

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

- (a) Name **THREE (3)** common types of adsorbents used in adsorption process.
*Namakan **TIGA (3)** jenis penyerap yang biasa digunakan dalam proses penyerapan.*

[3 marks]

[3 markah]

- (b) Extraction may be used to separate more than two components by using solvents that are needed in some applications.

Pengekstrakan boleh digunakan untuk memisahkan lebih daripada dua komponen dengan menggunakan pelarut yang diperlukan dalam beberapa aplikasi.

CLO1

- i. Explain the definition of liquid-liquid extraction.

Terangkan definisi pengekstrakan cecair-cecair.

[4 marks]

[4 markah]

- ii. Explain **TWO (2)** applications of extraction process in industry.

*Terangkan **DUA (2)** aplikasi proses pengekstrakan dalam industri.*

[4 marks]

[4 markah]

- (c) Absorption process is used to separate a soluble gas in the solution.
Proses penyerapan digunakan untuk memisahkan gas terlarut dalam larutan.

- i. Sketch a design with complete label of an absorption column.
Lakarkan reka bentuk beserta label yang lengkap turus penyerapan.

[6 marks]

[6 markah]

- ii. Expose the absorption process of soluble gas based on Figure 1 (c).
Dedahkan proses penyerapan gas terlarut berpandukan Rajah 1 (c).

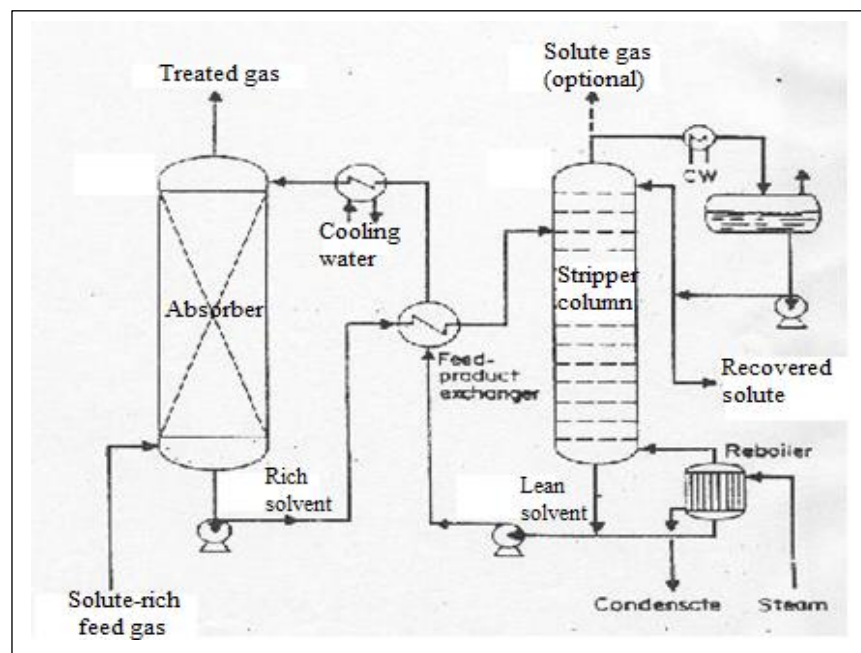


Diagram 1 (c) / Rajah 1 (c)

[8 marks]

[8 markah]

QUESTION 2

SOALAN 2

- CLO1 (a) List **THREE (3)** equipments used in crude oil distillation process.
*Senaraikan **TIGA (3)** alatan yang digunakan dalam proses penyulingan minyak mentah.*
- [3 marks]
[3 markah]
- CLO1 (b) Explain the function of the followings:
Terangkan fungsi berikut:
- i. Trays
Dulang
- [4 marks]
[4 markah]
- ii. Bubble caps
Tukup gelembung
- [4 marks]
[4 markah]
- CLO2 (c) Based on Diagram 2 (c),
Berpandukan Rajah 2 (c).
- i. Write the chemical reaction that takes place in the regenerator.
Tuliskan tindakbalas kimia yang berlaku dalam alat penjana semula.
- [6 marks]
[6 markah]

- ii. Expose the process occurred in the reaction chamber.
Dedahkan proses yang berlaku dalam kebuk pembakaran.

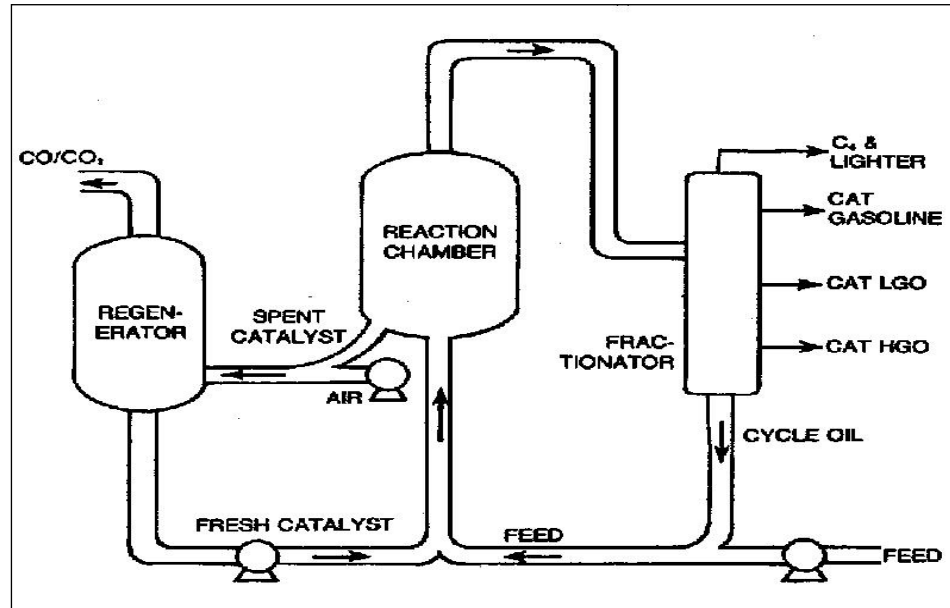


Diagram 2 (c) / Rajah 2 (c)

[8 marks]

[8 markah]

QUESTION 3**SOALAN 3**

CLO1

- (a) List **THREE (3)** out of five units in gas processing plant.

*Senaraikan **TIGA (3)** dari lima unit proses di loji pemprosesan gas.*

[3 marks]

[3 markah]

CLO1

- (b) The gas in Kerteh Terengganu is processed to separate hydrocarbons and produced hydrocarbon fractions such as methane, ethane, propane, butane and condensate.

Gas di Kerteh Terengganu diproses untuk memisahkan hidrokarbon dan menghasilkan pecahan hidrokarbon seperti metana, etana, propana, butana dan kondensat.

- i. Explain the chemical formula of methane and butane product.

Jelaskan formula kimia produk metana dan butane.

[4 marks]

[4 markah]

- ii. In the form of table, compare methane and butane product in terms of the density and carbon chain.

Dalam bentuk jadual, bandingkan produk metana dan butana dari segi ketumpatan dan rantai karbon.

[4 marks]

[4 markah]

CLO2

- (c) In Acid Gas Removal Unit, the gas from DPCU and LPGU is heated in six heat exchangers and further heated in the reactor feed heater and the gas flows through four zinc oxide reactors.

Dalam Unit Penyingkiran Gas Asid, gas dari DPCU dan LPGU dipanaskan dalam enam penukar haba dan selanjutnya dipanaskan dalam pemanas suapan reaktor dan gas mengalir melalui empat reaktor zink oksida.

- i. Write the chemical reaction of hydrogen sulphide removal that takes place in the reactor.

Tuliskan tindakbalas kimia penyingkiran hidrogen sulfida yang berlaku dalam reaktor.

[6 marks]

[6 markah]

- ii. Sketch with complete labels a process flow diagram of Acid Gas Removal Unit.

Lakar dengan label yang lengkap gambarajah aliran proses Unit Penyingkiran Gas Asid.

[8 marks]

[8 markah]

QUESTION 4**SOALAN 4**

CLO1

- a) List **THREE (3)** applications of ammonia in industries.
*Senaraikan **TIGA (3)** aplikasi ammonia dalam industri.*

[3 marks]

[3 markah]

CLO1

- b) Explain the function of the following units:
Terangkan fungsi unit-unit berikut:

- i. CO Conversion Unit.
Unit Penukaran CO.

[4 marks]

[4 markah]

- ii. CO₂ Removal Unit.
Unit Penyingkiran CO₂.

[4 marks]

[4 markah]

CLO2

- c) Based on Figure 4 (c), sketch a process flow diagram of the followings units:
Berdasarkan Rajah 4 (c), lakarkan gambarajah aliran proses unit-unit berikut:

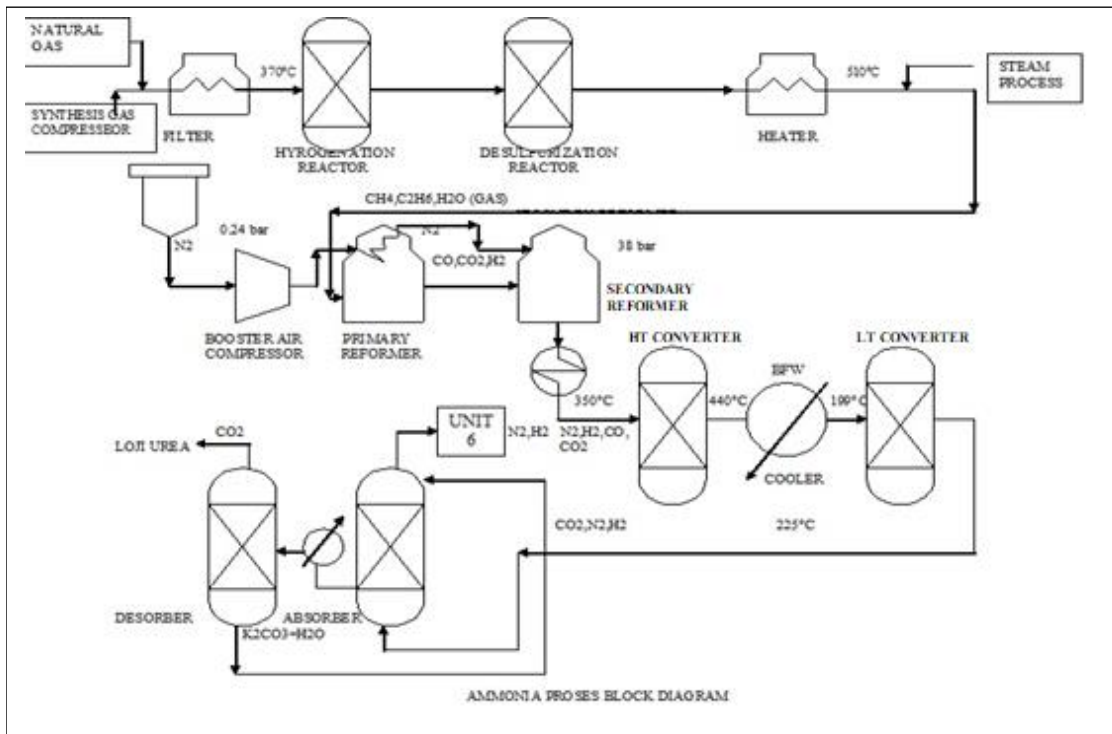


Diagram 4 (c) /Rajah 4 (c)

- i- CO₂ Removal Unit.
Unit Penyingkiran CO₂.

[6 marks]

[6 markah]

- ii- CO Conversion Unit.
Unit Penukaran CO.

[8 marks]

[8 markah]

SOALAN TAMAT