

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) i) State the function of methyl iodide.

Nyatakan fungsi metil iodide.

[2 marks]
[2 markah]

- ii) Write down the carbonylation reaction in methanol carbonylation process.

Tuliskan tindakbalas 'carbonylation' dalam proses 'methanol carbonylation'.

[3 marks]
[3 markah]

CLO1
C2

- (b) Describe the characteristics of a carbonylation reactor in Chiyoda Acetica process.

Huraikan ciri-ciri reaktor 'carbonylation' dalam proses Chiyoda Acetica.

[5 marks]
[5 markah]

CLO1
C3

- (c) Catalyst is used in the reactor to increase the rate of reaction. Explain the advantages of the catalyst used in EBOne and CDTech EB process.

Pemangkin digunakan di dalam reaktor untuk meningkatkan kadar tindakbalas. Terangkan kelebihan pemangkin yang digunakan dalam proses EBOne dan CDTech EB.

[10 marks]
[10 markah]

CLO1
C4

- (d) This reactor only consist in CDTech EB process. Discuss the function of the reactor.

Reaktor ini hanya terdapat pada CDTech EB. Bincangkan fungsi reaktor tersebut.

[5 marks]
[5 markah]

QUESTION 2**SOALAN 2**CLO2
C1

- (a) Explain the function of the following equipments in UOP/Hydro MTO process :

Terangkan fungsi bagi peralatan-peralatan proses 'UOP/Hydro MTO' berikut :

- i) Caustic wash / Larutan soda kaustik
- ii) Quench tower / Menara penyejuk
- iii) Reactor / Reaktor

[5 marks]
[5 markah]

CLO2
C2

- (b) In the fractionation of UOP/Hydro MTO process, products are separated from the by-products components. Identify the influent and effluent of the C₂ splitter and C₃ splitter.

Dalam proses pemeringkatan oleh UOP/Hydro, hasil utama dipisahkan daripada hasil sampingan. Kenalpasti influen dan efluen yang keluar dari C₂ 'splitter' dan C₃ 'splitter'.

[5 marks]
[5 markah]

CLO2
C3

(c) i)

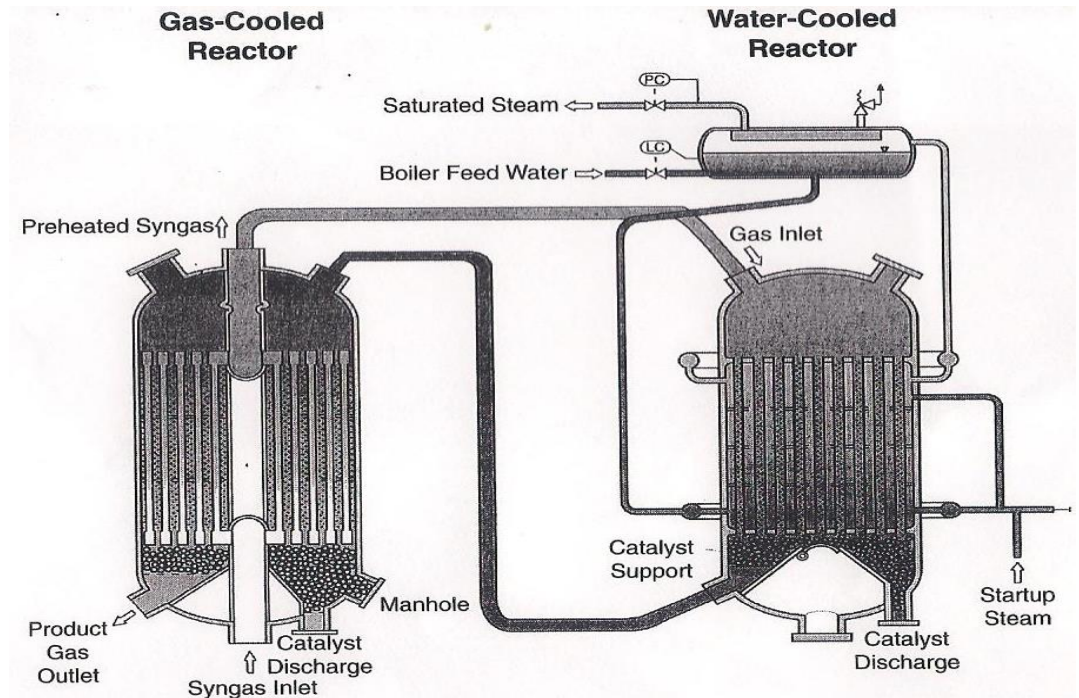


Diagram 1/Rajah 1

In the Lurgi MegaMethanol process, methanol is synthesized from hydrogen, carbon dioxide and carbon monoxide in the presence of a highly selective copper-based catalyst as shown in Diagram 1. Discuss the combined converter synthesis used to convert syngas to methanol.

Dalam proses Lurgi MegaMethanol, methanol dihasilkan dari hidrogen, karbon dioksida dan karbon monoksida dengan kehadiran 'copper-based catalyst' yang sangat selektif seperti yang ditunjukkan pada Rajah 1. Bincangkan 'combined converter synthesis' yang digunakan untuk menukarkan syngas kepada methanol.

[5 marks]

[5 markah]

- ii) Draw and label the methanol distillation section in Lurgi MegaMethanol Technology.

Lukis dan label bahagian penyulingan methanol dalam Teknologi Lurgi MegaMethanol.

[10 marks]

[10 markah]

QUESTION 3

SOALAN 3

CLO1
C1

- (a) i) Name the process occur in the reactor of classic styrene.

Namakan proses yang berlaku dalam reactor pada 'classic styrene'.

[2 marks]
[2 markah]

- ii) List **THREE (3)** side products in styrene monomer reactions.

*Senaraikan **TIGA (3)** hasil sampingan dalam tindakbalas 'styrene monomer'.*

[3 marks]
[3 markah]

CLO1
C2

- (b) Describe the SMART styrene reactor system.

Huraikan tentang sistem reactor 'SMART styrene'.

[5 marks]
[5 markah]

CLO1
C3

- (c) Explain the flow process of PxMax reaction section from raw material to the finishing product.

Terangkan aliran proses bahagian tindakbalas PxMax bermula dari bahan mentah sehingga ke hasil akhir.

[10 marks]
[10 markah]

CLO1
C4

- (d) Differentiate between classic and SMART styrene process.

Bezakan antara proses 'classic' dan 'SMART styrene'.

[5 marks]
[5 markah]

QUESTION 4

SOALAN 4

CLO2
C1

- (a) i) List **TWO (2)** families of linear polyethylene.

Senaraikan DUA (2) keluarga 'linear polyethylene'.

[2 marks]
[2 markah]

- ii) State **THREE (3)** safety features in Spherilene process plant design.

Nyatakan TIGA (3) ciri-ciri keselamatan dalam reka bentuk loji proses Spherilene.

[3 marks]
[3 markah]

CLO2
C2

- (b) Write the chemical reaction involved in Spherilene process and name the catalyst involved.

Tuliskan tindakbalas kimia yang melibatkan proses Spherilene dan namakan pemangkin yang terlibat.

[5 marks]
[5 markah]

CLO2
C3

- (c) i) Draw and label the flow process diagram of **UNIPOL** polypropylene process.

Lukis dan labelkan gambarajah aliran proses bagi proses UNIPOL 'polypropylene'.

[9 marks]
[9 marks]

- ii) After polymerization process is completed, polymer is sent to the next steps. Illustrate the sequence of the process involved.

Selepas proses pempolimeran telah selesai, polimer dihantar ke proses akan seterusnya. Lakarkan urutan proses yang terlibat.

[6 marks]

[6 marks]

SOALAN TAMAT