

Bank Soalan SPM Bab 2

Kertas 1

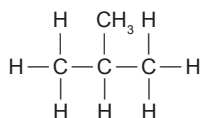
1. Bahan yang manakah merupakan hidrokarbon tak tepu?

Which substance is an unsaturated hydrocarbon?

- A** Propana
Propane
- B** Propanol
Propanol
- C** Propena
Propene
- D** Asid propanoik
Propanoic acid

2. Rajah 1 menunjukkan sesuatu sebatian organik.

Diagram 1 shows an organic compound.



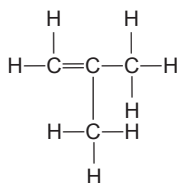
Rajah 1 / Diagram 1

Antara yang berikut, yang manakah siri homolog bagi sebatian ini?

Which of the following is the homologous series of the compound?

- A** Alkana
Alkane
- B** Alkena
Alkene
- C** Alkohol
Alcohol
- D** Asid karboksilik
Carboxylic acid
3. Rajah 2 menunjukkan formula struktur bagi sebatian T.

Diagram 2 shows the structural formula of compound T.



Rajah 2 / Diagram 2

Berapakah peratus jisim karbon dalam sebatian T?

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

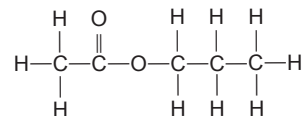
What is the percentage of carbon by mass in compound T?

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

- A** 20.69% **C** 82.79%
- B** 21.42% **D** 85.71%

4. Rajah 3 menunjukkan formula struktur bagi satu sebatian karbon.

Diagram 3 shows the structural formula of a carbon compound.



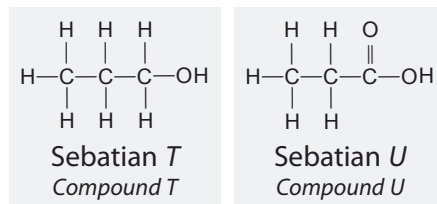
Rajah 3 / Diagram 3

Bahan manakah yang digunakan untuk menghasilkan sebatian tersebut?

Which substances are used to produce the compound?

- A** Butanol dan asid etanoik
Butanol and ethanoic acid
- B** Etanol dan asid propanoik
Ethanol and propanoic acid
- C** Propanol dan asid etanoik
Propanol and ethanoic acid
- D** Propanol dan asid metanoik
Propanol and methanoic acid
5. Rajah 4 menunjukkan formula struktur bagi sebatian T dan sebatian U.

Diagram 4 shows the structural formulae of compound T and compound U.



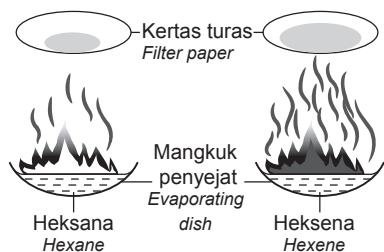
Rajah 4 / Diagram 4

Reagen manakah yang boleh digunakan untuk membezakan sebatian T dan sebatian U?

Which reagent can be used to differentiate compound T and compound U?

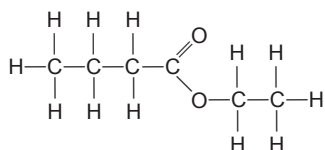
- A** Larutan natrium hidroksida
Sodium hydroxide solution
- B** Air bromin
Bromin water
- C** Magnesium
Magnesium
- D** Larutan kalium manganat(VII)
Potassium manganate(VII) solution

6. Berdasarkan Rajah 5, mengapakah nyalaan pembakaran heksena, C_6H_{12} menghasilkan lebih banyak jelaga berbanding heksana, C_6H_{14} ?
Based on Diagram 5, why does the combustion flame of hexene, C_6H_{12} produce more soot than hexane, C_6H_{14} ?



Rajah 5 / Diagram 5

- A** Peratus karbon per isi padu heksena lebih tinggi berbanding heksana.
The percentage of carbon by volume of hexene is higher than hexane.
- B** Peratus karbon per jisim heksena lebih tinggi berbanding heksana.
The percentage of carbon by mass of hexene is higher than hexane.
- C** Peratus hidrogen per jisim heksena lebih tinggi berbanding heksana.
The percentage of hydrogen by mass of hexene is higher than hexane.
- D** Peratus hidrogen per isi padu heksena lebih tinggi berbanding heksana.
The percentage of hydrogen by volume of hexene is higher than hexane.
7. Rajah 6 menunjukkan formula struktur bagi satu ester yang digunakan untuk menghasilkan perisa nanas.
Diagram 6 shows the structural formula of an ester which is used to make a pineapple flavour.



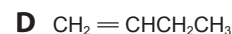
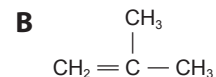
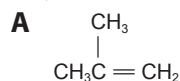
Rajah 6 / Diagram 6

Antara yang berikut, yang manakah boleh digunakan untuk menghasilkan perisa tersebut?
Which of the following can be used to make the flavour?

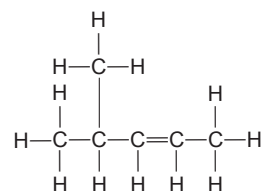
- A** Propanol dan asid propanoik
Propanol and propanoic acid
- B** Etanol dan asid butanoik
Ethanol and butanoic acid

- C** Butanol dan asid etanoik
Butanol and ethanoic acid
- D** Propil propanoat dan etanol
Propyl propanoate and ethanol

8. Alkohol mengalami tindak balas pendehidratan untuk membentuk alkena dan air. Alkena manakah yang terbentuk apabila butan-2-ol mengalami tindak balas pendehidratan?
Alcohol undergoes a dehydration reaction to form an alkene and water. Which alkene is formed when butan-2-ol undergoes a dehydration reaction?



9. Rajah 7 menunjukkan formula struktur bagi sebatian X.
Diagram 7 shows the structural formula of compound X.



Rajah 7 / Diagram 7

Apakah nama bagi sebatian X?

What is the name of compound X?

- A** 2-metilbut-2-ena
2-methylbut-2-ene
- B** 2-metilpent-2-ena
2-methylpent-2-ene
- C** 4-metilbut-2-ena
4-methylbut-2-ene
- D** 4-metilpent-2-ena
4-methylpent-2-ene
10. Antara yang berikut, yang manakah isomer bagi pentana, C_5H_{12} ?
Which of the following is the isomer for pentane, C_5H_{12} ?
- A** 2-metilpropana
2-methylpropane
- B** 2,2-dimetilpropana
2,2-dimethylpropane
- C** 2,2-dimetilbutana
2,2-dimethylbutane
- D** 2-etilpropana
2-ethylpropane

1. Jadual 1 menunjukkan tiga ahli pertama dalam sesuatu siri homolog.

Table 1 shows the first three members of a homologous series.

Nama / Name	Formula kimia / Chemical formula
Etuna / Ethyne	C_2H_2
Propuna / Propyne	C_3H_4
But-1-una / But-1-yne	C_4H_6

Jadual 1 / Table 1

(a) Berdasarkan Jadual 1:

Based on Table 1:

(i) Namakan kumpulan berfungsi bagi siri homolog ini.

Name the functional group for this homologous series.

[1 markah / 1 mark]

(ii) Lukis formula struktur but-1-una.

Draw the structural formula of but-1-yne.

[1 markah / 1 mark]

(b) (i) Satu siri homolog lain mempunyai kumpulan berfungsi hidroksil dalam sebatianannya. Namakan ahli pertama dalam siri homolog ini.

Another homologous series has a hydroxyl functional group in its compound. Name the first member of this homologous series.

[1 markah / 1 mark]

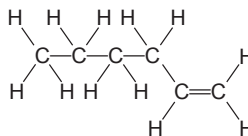
(ii) Jika propuna boleh ditukarkan kepada ahli dengan bilangan karbon yang sama dalam siri homolog di 1(b)(i), lukis formula struktur bagi hasil yang terbentuk.

If propyne can be converted to a member with the same number of carbons for the homologous series in 1(b)(i), draw the structural formula for the product formed.

[2 markah / 2 marks]

2. Rajah 1.1 menunjukkan formula struktur hidrokarbon R.

Diagram 1.1 shows the structural formula for hydrocarbon R.



Rajah 1.1 / Diagram 1.1

(a) Berdasarkan Rajah 1.1:

Based on Diagram 1.1:

(i) Apakah maksud hidrokarbon?

What does hydrocarbon mean?

[1 markah / 1 mark]

(ii) Namakan siri homolog bagi hidrokarbon R.

Name the homologous series for hydrocarbon R.

[1 markah / 1 mark]

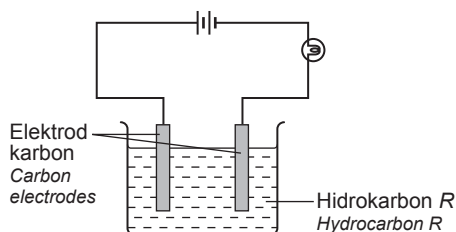
(iii) Tulis formula molekul untuk **dua** ahli pertama dalam siri homolog yang dinamakan di 2(a)(ii).

Write the molecular formulae for the first **two** members in the homologous series named in 2(a)(ii).

[2 markah / 2 marks]

(b) Rajah 1.2 menunjukkan susunan radas untuk mengkaji kekonduksian elektrik bagi hidrokarbon R.

Diagram 1.2 shows the apparatus set-up to investigate the electrical conductivity for hydrocarbon R.



Rajah 1.2 / Diagram 1.2

Ramalkan nyalaan mentol dalam susunan radas ini dan terangkan jawapan anda.

Predict the lighting of the bulb in this apparatus set-up and explain your answer.

[2 markah / 2 marks]

- (c) (i) Hidrokarbon R bertindak balas dengan oksigen untuk menghasilkan air dan sesuatu gas tidak berwarna yang mengeruhkan air kapur. Tulis persamaan kimia bagi tindak balas ini.

Hydrocarbon R reacts with oxygen to produce water and a colourless gas that turns limewater cloudy. Write the chemical equation for this reaction.

[2 markah / 2 marks]

- (ii) Jika 0.5 mol hidrokarbon R telah bertindak balas sepenuhnya dengan oksigen, hitungkan isi padu gas yang terhasil pada suhu dan tekanan piawai.

[1 mol gas memenuhi 22.4 dm³ pada suhu dan tekanan piawai.]

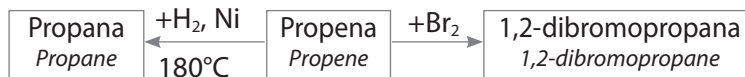
If 0.5 mole of hydrocarbon R reacted completely with oxygen, calculate the volume of gas produced at standard temperature and pressure.

[1 mole of gas occupies 22.4 dm³ at standard temperature and pressure.]

[2 markah / 2 marks]

3. Rajah 2 menunjukkan satu siri tindak balas yang melibatkan propena.

Diagram 2 shows a series of reactions involving propene.



Rajah 2 / Diagram 2

- (a) Berdasarkan Rajah 2, lukis formula struktur bagi 1,2-dibromopropana dan tulis persamaan kimia bagi pembentukan 1,2-dibromopropana. Nyatakan pemerhatian bagi tindak balas ini dan terangkan jawapan anda.

Based on Diagram 2, draw the structural formula for 1,2-dibromopropane and write the chemical equation for the formation of 1,2-dibromopropane. State the observation for this reaction and explain your answer.

[6 markah / 6 marks]

- (b) Pembakaran propana dan propena di udara akan menghasilkan nyalaan berjelaga. Manakah sebatian yang akan menghasilkan nyalaan yang lebih berjelaga? Terangkan jawapan anda. Sertakan persamaan kimia seimbang bagi pembakaran lengkap propana.

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

The combustion of propane and propene in the air will produce a sooty flame. Which compound will produce a sootier flame? Explain your answer. Include a balanced chemical equation for the combustion of propane.

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

[6 markah / 6 marks]

- (c) Huraikan satu ujian kimia menggunakan larutan kalium manganat(VII) berasid bagi membezakan propana dengan propena.

Describe a chemical test using acidified potassium manganate(VII) solution to differentiate between propane and propene.

[4 markah / 4 marks]

- (d) Sebatian Z terdiri daripada 4 atom karbon dan mempunyai kumpulan berfungsi yang sama dengan propena. Lukis dan namakan **dua** isomer sebatian Z.

Compound Z consists of 4 carbon atoms and has the same functional group as propene. Draw and name two isomers of compound Z.

[4 markah / 4 marks]