SULIT

KEMENTERIAN PENDIDIKAN TINGGI
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI

BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI
KEMENTERIAN PENDIDIKAN TINGGI

JABATAN TEKNOLOGI KIMIA DAN MAKANAN

PEPERIKSAAN AKHIR

SESI II : 2023/2024

DMT20043 : ORGANIC CHEMISTRY

TARIKH : 28 MEI 2024
MASA : 2.30 PETANG - 4.30 PETANG (2 JAM)

Kertas ini mengandungi **SEBELAS (11)** halaman bercetak.

Struktur (4 soalan)

Dokumen sokongan yang disertakan : Tiada

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

SULIT

INSTRUCTION:
This section consists of **FOUR (4)** questions. Answer **ALL** questions.

ARAHAN:
*Bahagian ini mengandungi **EMPAT (4)** soalan. Jawab **SEMUA** soalan.*

QUESTION 1

SOALAN 1

CLO1 (a) Identify **FIVE (5)** functional groups in the figure 1(a) chemical structure:

*Kenalpasti **LIMA (5)** kumpulan berfungsi dalam rajah 1(a) struktur kimia yang berikut:*

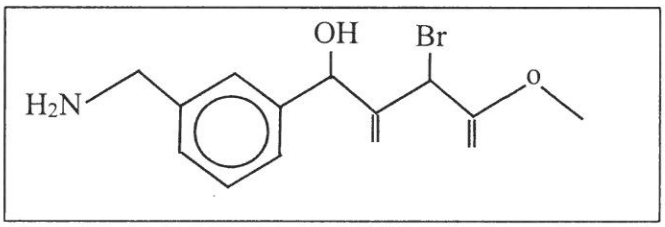


Figure 1(a): Example of a chemical structure

Rajah 1(a): Contoh satu struktur kimia

[5 marks]
[*5 markah*]

(b)

Table 1(b) :Chemical structure
Jadual 1(b): Struktur kimia

CLO1

$CH_2=CHCHCH_3$ (with CH_3 branch)	$CH_3CH(CH_3)CH_2CH_2CH(CH_3)_2$
Compound A	Compound B

Table 1(b) shows the chemical structure for two organic compounds which are A and B.

Jadual *1(b) menunjukkan struktur kimia dua sebation organik iaitu A dan B.*

i. Express the following organic compounds of A and B based on IUPAC nomenclature.
Zahirkan sebatian organik tersebut berdasarkan penamaan IUPAC.

[4 marks]
[*4 markah*]

ii. Referring to compound A dan B, choose the saturated and unsaturated compound with **ONE (1)** explanation for each compound.
Merujuk kepada struktur sebatian A dan B, pilih sebatian organik tepu dan tidak tepu beserta ***SATU (1)*** *penjelasan .*

[6 marks]
[*6 markah*]

CLO1

(c) Figure 1 (c) shows the structure of an organic compound.
Jadual 1(c) menunjukkan satu sebatian organic.

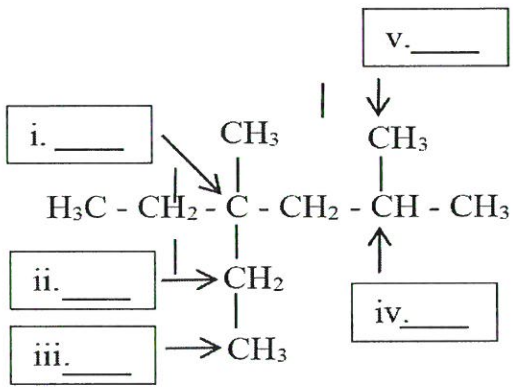


Figure 1(c): Structure of an organic compound
Rajah 1 (c): Struktur bagi satu sebatian organik

i. Based on the carbon that has been numbered i to v in Figure 1(c), express each of the following carbon as primary (1°), secondary (2°), tertiary (3°) or quaternary (4°) carbon.
Berdasarkan carbon yang telah dinomborkan i hingga v dalam rajah 1 (c), zahirkan setiap karbon berikut sebagai karbon premier (1°), *sekunder* (2°), *tertier* (3°) *atau kuatenari* (4°).

[5 marks]
[*5 markah*]

ii. Express the following organic compounds based on IUPAC nomenclature for the compound in figure 1 (c).
Zahirkan berdasarkan penamaan IUPAC terhadap sebatian organik dalam rajah 1 (c).

[2 marks]
[*2 markah*]

iii. Visualize the skeletal structure of organic compound in Figure 1 (c).
Gambarkan struktur tulang sebatian organik dalam rajah 1(c).

[3 marks]
[*3 markah*]

QUESTION 2

SOALAN 2

CLO1 (a) State **FIVE (5)** types of benzene derivatives.

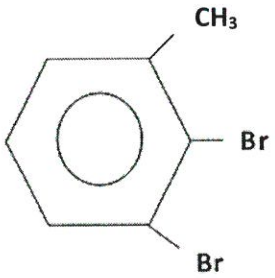
*Nyatakan **LIMA (5)** jenis terbitan benzina*

[5 marks]
[*5 markah*]

CLO1 (b) Express the following molecules by using IUPAC nomenclature system.

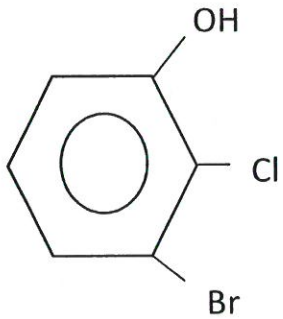
Zahirkan sebatian berikut dengan menggunakan system penamaan IUPAC.

i.



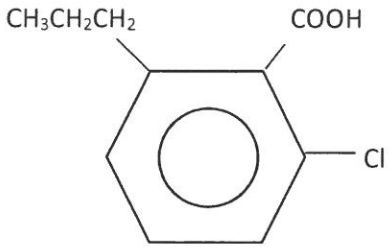
[3 marks]
[*3 markah*]

ii.



[3 marks]
[*3 markah*]

iii.



[4 marks]
[*4 markah*]

CLO1 (c) Carbonyl compounds contain the carbonyl functional group, which is composed of a carbon atom double bonded to an oxygen atom. Visualize the structural formula for the following carbonyl compound.

Sebatian karbonil mengandungi kumpulan berfungsi karbonil yang terdiri daripada atom karbon terikat dengan atom oksigen. Gambarkan struktur formula bagi sebatian karbonil berikut

i. 2-bromo-3-chloro -3 -butenal

2-bromo-3-kloro-3-butenal

[3 marks]
[*3 markah*]

ii. 3- ethyl -5- methyl-2-hexanone

3-etil-5-metil-2-heksanon

[3 marks]
[*3 markah*]

iii. 2-2- dichlorocyclopentanecarbaldehyde

2-2- dicloro*siklopentanakarbaldehid*

[4 marks]
[*4 markah*]

QUESTION 3

SOALAN 3

CLO1 (a) Amines are organic derivatives of ammonia NH_3, in which one or more of the three hydrogen is replaced by a carbon group. Amines are classified as primary (1°), secondary (2°), or tertiary (3°), depending on how many carbon groups are connected to the nitrogen atom. Give an example of each class of amine.

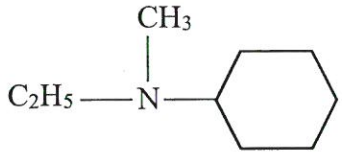
Amina ialah terbitan organik ammonia NH_3, di mana satu atau lebih daripada tiga atom hidrogen digantikan oleh kumpulan karbon. Amina dikelaskan sebagai primer (1°), sekunder (2°), atau tertier (3°), bergantung kepada bilangan kumpulan karbon yang terikat kepada atom nitrogen. Berikan satu contoh bagi setiap kelas amina.

[5 marks]
[*5 markah*]

CLO1 (b) Express the name for the following amine compounds below based on the IUPAC nomenclature system.

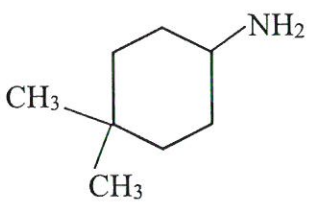
Berikan nama bagi sebatian amina di bawah mengikut tatacara penamaan sistem IUPAC.

i.



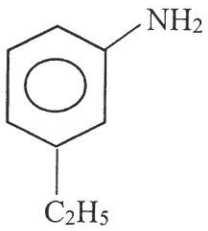
[3 marks]
[*3 markah*]

ii.



[3 marks]
[*3 markah*]

iii.



[4 marks]
[*4 markah*]

CLO1

(c) Visualize a structural formula for the following compounds.
Lukiskan formula struktur bagi sebatian berikut.

i. 3,4,4-trimethylpentanoic acid
3,4,4-trimetilpentanoik asid

[3 marks]
[*3 markah*]

ii. 4-hydroxybutanoic acid
4-hidroksibutanoik asid

[3 marks]
[*3 markah*]

iii. 2-isopropylhexanoic acid
2-isopropilheksanoik asid

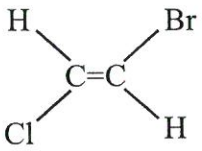
[4 marks]
[*4 markah*]

QUESTION 4
SOALAN 4

CLO1 (a) State whether the following alkenes are geometric isomers or non-geometric isomers.

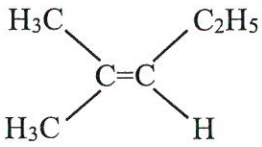
Nyatakan yang manakah antara alkena berikut adalah isomer geometric atau isomer bukan-geometric

i.



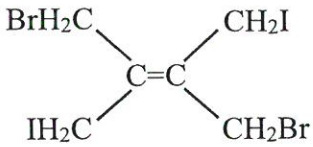
[1 mark]
[1 *markah*]

ii.



[2 marks]
[2 *markah*]

iii.



[2 marks]
[2 *markah*]

CLO1 (b) Referring to Figure 4(b), a compound named 2-bromo-2-methylbutane undergoes nucleophilic substitution reaction with hydroxide ion, OH^-.

Merujuk kepada gambarajah 4(b), satu sebatian bernama 2-bromo-2-metilbutana menjalani tindakbalas penukargantian nukleofil dengan ion hidroksida, OH^-.

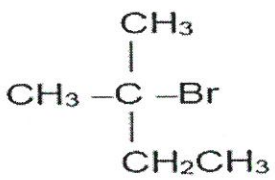


Figure 4(b): 2-bromo-2-methylbutane.

Gambarajah 4(b): 2-bromo-2-methylbutane

i. Catogerize whether the compound undergoes S_N1 or S_N2 reaction.
Kategorikan sama ada sebatian tersebut menjalani tindakbalas S_N1 atau S_N2.

[1 mark]
[*1 markah*]

ii. Simplify ONE **(1)** reason for your answer in 4b (i).
*Ringkaskan **SATU (1)** alasan bagi jawapan anda di 4b (i).*

[1 mark]
[*1 markah*]

iii.

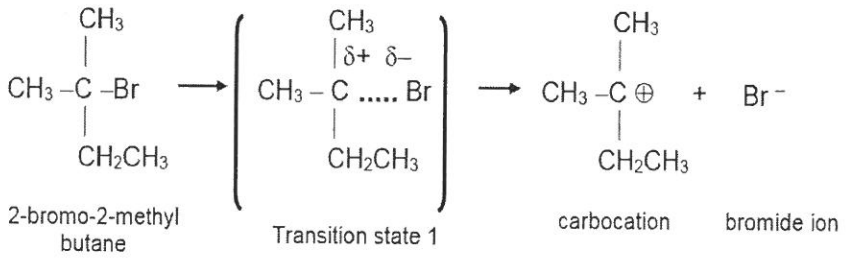


Figure 4(b)iii: First step of reaction mechanism of 2-bromo-2-methylbutane
Rajah 4(b)iii: Langkah pertama mekanisma tindakbalas 2-bromo-2-metilbutana

Figure 4(b) iii shows the first step in substitution reaction mechanism of S_N1 of 2-bromo-2-methylbutane. Show the second step of the mechanism which involved mechanism reaction of carbocation with hydroxide (OH^-) ion and name the products obtained.
Gambarajah 4(b) menunjukkan langkah pertama dalam mekanisma tindakbalas penggantian S_N1 bagi 2-bromo-2-metilbutana. Tunjukkan tindakbalas langkah kedua yang melibatkan tindakbalas mekanisma karbokation dengan ion hidroksida (OH^-) dan namakan produk yang terhasil.

[8 marks]
[*8 markah*]

CLO1 (c) Visualize the structural formula for the following compounds.
Lakarkan formula struktur untuk sebatian di bawah.

i. cis – 3,4-dichlorohex – 3 – ene
cis – 3,4-dikloroheks – 3 - ena

[3 marks]
[*3 markah*]

ii. (E)-1-bromo-2-iodobutene
(E)-1-bromo-2-iodobutena

[3 marks]
[*3 markah*]

ii. Trans-2,3-dichloro-but-2ene
Trans-2,3-dikloro-but-2-ena

[4 marks]
[*4 markah*]

SOALAN TAMAT