

INSTRUCTION:

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

ARAHAN:

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

QUESTION 1**SOALAN 1**

- | | |
|------|--|
| CLO1 | <p>(a) Identify THREE (3) compositions in crude oil.
<i>Kenalpasti TIGA (3) komposisi dalam minyak mentah.</i></p> <p style="text-align: right;">[3 marks]
[3 markah]</p> |
| CLO1 | <p>(b) The properties of crude oil differ according to their origin and the ratio of different components in the mixture. Explain
<i>Sifat minyak mentah berbeza mengikut asalnya dan nisbah komponen yang berbeza dalam campuran. Terangkan:</i></p> <p>i) FIVE (5) non-hydrocarbon compounds found in crude oil.
<i>LIMA (5) sebatian bukan hidrokarbon yang dijumpai dalam minyak mentah.</i></p> <p style="text-align: right;">[5 marks]
[5 markah]</p> <p>ii) the consequences of the presence of metal compound in crude oil.
<i>akibat kehadiran sebatian logam dalam minyak mentah.</i></p> <p style="text-align: right;">[5 marks]
[5 markah]</p> |
| CLO1 | <p>(c) The heating value of natural gas is a function of the constituents present in the mixture. Write:
<i>Nilai pemanasan gas asli adalah fungsi juzuk yang terdapat dalam campuran. Tuliskan:</i></p> <p>i) the heating value of natural gas.
<i>nilai pemanasan gas asli.</i></p> <p style="text-align: right;">[4 marks]
[4 markah]</p> |

- ii) **TWO (2)** ways to improve the heating value of natural gas, nearly similar to methane.

DUA (2) cara untuk meningkatkan nilai pemanasan gas asli, hampir serupa dengan metana.

[4 marks]

[4 markah]

- iii) **TWO (2)** consequences of using natural gas that contains high percentage of impurities in industry.

DUA (2) akibat menggunakan gas asli yang mengandung peratus kekotoran yang tinggi dalam industry.

[4 marks]

[4 markah]

QUESTION 2

SOALAN 2

CLO1

- (a) Define isomers.

Definisikan isomer.

[3 marks]

[3 markah]

CLO1

- (b) Hydrocarbon with C₄ and above have isomers.

Hidrokarbon dengan C₄ dan ke atas mempunyai isomer.

- i) Express **ONE (1)** possible isomer structure for each alkane below.

*Tunjukkan **SATU (1)** struktur isomer yang mungkin bagi setiap alkana di bawah.*

Alkane / Alkana	Isomer structure/ Bentuk isomer
n-hexane	
n-Octane	
n-Heptane	
n-Pentane	
n-Butane	

[5 marks]

[5 markah]

CLO1

- ii) Express the name of each isomer in (i).
Nyatakan nama bagi setiap isomer pada (i).

[5 marks]

[5 markah]

- (c) Alkenes are unsaturated compounds, which makes them more reactive than alkanes. Write:

Alkena adalah sebatian tak tepu, yang menjadikannya lebih reaktif daripada alkana. Tuliskan:

- i) the balance equations for both complete and incomplete combustion of propene, C_3H_6 .
persamaan seimbang bagi pembakaran lengkap dan pembakaran tidak lengkap propena, C_3H_6 .

[4 marks]

[4 markah]

- ii) the complete equations for the reaction of $CH_2=CH_2$ with each of the following substance:
persamaan lengkap bagi tindak balas antara $CH_2=CH_2$ dengan setiap bahan berikut:

Hydrogen, H_2

Hidrogen, H_2

Hydrogen Bromide, HBr

Hidrogen Bromida, HBr

[4 marks]

[4 markah]

- iii) the rule involved with proper justification for the reaction propene, $\text{CH}_2=\text{CHCH}_3$ with water, H_2O will produce isopropanol, $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$.

peraturan yang terlibat dengan justifikasi yang betul untuk tindak balas propena, $\text{CH}_2=\text{CHCH}_3$ dengan air, H_2O akan menghasilkan isopropanol, $\text{CH}_3\text{CH}(\text{OH})\text{CH}_3$.

[4 marks]

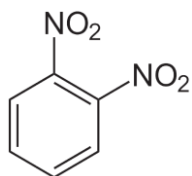
[4 markah]

QUESTION 3

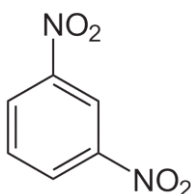
SOALAN 3

CLO1

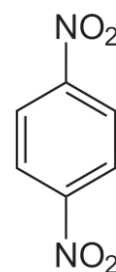
- (a) Name the di-substituted benzene rings below using the correct prefix.
Namakan dwi-penggantian gelang benzena di bawah dengan menggunakan awalan yang betul.



____ dinitrobenzene



____ dinitrobenzene



____ dinitrobenzene

[3 marks]

[3 markah]

CLO1

- (b)
- i) Outline **FIVE (5)** physical properties of benzene.
*Nyatakan **LIMA (5)** ciri-ciri fizikal benzena.*

[5 marks]

[5 markah]

- ii) Interpret the type of electrophilic substitution reactions involved according to the explanation below:

Tafsirkan jenis tindak balas penggantian elektrofilik yang terlibat mengikut penjelasan di bawah:

Electrophilic Substitution Reaction	Description
	In the presence of Lewis acids (FeCl_2 , FeBr_2), benzene reacts with the halogens for forming the aryl halides.
	At 323-333K, Benzene reacts with nitric acid in the presence of sulfuric acid for the formation of nitrobenzene.
	It is a process in which benzene is heated with fuming sulfuric acid, for the formation of benzene sulphonic acid. It is reversible reaction.
	Benzene gets treated with an alkyl halide in the presence of any Lewis acid for the formation of alkylbenzene.
	Benzene is treated with acyl halide in the presence of any Lewis acid for the formation of acyl benzene

[5 marks]

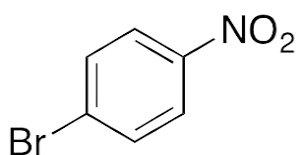
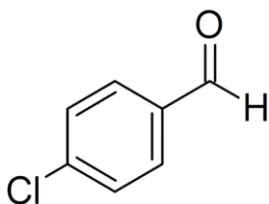
[5 markah]

CLO1

(c)

- i) Write the IUPAC name of the following compounds:

Tuliskan nama IUPAC bagi sebatian berikut:



[4 marks]

[4 markah]

- ii) Draw the structure corresponding to the following IUPAC names:

Lukiskan struktur yang sepadan dengan nama IUPAC berikut:

p-Bromochlorobenzene

p-bromoklorobenzena

m-Bromotoluene

m-bromotoluena

[4 marks]

[4 markah]

- iii) Write the balance equation for complete combustion of benzene, C_6H_6 .

Tuliskan tindak balas seimbang bagi pembakaran lengkap benzena, C_6H_6 .

[4 marks]

[4 markah]

QUESTION 4

SOALAN 4

CLO1

- (a) List **THREE (3)** products obtained from direct reaction of methane.
*Senaraikan **TIGA (3)** produk yang diperoleh daripada tindak balas langsung metana.*

[3 marks]

[3 markah]

CLO1

- (b) Hydrogen is one of the non-hydrocarbon compounds used in petrochemical industry. Discuss:
Hidrogen adalah salah satu sebatian bukan hidrokarbon yang digunakan dalam industri kimia. Bincangkan:

- i) **FIVE (5)** major sources of hydrogen.
LIMA (5) sumber utama hidrogen.

[5 marks]

[5 markah]

- ii) the uses of hydrogen in industry.
kegunaan hidrogen dalam industri.

[5 marks]

[5 markah]

CLO1

- (c) Ethylene is known as the king of petrochemicals because more commercial chemicals are produced from ethylene. Direct hydration of ethylene with water will produce ethanol. Write
Etilena dikenali sebagai raja petrokimia kerana lebih banyak bahan kimia komersial dihasilkan daripada etilena. Penghidratan langsung etilena dengan air akan menghasilkan etanol. Tuliskan:

- i) the reaction equation of direct hydration of ethylene with water.
persamaan tindak balas untuk penghidratan langsung etilena dengan air.
- [4 marks]
[4 markah]
- ii) **TWO (2)** uses of ethanol in industry.
DUA (2) kegunaan etanol dalam industri.
- [4 marks]
[4 markah]
- iii) **TWO (2)** other type of reaction involved ethylene.
DUA (2) jenis tindak balas lain yang melibatkan etilena.
- [4 marks]
[4 markah]

SOALAN TAMAT