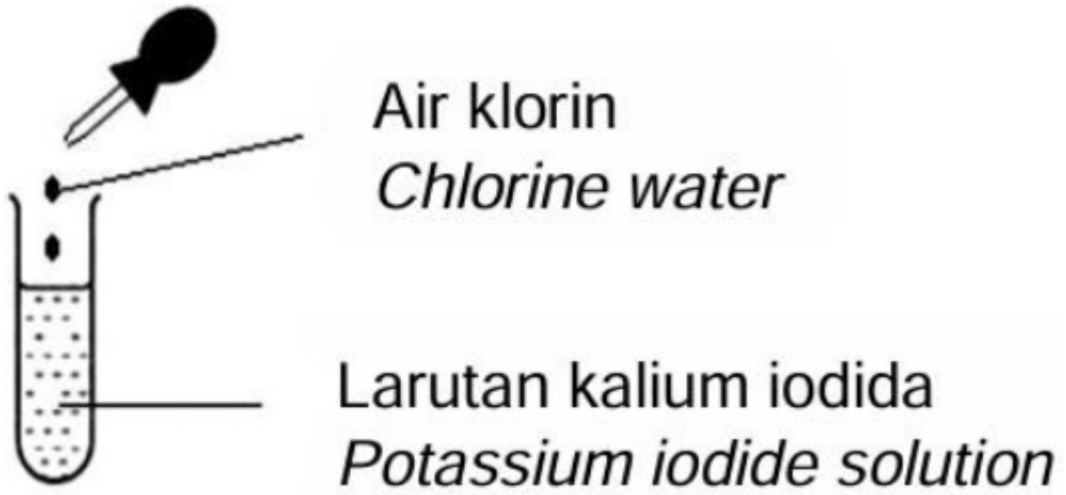
(ii) Namakan agen penurunan untuk Sel I dalam Rajah 3.1.
Name the reducing agent for Cell I in Diagram 3.1.

..... [1M]

(iii) Tandakan elektrod katod dan anod dalam Sel II di Rajah 3.1.
Mark cathode and anode electrode for Sel II in Diagram 3.1.

[1M]

(b) Rajah 3.2 menunjukkan susunan radas bagi menyiasat suatu tindak balas.
Diagram 3.2 shows an apparatus set-up to investigate a reaction.



(i) Tuliskan setengah persamaan untuk:/ *Write the half equation for:*

Proses pengoksidaan : .....
Oxidation process:

Proses penurunan : .....
Reducing process:

[2M

(ii) Huraikan ujian pengesahan untuk hasil yang terbentuk dalam tabung uji.
Describe the chemical test for product formed in the test tube.

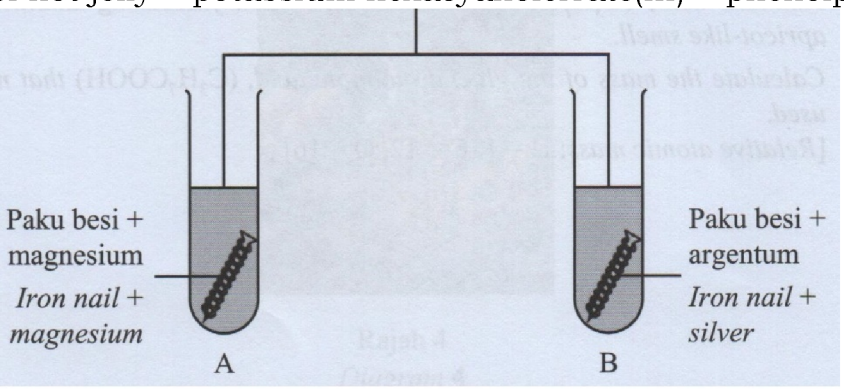
.....

.....

..... [2M]

[2024-Selangor-Set0?-07] Rajah 5.1 menunjukkan susunan radas bagi satu eksperimen untuk mengkaji kesan dua logam yang berlainan ke atas pengaratan besi.
Diagram 5.1 shows the apparatus set-up in an experiment to investigate the effects of two different metals on the rusting of iron.

Campuran agar-agar panas + kalium heksasianoferat(III) + fenolftalein
Mixture of hot jelly + potassium hexacyanoferrate(III) + phenolphthalein



(a) (i) Pengaratan adalah tindak balas redoks. Nyatakan jenis tindak balas yang berlaku pada logam besi apabila besi berkarat.
Rusting is a redox reaction. State the type of reaction that occurs on iron metal when iron rusts.

..... [1M]

(ii) Daripada jawapan anda di 7(a)(i), di dalam tabung uji yang manakah berlakunya pengaratan?
From your answer in 7(a)(i), in which test tube does rusting takes place?

..... [1M]

(iii) Terangkan j awapan anda.
Explain your answer.

.....

..... [1M]

(b)(i) Tuliskan setengah persamaan bagi pengaratan besi.
Write the half-equation for the rusting of iron.

..... [1M]

(ii) Nyatakan satu pemerhatian terhadap wama campuran jika besi berkarat.
State one observation to the colour of mixture if iron is rusted.

..... [1M]

(iii) Nyatakan tujuan menggunakan kalium heksasianoferat(III).
State the purpose of using potassium hexacyanoferrate(III).

..... [1M]

(c) Dalam tabung uji A,/ *In test tube A,*

(i) apakah yang berlaku kepada warna campuran?
what happens to the colour of mixture?

..... [1M]

(ii) namakan tindak balas yang berlaku kepada magnesium.
name the reaction that occurred to magnesium.

..... [1M]

(d) Rajah 5.2 menunjukkan tiang bola keranjang yang telah berkarat di sekolah.
Diagram 5.2 shows a rusted basketball pole in school.

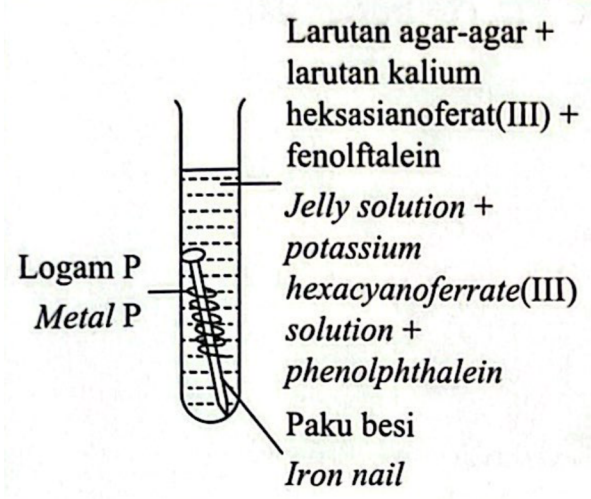
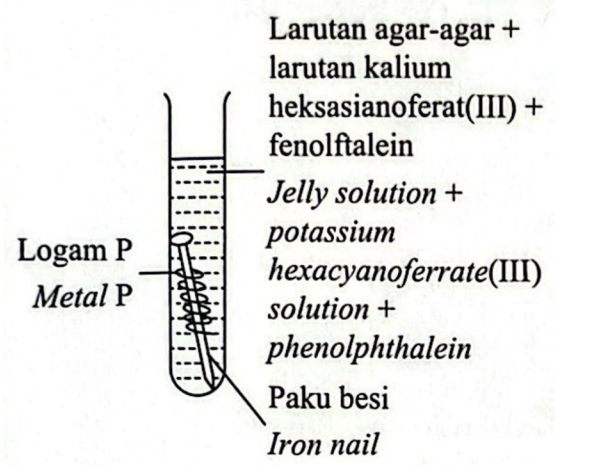
Anda ditugaskan membaik pulih keadaan tiang bola keranjang yang telah berkarat.
Nyatakan tindakan anda dan wajarkan jawapan anda.
You are assigned to restore the condition of the rusted basketball pole.
State your action and justify your answer.

.....

.....

..... [2M]

[2024-Selangor-Set1-07] (a) Jadual 3 menunjukkan dua set eksperimen yang dijalankan untuk mengkaji kesan logam lain terhadap pengaratan besi.
Table 3 shows two sets of experiments which are carried out to study the effect of other metals on rusting of iron.

Set Set	Eksperimen *Experiment*	Pemerhatian *Observation*
I		Tompokan biru tua terbentuk *Dark blue spots formed* Keamatan warna merah jambu yang rendah terbentuk *Low intensity of pink colour is formed*
II		Tiada tompokan biru tua terbentuk *No dark blue spot is formed* Keamatan warna merah jambu yang tinggi terbentuk *High intensity of pink colour is formed*

(i) Apakah yang dimaksudkan dengan kakisan logam?
What is meant by metal corrosion?

.....

..... [1M]

Berdasarkan pemerhatian dalam Jadual 3,
Based on the observations in Table 3,

(ii) nyatakan nama logam P dan logam Q.
state the name of metal P and metal Q.

Logam P : .....
Metal P

Logam Q : .....
Metal Q

[2M]

(iii) Tuliskan setengah persamaan bagi pengoksidaan dan penurunan dalam Set I dan Set II.
Write the half equations for the oxidation and reduction in Set I and Set II.

Setengah persamaan bagi pengoksidaan:
Half equations for the oxidation:

Set I : .....

Set II : .....

Setengah persamaan bagi penurunan:
Half equations for the reduction:

Set I : .....

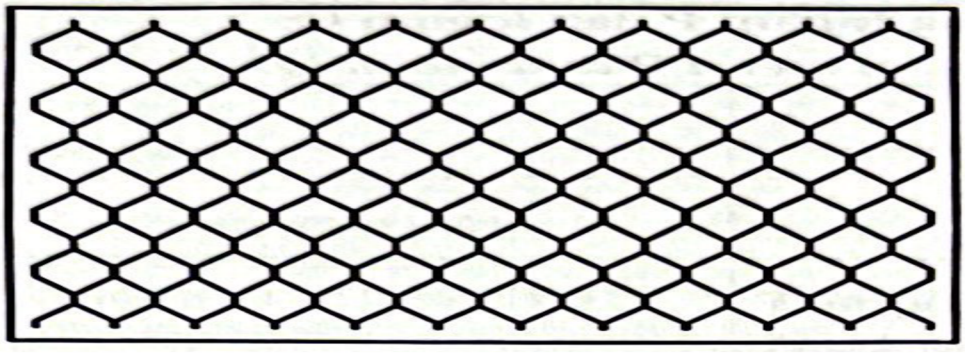
Set II : .....

[4M]

(iv) Berdasarkan Jadual 3, paku besi di Set manakah yang berkarat?
Based on Table 3, iron nail in which Set ms ted?

..... [1M]

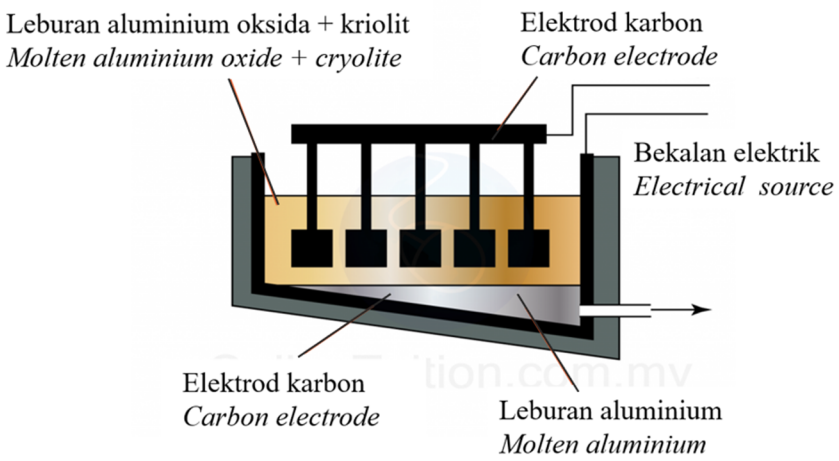
(b) Rajah 7 menunjukkan satu dawai pagar yang dibuat daripada besi.
Diagram 7 shows a wire fence made of iron.



Cadangkan satu cara untuk melambatkan proses pengaratan pada dawai pagar. Terangkan jawapan anda.
Suggest one way to slow down the rusting process on the wired fence. Explain your answer.

[2M]

[2024-Johor Batu Pahat-03] Rajah 3 menunjukkan suatu proses pengekstrakan logam aluminium dari bijihnya.
Diagram 3 shows a process of extracting aluminium metal from its ore.



(a) Apakah nama kaedah yang digunakan untuk mengekstrak aluminium tersebut?
What is the name of the method used to extract the aluminium?

..... [1M]

(b) Apakah fungsi kriolit?/ *What is the function of cryolite?*

..... [1M]

(c) Tuliskan setengah persamaan yang berlaku di
Write the half-equation that occurs at

Anod/ Anode : ..... [1M]

(d) Persamaan kimia di bawah menunjukkan pengekstrakan logam besi daripada bijihnya menggunakan tindak balas penurunan oleh karbon.
Chemical equation below shows the extraction of iron from its ore by the process of carbon reduction

$$2Fe_2O_3\ (p/s) + 3C\ (p/s) \rightarrow 4Fe\ (ce/l) + 3CO_2\ (g/g)$$

Rajah 3a / Diagram 3a

(i) Mengapakah aluminium tidak dapat diekstrak dengan menggunakan tindak balas penurunan oleh karbon?
Why does aluminium cannot be extracted using the reduction reaction by carbon ?

..... [1M]

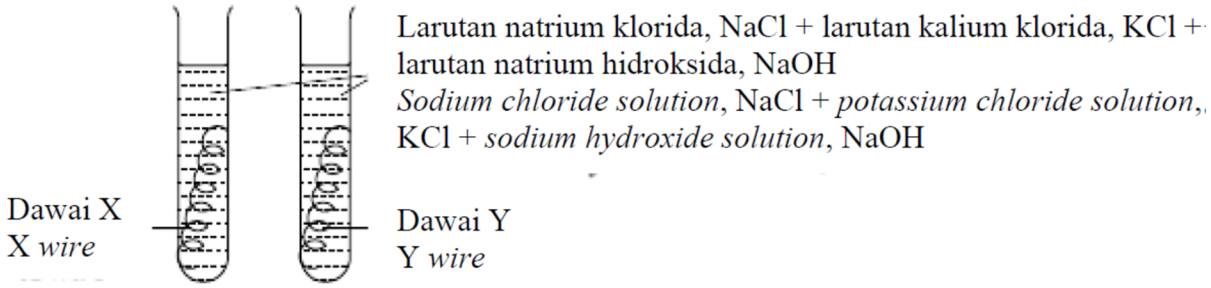
(ii) Namakan logam yang dapat digunakan untuk mengekstrak kuprum daripada kuprum(II) oksida. Terangkan jawapan anda.
Name a metal that can be used to extract copper from copper(II) oxide. Explain your answer.

.....

..... [2M]

Esei

[2024 Perlis-11] Rajah 9.1 menunjukkan susunan radas bagi proses kakisan logam yang berlaku ke atas dua logam yang berbeza.
Diagram 9.1 shows apparatus set-up for corrosion of metal that occurred to two different metals.



(a) (i) Apakah yang dimaksudkan dengan kakisan logam?
What is meant by metal corrosion?

[1M]

(ii) **Logam Y lebih elektropositif berbanding logam X.**
Metal Y is more electropositive compared to metal X.

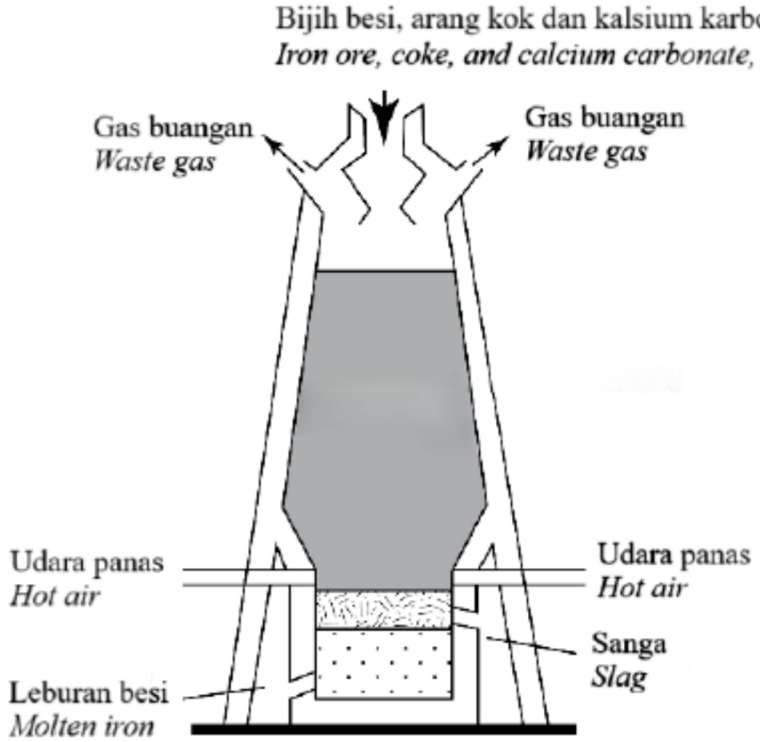
Berdasarkan pernyataan di atas, nyatakan nama dawai X dan dawai Y.
Based on the above statement, state the name of wire X and wire Y.

[2M]

(iii) Eksperimen tersebut dijalankan selama tiga hari. Berdasarkan Rajah 9.1, bandingkan pemerhatian dan inferens dalam tabung uji I dan tabung uji II.
The experiment had been carried out for three days. Based on Diagram 9.1, compare the observations and inferences in test tube I and test tube II.

[5M]

(b) Rajah 9.2 menunjukkan pengekstrakan logam besi melalui proses penurunan oleh karbon. Proses ini dijalankan di dalam relau bagas.
Diagram 9.2 shows extraction of iron metal by reduction process by carbon. This process is carried out in a blast furnace.



Penghasilan besi dalam industri melalui tindak balas antara bijih besi, Fe_2O_3 dan arang kok, C ditunjukkan dalam persamaan kimia di bawah :
The production of iron in industry through the reaction between iron ore, Fe_2O_3 *and coke, C is shown in chemical equation below :*

$$2Fe_2O_3 + 3C \rightarrow 4Fe + 3CO_2$$

[Jisim atom relatif : O = 16, Fe = 56]
[Relative atomic mass : O = 16, Fe = 56]
Jika kilang tersebut mampu memproses 640 kg bijih besi sehari dengan menggunakan karbon yang berlebihan, hitung jisim besi yang dihasilkan.
If the factory is able to process 640 kg iron ore a day using excess carbon, calculate the mass of the iron produced.

[4M]

(c)

Tindak balas redoks melibatkan pembebasan dan penerimaan elektron.
Redox reaction involved donating and receiving electrons.

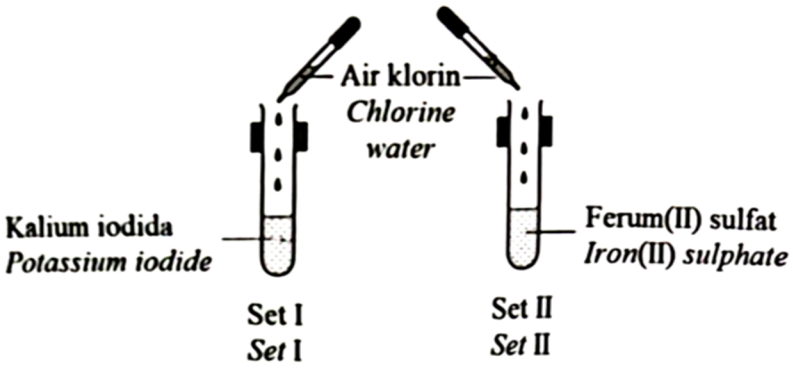
Dengan menggunakan larutan ferum(II) sulfat, asid sulfurik cair dan air bromin, huraikan satu eksperimen makmal untuk menunjukkan pemindahan elektron pada suatu jarak. Huraian anda perlu mengandungi :

By using iron(II) sulphate solution, dilute sulphuric acid and bromine water, describe one laboratory experiment to show the transfer of electrons at a distance. In your description include :

- gambar rajah berlabel/ *labelled diagram*
- prosedur eksperimen/ *procedure of experiment*

[8M]

[2024-Johor Batu Pahat-11] Rajah 11.1 menunjukkan susunan radas untuk mengkaji tindak balas redoks.
Diagram 11.1 shows the apparatus set-up to study the redox reaction.

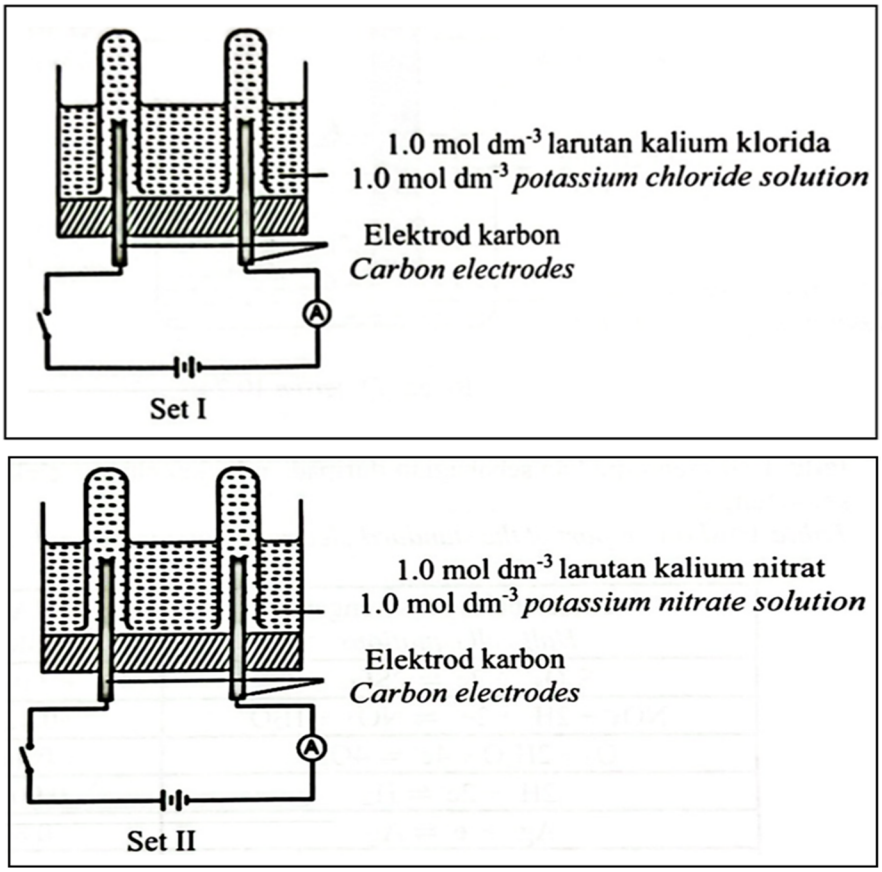


Rajah 11.1 /Diagram 11.1

(a) Tuliskan setengah persamaan bagi tindak balas pengoksidaan dan penurunan yang berlaku di set I dan set II.
Kemudian tentukan perubahan nombor pengoksidaan untuk klorin bagi kedua-dua set.
Write the half-equation for the oxidation and reduction occurs in set I and set II. then determine the change in oxidation number of chlorine for both sets.

[4M]

(b) Dalam satu eksperimen yang lain, seorang murid menjalankan eksperimen di dalam makmal untuk mengkaji faktor yang mempengaruhi pemilihan ion-ion untuk dinyahcas pada elektrod berbeza. Rajah 11.2 menunjukkan susunan radas bagi kedua-dua set eksperimen itu.
In another experiment, a student conducts an experiment in laboratory to investigate the factors that affecting the discharge of ions at different electrodes. Diagram 11.2 shows the apparatus set up for both the experiments.



Rajah 11.2/ *Diagram* 11.2

Jadual 11.1 menunjukkan sebahagian daripada nilai keupayaan elektrod piawai sel setengah
Table 11.1 shows a part of the standard electrode potential of half-cells

Tindak balas sel setengah *Half-cell equations*	E°/ V (298K)
$Cl_2 + 2e^- \leftrightharpoons 2Cl^-$	+ 1.36
$NO_3^- + 2H^+ + 2e^- \leftrightharpoons NO_2^- + H_2O$	+0.42
$O_2 + 2H_2O + 4e^- \leftrightharpoons 4OH^-$	+ 0.40
$2H^+ + 2e^- \leftrightharpoons H_2$	0.00
$K^+ + e^- \leftrightharpoons K$	– 2.92

Berdasarkan Rajah 11.2 dan jadual 11.1
Based on Diagram 11.2 and Table 11.1

Banding dan bezakan set I dan set II dari segi:
Compare and contrast between set I and Set II based on:

- Ion-ion tertarik ke anod/*Ions attracted to anode*
- Pemilihan ion untuk dioksidakan/ *Choice of ion to be oxidized*

- Sebab mengapa ion itu dipilih untuk dioksidakan
Reason why the ions were chosen to be oxidized

 Pemerhatian di anod/ *Observation at anode*

[8M]

(c) Jadual 11.2 menunjukkan sebahagian daripada siri keupayaan elektrod piawai
Table 11.2 shows part of the standard electrode potential series

Persamaan setengah Half-equation	E^o / V (298K)
$Mg^{2+}_{(ak/aq)} + 2e \rightleftharpoons Mg_{(p/s)}$	-2.38
$Zn^{2+}_{(ak/aq)} + 2e \rightleftharpoons Zn_{(p/s)}$	-0.76
$Fe^{2+}_{(ak/aq)} + 2e \rightleftharpoons Fe_{(p/s)}$	- 0.44
$2H^{+}_{(ak/aq)} + 2e \rightleftharpoons H_{2\,(p/s)}$	0.00
$Cu^{2+}_{(ak/aq)} + 2e \rightleftharpoons Cu_{(p/s)}$	+0.34

Jadual 11.2/ Table 11.2

Rajah 11.3 menunjukkan senarai bahan dan radas yang dibekalka untuk membina satu sel kimia
Diagram 11.3 shows the list of materials and apparatus provided to construct a voltaic cell

Tomato *Tomato*	Wayar penyambung *Connecting wire*	Mentol LED *LED bulb*
Paku besi *Iron nail*	Kepingan zink *Zinc strip* Kepingan magnesium *Magnesium strip*	Wayar kuprum *Copper wire*
Sudu plastik *Plastic spoon*	Kertas pasir *Sandpaper*	Rod karbon *Carbon rod*

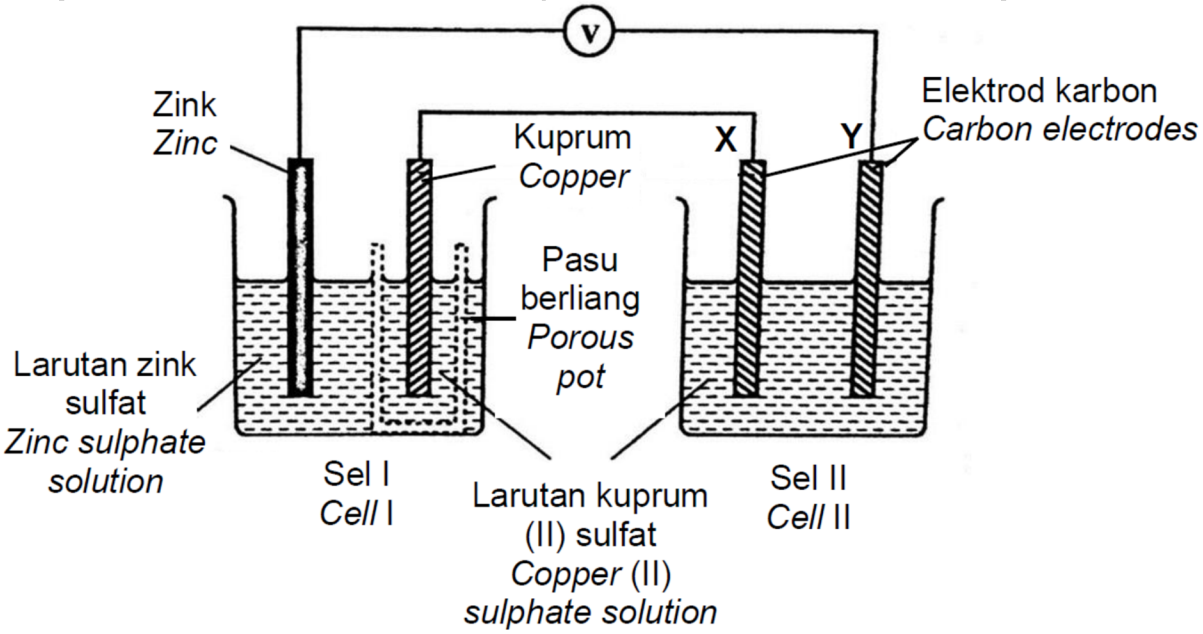
Rajah 11.3 / Diagram 11.3

Dengan menggunakan pengetahuan kimia anda, lukis susunan radas sel kimia yang dapat menyalakan mentol LED. Susunan radas yang dibina perlulah menggunakan bahan dan radas yang sesuai daripada senarai dalam rajah 11.3. Huraikan secara ringkas langkah pembinaan sel kimia itu dan terangkan tindak balas redoks yang berlaku. Kemudian tentukan nilai bacaan voltan yang diperolehi.

By using your chemistry knowledge, draw the apparatus set up of a voltaic cell that can light up an LED bulb. The arrangement of apparatus built must use suitable materials and apparatus given in diagram 11.3. Describe briefly the steps of constructing the voltaic cell and explain the redox reaction that takes place. Then determine the value of the voltage reading obtained

[8M]

[2024-Melaka-11] Rajah 10 menunjukkan gabungan satu sel kimia dan sel elektrolisis.
Diagram 10 shows a combination of chemical cell and an electrolytic cell.



Jadual 6 menunjukkan sebahagian daripada nilai keupayaan elektrod piawai bagi beberapa jenis ion.
Diagram 6 shows part of the standard electrode potential values for a few types of ions.

Tindak balas sel setengah Reaction of half-cell	E° (V) (298K)
$Zn^{2+} + 2\ e^- \leftrightharpoons Zn$	– 0.76
$2H^+ + 2\ e^- \leftrightharpoons H2$	0.00
$Cu^{2+} + 2\ e^- \leftrightharpoons Cu$	+ 0.34
$O_2 + 2\ H_2O + 4\ e^- \leftrightharpoons 4OH^-$	+ 0.40
$S_2O_8^{2-} + 2\ e^- \leftrightharpoons 2\ SO_4^{2-}$	+ 2.01

(a) Nyatakan warna larutan kuprum (II) sulfat. Berdasarkan Rajah 10 dan Jadual 6, kenal pasti terminal negatif dalam Sel I dan terangkan jawapan anda.
State the colour of copper (II) sulphate. Based on Diagram 10 and Table 6, identify the negative terminal in Cell I and explain your answer.

[3M]

(b) Berdasarkan Sel I, tuliskan setengah persamaan bagi tindak balas yang berlaku di zink dan di kuprum. Dengan merujuk Jadual 6, hitungkan nilai voltan sel, E° sel bagi Sel I.
Based on Cell I, write the half-equations for the reaction that occurr at zinc and at copper. By referring to Table 6, calculate the cell voltage, E° cell in Cell I.

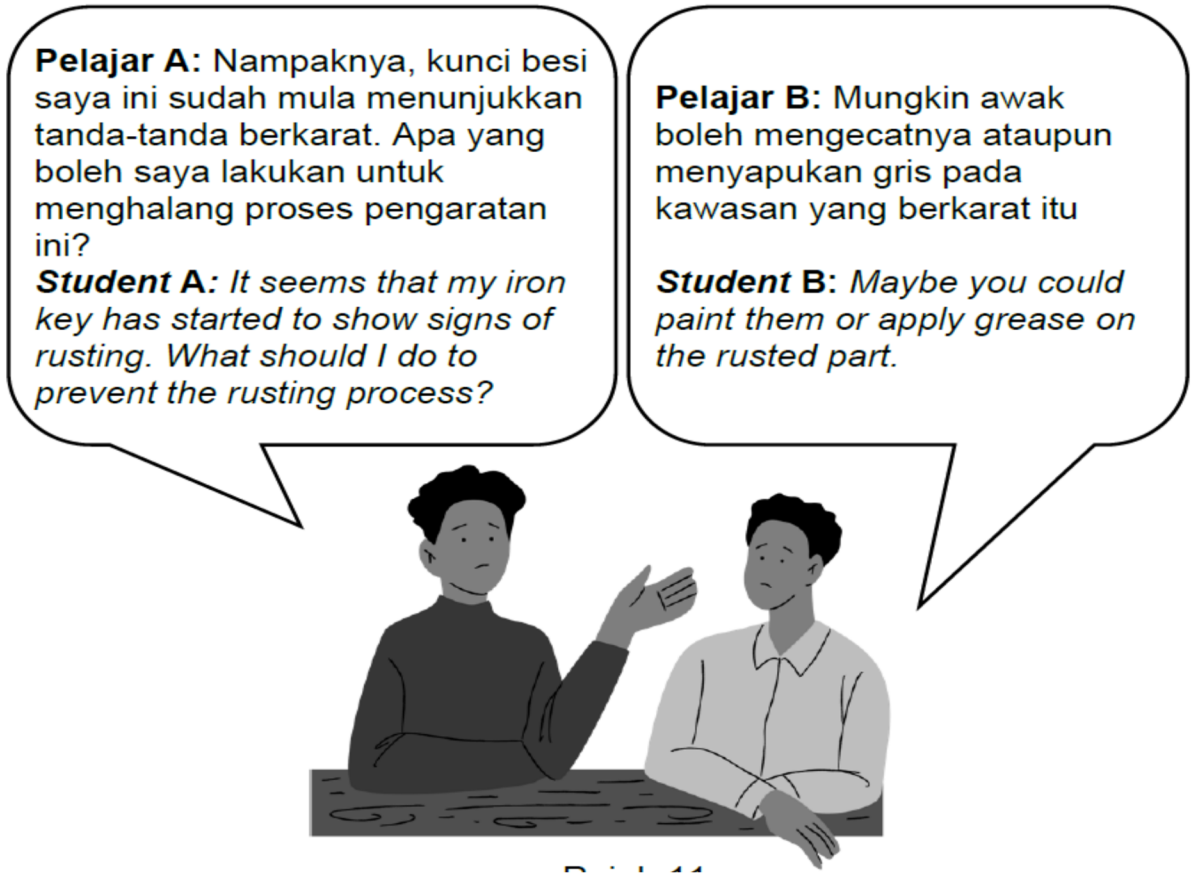
[4M]

(c) Berdasarkan Sel II, terangkan tindak balas yang berlaku di elektrod X dari aspek-aspek berikut:
• Ion-ion yang tertarik ke elektrod X
• ion yang dioksidakan dan sebab
• pemerhatian
• hasil yang terbentuk

Based on Cell II, explain the reaction that occurs at electrode X based on the following aspects:
• *ions that are attracted to electrode X*
• *ion that is oxidized and reason*
• *observation*
• *product formed*

[5M]

(d) Rajah 11 menunjukkan perbualan antara dua orang pelajar.
Diagram 11 shows the conversation between two students.



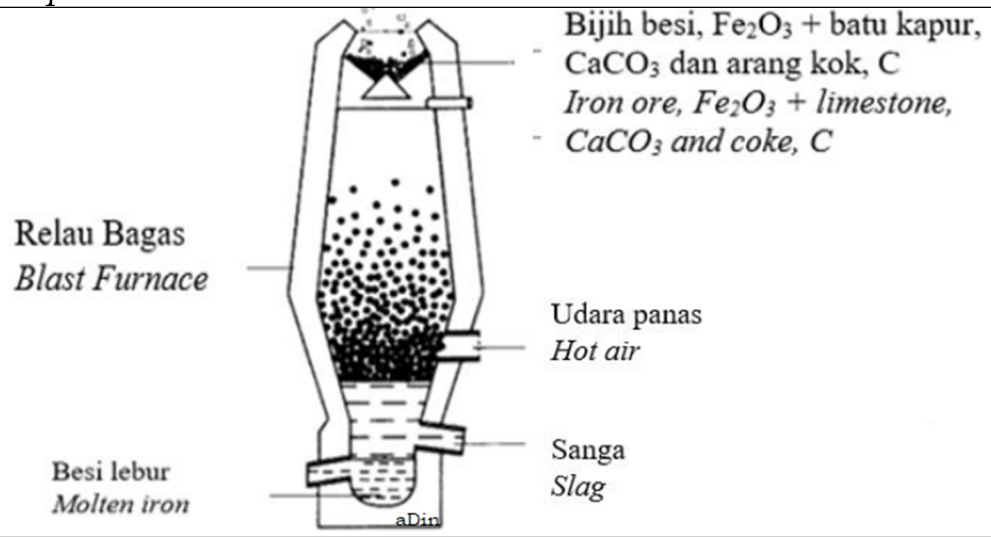
(i) Gunakan maklumat diatas dan pilih kaedah yang lebih sesuai digunakan untuk mencegah pengaratan. Wajarkan jawapan anda.
Use the information above and choose the more appropriate method that could be used to prevent rusting. Justify your answer.

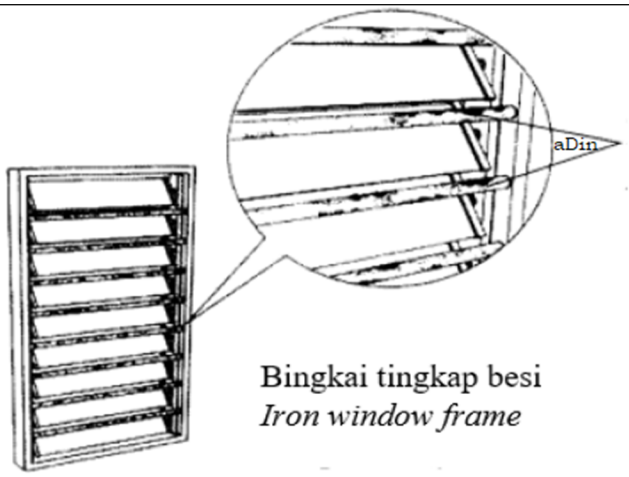
[2M]

(ii) Selepas beberapa bulan, Pelajar A mendapati kunci besinya sudah mula berkarat. Dengan mengubahsuai Sel II, huraikan secara ringkas satu kaedah lain yang boleh dijalankan oleh pelajar itu untuk menghalang proses pengaratan daripada terus berlaku. Sertakan rajah berlabel dalam jawapan anda.
After a few months, Student A found that his iron keys have started to rust. By modifying Cell II, describe briefly another method that could be carried out by the student to prevent the rusting process from continuing. Include a labelled diagram in your answer.

[6M]

[2024-Sarawak-Set02-10] Rajah 9.1 menunjukkan proses yang berlaku bagi dua situasi yang berbeza.
Diagram 9.1 shows the process that occurs for two different situations.

Situasi *Situation*	Penerangan *Explanation*
I	

II	

(a) Berdasarkan Situasi I, penghasilan besi dalam industri melalui tindak balas antara bijih besi, Fe_2O_3. dan arang kok, C ditunjukkan dalam persamaan kimia di bawah.
Based on Situation I, the production of iron in industry through the reaction between iron ore, Fe_2O_3 and coke, C is shown in chemical equation below.

$$\mathbf{2Fe_2O_3 + 3C \rightarrow 4Fe + 3CO_2}$$

[Jisim atom relatif : O = 16; Fe = 56]
[Relative atomic mass: O = 16; Fe = 56]

(i) Tentukan nombor pengoksidaan bagi besi dalam sebatian Fe_2O_3 dan nyatakan nama sebatian itu mengikut penamaan IUPAC.
Determine the oxidation number of iron in compound Fe_2O_3 and state the name of the compound according to the IUPAC nomenclature.

[2M]

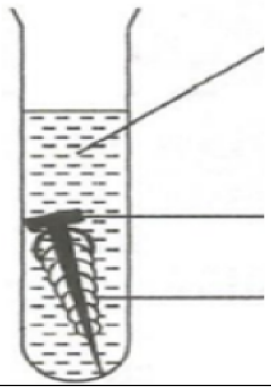
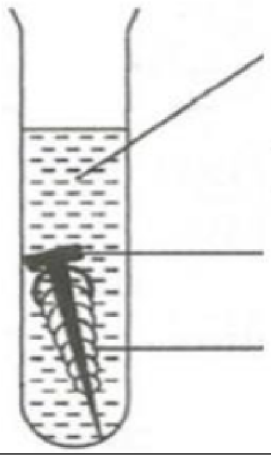
(ii) Jika kilang tersebut mampu memproses 360 kg bijih besi sehari dengan menggunakan karbon yang berlebihan, hitung jisim besi yang dihasilkan.
If the factory is able to process 360kg iron ore a day by using excess carbon, calculate the mass of the iron produced.

[4M]

(iii) Berdasarkan Situasi II, terangkan pembentukan pepejal perang dan cadangkan satu cara untuk menghalang pembentukan tersebut.
Based on Situation II, explain formation of brown solid and suggest one way to prevent the formation.

[6M]

(b) Rajah 9.2 menunjukkan susunan radas eksperimen untuk mengkaji kesan logam M dan logam N ke atas pengaratan besi.
Diagram 9.2 shows the apparatus set-up of an experiment to investigate the effect of metal M and metal N on the rusting of iron.

Tabung uji I *Test tube I*	 Larutan agar-agar panas mengandungi larutan kalium heksasianoferat (III) dan fenolftalein *Hot agar solution containing potassium hexacyanoferrate (III) and phenolphthalein* Paku besi *Iron nail* Logam M *Metal M*
Tabung uji II *Test tube II*	 Larutan agar-agar panas mengandungi larutan kalium heksasianoferat (III) dan fenolftalein *Hot agar solution containing potassium hexacyanoferrate (III) and phenolphthalein* Paku besi *Iron nail* Logam N *Metal N*

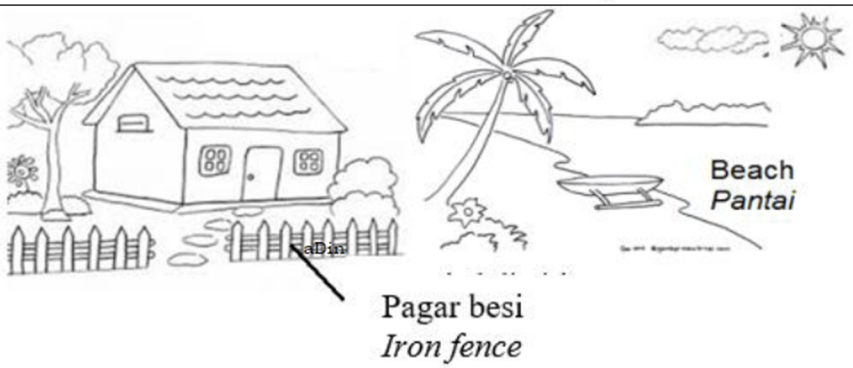
Jadual 3 menunjukkan nilai keupayaan elektrod piawai, E° bagi logam M, logam N dan besi.
Table 3 shows the standard electrode potential, E° for metal M, metal N and iron.

Tindak balas setengah Half-cell equation	Nilai E° (V) E° Value (V)
$M^{2+} + 2e^- \rightarrow M$	-0.76
$Fe^{2+} + 2e^- \rightarrow Fe$	-0.44
$N^{2+} + 2e^- \rightarrow N$	+0.34

Bandingkan pemerhatian di tabung uji I dan tabung uji II dan jelaskan perbezaan pemerhatian antara kedua-dua tabung uji.
Compare the observations in test tube I and test tube II and explain the differences in the observations between both test tubes.

[6M]

(c) Rajah 9.3 menunjukkan dua rumah dengan pagar besi yang dibina di dua kawasan yang berlainan.
Diagram 9.3 shows two houses with iron fences built at two different areas.

Kawasan *Area*	Jenis pagar *Type of fences*
Luar bandar *Rural area*	
Pantai *Coastal*	

Pada pandangan anda, kawasan manakah pagar besi akan berkarat lebih cepat? Berikan sebab untuk jawapan anda itu.
In our opinion, iron fence at which area rusted faster? Give reasons for your answer.

[2M]

[2024 JUJ Set2-02] Maklumat dalam Rajah 2 adalah mengenai sebatian hidrokarbon, C_2H_4 .
The information in Diagram 2 is about hydrocarbon compound, C_2H_4 .

• Gas pada suhu bilik/
Gas at room temperature

• Takat lebur dan takat didih rendah
Low melting and boiling point

• Ahli suatu siri homolog
Member of a homologous series

Rajah 2/ *Diagram 2*

(a) Apakah maksud sebatian hidrokarbon?
What is the meaning of hydrocarbon compound?

..... [1M]

(b) Nyatakan formula am dan kumpulan berfungsi bagi sebatian dalam Rajah 2.
State the general formula and the functional group of the compound in Diagram 2.

.....

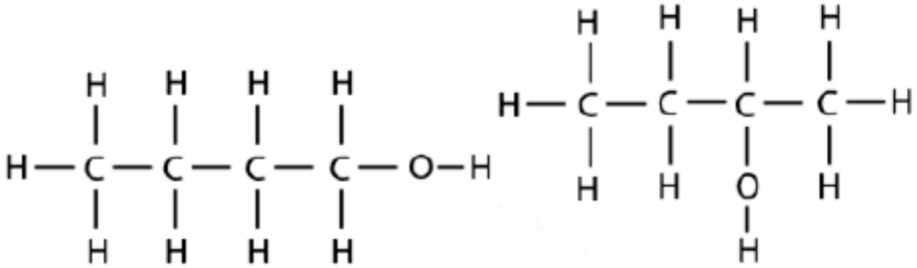
..... [2M]

(c) Hidrokarbon boleh diperolehi melalui proses penyulingan berperingkat. Nyatakan sumber utama hidrokarbon dan kegunaannya.
Hydrocarbon can be derived from the fractional distillation process.
State the main source of hydrocarbon and its uses.

.....

..... [2M]

[2024 Perlis-02] Rajah 2 menunjukkan dua isomer bagi sebatian P.
Diagram 2 shows two isomers for compound P.



(a) (i) Berdasarkan Rajah 2, apakah yang dimaksudkan dengan isomer?
Based on Diagram 2, what is meant by isomer?

..... [1M]

(ii) Sebatian P mempunyai empat isomer.
Lukis satu formula struktur yang lain bagi isomer sebatian P.
Compound P has four isomers.
Draw another one structural formula for isomer compound P.

[1M]

(iii) Berdasarkan jawapan anda di 2(a)(ii), nyatakan nama isomer itu dengan menggunakan sistem penamaan IUPAC.
Based on your answer in 2(a)(ii), state the name of the isomer by using IUPAC nomenclature system.

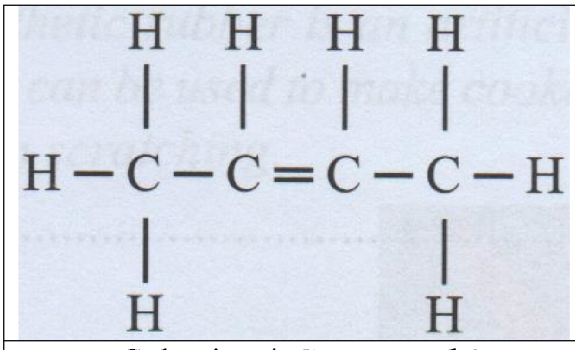
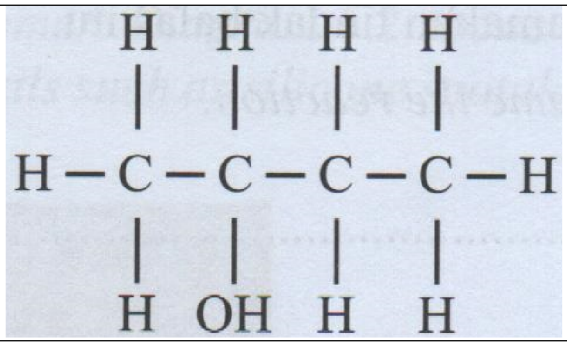
..... [1M]

(b) Nyatakan kumpulan berfungsi bagi alkohol dan formula amnya.
State functional group for alcohol and its general formula.

Kumpulan berfungsi/ Functional group : .....

Formula am/ General formula : .....[2M]

[2024-Selangor-Set0?-08] Rajah 6.1 menunjukkan formula struktur bagi dua sebatian organik A dan B.
Diagram 6.1 shows the structural formulae of two organic compound A and B.

	
Sebatian/ *Compound* A	Sebatian/ *Compound* B

(a) (i) Apakah kumpulan berfungsi sebatian A dalam Rajah 6.1?
What is the functional groups of compound A in Diagram 6.1?

..... [1M]

(ii) Namakan sebatian B mengikut penamaan IUPAC.
Name compound B according to IUPAC nomenclature.

..... [1M]

(b) Huraikan satu ujian kimia untuk membezakan kedua-dua sebatian dalam Rajah 6.1. Nyatakan pemerhatian yang terlibat.
Describe a chemical test to differentiate the two compounds in Diagram 6.1. State the observations involved.

..... [1M]

(c) Dengan tindak balas yang sesuai, sebatian A boleh ditukarkan kepada sebatian B.
Through a suitable reaction, compound A could be converted into compound B.

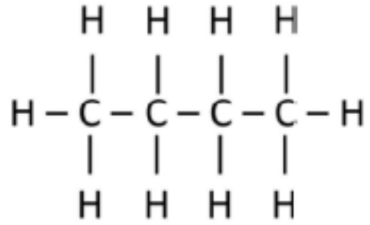
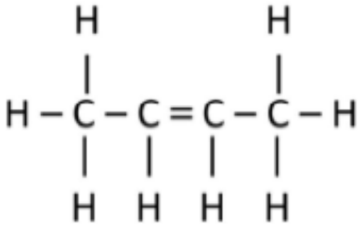
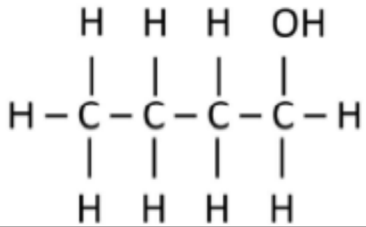
(i) Namakan tindak balas itu./ *Name the reaction.*
..... [1M]

(ii) Nyatakan mangkin dan keadaan optimum untuk tindak balas yang dinamakan di 8(c)(i) berlaku.
State the catalyst and the optimum conditions for the reaction named in 8(c)(i) to occur.

Mangkin/ *Catalyst* : .....

Keadaan optimum/ *Optimum conditions* : .....[2M]

[2024 Kelantan-08] Rajah 8 menunjukkan formula struktur bagi tiga sebatian karbon, P, Q dan R.
Diagram 8 shows structural formula for carbon compound P, Q and R

		
Sebatian karbon P *Carbon compound P*	Sebatian karbon Q *Carbon compound Q*	Sebatian karbon R *Carbon compound R*

Rajah 8/ *Diagram 8*

(a) Apakah maksud bagi sebatian karbon?
What is meant by carbon compound?

.....

..... [1M]

(b) Namakan sebatian Q dan R mengikut sistem penamaan IUPAC
Name the compound Q and R according to the IUPAC naming system

Sebatian/ *Compund Q* : .....

Sebatian/*Compund R* : .....[2M]

(c) Sebatian karbon R boleh terbakar lengkap dalam oksigen berlebihan dan tidak menghasilkan jelaga.
Carbon compounds R can bum completely in excess oxygen and produce no soot.

(i) Tuliskan persamaan kimia bagi tindak balas pembakaran sebatian R
Write the chemical equation for the combustion reaction of compound R

..... [2M]

(ii) Tentukan isipadu oksigen yang diperlukan untuk memastikan 0.1 mol sebatian R terbakar dengan lengkap.
[Isipadu molar gas pada keadaan bilik = 24 dm3 mol^{-1}]
Determine the volume of oxygen required to ensure complete combustion of 0.1 mol of compound R.
[Molar volume of gas at room condition = 24 dm3 mol^{-1}]

[2M]

(d) Sebatian karbon P dan Q boleh dijadikan sebagai bahan api yang digunakan untuk memasak di rumah. Pada pandangan anda sebatian karbon yang manakah lebih sesuai dijadikan sebagai bahan api untuk memasak di rumah. Wajarkan jawapan anda.
Carbon compounds P and Q can be used as fuel for cooking at home. In your opinion, which carbon compound is more suitable to be used as fuel for cooking at home. Justify your answer.

.....

.....

.....

..... [3M]

[2024-Kedah-06] Jadual 6 menunjukkan maklumat mengenai sebatian karbon X, Y dan Z apabila bertindak balas dengan larutan kalium manganat(VII), $KMnO_4$ berasid dan serbuk natrium karbonat.
Table 6 shows information about carbon compound X, Y and Z when undergo reactions with acidified potassium manganate(VII) solution, $KMnO_4$ and sodium carbonate powder.

Sebatian *Compound*	Bilangan atom karbon *Number of carbon atom*	Siri homolog *Homologous series*	Tindak balas dengan larutan $KMnO_4$ berasid *Reaction with acidified $KMnO_4$ solution*	Tindak balas dengan natrium karbonat *Reaction with sodium carbonate*
X	4	Alkena *Alkene*	√	X
Y	3	Asid karboksilik *Carboxylic acid*	X	√
Z	6	Alkohol *Alcohol*	√	X

(a) Apakah formula am alkena?/ *What is the general formula of alkene?*

..... [1M]

(b) Berdasarkan Jadual 6, namakan sebatian Z.
Based on Table 6, name compound Z.

..... [1M]

(c) 0.5 mol sebation Y bertindak balas dengan serbuk natrium karbonat berlebihan dan menghasllkan natrium propanoat, air dan gas karbon dioksida.
0.5 mol compound Y reacts with excess sodium carbonate powder to form sodium propanoate, water and carbon dioxide gas.

(i) Tuliskan persamaan kimia bagi tindak balas ini.
Write chemical equation for this roactlon.

..... [2M]

(ii) Hitungkan bilangan molekul gas karbon dioksida yang dihasilkan.
Determine number of molecules of carbon dioxide gas produced.
[Pemalar Avogadro / Avogadro constant: 6.02×10^{23} mol^{-1}]

[2M]

(d) Nyatakan pemerhatian bagi tindak balas sebatian X dan Z terhadap larutan kalium manganat(VII) berasid dan bandingkan tindak balas yang berlaku dalam sebatian X dan Z.
State the observation for the reaction reactions of compound X and Z toward acidified potassium manganate(VII) solution and compare the reaction occurred in compound X and Z.

.....

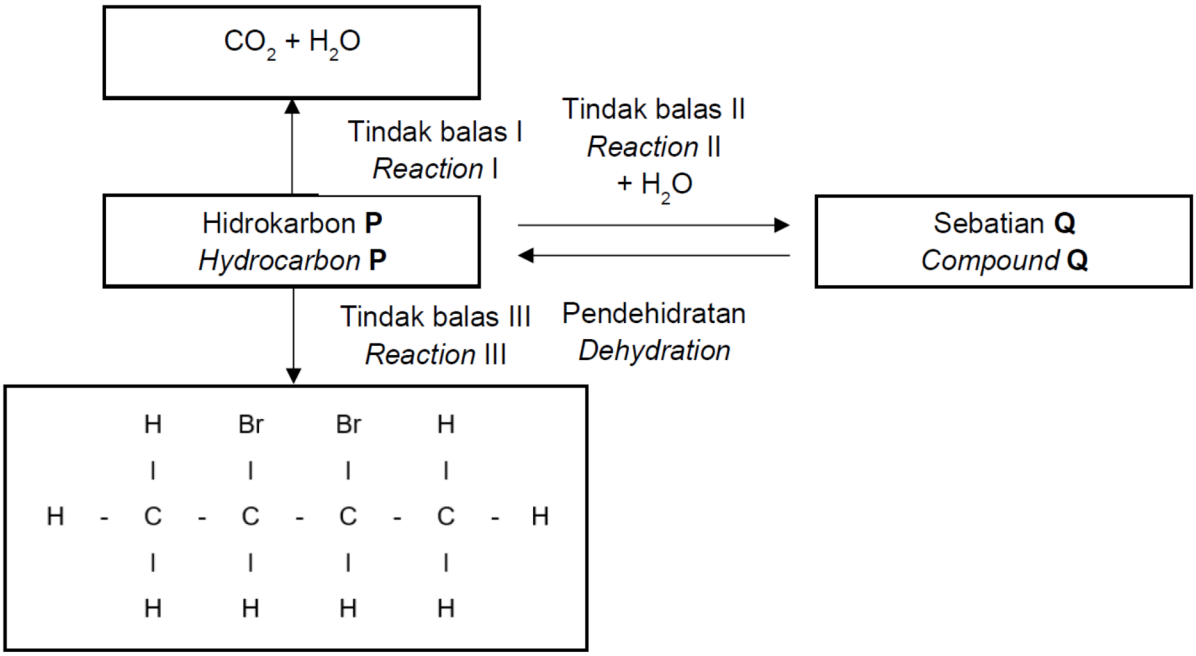
.....

.....

.....

..... [3M]

[2024-Melaka-07] Rajah 6 menunjukkan carta alir tindak balas kimia bagi hidrokarbon P.
Diagram 6 shows the flow chart for chemical reactions of hydrocarbon P.



(a) Nyatakan maksud hidrokarbon.
State the meaning of hydrocarbon.

.....

..... [1M]

(b) Nyatakan siri homolog bagi hidrokarbon P.
State the homologous series of hydrocarbon P.

..... [1M]

(c)(i) Hidrokarbon P terbakar dengan lengkap dalam oksigen pada Tindak balas I dan menghasilkan jelaga. Tuliskan persamaan kimia bagi tindak balas itu.
Hydrocarbon P is burnt completely in excess oxygen in Reaction I and produce soot. Write the chemical equation for the reaction.

..... [2M]

(ii) Hitungkan peratus jisim karbon per molekul dalam hidrokarbon P.
[Jisim atom relatif : H=1; C=12]
Calculate the percentage of mass of carbon per molecule in hydrocarbon P.
[Relative atomic mass: H=1; C=12]

[1M]

(d) Kenalpasti P, Q dan Tindak balas III.
Identify P, Q and Reaction III.

P : ..... Q : .....

Tindak balas III/ Reaction III : ..... [3M]

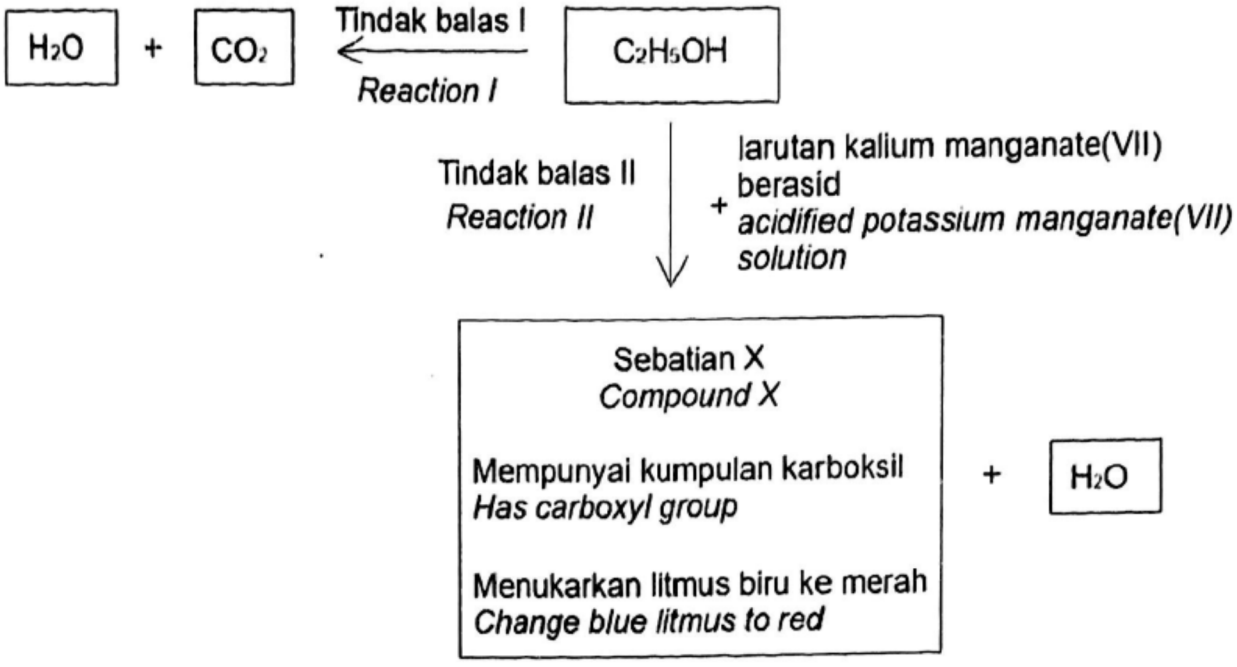
(e) Huraikan secara ringkas bagaimana tindak balas III boleh dijalankan di dalam makmal.
Describe briefly how reaction III can be carried out in the laboratory.

.....

.....

..... [2M]

[2024 Johor-071] Rajah 7 menunjukkan dua tindak balas yang melibatkan sebatian C_2H_5OH.
Diagram 7 shows two reactions involving compound C_2H_5OH.



(a) Nyatakan kumpulan berfungsi bagi sebatian C_2H_5OH.
State the functional group of C_2H_5OH.

..... [1M]

(b) Salah satu kegunaan sebatian C_2H_5OH dalam tindak balas I adalah sebagai bahan api.
One of the uses of C_2H_5OH in reaction I as fuels.

Persamaan kimia bagi tindak balas I adalah seperti berikut:
Chemical equation for reaction I is as follows:

C_2H_5OH (ce) + $3O_2$(g) → $2CO_2$(g) + $3H_2O$ (ce)
C_2H_5OH(l) + $3O_2$(g) → $2CO_2$(g) + $3H_2O$ (l)

(i) Tafsirkan persamaan kimia tersebut secara kuantitatif.
Interpret the chemical equation quantitatively.

.....

..... [1M]

(ii) Hitungkan isi padu gas terbebas apabila 3.68 g C_2H_5OH terbakar lengkap dalam udara.
[Jisim molar C_2H_5OH = 46 g mol^{-1}; 1 mol gas menempati isi padu 24 dm^3 pada keadaan bilik]
Calculate the volume of gas released when g of C_2H_5OH burns completely in air.
[Molar mass C_2H_5OH = 46 g mol^{-1}; 1 mol of gas occupied the volume of 24 dm^3 at room condition]

[3M]

(c) Berdasarkan tindak balas II
Based on reaction II

(i) nyatakan nama tindak balas ini.
state the name of this reaction.

..... [2M]

(ii) Nyatakan satu pemerhatian dalam tindak balas ini.
State one observation in this reaction.

..... [2M]

(iii) Lukis formula struktur bagi sebatian X.
Draw the structural formula of compound X.

[1M]

(d) Sebatian X digunakan secara meluas dalam pembuatan makanan seperti tomato sos dan mayonis.
Wajarkan penggunaan sebatian X dalam makanan dan berikan alasan.
Compound X is widely used in the manufacture of foods such as tomato sauce and mayonnaise. Justify the use of compound X in foods and give reason.

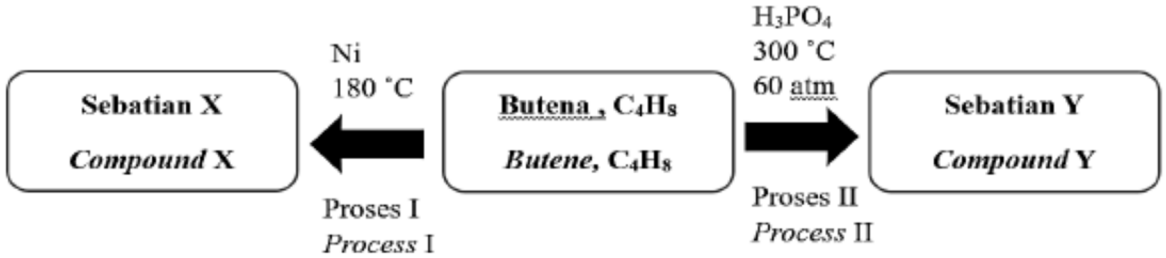
.....

.....

.....

..... [2M]

[2024 Johor Pasir Gudang-07]



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?

..... [1M]

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

[1M]

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

..... [1M]

(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

..... [1M]

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

[2M]

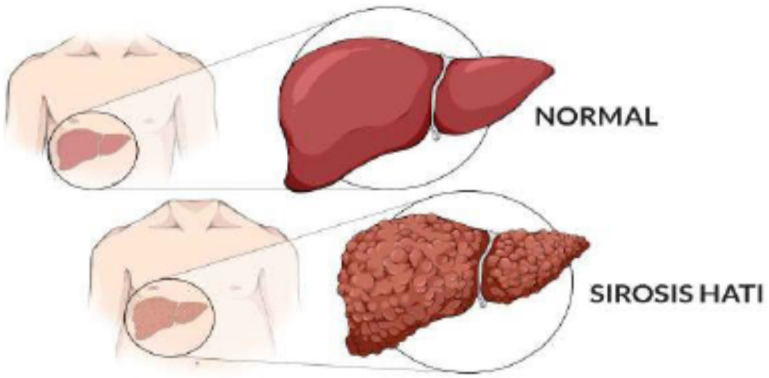
© Butena dan sebatian X terbakar lengkap dalam oksigen menghasilkan gas karbon dioksida dan air. Namun begitu kejelagaan setiap pembakaran adalah berbeza disebabkan oleh 55eritus karbon per molekul yang berbeza.
Butene and compound X are completely burnt in oxygen and produce carbon dioxide gas and water. 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.

[3M]

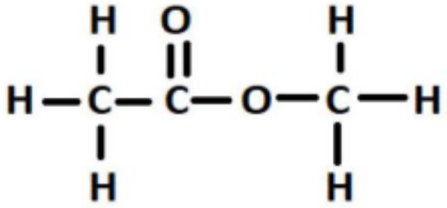
(d) Rajah 7.2 menunjukkan hati yang sihat dan hati yang mengalami sirosis akibat penyalahgunaan alkohol.
Diagram 7.2 shows a healthy liver and a liver with cirrhosis due to the alcohol abuse.



Nyatakan satu kesan lain penyalahgunaan alkohol.
State another effect of alcohol abuse.

..... [1M]

[2024 Johor Pasir Gudang-07] Rajah 7.1 menunjukkan formula struktur bagi satu sebatian karbon Z.
Diagram 7.1 shows the structural formula for a carbon compound Z.



(a) (i) Nyatakan maksud sebatian karbon
State the meaning of carbon compound.

.....

..... [1M]

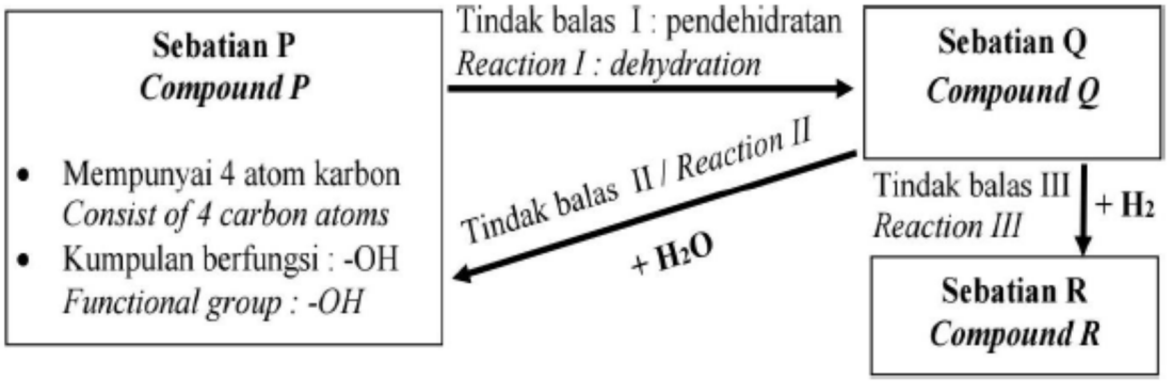
(ii) Nyatakan Kumpulan berfungsi bagi sebatian karbon Z.
State the functional group of carbon compound Z.

..... [1M]

(iii) Sebatian Z boleh dihasilkan melalui tindak balas antara asid karboksilik X dan alkohol Y. Tuliskan persamaan kimia bagi tindak balas ini.
Compound Z can be produced by the reaction between carboxylic acid X and alcohol Y. Write the chemical equation for the reaction.

..... [2M]

(b) Rajah 7.2 menunjukkan satu carta alir bagi tindak balas kimia yang berlaku di antara ahli-ahli siri homolog dan ciri-ciri bagi sebatian P.
Diagram 7.2 shows a flow chart for the chemical reactions that occur between members of the homologous series and the characteristics of compound P.



(i) Namakan siri homolog bagi sebatian P.
Name the homologous series of compound P.

..... [1M]

(ii) Nyatakan formula am bagi sebatian Q
State the general formula of compound Q

..... [1M]

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

[1M]

(iv) Huraikan satu ujian kimia untuk membezakan antara sebatian Q dan sebatian R.
Describe a chemical test to differentiate between compound Q and compound R.

.....

.....

.....

.....

..... [3M]

[2024 JUJ Set1-05] Jadual 5 menunjukkan maklumat bagi sebatian karbon K dan L.
Table 5 shows information of carbon compound K and L.

Sebatian *Compound*	Ciri-ciri *Characteristics*
K	□ Mempunyai 5 atom karbon □ Mengandungi karbon dan hidrogen sahaja □ Tidak menyahwarnakan warna ungu larutan kalium manganat (VII) berasid. □ *Has 5 carbon atoms* □ *Contains carbon and hydrogen only.* □ *Not decolourises purple colour of acidified potassium manganate(VII) solution.*

L	□ Mempunyai 5 atom karbon □ Mengandungi karbon dan hidrogen sahaja □ Menyahwarnakan warna ungu larutan kalium manganat (VII) berasid. □ *Has 5 carbon atoms* □ *Contains carbon and hydrogen only.* □ *Decolourises purple colour of acidified potassium manganate(VII) solution.*

(a) Apakah yang dimaksudkan dengan sebatian karbon?
What is meant by carbon compound?

..... [1M]

(b) Berdasarkan maklumat dalam Jadual 5,
Based on information in Table 5

(i) Kenal pasti siri homolog bagi sebatian K.
Identify the homologous series of compound K.

..... [1M]

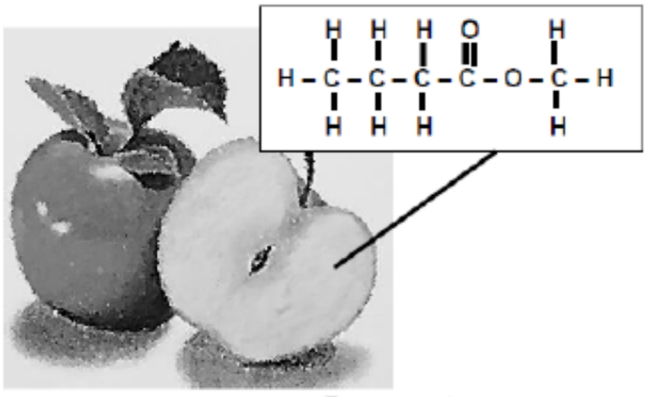
(ii) Tulis formula molekul bagi sebatian L.
Write the molecular formula of compound L.

..... [1M]

(iii) Nyatakan kumpulan berfungsi bagi sebatian L.
State the functional group of compound L

..... [1M]

(c) Rajah 5 menunjukkan formula struktur bagi ester yang menghasilkan bau wangi yang terdapat pada epal hijau.
Diagram 5 shows the structural formula of ester that produces the fragrant smell found in green apple.



Berdasarkan Rajah 5/ *Based on Diagram 5,*

(i) Nyatakan nama ester tersebut/ *State the name of the ester.*

..... [1M]

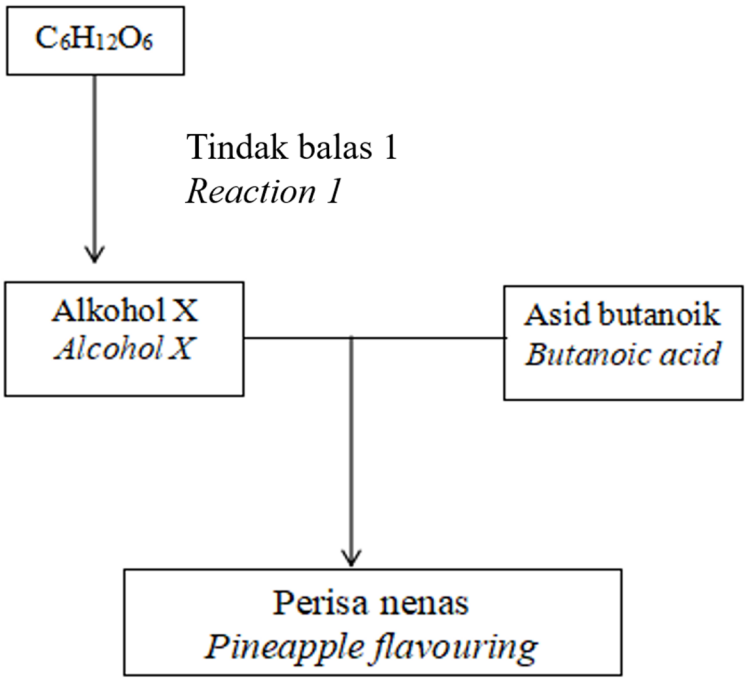
(ii) Lukis formula struktur bagi asid karboksilik yang digunakan untuk menghasilkan ester tersebut.
Draw structural formula of the carboxylic acid used to produce the ester.

[1M]

(iii) Tuliskan persamaan kimia bagi pembentukan ester tersebut.
Write chemical equation for the formation of the ester.

..... [2M]

[2024-Johor Batu Pahat-07] Rajah 7 menunjukkan carta alir bagi pembentukan perisa nanas dengan alkohol X dan asid butanoik.
Diagram 7 shows the flow chart for the formation of pineapple flavour using alcohol X and butanoic acid.



(a) Nyatakan nama tindak balas 1.
State the name for reaction 1.

..... [1M]

(b) Apakah kumpulan berfungsi bagi alkohol X?
What is the functional group of alcohol X?

..... [1M]

(c) (i) Alkohol X dibakar dengan oksigen berlebihan menghasilkan gas Y dan air.
Tuliskan persamaan kimia seimbang bagi tindak balas tersebut.
Alcohol X is burned in excess of oxygen gas produced Y gas and water.
Write a balanced chemical equation for the reaction.

..... [2M]

(ii) Jika 2.3 g alkohol X digunakan, hitung isipadu gas Y yang terhasil.
[1 mol gas menempati 24 dm^3 pada keadaan bilik]
If 2.3 g alcohol X is used, calculate the volume of Y gas produced.
[1 mol gas occupies 24 dm^3 at room temperature]

[3M]

(d) Perisa nanas boleh dihasilkan melalui tindak balas antara alkohol X dengan asid butanoik.
Pineapple flavour can be produced by the reaction between alcohol X and butanoic acid.

(i) Namakan ester tersebut/ *Name the ester*

..... [1M]

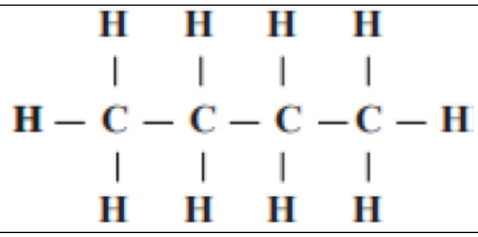
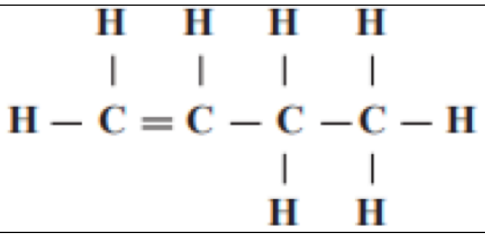
(ii) Cadangkan produk dalam industri makanan yang menggunakan ester di (d)(i)
Suggest a product in food industry that used ester in (d)(i).

..... [1M]

(iii) Wajarkan penggunaan ester dalam industri pemakanan
Justify the uses of ester in food industry.

..... [1M]

[2024 Johor Muar-06] (a) Rajah 6.1 menunjukkan formula struktur bagi dua hidrokarbon
Diagram 6.1 shows the structural formulae of two hydrocarbons.

	
Sebatian/ *Compound* X	Sebatian/ *Compound* Y

(i) Nyatakan maksud isomer./ *State the meaning of isomer.*

..... [1M]

(ii) Nyatakan nama sebatian X dan sebatian Y dengan menggunakan penamaan IUPAC.
State the names of compound X and compound Y by using IUPAC nomenclature.

Sebatian/ *Compound X* : .....

Sebatian/ *Compound* Y : ..... [2M]

(iii) Lukis formula struktur untuk satu lagi isomer sebatian X.
Draw the structural formula for another isomer of compound X.

[1M]

(b) (i) Hidrokarbon X dan Y menghasilkan jelaga apabila terbakar. Bandingkan kejelagaan nyalaan semasa pembakaran hidrokarbon X dan Y dalam keadaan gas oksigen berlebihan.
Hydrocarbon X and Y produce soot when burnt.
Compare the sootiness of the flame during combustion of hydrocarbon X and Y in excess of oxygen gas.

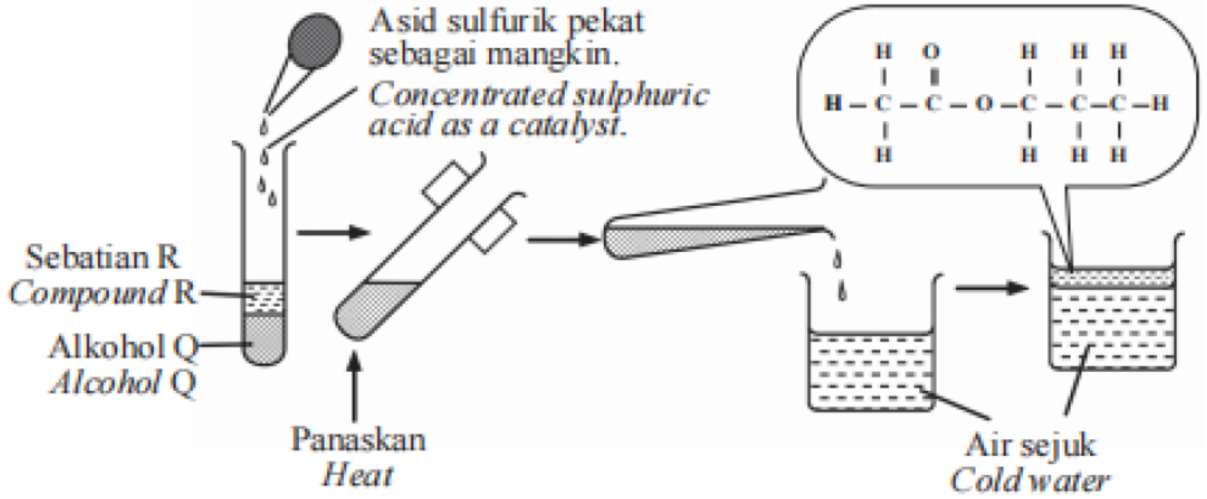
.....

..... [1M]

(ii) Terangkan mengapa terdapat perbezaan kejelagaan hidrokarbon X dan Y? [Jisim atom relatif : C = 12, H = 1]
Explain why there is a difference in the sootiness of the flame of hydrocarbon X and hydrocarbon Y? [Relative atomic mass : C = 12, H = 1]

[2M]

(c) Pengusaha sebuah kilang gula-gula ingin mengeluarkan gula-gula berperisa pir. Seorang ahli kimia di kilang tersebut diarahkan untuk menyediakan satu sampel ester dengan perisa pir melalui tindak balas pengesteran antara alkohol Q dengan sebatian R. Rajah 6.1 menunjukkan langkah penyediaan sampel ester tersebut di dalam makmal.
The owner of a candy factory wants to manufacture pear flavoured candies. A chemist in the factory is instructed to prepare a sample of ester with pear flavour through the esterification reaction between alcohol Q and compound R. Diagram 6.1 shows the steps of preparation for the sample of the ester in the laboratory.



Berdasarkan Rajah 6.2,/*Based on the Diagram 6.2,*

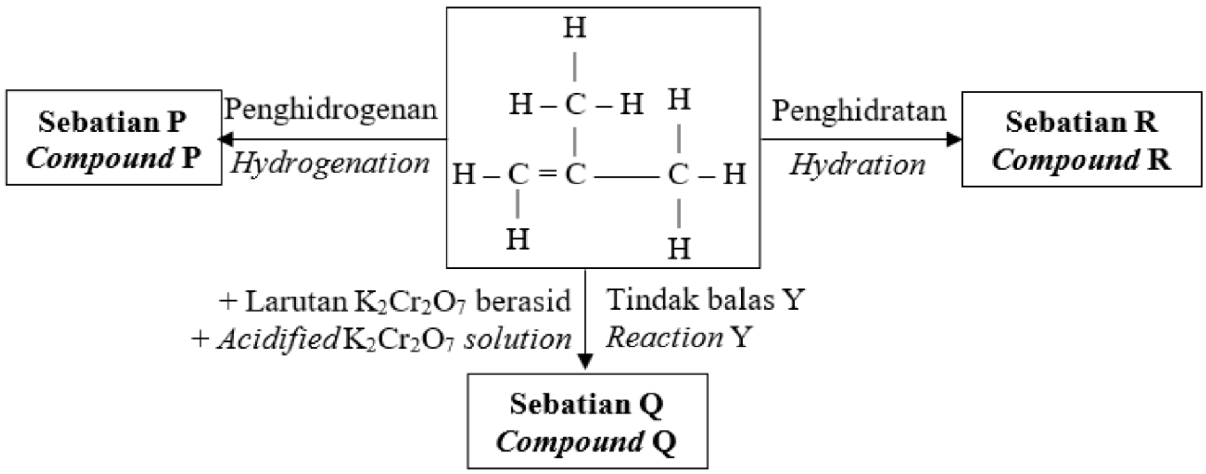
(i) Tulis satu persamaan kimia bagi tindak balas pengesteran antara alkohol Q dengan sebatian R.
Write a chemical equation for the esterification reaction between alcohol Q and compound R.

..... [1M]

(ii) Wajarkan penggunaan ester dalam gula-gula.
Justify the usage of ester in candy.

..... [1M]

[2024-Sarawak-Set02-08] Rajah 7 menunjukkan suatu siri tindak balas bagi suatu isomer butena.
Diagram 7 shows a series of reactions of an isomer of butene.



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

..... [1M]

(b) Isomer butena dalam Rajah 8 boleh mengalami tindak balas pempolimeran penambahan. Lukis formula struktur bagi polimer yang terbentuk.
The isomer of butene in Diagram 8 can undergo addition polymerisation. Draw the structural formula of the polymer formed.

[1M]

(c)(i) Pemanasan butena dan gas hidrogen menghasilkan sebatian P. Nyatakan keadaan yang diperlukan untuk penghasilan sebatian P secara optimum.
Heating butene and hydrogen gas produces compound P. State the conditions required for the optimal production of compound P.

..... [1M]

(ii) Huraikan satu ujian kimia secara ringkas untuk membezakan sebatian P dan butena.
Briefly describe one chemical test to differentiate compound P and butene.

.....

..... [2M]

(d)(i) Namakan tindak balas Y./ *Name reaction Y.*

..... [1M]

(ii) Tulis satu persamaan kimia yang seimbang bagi tindak balas Y.
Write a balanced chemical reaction for reaction Y.

..... [1M]

(e) (i) Namakan sebatian R berdasarkan penamaan IUPAC.
Name compound R according to IUPAC nomenclature.

..... [1M]

(ii) Jadual 2 menunjukkan bau haruman bagi sebatian karbon yang berbeza.
Table 2 shows the scents of different carbon compounds.

Jenis sebatian karbon *Type of carbon compounds*	Bau haruman *Scent*
Butil metanoat *Butyl methanoate*	Plum *Plum*
Metil butanoat *Methyl butanoate*	Epal *Apple*
Pentil butirat *Pentyl butyrate*	Aprikot *Apricot*
2-metilpropil metanoat *2*-methylpropyl methanoate	Raspberi *Raspberry*

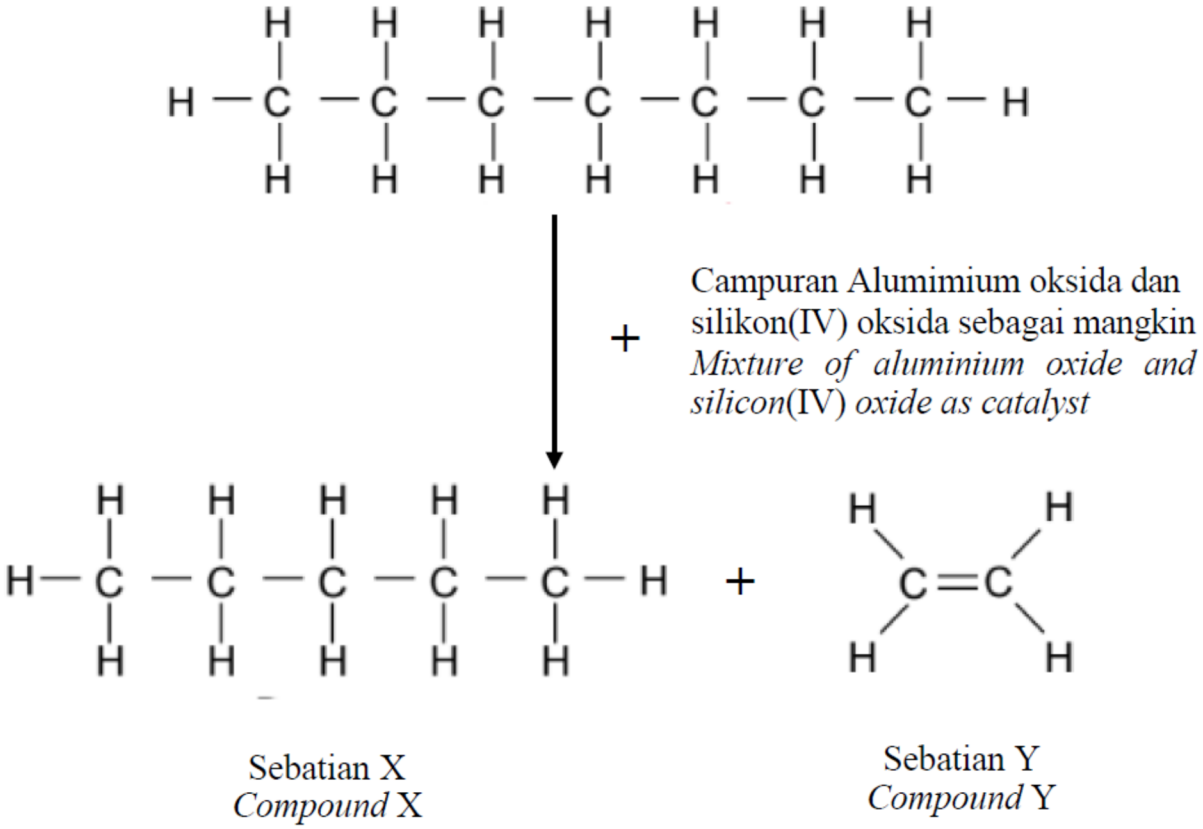
Berdasarkan Jadual 8, huraikan secara ringkas bagaimana sebatian R boleh digunakan sebagai bahan mentah untuk menghasilkan suatu pewangi dalam bahan kosmetik. Nyatakan bau haruman bagi hasil tindak balas yang terbentuk.

Based on Table 8, briefly explain how compound R can be used as raw material to produce a fragrance in cosmetic products. State the scent of the product formed.

.....

..... [2M]

[2024 Putrajaya-07][Rajah 5 menunjukkan carta alir pertukaran sebatian hidrokarbon dalam petroleum, C_7H_{16} kepada beberapa sebatian melalui proses peretakan.
Diagram 5 shows a flow chart for the conversion of hydrocarbon compound, C_7H_{16} in petroleum to a few carbon compounds by undergoes cracking process.



(a) Apakah yang dimaksudkan dengan proses peretakan?
What is meant by cracking process?

..... [1M]

(b) Sebatian X terbakar dengan lengkap dalam gas oksigen yang berlebihan menghasilkan gas karbon dioksida dan air.
Compound X is burnt completely in excess oxygen gas to produce carbon dioxide gas and water.

(i) Tulis persamaan kimia bagi tindak balas pembakaran itu.
Write the chemical equation for the combustion reaction.

..... [2M]

(ii) Jika 0.2 mol sebatian X digunakan dalam tindak balas itu, hitung isipadu gas karbon dioksida yang terhasil.
[1 mol gas menempati 24 dm^3 pada keadaan bilik]
If 0.2 mol of compound X is used in the reaction, calculate the volume of gas carbon dioxide produced.
[1 mol of gas occupies 24 dm^3 at room temperature]

[2M]

(c) Jadual 3.1 menunjukkan pemerhatian yang diperolehi daripada ujian yang telah dijalankan ke atas sebatian, X dan sebatian Y.
Table 3.1 shows the observations obtained from the tests that have been carried out on compound X and Y.

Tindak balas *Reaction*	Pemerhatian/ *Observation*	
	Sebatian/ *Compound* X	Sebatian/ *Compound* Y
Penambahan air bromin *Addition of bromine water*	Warna perang air bromin kekal tidak berubah *Brown colour of bromine water remains unchanged*	Warna perang air bromin bertukar tidak berwarna *Brown colour of bromine water turns colourless*

Berdasarkan Jadual 3.1, terangkan mengapa terdapat perbezaan pemerhatian bagi tindak balas itu.
Based on Table 3.1, explain why there are differences in the observations for the reaction.

.....

..... [2M]

(d) Jadual 3.2 menunjukkan susunan radas bagi dua kaedah berlainan untuk menghasilkan etanol.
Table 3.2 shows apparatus set-up for two different methods to prepare ethanol.

Kaedah *Method*	Persamaan kimia *Chemical equation*
I	Bahan P / Substance P → (Yis / Yeast) $C_2H_5OH + CO_2$
II	Bahan Q + H_2O / Substance Q → (H_3PO_4, 300°C, 60 atm) C_2H_5OH

Pada pandangan anda, kaedah manakah yang lebih sesuai untuk menyediakan etanol dan berikan sebab bagi jawapan anda.
Bagi kaedah yang dipilih, cadangkan bahan P atau bahan Q.
In your opinion, which method is more suitable to prepare ethanol and give a reason for your answer. For the selected method, suggest the substance P or Q.

.....

.....

.....

.....

..... [3M]

[2024-Selangor-Set0?-06] Rajah 4 menunjukkan sejenis bahan penambah perisa makanan yang mempunyai bau seperti buah aprikot yang dihasilkan daripada 2 bahan iaitu propanol tulen, (C_3H_7OH) dan asid butanoik glasial, (C_3H_7COOH). Air turut dihasilkan dalam tindak balas ini.
Diagram 4 shows a type of food flavouring additive with an apricot-like smell that is made from 2 substances which are pure propanol, (C_3H_7OH) and glacial butanoic acid, (C_3H_7COOH). Water is also produced in this reaction.

(a) Tuliskan persamaan kimia bagi tindak balas antara dua bahan tersebut.
Write the chemical equation for the reaction between the two substances.

..... [2M]

(b) Nyatakan maklumat kualitatif dan maklumat kuantitatif yang boleh diperoleh daripada persamaan kimia tersebut.
State qualitative information and quantitative information that can be obtained from the chemical equation.

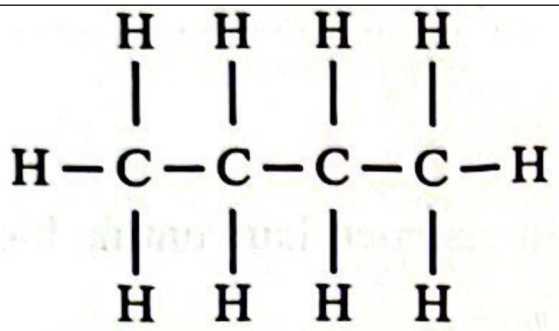
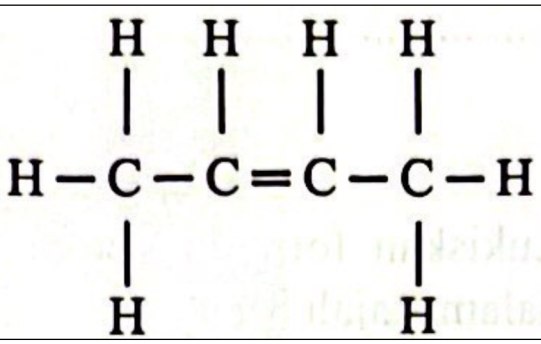
.....

.....

..... [3M]

(c) Amani menggunakan 60.0 g propanol tulen, (C_3H_7OH) untuk bertindak balas dengan asid butanoik glasial, (C_3H_7COOH) bagi menghasilkan bahan penambah perisa makanan yang mempunyai bau seperti buah aprikot. Hitung jisim asid butanoik glasial, (C_3H_7COOH) yang perlu digunakan.
[Jisim atom relatif: H = 1, C = 12, O = 16]
Amani used 60.0 g of pure propanol, (C_3H_7OH) to be reacted with glacial butanoic acid, (C_3H_7COOH) to make the food flavouring additive with an apricot-like smell. Calculate the mass of the glacial butanoic acid, (C_3H_7COOH) that needs to be used. [Relative atomic mass: H=1,C=12, 0 = 16]

[2024-Selangor-Set1-08] Rajah 8.1 menunjukkan formula struktur bagi dua hidrokarbon.
Diagram 8.1 shows the structural formulae of two hydrocarbons.

	
Hidrokarbon/ *Hydrocarbon* A	Hidrokarbon/ *Hydrocarbon* B

(a) Namakan hidrokarbon B mengikut penamaan IUPAC.
Name hydrocarbon B according to IUPAC nomenclature.

..... [1M]

(b) (i) Nyatakan maksud isomer./ State the meaning of isomer.

.....

..... [1M]

(ii) Lukiskan formula struktur bagi satu isomer lain untuk hidrokarbon A dalam Rajah 8.1.
Draw the structural formula for another isomer of the hydrocarbon A in Diagram 8.1.

[1M]

(c) (i) Heksana dan heksena menghasilkan jelaga apabila dibakar. Bandingkan kejelagaan semasa pembakaran heksana dan heksena dalam keadaan gas oksigen berlebihan.
Hexane and hexene produce soot when burnt. Compare the sootiness of the combustion of hexane and hexene in excess oxygen gas.

..... [1M]

(ii) Terangkan mengapa terdapat perbezaan kejelagaan daripada pembakaran heksana dan heksena. [Jisim atom relatif: C = 12, H = 1]
Explain why there is a difference in the sootiness from the combustion of hexane and hexene. [Relative atomic mass: C = 12, H = 1]

[3M]

(d) Rajah 8.2 menunjukkan sepasang kasut sukan yang digunakan oleh seorang pemain badminton.
Diagram 8.2 shows a pair of sports shoes used by a badminton player.

(i) Namakan jenis getah sintetik ini./ *Name this type of synthetic rubber.*

..... [1M]

(ii) Getah asli dan getah sintetik boleh digunakan sebagai bahan pembuatan tapak kasut sukan. Pilih jenis getah yang boleh digunakan sebagai bahan pembuatan tapak kasut sukan dan wajarkan pilihan anda.
Natural rubber and synthetic rubber can be used as the materials for the sports shoes sole. Choose the type of rubber that can be used as the material of the sports shoes sole and justify your choice.

.....

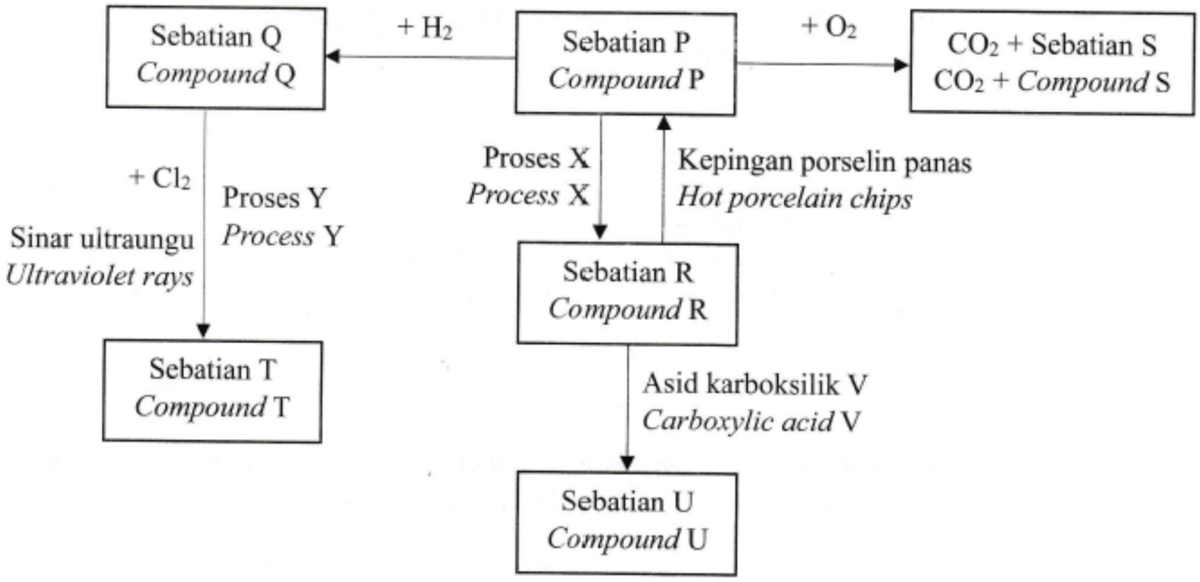
.....

.....

..... [2M]

Esei

[2024 Negeri Sembilan-10] Rajah 10 menunjukkan carta alir tindak balas yang dialami oleh sebatian P. Sebatian P ialah suatu hidrokarbon tak tepu yang mempunyai empat atom karbon.
Diagram 10 shows the flow chart for the reactions undergoes by compound P. Compound P is an unsaturated hydrocarbon that has four carbon atoms.



Berdasarkan Rajah 10,/ *Based on Diagram 10,*

(a) Apakah yang dimaksudkan dengan hidrokarbon?
Berikan satu contoh siri homolog bagi hidrokarbon tak tepu.
What is meant by hydrocarbon ?
Give an example of a homologous series for unsaturated hydrocarbons.
[2M]

(b) Kenal pasti sebatian Q, sebatian R dan sebatian S. Namakan proses X dan proses Y. Nyatakan kumpulan berfungsi bagi sebatian U.
Identify compounds Q, R and S. Name process X and Y. State functional group of compound U.

[6M]

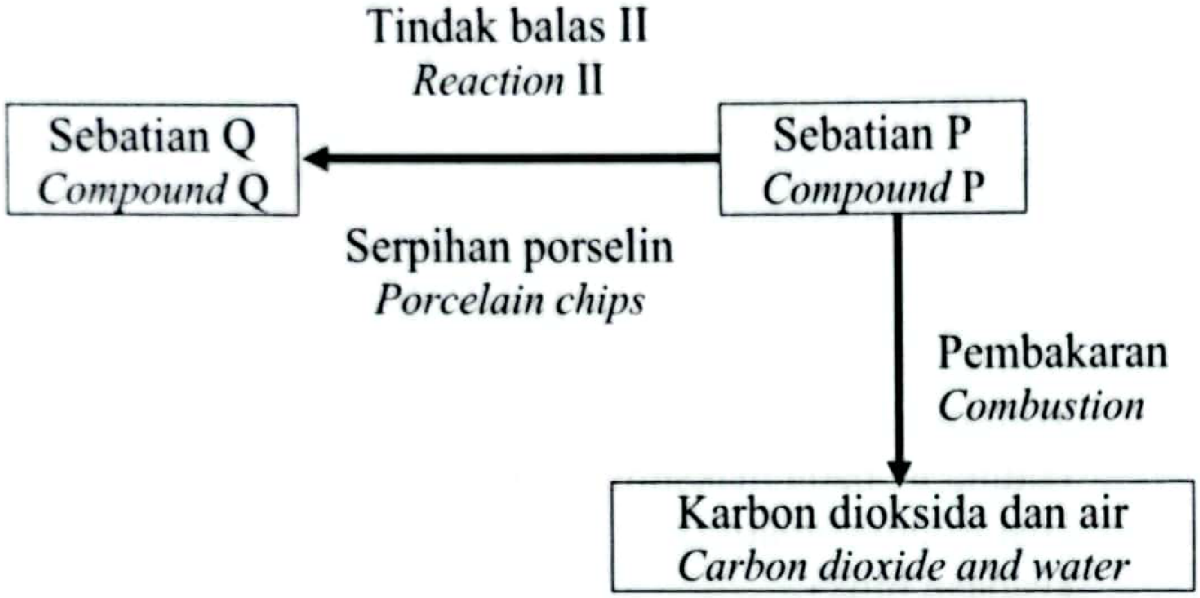
(c) Lukis dan namakan dua isomer bagi sebatian R. Sebatian P dan sebatian Q wujud sebagai gas pada keadaan bilik. Huraikan bagaimana untuk membezakan sebatian P dan sebatian Q di dalam makmal.
Draw and name two isomers of compound R. Compound P and Q exist as gas at room conditions. Describe how to distinguish compound P and Q that exist as gas in the laboratory.

[7M]

(d) Sekumpulan murid ditugaskan untuk menyediakan sebatian U yang mempunyai perisa pisang iaitu butil etanoat. Cadangkan asid karboksilik V yang digunakan untuk menyediakan sebatian U. Tulis persamaan kimia bagi penyediaan sebatian U. Hitung jisim sebatian R yang akan digunakan bagi mendapatkan 2 g sebatian U.
[Jisim atom relatif: H = 1; C = 12; O = 16]
A group of students was assigned to prepare a compound U that has a banana flavour which is butyl ethanoate. Suggest carboxylic acid V used to prepare compound U. Write the chemical equation for the preparation of compound U. Calculate the mass of compound R that will be used to obtain 2 g of compound U.
[Relative atomic mass: H = 1; C = 12; O = 16]

[5M]

[2024 Perak – Set 1-11] (a) Rajah 9.1 menunjukkan pertukaran sebatian P kepada sebatian Q. Sebatian P mempunyai formula molekul $C_4H_{10}O$.
Diagram 9.1 shows the conversions of compound P to compound Q. Compound P has a molecular formula of $C_4H_{10}O$.



Berdasarkan Rajah 9.1,
Based on Diagram 9.1,

(i) • Nyatakan siri homolog bagi sebatian P.
State the homologous series of compound P.

• Sebatian P boleh membentuk isomer. Lukiskan formula struktur bagi satu isomer itu dan namakannya mengikut sistem penamaan IUPAC.
Compound P can form isomers. Draw the structural formula for one of the isomer and name it according to the IUPAC system.

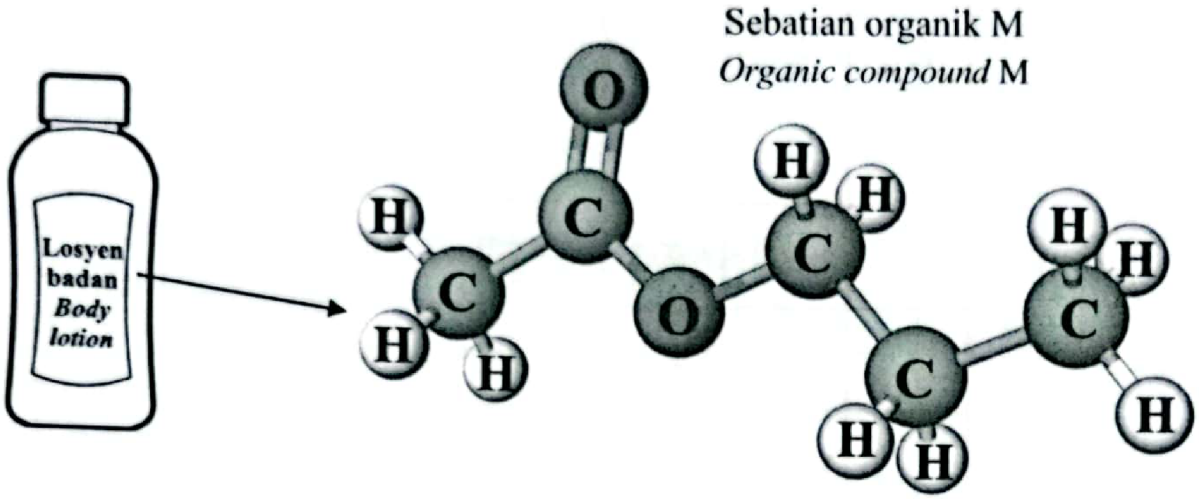
• Namakan tindak balas II dan lukis gambar rajah berlabel bagi menunjukkan susunan radas penyediaan sebatian Q dalam makmal.
State the name of (he reaction II and draw a labelled diagram to show apparatus set-up in order to prepare compound Q in laboratory.

[6M]

(ii) Tulis persamaan kimia seimbang bagi pembakaran lengkap 2.1 g sebatian P dan hitung isi padu gas karbon dioksida yang terhasil.
[Jisim atom relatif: H = 1, C = 12, O = 16; 1 mol bagi sebarang gas menempati 24 dm^3 pada keadaan bilik]
Write a balanced chemical equation for the complete combustion of 2.1 g of compound P and calculate the volume of carbon dioxide gas released.
[Relative atomic mass : H = 1, C = 12, O = 16 ; 1 mole of any gas occupies 24 dm^3 at room conditions]

[5M]

(b) Rajah 9.2 menunjukkan formula struktur bagi sebatian organik M yang terkandung dalam losyen badan.
Diagram 9.2 shows the structural formula of organic compound M contained in a body lotion.

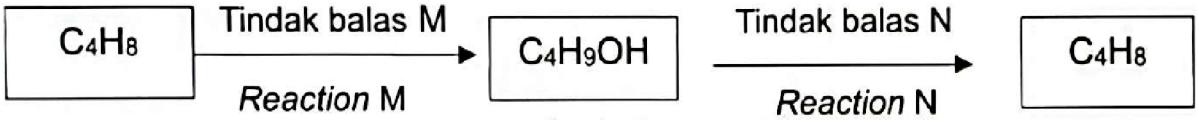


Rajah/ Diagram 9.2

Dengan menggunakan bahan dan radas yang sesuai, huraikan penyediaan sebatian organik M di dalam makmal. Dalam penerangan anda, nyatakan pemerhatian bagi hasil yang terbentuk dan tulis persamaan kimia bagi tindak balas itu.
By using suitable materials and apparatus, describe the preparation of organic substance M in the laboratory. In your explanation, state the observation for the product fanned and write the chemical equation for the reaction.

[9M]

[2024 – Terengganu-11] (a) Rajah 11 menunjukkan dua jenis tindak balas penukaran sebatian C_4H_9OH kepada sebatian organik yang lain.
Diagram 11 shows two types of reactions for the change of compound C_4H_9OH to another organic compounds.



Berdasarkan Rajah 11, nyatakan kumpulan berfungsi bagi C_4H_9OH dan nyatakan nama bagi tindak balas M dan tindak balas N.
Lukis gambar rajah susunan radas bagi tindak balas N.
Based on Diagram 11, state the functional group of C_4H_9OH and state the name of reaction M and reaction N. Draw the apparatus set-up for reaction N.

[5M]

(b) Sebatian R dihasilkan daripada tindak balas fermentasi glukosa. Sebatian R ditambah dengan larutan kalium dikromat (VI) berasid untuk menghasilkan sebatian S. Seterusnya sebatian R dan sebatian S bertindak balas dengan kehadiran asid sulfurik pekat menghasilkan sebatian T.
Compound R is produced from the fermentation reaction of glucose. Compound R is added to acidic potassium dichromate (VI) solution to produce compound S. Then compound R and compound S react in the presence of concentrated sulphuric acid to produce compound T.

(i) Nyatakan sebatian R, sebatian S dan sebatian T. Lukis formula struktur bagi sebatian R dan sebatian S.
State compound R, compound S and compound T. Draw the structural formula of compound R and compound S.

[5M]

(ii) Nyatakan nama tindak balas untuk menghasilkan sebatian T. Dengan menggunakan jawapan anda di (b)(i), huraikan bagaimana sebatian T dapat dihasilkan di dalam makmal. Sertakan persamaan kimia yang terlibat. Seterusnya hitung jisim sebatian T yang terhasil jika 0.5 mol sebatian R digunakan.
[Jisim atom relatif; C=12, O=16, H=1]

State the name of the reaction to produce compound T. Using your answer in (b)(i), describe how compound T can be produced in the laboratory. Include the chemical equation involved. Next, calculate the mass of compound T that results if 0.5 mol of compound R is used.
[Relative atomic mass', C=12, O=16, H=1] [10M]

[2024-Sarawak-Set01-09] Jadual 5 menunjukkan maklumat bagi empat sebatian organik P, Q, R dan S.
Table 5 shows the information of four organic compounds P, Q, R and S.

Sebatian organic *Organic compound*	Maklumat *Information*
P	• Mempunyai 3 atom karbon *Has 3 carbon atoms* • Larut dalam air *Soluble in water* • Bakar dengan nyalaan biru dan tiada jelaga *Burns with blue flame without soot*
Q	• Mempunyai 3 atom karbon *Has 3 carbon atoms* • Mengandungi karbon dan hidrogen sahaja *Contains carbon and hydrogen only* • Menyahwarnakan warna perang air bromin *Decolourises the brown colour of bromine water*
R	• Mempunyai 2 atom karbon *Has 2 carbon atoms* • Larut dalam air *Soluble in water* • Bertindak balas dengan kalsium karbonat menghasilkan gas karbon dioksida *Reacts with calcium carbonate to produce carbon dioxide gas*
S	• Mempunyai 4 atom karbon *Has 4 carbon atoms* • Mengandungi karbon dan hidrogen sahaja *Contains carbon and hydrogen only* • Tidak menyahwarnakan warna perang air bromin *Does not decolourise the brown colour of bromine*

Berdasarkan maklumat dalam Jadual 5,
Based on the information in Table 5,

(a) Tentukan formula molekul bagi sebatian P, Q, R dan S. Nyatakan nama siri homolog bagi setiap sebatian itu.
Determine the molecular formula of compounds P, Q, R and S. State the name of the homologous series for each compound.

[8M]

(b) Dalam proses peretakan, sebatian X dipanaskan pada suhu dan tekanan yang tinggi menghasilkan sebatian Q dan S. Kenal pasti sebatian X. Tuliskan persamaan kimia proses peretakan sebatian X. Hitungkan jisim sebatian Q jika 2400 dm3 sebatian X digunakan dalam tindak balas ini.
In the cracking process, compound X is heated at high temperature and pressure to produce compounds Q and S. Identify the compound X.
Write the chemical equation for the cracking process of compound X. Calculate the mass of compound Q if 2400 dm3 of compound X is used in the reaction.
[Jisim atom relatif: H = 1; C = 12. 1 mol gas menempati 24 dm3 pada keadaan bilik]
[Relative atomic mass: H=1; C = 12. 1 mole of gas occupies 24 dm3 at room temperature]

[5M]

(c) Sebatian P boleh ditukar kepada sebatian organik Q melalui proses T. Namakan proses T. Lukis gambar rajah yang berlabel untuk menunjukkan cara menyediakan dan mengumpul sebatian Q.
Compound P can be converted to organic compound Q through process T. Name process T. Draw a labelled diagram to show how to prepare and collect compound Q.

[3M]

(d) Sebuah kilang gula ingin mengeluarkan gula-gula berperisa baru. Satu sampel ester Z boleh disediakan melalui pengesteran antara sebatian P dan R. Tulis persamaan kimia untuk tindak balas ini. Lukis formula struktur dan namakan ester Z.
A factory wants to manufacture a new flavoured candy. A sample of ester Z is prepared through the esterification between compound P and R. Write the chemical equation for the reaction. Draw the structural formula and name the ester Z.

[4M]

[2024-Sarawak-Set02-06] Kalsium karbonat merupakan sejenis garam tak terlarutkan yang terhasil melalui proses pemendakan antara 50 cm^3 larutan kalsium nitrat 1.0 mol dm^{-3} dan 50 cm^3 larutan X 1.0 mol dm^{-3}. Persamaan termokimia berikut menunjukkan pembentukan kalsium karbonat.
Calcium carbonate is a type of insoluble salt that is produced through the precipitation process between 50 cm^3 of 1.0mol dm^{-3} calcium nitrate solution and 50 cm^3 of 1.0 mol dm^{-3} X solution. The following thermochemical equation shows the formation of calcium carbonate.

$$Ca^{2+}(ak/aq) + CO_3^{2-}(ak/aq) \rightarrow CaCO_3\ (p/s)\ ;\ \Delta H = +\ 12.6\ kJ\ mol^{-1}$$

(a) Nyatakan larutan X./ *State solution X.*

..... [1M]

(b) Berdasarkan persamaan termokimia yang diberi,
Based on the thermochemical equation given,

(i) lukis gambar rajah aras tenaga bagi tindak balas tersebut pada paksi yang disediakan.
draw the energy level diagram for the reaction on the provided axis.

[2M]

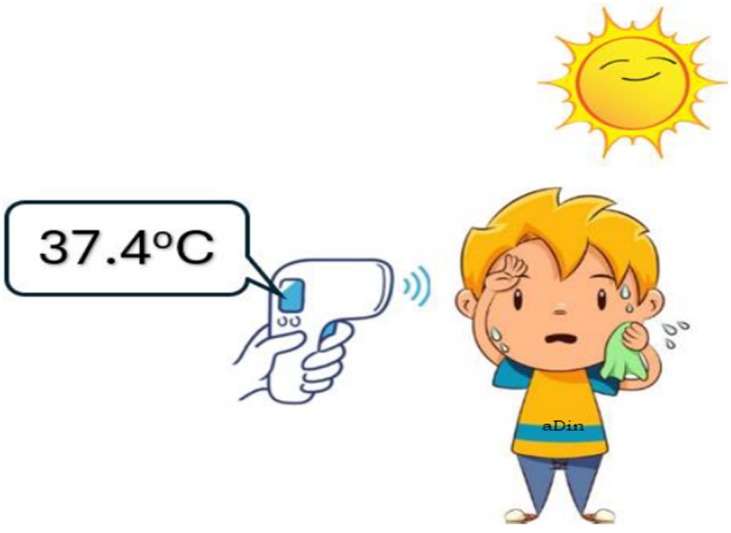
(ii) Nyatakan satu maklumat yang boleh dideduksikan daripada gambar rajah di 6(b)(i)
State one information that can be deduced from the diagram in 6(b)(i).
.....

..... [1M]

(iii) 24 g kalsium karbonat terhasil dalam aktiviti yang dijalankan. Hitung perubahan haba bagi tindak balas itu.
24 g of calcium carbonate is formed in the activity. Calculate the heat change of the reaction.
[Jisim molar kalsium karbonat = 100 g mol^{-1}, muatan haba tentu air = 4.2 J g^{-1} $°C^{-1}$]
[Molar mass of calcium carbonate = 100 g mol^{-1}, specific heat capacity of solution = 4.2 J g^{-1} $°C^{-1}$]

[2M]

(c) Seorang atlet telah mengambil bahagian dalam acara lompat jauh semasa hari sukan sekolah. Suhu badan tertinggi atlet yang dapat dikesan oleh termometer inframerah semasa pertandingan mencecah 38.6 °C. Rajah 5.1 menunjukkan suhu badan atlet selepas berehat 10 minit.
An athlete who has participated in a long jump event during a school sports day. The highest body temperature of the athlete detected by an infrared thermometer during the game reached 38.6 ℃.
Diagram 5.1 shows the body temperature of the athlete after resting for 10 minutes.



Perpeluhan menyebabkan badan atlet berasa sejuk. Adakah perpeluhan tindak balas endotermik atau tindak balas eksotermik? Terangkan sebab bagi jawapan anda.
Sweating causes the athlete's body to feel cold. Is sweating an endothermic reaction or an exothermic reaction? Explain the reason for your answer.

.....

..... [3M]

[2024 Johor Pasir Gudang-08] Persamaan termokimia berikut menunjukkan tindak balas pemendakan antara 20 cm^3 larutan natrium klorida 0.5 mol dm^{-3} dengan 20 cm^3 larutan argentum nitrat 0.5 mol dm^{-3}.
The following thermochemical equation shows the precipitation reaction between 20 cm^3 of 0.5mol dm^{-3} sodium chloride solution and 20 cm^3 of 0.5 mol dm^{-3} silver nitrate solution.

$$AgNO_3 + NaCl \rightarrow AgCl + NaNO_3 \; ; \Delta H = -67.2 \text{ kJ mol}^{-1}$$

(a) Nyatakan jenis tindak balas yang berlaku dari segi perubahan haba.
State the type of reaction in terms of heat change.

..... [1M]

(b) Namakan garam tak terlarutkan yang terhasil.
Name the insoluble salt produced.

..... [1M]

(c) Hitung/ *Calculate*

(i) bilangan mol ion argentum yang digunakan dalam eksperimen itu.
the number of moles of silver ions used in the experiment.

[1M]

(ii) perubahan haba, dalam J, tindak balas itu.
the heat change, in J, of the reaction.

[2M]

(d) Lukis rajah aras tenaga bagi tindak balas ini.
Draw the energy level diagram for the reaction.

[2M]

(e) Jadual 4 menunjukkan jenis pek yang digunakan untuk mengurangkan kesakitan akibat kecederaan.
Table 4 shows the type of pack used to reduced pain from injuries.

Pek E / Pack E	Pek J / Pack J
Pek panas Hot pack	Pek sejuk Cold pack

Pek yang manakah sesuai digunakan untuk meningkatkan aliran darah bagi mengurangkan kesakitan sendi atau otot? Cadangkan bahan- bahan kimia yang sesuai untuk menghasilkan pek tersebut.
Wajarkan cadangan anda.
Which pack is suitable to be used in increasing the blood flow to help to reduce joint or muscle pain? Suggest suitable chemical substances that can be used to make the pack. Justify your suggestion.

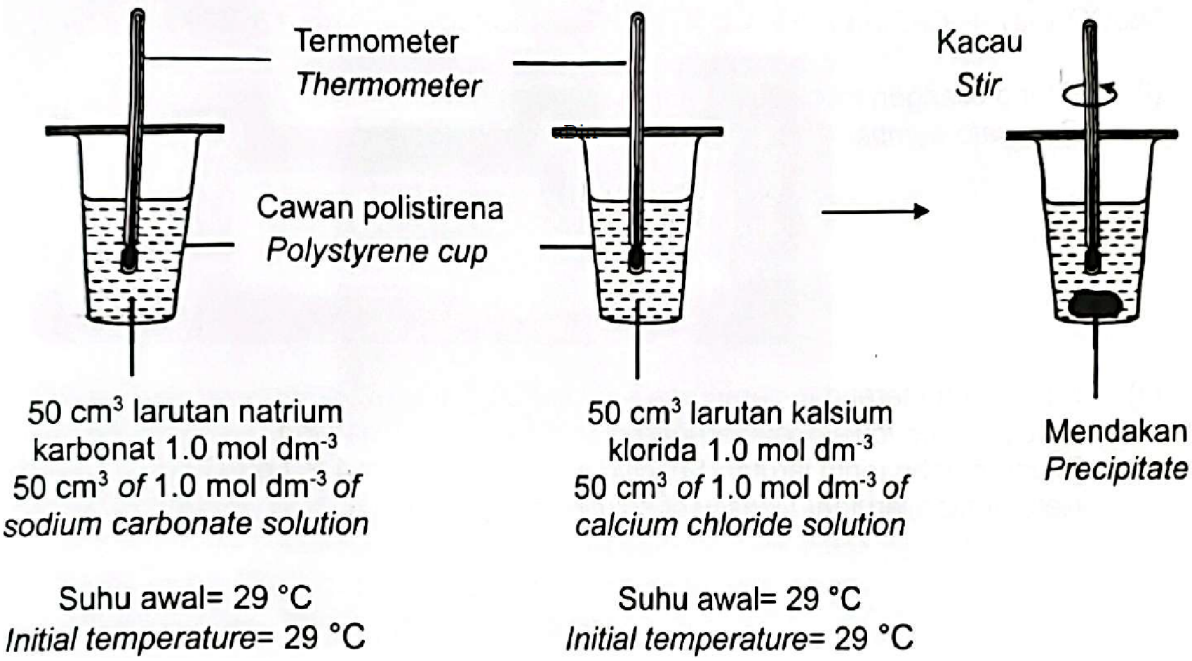
.....

.....

.....

..... [3M]

[2024 – Terengganu-08] Rajah 8.1. menunjukkan susunan radas yang digunakan untuk menentukan haba pemendakan.
Diagram 8.1 shows the apparatus set-up used to determine the heat of precipitation.



(a) Apakah maksud haba pemendakan?
What is meant by heat of precipitation?

..... [1M]

(b) Nyatakan satu pemerhatian bagi tindak balas ini.
State one observation of the reaction.

..... [1M]

(c) Tulis persamaan ion bagi tindak balas yang berlaku.
Write the ionic equation for the reaction occur.

..... [1M]

(d) Persamaan termokimia bagi tindak balas pemendakan seperti di bawah:
The thermochemical equation for the precipitation reaction as below:

$Na_2CO_3(ak) + CaCl_2(ak) \rightarrow CaCO_3(p) + 2NaCl(ak)$; $\Delta H = +21$ kJ mol^{-1}
$Na_2CO_3(aq) + CaCl_2(ag) \rightarrow CaCO_3(s) + 2NaCl(aq)$; $\Delta H = +21$ kJ mol^{-1}

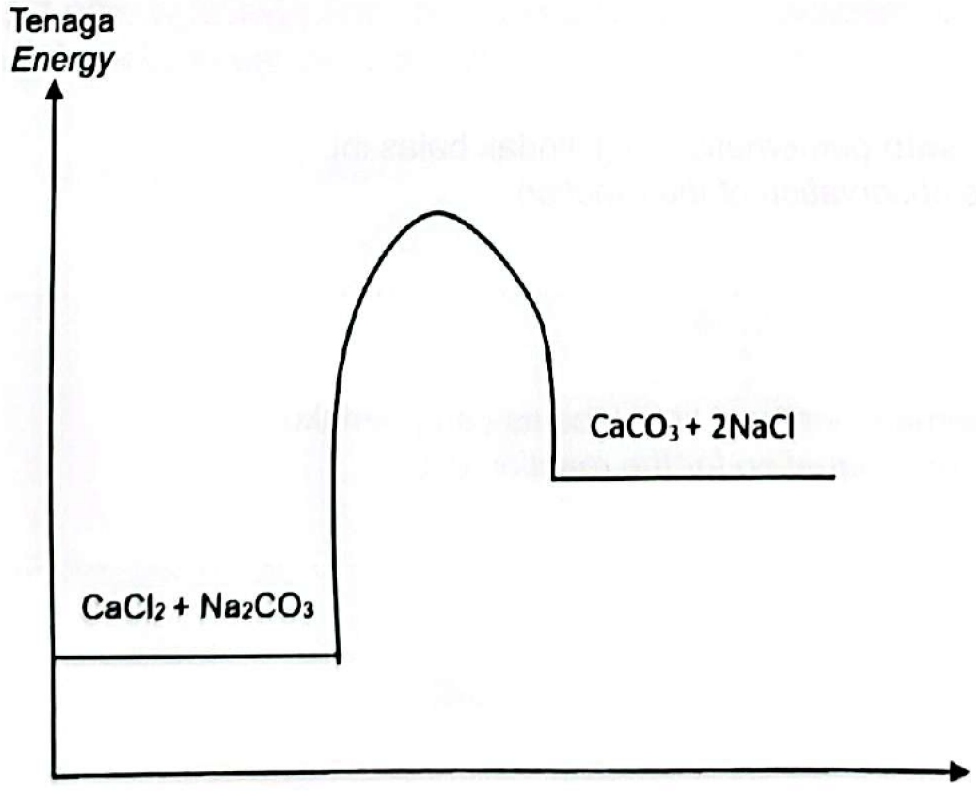
(i) Hitung bilangan mol kalsium karbonat yang terbentuk.
Calculate number of mol of calcium carbonate formed.

[1M]

(ii) Hitung suhu terendah campuran bagi tindak balas ini.
Calculate the lowest temperature of mixture for the reaction.
[Muatan haba tentu larutan/Specific heat of solution = 4.2 J $g^{-1}°C^{-1}$;
Ketumpatan larutan/ Density of solution = 1 g cm^{-3}]

[2M]

(e) Rajah 8.2 menunjukkan gambar rajah profil tenaga bagi haba pemendakan. Tandakan haba pemendakan dengan menggunakan simbol ΔH pada Rajah 8.2.
Diagram 8.2 shows the energy profile for the precipitation reaction.
Mark the heat of precipitation using ΔH symbol in Diagram 8.2.



(f) Semasa perlawanan ragbi, seorang pemain mendapati lututnya bengkak selepas terjatuh di padang.
During rugby match, a player found his knee was swollen after fell in the field.

Sebagai seorang pelajar kimia, cadangkan kaedah untuk membantu pemain itu. Terangkan bagaimana ia dapat mengurangkan kesakitan pemain itu.
As a chemistry student, suggest a method to help the player. Explain how the method can reduce the player's pain.

.....

.....

..... [3M]

[2024-Johor Batu Pahat-04] Jadual 4 di bawah menunjukkan haba pembakaran beberapa alkohol
Table 4 shows the heats of combustion of some alcohols.

Alkohol *Alcohol*	Formula molekul *Molecular formula*	Haba Pembakaran($kJmol^{-1}$) *Heat of Combustion ($kJmol^{-1}$)*
Etanol *Ethanol*	C_2H_5OH	-1 376
Propanol *Propanol*	C_3H_7OH	-2 016

(a) Apakah maksud haba pembakaran?
What is meant by heat of combustion?

.....

..... [1M]

(b) Berdasarkan maklumat dalam Jadual 4, bandingkan nilai bagi haba pembakaran etanol dan propanol. Terangkan jawapan anda.
Based on the information in Table 4, compare the value of heat of combustion of ethanol and propanol. Explain your answer.

.....

.....

..... [2M]

(c) Haba yang terbebas daripada pembakaran lengkap etanol 4.6 g etanol digunakan untuk memanaskan 200 cm^3 air.
Heat energy released from the complete combustion of 4.6 g ethanol is used to heat 200 cm^3 of water.

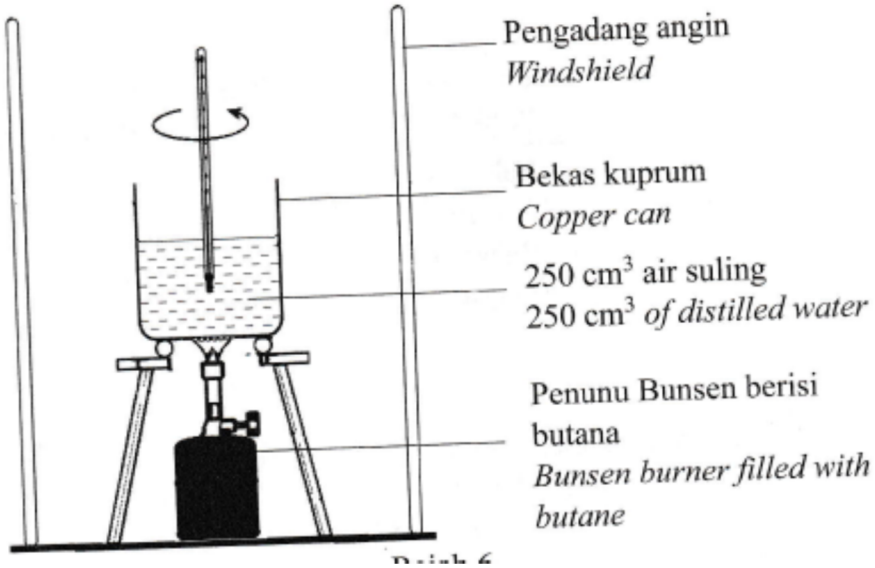
(i) Hitung tenaga haba yang dibebaskan dalam tindakbalas ini.
Calculate the heat energy released in this reaction.
[Jisim atom relative/ *Relative atomic mass*: C=12, H=1, O=16]

[2M]

(ii) Hitung perubahan suhu dalam tindakbalas itu.
[Muatan haba tentu air: 4.2 J g^{-1} $°C^{-1}$]
Calculate the temperature change in the reaction.
[Specific heat capacity of water: 4.2 J g^{-1} $°C^{-1}$]

[2M]

[2024 Negeri Sembilan-06] Rajah 6 menunjukkan susunan radas bagi menentukan haba pembakaran butana.
Diagram 6 shows the apparatus set-up to determine the heat of butane.



Dalam eksperimen tersebut, air telah dipanaskan sehingga suhu meningkat sebanyak 40°C.
Keputusan eksperimen telah direkodkan seperti yang berikut.
In experiment, water was heated until the temperature increased by 40°C.
The result of experiment was recorded as below:

Penerangan *Description*	Jisim (g) *Mass (g)*
jisim penunu Bunsen dengan butana sebelum pemanasan *Mass of Bunsen burner with butane before heating*	595.00
Jisim penunu Bunsen dengan butana selepas pemanasan *Mass of Bunsen burner with butane with butane after heating*	594.13

(a) Nyatakan maksud haba pembakaran.
State the meaning of heat of combustion.

..... [1M]

(b) Nyatakan jenis tindak balas bagi pembakaran butana.
State the type of reaction for combustion of butane.

(c) Hitungkan haba pembakaran butana.
[Jisim atom relatif: H = 1; C = 12; Muatan haba tentu air = 4.2 J g^{-1} $°C^{-1}$; Ketumpatan air = 1 g cm^{-3}]
Calculate the heat of combustion of butane.
[Relative atomic mass: H = 1; C = 12; Specific heat capacity of water = 4.2 J g^{-1} $°C^{-1}$; Density of water = 1 g cm^{-3}]

[4M]

(d) Jadual 2 menunjukkan haba pembakaran bagi metanol dan propanol
Table 2 shows the heat of combustion for methanol and propanol.

Alkohol *Alcohol*	Haba pembakaran (kJ mol^{-1}) *Heat of combustion (kJ mol^{-1})*
Metanol/ *Methanol*	-726
Propanol/ *Propanol*	-2021

Bandingkan haba pembakaran metanol dan propanol. Terangkan perbezaannya.
Compare the heat of combustion of methanol and propanol. Explain the difference.

.....

.....

.....

..... [4M]

[2024 Perlis-08] Jadual 2 menunjukkan nilai haba pembakaran bagi metanol, propanol dan butanol.
Table 2 shows the value of heat of combustion of methanol, propanol and butanol.

Alkohol *Alcohol*	Haba pembakaran (kJ mol^{-1}) *Heat of combustion (kJ mol^{-1})*
Metanol/*Methanol*, CH_3OH	-728
Propanol, C_3H_7OH	-2030
Butanol, C_4H_9OH	-2680

(a) Nyatakan maksud haba pembakaran.
State the meaning of heat of combustion.

..... [1M]

(b) Nyatakan jenis tindak balas pembakaran alkohol.
State the type of reaction for the combustion of alcohol.

..... [1M]

(c) Pembakaran metanol di dalam oksigen berlebihan menghasilkan karbon dioksida dan air. Tuliskan persamaan kimia bagi tindak balas tersebut.
The combustion of methanol in excess oxygen produces carbon dioxide and water. Write the chemical equation for the reaction.

..... [2M]

(d) Lukiskan gambar rajah aras tenaga bagi tindak balas di 8(c).
Draw the energy level diagram for the reaction in 8(c).

[2M]

(e) Nyatakan satu maklumat yang boleh diperoleh daripada jawapan anda di 8(d).
State one information that can be obtained from your answer in 8(d).

..... [1M]

(f) Jika 1.2 g propanol digunakan untuk memanaskan 200 cm^3 air, hitungkan perubahan suhu dalam tindak balas tersebut.
If 1.2 g of propanol is used to heat 200 cm^3 of water, calculate the temperature change in the reaction.
[Jisim molar propanol = 60 g mol^{-1}; Muatan haba tentu bagi air, c = 4.2 J g^{-1} $°C^{-1}$; Ketumpatan air = 1.0 g cm^{-3}]
[Molar mass of propanol = 60 g mol^{-1}; Specific heat capacity of water, c = 4.2 J g^{-1} $°C^{-1}$; Density of water = 1.0 g cm^{-3}]

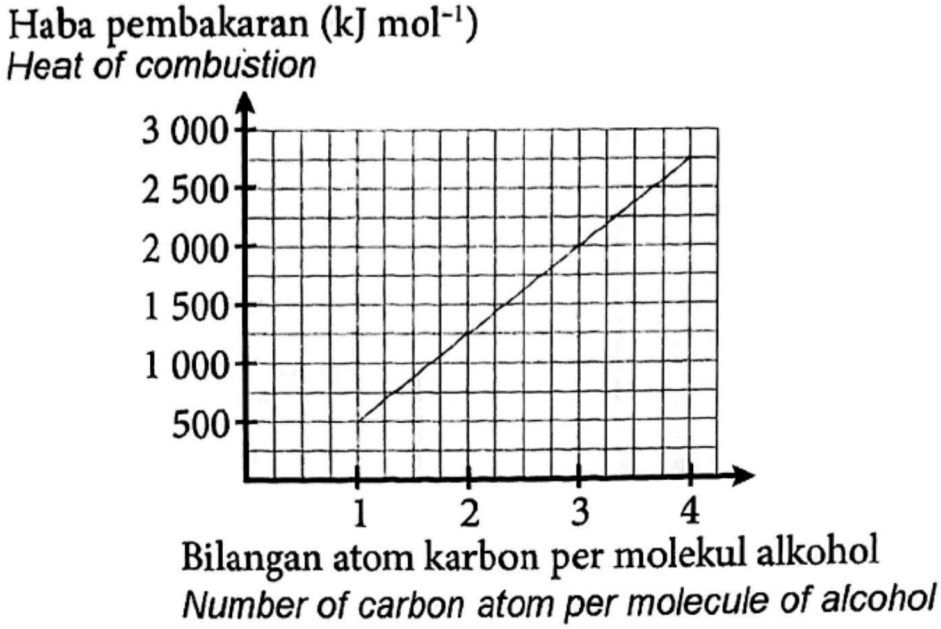
[2M]

(g) Bandingkan dan terangkan mengapa terdapat perbezaan dalam nilai haba pembakaran antara propanol dan butanol.
Compare and explain why there is a difference in the value of heat of combustion between propanol and butanol.

.....

..... [2M]

[2024 Johor-08] Rajah 8.1 menunjukkan graf haba pembakaran melawan bilangan atom karbon per molekul beberapa jenis alkohol.
Diagram 8.1 shows a graph of the heat of combustion against the number of carbon atom per molecule of several types of alcohol.



(a) Apakah maksud haba pembakaran?
What is the meaning of heat of combustion?

..... [1M]

(b) Berdasarkan Rajah 7, apakah nilai haba pembakaran etanol?
Based on Diagram 1, what is the heat value of combustion of ethanol?

..... [1M]

(c) Berdasarkan maklumat dari (b), tentukan perubahan suhu bagi 2.3 g etanol yang memanaskan bekas kuprum yang berisi 200 cm^3 air suling.
Based on the information from (b), determine the temperature change of 2.3 g of ethanol that heats a copper tin containing 200 cm^3 of distilled water.
[Muatan haba tentu larutan = 4.2 J g^{-1} $°C^{-1}$; ketumpatan larutan: 1 g cm^{-3}]
[Specific heat capacity of solution = 4.2 J g^{-1} $°C^{-1}$; density of solution: 1 g cm^{-3}]
[Jisim atom relatif: C = 12; H = 1; 0 = 16]
Relative atomic mass: C = 12; H = 1; O = 16]

[3M]

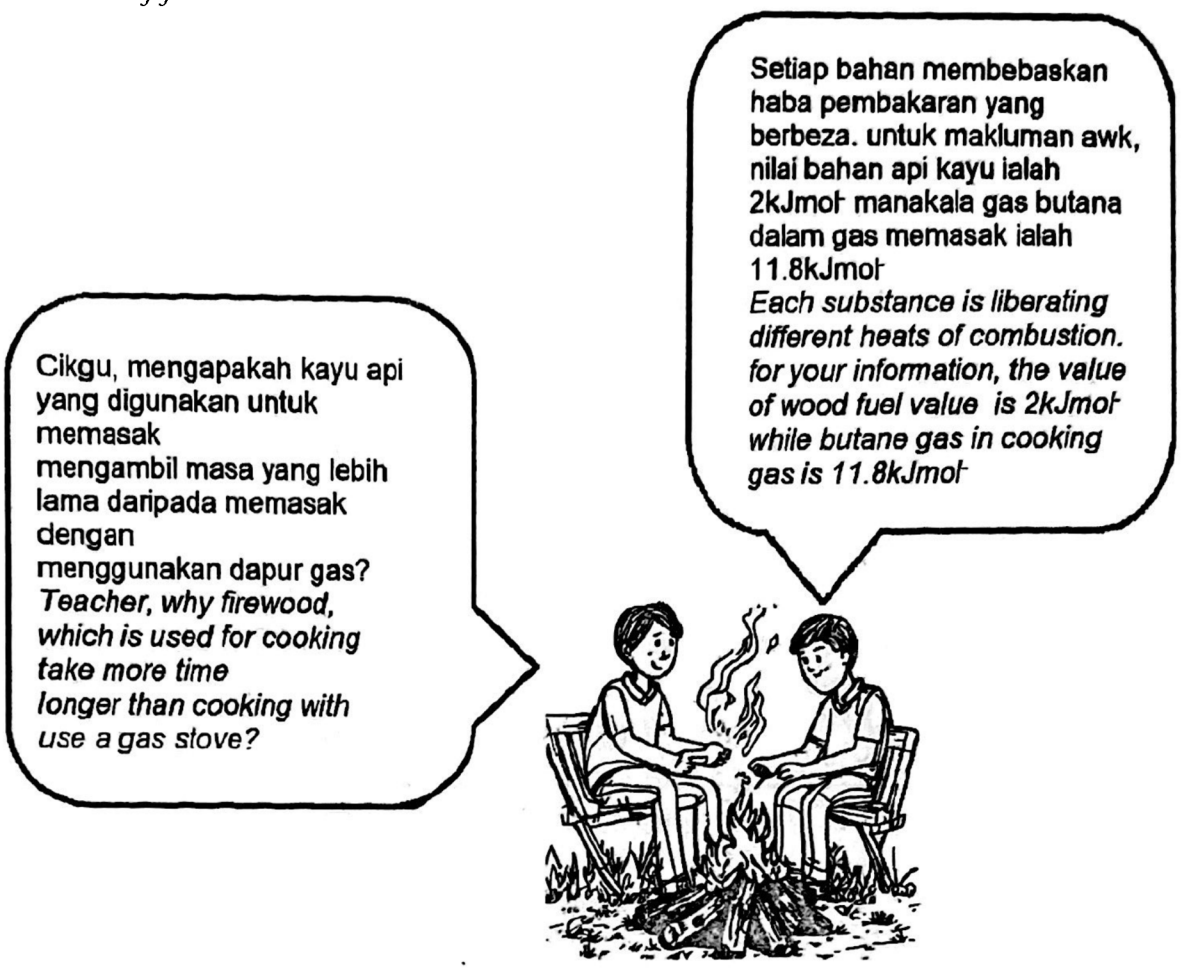
(d) Berdasarkan nilai dalam (c), bandingkan perubahan suhu eksperimen yang sama dilakukan oleh Ali di makmal sekolahnya dan nyatakan sebab kepada jawapan itu.
Based on the value in (c), compare the temperature changes of the same experiment conducted by Ali in his school laboratory and state the reason for the answer.

……

……

…… [2M]

(e) Rajah 8.2 menunjukkan perbualan seorang murid kepada gurunya semasa perkhemahan tentang nilai bahan api.
Diagram 8.2 shows a student's conversation with his teacher during the camp about the value of fuel.



Rajah 8.2/ Diagram 8.2

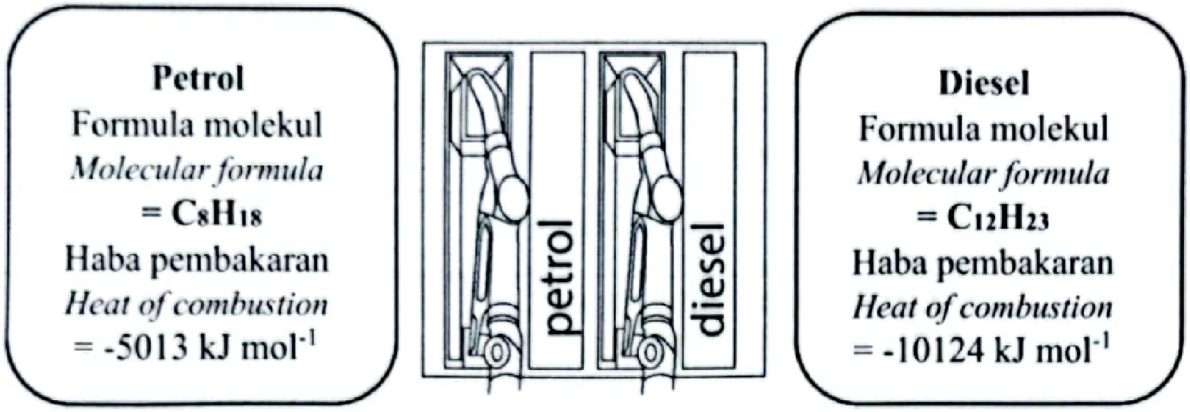
Guru tersebut menggunakan gas butana dalam dapur memasak.
Wajarkan penggunaan gas butana dalam dapur memasak bagi kegunaan penyediaan makanan seramai 80 orang murid semasa perkhemahan.
Huraikan jawapan anda.
The teacher uses butane gas in the cooking stove.
Justify the use of butane gas in the cooking stove for food preparation of 80 pupils during camping. Explain your answer.

.....

.....

..... [3M]

[2024 Perak – Set 1-07] Rajah 5 menunjukkan dua bahan api yang berlainan yang boleh didapati dengan mudah di semua stesen petrol seluruh Malaysia.
Diagram 5 shows two different fuels that are easily available at all petrol stations throughout Malaysia,



(i) Nyatakan maksud haba pembakaran.
State the meaning of heat of combustion.

..... [1M]

(ii) Bandingkan haba pembakaran bagi petrol dan diesel.
Compare the heat of combustion of petrol and diesel.

..... [1M]

(iii) Vishantan telah mengisi 2.28 liter petrol ke dalam tangki motosikalnya. Hitungkan haba yang terbebas jika petrol terbakar lengkap dalam oksigen berlebihan.
[Jisim molekul relatif petrol =114; Anggap 1 liter bersamaan 1000 g]
Vishantan had filled 2.28 liters of petrol into the tank of his motorcycle. Calculate the heat liberated if petrol burns completely in excess oxygen.
[The relative molecular mass of petrol =114; Assume 1 liter equals 1000 g]

[3M]

(b) Jadual 6 menunjukkan nilai bahan api bagi beberapa jenis bahan api.
Table 6 shows the fuel value for several types of fuel.

Bahan api *Fuel*	Nilai bahan api (kJ g^{-1}) *Fuel value (kJ g^{-1})*
Petrol/ *Petrol*	34
Metanol/ *Methanol*	30
Gas asli/ *Natural gas*	50
Gas hydrogen/ *Hydrogen gas*	143

Petrol telah digunakan secara meluas di dalam negara kita. Berdasarkan Jadual 6, pilih bahan api yang sesuai digunakan bagi menggantikan petrol. Wajarkan pilihan anda.
Petrol has been widely used in our country. Based on Table 6, choose the appropriate fuel to be used to replace petrol. Justify your choice.

.....

.....

..... [2M]

(c) Daziel dan rakan-rakan telah menyertai satu perkhemahan STEM. Mereka ditugaskan untuk memasak tanpa menggunakan api. Sebagai murid kimia, anda dikehendaki membantu Daziel untuk mereka cipta satu pek panas. Pilih bahan- bahan yang sesuai dan terangkan bagaimana ia berfungsi.
Daziel and friends have participated in a STEM camp. They were assigned to cook without using fire. As a chemistry' student, you are required to help Daziel to create a heat pack. Choose the appropriate ingredients and explain how they work.

Pek makanan *Food package*	• Air *Water*	• Besen *Basin*
Ammonium nitrat *Ammonium nitrate*	• Kalsium oksida *Calcium oxide*	

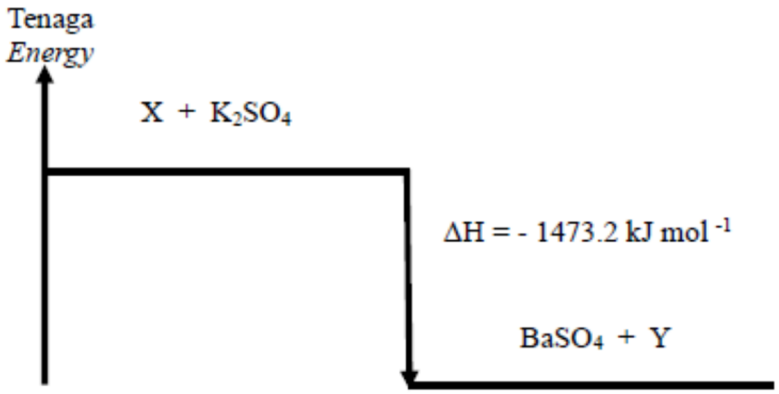
.....

.....

.....

..... [3M]

[2024 Johor Pasir Gudang-08] Rajah 8 menunjukkan gambar rajah aras tenaga bagi pemendakan barium sulfat, $BaSO_4$.
Diagram 8 shows the energy level diagram for the precipitation of barium sulphate, $BaSO_4$.



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

.....

..... [1M]

(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.

..... [1M]

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

..... [1M]

(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.

..... [1M]

(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.

$$Pb(NO_3)_2 + Na_2SO_4 \rightarrow PbSO_4 + 2NaNO_3 \; ; \; \Delta H = -50.4 \text{ kJ mol}^{-1}$$

Hitungkan kenaikan suhu apabila 25 cm^3 plumbum(II) nitrat 1 mol dm^{-3} ditambah kepada 25 cm^3 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 cm^3 of 1 mol dm^{-3} lead (II) nitrate solution is added to 25 cm^3 of 1 mol dm^{-3} sodium sulphate solution.
[Specific heat capacity of solution= 4.2 J g^{-1} $°C^{-1}$, density of solution=1gcm^{-3}]

[3M]

(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.

.....

..... [1M]

(c) Jadual 4 menunjukkan nilai bahan api metana dan oktana.
Table 4 shows fuel value of methane and octane.

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

Jadual 4/ *Table* 4

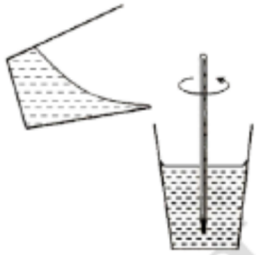
Bahan api manakah yang anda pilih untuk memasak dan wajarkan pilihan anda.
Which fuel would you choose for cooking and justify your choice.

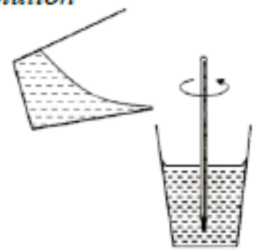
.....

..... [2M]

Esei

[2024 JUJ Set1-11] (a) Rajah 11.1 menunjukkan dua set eksperimen yang dijalankan oleh seorang murid untuk menentukan haba pemendakan argentum klorida dan mendakan X.
Diagram 11.1 shows two sets of experiment that carried out by a student to determine the heat of precipitation of silver chloride and precipitate X.

Set	Susunan alat radas *Set up apparatus*	Suhu awal (°C) *Initial temperature (°C)*	Suhu tertinggi atau terendah campuran (°C) *Highest or lowest temperature of the mixture (°C)*
I	$20\ cm^3$ larutan natrium klorida $0.5\ mol\ dm^{-3}$ *$20\ cm^3$ of $0.5\ mol\ dm^{-3}$ sodium chloride solution*  $20\ cm^3$ larutan argentum nitrat $0.5\ mol\ dm^{-3}$ *$20\ cm^3$ of $0.5\ mol\ dm^{-3}$ silver nitrate solution*	Larutan natrium klorida = 29.0 °C *Sodium chloride solution= 29.0 °C* Larutan argentum nitrat = 29.0 °C *Silver nitrate solution= 29.0 °C*	33°C  Mendakan argentum klorida *Silver chloride precipitate*

II	20 cm^3 larutan kalium karbonat 0.5 mol dm^{-3} *20 cm^3 of 0.5 mol dm^{-3} potassium carbonate solution*  20 cm^3 larutan magnesium nitrat 0.5 mol dm^{-3} *20 cm^3 of 0.5 mol dm^{-3} magnesium nitrate solution*	Larutan kalium karbonat = 29.0 °C Potassium carbonate solution= 29.0 °C Larutan magnesium nitrat = 29.0 °C Magnesium nitrate solution= 29.0 °C	26°C  Mendakan X *Precipitate X*

Rajah 11.1 / Diagram 11.1

Berdasarkan Rajah 11.1,/ *Based on Diagram 11.1,*

(i) Nyatakan warna bagi mendakan argentum klorida dan namakan mendakan X.
State the colour of silver chloride precipitate and name precipitate X.

[2M]

(ii) Hitungkan haba pemendakan bagi tindak balas dalam set I dan set II. Lukiskan gambarajah aras tenaga bagi set II.
Calculate the heat of precipitation for the reaction in set I and set II.
Draw the energy level diagram for set II.
[Diberi muatan haba tentu bagi larutan ialah C= 4.2 J g^{-1} $°C^{-1}$; ketumpatan larutan = 1 g cm^{-3}]
[Given the specific heat capacity of solution is C= 4.2 J g^{-1} $°C^{-1}$; density of solution = 1 g cm^{-3}]

[8M]

(iii) Bandingkan perbezaan bagi tindak balas dalam set I dan set II dari segi jenis tindak balas dan perubahan tenaga semasa pemutusan ikatan dan pembentukan ikatan.
Compare the difference of the reaction in Set I and Set II in terms of types of reaction and heat energy changes during bond breaking and bond formation.

[2M]

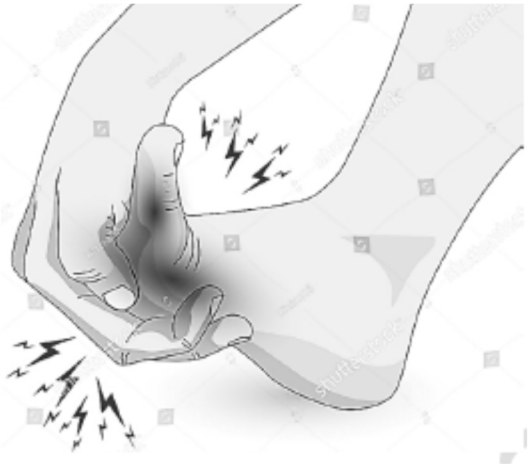
(b) (i) Anda dibekalkan dengan bahan-bahan berikut:
You are supplied with the following substances:

- Pelet natrium hidroksida/ *Sodium hydroxide pellets*
- Ammonium nitrate/ *Ammonium nitrat*
- Kalsium oksida/ *Calcium oxide*
- Air suling/ *Distilled water*

Huraikan satu eksperimen untuk menentukan perubahan suhu apabila bahan-bahan yang dibekalkan dilarutkan di dalam air suling.
Dalam huraian anda, sertakan keputusan perubahan suhu yang diperhatikan.
Describe an experiment to determine the temperature change when the substances are dissolved in distilled water.
In your description, include the result of the temperature change that is observed.

[6 M]

(ii) Rajah 11.2 menunjukkan kaki kawan anda yang bengkak akibat terjatuh semasa berlari di padang sekolah.
Diagram 11.2 shows your friend's swollen foot caused by falling while running on the school field.

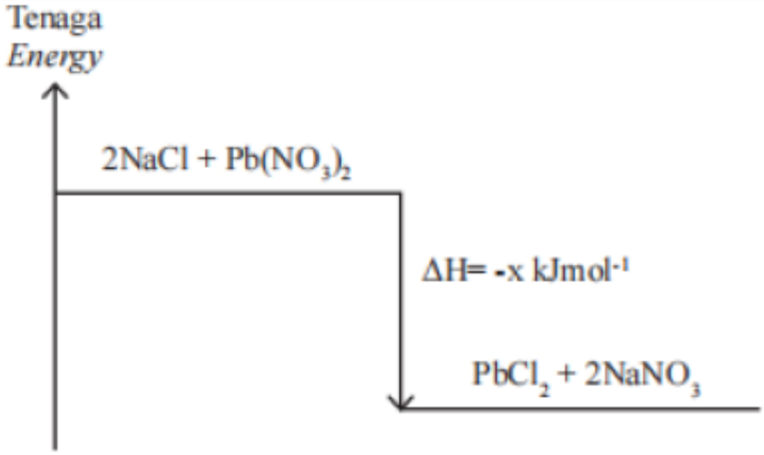
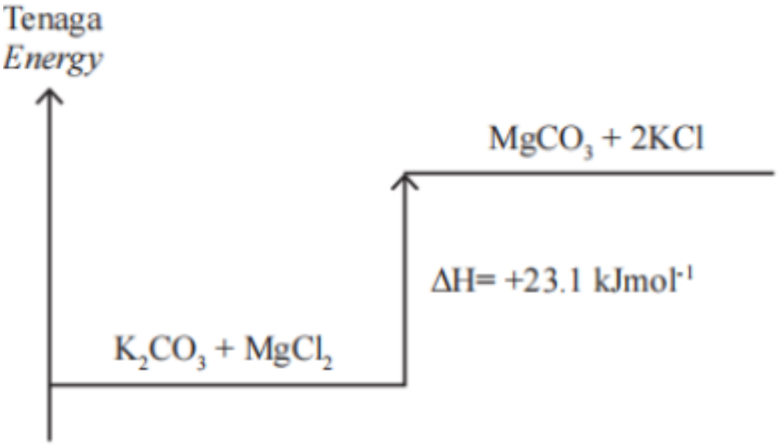


Rajah 11.2 / Diagram 11.2

Pilih satu bahan yang paling sesuai daripada b(i) untuk dijadikan pek sejuk bagi mengurangkan bengkak di bahagian kaki kawan anda dan berikan alasan anda.
Choose one substance that is most suitable from b(i) to make a cold pack to reduce the swelling on your friend's foot and give your reason.

[2M]

[2024 Johor Muar-09] Rajah 8 menunjukkan gambar rajah aras tenaga bagi dua tindak balas pemendakan.
Diagram 8 shows energy level diagrams for two sets of precipitation reaction.

Set *Set*	Gambar rajah aras tenaga *Energy level diagram*
I	
II	

(a) Berdasarkan Rajah 8,/ *Based on Diagram 8.*

(i) Tindak balas yang manakah membebaskan tenaga haba ke persekitaran semasa tindak balas berlaku? Terangkan.
Which reaction release heat energy to the surrounding during the reaction? Explain.

[2M]

(ii) Dalam Set I, apabila 50 cm^3 larutan natrium klorida 1.0 mol dm^{-3} ditambahkan kepada 50 cm^3 larutan plumbum(II) nitrat 1.0 mol dm^{-3}, suhu meningkat sebanyak 3.5°C.
Tentukan bahan tindak balas yang manakah berlebihan. Hitungkan nilai x.
[Ketumpatan air = 1.0 g cm^{-3}, muatan haba tentu air, c = 4.2 Jg^{-1} $^{\circ}C^{-1}$]
In Set I, when 50 cm^3 of 1.0 mol dm^{-3} sodium chloride solution is added into 50 cm^3 of 1.0mol dm^{-3} lead (II) nitrate solution, temperature increases by 3.5°C. Determine which reactant is in excess. Calculate the value of x.
[Density of water = 1.0 g cm^{-3}, specific heat capacity of water, c = 4.2 Jg^{-1} $^{\circ}C^{-1}$] [5M]

(iii) Ahmad menjalankan eksperimen Set II dengan menambahkan 50 cm^3 larutan kalium karbonat 1.0 mol dm^{-3} ke dalam 50 cm^3 larutan magnesium klorida 1.0 mol dm^{-3}. Perubahan suhu dicatat dan seterusnya haba pemendakan bagi eksperimen tersebut dihitung. Akan tetapi, nilai haba pemendakan yang diperoleh tidak sama seperti dalam Rajah 8..

Nyatakan maksud haba pemendakan dan terangkan mengapa nilai haba pemendakan ini berbeza? Tuliskan persamaan termokimia bagi tindak balas ini. Nyatakan warna mendakan yang terbentuk dalam tindak balas ini.

Ahmad conducted the experiment in Set II by adding 50 cm^3 of 1.0 mol dm^{-3} potassium carbonate solution into 50 cm^3 of 1.0 mol dm^{-3} magnesium chloride solution. The temperature change is recorded and then the heat of precipitation for the reaction is calculated. However, the value of heat of precipitation obtained is not the same as in Diagram 14.

State the meaning of heat of precipitation and explain why these heat values of precipitation are different? Write a thermochemical equation for the reaction. State the colour of precipitate formed in this reaction.

[5M]

(b) Jadual 3 menunjukkan bahan tindak balas yang digunakan oleh Jeffrey semasa menjalankan eksperimen untuk menentukan haba penyesaran kuprum.
Table 3 shows the reactants used by Jeffrey when carrying out an experiment to determine the heat of displacement of copper.

Set *Set*	Bahan tindak balas *Reactants*
I	Serbuk magnesium berlebihan + 50 cm^3 larutan kuprum(II) nitrat 0.5 mol dm^{-3} *Excess magnesium powder + 50 cm^3 of 0.5 mol dm^{-3} copper(II) nitrate solution*
II	Serbuk ferum berlebihan + 50 cm^3 larutan kuprum(II) nitrat 0.5 mol dm^{-3} *Excess iron powder + 50 cm^3 of 0.5 mol dm^{-3} copper(II) nitrate solution*

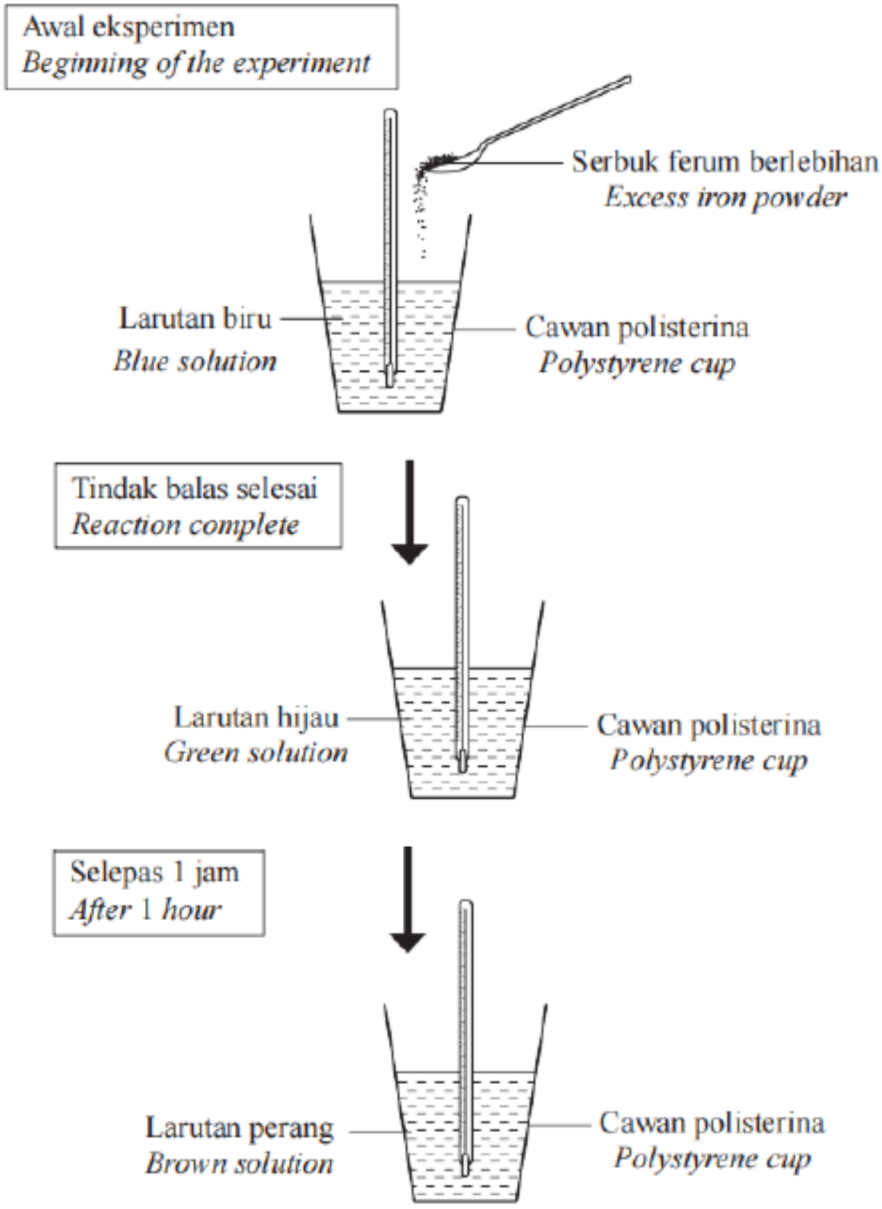
(i) Nyatakan dua pemerhatian daripada Set I.
State two observations from Set I.

[2M]

(ii) Bandingkan haba penyesaran Set I dan Set II. Terangkan.
Compare the heat of displacement of Set I and Set II. Explain.

[2M]

(iii) Rajah 15 menunjukkan perubahan warna larutan dalam Set II selepas tindak balas selesai.
Diagram 15 shows the colour change of solution in Set II after the reaction complete.

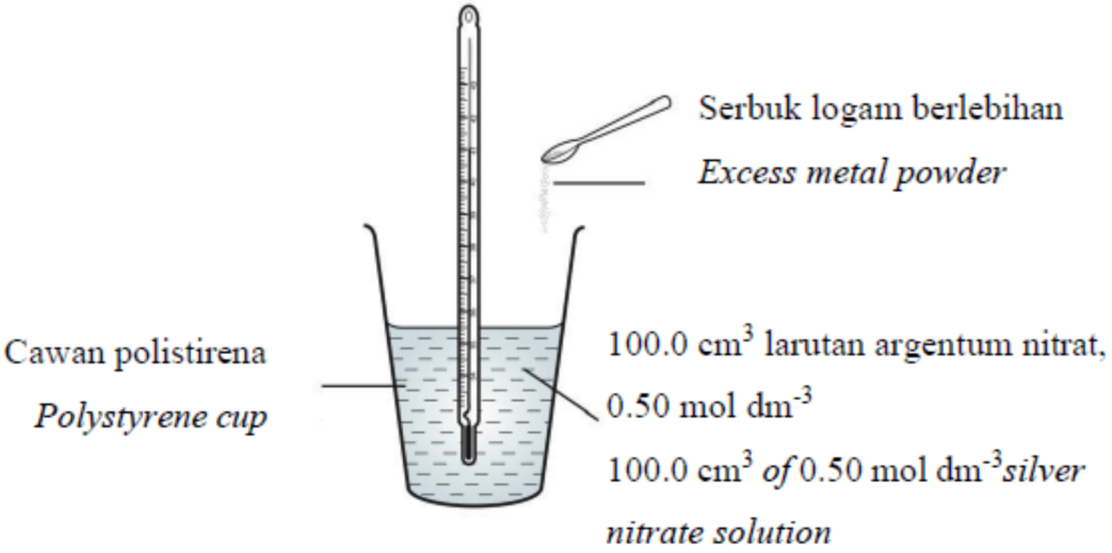


Rajah 9 / Diagram 9

Terangkan perubahan warna larutan ini.
Explain the colour change of the solution.

[4M]

[2024 Putrajaya-11] (a) Rajah 9.1 menunjukkan set eksperimen yang dijalankan oleh seorang pelajar untuk mengkaji haba penyesaran bagi tindak balas antara larutan argentum nitrat dengan suatu serbuk logam. Suhu awal larutan argentum nitrat bagi kedua – dua set adalah sama, iaitu 29.0 °C.
Diagram 9.1 shows a set of experiment carried out by a student to investigate the heat of displacement for the reaction between silver nitrate solution with metal powder. Initial temperature of silver nitrate solution for both sets are the same, which is 29.0 °C.



Jadual 4.1 menunjukkan nilai haba penyesaran bagi dua logam yang berbeza.
Table 4.1 shows heat of displacement values for two different metals.

Set	Logam *Metal*	Haba penyesaran (kJ mol^{-1}) *Heat of neutralisation (kJ mol^{-1})*
I	Magnesium *Magnesium*	-60.5
II	Zink *Zinc*	-45.5

Berdasarkan Jadual 4.1,/ *Based on Table 4.1,*

(i) Nyatakan maksud bagi haba penyesaran.
State the meaning of heat of displacement.

[1M]

(ii) Hitung suhu tertinggi campuran bagi tindak balas dalam Set I.
[Diberi muatan haba tentu bagi larutan ialah c = 4.2 J g^{-1} $°C^{-1}$; ketumpatan larutan = 1 g cm^{-3}]
Calculate highest temperature of the mixture in Set I.
[Given the specific heat capacity of solution is c = 4.2 J g^{-1} $°C^{-1}$; density of the solution = 1 g cm^{-3}]

[4M]

(iii)Lukis gambar rajah aras tenaga bagi Set II.
Draw the energy level diagram for Set II.

[2M]

(b) Jadual 4.2 menunjukkan bahan api dan haba pembakaran bagi butanol, C_4H_9OH dan kerosin, $C_{12}H_{26}$.
Table 4.2 shows type of fuel and heat of combustion of ethanol, C_4H_9OH and kerosene, $C_{12}H_{26}$.

Bahan api *Fuel*	Haba pembakaran, (kJ mol^{-1}) *Heat of combustion, (kJ mol^{-1})*
Butanol/ *Butanol*	2676
Kerosin/ *Kerosene*	6290

Berdasarkan Jadual 4.2, pilih satu bahan api yang terbaik dari aspek:
● Nilai bahan api
● Kesan terhadap alam sekitar
Wajarkan kedua – dua pemilihan anda itu.
[Jisim molar: butanol = 74 g mol^{-1}, kerosin = 170 g mol^{-1}, Jisim atom relatif: C = 12, H = 1]
Based on Table 4.2, choose one fuel that is best in terms of:
● *Fuel value*
● *Effects on environment*
Justify both of your choices.
[Molar mass: butanol = 74 g mol^{-1}, kerosene = 170 g mol^{-1}, Relative atomic mass: C = 12, H = 1]

[8M]

(c) Rajah 10 menunjukkan Iman yang terseliuh dan kakinya membengkak.
Diagram 10 Iman that sprained his leg, and his leg was swollen.

Dia memerlukan pek penyejuk. Sebagai seorang murid Kimia, cadangkan bahan - bahan yang sesuai dan mudah didapati di rumah. Tuliskan kaedah untuk menyediakan pek penyejuk serta terangkan fungsinya.
He needs a cooling pack. As a Chemistry student, suggest suitable materials and easy to obtain from the house. Write the methods to prepare the cooling pack and explain the function of it.

[5M]

[2024-Selangor-Set2-09] (a) Nyatakan maksud haba pembakaran.
State the meaning of heat of combustion.

[1M]

(b) Butana, C_4H_{10} dan butanol, C_4H_9OH boleh terbakar dalam gas oksigen berlebihan untuk menghasilkan gas karbon dioksida dan air.
Tuliskan persamaan kimia untuk kedua-dua tindak balas ini.
Butane, C_4H_{10} and butanol, C_4H_9OH can burn in excess oxygen gas to produce carbon dioxide gas and water. Write the chemical equations for both reactions.

[4M]

(c) Jadual 4 menunjukkan nilai haba pembakaran untuk dua sebatian.
Table 4 shows the heat of combustion of two compounds.

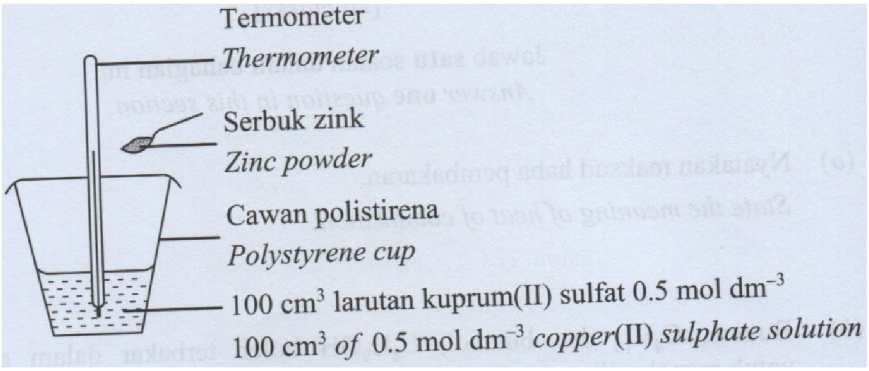
Sebatian *Compound*	Jisim molar (g mol^{-1}) *Molar mass (g mol^{-1})*	Haba pembakaran (kJ mol^{-1}) *Heat of combustion (kJ mol^{-1})*
Metana, CH_4 *Methane, CH_4*	16	890
Propana, C_3H_8 *Propane, C_3H_8*	44	2 220

(i) Nyatakan maksud nilai bahan api.
State the meaning of fuel value.

(ii) Justifikasikan sebatian yang mana adalah bahan pembakaran yang lebih baik. Jelaskan jawapan anda.
Justify which compound is a better fuel.
Explain your answer.

[5M]

(d) Rajah 7 menunjukkan tindak balas antara serbuk zink dan larutan kuprum(II) sulfat.
Diagram 7 shows the reaction between zinc powder and copper(II) sulphate solution.



Suhu awal larutan kuprum(II) sulfat (°C) *Initial temperature of copper(II) sulphate solution (°C)*	27.0
Suhu tertinggi untuk campuran (°C) *Highest temperature of the mixture (°C)*	38.5

(i) Nyatakan perubahan suhu dan jenis tindak balas.
State the temperature change and the type of reaction.

(ii) Hitungkan haba tindak balas.
Calculate the heat of reaction.

(iii) Tuliskan persamaan termokimia yang terlibat.
Write the thermochemical equation involved.

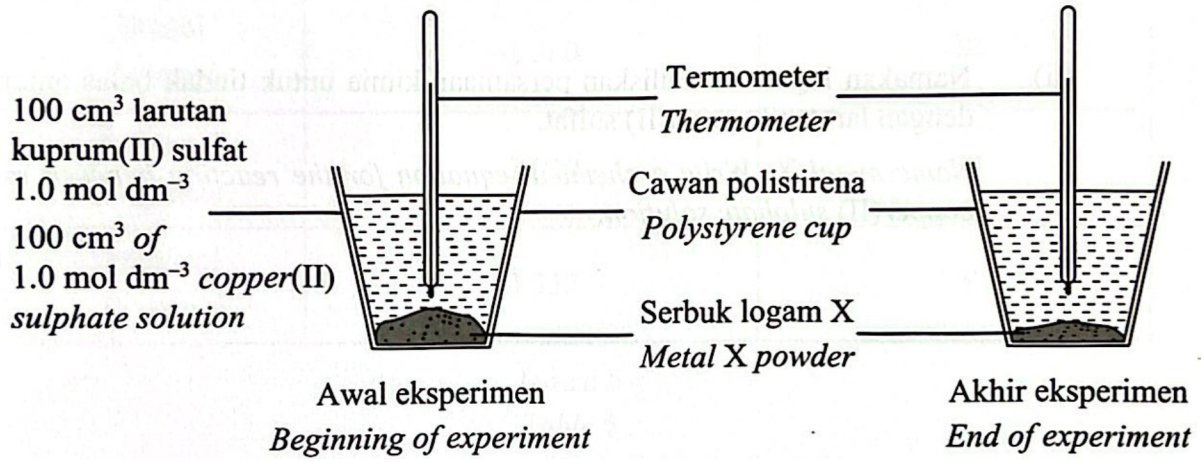
(iv) Lukis gambar rajah aras tenaga.
Draw the energy level diagram.
[Muatan haba tentu larutan, c = 4.2 J g^{-1} $°C^{-1}$;
Ketumpatan larutan = 1 g cm^3]
[Specific heat capacity of solution, c = 4.2 J g^{-1} $°C^{-1}$;
Density of solution = 1 g cm^3]

[10M]

[2024-Selangor-Set1-09] (a) Nyatakan maksud haba penyesaran.
State the meaning of heat of displacement.

[1M]

(b) Rajah 9 menunjukkan susunan radas yang digunakan dalam satu eksperimen untuk menentukan haba penyesaran kuprum oleh logam X.
Diagram 9 shows the set-up of apparatus used in an experiment to determine the heat of displacement of copper by metal X.



Jadual 4 menunjukkan keputusan bagi eksperimen ini.
Table 4 shows the results of this experiment.

Penerangan *Description*	Suhu (°C) *Temperature (°C)*
Suhu larutan sebelum tindak balas *Temperature of the solution before the reaction*	28.0
Suhu tertinggi yang dicapai oleh campuran bahan tindak balas *The highest temperature achieved by the mixture of the reaction*	35.5

(i) Nyatakan perubahan warna larutan dalam tindak balas ini.
State the colour change of the solution in this reaction.

[2M]

(ii) Namakan logam X. Tuliskan persamaan kimia untuk tindak balas antara logam X dengan larutan kuprum(II) sulfat.
Name metal X. Write a chemical equation for the reaction between metal X and copper(II) sulphate solution.

[2M]

(c) Hitungkan haba penyesaran apabila 1 mol kuprum disesarkan oleh logam X.
[Muatan haba tentu larutan, c = 4.2 J g^{-1} $°C^{-1}$; Ketumpatan larutan = 1 g cm^{-3}]
Calculate the heat of displacement when 1 mole of copper is displaced by metal X.
[Specifc heat capacity of solution, c = 4.2 J g^{-1} $°C^{-1}$; Density of solution = 1 g cm^{-3}]

[4M]

(d) Lukis gambar rajah aras tenaga bagi tindak balas ini.
Draw the energy level diagram for this reaction.

[3M]

(e) Jadual 5 menunjukkan nama dan haba pembakaran untuk etanol, propanol dan pentanol.
Table 5 shows the name and heat of combustion of ethanol, propanol and pentanol.

Nama alkohol Name of alcohol	Haba pembakaran (kJ mol^{-1}) *Heat of combustion (kJ mol^{-1})*	Nilai bahan api (kJ g^{-1}) Fuel value (kJ g^{-1})
Etanol/*Ethanol*	-1 380	30
Propanol/ *Propanol*	-2 020	34
Pentanol/ *Pentanol*	-3 332	Y

(i) Berdasarkan Jadual 5, hitungkan nilai Y.
Kemudian pilih satu alkohol yang lebih sesuai untuk dijadikan sebagai bahan api. Wajarkan pilihan anda.
[Jisim atom relatif: H = 1, C = 12, 0 = 16]

Based on Table 5, calculate the value of Y.
Then choose a more suitable alcohol to be used as fuel.
Justify your choice.
[Relative atomic mass: H = 1, C = 12, O = 16]

[5M]

(ii) Jika anda ialah seorang pencinta alam, alkohol yang manakah akan anda pilih untuk digunakan sebagai bahan api? Jelaskan.
If you are a nature lover, which alcohol will you choose to use as fuel? Explain.

[3M]

[2024-Sarawak-Set01-10] (a) Persamaan termokimia berikut mewakili tindak balas penyesaran antara zink dan larutan kuprum(II) sulfat.
The following thermochemical equation represents the reaction between zinc and copper(II) sulphate solution.

$$Zn + CuSO_4 \rightarrow ZnSO_4 + Cu; \quad \Delta H = -210 \text{ kJ mol}^{-1}$$

(i) Berdasarkan persamaan termokimia di atas, nyatakan maksud haba penyesaran.
Based on the above thermochemical equation, state the meaning of heat of displacement.

[1M]

(ii) Nyatakan warna larutan kuprum(II) sulfat.
State the colour of copper(II) sulphate solution.

[1M]

(iii) Apakah yang akan berlaku kepada nilai ΔH apabila logam zink digantikan dengan logam magnesium? Jelaskan jawapan anda.
What will happen to ΔH value when zinc metal is replaced with magnesium metal? Explain your answer.

[2M]

(b) 50 cm3 larutan argentum nitrat 2.0 mol dm^{-3} dicampurkan dengan 50 cm^3 larutan natrium klorida 2.0 mol dm^{-3} untuk membentuk mendakan putih argentum klorida, AgCl. 65.5 kJ tenaga haba dibebaskan apabila 1 mol argentum klorida termendak.
50 cm^3 of 2.0 mol dm^{-3} silver nitrate solution is mixed with 50 cm^3 of 2.0 mol dm^{-3} sodium chloride solution to form a white precipitate of silver chloride, AgCl. 65.5 kJ of heat energy is released when 1 mol of silver chloride precipitated.

(i) Tulis persamaan ion bagi pembentukan argentum klorida.
Write the ionic equation for the formation of silver chloride.

[1M]

(ii) Kira haba yang dibebaskan dalam tindak balas ini.
Calculate the heat released in the reaction.

[3M]

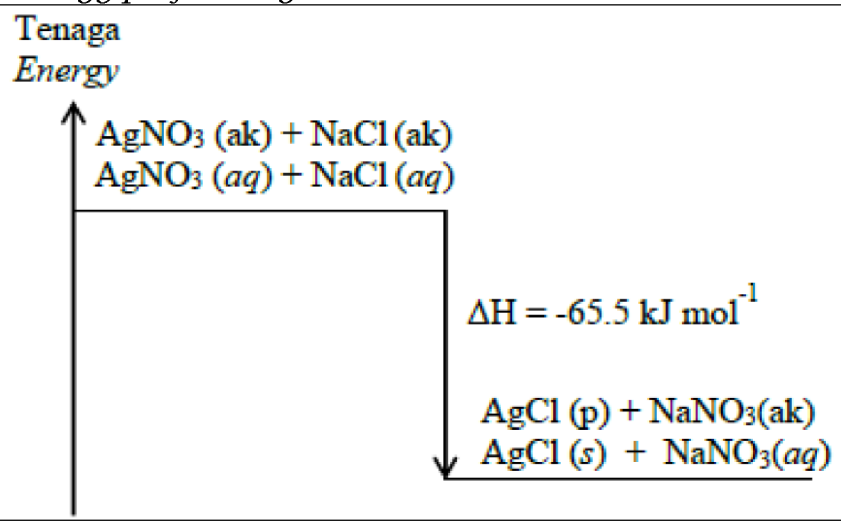
(iii) Apakah perubahan suhu dalam campuran ini?
[Muatan haba tentu larutan = 4.2 J g^{-1} $°C^{-1}$; ketumpatan larutan: 1 g cm^{-3}]
What is the temperature change in the mixture?
[Specific heat capacity of solution = 4.2 J g^{-1} $°C^{-1}$; density of solution:1gcm^{-3}]

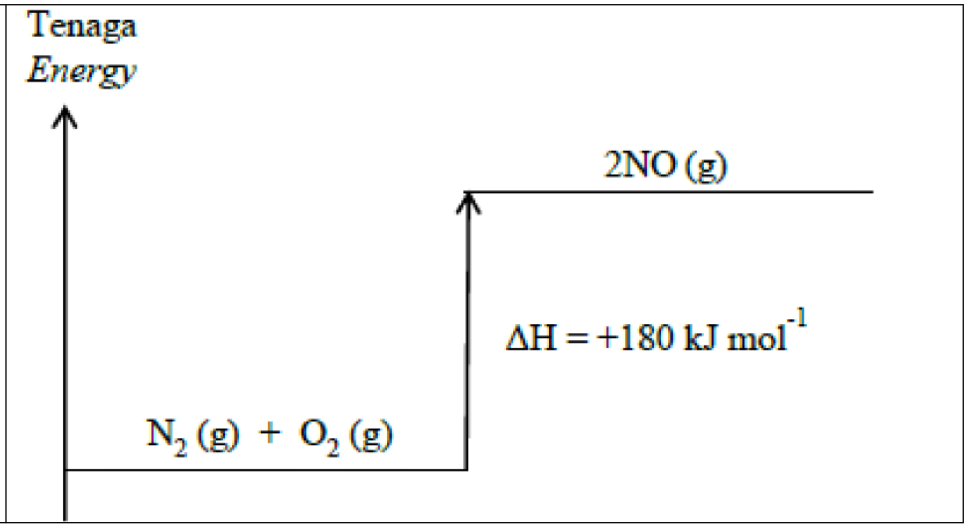
[2M]

(iv) Nilai haba yang terbebas semasa tindak balas penyesaran logam selalunya lebih rendah daripada nilai teori. Terangkan mengapa dan nyatakan langkah berjaga-jaga yang perlu diambil semasa menjalankan eksperimen ini.
The value of heat released during displacement of metal reaction is usually lower than theoretical value. Explain why and state the precautionary steps to be taken during the experiment.

[2M]

(c) Jadual 6 menunjukkan gambar rajah aras tenaga bagi dua jenis tindak balas, Tindak Balas I dan Tindak Balas II.
Diagram 6 shows the energy profile diagram for two types of reactions, Reaction I and Reaction II.

Tindak Balas *Reaction*	Gambar rajah aras tenaga *Energy profile diagram*
I	

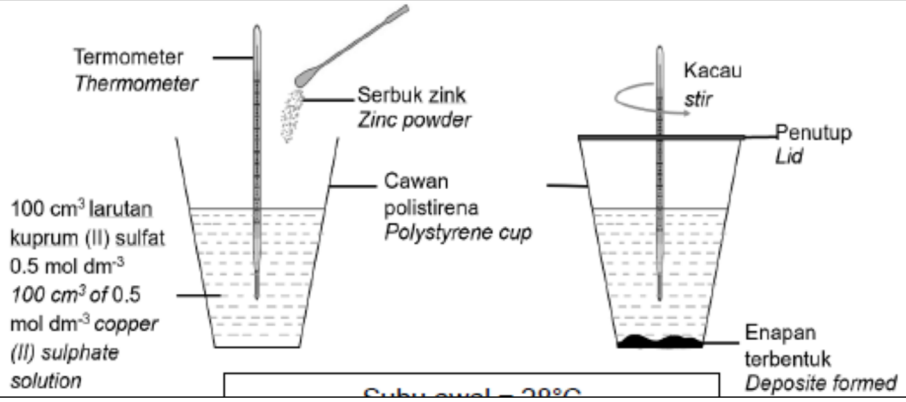
II	

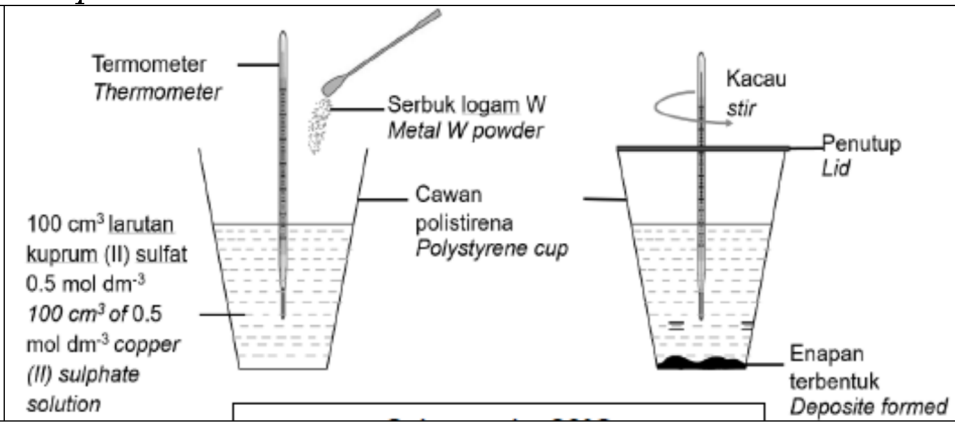
Berdasarkan Jadual 6, bandingkan Tindak balas I dan Tindak balas II dari segi:
• jenis tindak balas
• perubahan haba semasa tindak balas
• perubahan suhu semasa tindak balas
• jumlah kandungan tenaga bahan tindak balas dan hasil tindak balas
• perubahan tenaga haba sewaktu pemutusan dan pembentukan ikatan

Based on Table 6, compare Reaction I and Reaction II in terms of:
• the type of reactions
• heat change during reactions
• temperature change during reactions
• total energy content of reactants and products
• change of heat energy during the breaking and formation of bonds

[8M]

[2024-Kedah-09] Rajah 9 menunjukkan dua set susunan radas eksperimen yang dijalankan oleh seorang pelajar untuk mengkaji haba penyesaran kuprum daripada larutan kuprum(II) sulfat.
Diagram 9 shows two sets of apparatus set up carried out by a student to study the heat of displacement of copper from copper(II) sulphate solution.

Set	Susunan radas / Apparatus set up
I	

Suhu awal = 28°C Suhu tertinggi = 34°C *Initial temperature = 28°C* *Highest temperature = 34°C*	
II	
Suhu awal = 28°C Suhu tertinggi = 48°C *Initial temperature = 28°C* *Highest temperature = 48°C*	

(a) (i) Nyatakan maksud haba penyesaran
State the meaning of heat of displacement.

[1M]

(ii) Berdasarkan perubahan suhu, nyatakan jenis tindak balas bagi Set I
Based on temperature change, state the type of reaction of Set I.

[1M]

(iii) Cadangkan logam W bagi Set II dan nyatakan warna enapan yang terhasil.
Suggest the metal W for Set II and state the colour of the resulting deposite.

[2M]

(iv) Hitungkan haba penyesaran bagi Set I dan Set II.
Calculate the heat of displacement for Set I and Set II.
[Diberi muatan haba tentu bagi larutan, c = 4.2 Jg-1°C-1]
[Given the specific heat capacity of solution, c = 4.2 Jg-1°C-1]

[6M]

(b) Jadual 9 menunjukkan data yang diperolehi daripada dua set eksperimen untuk menentukan haba pemendakan.
Table 9 shows the data obtained from two sets of experiment to determine the heat of precipitation.

Set	Eksperimen *Experiment*	Haba pemendakan *Heat of precipitation* (kJ mol^{-1})
	25 cm^3 larutan barium klorida 0.5 mol dm^{-3} + 25cm3 larutan zink sulfat 0.5 mol dm^{-3} *25 cm^3 of 0.5 mol dm^{-3} barium chloride solution + 25 cm^3 of 0.5 mol dm^{-3} zinc sulphate solution*	- 42.0
	25 cm^3 larutan kalium karbonat 0.5 mol dm^{-3} + 25 cm^3 larutan magnesium klorida 0.5 mol dm^{-3} *25 cm^3 of 0.5 mol dm^{-3} potassium carbonate solution + 25 cm^3 of 0.5 mol dm^{-3} magnesium chloride solution*	+ 23.1

Berdasarkan Jadual 9,/ *Based on Table 9,*

(i)terangkan perbezaan haba pemendakan bagi Set I dan Set II. Penerangan anda mesti merangkumi :
• Perubahan suhu
• Jumlah kandungan tenaga
• Perubahan tenaga haba semasa pemecahan ikatan dan pembentukan ikatan

Tuliskan persamaan termokimia bagi Set I dan lukiskan gambar rajah aras tenaga bagi Set II.

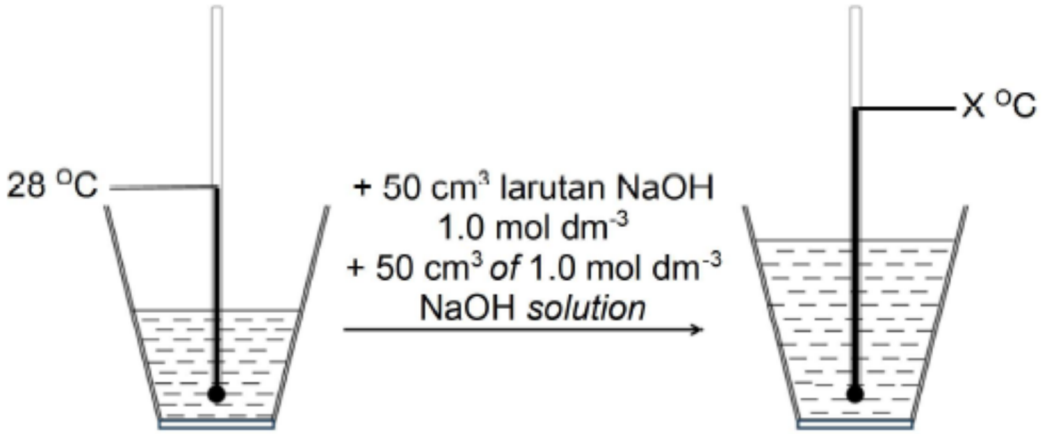
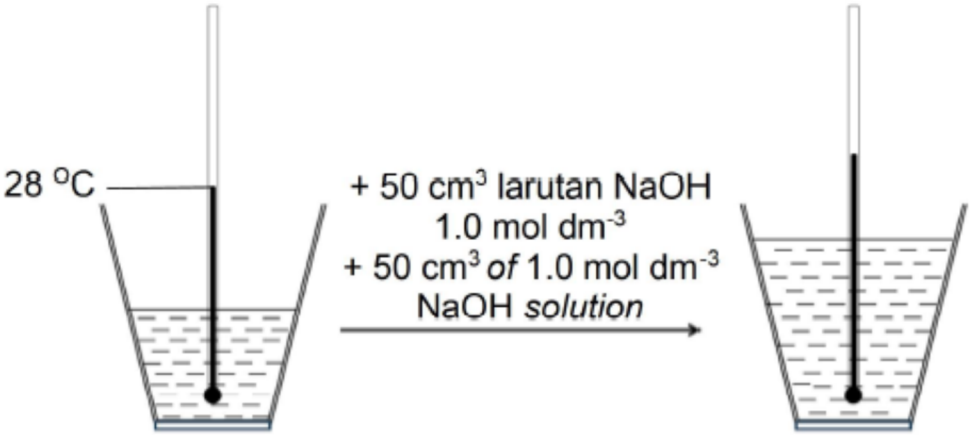
explain the difference in heat of precipitation for Set I and Set II. Your explanation must include:
• Change in temperature.
• Total energy content
• Heat energy change during bond breaking and bond formation.
Write thermochemical equation for Set I and draw the energy level diagram of Set II.

[7M]

(ii) Nilai haba pemendakan semasa eksperimen selalunya lebih rendah berbanding nilai teori. Mengapakah ini berlaku dan apakah yang boleh dilakukan untuk mengurangkan masalah ini.
The value of the heat of precipitation during the experiment of the lower than the theoretical value. Why does this happen and what can be done to reduce this problem.

[3M]

[2024 Kelantan-10] (a) Rajah 10.1 menunjukkan pemerhatian bagi tindak balas peneutralan yang dilakukan menggunakan dua asid yang berbeza. Asid P dan asid Q adalah asid monoprotic.
Diagram 11.1 shows observations for neutralization reactions carried out using two different acids. Acid P and acid Q are monoprotic acids.

Set	Pemerhatian/ *Observation*
I	
II	

Jadual 10.2 menunjukkan haba peneutralan yang diperolehi dari kedua-dua tindak balas yang ditunjukkan dalam Rajah 10.1
Table 10.2 shows the heat of neutralization obtained from the two reactions shown in Diagram 10.1

Set	Haba peneutralan, kJ mol^{-1} *Heat of neutralisation, kJ* mol^{-1}
I	-57.0
II	-55.0

(i) Apakah yang dimaksudkan dengan haba peneutralan?
What is meant by heat of neutralisation?

[1M]

Berdasarkan Rajah 10.1 dan Jadual 10.2
Based on Diagram 10.1 and Table 10.2

(ii) Cadangkan nama asid yang sesuai bagi asid P dan asid Q. Tuliskan persamaan kimia bagi tindak balas yang berlaku dalam Set I dan Set II.
Suggest the appropriate acid name for acid P and acid Q. Write the chemical equation for the reaction that occurs in Set I and Set II.

[6M]

(iii) Tentukan nilai Xyang ditunjukkan dalam Rajah 10.1. Nilai X adalah suhu maksimum yang dicapai dalam tindak balas tersebut.
[Muatan haba tentu bagi air = 4.2 J g^{-1} $°C^{-1}$]
Determine the X value that is shown in Diagram 10.1. X value is the maximum temperature reached in the reaction.
[Specific heat capacity of water = 4.2 J g^{-1} $°C^{-1}$]

[4M]

(iv) Terangkan mengapa terdapat perbezaan nilai haba tindak balas dalam kedua- dua set eksperimen yang dijalankan.
Explain why there is a difference in the value of the heat of reaction in the two sets of experiments carried out.

(b) Rajah 10.3 menunjukkan pek sejuk dan pek panas yang mengaplikasikan konsep termokimia dalam kehidupan seharian.
Diagram 10.3 shows a cold pack and hot pack that apply the thermochemistry concept in daily life.

Berdasarkan Rajah 10.3
Based on Diagram 10.3

(i) Nyatakan jenis tindak balas yang berlaku pada pek sejuk dan pek panas.
State the type of reaction that occurs in cold packs and hot packs.

[2M]

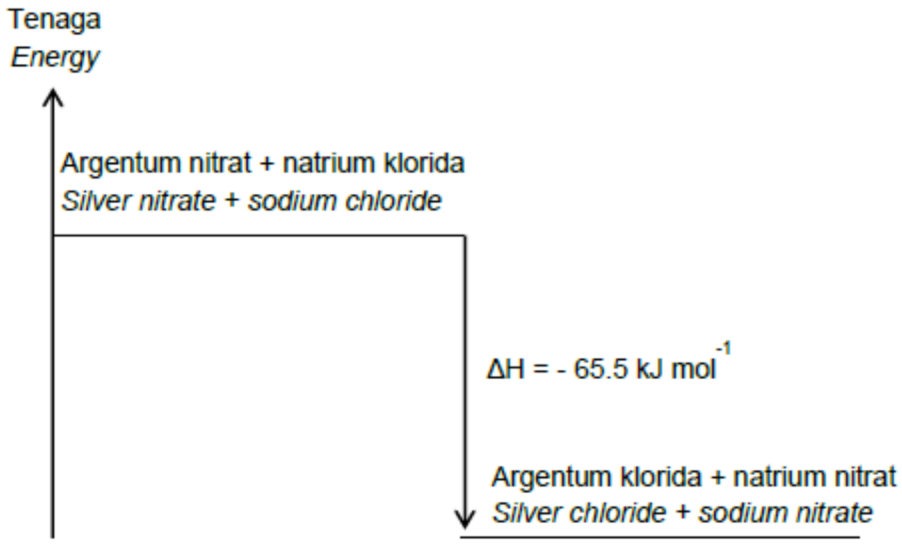
(ii) Bandingkan tindak balas yang berlaku dalam pek sejuk dan pek panas dari segi Compare the reactions that occur in cold pack and hot pack in terms of
• Perubahan haba/ *Heat change*
• Perubahan suhu/ *Temperature change*

• Jumlah kandungan tenaga bahan tindak balas dan hasil tindak balas
The total energy content of reactant and products

• Perubahan haba semasa pemecahan dan pembentukan ikatan Heat
change during the breaking and formation of bonds.

[4M]

[2024-Melaka-09] (a) Rajah 8 menunjukkan gambar rajah aras tenaga bagi tindak balas antara argentum nitrat dan natrium klorida.
Diagram 8 shows the energy level diagram for the reaction between silver nitrate and sodium chloride.



(i) Tuliskan formula kimia bagi argentum klorida dan nyatakan keterlarutan argentum klorida dalam air.
Write the chemical formula for silver chloride and state the solubility of silver chloride in water.

[2M]

(ii) Tuliskan dua pernyataan yang boleh ditafsir daripada Rajah 8.
Write two statements that can be interpreted from Diagram 8.

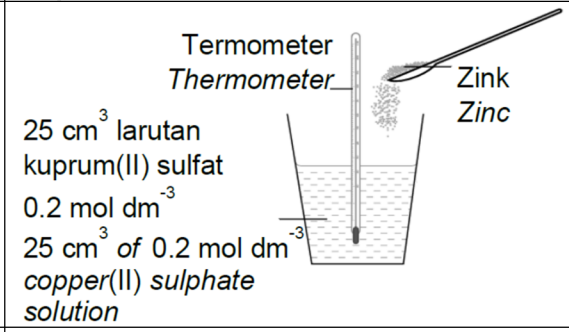
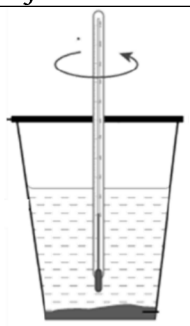
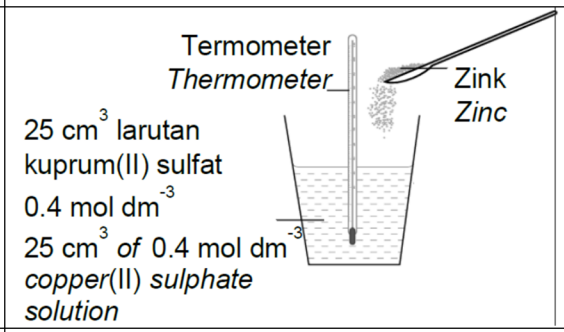
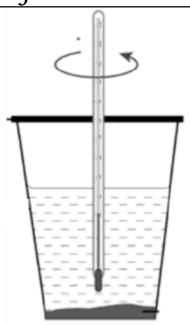
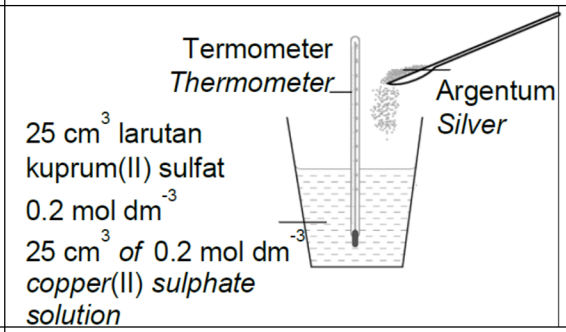
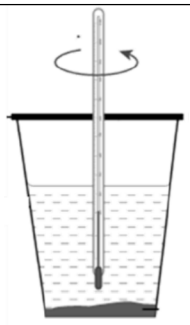
[2M]

(iii) Cadangkan satu sebatian klorida yang lain untuk menggantikan natrium klorida untuk mendapatkan nilai haba pemendakan yang sama. Terangkan jawapan anda.
Suggest another chloride compound to replace sodium chloride to obtain the same value of heat of precipitation. Explain your answer.

[2M]

(b) Jadual 4 menunjukkan keputusan bagi tiga eksperimen yang berlainan antara larutan kuprum(II) sulfat dan zink berlebihan dalam eksperimen I dan eksperimen II, dan dengan argentum berlebihan dalam eksperimen III.

Table 4 shows the results of three different experiments for the reaction between copper(II) sulphate solution and excess zinc in experiments I and II, and with excess silver in experiment III.

Eksperimen *Experiment*	Sebelum tindak balas *Before reaction*	Selepas tindak balas *After reaction*
I		
	Suhu awal = 28.0 °C *Initial temperature = 28.0 °C*	Suhu tertinggi campuran = 33.0 °C *Highest temperature of mixture = 33.0 °C*
II		
	Suhu awal = 28.0 °C *Initial temperature = 28.0 °C*	Suhu tertinggi campuran = T_1 °C *Highest temperature of mixture = T_1 °C*
III		
	Suhu awal = 28.0 °C *Initial temperature = 28.0 °C*	Suhu tertinggi campuran = T_2°C *Highest temperature of mixture = T_2°C*

(i) Dengan membandingkan,
• eksperimen I dan eksperimen II, ramalkan nilai T1 Terangkan jawapan anda.
• eksperimen I dan eksperimen III, ramalkan nilai T2. Terangkan jawapan anda.
By comparing,
• *experiments I and II, predict the value of T1. Explain your answer.*
• *experiments I and III, predict the value of T2. Explain your answer.*

[6M]

(ii) Cadangkan satu logam lain yang dapat menyesarkan ion kuprum(II), Cu^{2+} dalam eksperimen I.
Nyatakan satu pemerhatian dalam tindak balas yang berlaku.
Suggest another metal that can displace copper(II) ions, Cu^{2+}, in experiment I.
State one observation in the reaction that occurs.

[2M]

(iii)Hitung haba penyesaran kuprum oleh zink dalam eksperimen I. Tulis persamaan kimia yang terlibat.
[Muatan haba tentu larutan ialah 4.2 J g^{-1} $°C^{-1}$ dan ketumpatan larutan ialah 1.0 g cm^{-3}]
Calculate the heat of displacement of copper by zinc in experiment I.
Write the chemical equation involved.
[Specific heat capacity of solution is 4.2 J g^{-1} $°C^{-1}$ and the density of the solution is 1.0 g cm^{-3}]

[6M]

[2024 JUJ Set2-09] (a) Rajah 9 menunjukkan persamaan termokimia bagi Eksperimen I dan Eksperimen II.
Diagram 9 shows the thermochemical equation for Experiment I and Experiment II.

Eksperimen *Experiment*	Persamaan Termokimia *Thermochemical Equation*
I	$NaOH + HX \rightarrow NaX + H_2O$; $\Delta H = -57$ kJ mol^{-1}
II	$NaOH + HY \rightarrow NaY + H_2O$; $\Delta H = -52$ kJ mol^{-1}

(i) Nyatakan maksud haba peneutralan dan kenal pasti asid HX dan asid HY yang digunakan dalam Eksperimen I dan Eksperimen II.
Berdasarkan maklumat pada Rajah 9, lukis gambar rajah aras tenaga bagi Eksperimen I dan kenal pasti dua maklumat daripada gambarajah aras tenaga tersebut.
State the meaning of heat of neutralisation and identify the type of acid HX and acid HY that is used in Experiment I and Experiment II.
Based on the information in Diagram 9, draw the energy level diagram for Experiment I and identify two information from the energy level diagram.

[7M]

(ii) Terangkan perbezaan nilai haba peneutralan bagi Eksperimen I dan Eksperimen II.
Explain the difference in heat of neutralisation value for Experiment I and Experiment II.

[3 markah]
[3 marks]

(b) Jadual 9 menunjukkan haba pembakaran bagi beberapa jenis alkohol.
Table 9 shows heat of combustion for several types of alcohol.

Alkohol *Alcohols*	Bilangan atom karbon per molekul *Number of carbon atom per molecule*	Haba pembakaran *Heat of combustion* (kJ mol^{-1})
Metanol *Methanol*	1	-650
Etanol *Ethanol*	2	X
Propanol *Propanol*	3	-2020
Butanol *Butanol*	4	-2680

Berdasarkan Jadual 9/ *Based on Table 9,*

(i) Nyatakan definisi haba pembakaran dan plot graf haba pembakaran melawan bilangan atom karbon per molekul alkohol di atas kertas graf yang disediakan. Tandakan dan tentukan nilai x pada graf tersebut.
State the definition of heat of combustion and plot a graph of heat of combustionagainst number of carbon atom per molecule of alcohol on a graph paper provided. Mark and determine value of x on the graph.

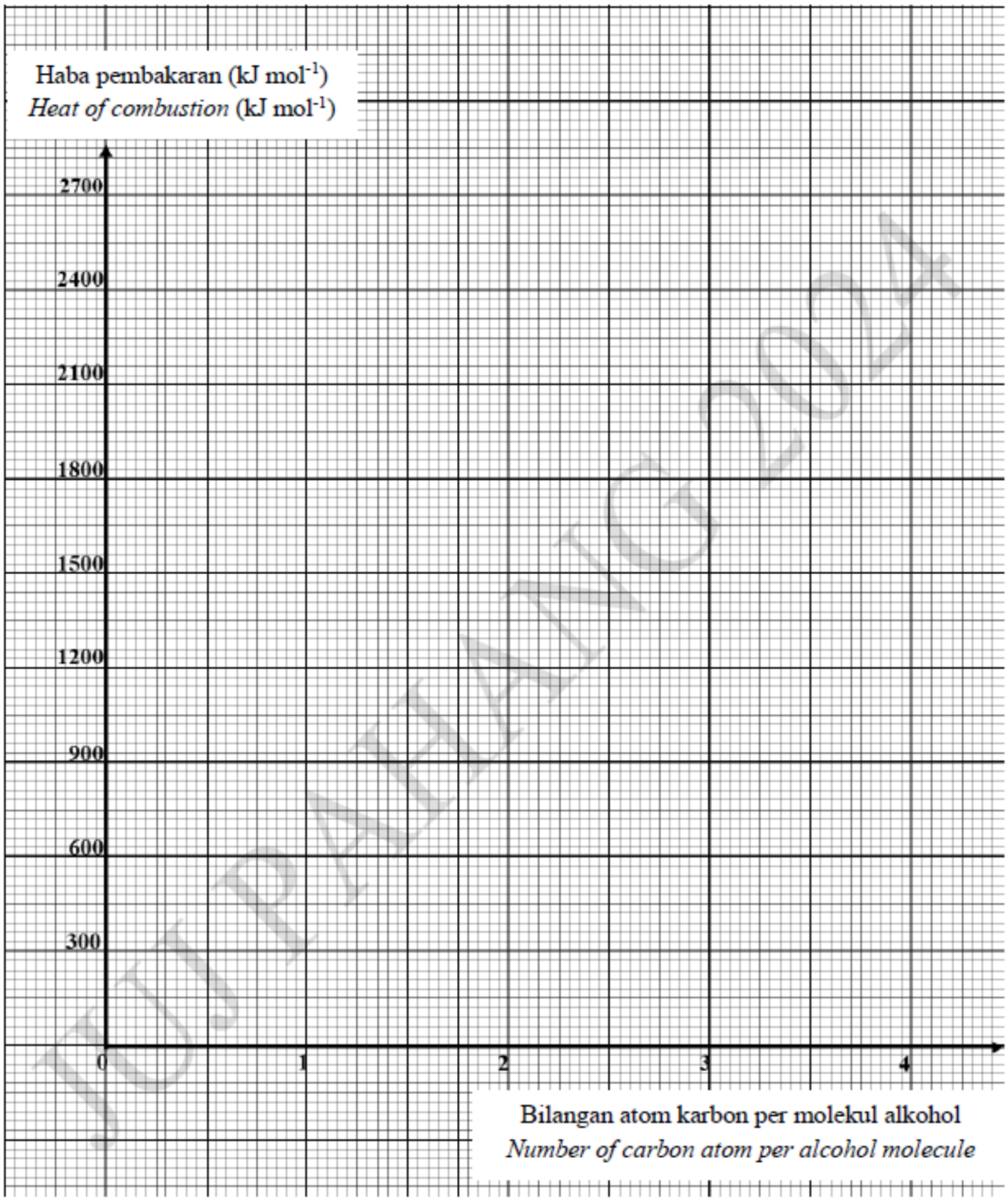
[5M]

(ii)

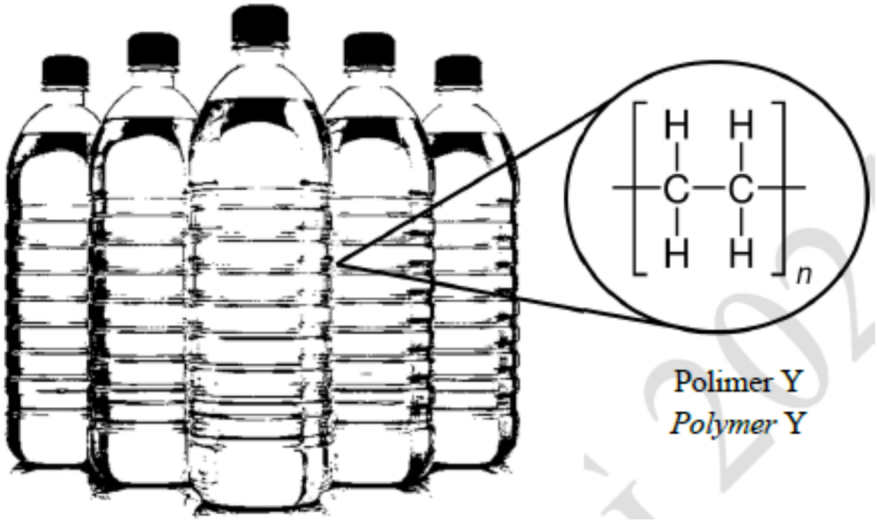
"Butanol menghasilkan haba pembakaran yang lebih tinggi berbanding propanol"
"Butanol produce higher heat of combustion then propanol"

Tuliskan persamaan kimia bagi pembakaran lengkap butanol dan jelaskan penyataan di atas.
Write chemical equation for complete combustion of butanol and explain the statement above.

[5M]



[2024 JUJ Set2-03] (a) Rajah 3 menunjukkan formula struktur polimer Y yang digunakan dalam pembuatan botol minuman.
Diagram 3 shows the structural formula of polymer Y that is used in the manufacturing of drinking bottle.



(i) Apakah yang dimaksudkan dengan polimer?
What is the meaning of polymer?

.....

..... [1M]

(ii) Kenal pasti monomer bagi polimer Y./*Identify the monomer of polymer Y.*

..... [1M]

(iii) Tuliskan persamaan tindak balas pempolimeran bagi polimer Y.
Write the equation for polymerisation reaction of polymer Y.

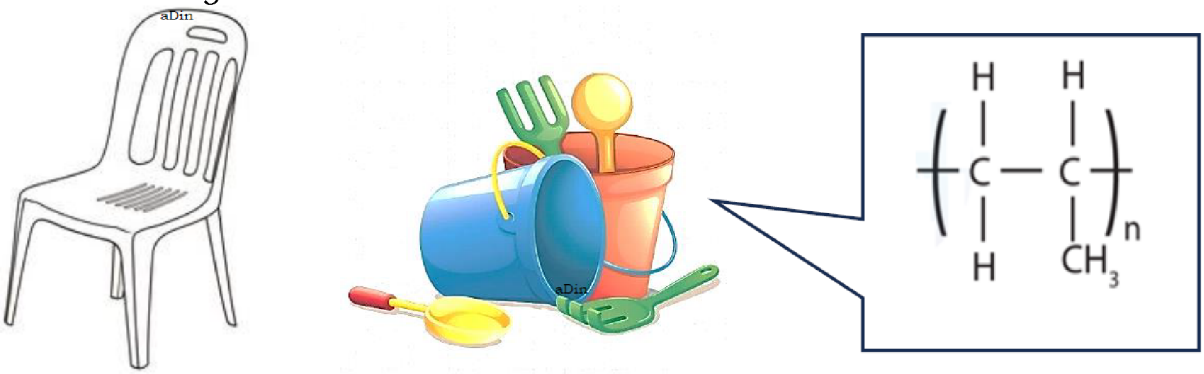
[2M]

(b) Sarung tangan getah yang diperbuat daripada getah asli didapati mudah terkoyak apabila disimpan terlalu lama. Cadangkan satu cara untuk menambah baik penghasilan sarung tangan itu dan namakan proses yang terlibat.
Rubber glove made from natural rubber is easily tear when stored for too long. Suggest one way to improve the production of the gloves and name the process involved.

.....

..... [2M]

[2024-Sarawak-Set01-01] Kerusi dan baldi mengandungi polimer X. Formula struktur bagi polimer X ditunjukkan dalam Rajah 1.
The chair and pails contain polymer X. The structural formula of polymer X is shown in Diagram 1.



Berdasarkan Rajah 1,/ *Based on Diagram 1,*

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

.....

..... [1M]

(ii) Nyatakan jenis pempolimeran yang terlibat.
State the type of polymerisation involved.

..... [1M]

(iii) Nyatakan nama monomer bagi polimer dalam Rajah 1.
State the name of the monomer for the polymer in Diagram 1.

..... [1M]

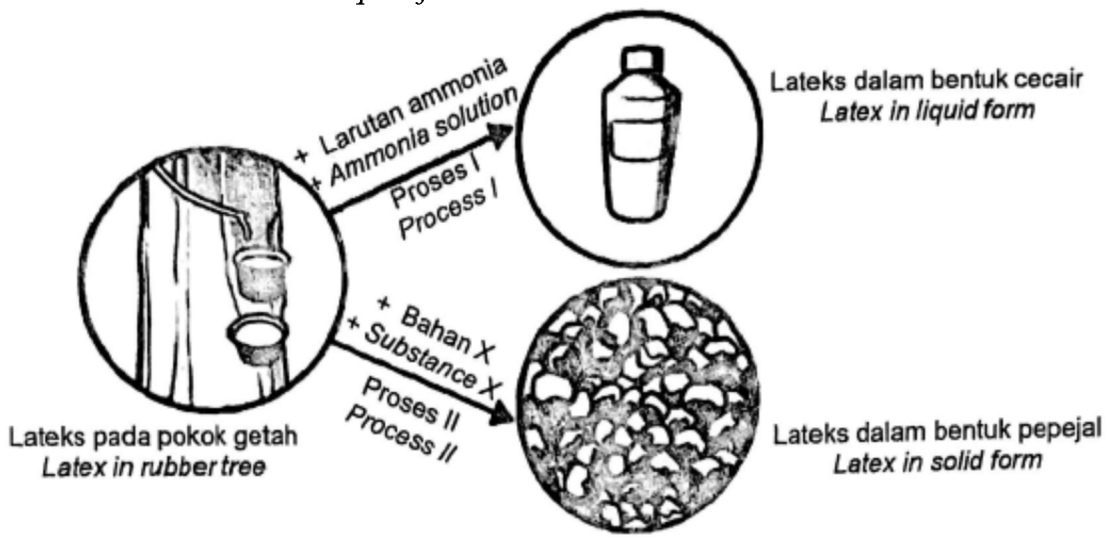
(iv) Lukis formula struktur monomer dalam (a)(iii).
Draw the structural formula of monomer in (a)(iii).

[1M]

(b) Nyatakan satu ciri polimer X yang menjadikannya sesuai untuk menghasilkan produk dalam Rajah 1.
State one characteristic of the polymer X that makes it suitable for producing the products in Diagram 1.

..... [1M]

[2024 Johor-04] (a) Rajah 3 menunjukkan carta alir bagi lateks yang dikumpulkan daripada pokok getah dan digunakan untuk menghasilkan lateks dalam bentuk pepejal dan cecair.
Diagram 3 shows the flow chart of latex collected from the rubber tree and used to produce latex in solid and liquid forms.



Getah asli (lateks) merupakan polimer semula jadi yang dinamakan poliisoprena.
Natural rubber (latex) is natural polymer called polyisoprene.

(i) Apakah yang dimaksudkan dengan polimer?/ *What is the meaning of polymer?*

..... [1M]

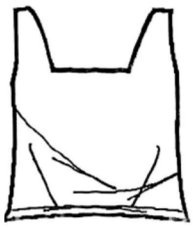
(ii) Namakan proses II./ *Name process II.*

..... [1M]

(ii) Nyatakan satu contoh bahan X./ *State one example of substance X.*

..... [1M]

(b) Jadual 2 menunjukkan maklumat-maklumat bagi dua contoh plastik yang digunakan secara meluas dalam kehidupan seharian.
Table 2 shows the information for two examples of plastic that is widely used in daily life.

Plastik A/ *Plastic A*	Plastik B/ *Plastic B*
	
• Diperbuat daripada polimer sintetik iaitu polietena. *Made from synthetic polymer that is polyethylene.* • Sukar diuraikan oleh mikroorganisma. *Difficult to be decomposed by microorganism.*	

(i) Tuliskan persamaan kimia pempolimeran etena untuk membentuk polietena.
Write the chemical equation for the polymerization of ethene to form polyethylene.

..... [2M]

(ii) Pembuangan polimer sintetik seperti plastik A dan B boleh menyebabkan sistem saliran dan sungai tersekat dan mungkin mengakibatkan banjir kilat.
Disposal of synthetic polymer such as plastic A and B can cause blockage of drainage systems and river and may result in flash floods.

Cadangkan dua cara bagi menyelesaikan isu pencemaran tersebut.
Suggest two ways to solve the pollution issue.

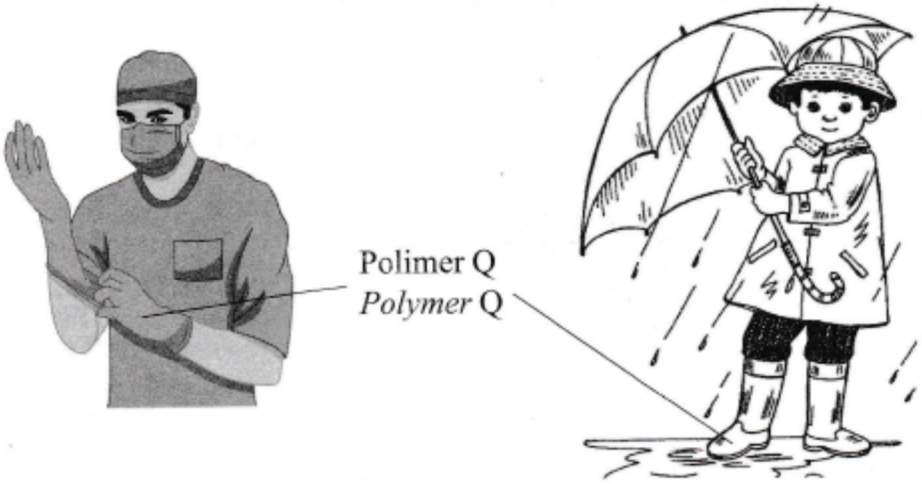
.....

.....

.....

..... [2M]

[2024 Negeri Sembilan-04] Rajah 4.1 menunjukkan dua bahan yang diperbuat daripada sejenis polimer.
Diagram 4.1 shows two products that is made up of a type of polymer.



[a] Polimer Q adalah getah asli dan monomernya mengikut penamaan IUPAC ialah 2-metilbut-1,3-diena.
Polymer Q is a natural rubber and its monomer according to the IUPAC nomenclature is 2-methylbut-1,3-diene.

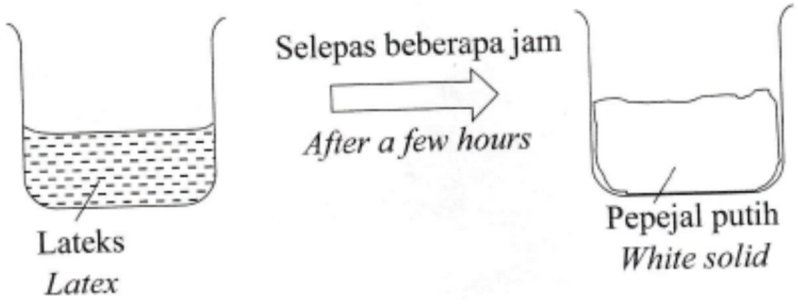
(i) Apakah nama lain bagi monomer ini?
What is the other name of the monomer?

..... [1M]

(ii) Lukiskan formula struktur bagi monomer ini.
Draw the structural formula for this monomer.

[1M]

(b) Lateks merupakan sejenis koloid yang mengandungi polimer Q dan air. Rajah 4.2 menunjukkan satu situasi bagi lateks.
Latex is a type of colloid that contains polymer Q and water.
Diagram 4.2 shows a situation for latex.



Apakah yang perlu dilakukan untuk mengelakkan situasi dalam Rajah 4.2 berlaku? Jelaskan jawapan anda.
What should be done to prevent the situation in Diagram 4.2?
Explain your answer.

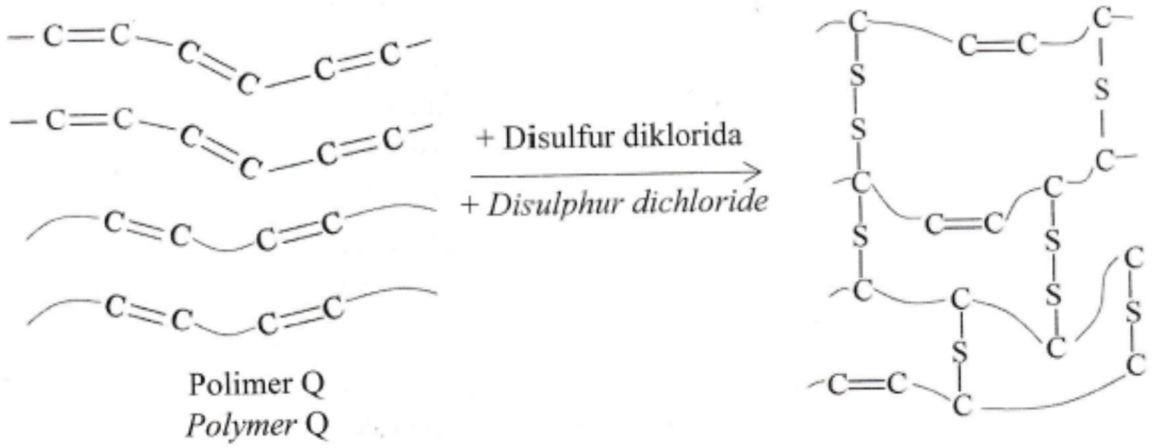
.....

.....

.....

..... [3M]

(c) Rajah 4.3 menunjukkan satu proses yang berlaku pada polimer Q bagi meningkatkan ciri-cirinya.
Diagram 4.3 shows a process on polymer Q to improve its characteristics.



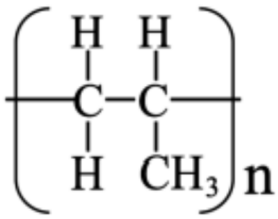
(i) Namakan proses dalam Rajah 4.3./*Name the process in Diagram 4.3.*

..... [1M]

(ii) Apakah kesan proses dalam 4(c)(1) ke atas ciri-ciri polimer Q?
What is the effect of the process in 4(c)(i) on the characteristic of polymer Q?

..... [1M]

[2024 Johor Pasir Gudang-04] Rajah 4.1 menunjukkan formula struktur bagi satu polimer.
Diagram 4.1 shows structural formula of a polymer.



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

.....

..... [1M]

(b) (i) Lukiskan formula struktur monomernya.
Draw the structural formula of the monomer.

[1M]

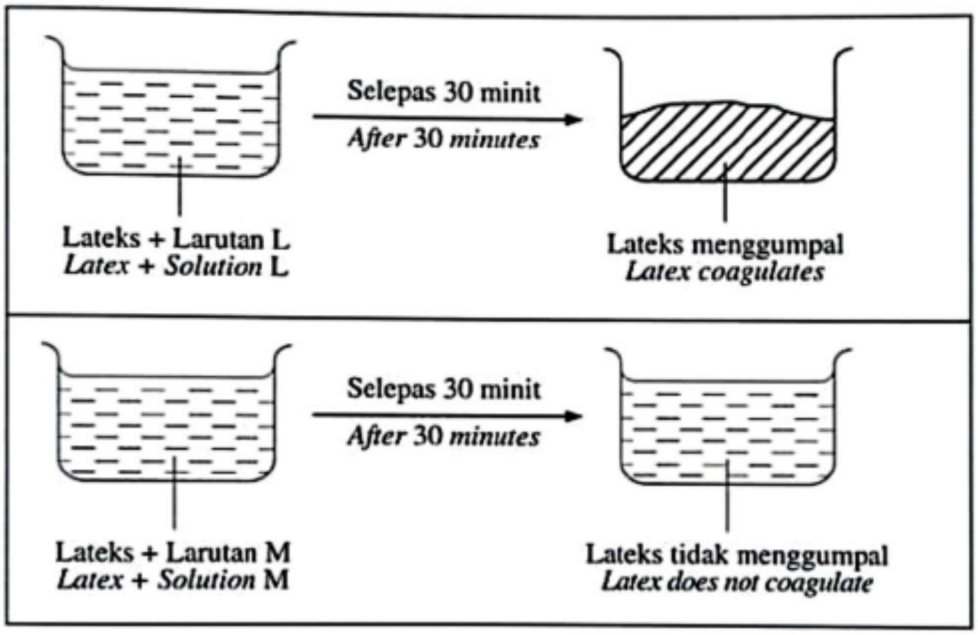
(ii) Namakan jenis tindak balas pempolimeran dalam penghasilan polimer tersebut.
Name the type of polymerisation reaction in the production of the polymer.

..... [1M]

(iii) Nyatakan satu kegunaan polimer tersebut.
State one of the uses of the polymer.

..... [1M]

(c) Rajah 4.2 menunjukkan pemerhatian apabila larutan L dan larutan M ditambah kepada lateks.
Diagram 4.2 shows the observations when solution L and solution M are added to the latex.



Cadangkan larutan L. Terangkan mengapa terdapat perbezaan dalam pemerhatian bagi setiap bikar selepas 30 minit.
Suggest solution L. Explain why there is a difference in the observation for each beaker after 30 minutes.

.....

.....

.....

.....

..... [3M]

[2024 Johor Pasir Gudang-04] 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.

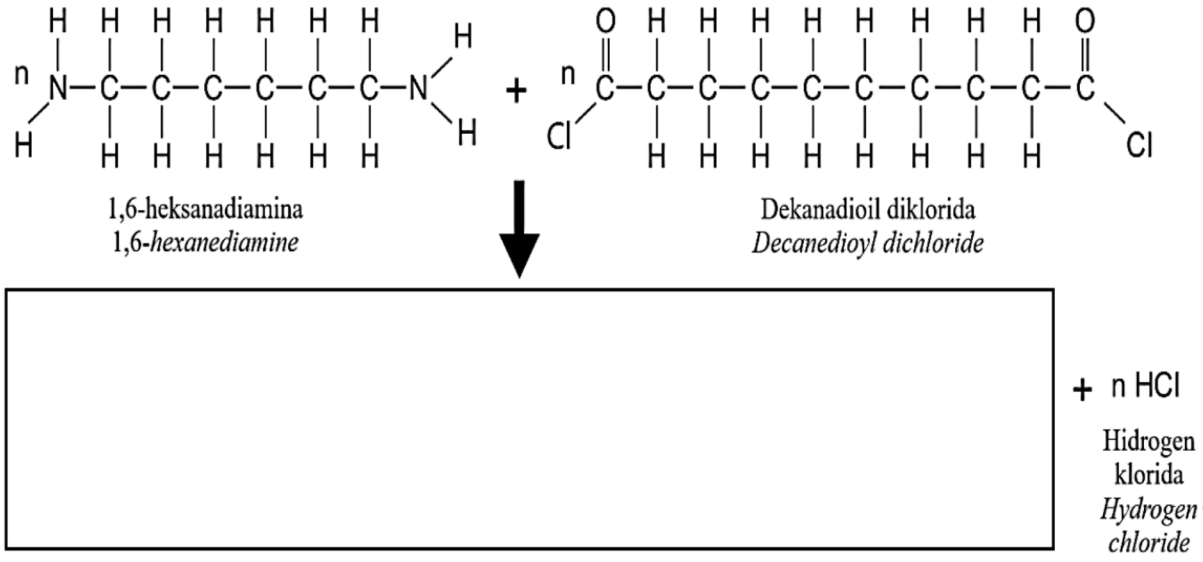
	
Benang nilon/ *Nylon threads*	Tali nilon/ *Nylon rope*

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

.....

..... [1M]

(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.

[1M]

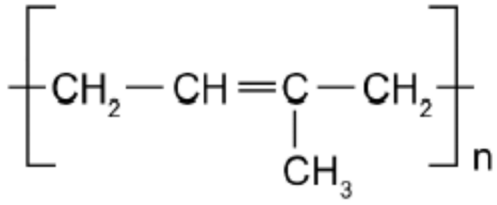
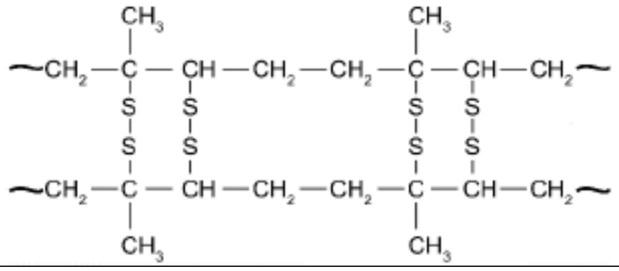
(ii) Nyatakan satu sifat nilon yang membolehkannya sesuai digunakan untuk membuat tali dan benang.
State one property of nylon that makes it suitable to be used to make ropes and threads.

..... [1M]

(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 *Less elastic*	Lebih kenyal *More elastic*
Mudah dioksidakan *Easily oxidised*	Tidak mudah dioksidakan *Does not oxidised easily*

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.

Getah M/ *Rubber M*	Getah N/ *Rubber N*
	

Nyatakan dua sebab mengapa getah M mudah dioksidakan berbanding getah N.
State two reasons why rubber M is easily oxidised compared to rubber N.

.....

.....

..... [2M]

(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.

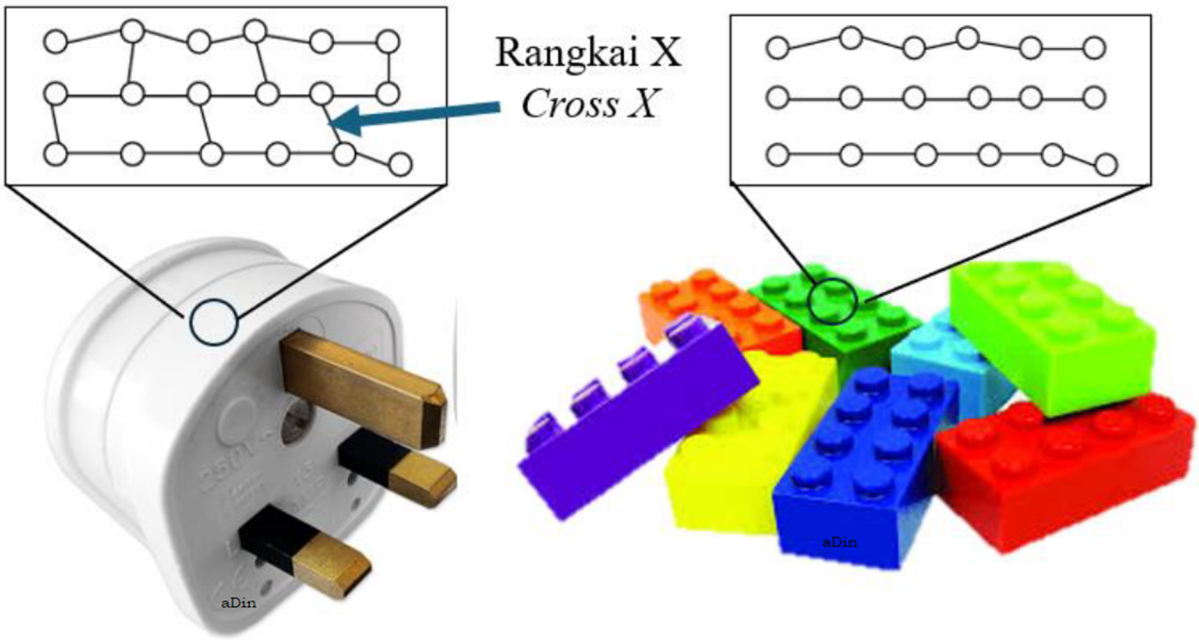
Nyatakan satu kaedah dan terangkan bagaimana kaedah itu dapat mengurangkan masalah tersebut.
State one method and explain how the method can reduce the problem.

.....

.....

..... [2M]

[2024-Sarawak-Set02-05] (a) Rajah 4.1 menunjukkan dua contoh bahan buatan serta struktur molekul daripada plastik termoset dan plastik termoplastik.
Diagram 4.1 shows two examples of manufactured substances with their molecular structures from thermosetting plastic and thermoplastic.



Plastik termoset
Thermosetting plastic

Termoplastik
Thermoplastic

Rajah 4.1/ *Diagram 4.1*

(a) (i) Istilah "plastik" ialah nama umum yang merujuk kepada polimer sintetik. Apakah unit asas plastik?
The term "plastic" is a general name referring to synthetic polymer. What is the basic unit of plastic?

..... [1M]

(ii) Plastik yang manakah boleh di kitar semula? Nyatakan alasan anda.
Which plastics can be recycled? State your reasons.

.....

..... [2M]

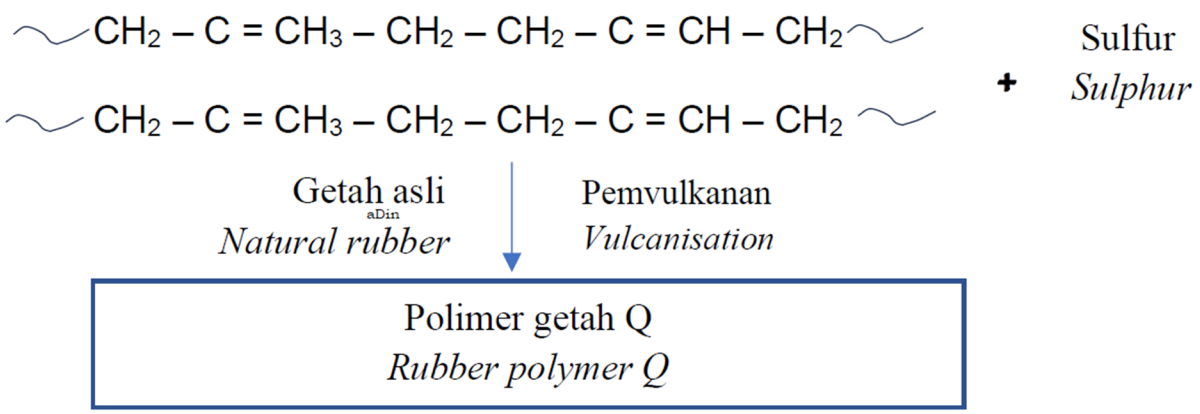
(ii) Rajah 4.2 menunjukkan poster kempen pengurangan penggunaan plastik yang dilancarkan di Malaysia.
Diagram 4.2 shows a plastic reduction campaign poster that is launched in Malaysia.

Wajarkan pelaksanaan kempen ini
Justify the implementation of the campaign.

.....

..... [2M]

(b) Rajah 4.3 menunjukkan proses pemvulkanan getah.
Diagram 4.3 shows the process of vulcanisation of rubber.



(i) Lukiskan polimer getah Q dalam ruang jawapan di bawah.
Draw the rubber polymer Q in the answer space below.

[1M]

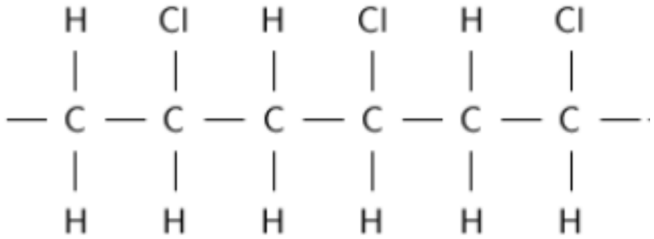
(ii) Rajah 4.4 di bawah menunjukkan tayar kenderaan.
The Diagram 4.4 below shows the car tyres.

Tayar kereta diperbuat daripada getah tervulkan. Pada pendapat anda, mengapakah getah tervulkan lebih sesuai digunakan untuk menghasilkan tayar kereta?
Car tyres are made of vulcanised rubber. In your opinion, why vulcanised rubber is more suitable to be used to manufacture car tyres?

.....

..... [2M]

[2024-Kedah-08] Polimer boleh dikelaskan sebagai polimer semulajadi dan polimer sintetik. Rajah 8.1 menunjukkan formula struktur bagi suatu polimer.
Polymer can be classified as natural polymer and synthetic polymer. Diagram 8.1 shows the structural formula of a polymer.



Rajah 8.1 / Diagram 8.1

(a) Berdasarkan rajah 8.1,/ *Based on diagram 8.1,*

(i) Nyatakan jenis polimer tersebut./ *State the type of the polymer.*

..... [1M]

(ii) Lukis formula struktur monomer bagi polimer dalam Rajah 8.1
Draw the structural formula of the monomer for the polymer in Diagram 8.1

[1M]

(iii) Tuliskan persamaan kimia bagi pembentukan polimer dalam Rajah 8.1
Write chemical equation for the formation of polymer in Diagram 8.1.

..... [2M]

(iv) Nyatakan satu contoh objek yang diperbuat daripada bahan yang sama seperti Rajah 8.1.
State one example of object made from the same material as in Diagram 8.1.

..... [1M]

(b) Jadual 8.1 menunjukkan keputusan bagi eksperimen yang dijalankan ke atas lateks.
Table 8.1 shows the results of experiments conducted on latex.

Prosedur *Procedure*	Pemerhatian *Observation*
Bahan P ditambahkan kepada lateks. *Material P is added into the latex.*	Lateks menggumpal dengan cepat. *Latex coagulates very quickly.*
Bahan Q ditambahkan kepada lateks *Material Q is added into the latex*	Tiada perubahan *No change*

Berdasarkan Jadual 8.1, cadangkan bahan P dan Q.
Based on Table 8.1, suggest material P and Q.

P : .....

Q : ..... [2M]

(c) Jadual 8.2 menunjukkan maklumat bagi dua jenis penyedut minuman yang terdapat dalam suatu restoran diperbuat daripada polimer berbeza.
Table 8.2 shows information on two types of drinking straw in a restaurant made from different polymers.

Penyedut minuman S Drinking straw S	Penyedut minuman T Drinking straw T
	
Diperbuat daripada selulosa *Made from cellulose*	Diperbuat daripada pecahan petroleum *Made from petroleum fraction*

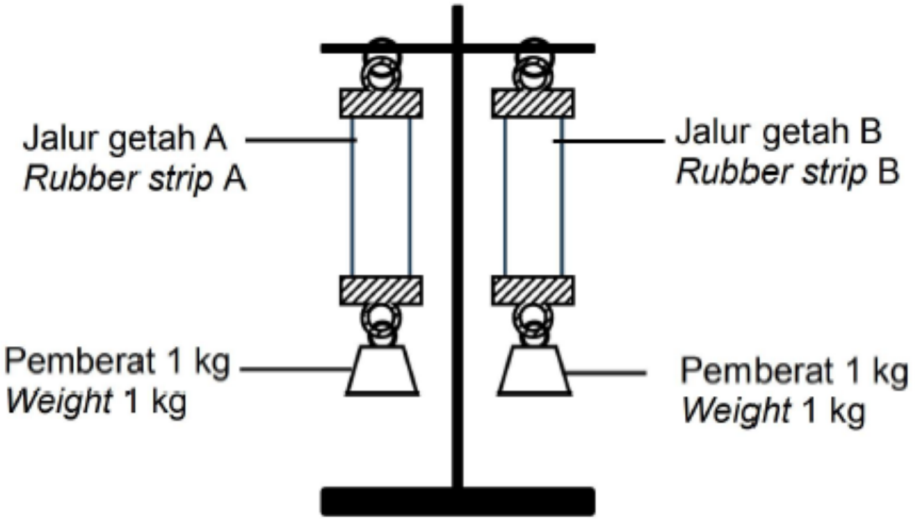
Anda sebagai pencinta alam sekitar, penyedut minuman manakah menjadi pilihan anda dalam penggunaan kehidupan seharian? Wajarkan jawapan anda.
You as a nature lover, which straw is your choice in daily life usage? Justify your answer.

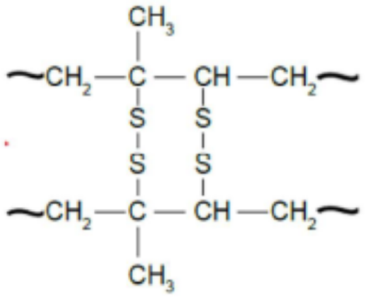
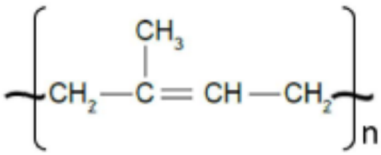
.....

.....

..... [3M]

[2024 Kelantan-06] Getah merupakan polimer semula jadi. Susunan radas yang ditunjukkan dalam Rajah 6.1 telah digunakan untuk ujian kekenyalan getah tersebut. Keputusan ujian direkodkan dalam Jadual 6.2
Rubber is a natural polymer. The apparatus arrangement shown in Diagram 6.1 was used for the rubber elasticity test. The test results are recorded in Table 6.2



	Getah A/ *Rubber A*	Getah B/ *Rubber B*
Formula Struktur *Structural formula*		
Panjang jalur getah *The length of the rubber band*	12.0 cm	12.0 cm
Panjang jalur getah + pemberat 1 kg *The length of rubber band + weight 1 kg*	15.5 cm	16.5 cm
Panjang jalur gerah selepas pemberat dilepaskan *The length of the hot band after the weight is released*	12.0 cm	15.0 cm

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

.....

..... [1M]

(b) Namakan monomer bagi getah asli.
Name the monomer of natural rubber.

..... [1M]

(c) Berdasarkan Rajah 6.1 dan Jadual 6.2 bandingkan kekenyalan getah A dan getah B. Terangkan jawapan anda.
Based on Diagram 6.1 and Table 6.2, compare the elasticity of rubber A and rubber B Explain your answer.

.....

.....

.....

..... [3M]

(d) Penggunaan getah telah dikomersial dengan meluas termasuk penghasilan getah sintetik terutama dalam penghasilan tayar kenderaan. Tetapi pelupusan tayar dari getah asli dan sintetik yang tidak lestari akan menyebabkan pencemaran alam sekitar. Nyatakan dua kaedah dan terangkan bagaimana kaedah itu dapat mengurangkan masalah tersebut.
The use of rubber has been widely commercialized including the production of synthetic rubber, especially in the production of vehicle tires. But the unsustainable disposal of tires from natural and synthetic rubber will cause environmental pollution. State two methods and explain how they can reduce the problem.

.....

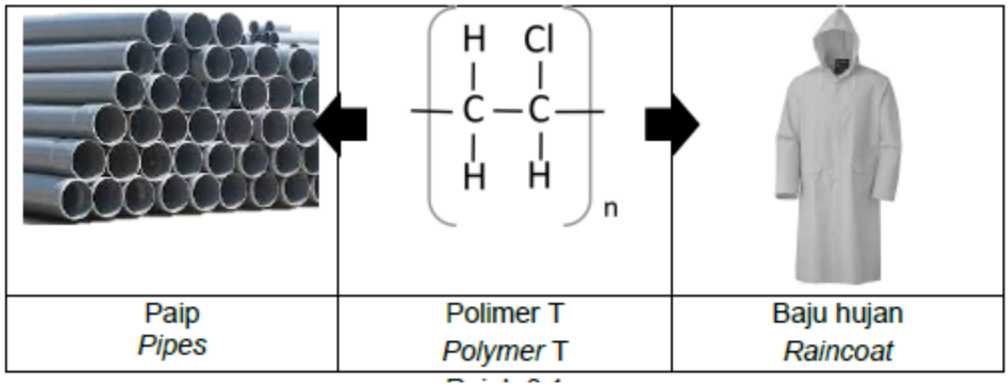
.....

.....

.....

..... [4M]

[2024-Melaka-03] (a) Paip dan baju hujan diperbuat daripada polimer T. Formula struktur bagi polimer T ditunjukkan dalam Rajah 3.1.
Pipes and raincoats are made from polymer T. The structural formula of polymer T is shown in Diagram 3.1.



(i) Apakah maksud polimer?/ *What is the meaning of polymer?*

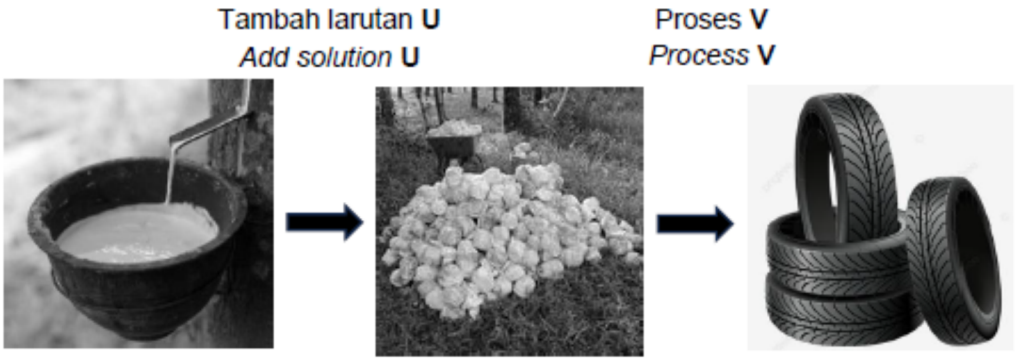
.....

..... [1M]

(ii) Nyatakan nama bagi monomer yang membentuk polimer T.
State the name of the monomer that makes up polymer T.

..... [1M]

(b) Rajah 3.2 menunjukkan carta alir untuk penghasilan tayar kereta. Proses V dijalankan untuk meningkatkan kekenyalan getah asli.
Diagram 3.2 shows a flow chart for the production of car tyres. Process V is carried out to increase the elasticity of natural rubber.



(i) Cadangkan larutan U dan nyatakan namakan proses V.
Suggest solution U and state the name of process V.

Larutan/ Solution U : .....

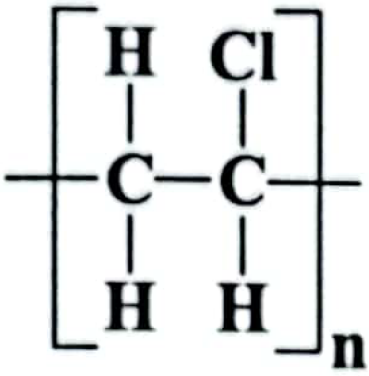
Proses/ Process V : ..... [2M]

(ii) Bagaimanakah proses V boleh meningkatkan kekenyalan getah asli?
How process V can increase the elasticity of natural rubber?

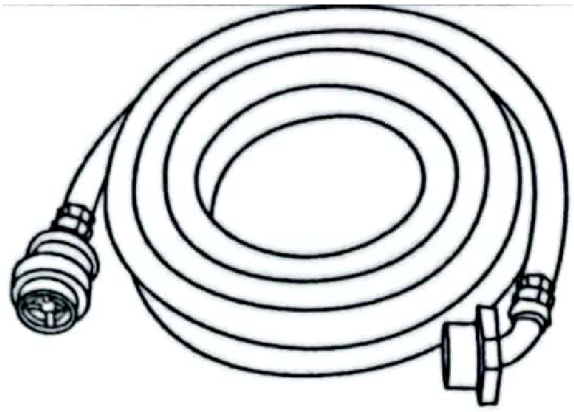
.....

..... [2M]

[2024 Perak – Set 1-03] (a) Rajah 1 menunjukkan formula struktur polimer X yang digunakan untuk menghasilkan produk Y.
Diagram I shows the structural formula of polymer X which is used to make product Y.



polimer X/ *polymer X*



produk Y/ *product Y*

(i) Apakah maksud polimer?/ *What is the meaning of polymer?*

.....

..... [1M]

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

[1 markah / mark]

(b) Jadual 3 menunjukkan dua pemerhatian bagi keadaan lateks apabila ditambah bahan A dan bahan B.
Table 3 shows two observations for the condition of latex when substances A and substances B are added

Bahan *Substance*	Pemerhatian *Observation*
A	Menggumpal/ *Coagulates*
B	Tidak menggumpal/ *Does not coagulate*

(i) Namakan bahan yang ditambah ke dalam cecair lateks.
Same the substances that arc added to the liquid latex.

Bahan/ *Substance* A : .....
A

Bahan/ *Substance* B : ..... [2M]

(ii) Terangkan secara ringkas proses penggumpalan lateks yang berlaku selepas terdedah kepada udara selama beberapa hari.
Explain briefly the process of coagulation of latex that occurs after the latex is exposed to air for a few- days.

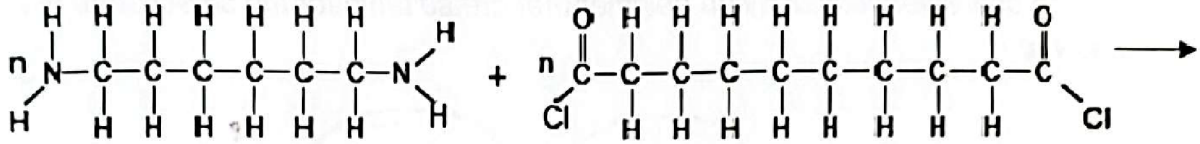
.....

.....

.....

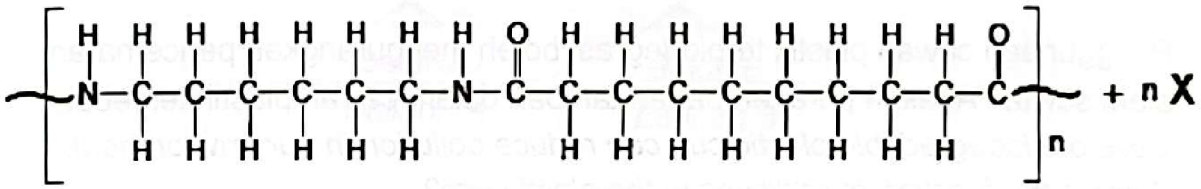
..... [2M]

[2024 – Terengganu-03] Rajah 3 menunjukkan tindak balas pempolimeran penghasilan nilon antara dua jenis monomer iaitu 1,6-heksanadiamina dan dekanadiol diklorida.
Diagram 3 shows polymerisation reaction producing nylon between two types of monomer, 1,6-hexanediamine and decanedioyl dichloride.



1.6 - heksanadiamina
1.6 - hexanediamine

dekanadiol diklorida
decanedioyl dichloride



Nilon
Nylon

bahan sampingan
by-product

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

..... [1M]

(b) (i) Nyatakan jenis tindak balas pempolimeran tersebut.
State type of the polymerisation reaction.

..... [1M]

(ii) Namakan hasil sampingan X daripada tindak balas pempolimeran tersebut.
Name the by-product X of the polymerisation reaction.

..... [1M]

(c) Bidang tekstil telah menjadikan nilon sebagai bahan utama menghasilkan benang.
Apakah ciri-ciri polimer nilon yang sesuai dengan pemilihan bahan tersebut.
The textile field has made nylon the main material for producing threads.
What are the characteristics of nylon polymer that are suitable for the selection of the material.

..... [2M]

(d) Penggunaan cawan plastik terbiodegrasi boleh mengurangkan pencemaran alam sekitar. Apakah peranan bahan tambah dalam cawan plastik tersebut?
Uses of biodegradable plastic cup can reduce pollution in our environment.
What is the function of additives in the plastic cup?

..... [1M]

[2024-Selangor-Set0?-08-d] (d) Getah sintetik ialah elastomer tiruan. Rajah 6.2 menunjukkan getah sintetik yang boleh digunakan untuk membuat peralatan memasak seperti spatula silikon bagi mengelakkan periuk tercalar semasa mengacau.
Synthetic rubber is an artificial elastomer. Diagram 6.2 shows synthetic rubber that can be used to make cooking utensils such as silicone spatula to avoid the pot from scratching.

(i) Mengapakah spatula silikon sesuai digunakan untuk memasak berbanding plastik?
Why is silicone spatula more suitable to be used for cooking compared to plastic?

..... [1M]

(ii) Getah sintetik digunakan secara meluas dan dihasilkan dengan banyak setiap tahun. Penggunaan getah sintetik secara tidak lestari akan mendatangkan kesan negatif kepada alam sekitar.
Nyatakan dan terangkan kesan tersebut.
Synthetic rubber is widely used and large amount is produced every year. Unsustainable use of synthetic rubber will cause negative effects to the environment. State and explain the effect.

.....

.....

.....

..... [2M]

[2024 JUJ Set1-08c] (c) Pernyataan berikut menunjukkan ciri-ciri bagi dua jenis getah sintetik iaitu Getah Y dan Getah Z.
The following statement shows the characteristics of two types of synthetic rubber, which are Rubber Y and Rubber Z.

Getah Y/ *Rubber Y*		Getah Z/ *Rubber Z*
• Tahan haba yang tinggi *High heat resistance* • Tahan pengoksidaan *Resistant to oxidation* • Tahan pelelasan *Abrasion resistant*		• Tahan haba yang tinggi *High heat resistance* • Tahan pengoksidaan *Resistant to oxidation* • Lengai *Inert*

Berdasarkan pernyataan di atas,
Based on the statement above,

(i) Cadangkan Getah Y dan Getah Z.
Suggest Rubber Y and Rubber Z.

Getah Y / *Rubber* Y : .....

Getah Z / *Rubber Z* : .....[2M]

(ii) Cadangkan satu kegunaan Getah Z dalam kehidupan seharian.
Suggest one use of Rubber Z in daily life.

..... [1M]

(d) Rajah 8.2 menunjukkan keratan artikel dari sebuah laman web.
Diagram 8.2 shows a section of an article from a website.

> Masalah Alam Sekitar Disebabkan oleh Polimer Sintetik
> Polimer sintetik boleh datang dalam pelbagai bentuk, seperti plastik biasa, nilon pada jaket, atau permukaan kuali tidak melekat, tetapi bahan buatan manusia ini mempunyai kesan buruk ke atas ekosistem di mana penyelidik Institut Kesihatan Kebangsaan A.S. telah memanggilnya "ancaman jangka panjang yang meningkat pesat."
> *Sumber: sciencing.com/ environmental-problems-caused-by-synthetic-polymers-*
> *Environmental Problems Caused by Synthetic Polymers*
> *Synthetic polymers can come in a variety of forms, such as common plastics, the nylon of a jacket, or the surface of a non-stick frying pan, but these human-made materials have a detrimental impact on ecosystems which U.S. National Institute of Health researchers have called "a rapidly increasing, long-term threat."*
> *Source: sciencing.com/ environmental-problems-caused-by-synthetic-polymers-*

Rajah 8.2 / Diagram 8.2

Pada pendapat anda, adakah sesuai untuk meneruskan penggunaan polimer sintetik dalam kehidupan seharian? Wajarkan jawapan anda.
In your opinion, is it appropriate to continue using synthetic polymers in everyday life? Justify your answer.

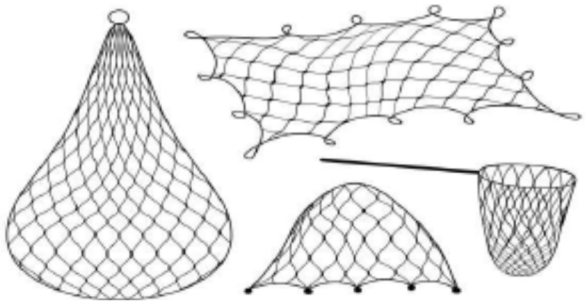
.....

.....

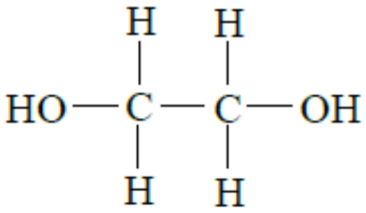
..... [3M]

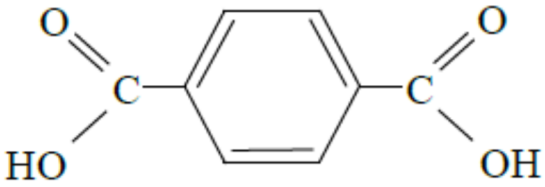
Esei

[2024 Perlis-10] Rajah 8.1 menunjukkan polimer sintetik X digunakan dalam pembuatan jala ikan.
Diagram 8.1 shows the synthetic polymer X is used in making fishing nets.



Rajah 8.2 menunjukkan monomer-monomer bagi polimer X.
Diagram 8.2 shows the monomers for polymer X.





(a) (i) Apakah maksud pempolimeran? Apakah jenis pempolimeran bagi pembentukan polimer X?
What does polymerization mean? What is the type of polymerization for the formation of polymer X?

[2M]

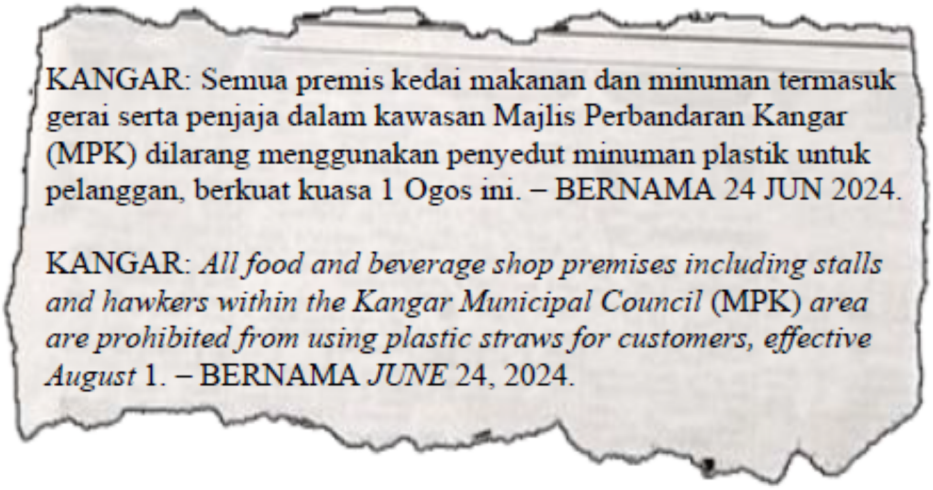
(ii) Lukiskan formula struktur bagi polimer X yang terbentuk dari monomer-monomer dalam Rajah 10.2. Apakah molekul yang disingkirkan dari pempolimeran itu?
Terangkan mengapa polimer yang dilukis juga dinamakan poliester.
Draw the structural formula for polymer X formed from the monomers in Diagram 10.2. What molecules are removed from the polymerization?
Explain why drawn polymers are also called polyesters.

[4M]

(b) (i) Penggunaan polimer sintetik adalah lebih meluas berbanding polimer semula jadi. Nyatakan ciri-ciri bagi polimer sintetik yang baik.
The use of synthetic polymers is more widespread than natural polymers.
State the characteristics of a good synthetic polymer.

[4M]

(ii)



KANGAR: Semua premis kedai makanan dan minuman termasuk gerai serta penjaja dalam kawasan Majlis Perbandaran Kangar (MPK) dilarang menggunakan penyedut minuman plastik untuk pelanggan, berkuat kuasa 1 Ogos ini. – BERNAMA 24 JUN 2024.

KANGAR: *All food and beverage shop premises including stalls and hawkers within the Kangar Municipal Council* (MPK) *area are prohibited from using plastic straws for customers, effective August* 1. – BERNAMA *JUNE* 24, 2024.

Keratan media menunjukkan larangan penggunaan penyedut minuman plastik oleh Majlis Perbandaran Kangar (MPK).
Penggunaan plastik mengambil masa sehingga 450 tahun untuk terurai.
Bagaimanakah anda boleh membantu untuk memendekkan tempoh penguraian penyedut minuman plastik ini?
Terangkan kaedah tersebut dan dua kelebihannya kepada alam sekitar.
Media clippings show the ban on the use of plastic straws by the Kangar Municipal Council (MPK).
The use of plastic takes up to 450 years to decompose.
How can you help to shorten the decomposition period of these plastic straws? Explain the method and its two advantages to the environment.

[6M]

(c)

Malaysia merupakan pengeluar getah asli ketujuh terbesar
Malaysia merupakan pengeluar getah asli ketujuh terbesar di dunia pada tahun 2020 dan pada tahun 2021, sektor di dunia pada tahun 2020 dan pada tahun 2021, sektor getah memberi sumbangan sebanyak 0.2% kepada getah memberi sumbangan sebanyak 0.2% kepada Keluaran Dalam Negara Kasar (KDNK) negara.Keluaran Dalam Negara Kasar (KDNK) negara.
Malaysia is the seventh largest producer of natural the seventh largest producer of natural rubber in the world in rubber in the world in 20202020 and in and in 2021, 2021, the rubber the rubber sector contributes sector contributes 0.2% 0.2% to the country's Gross Domestic to the country's Gross Domestic Product (GDP).

Meskipun Malaysia antara pengeluar getah utama di dunia, penggunaan getah sintetik lebih meluas dalam industri berbanding getah semula jadi.
Apakah faktor yang menyumbang kepada situasi ini?
Although Malaysia is one of the main producers of rubber in the world, the use of synthetic rubber is more widespread in the industry than natural rubber.
What factors contribute to this situation?

[4M]

[2024-Melaka-04] (a) Persamaan berikut menunjukkan tindak balas penyediaan sabun di dalam makmal.
The following equation shows the reaction in preparation of soap in the laboratory.

Asid palmitik + Larutan J → Sabun K + Gliserol
Palmitic acid + Solution J → Soap K + Glycerol

(i) Nyatakan nama bagi tindak balas penyediaan sabun.
State the name of the reaction to prepare soap.

..... [1M]

(ii) Nyatakan nama larutan J jika sabun K ialah natrium palmitat.
State the name of solution J if soap K is sodium palmitate.

..... [1M]

(iii) Pn Salmiah mendapati kotoran pada seluar sukan anaknya masih belum hilang selepas dicuci menggunakan sabun K dan air di rumahnya. Nyatakan nama bahan pencuci yang boleh digunakan bagi mengatasi masalahnya.
Pn. Salmiah found that the dirt on her son's sports pants still remained after washing with soap K and water at her house. State the name of the cleaning agent that can be used to overcome the problem.

..... [1M]

(b) Seorang pesakit yang berusia 12 tahun mengalami sakit kepala. Anda mempunya dua pilihan ubat seperti Rajah 4 yang boleh diberikan kepada pesakit itu.
A patient aged 12 experiencing headache. You have two options of medicine as shown in Diagram 4 that could be given to the patient.

(i) Pilih ubat manakah yang lebih sesuai diberikan kepada pesakit itu dan nyatakan bagaimanakah ubat itu boleh diambil.
Choose which medicine is more suitable to be given to the patient and state how the medicine can be taken.

.....

..... [2M]

(ii) Terangkan mengapa anda memilih ubat tersebut.
Explain why you choose the medicine.

.....

..... [2M]

[2024-Selangor-Set1-01] Rajah 1 menunjukkan pengelasan ubat moden.
Diagram 1 shows a classification of modern medicine.

(a) Nyatakan jenis ubat W dan X./ *State the type of medicine W and X.*

.....

..... [2M]

(b) Apakah fungsi ubat W?/ *What is the function of medicine W?*

..... [1M]

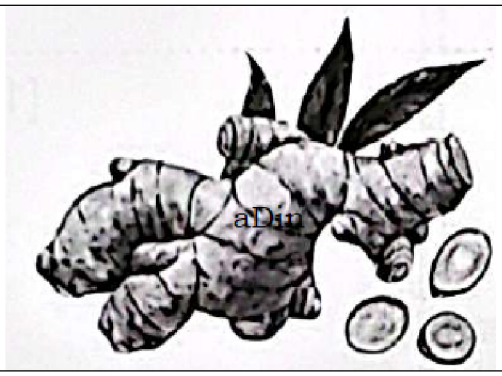
(c) Berikan satu contoh ubat psikotik./*Give one example of psychotic drug.*

..... [1M]

(d) Apakah fungsi ubat X?/ *What is the function of medicine X?*

..... [1M]

[2024 – Terengganu-01] Rajah 1 menunjukkan dua jenis ubat yang biasa digunakan untuk menyingkirkan angin dalam badan.
Diagram 1 shows two types of medicine commonly used to get rid of wind in the body.

	
Halia/ *Ginger*	Antasid/ *Antacid*

(a) Nyatakan definisi ubat./ *State the definition of medicine.*

..... [1M]

(b) Nyatakan jenis ubat seperti ditunjukkan dalam Rajah 1
State the type of medicine as shown in Diagram 1

Halia/ *Ginger* : .....

Antasid/ *Antacid* : .....[2M]

(c) Pada zaman dahulu halia digunakan secara meluas untuk merawat kembung perut akibat angin dalam badan.
In ancient times, ginger was widely used to treat flatulence caused by wind in the body.

(i) Apakah kelebihan menggunakan halia berbanding antasid?
What are the advantages of using ginger over antacid?

..... [1M]

(ii) Bagaimanakah cara halia digunakan untuk merawat penyakit tersebut?
How ginger is used to treat illness?

..... [1M]

[2024-Selangor-Set2-01] Rajah 1 menunjukkan pelbagai kosmetik di pasaran.
Diagram 1 shows various type of cosmetics in the market.

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

.....

..... [1M]

(ii) Nyatakan satu bahan asas dalam pembuatan kosmetik.
State one basic ingredient in cosmetics production.

..... [1M]

(b). Jadual 1 menunjukkan tiga jenis kosmetik P, Q dan R serta kegunaannya.
Table 1 shows three types of cosmetics P, Q and R with its uses.

Jenis kosmetik *Type of cosmetics*	Kegunaan *Uses*
P	Untuk mencantikkan wajah *To beautify the face*
Q	Untuk merawat badan *To treat the body*
R	Untuk menghasilkan pewangi *To provide fragrances*

Berdasarkan Jadual 1, berikan contoh P, Q dan R.
Based on Table 1, give an example of P, Q and R.

P : .....

Q : .....

R : ..... [3M]

[2024 Johor-01] Rajah 1 menunjukkan produk kosmetik yang dapat memberikan penampilan yang cantik serta meningkatkan keyakinan seseorang.
Diagram 1 shows cosmetic products that provide a pleasant appearance and increase the confident level.

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

.....

..... [1M]

(b) Nyatakan dua jenis bahan asas dalam pembuatan kosmetik.
State two types of basic ingredients in cosmetics production.

..... [2M]

(c)(i) Aida disahkan mengalami kerosakan buah pinggang oleh doktor disebabkan oleh penggunaan produk kosmetik.
Aida was diagnosed with kidney damage by a doctor due to the use of cosmetic products.

Cadangkan satu bahan kimia terlarang yang ada dalam produk kosmetik tersebut.
Suggest one prohibited chemical substance in that cosmetic products.

..... [1M]

(ii) Nyatakan satu lagi kesan sampingan penggunaan bahan kimia dalam (c)(i)
State another one side effect of chemical uses in 1(c)(i).

..... [1M]

[2024 JUJ Set2-04] Jadual 4.1 menunjukkan maklumat bagi kosmetik A dan kosmetik B yang digunakan secara meluas oleh pengguna.
Table 4.1 shows the information of cosmetic A and cosmetic B that is widely used by the consumers.

Jenis Kosmetik *Type of cosmetics*	Maklumat *Informations*
A	Digunakan untuk mencantikkan wajah. To beautify the face.
B	Rawatan pada tubuh. *To treat the body.*

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

.....

..... [1M]

(b) Berdasarkan Jadual 4.1, kenal pasti jenis kosmetik bagi:
Based on Table 4.1, identify the types of cosmetics for:

Kosmetik/ *Cosmetic* A : .....

Kosmetik/ *Cosmetic* B : ..... [2M]

(c) Percampuran antara peluh dan bakteria di permukaan kulit menyebabkan badan berbau. Sebagai seorang atlet sukan, cadangkan dua contoh bahan kosmetik yang boleh digunakan untuk mengatasi masalah bau badan.
A mixture between sweat and bacteria causes an unpleasant body odour. As a sports athlete, suggest two examples of cosmetics that can be used to overcome body odour problem.

.....

..... [2M]

(d) Rajah 4.2 menunjukkan bil elektrik yang tinggi akibat penggunaan penyaman udara di rumah Ammar.
Diagram 4.2 shows a high electricity bill due to the usage of air conditioners in Ammar's house.

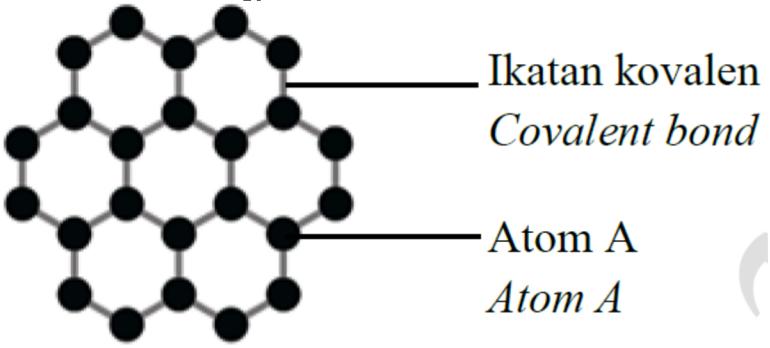
Berdasarkan pengetahuan anda tentang aplikasi teknologi hijau, cadangkan satu sumber tenaga alternatif yang sesuai untuk mengurangkan penggunaan tenaga di rumah Ammar. Terangkan jawapan anda.
Based on your knowledge of green technology applications, suggest one suitable alternative source energy to reduce the energy usage in Ammar's house. Explain your answer.

.....

.....

..... [2M]

[2024 JUJ Set1-02] Rajah 1 menunjukkan struktur helaian grafen yang terhasil dari perkembangan nanoteknologi.
Diagram 1 shows the structure of graphene sheet produced from the development of nanotechnology.



(a) Apakah maksud nanoteknologi?/ *What is meant by nanotechnology?*

.....

..... [1M]

(b) Nyatakan nama atom A./ *State the name of atom A.*

..... [1M]

(c) Nyatakan satu sifat fizik grafen./ *State one physical property of graphene.*

..... [1M]

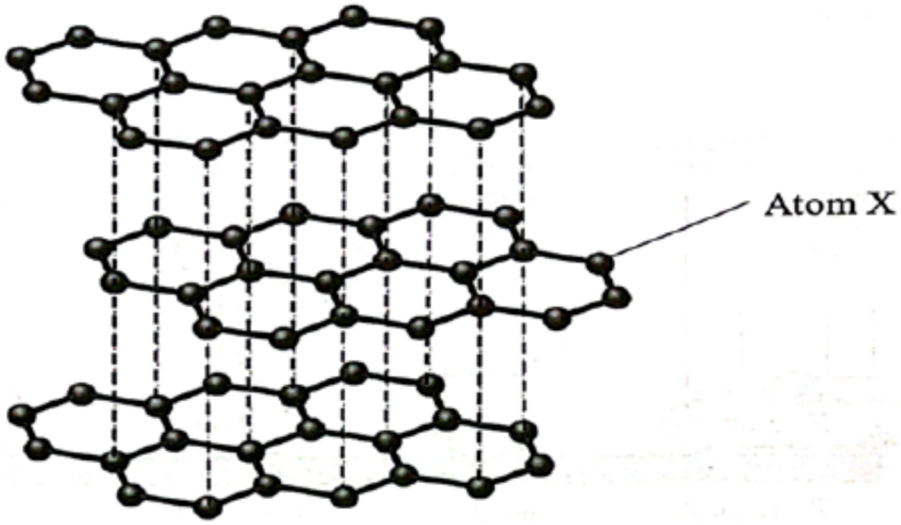
(d) Mengapakah helaian grafen boleh digunakan dalam penghasilan alat storan tenaga?
Why graphene sheets can be used in the production of energy storage devices?

.....

.....

..... [2M]

[2024 Johor Muar-03] Rajah 3 menunjukkan struktur grafen yang digunakan dalam satu industri. Grafen adalah bahan yang terpenting dalam bidang nanosains dan nanoteknologi kerana saiznya yang berukuran 0.1 nm.
Diagram 3 shows the structure of graphene used in an industry. Graphene is an important material in the field of nanoscience and nanotechnology due to its 0.1 nm in size.



Rajah 3 / Diagram 3

(a) Apakah maksud nanoteknologi?/ *What is the meaning of nanotechnology?*

.....

..... [1M]

(b) Namakan satu bidang yang menggunakan grafen.
Name one field that used graphene.

..... [1M]

(c) Nyatakan satu sifat fizik bagi grafen.
State one physical property of graphene.

..... [1M]

(d) Apakah ciri istimewa bagi grafen yang menjadikannya sesuai dalam penghasilan sensor?
What is the special characteristics of graphene that make it suitable for the production of sensors?

..... [1M]

(e) Berdasarkan Rajah 3, namakan atom X dan jenis ikatan terbentuk.
Based on Diagram 3, name atom X and the type of bond formed.

Nama atom X : .....
Name of atom X :

Jenis ikatan : .....
Type of bond :

[2 markah/marks]

[2024-Johor Batu Pahat-02] Rajah 2 menunjukkan pelbagai peringkat pengurusan sisa dalam Teknologi Hijau
Diagram 2 shows various levels of waste management in Green Technology

Rajah 2 / Diagram 2

(a) Apakah maksud Teknologi Hijau?
What is the meaning of Green Technology?

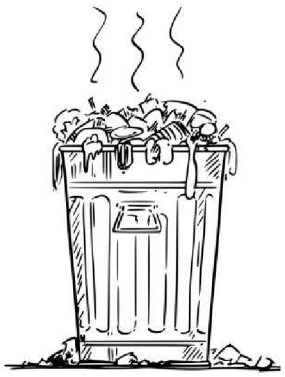
.....

..... [1M]

(b) Nyatakan satu sektor dalam Teknologi Hijau dan contoh aplikasinya
State one sector in Green Technology and its application.

..... [2M]

(c) Rajah 2a menunjukkan bagaimana pekerja syarikat pengurusan sisa pepejal mengumpulkan sampah secara berkala.
Diagram 2a shows how employees of a solid waste management company collect garbage regularly

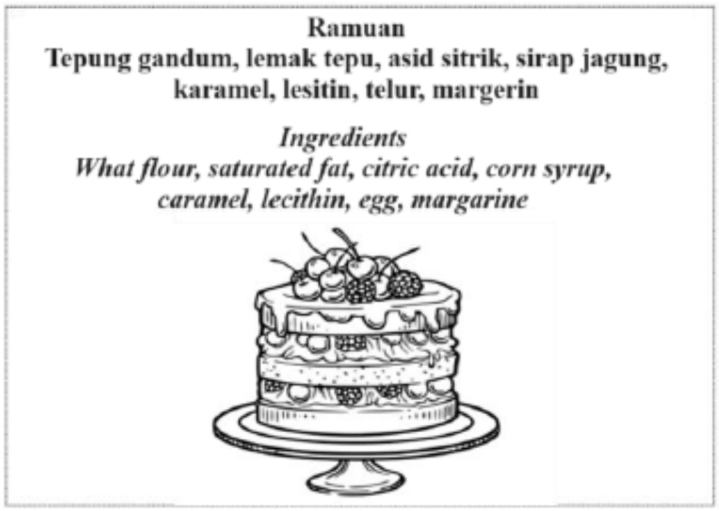


Terdapat pelbagai sisa buangan di kawasan perumahan anda seperti sisa makanan dan botol plastik. Sebagai seorang pelajar yang mempunyai pengetahuan mengenai Teknologi Hijau, cadangkan dua kaedah yang boleh mengatasi masalah itu.
There are various wastes in your residential area such as food wastes and plastic bottles. As a student who has knowledge of Green Technology, suggest two methods that can overcome the problem.

.....

..... [2M]

[2024 Johor Pasir Gudang-01] Rajah 1 menunjukkan ramuan bagi suatu kek.
Diagram 1 shows the ingredients of a cake.



(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.

..... [1M]

(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.

..... [1M]

(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 : ..... [2M]
Function

(d) Untuk memastikan kek lebih sedap, suatu bahan tambah makanan yang dimasukkan dalam kek tersebut. Tuliskan nama bahan tambah makanan tersebut.
To ensure that the cake more delicious, a food additive is included in the cake. Write the name of the food additive.

..... [1M]

[2024 Johor Pasir Gudang-01] Jadual 1 menunjukkan maklumat bagi dua bahan tambah makanan yang berbeza, P dan Q.
Table 1 shows information of two different food additives, P and Q.

Bahan tambah makanan *Food additive*	Maklumat *Information*
P	Ditambah kepada sos supaya ia dapat memekatkan cecair. *Added to sauces to make it thicken liquids.*
Q	Ditambah kepada jeruk buah-buahan untuk menyediakan keadaan yang berasid, untuk melambatkan atau merencatkan pertumbuhan mikroorganisma. *Added to picked fruits to provide an acidic condition to slow down or inhibit the growth of microorganisms.*

Jadual 1/ Table 1

(a) (i) Nyatakan satu kelebihan penggunaan bahan tambah makanan dalam kehidupan.
State one advantage of uses of food additives in daily life.

..... [1M]

(ii) Cadangkan nama bagi contoh bahan tambah makanan P dan Q.
Suggest the name for example of food additives, P and Q.

P : .....

Q : ..... [2M]

(iii) Apakah yang berlaku jika bahan tambah P tidak ditambah kepada sos?
What will happen if food additive P not added into sauce?

..... [1M]

(b) Rajah 1 menunjukkan asam jawa yang biasa digunakan sebagai ubat tradisional di Malaysia.
Diagram 1 shows tamarind usually used as traditional medicines in Malaysia.

Nyatakan satu kegunaan ubat tradisional ini.
State one use of this traditional medicine.

..... [1M]

[2024-Sarawak-Set01-07] Rajah 6.1 menunjukkan ramuan bagi aiskrim buatan sendiri yang di buat oleh Puan Patricia.
Diagram 6.1 shows the ingredients of a homemade ice cream which made by Madam Patricia.

Ramuan:
Keju krim, susu penuh krim, gula tebu, ekstrak vanila, garam laut, gam xanthan.

Ingredients:
Cream cheese, full cream milk, cane sugar, vanilla extract, sea salt, xanthan gum

(a) (i) Lemak ialah salah satu bahan yang terdapat dalam aiskrim. Nyatakan keadaan fizikal lemak pada suhu bilik.
One of the ingredients in the ice cream is fats. State the physical state of fats at room temperature.

..... [1M]

(ii) Gam xanthan diguna secara meluas dalam makanan seperti sos cili dan aiskrim.
Nyatakan jenis bahan tambah makanan dan fungsi gam xanthan tersebut.
Xanthan gum is widely used in foods such as chili sauce and ice cream. State the type of food additive and the function of xanthan gum.

.....

.....

..... [2M]

(iii) Puan Patricia ialah seorang penghidap kencing manis. Cadang dan terangkan alternatif lain bagi Puan Patricia untuk menikmati aiskrim tanpa memudaratkan kesihatannya.
Madam Patricia is a diabetic. Suggest and explain another alternative for Madam Patricia to enjoy the ice cream without harming her health.

.....

.....

..... [2M]

(iv) Wajarkan penggunaan bahan tambah makanan dalam kehidupan seharian.
Justify the use of food additives in daily life.

.....

.....

..... [2M]

[2024-Sarawak-Set01-07b] (b) Rajah 6.2 menunjukkan suatu iklan yang mempromosikan garam nano di laman web beli-belah dalam talian yang dilayari oleh Puan Patricia. Iklan tersebut menyatakan bahawa garam nano merupakan satu produk nanoteknologi. Puan Patricia ingin membelinya untuk menggantikan garam laut dalam pembuatan aiskrim.

Diagram 6.2 shows an advertisement promoting nano salt on an online shopping website which visited by Madam Patricia. The advertisement claims that nano salt is a nanotechnology product.
Madam Patricia wants to buy it to replace the sea salt in making ice cream.

(i) Apakah maksud nanoteknologi?
What is the meaning of nanotechnology?

.....

..... [1M]

(ii) Penggunaan garam nano adalah lebih sihat berbanding garam laut. Terangkan.
The use of nano salt is healthier than sea salt. Explain.

.....

.....

.....

..... [2M]

[2024 Perak – Set 1-01] Jadual 1 menunjukkan dua jenis kosmetik M dan N yang digunakan secara meluas oleh pengguna.
Table 1 show s two types of cosmetics M and N which arc widely used by consumers.

Jcnis kosmetik *Type of cosmetics*	Kegunaan *Use*
M	Sebagai pelembap kulit dan masker muka. *As skin moisturisers and facial masks*
N	Sebagai deodoran dan minyak wangi. *As deodorants and perfumes.*

(a) Apakah yang dimaksudkan dengan kosmetik?
What is meant by cosmetics?

..... [1M]

(b) Berdasarkan Jadual 1, kenal pasti jenis kosmetik M dan N.
Based on Table 1, identify type of cosmetics M and N.

M : .....

N : ..... [2M]

(c) Terangkan mengapa nanoteknologi digunakan secara meluas dalam pembuatan bahan kosmetik.
Explain why nanotechnology is widely used in the manufacturing of cosmetics.

.....

..... [2M]

[2024 Putrajaya-05] (a) Jadual 2 menunjukkan maklumat bagi tiga bahan tambah makanan yang berbeza, X, Y dan Z. Table 2 shows the information of three different food additives, X, Y and Z.

Bahan tambah makanan *Food additives*	Maklumat *Information*
X	Ditambah kepada jem nanas untuk memaniskan jem nanas. *Added to pineapple jam to make it sweeter.*
Y	Ditambah kepada kek harijadi untuk menjadikan kek berwarna-warna supaya kelihatan menarik. *Added to a birthday cake to make the cake colourful and look attractive.*
Z	Ditambah kepada daging segar supaya ia tahan lama dan kelihatan segar. *Added to fresh meat to preserve it and to make it looks fresh.*

Berdasarkan Jadual 2/ *Based on Table 2:*

(i) Apakah maksud bagi bahan tambah makanan?
What is the meaning of food additives?

.....

..... [1M]

(ii) Nyatakan jenis bahan tambah makanan Z.
State the types of food additives Z.

..... [1M]

(iii) Cadangkan nama bagi bahan tambah makanan X.
Suggest the name for food additive X.

..... [1M]

(iv)

Siti bercadang untuk membuat sebiji kek untuk harijadi adiknya. Siti ada dua pilihan iaitu perah air dari kisaran daun pandan atau tambahkan sebatian trifenil sebagai pewarna.
Siti plans to bake a birthday cake for her sister. Siti has two options either to squeeze the water from grindered pandan leaves or to add triphenyl compounds as dyes.

Berdasarkan pernyataan di atas, anda diminta untuk membantu Siti buat keputusan. Jelaskan jawapan anda
Based on the above statement, you are asked to help Siti makes the decision. Explain you answer.

.....

..... [2M]

(b) Rajah 4 menunjukkan losyen penghalang cahaya matahari yang menggunakan nanoteknologi.
Diagram 4 shows a sunblock lotion that utilises nanotechnology.

Rajah 4
Diagram 4

(i) Terangkan kelebihan penggunaan nanoteknologi bagi losyen penghalang cahaya matahari.
Explain the advantage of nanotechnology application in sunblock lotions.

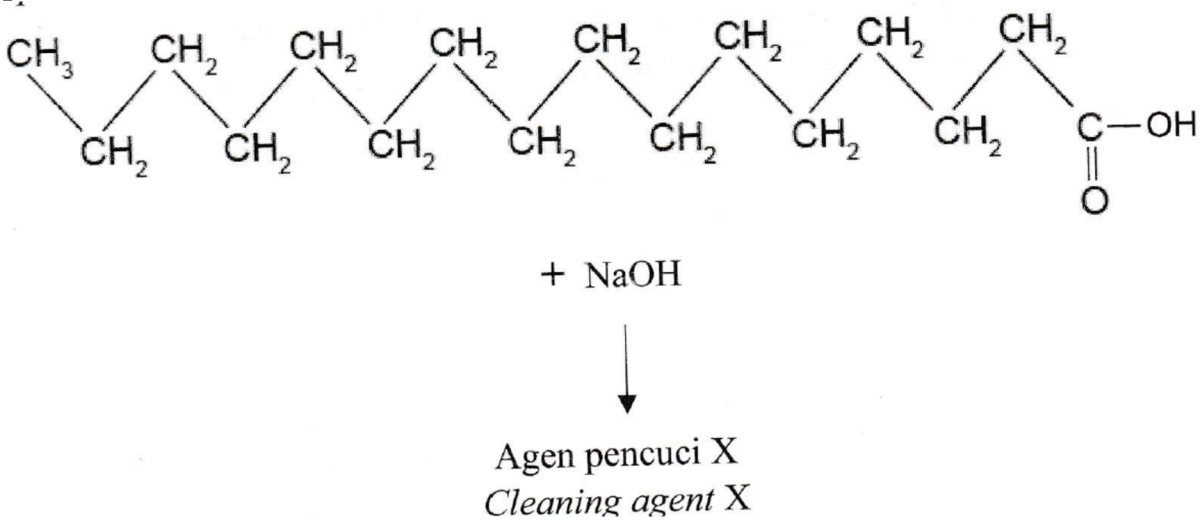
.....

..... [2M]

(ii) Nyatakan satu kegunaan nanoteknologi yang lain dalam bidang tekstil.
State one other uses of nanotechnology in textile.

..... [1M]

[2024 Negeri Sembilan-07] (a) Rajah 7.1 menunjukkan tindak balas dalam penghasilan satu agen pencuci menggunakan asid palmitik.
Diagram 7.1 shows the reaction in producing a cleaning agent by using palmitic acid.



Berdasarkan Rajah 7.1,/ *Based on Diagram 7.1,*

(i) Nyatakan jenis asid lemak bagi asid palmitik.
State the type of fatty acid for palmitic acid.

..... [1M]

(ii) Namakan tindak balas tersebut./ *Name the reaction.*

..... [1M]

(iii) Lukis formula struktur bagi agen pencuci X.
Draw the structural formula for cleaning agent X.

[1M]

(iv) Namakan struktur dalam 7(a)(iii)./ *Name the structure in 7(a)(iii).*

..... [1M]

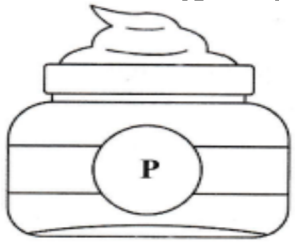
(v) Terangkan keberkesanan tindakan pencucian agen pencuci X dalam air liat.
Explain the effectiveness of cleansing action of cleaning agent X in hard water.

.....

.....

..... [2M]

(b) Rajah 7.2 menunjukkan dua jenis kosmetik.
Diagram 7.2 shows two types of cosmetics.



100% buatan sendiri
100% *homemade*

Dihasilkan di kilang
Produced in the factory

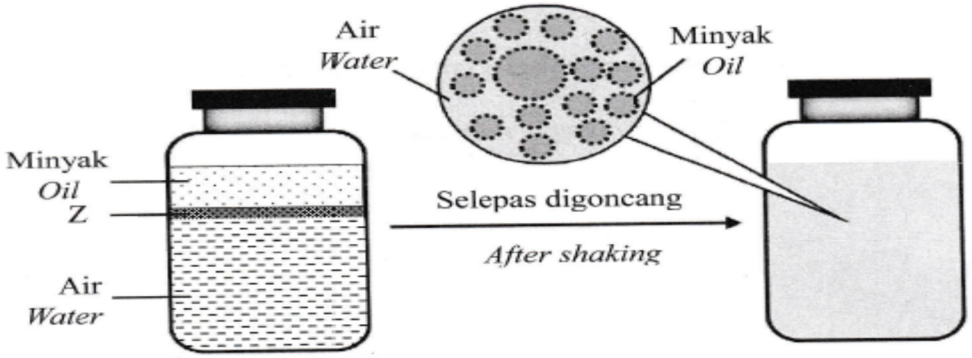
Wajarkan penggunaan kedua-dua kosmetik tersebut dalam membantu penampilan seseorang.
Justify the use of both cosmetics in helping a person's appearance.

.....

.....

..... [2M]

(c) Rajah 7.3 menunjukkan satu tindak balas kimia yang berlaku dalam penghasilan makanan apabila ditambah bahan tambah Z.
Diagram 7.3 shows a chemical reaction that occurs in producing of food when food additive Z is added.



Berdasarkan Rajah 7.3,/ *Based on Diagram 7.3,*

(i) Nyatakan perubahan yang berlaku selepas digoncang.
State the changes that occur after shaking.

.....

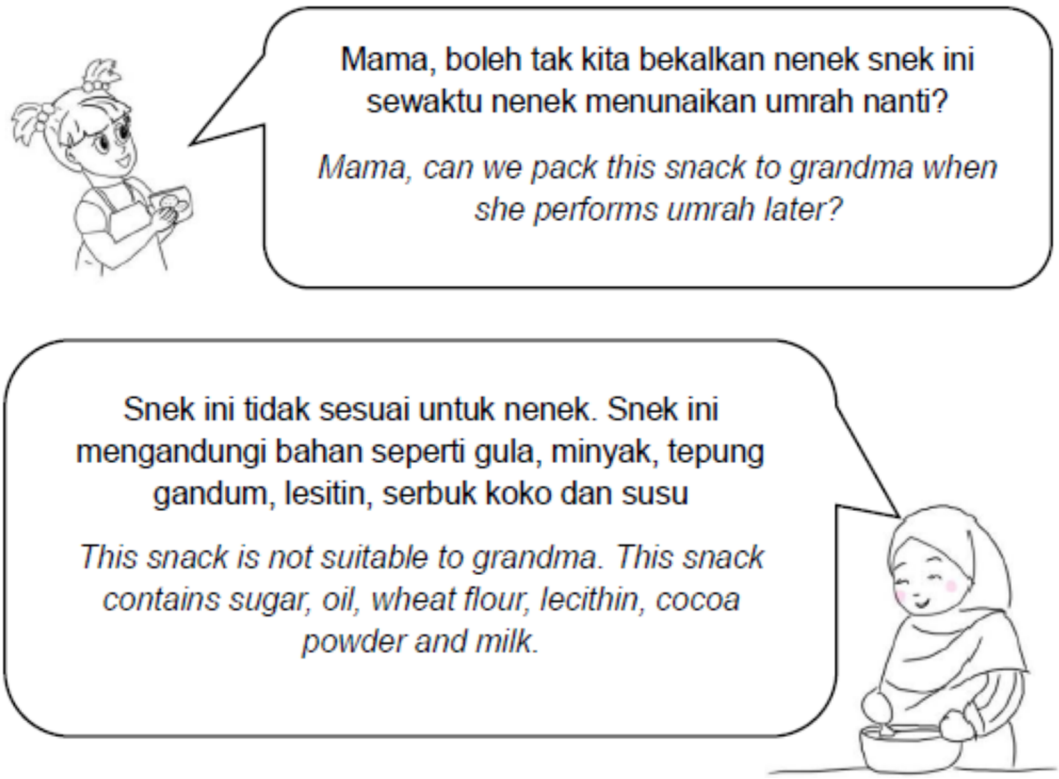
..... [1M]

(ii) Jika diberikan pilihan antara pektin dan lecitin, bahan tambah manakah yang anda pilih untuk menghasilkan perubahan seperti dalam 7(c)(i)?
If given a choice between pectin and lecithin, which additive would you choose to produce the change as in 7(c)(i)?

..... [1M]

Esei

[2024-Kedah-10c] (c) Rajah 10.3 menunjukkan perbualan antara Aileen dan ibunya.
Diagram 10.3 shows the conversation between Aileen and her mother.

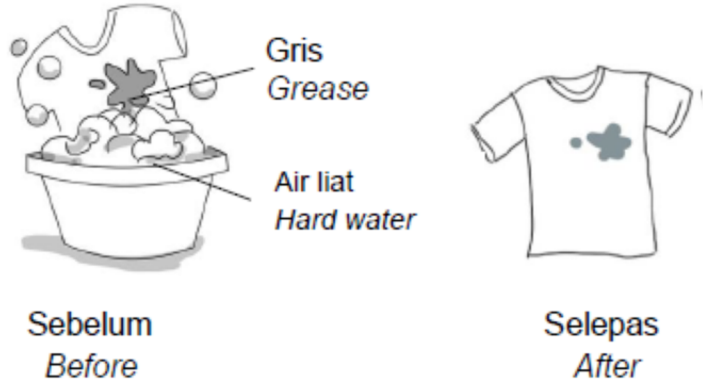
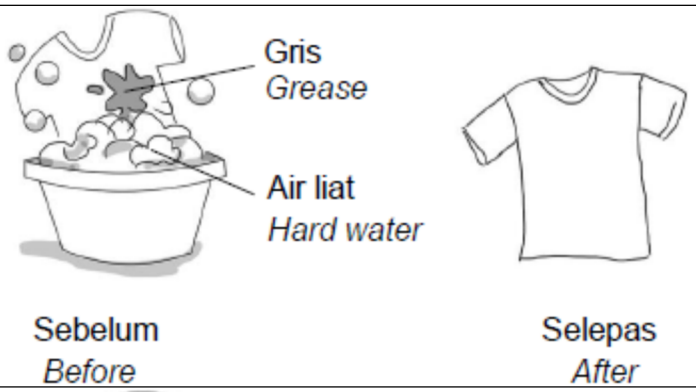
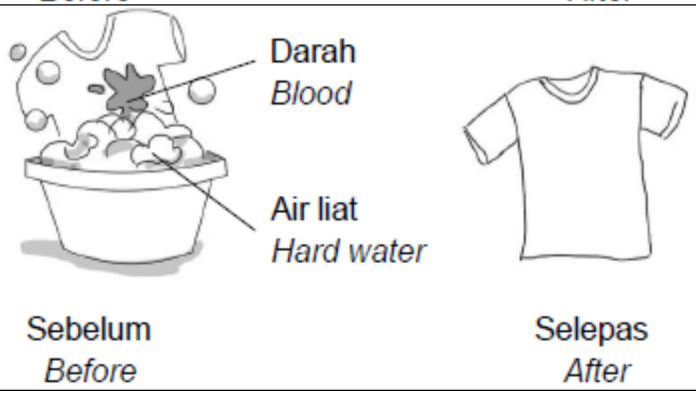


Berdasarkan perbualan di atas, snek tersebut mengandungi beberapa jenis bahan tambah makanan. Nyatakan maksud bahan tambah makanan. Nyatakan satu jenis bahan tambah makanan dalam snek tersebut beserta fungsinya. Sekiranya nenek tersebut menghidapi penyakit diabetes, apakah bahan lain yang boleh menggantikan gula? Terangkan mengapa.

Based on the conversation, the snack contains few type of food additives. State the meaning of food additives. State one type of food additive and its function. If grandma has diabetes, what other ingredient can be used to replace sugar? Explain your answer.

[5M]

[2024-Kedah-10d] (d) Rajah 10.4 menunjukkan pemerhatian apabila menggunakan agen pencuci yang berbeza.
Diagram 10.4 shows the observations when using different cleaning agents.

Set	Agen Pencuci *Cleaning Agent*	Pemerhatian *Observation*
I	Y	
II	Z	
	Z + Bahan tambah X *Z + Additive X*	

Berdasarkan maklumat dalam Rajah 10.3,
Based on the information in Diagram 10.3,

• Kenal pasti bahan X, Y dan Z/ *Identify substance X, Y and Z.*
• Terangkan perbezaan pemerhatian antara Set I dan Set II
Explain the differences in observations between Set I and Set II [6M]

[2024 Kelantan-11b] (b) Rajah 11.3 menunjukkan senarai ubat dan arahan penggunaan oleh doktor yang diberikan kepada dua orang pesakit, A dan B
Diagram 11.3 shows the list of medicines and instructions for use by the doctor given to two patients, A and B

Ubat Pesakit A *Patient A's medication*		Ubat Pesakit B *Patient B's medication*
Parasetamol *Paracetamol*		Aspirin *Aspirin*
Ubat B - untuk meredakan bengkak sendi dan keradangan *Medicine B-to relieve joint swelling and inflammation*		Ubat C - untuk meredakan alahan dan selsema yang teruk *Medicine C-to relieve severe allergies and colds*

Rajah 11.3 Diagram 11.3

Berdasarkan senarai ubat dalam Rajah 11.3, namakan jenis ubat B dan C serta banding bezakan parasetamol dan aspirin.
Based on the list of medicine in Diagram 11.3, name the types of drugs B and C and contrast paracetamol and aspirin.

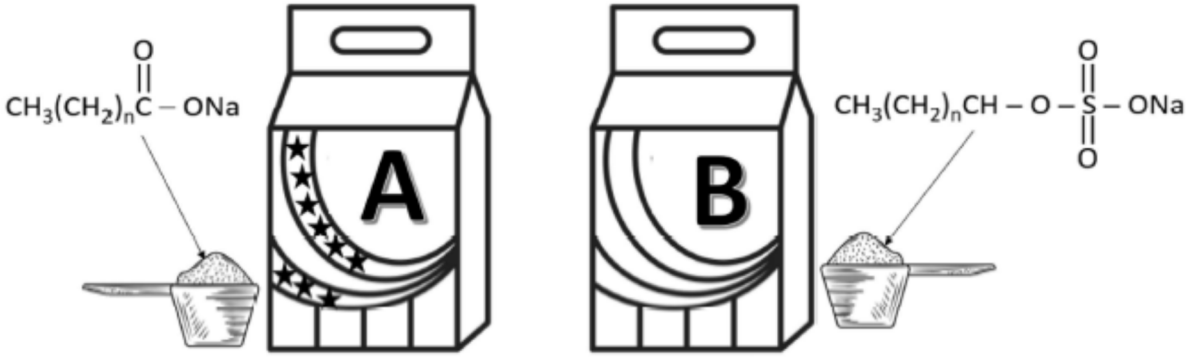
[4M]

[2024 Kelantan-11c] (c) Rajah 11.4 menunjukkan satu poster iklan produk kosmetik.
Diagram 11.4 shows a cosmetic product advertisement poster.

Apakah jenis kosmetik yang diiklankan dalam poster tersebut dan terangkan bagaimana pelembab yang dicipta dengan nanoteknologi dapat memberi kesan yang lebih baik kepada kulit.
What kind of cosmetics are advertised in the poster and explain how moisturizers created with nanotechnology can have a better effect on the skin.

[2M]

[2024 Kelantan-11d] (d) Rajah 11.5 menunjukkan dua serbuk pencuci dan formula strukturnya yang biasa digunakan dalam kehidupan seharian.
Diagram 11.5 shows two washing powders and their structural formulas that are commonly used in everyday life.



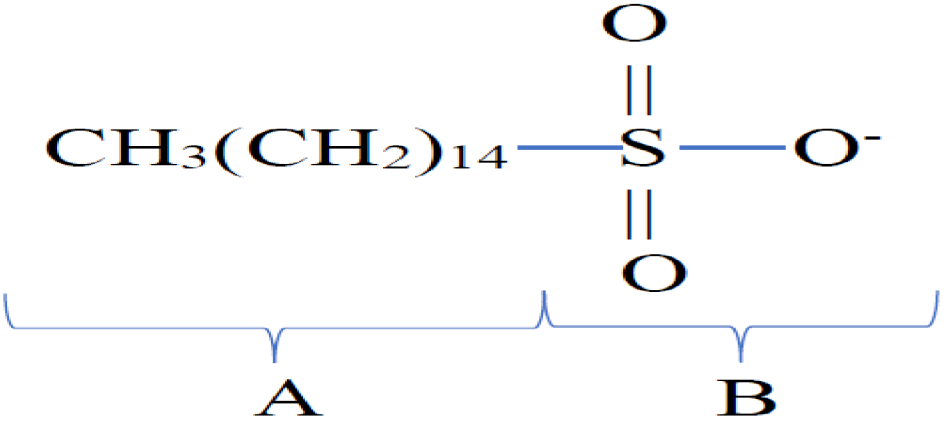
(i) Kenalpasti jenis serbuk pencuci tersebut
Identify the type of washing powder

[2M]

(ii) Dengan menggunakan reagen larutan magnesium nitrat, huraikan satu ujian kimia bagi membezakan serbuk pencuci A dan serbuk pencuci B. Nyatakan langkah-langkah ujian dijalankan dan jadualkan hasil dari ujian tersebut.
Using magnesium nitrate solution reagents, describe a chemical test to differentiate washing powder A and washing powder B. State the steps of the test and tabulate the results of the test.

[7M]

[2024-Sarawak-Set02-09] (a) (i) Rajah 8.1 menunjukkan formula struktur bagi anion molekul detergen. Struktur ini mengandungi bahagian hidrofilik dan hidrofobik.
Diagram 8.1 shows the structural formula of the anion of detergent molecule. The structure contains hydrophilic part and hydrophobic part.

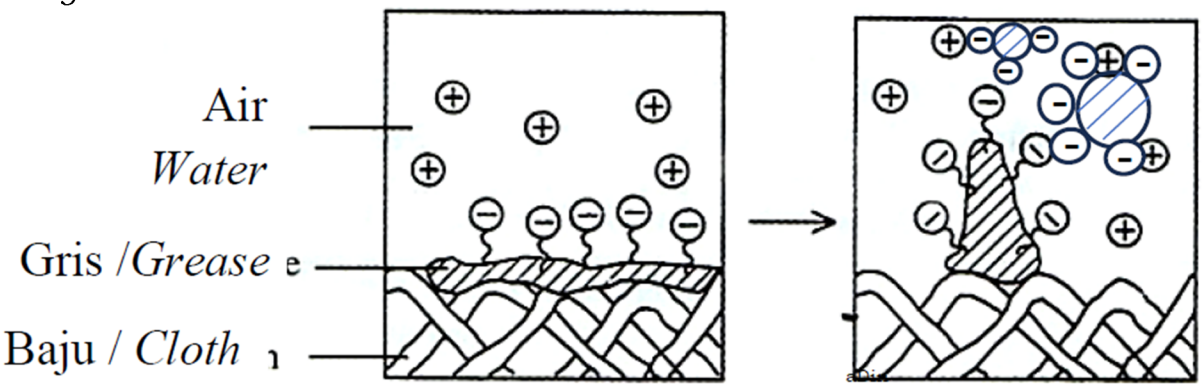


Rajah 8.1 / Diagram 8.1

Berdasarkan rajah 8.1, tentukan bahagian A dan B.
Based on diagram 8.1, identify part A and B

[2M]

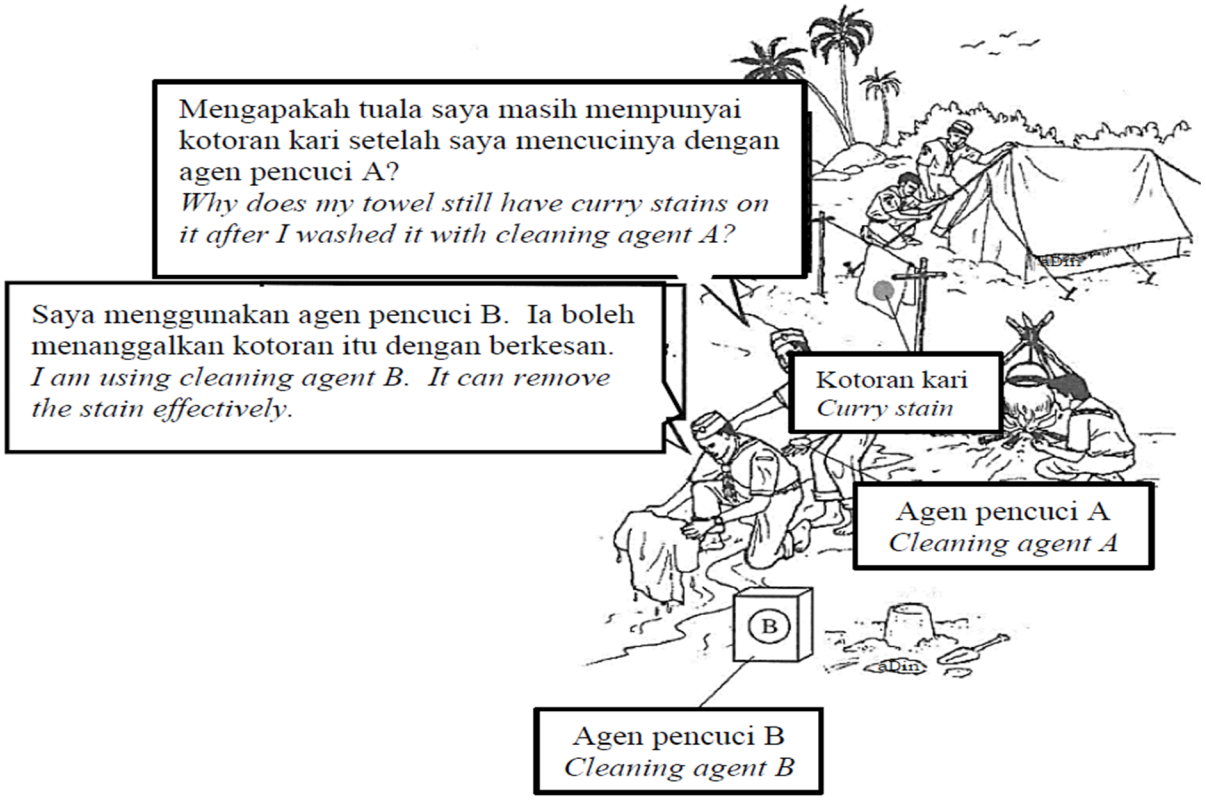
(ii) Rajah 8.2 menunjukkan sebahagian tindakan pencucian anion detergen terhadap kotoran bergris pada baju.
Diagram 8.2 shows part of the washing action of anion of detergent towards the grease stain on cloth.



Berdasarkan rajah 8.2, jelaskan tindakan pencucian anion detergen terhadap kesan gris pada baju.
Based on Diagram 8.2, explain the washing action of detergent anion on greasy stain on cloth.

[5M]

(iii) Rajah 8.3 menunjukkan sekumpulan pengakap sedang mendirikan khemah di tepi pantai.
Diagram 8.3 shows a group of scouts setting up a tent by the beach.



Berdasarkan Rajah 8.3, cadangkan agen pencuci A dan B. Jelaskan perbezaan dalam pemerhatian.
Based on Diagram 8.3, suggest cleaning agent A and B. Explain the difference in observation.

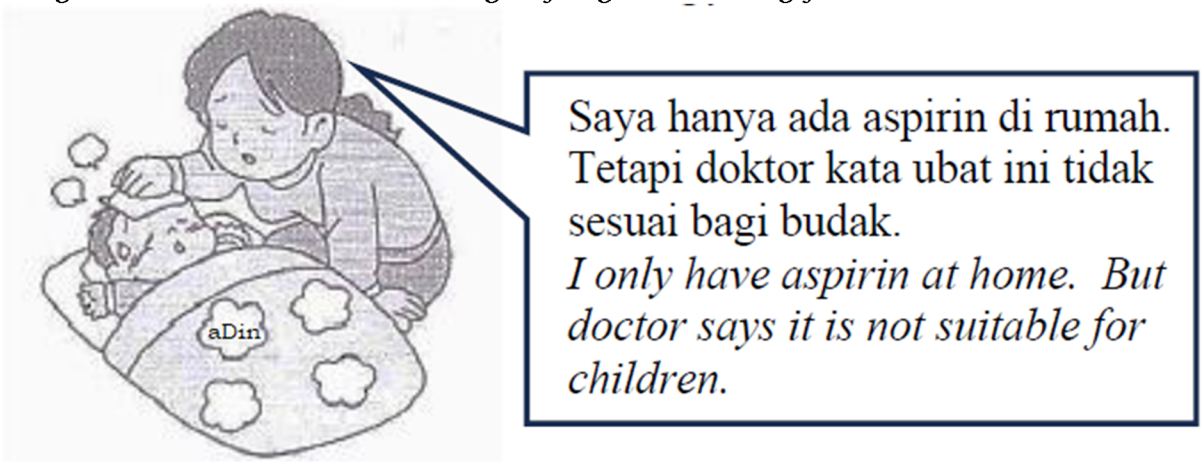
[5M]

(b) Rajah 8.4 menunjukkan pembuangan air sisa dari kilang ke dalam sungai.
Diagram 8.4 shows the wastewater disposal from a factory into river.

Teknologi hijau digunakan untuk merawat air sisa dari kilang supaya masalah pencemaran sumber air dapat dielakkan. Apakah maksud teknologi hijau? Nyatakan dua kesan pembuangan air sisa tanpa dirawat ke dalam sungai terhadap persekitaran.
Green technology is applied to treat the wastewater from industries so that water pollution can be prevented. What is the meaning of green technology? State two effects of untreated wastewater disposal into the river toward the environment.

[3M]

(c) Rajah 8.5 menunjukkan seorang kanak-kanak yang berumur 2 tahun yang sakit deman.
Diagram 8.5 shows a child at age of 2 years having fever.



(i) Berdasarkan Rajah 8.5, jelaskan mengapa aspirin tidak sesuai diberikan kepada kanak-kanak. Cadangkan ubat moden yang boleh digunakan untuk merawat budak itu.
Based on Diagram 8.5, explain why aspirin is not suitable for children. Suggest modern medicine that can be used to treat the child.

[3M]

(ii) Ubat tradisional seperti teh halia madu boleh digunakan untuk merawat demam. Namun, ia tidak digunakan secara meluas kebelakangan ini berbanding dengan ubat moden. Wajarkan kegunaan ubat tradisional.
Traditional medicines such as honey ginger tea can be used to treat fever. However, it is not widely used nowadays compared to modern medicines. Justify the uses of traditional medicines.

[2M]