

INSTRUCTION:

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

ARAHAN:

Bahagian ini mengandungi (EMPAT) 4 soalan struktur. Jawab semua soalan.

QUESTION 1**SOALAN 1**

CLO1
C1

- (a) Chiyoda Acetica Process is a process to produce acetic acid. Describe the function of the following units :

i. Flasher and finishing column in distillation unit.

ii. Methyl iodide generation unit.

iii. HP and LP absorber in absorption unit.

Proses 'Chiyoda Acetica' merupakan proses untuk menghasilkan asid asetik.

Huraikan fungsi bagi unit-unit berikut :

i. 'Flasher' dan 'finishing column' dalam unit penyulingan

ii. 'HP' dan 'LP absorber' dalam unit penyerapan.

iii. Unit penghasilan metil iodida

[10 marks]

[10 markah]

CLO1
C2

- (b) Explain by-product formation reactions occur in carbonylation reactor .

Terangkan tindakbalas hasil sampingan yang berlaku dalam reaktor 'carbonylation'.

[5 marks]

[5 markah]

CLO1
C3

- (c) Lummus/UOP CDTech EB Technology is the technology to produce ethylbenzene. Explain the process for CDTech EB Technology.

Teknologi Lummus/UOP CDTech EB merupakan teknologi untuk menghasilkan etilbenzena. Terangkan proses bagi Teknologi CDTech EB.

[10 marks]

[10 markah]

QUESTION 2
SOALAN 2CLO2
C1

- (a) The methanol process in Lurgi Megamethanol Technology consists of three important steps.

- i. List **THREE (3)** steps in the methanol process.
- ii. Name **TWO (2)** of the synthesis gas produced.

Proses penghasilan methanol dalam Teknologi Lurgi Megamethanol mengandungi tiga langkah yang penting.

- i. Senaraikan **TIGA (3)** langkah dalam proses penghasilan methanol.
- ii. Namakan **DUA (2)** gas sintesis yang dihasilkan.

[5 marks]

[5 markah]

CLO2
C2

(b) Explain the function of the following equipment in syngas generation.

- i. Pre reformer
- ii. Steam reformer
- iii. Autothermal reformer
- iv. Desulfurizer

Terangkan fungsi peralatan-peralatan berikut dalam penghasilan 'syngas'.

- i. 'Pre reformer'*
- ii. 'Steam reformer'*
- iii. 'Autothermal reformer'*
- iv. 'Desulfurizer'*

[8 marks]
[8 markah]

CLO2
C3

(c) Methanol can be converted to ethylene and propylene via the UOP/Hydro MTO process. Draw the process flow diagram of UOP/Hydro MTO process with complete labelling.

Methanol boleh ditukarkan kepada etilena dan propilena melalui proses MTO oleh UOP/Hydro. Lukiskan gambarajah aliran proses MTO oleh UOP/Hydro dengan label yang lengkap.

[12 marks]
[12 markah]

QUESTION 3

SOALAN 3

CLO1
C1

(a) i. Styrene monomer (SM) product is separated from dehydrogenated mixture (DM) by fractionation. List **FIVE (5)** components in DM.

*Hasil 'styrene monomer' (SM) dipisahkan dari 'dehydrogenated mixture' (DM) melalui penyulingan. Senaraikan **LIMA (5)** komponen dalam DM.*

[5 marks]
[5 markah]

- ii. Describe the fractionation process of the DM starting from EB/SM splitter until SM is produced.

Huraikan proses penyulingan DM bermula dari 'EB/SM splitter' sehingga mendapat hasil SM.

[5 marks]
[5 markah]

CLO1
C2

- (b) Explain the reactor in PxMax process.
Terangkan reactor bagi proses PxMax.

[5 marks]
[5 markah]

CLO1
C3

- (c) i. Write the chemical reaction showing the chemical structure of p-xylene production from toluene.

Tuliskan tindakbalas kimia yang menunjukkan struktur kimia bagi penghasilan 'p-xylene' dari 'toluene'.

[5 marks]
[5 markah]

- ii. Complete the table below with the correct process that occurs in PxMax reaction section.

Lengkapkan jadual di bawah dengan proses yang betul yang berlaku dalam seksyen tindakbalas PxMax.

Table 3 (c) (ii) / Jadual 3 (c) (ii)

Equipment / Peralatan	Process / Proses
Reactor / Reaktor	A
Furnace / Relau	B
Compressor / Pemampat	C
Condenser / Kondenser	D
Separator / Pemisah	E

[5 marks]
[5 markah]

QUESTION 4**SOALAN 4**CLO2
C1

- (a) Spherilene technology is used to produce polypropylene. List **FIVE (5)** equipment in reactor system 1 for Spherilene process.

*Teknologi 'spherilene' digunakan untuk menghasilkan polipropilena. Senaraikan **LIMA (5)** peralatan dalam sistem reactor 1 bagi proses 'spherilene'.*

[5 marks]
[5 markah]

CLO2
C2

- (b) Explain the function of the following process below related to UNIPOL polypropylene technology.

- i. Reactor 1
- ii. Resin degassing
- iii. Vent recovery
- iv. Pelletting
- v. Resin handling

Terangkan fungsi bagi proses berikut yang berkaitan dengan teknologi UNIPOL Polypropylene.

- i. Reaktor 1*
- ii. 'Resin degassing'*
- iii. 'Vent recovery'*
- iv. 'Pelletting'*
- v. 'Resin handling'*

[10 marks]
[10 markah]

CLO2
C3

- (c) Draw the process flow diagram for Spherilene process technology.

Lukiskan rajah aliran proses bagi proses teknologi Spherilene..

[10 marks]

[10 markah]

SOALAN TAMAT