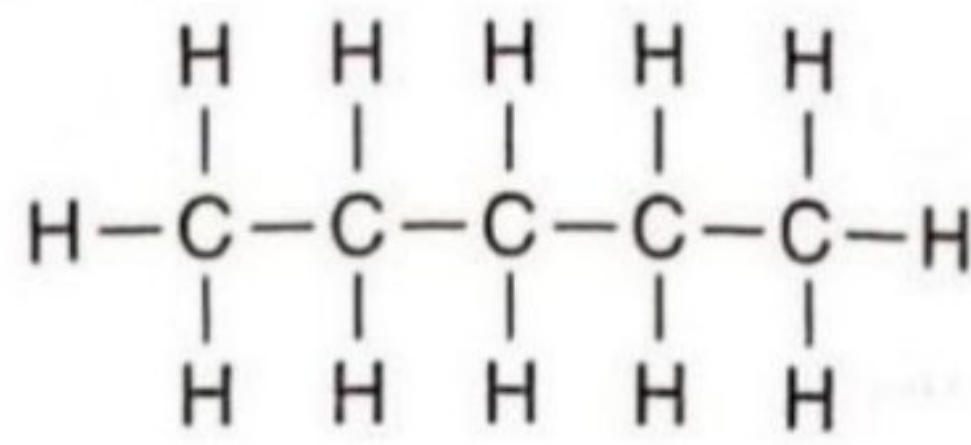
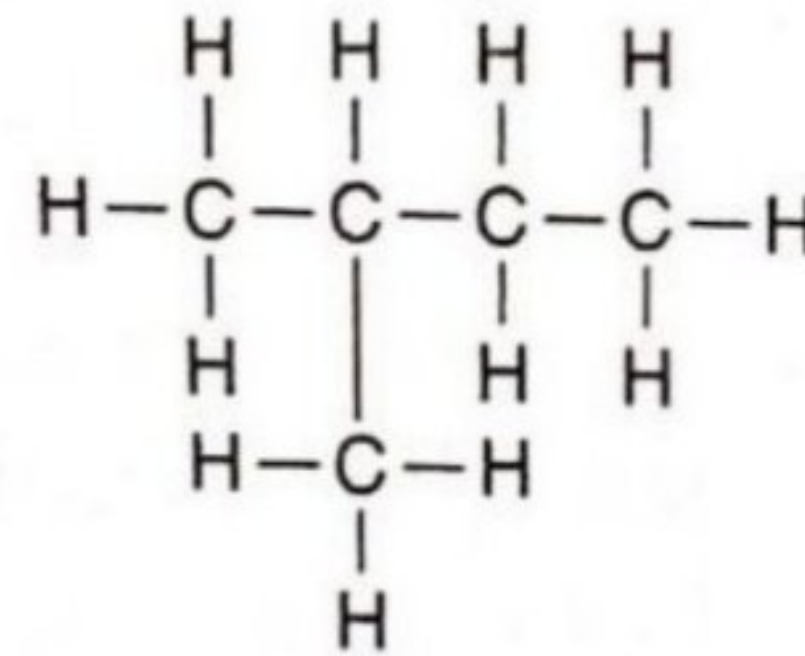


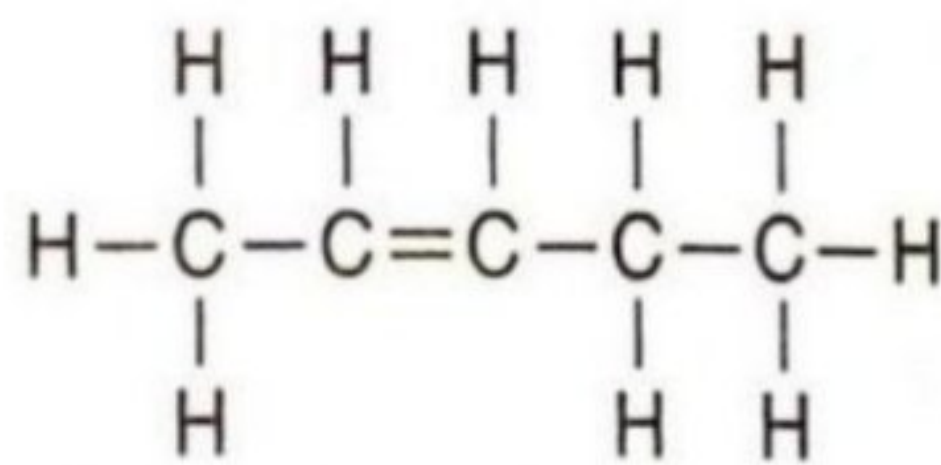
- 6 Rajah 6 menunjukkan formula struktur bagi sebatian P, Q, R dan T.
Diagram 6 shows the structural formulae of compounds P, Q, R and T.



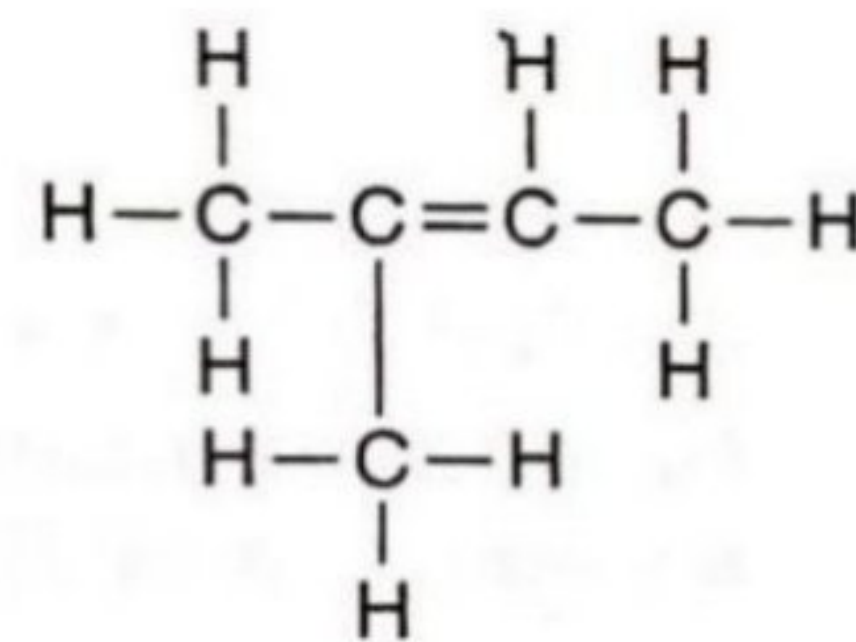
Sebatian P
Compound P



Sebatian Q
Compound Q



Sebatian R
Compound R



Sebatian T
Compound T

Rajah 6
Diagram 6

Sebatian P dan Q merupakan isomer bagi sebatian hidrokarbon tepu manakala sebatian R dan T pula adalah isomer bagi suatu sebatian hidrokarbon tidak tepu.
Compounds P and Q are isomers of a saturated hydrocarbon compounds while compounds R and T are isomers of an unsaturated hydrocarbon compound.

Berdasarkan rajah 6,
Based on Diagram 6,

- (a) Apakah dimaksudkan dengan isomer?
What is meant by isomer?

.....

.....

[1 markah]
 [1mark]

- (b) Namakan sebatian T mengikut penamaan IUPAC.
Name compound T according to the IUPAC nomenclature.

.....

[1 markah]
 [1mark]

- (c) Lukis formula struktur bagi satu isomer lain bagi sebatian karbon P dan Q.
Draw the structural formula for another isomer of carbon compounds P and Q.

[1 markah]

- (d) Sebatian R boleh ditukar kepada sebatian P. Tuliskan persamaan kimia bagi tindakbalas penambahan yang berlaku.

Compound R can be converted to compound P. Write the chemical equation for the addition reaction occur.

[2 markah]

[2 marks]

- (f) Persamaan kimia dibawah menunjukkan tindak balas pembakaran lengkap bagi 300 cm³ sebatian P.

The chemical equation below shows a complete combustion reaction of 300cm³ of compound P.



Seimbangkan persamaan kimia tersebut dan hitung jisim gas karbon dioksida yang terbentuk.

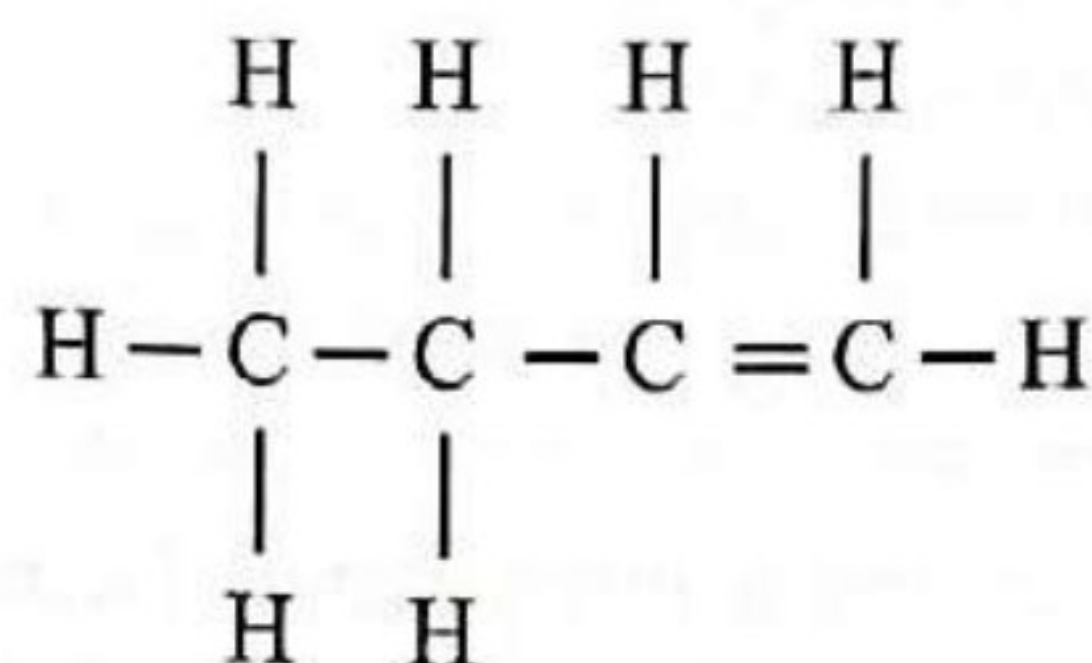
[Jisim atom relatif: C=12, O=16, Isipadu molar = 24 dm³ mol⁻¹ pada keadaan bilik]

Balance the chemical equation and calculate the mass of carbon dioxide gas formed.

[Relative atomic mass: C=12, O=16, Molar volume = 24 dm³ mol⁻¹ at room temperature].

- 10 (a) Rajah 10.1 menunjukkan satu formula struktur bagi butena.

Diagram 10.1 shows a structural formula of butene.



Rajah 10.1

Diagram 10.1

- (i) Nyatakan maksud isomer.

State the meaning of isomer.

[1 markah]

[1 mark]

- (ii) Lukis formula struktur bagi dua lagi isomer bagi butena.

Namakan setiap isomer tersebut mengikut penamaan IUPAC.

Draw the structural formulae for another two isomers of butene.

Name each isomer according to the IUPAC nomenclature.

[4 markah]

[4 marks]

- (iii) Tulis persamaan kimia seimbang bagi pembakaran butena dalam oksigen yang berlebihan.

Jika 1 200 cm³ gas butena digunakan, hitungkan isi padu gas oksigen yang diperlukan untuk pembakaran tersebut.

[1 mol gas menempati 24 dm³ pada keadaan bilik]

Write the balanced chemical equation for the combustion of butene in excess oxygen.

If 1 200 cm³ butene gas is use, calculate the volume of oxygen gas needed for the combustion.

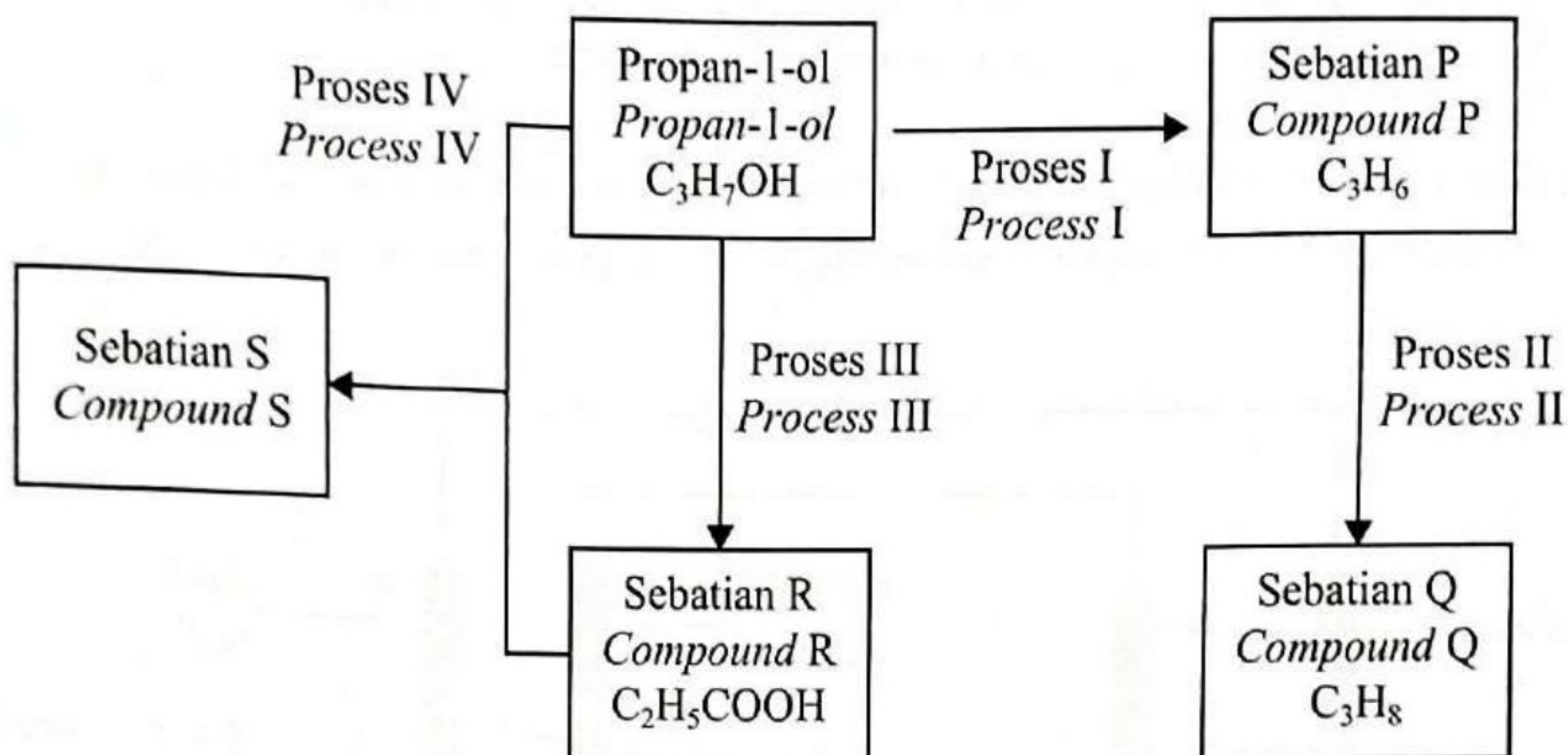
[1 mol of gas occupies 24 dm³ at room condition]

[5 markah]

[5 marks]

- (b) Rajah 10.2 menunjukkan carta alir pertukaran propan-1-ol kepada beberapa sebatian organik.

Diagram 10.2 shows a flow chart for the conversion of propan-1-ol to a few organic compounds.



Rajah 10.2
Diagram 10.2

Nyatakan nama bagi Proses I, Proses II, Proses III dan Proses IV.

Kenal pasti siri homolog bagi Sebatian P, Sebatian Q, Sebatian R dan Sebatian S.

Lukis formula struktur bagi Sebatian P dan Sebatian S.

State the name for Process I, Process II, Process III and Process IV.

Identify the homologous series for Compound P, Compound Q, Compound R and Compound S.

Draw the structural formula for Compound P and Compound S.

[10 markah]

[10 marks]

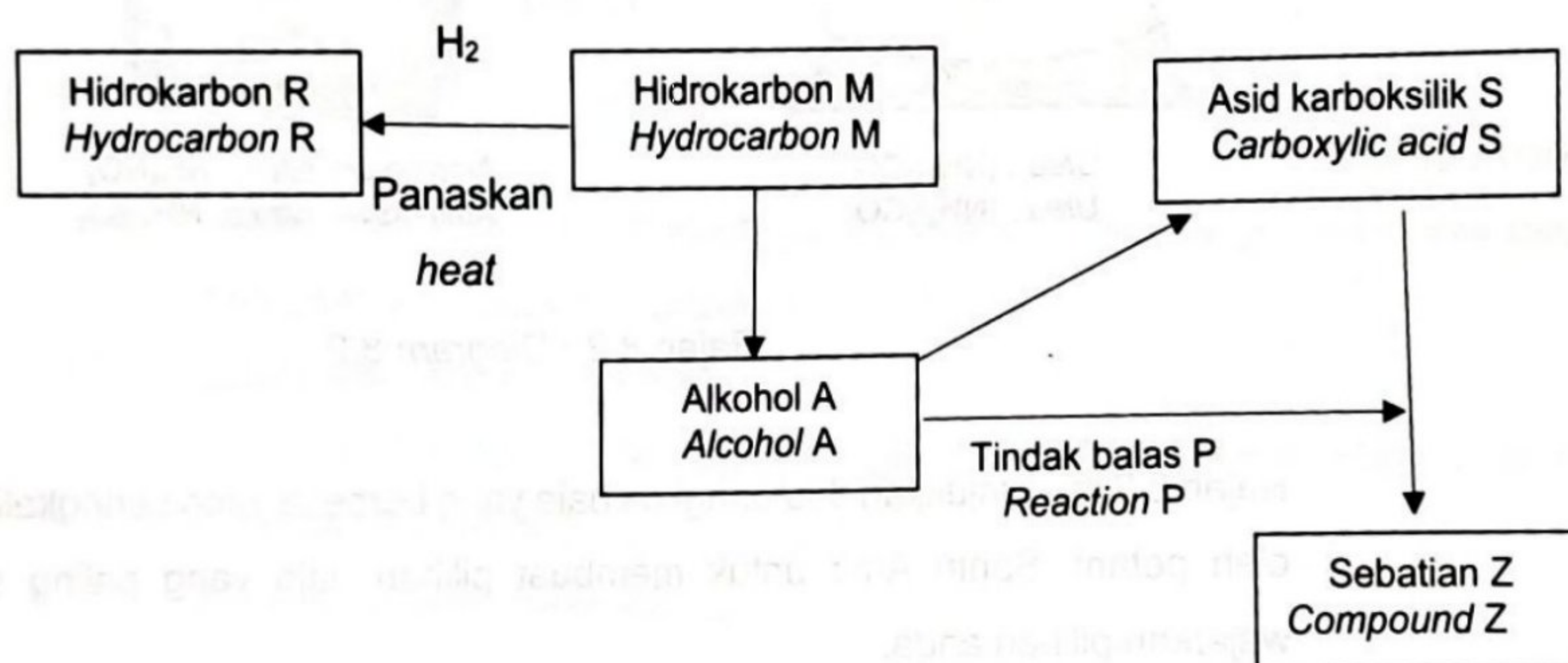
Bahagian B
Section B
 [20 markah]
 [20 marks]

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

Answer **one** question from this section.

9. Rajah 9.1 menunjukkan satu siri tindak balas penukaran yang melibatkan sebatian karbon.

Diagram 9.1 shows the conversions of a carbon compound involving a series of reactions.



Rajah 9.1/ Diagram 9.1

Berdasarkan Rajah 9.1,

Based on Diagram 9.1,

- (a) Berikan maksud sebatian hidrokarbon dan tuliskan formula am bagi Hidrokarbon R.

Define the meaning of hydrocarbon and write the general formula of Hydrocarbon R.

[2 markah/marks]

- (b) Hidrokarbon M mempunyai 85.7% karbon dan 14.3% hidrogen mengikut jisim. Jisim molekul relatif bagi hidrokarbon M ialah 56. Tentukan formula molekul bagi hidrokarbon M.

Hydrocarbon M has 85.7% of carbon and 14.3% of hydrogen by mass. The relative molecular mass of Hydrocarbon M is 56. Determine the molecular formula of hydrocarbon M.

[3 markah/marks]

- (c) Hidrokarbon R dan Hidrokarbon M wujud dalam berbagai isomer.

Lukiskan dua isomer bagi sebatian hidrokarbon tersebut.

Hydrocarbon R and Hydrocarbon M occur in different isomers.

Draw two isomers of the hydrocarbons.

[2 markah/marks]

- (d) Hidrokarbon R dan M terbakar dalam udara menghasilkan air, karbon dioksida dan jelaga. Terangkan perbezaan pada kuantiti jelaga yang terhasil bagi setiap hidrokarbon tersebut.

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

Hydrocarbon R and M burn in the air produce water, carbon dioxide and soot.

Explain the difference in the quantity of soot produced for each of the hydrocarbons

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

[3 markah/marks]

- (e) Tindakbalas antara asid karboksilik S dan alkohol A akan menghasilkan sebatian Z. Namakan tindakbalas P dan reagen yang terlibat dalam penghasilan asid karboksilik S dan sebatian Z.

Lukiskan formula struktur sebatian Z dan namakannya.

The reaction between carboxylic acid S and alcohol A will produce compound Z.

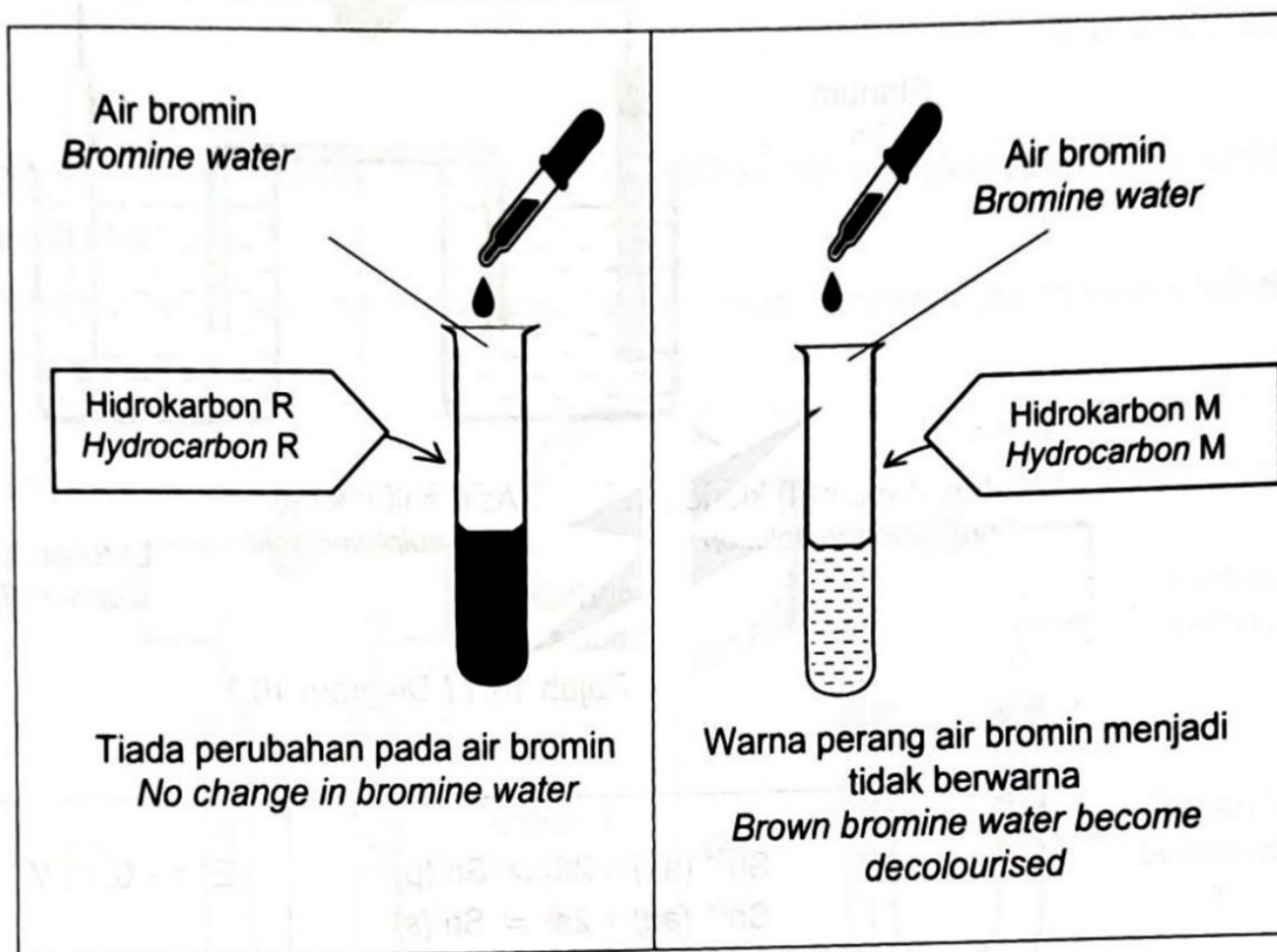
Name the reaction P and the reagent involved in the production of carboxylic acid S and compound Z.

Draw the structural formula of compound Z and name it.

[6 markah/marks]

- (f) Rajah 9.2 menunjukkan keputusan bagi ujian kimia untuk membezakan antara hidrokarbon R dan M.

Diagram 9.2 shows the result of two chemical test to differentiate between hydrocarbon R and M.



Rajah 9.2 / Diagram 9.2

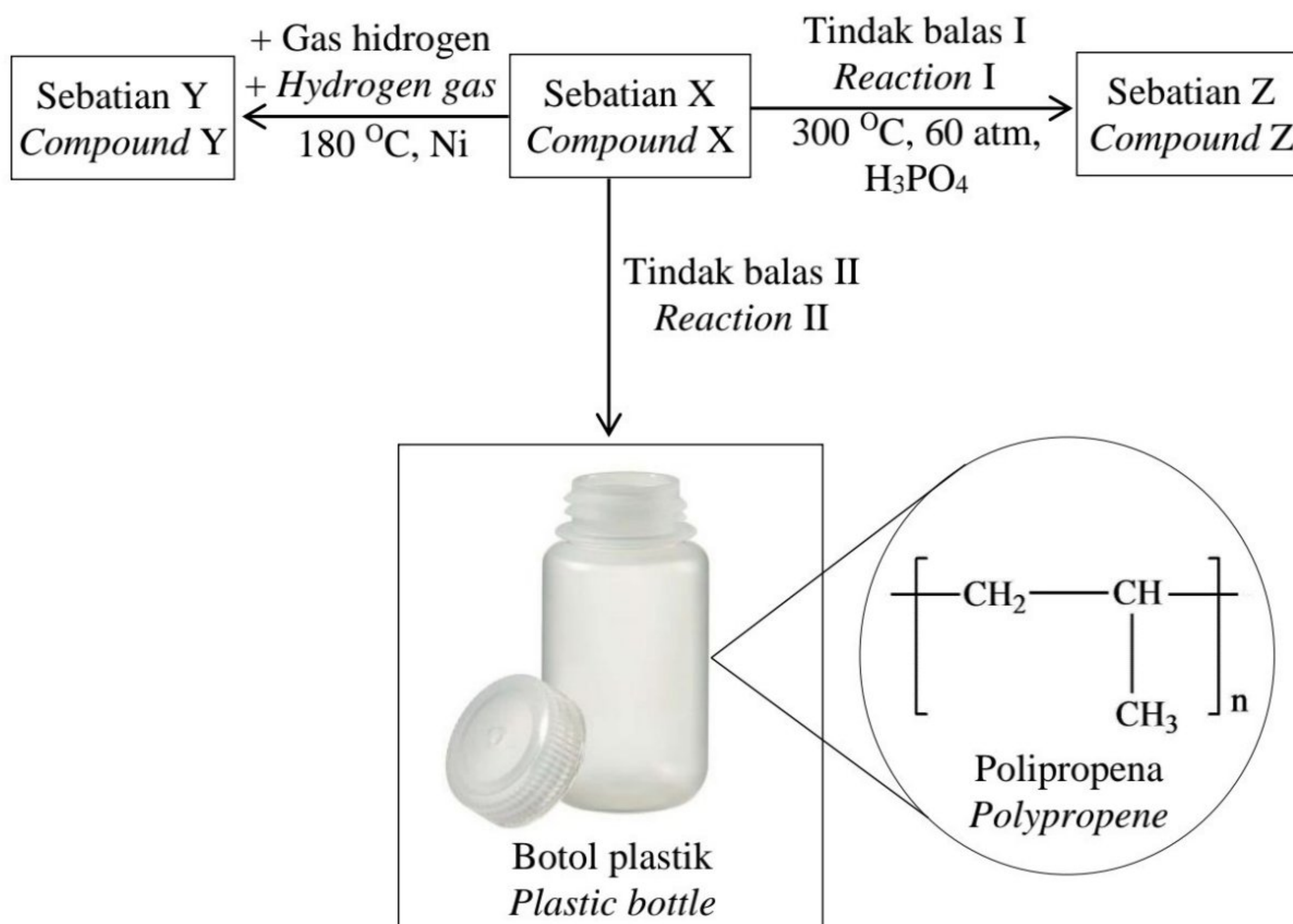
Terangkan perbezaan pemerhatian.

Explain the difference in the observations.

[4 markah/marks]

5. Rajah 4 menunjukkan satu siri tindak balas yang berlaku ke atas Sebatian X.

Diagram 4 shows a series of reaction that occurred on Compound X.



Rajah 4/ Diagram 4

- (a) Sebatian X dan Sebatian Y adalah hidrokarbon.

Compound X and Compound Y is a hydrocarbon.

- (i) Apakah yang dimaksudkan dengan hidrokarbon?

What is meant by hydrocarbon?

.....

[1 markah/ mark]

- (b) Kedua-dua Sebatian X dan Sebatian Y sesuai digunakan sebagai bahan bakar dan dapat menghasilkan nyalaan yang berjelaga.

Both Compound X and Compound Y are suitable to be used as fuel and can produce a sooty flame.

- (i) Sebatian yang manakah akan menghasilkan lebih banyak jelaga?

Terangkan mengapa.

Which compounds will produce more soot? Explain why.

.....

.....

[2 markah/ marks]

- (ii) Tulis persamaan kimia bagi pembakaran lengkap sebatian di (b)(i).
Write the chemical equation for the complete combustion of the compound in (b)(i).

.....

[2 markah/ marks]

- (c) Berdasarkan Rajah 4,
Based on Diagram 4,

- (i) Kenal pasti Sebatian Y dan Sebatian Z
Identify Compound Y and Compound Z

Y :

Z :

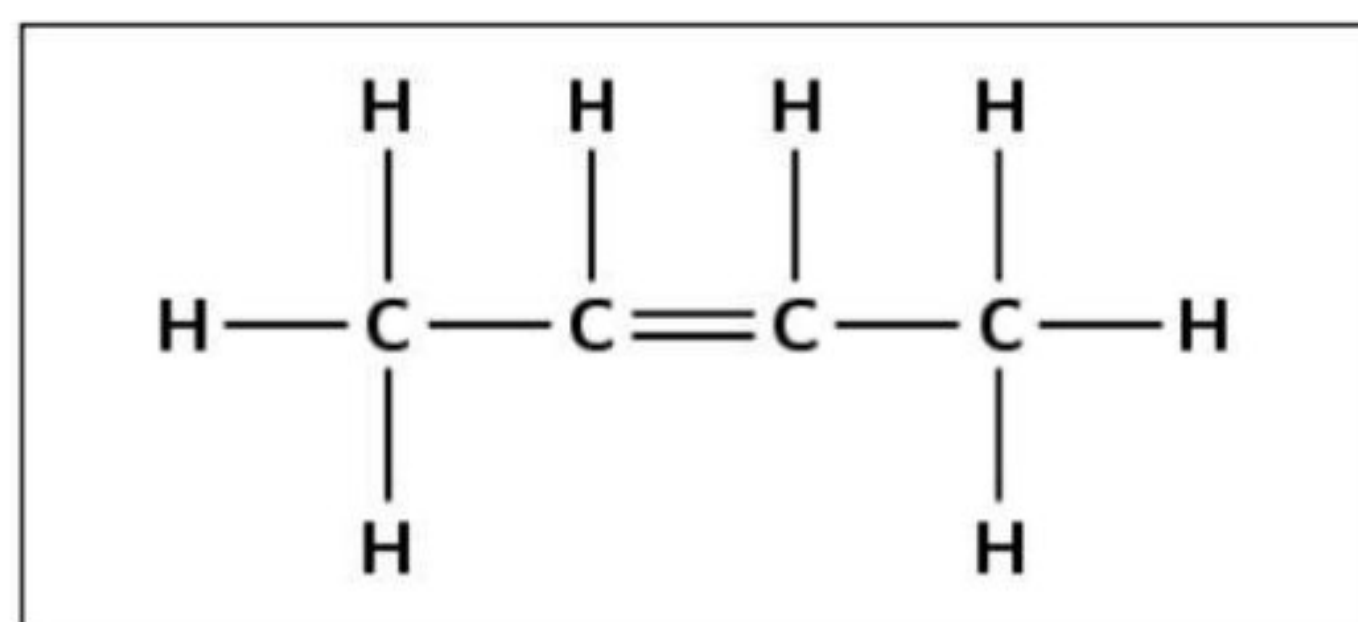
[2 markah/ marks]

- (ii) Lukiskan formula struktur bagi monomer botol plastik itu.
Draw the structural formula for the monomer of the plastic bottle.

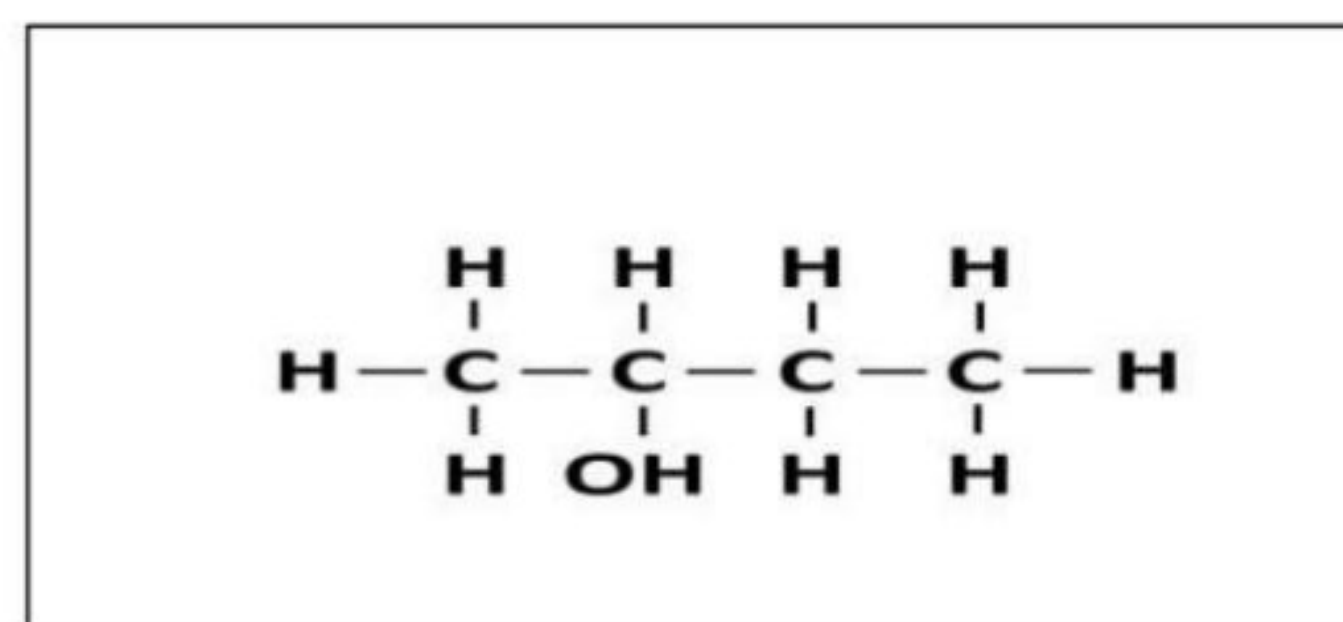
[1 markah/ mark]

8. Rajah 8 menunjukkan formula struktur sebatian J dan sebatian K.

Diagram 8 shows the structural formulae of compounds J and K.



Sebatian / Compound J



Sebatian / Compound K

Rajah 8 / Diagram 8

- (a) Nyatakan siri homolog bagi sebatian J dan K.
State the homologous series for compounds J and K

Sebatian /Compound J :

Sebatian/Compound K :

[2 markah/marks]

- (i) Namakan sebatian K.

Name compound K

.....

[1 markah/mark]

- (ii) Namakan tindak balas tersebut.

Name the reaction.

.....

[1 markah/mark]

- (ii) Lukiskan satu lagi isomer bagi sebatian K dan namakannya mengikut penamaan IUPAC.

Draw another isomer of compound K and name it according to IUPAC nomenclature.

[2 markah/marks]

- (c) Sebatian L dihasilkan apabila larutan kalium dikromat berasid (VI) ditambah ke dalam tabung uji yang mengandungi sebatian K
Compound L is produced when an acidic potassium dichromate (VI) solution is added into a test tube containing compound K.

- (i) Nyatakan satu pemerhatian bagi tindak balas tersebut.
State one observation for this reaction.

.....
[1 markah/mark]

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

.....
[1 markah/mark]

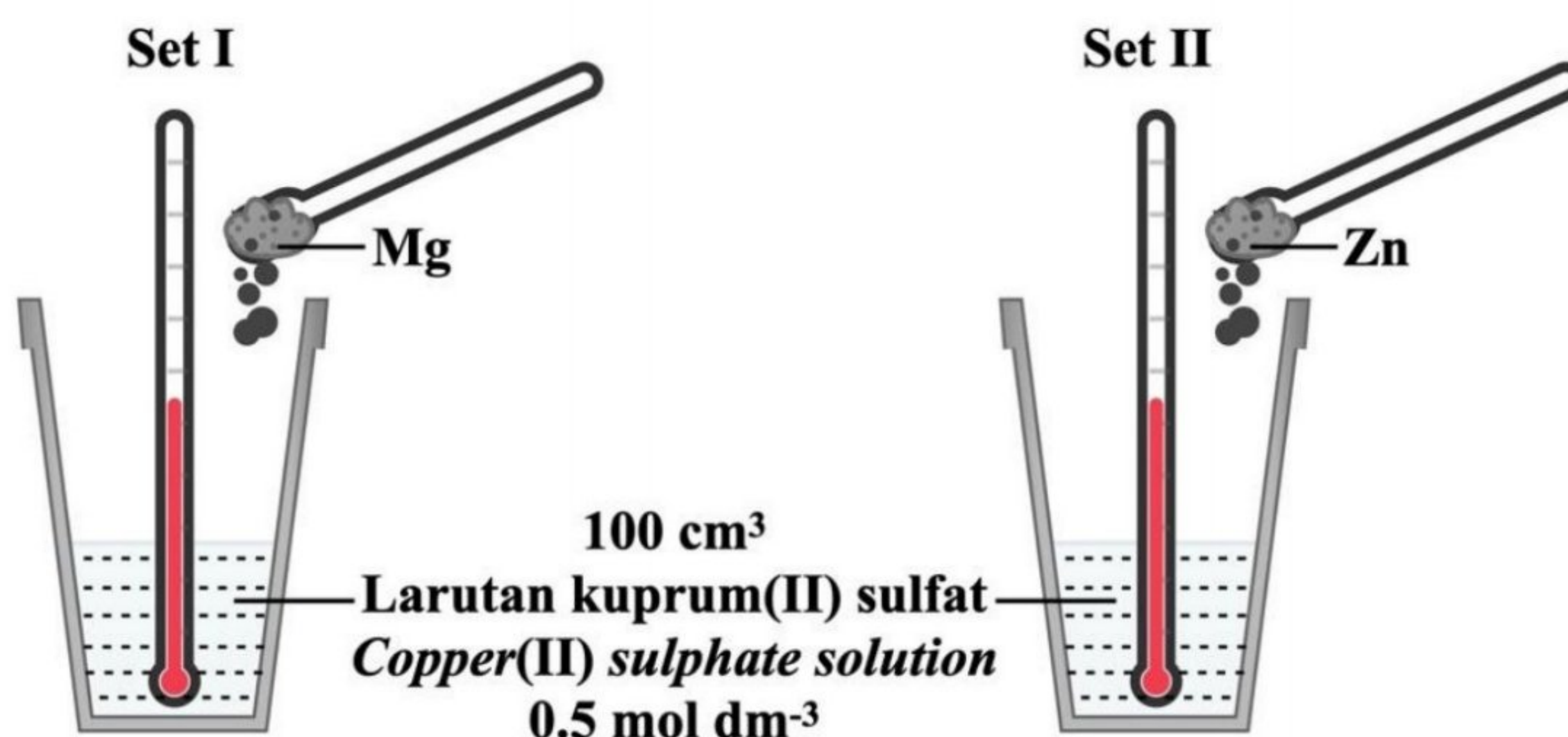
- (d) Sebatian J terbakar dengan oksigen yang berlebihan.
Compound J burns completely in excess oxygen.

Tulis persamaan kimia bagi pembakaran lengkap J.
Write the chemical equation for the complete combustion of J.

.....
[2 markah/marks]

- 10 (a) Rajah 10 menunjukkan susunan radas bagi membandingkan haba penyesaran kuprum daripada larutan kuprum(II) sulfat oleh serbuk magnesium, Mg dan serbuk zink, Zn.

Diagram 10 shows the apparatus set up to compare the heat of displacement of copper from copper(II) sulphate solution by magnesium powder, Mg and zinc powder, Zn.



Rajah / Diagram 10

Jadual 10.1 menunjukkan keputusan eksperimen itu.

Table 10.1 shows the results of the experiment.

Suhu (°C) <i>Temperature (°C)</i>	Set I	Set II
Awal, θ_i <i>Initial, θ_i</i>	27.0	27.0
Tertinggi, θ_f <i>Highest, θ_f</i>	32.0	31.0

Jadual / Table 10.1

- (i) Dengan memilih sama ada Set I atau Set II, jawab soalan berikut :

By choosing either Set I or Set II, answer the following questions :

- maksud haba penyesaran.
the meaning of heat of displacement.
- satu langkah berjaga-jaga semasa menjalankan eksperimen ini.
one precautionary step while conducting the experiment.
- Nyatakan satu pemerhatian selain daripada perubahan suhu.
State another observation, other than change in temperature
- Tuliskan inferens bagi pemerhatian tersebut
Write the inference for the observation.

[4 markah / marks]

- (ii) Hitung haba penyesaran bagi kedua-dua set eksperimen dan terangkan mengapa terdapat perbezaan pada nilai haba penyesaran itu.

[Diberi muatan haba tentu bagi larutan ialah $c = 4.2 \text{ J g}^{-1}\text{°C}^{-1}$,
ketumpatan larutan = 1 g cm^{-3}]

Calculate the heat of displacement of both sets of experiment and explain why there is a difference in the value of the heat of displacement.

[Given that the heat capacity of solution is $c = 4.2 \text{ J g}^{-1}\text{°C}^{-1}$,
density of solution = 1 g cm^{-3}]

[6 markah / marks]

- (b) Jadual 10.2 menunjukkan bilangan atom karbon per molekul alkohol dan haba pembakaran bagi metanol, etanol, propanol dan butanol.

Table 10.2 shows the number of carbon atoms per alcohol molecule and the heat of combustion of methanol, ethanol, propanol and butanol.

Alkohol <i>Alcohol</i>	Bilangan atom karbon per molekul alkohol <i>Number of carbon atoms per alcohol molecule</i>	Haba pembakaran <i>Heat of combustion</i> (kJ mol ⁻¹)
Metanol <i>Methanol</i>	1	-720
Etanol <i>Ethanol</i>	2	-1350
Propanol <i>Propanol</i>	3	
Butanol <i>Butanol</i>	4	-2680

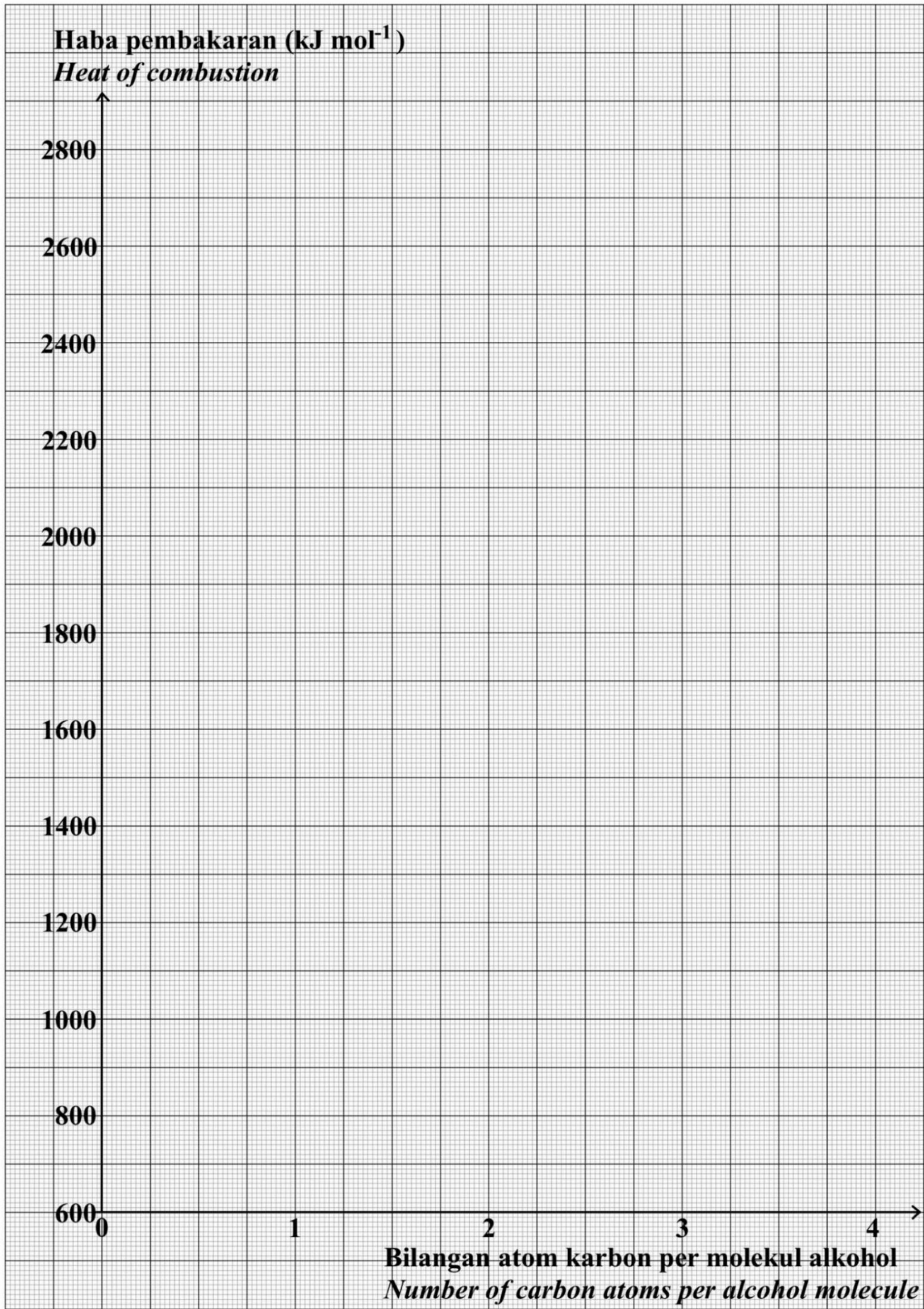
Jadual / Table 10.2

- (i) Dengan menggunakan data pada Jadual 10.2 lukis satu graf bagi haba pembakaran melawan bilangan atom karbon per molekul alkohol di halaman 19.

Daripada graf yang dilukis, tentukan nilai haba pembakaran bagi propanol.

By using data in Table 10.2 draw a graph of combustion against the number of carbon atoms per alcohol molecule on 19. From the graph plotted, determine the value of the heat of combustion of propanol.

[3 markah / marks]



- (ii) Terangkan mengapa haba pembakaran bagi propanol dan butanol berbeza. Sertakan persamaan kimia bagi pembakaran lengkap propanol dan butanol untuk membantu penerangan anda.

Explain why the heat of combustion of propanol and butanol are different. Include the chemical equations for the complete combustion of propanol and butanol to aid your explanation.

[5 markah / marks]

- (c) Jadual 10.3 menunjukkan perbandingan haba pembakaran bagi dua bahan api.

Table 10.3 shows the comparison of the heat of combustion of two fuels.

Bahan api <i>Fuel</i>	Haba pembakaran (kJ mol ⁻¹) <i>Heat of combustion</i>
Metana <i>Methane</i>	-880
Metanol <i>Methanol</i>	-720

Jadual 10.3 / Table 10.3

Yusuf telah mencipta suatu mesin untuk membantu mempercepatkan kerjanya di bengkel. Berdasarkan Jadual 10.3 pilih bahan api yang paling sesuai digunakan dalam mesin tersebut, berdasarkan faktor nilai bahan api atau kesan ke atas alam sekitar. Wajarkan pilihan anda.

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

Yusuf created a machine to help speed up his work at the workshop. Based on Table 10.3, choose the most suitable fuel for the machine, based on either the fuel value or the effects of the fuel on the environment. Justify your choice.

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

[2 markah / marks]

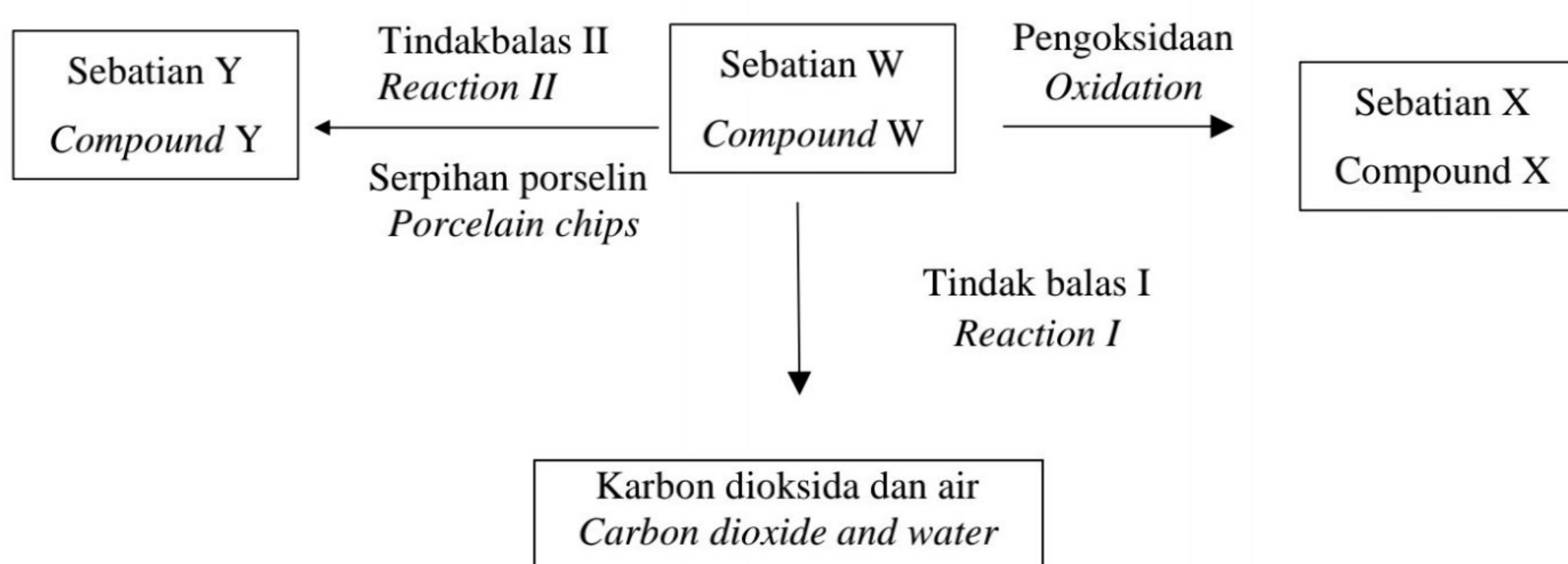
Bahagian C**Section C**

[20 markah/ marks]

Jawab semua soalan dalam bahagian

Answer all questions in this section

- 11** Rajah 11 menunjukkan penukaran sebatian W kepada sebatian X dan sebatian Y. Sebatian W mempunyai formula molekul $C_4H_{10}O$.
Diagram 11 shows the conversions of compound X and compound Y. Compound W has a molecular formula of $C_4H_{10}O$.



Rajah /Diagram 11

- (a) (i) Berdasarkan Rajah 11
Based on diagram 11

- Nyatakan nama bagi sebatian W
State the name of compound W
- Sebatian W boleh membentuk isomer.
 Lukis formula struktur dan namakan salah satu isomer bagi sebatian W.
*Compound W can form isomers.
 Draw structural formula and name one of the isomer for compound W*
- Nyatakan nama bagi Tindak balas II dan tulis persamaan tindak balas tersebut.
State the name of the Reaction II and write the chemical equation for the reaction

[5 markah/mark]

- (ii) Hitung isipadu gas karbon dioksida terhasil apabila 7.4g sebatian W dibakar dalam oksigen berlebihan
[Jisim atom relatif; H=1; C=12; O=16]
[Isipadu molar gas=24dm³mol⁻¹]

Calculate the volume of carbon dioxide gas produced when 7.4g compound W is burnt in excess oxygen

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

[Molar volume of gas=24dm³mol⁻¹]

[2 markah/marks]

- (b) Seorang murid telah diberikan dua cecair tidak berwarna yang merupakan sebatian alkana dan alkena
Gurunya telah meminta beliau untuk membuat ujian pengesahan cecair. Nyatakan dan huraikan satu ujian kimia yang boleh dibuat oleh murid berkenaan untuk membezakan dua cecair tersebut.

A student was given two colourless liquids which are alkane and alkene compound. Her teacher asked him to do a confirmation test. State and describe a chemical test that can be used to distinguish between the liquids.

[5 markah/marks]

- (c) Diana ingin membakar tart nanas. Dia pergi ke kedai roti untuk membeli pati nanas. Sebagai pelajar kimia, bagaimanakah anda membantunya menyediakan pati nanas (etil butanoat) di makmal dengan menamakan dua bahan yang terlibat, Tulis persamaan kimia untuk tindak balas dan prosedur penyediaan.

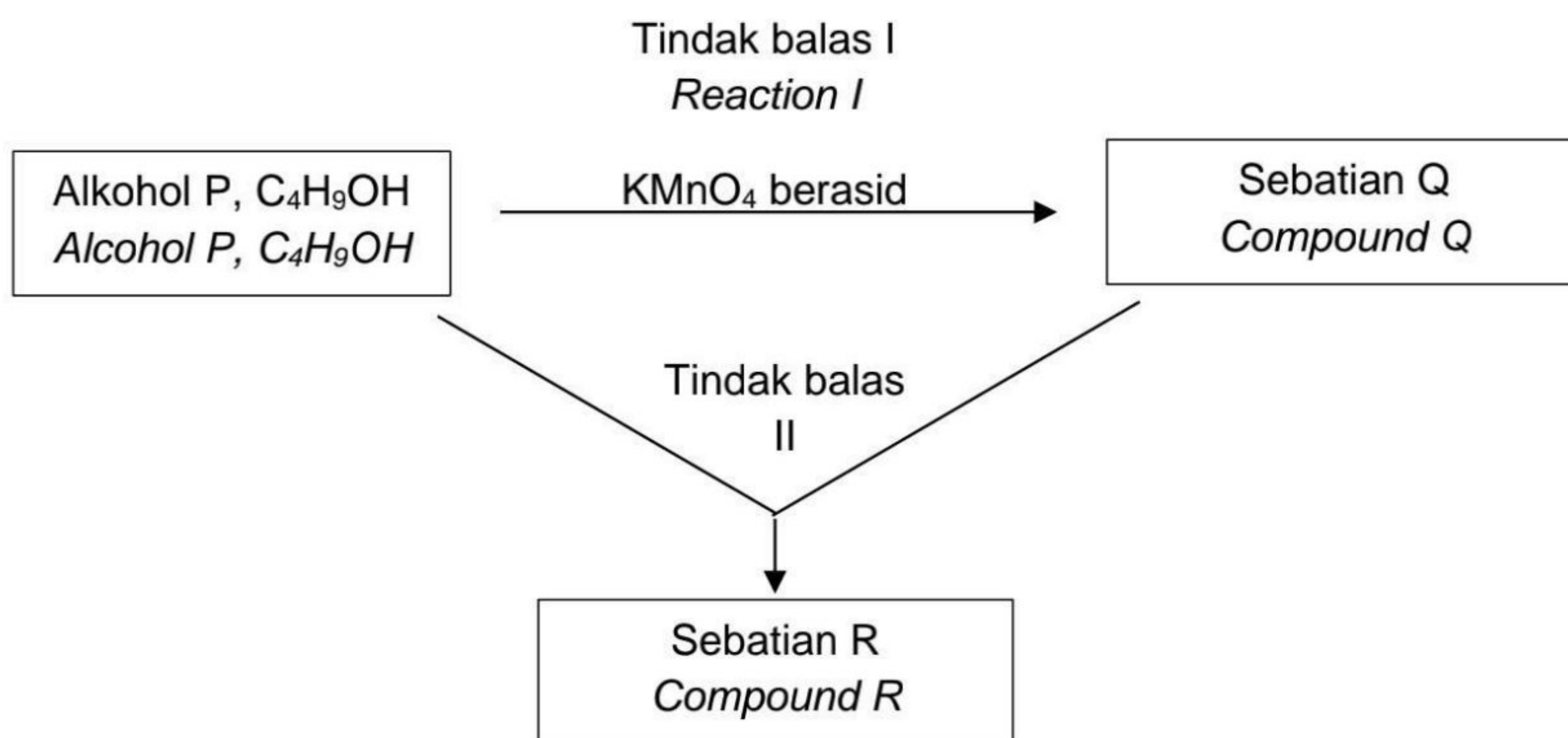
Diana wants to bake a pineapple tart. She went to bakery to buy pineapple essence. As a chemistry student how would you help her to prepare the pineapple essence (ethyl butanoate) in the laboratory by naming the two substances involve, write the chemical equation for the reaction and procedure of preparation.

[8 markah/marks]

KERTAS SOALAN TAMAT

END OF QUESTION PAPER

- 7 Rajah 7 menunjukkan alkohol P, C_4H_9OH yang berantai lurus melalui tindak balas I membentuk sebatian Q. Alkohol P melalui tindak balas II membentuk sebatian R.
Diagram 7 shows alcohol P, C_4H_9OH straight line undergoes reaction I to form compound Q. Alcohol P undergoes reaction II to form compound R.



Rajah 7/Diagram 7

- (a) Nyatakan nama bagi alkohol P, C_4H_9OH .
State the name for alcohol P, C_4H_9OH .

[1 markah/mark]

- (b) Lukis formula struktur untuk dua isomer bagi alkohol P, C_4H_9OH
Draw the structural formulae for two isomer of alcohol P, C_4H_9OH

[2 markah/marks]

- (c) (i) Nyatakan pemerhatian bagi tindak balas I.
State the observation for reaction I

[1 markah/mark]

- (ii) Namakan kumpulan berfungsi bagi sebatian Q.
Name the functional group of compound Q.

.....
[1 markah/mark]

- (d) Apabila sebatian Q bertindak balas dengan magnesium, gas tidak berwarna dihasilkan. Terangkan kaedah bagi menguji kehadiran gas tersebut.
When compound Q react with magnesium, colourless gas is produced. Describe the method to test the presence of this gas.

.....
.....
[2 markah/marks]

- (e) (i) Namakan tindak balas II
Name the reaction II

.....
[1 markah/mark]

- (ii) Tulis persamaan kimia seimbang bagi tindak balas II
Write the balanced chemical equation for reaction II

.....
[2 markah/marks]

- 3 Propana dan butana merupakan sebatian hidrokarbon, yang masing-masing mempunyai formula molekul C_3H_8 dan C_4H_{10} .

Propane and butane are hydrocarbon compounds which are molecular formula C_3H_8 and C_4H_{10} respectively.

- (a) (i) Apakah maksud hidrokarbon?
What is the meaning of hydrocarbon?

.....
[1 markah]

[1 mark]

- (ii) Tuliskan formula empirik bagi butana, C_4H_{10} .
Write the empirical formula for butane, C_4H_{10} .

.....
[1 markah]

[1 mark]

- (b) (i) Pembakaran gas propana di dalam oksigen berlebihan akan menghasilkan gas karbon dioksida dan air.

Tuliskan persamaan kimia bagi tindak balas tersebut.

Combustion of propane gas in excess oxygen will produce carbon dioxide gas and water.

Write the chemical equation for the reaction.

.....
[2 markah]

[2 marks]

- (ii) Sekiranya 0.5 mol gas propana terbakar lengkap di dalam oksigen berlebihan, tentukan isipadu gas karbon dioksida yang dibebaskan pada keadaan suhu bilik.

If 0.5 mol propane gas burns completely in excess oxygen, determine the volume of carbon dioxide gas released in room temperature condition.

[1 mol bagi sebarang gas menempati $24 \text{ dm}^3 \text{ mol}^{-1}$ pada keadaan bilik]

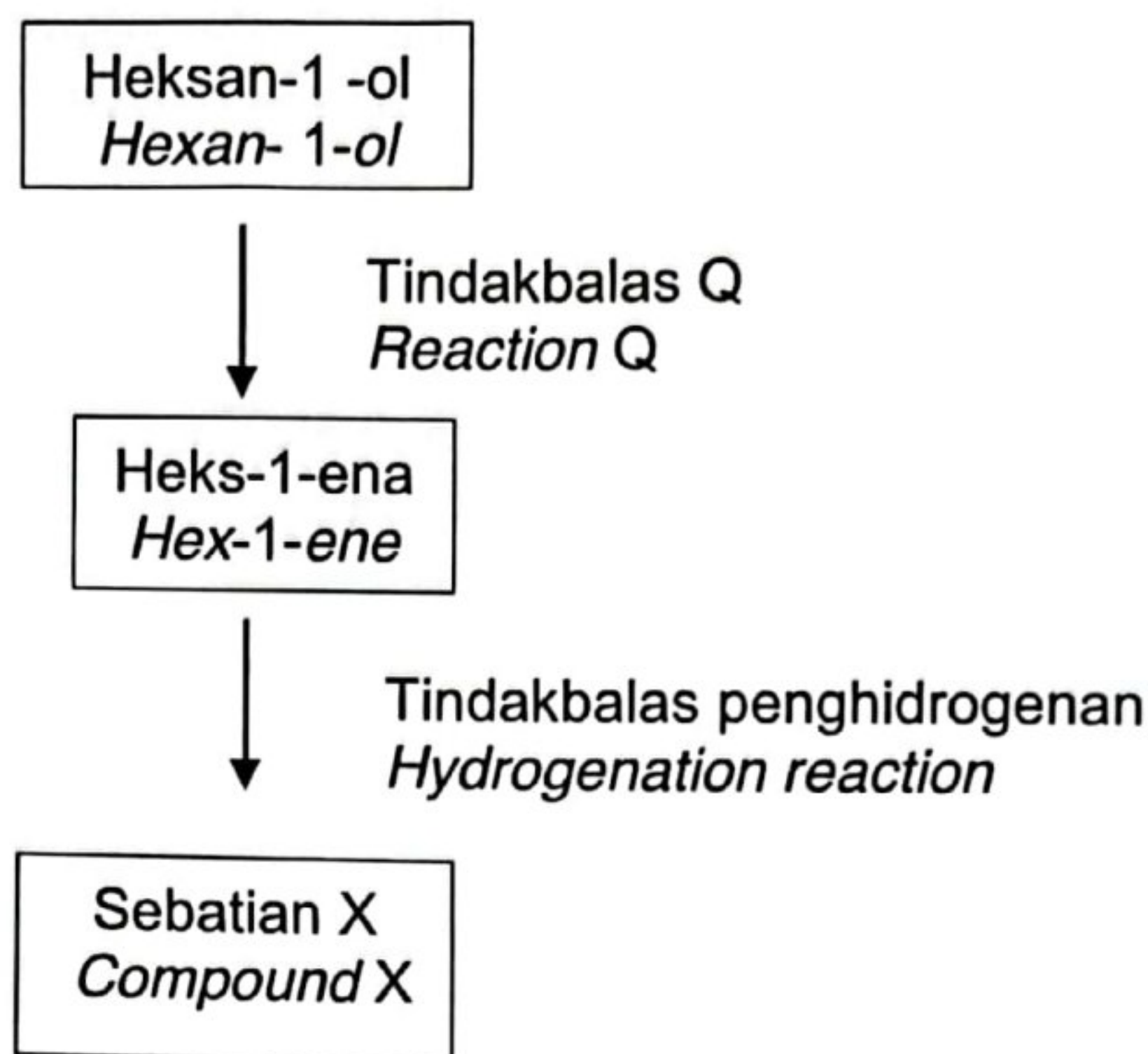
[1 mole of any gas occupies $24 \text{ dm}^3 \text{ mol}^{-1}$ at room conditions]

[2 markah]

[2 marks]

[Lihat halaman sebelah

- 6 Rajah 6 menunjuk carta alir penukaran beberapa siri homolog.
Diagram 6 shows a flow chart the conversion of a few homologous series.



Rajah / Diagram 6

- (a) Nyatakan kumpulan berfungsi bagi heksan-1-ol.
State the functional group for hexan-1-ol.
-
[1 mark]
- (b) (i) Heksan-1-ol boleh ditukar kepada heks-1-ena menerusi tindakbalas Q. Nyatakan nama tindakbalas Q.
Hexan-1-ol can be converted to hex-1-ene through Q reaction. State the name of Q reaction
-
[1 mark]
- (ii) Tuliskan persamaan kimia bagi tindakbalas Q.
Write the chemical equation for Q reaction.
-
[2 marks]
- (iii) Jika 2 mol heksan-1-ol digunakan dalam tindak balas Q, hitung jisim heks-1-ena yang terhasil. [Jisim atom relatif: C = 12, H=1]
If 2 moles of hexan-1-ol is used in the reaction, calculate the mass of hex-1-ene produced.

[2 marks]

- (c) Sebatian heks-1-ena dan sebatian X boleh dibezakan melalui tindak balas dengan air bromin. Terangkan perbezaan pemerhatian tindak balas antara sebatian heks-1-ena dan sebatian X dengan air bromin.

Compound hex-1-ene and compound X can differentiate by reacting with bromine water. Explain the difference in observation for the reaction between hex-1-ene and compound X with bromine water.

.....

.....

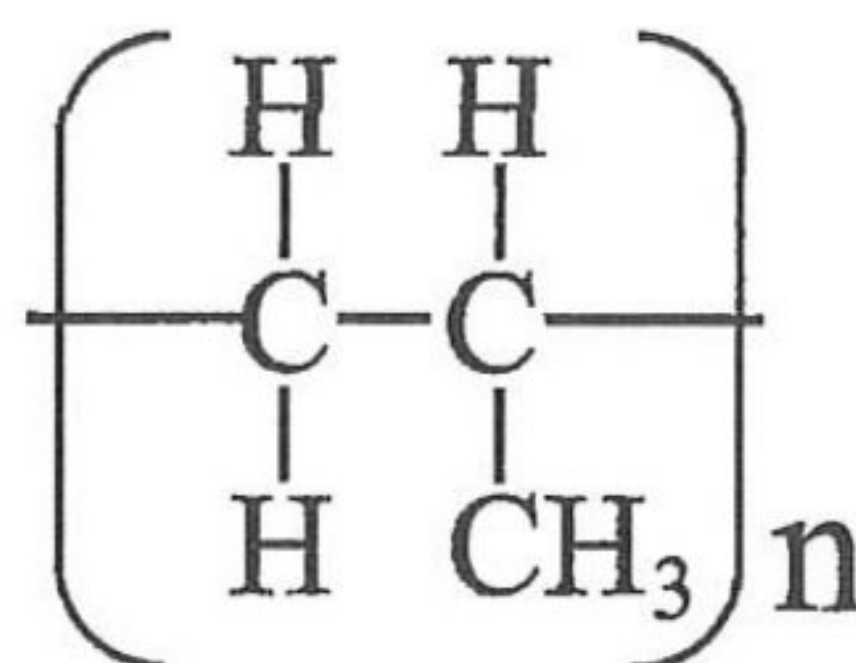
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[3 marks]

For
examiner's
use

- 5 Rajah 5.1 menunjukkan formula struktur bagi satu polimer.
Diagram 5.1 shows structural formula of a polymer.



Rajah 5.1
Diagram 5.1

- (a) Apakah yang dimaksudkan dengan polimer?

What is meant by polymer?

5(a)	
	1

.....
.....

[1 mark]

- (b) Berdasarkan Rajah 5.1,

Based on Diagram 5.1,

- (i) Lukiskan formula struktur monomernya.

Draw the structural formula of the monomer.

5(b)(i)	
	1

[1 mark]

- (ii) Namakan jenis tindak balas pempolimeran dalam penghasilan polimer tersebut.

Name the type of polymerisation reaction in the production of the polymer.

5(b)(ii)	
	1

.....

[1 mark]

- (iii) Nyatakan satu kegunaan polimer tersebut.

State one of the uses of the polymer.

5(b)(iii)	
	1

.....

[1 mark]

- (c) Rajah 5.2 menunjukkan kasut sukan yang digunakan oleh seorang pemain badminton.

Diagram 5.2 shows sport shoes used by a badminton player.



Rajah 5.2
Diagram 5.2

- (i) 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 sport shoe sole. Choose the type of rubber that can be used as the material and justify your choice.

.....

.....

.....

.....

[3 marks]

- (ii) Pembuangan getah sintetik yang tidak terkawal boleh menyebabkan masalah pencemaran alam sekitar. Cadangkan satu cara untuk mengatasi isu ini.

Uncontrolled disposal of synthetic rubber leads to an environmental pollution. Suggest one way to overcome this issue.

.....

[1 mark]

5(c)(i)	
	3

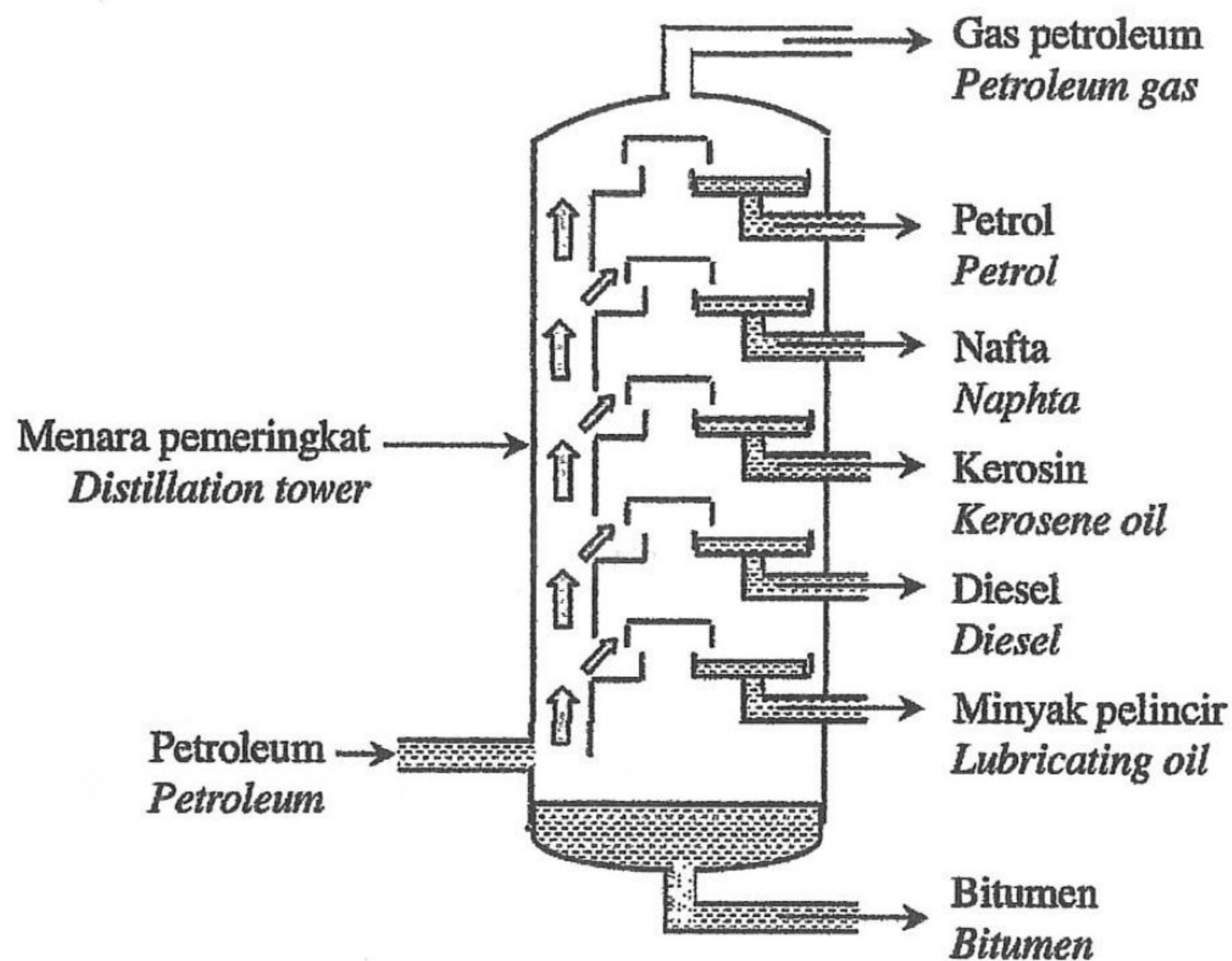
5(c)(ii)	
	1

TOTAL A5	
	8

[Lihat halaman sebelah

- 10 Rajah 10.1 menunjukkan proses yang digunakan untuk mengasingkan petroleum dalam penghasilan pelbagai produk dalam industri.

Diagram 10.1 shows a process used to separate petroleum into various products in industry.



Rajah 10.1
Diagram 10.1

- (a) (i) Nyatakan kaedah dan sifat fizik yang terlibat dalam proses pengasingan petroleum seperti yang ditunjukkan dalam Rajah 10.1.

State the method and physical properties involved in the separation process of petroleum as shown in Diagram 10.1.

[2 marks]

- (ii) 2,2,4-trimetilpentana dan butana adalah hasil sulingan petroleum. Lukiskan formula struktur untuk kedua-dua hasil sulingan.

2,2,4-trimethylpentane and butane are products of petroleum distillate. Draw the structural formulae for both distillates.

[2 marks]

- (b) Nafta adalah campuran hidrokarbon yang terdiri daripada 5 hingga 10 atom karbon. Salah satu hasil sulingan adalah heksana, C_6H_{14} .

Naphtha is the mixture of hydrocarbon that consists of 5 to 10 carbon atoms. One of the distilled product is hexane, C_6H_{14} .

Tulis persamaan kimia bagi pembakaran heksana.

Hitung isipadu gas karbon dioksida, CO_2 yang dibebaskan pada keadaan bilik apabila 258 g heksana digunakan dalam pembakaran lengkap di atas. [Jisim atom relatif : $H=1$, $C=12$; 1 mol gas menempati $24 \text{ dm}^3 \text{ mol}^{-1}$ pada keadaan bilik]

Write the chemical equation for the combustion of hexane.

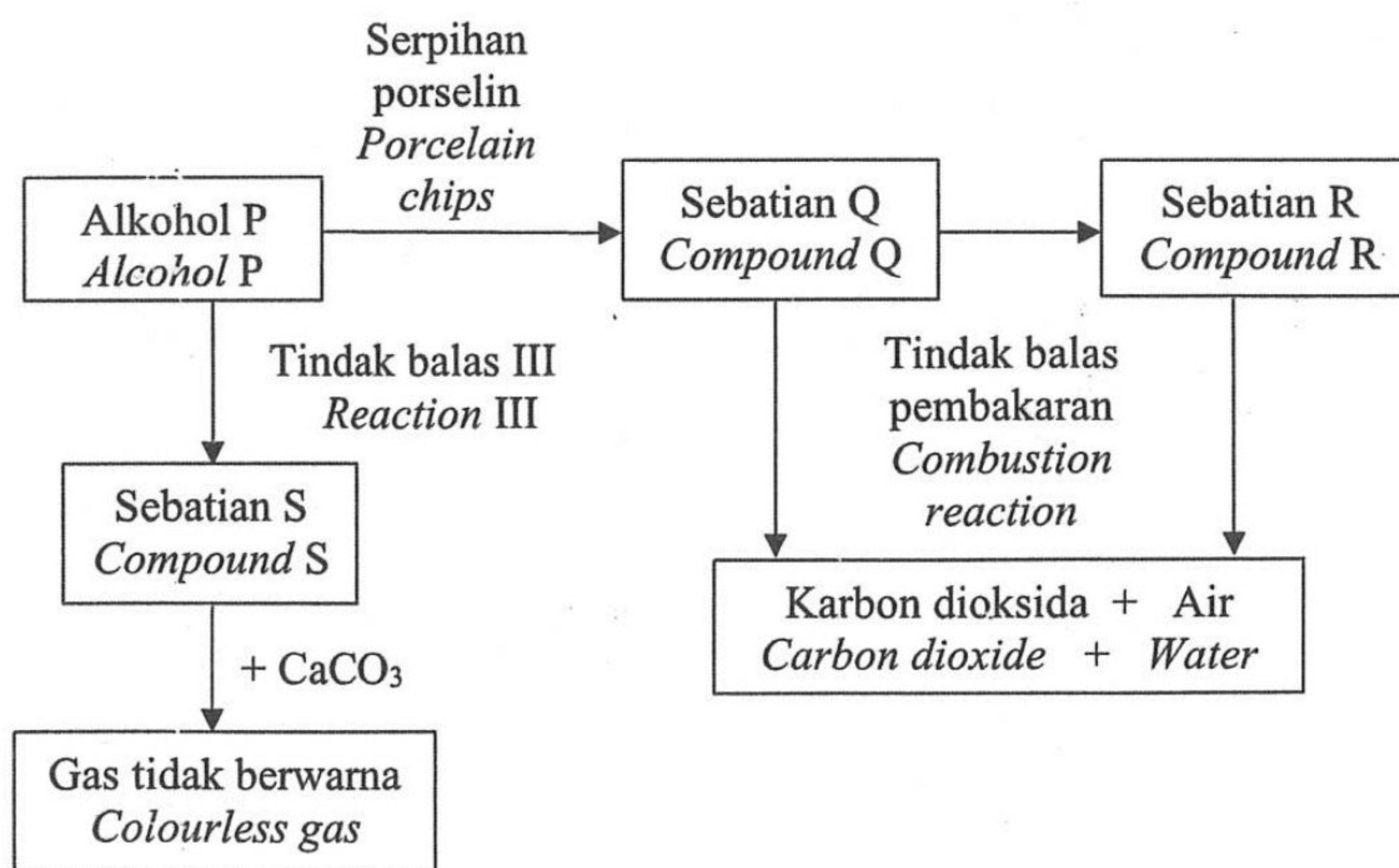
Calculate the volume of carbon dioxide, CO_2 gas released at room condition when 258 g of hexane used in the complete combustion above.

[Relative atomic mass : $H=1$, $C=12$; 1 mol of gas occupies $24 \text{ dm}^3 \text{ mol}^{-1}$ at room conditions]

[5 marks]

- (c) Rajah 10.2 menunjukkan pertukaran sebatian organik daripada satu siri homolog kepada yang lain. Alkohol P mempunyai kurang daripada empat karbon atom dalam molekulnya. Sebatian Q boleh ditukarkan kepada R melalui tindak balas penghidrogenan.

Diagram 10.2 shows the conversion of organic compound from one homologous series to another. Alcohol P has less than four carbon atoms in its molecules. Compound Q can be converted to R through hydrogenation reaction.



Rajah 10.2
Diagram 10.2

- (i) Cadangkan nama alkohol P, tuliskan formula molekul sebatian Q, nyatakan siri homolog bagi sebatian R dan namakan tindak balas III.

Suggest the name of alcohol P, write the molecular formula of compound Q, state the homologous series of compound R and name Reaction III.

[4 marks]

- (ii) Bandingkan kejelagaan nyalaan bagi pembakaran sebatian Q dan sebatian R.

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

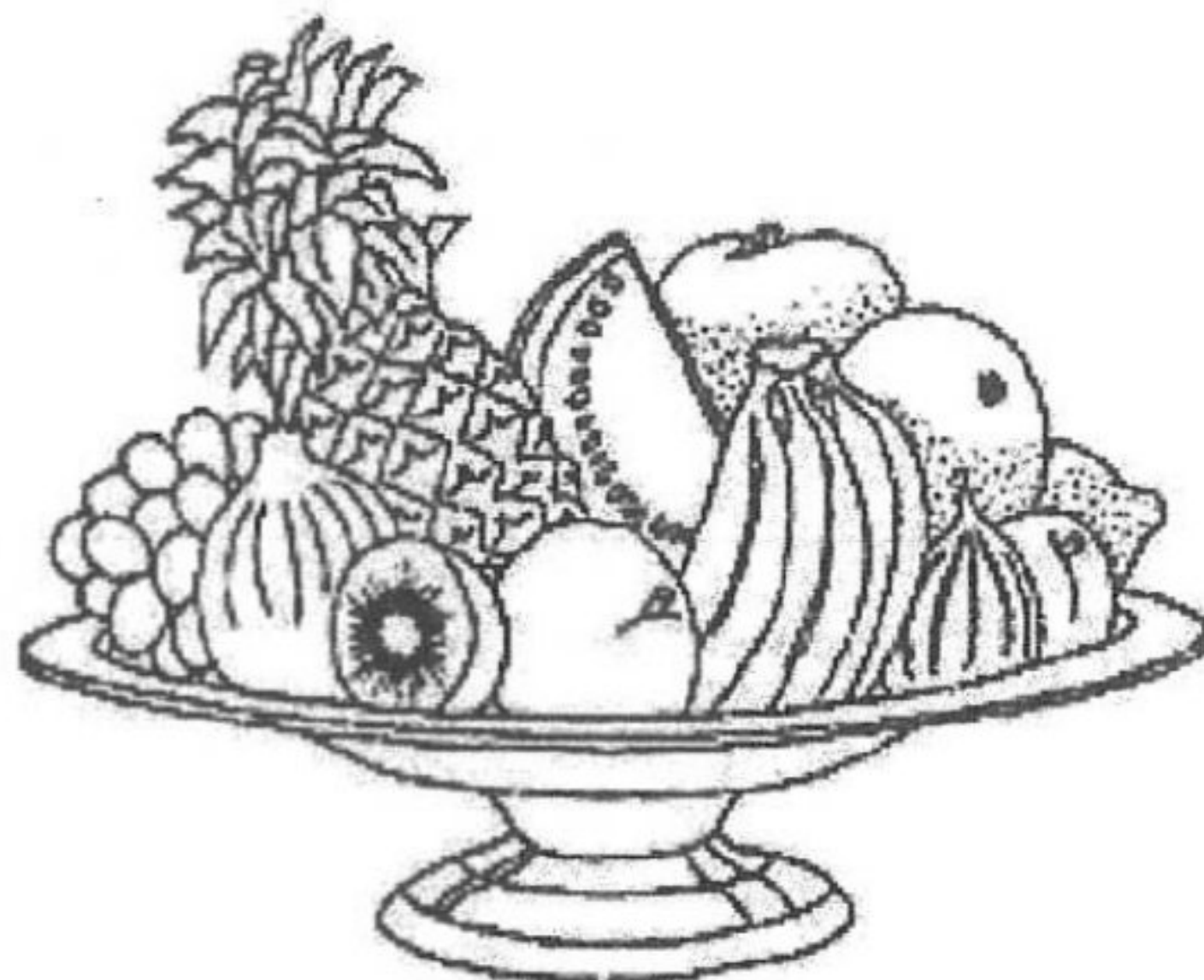
Compare the sootiness of flames for the combustion of compound Q and compound R.

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

[4 marks]

- (d) Rajah 10.3 menunjukkan buah-buahan tempatan yang baru dipetik.

Diagram 10.3 shows the freshly plucked local fruits.



Rajah 10.3
Diagram 10.3

Buah-buahan yang masak secara semulajadi akan mengeluarkan gas etena, C_2H_4 . Sesetengah buah-buahan disuntik dengan etena, C_2H_4 tiruan semasa proses pemeraman.

Wajarkan penggunaan etena tiruan semasa proses pemeraman buah.

Ethene, C_2H_4 gas is naturally released from the ripe fruits. Some fruits are injected with artificial ethene, C_2H_4 during the ripening process.

Justify the use of artificial ethene during the fruit ripening process.

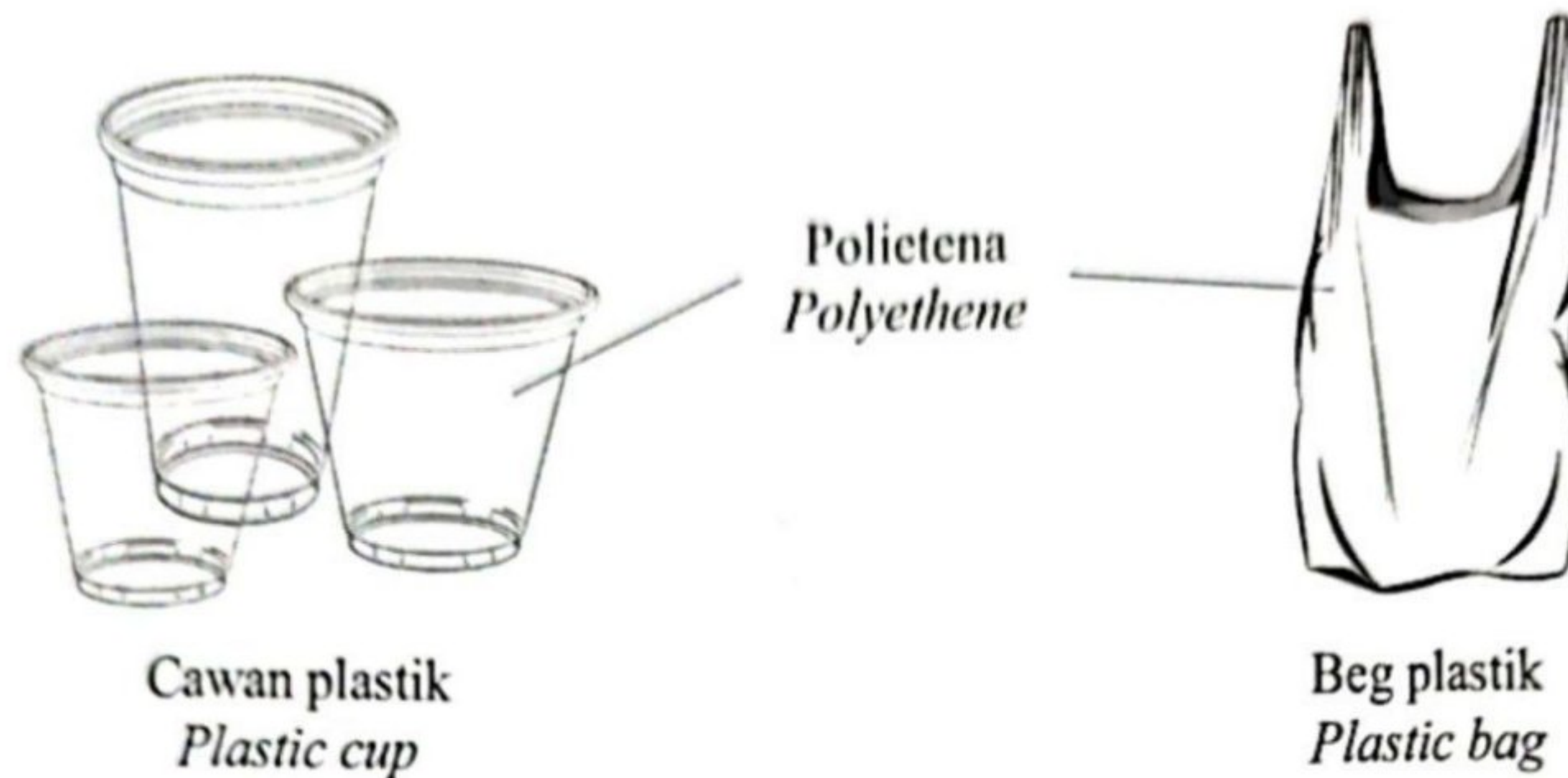
[3 marks]

Bahagian A

[60 markah]

Jawab semua soalan dalam bahagian ini

- 1 (a) Rajah 1 menunjukkan barangan yang diperbuat daripada satu polimer sintetik.
Diagram 1 shows the products that are made from a synthetic polymer.



Rajah 1
Diagram 1

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

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

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

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

- (iii) Lukis formula struktur bagi monomer yang dinyatakan dalam 1(a)(ii).
Draw the structural formula for the monomer stated in 1(a)(ii).

[1 markah / 1 mark]

- (b) Nyatakan **dua** masalah pencemaran alam sekitar yang disebabkan oleh polimer sintetik.

*State **two** environmental pollution problems caused by synthetic polymers.*

.....

.....

.....

[2 markah / 2 marks]

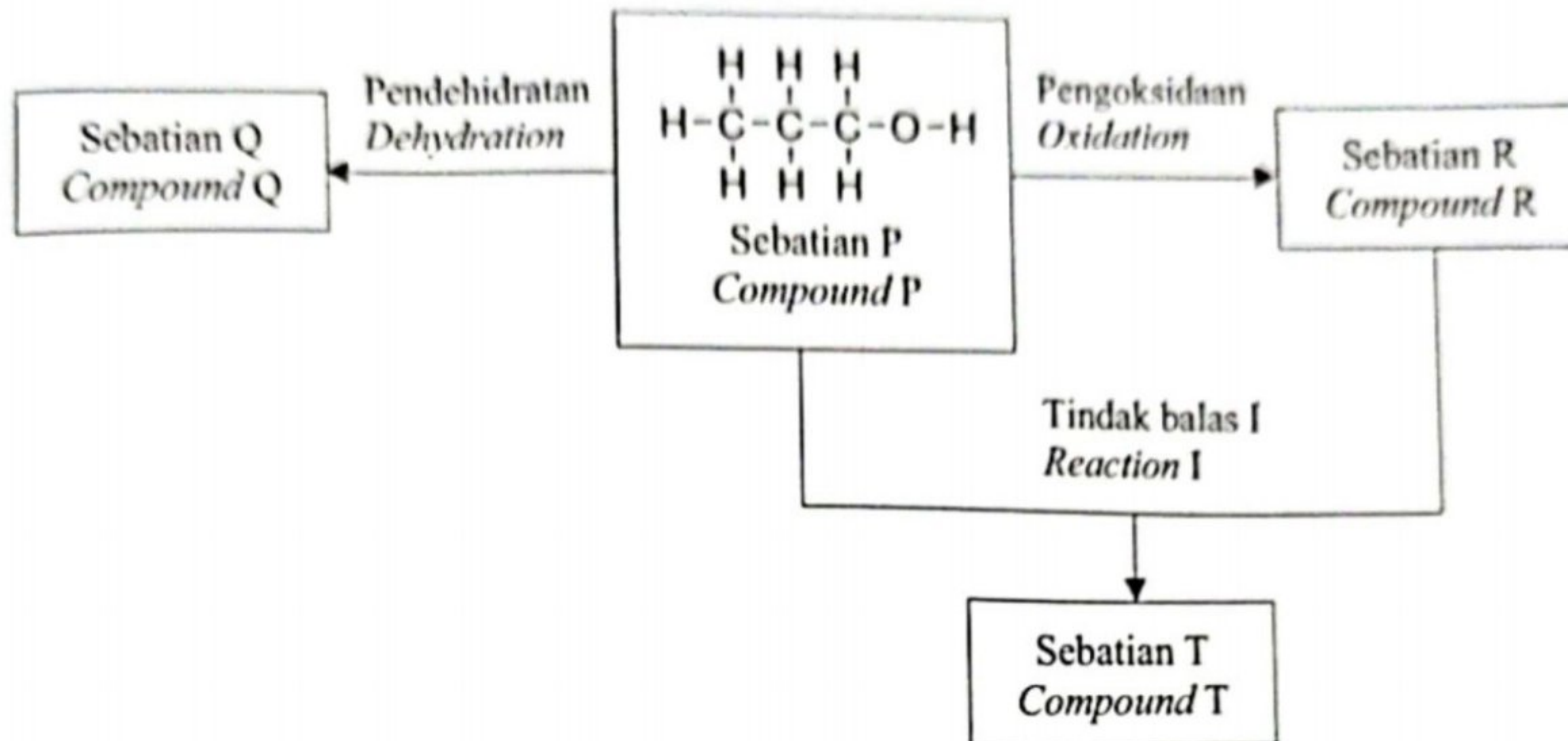
Bahagian B

[20 markah]

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

- 9 Rajah 9 menunjukkan penukaran sebatian P kepada sebatian Q, sebatian R dan sebatian T.

Diagram 9 shows the conversion of compound P into compound Q, R and T.



Rajah 9
Diagram 9

- (a) Nyatakan maksud isomer dan tuliskan formula am bagi alkohol.
Lukis formula struktur bagi satu isomer sebatian P dan nyatakan nama bagi isomer itu mengikut penamaan IUPAC.
*State the meaning of isomer and write the general formula for alcohol.
Draw the structural formula of isomer of compound P and state the name of the isomer according to IUPAC nomenclature.*

[4 markah / 4 marks]

- (b) Nyatakan nama bagi tindak balas I.
Kenal pasti siri homolog, formula molekul dan formula struktur bagi sebatian Q, sebatian R dan sebatian T.
*State the name of reaction I.
Identify the homologous series, molecular formula and structural formula of compound Q, R and T.*

[10 markah / 10 marks]

- (c) 4.2 g sebatian P terbakar dalam oksigen berlebihan menghasilkan gas karbon dioksida dan air.

Tulis persamaan kimia bagi tindak balas itu dan hitung isi padu gas yang terhasil.

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

[Isi padu molar gas pada keadaan bilik = $24 \text{ dm}^3 \text{ mol}^{-1}$]

4.2 g compound P burns in excess oxygen producing carbon dioxide gas and water.

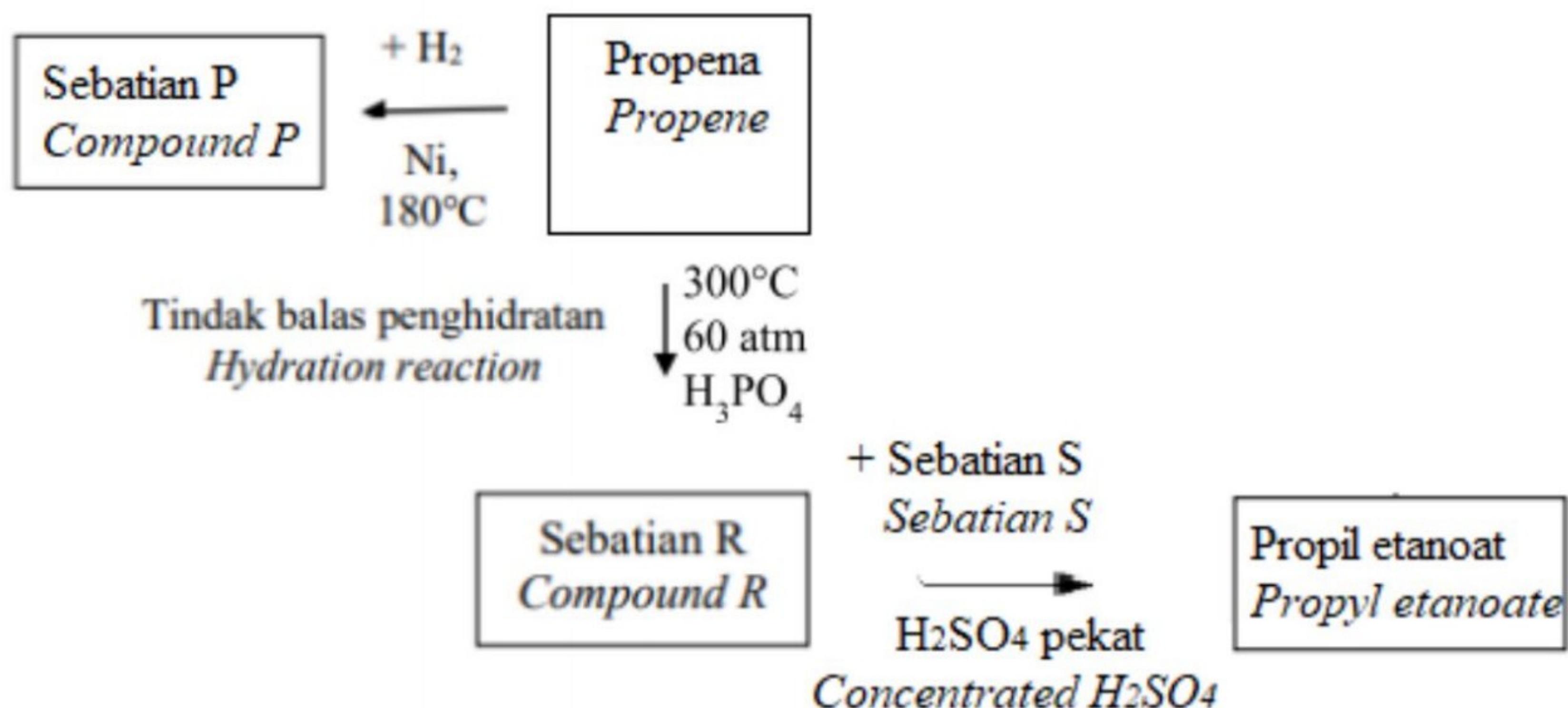
Write the chemical equation and calculate the volume of gas produced.

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

[Molar volume of gas at room condition = $24 \text{ dm}^3 \text{ mol}^{-1}$]

[6 markah / 6 marks]

6. Rajah 6 menunjukkan siri tindak balas bagi propena.
Diagram 6 shows series of reactions for propene.



Rajah 6/ Diagram 6

Berdasarkan Rajah 6,
Based on Diagram 6,

- (a) (i) Nyatakan siri homolog bagi propena.
State the homologous series for propene.

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

- (ii) Tuliskan formula molekul bagi propena.
State the molecular formula for propene.

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

- (iii) Pembakaran propena menghasilkan lebih banyak jelaga berbanding sebatian P. Kira peratus karbon mengikut jisim bagi propena.
Combustion of propene produces more soot than compound P. Calculate the percentage of carbon by mass for propene.
 [Jisim atom relatif / Relative atomic mass: $\text{C}=12$, $\text{H}=1$]

[1 markah / 1 mark]

- (iv) Polipropena adalah polimer bagi propena. Pembakaran secara terbuka polipropena boleh mencemarkan alam sekitar. Jelaskan.

Polypropene is a polymer of propene. Open burning of polypropene can pollute the environment. Explain.

.....
.....

[2 markah / 2 mark]

- (b) Tuliskan formula am bagi sebatian P.

Write the general formula for compound P.

.....

[1 markah / 1 mark]

- (c) Lukiskan dua isomer bagi sebatian R.

Draw two isomers of compound R.

[2 markah / 2 mark]

- (d) Namakan sebatian S untuk menghasilkan propil etanoat.

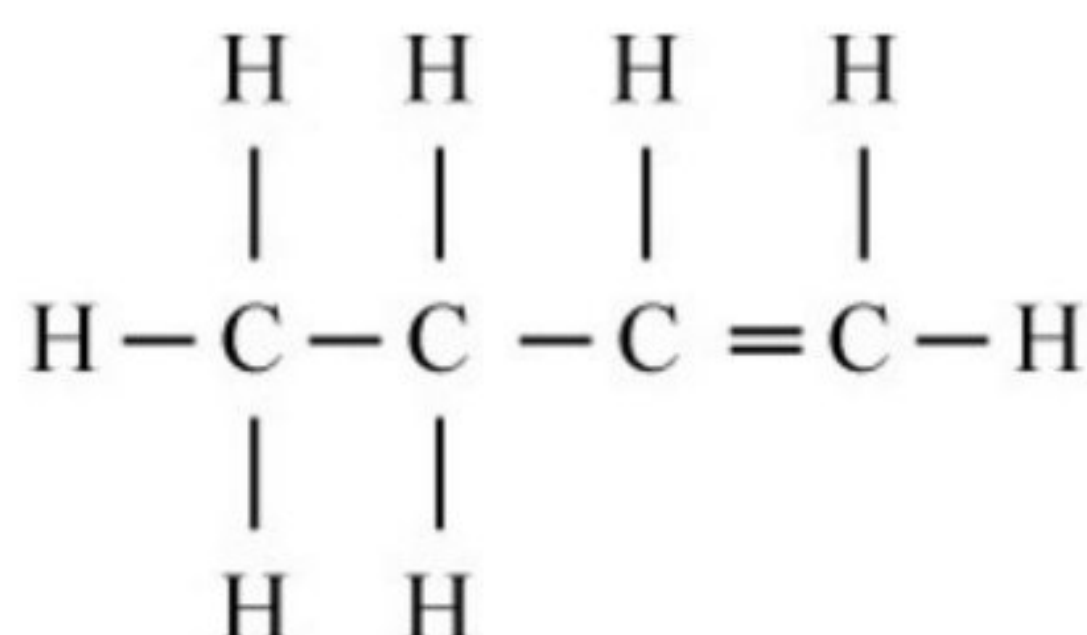
Name the compound S to produce propyl ethanoate.

.....

[1 markah / 1 mark]

- 10 (a) Rajah 10.1 menunjukkan satu formula struktur bagi butena.

Diagram 10.1 shows a structural formula of butene.



Rajah 10.1

Diagram 10.1

- (i) Nyatakan maksud isomer.

State the meaning of isomer.

[1 markah]

[1 mark]

- (ii) Lukis formula struktur bagi dua lagi isomer bagi butena.

Namakan setiap isomer tersebut mengikut penamaan IUPAC.

Draw the structural formulae for another two isomers of butene.

Name each isomer according to the IUPAC nomenclature.

[4 markah]

[4 marks]

- (iii) Tulis persamaan kimia seimbang bagi pembakaran butena dalam oksigen yang berlebihan.

Jika 1 200 cm³ gas butena digunakan, hitungkan isi padu gas oksigen yang diperlukan untuk pembakaran tersebut.

[1 mol gas menempati 24 cm³ pada keadaan bilik]

Write the balanced chemical equation for the combustion of butene in excess oxygen.

If 1 200 cm³ butene gas is use, calculate the volume of oxygen gas needed for the combustion.

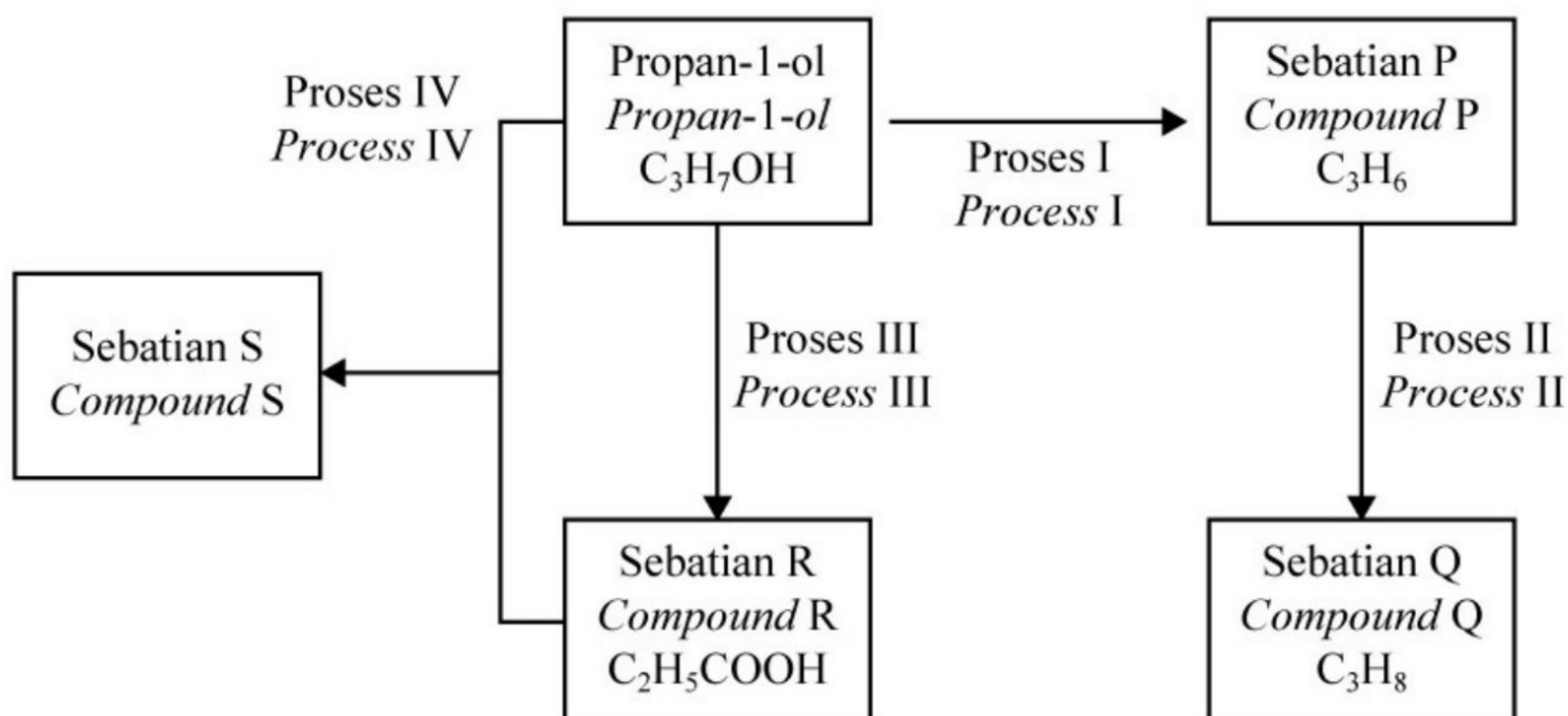
[1 mol of gas occupies 24 cm³ at room condition]

[5 markah]

[5 marks]

- (b) Rajah 10.2 menunjukkan carta alir pertukaran propan-1-ol kepada beberapa sebatian organik.

Diagram 10.2 shows a flow chart for the conversion of propan-1-ol to a few organic compounds.



Rajah 10.2
Diagram 10.2

Nyatakan nama bagi Proses I, Proses II, Proses III dan Proses IV.

Kenal pasti siri homolog bagi Sebatian P, Sebatian Q, Sebatian R dan Sebatian S.

Lukis formula struktur bagi Sebatian P dan Sebatian S.

State the name for Process I, Process II, Process III and Process IV.

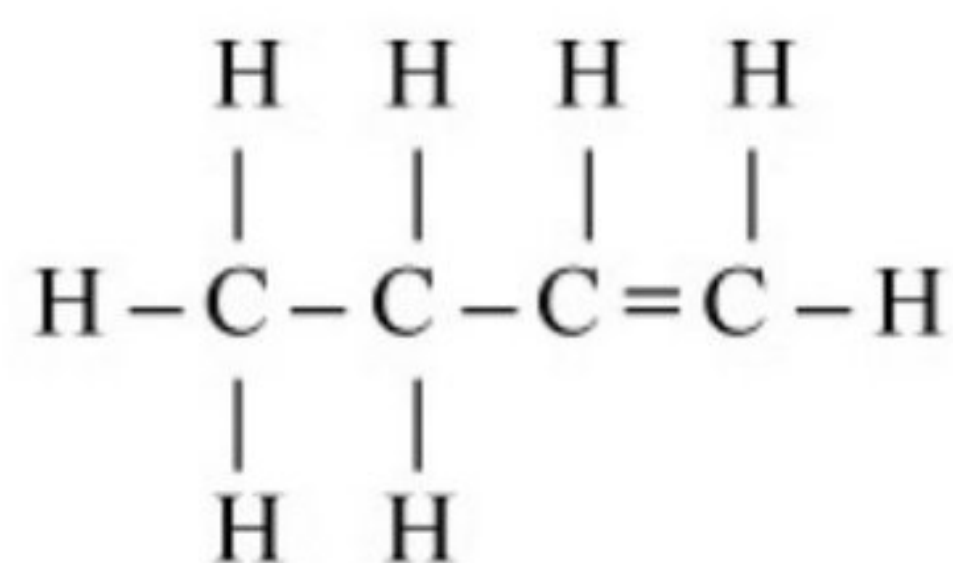
Identify the homologous series for Compound P, Compound Q, Compound R and Compound S.

Draw the structural formula for Compound P and Compound S.

[10 markah]
[10 marks]

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



Rajah 10.1
Diagram 10.1

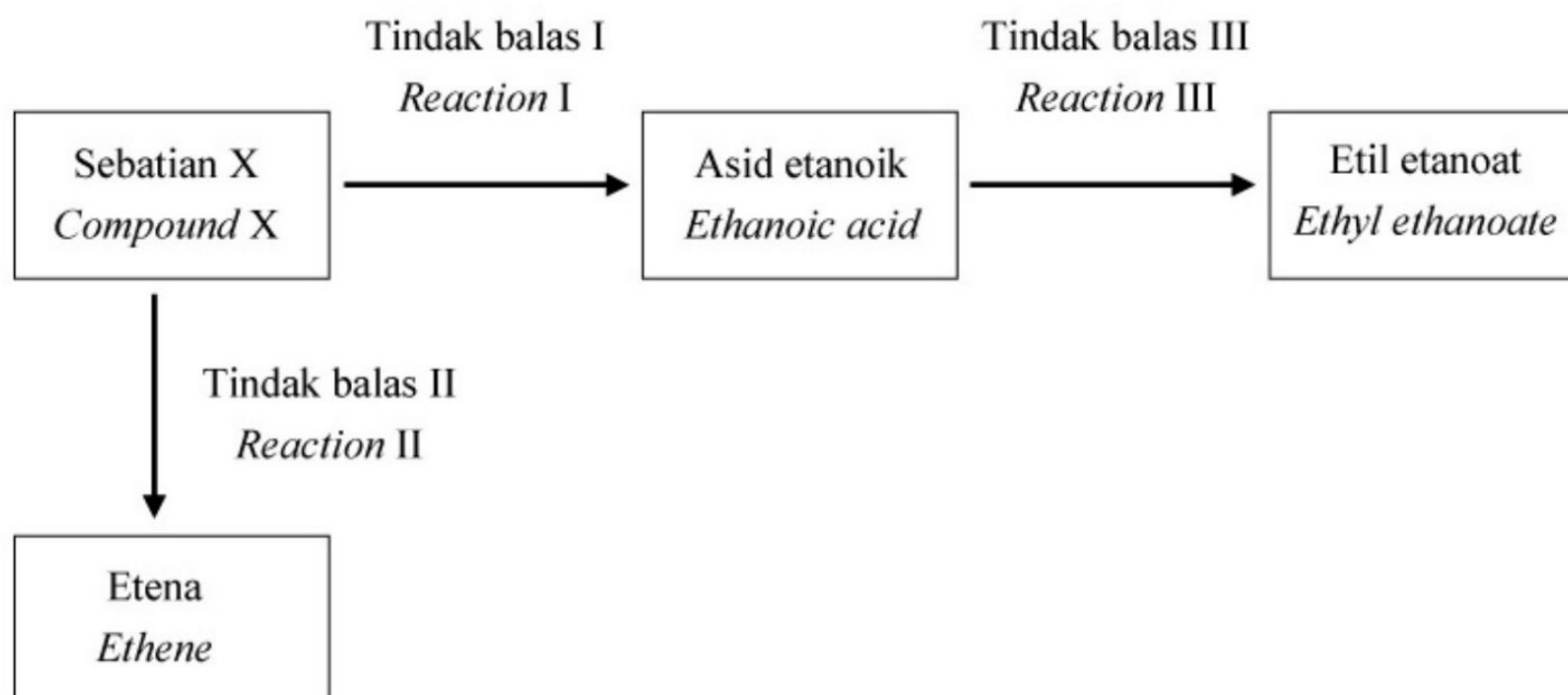
Lukis formula struktur bagi dua lagi isomer bagi butena dan namakan setiap isomernya mengikut penamaan IUPAC.

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

[4 markah]

[4 marks]

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



Rajah 10.2
 Diagram 10.2

- (i) Nyatakan nama, siri homolog, formula molekul dan kumpulan berfungsi bagi sebatian X.
State the name, homologous series, molecular formula and functional group of compound X.
 [4 markah]
 [4 marks]
- (ii) Nyatakan nama bagi Tindak balas I, Tindak balas II dan Tindak balas III.
State the name for Reaction I, Reaction II and Reaction III.
 [3 markah]
 [3 marks]
- (iii) Tulis persamaan kimia bagi Tindak balas I dan Tindak balas II.
Write chemical equation for Reaction I and Reaction II.
 [4 markah]
 [4 marks]

- (c) Butena terbakar lengkap dalam oksigen menghasilkan air dan gas karbon dioksida. Tulis persamaan kimia seimbang dan hitung isi padu gas karbon dioksida yang terhasil apabila 1.12 g butena terbakar lengkap.
[Jisim atom relatif: C = 12, H = 1 dan 1 mol bagi sebarang gas menempati 24 dm³ pada keadaan bilik]

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

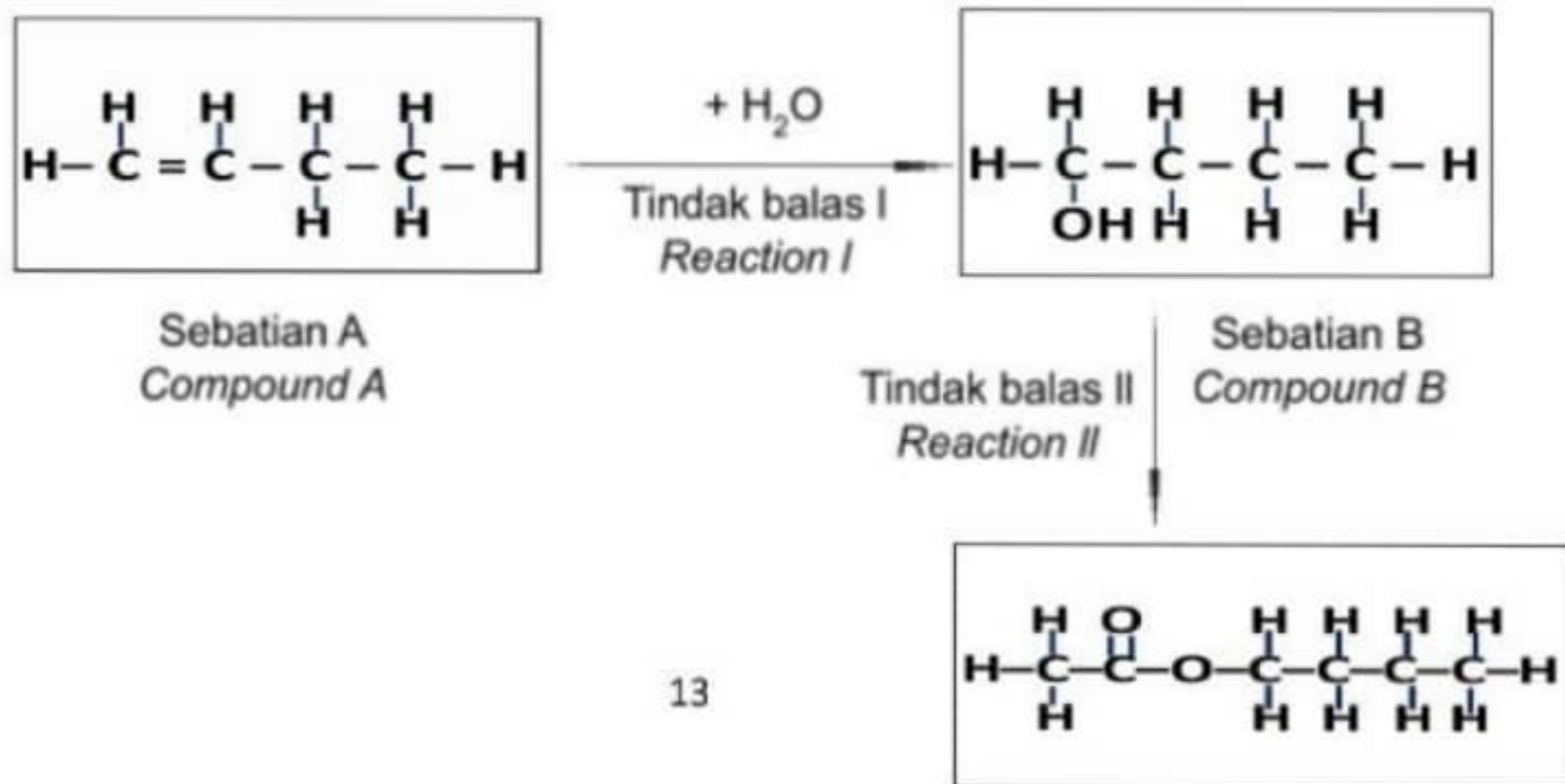
Write a balanced chemical equation and calculate the volume of carbon dioxide gas produced when 1.12 g of butene is completely burnt.

[Relative atomic mass: C = 12, H = 1 and 1 mol of any gas occupies 24 dm³ at room conditions]

[5 markah]

[5 marks]

8. Rajah 6 menunjukkan penukaran bagi beberapa sebatian organik.
Diagram 6 shows the conversions of several organic compounds.



Sebatian C
Compound C

Rajah 6
Diagram 6

- (a) Sebatian A mempunyai tiga isomer. Lukis satu isomer bagi sebatian A selain struktur di atas. Namakan isomer tersebut.
Compound A has three isomers. Draw one of the isomer other than above structural. Name the isomer.

[2 marks]

- (b) (i) Namakan tindak balas I. *Name the reaction I.*

[1 mark]

- (ii) Apakah keadaan yang diperlukan untuk tindak balas I berlaku?
What conditions are needed in reaction II?

[1 mark]

- (c) Huraikan satu ujian kimia untuk membezakan antara sebatian A dan sebatian B.
Describe a chemical test to differentiate between compound A and compound B?

[3 marks]

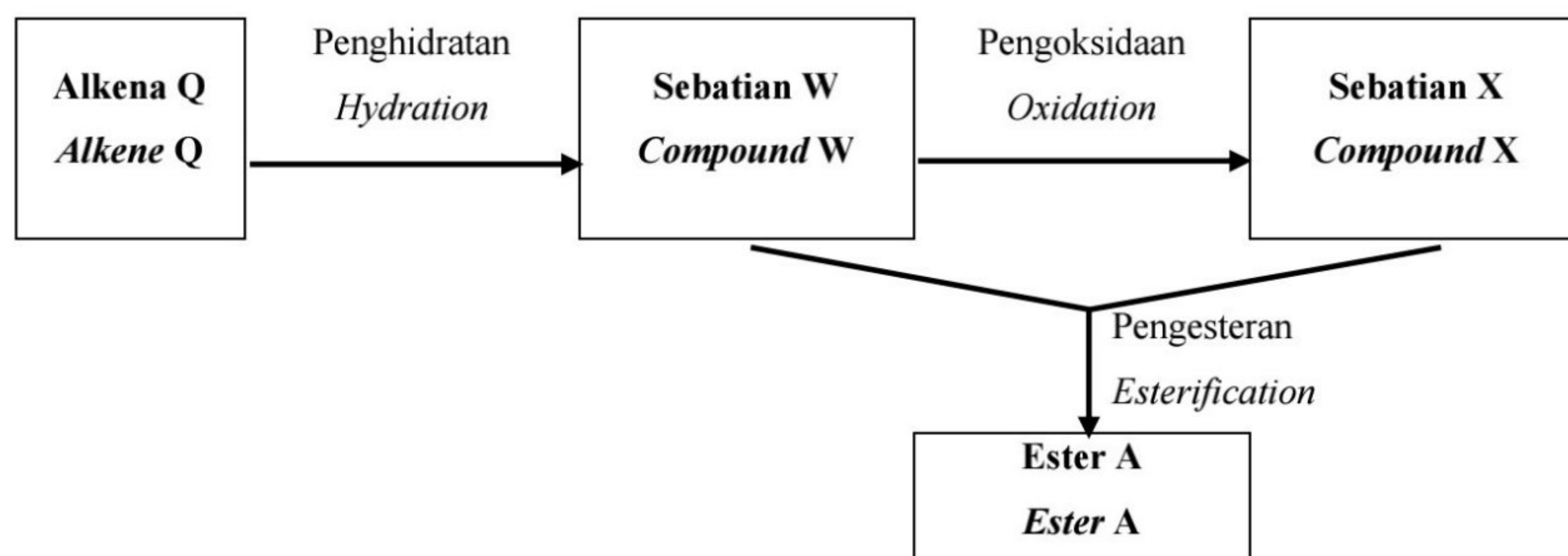
- (d) Huraikan secara ringkas bagaimana anda boleh menyediakan sebatian C di dalam makmal melalui tindak balas II.

Explain briefly how you can prepare the compound C in laboratory through reaction II.

[3 marks]

- 11 (a) Rajah 10.1 menunjukkan penukaran sebatian organik daripada satu siri homolog kepada yang lain.

Diagram 10.1 shows the conversion of an organic compound from one homologous series to another.



Rajah / Diagram 10.1

- (i) Apakah maksud siri homolog?
What is the meaning of homologous series?

[1 markah / mark]

- (ii) Jisim molekul relatif yang mungkin bagi alkena Q adalah 28, 42 atau 56. Dengan memilih salah satu daripada jisim molekul relatif itu, tentukan formula molekul bagi alkena itu dan nyatakan nama bagi alkena itu.
[Jisim atom relatif: H= 1; C= 12]

The possible relative molecular masses of alkene Q are 28, 42 or 56. By choosing any one of the relative molecular masses, determine the molecular formula for the alkene and state the name of the alkene.

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

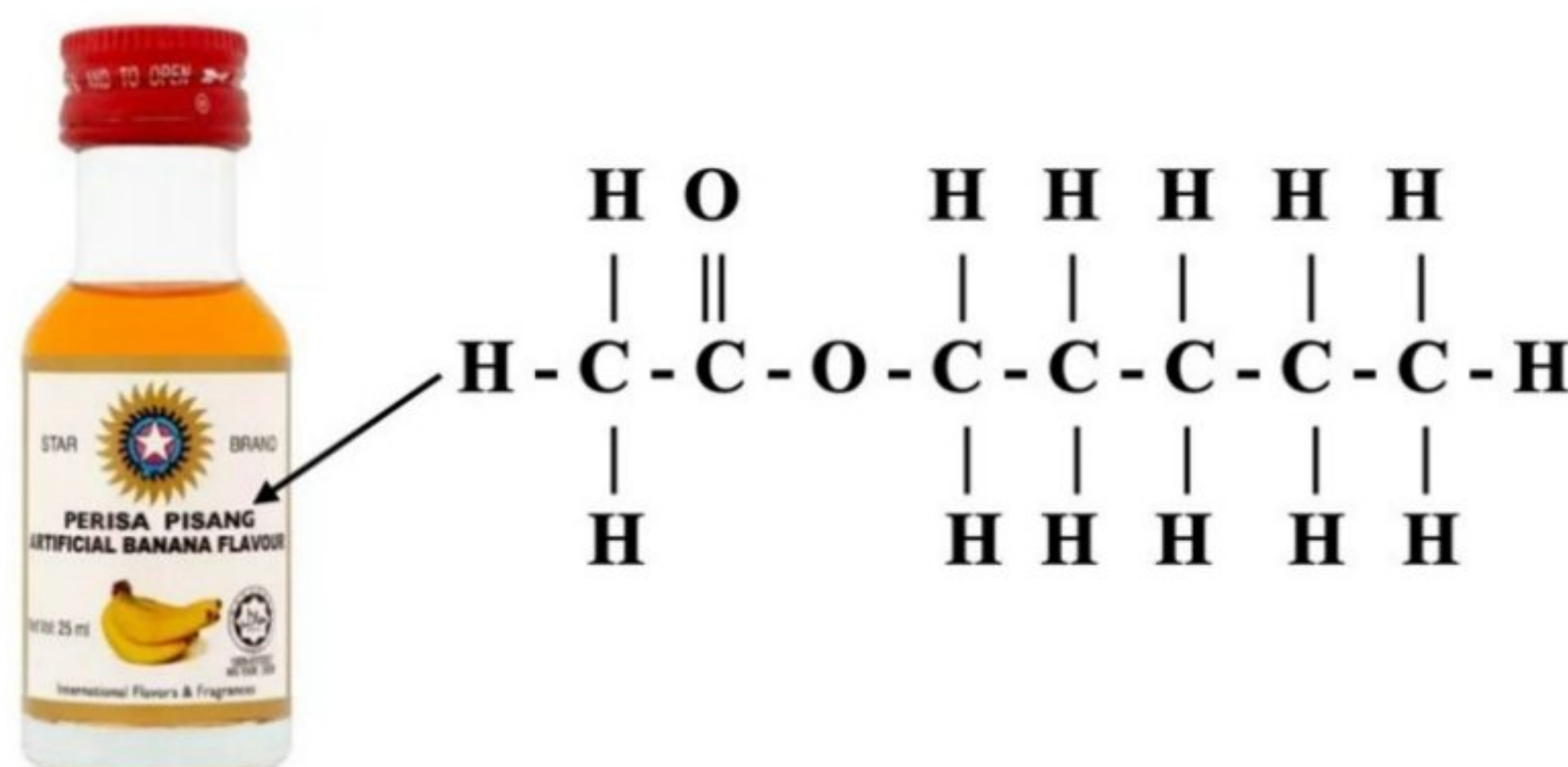
[3 markah / marks]

- (iii) Berdasarkan Rajah 10.1 dan jawapan daripada 11(a)(ii), nyatakan nama dan lukiskan formula struktur sebatian W dan sebatian X. Tuliskan persamaan kimia untuk menunjukkan penukaran sebatian W kepada sebatian X.
Based on Diagram 10.1 and the answer from 11(a)(ii), state the names and draw the structural formulae of compound W and compound X. Write the chemical equation to show the conversion of compound W to compound X.

[6 markah / marks]

- (b) Rajah 10.2 menunjukkan formula struktur bagi perisa pisang tiruan.

Diagram 10.2 shows the structural formula of artificial banana flavour.



Rajah / Diagram 10.2

Dengan menggunakan bahan yang sesuai, terangkan secara ringkas bagaimana anda boleh menyediakan perisa pisang tersebut di dalam makmal. Jawapan anda haruslah mengandungi persamaan kimia yang terlibat.

By using suitable substances, explain briefly how you can prepare the banana flavour in the laboratory. Your answer should include the chemical equation involved.

[7 markah / marks]

- (c) Rajah 10.3 menunjukkan dua jenis pembasmi kuman tangan yang mengandungi peratusan alkohol yang berbeza. *Diagram 10.3 shows two types of hand sanitisers that contains different percentage of alcohol.*



Pembasmi kuman tangan A
Kandungan alkohol : 75%
Hand sanitiser A
Alcohol content : 75%



Pembasmi kuman tangan B
Kandungan alkohol : 55%
Hand sanitiser B
Alcohol content : 55%

Rajah / Diagram 10.3

Berdasarkan Rajah 10.3, pilih pembasmi kuman tangan yang akan anda gunakan. Wajarkan pilihan anda.

Based on Diagram 10.3, choose the hand sanitiser that you will use. Justify your choice.

[3 markah / marks]