

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) Define adsorption and give **ONE (1)** example of adsorption process.

Takrifkan penjerapan dan berikan SATU (1) contoh proses penjerapan.

[3 marks]

[3 markah]

CLO1

C2

- (b) Distillation device includes two major categories: tray and packing.

Alatan penyulingan termasuk dua kategori utama: dulang dan padatan.

- i. Explain the function of tray and packing.

Terangkan fungsi dulang dan padatan.

[4 marks]

[4 markah]

- ii. Explain the two types of distillation; batch distillation and continuous distillation.

Terangkan dua jenis penyulingan; penyulingan kelompok dan penyulingan berterusan.

[4 marks]

[4 markah]

CLO2
C3

- (c) Diagram 1(c) shows the process flow of the absorption of solute-rich feed gas mixture.

Rajah 1(c) menunjukkan aliran proses penyerapan campuran gas masukan yang mengandungi bahan larut.

- i. Explain **THREE (3)** principles of absorption rate.

Terangkan TIGA (3) prinsip kadar penyerapan.

[6 marks]

[6 markah]

- ii. Provide the process description in equipment (a) and equipment (b).

Berikan penjelasan proses dalam alatan (a) dan alatan (b).

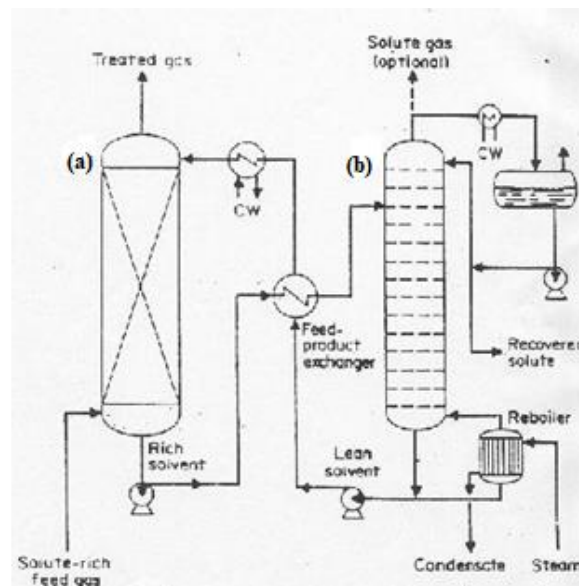


Diagram 1(c) / Rajah 1(c)

[8 marks]

[8 markah]

QUESTION 2

SOALAN 2

CLO1
C1

- (a) List **THREE (3)** types of crude oil.

Senaraikan TIGA (3) jenis minyak mentah.

[3 marks]

[3 markah]

CLO1
C2

- (b) Explain the function of Catalytic Cracking Unit and Hydrotreating Unit.
Terangkan fungsi Unit Pemecahan Bermangkin dan Unit Hydrotreating.

[8 marks]

[8 markah]

CLO2
C3

- (c) A catalyst is required in catalytic reforming process in oil refinery plant. The operating conditions promote three different chemical reactions in catalytic reformer as shown in Diagram 2(c).

Pemangkin diperlukan dalam proses pembentukan bermangkin di loji penapisan minyak. Keadaan semasa beroperasi menghasilkan tiga tindakbalas kimia yang berbeza dalam reaktor pembentukan semula seperti yang ditunjukkan dalam Rajah 2(c).

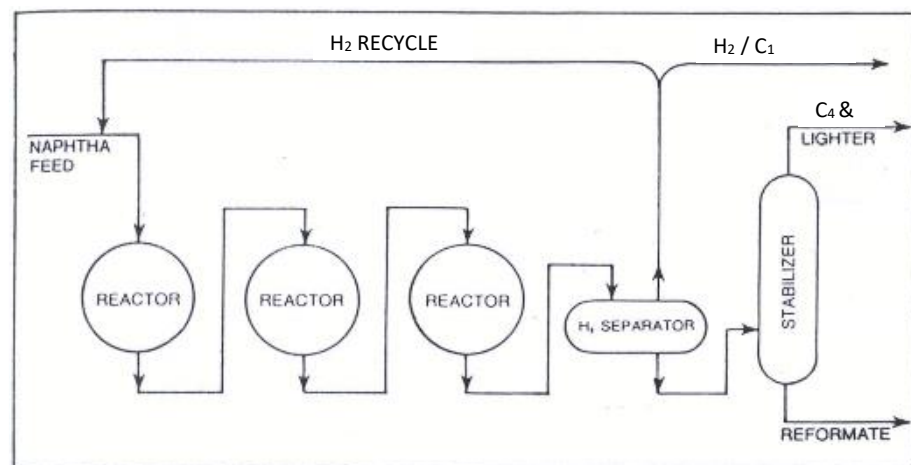


Diagram 2(c) / Rajah 2(c)

- i. Use Diagram 2(c) to explain the function of reactors and H₂ separator in this process unit.

Gunakan Rajah 2(c) untuk menerangkan fungsi reaktor dan pemisah H₂ dalam unit proses ini.

[6 marks]

[6 markah]

- ii. Write three good chemical reactions that occur in the catalytic reforming process.

Tuliskan tiga tindakbalas kimia baik yang berlaku dalam proses pembentukan semula bermangkin.

[8 marks]

[8 markah]

QUESTION 3

SOALAN 3

CLO1
C1

- (a) State **THREE (3)** factors to be considered in designing a gas processing plant.

*Nyatakan **TIGA (3)** factor yang perlu diambil kira dalam mereka bentuk loji pemprosesan gas.*

[3 marks]

[3 markah]

CLO1
C2

- (b) The gas processing plant in Terengganu is located in Kerteh, Terengganu.

Loji pemprosesan gas di Terengganu terletak di Kerteh, Terengganu.

- i. Explain **TWO (2)** reasons it was designed and built in Malaysia.

*Jelaskan **DUA (2)** alasan ianya direka dan dibina di Malaysia.*

[4 marks]

[4 markah]

- ii. In the table form, compare sales gas product (methane & ethane) and propane & butane product in terms of chemical formula and uses.

Dalam bentuk jadual, bandingkan produk gas jualan (metana & etana) dan produk propane & butana dari formula kimia dan kegunaan.

[4 marks]

[4 markah]

CLO2
C3

- (c) Sketch the butane process flow diagram in Product Recovery Unit with complete labels.

Lakarkan gambarajah aliran proses butana dalam Product Recovery Unit dengan label yang lengkap.

[14 marks]

[14 markah]

QUESTION 4

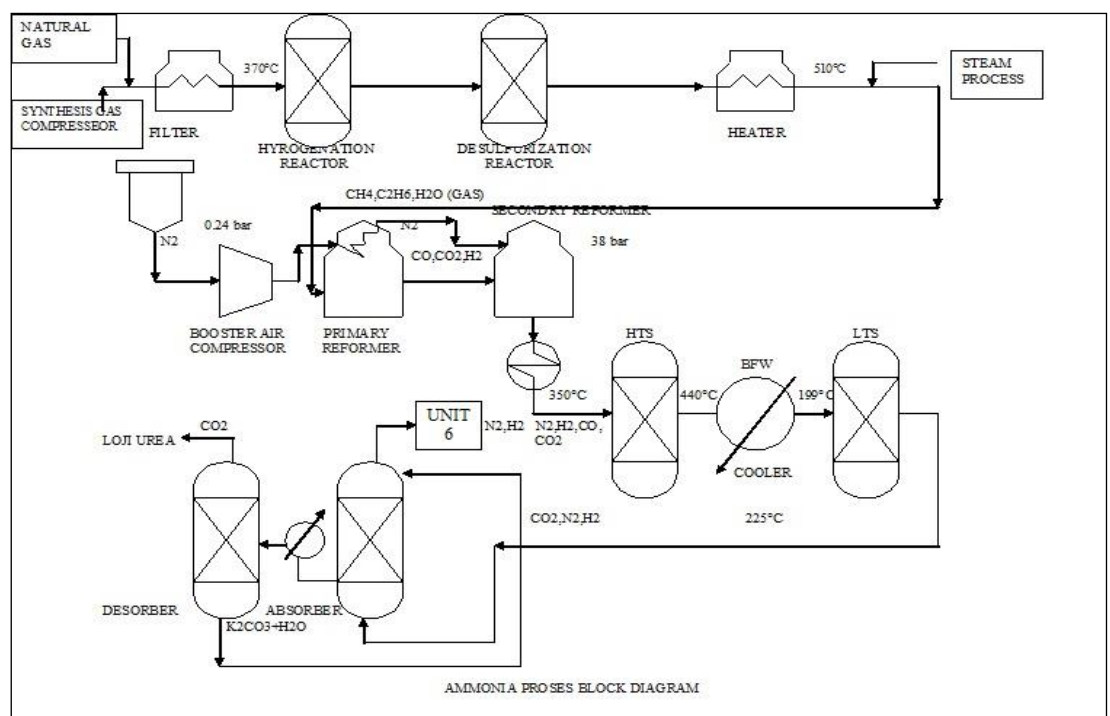
SOALAN 4

CLO1
C1

- a) With the help of Diagram 4(a), list **THREE (3)** major equipment in CO Conversion Unit.
 Dengan bantuan Rajah 4(a), senaraikan **TIGA (3)** alatan utama dalam Unit Penukaran CO.

[3 marks]

[3 markah]

CLO1
C2

- b) With the help of Diagram 4(a), explain the following functions:
 Dengan bantuan Rajah 4(a), terangkan fungsi berikut:

- i. CO₂ Removal Unit
 Unit Penyingkiran CO₂

[4 marks]

[4 markah]

- CLO2
C3
- ii. Process Air Compression Unit
Unit Proses Pemampatan Udara
- [4 marks]
[4 markah]
- c) With the help of Diagram 4(a), sketch the following process flow with complete labels:
Dengan bantuan Rajah 4(a), lakar aliran proses berikut dengan label yang lengkap:
- i. Desulphurization Unit
Unit Penyahsulfuran.
- [6 marks]
[6 markah]
- ii. CO Conversion Unit
Unit Penukaran CO.
- [8 marks]
[8 markah]

SOALAN TAMAT