

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
C1

- (a) Piping and Instrumentation Diagram is the most important document that frequently used by process operator. List **FOUR (4)** knowledge in piping and instrumentation diagram.

*Lukisan Perpaipan dan Instrumentasi adalah dokumen penting yang selalu digunakan oleh operater pemprosesan. Senaraikan **EMPAT (4)** pengetahuan tentang gambar rajah perpaipan dan instrumentasi..*

[4 marks]

[4 markah]

(b)

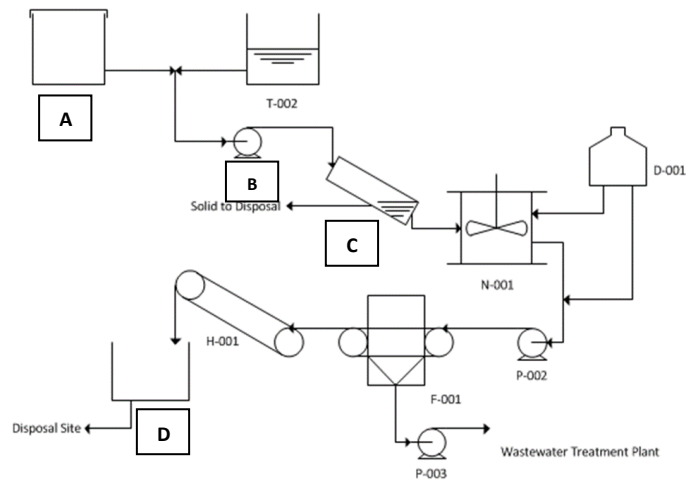


Diagram 1(a)

Rajah 1(a)

Diagram 1 (a) shows the wastewater liquid treatment plant. By referring to the diagram:

Rajah 1(a) menunjukkan loji rawatan air sisa kumbahan. Dengan merujuk kepada rajah tersebut:

CLO1
C2

i. Categorize the diagram.

Kategorikan rajah tersebut.

[2 marks]

[2 markah]

CLO1
C2

ii. Explain the function of A to D.

Terangkan fungsi A hingga D.

[8 marks]

[8 markah]

CLO1
C3

(c) Sketch the instrumentation symbol below:

Lakarkan simbol instrumentasi berikut:

- i. Flow recording controller with tag number 103 mounted on the panel inside the control room.

'Flow recording controller' dengan nombor 103 dipasang pada panel di dalam bilik kawalan.

[3 marks]

[3 markah]

- ii. Level controller, Interface with tag number 12 is mounted behind the panel in the control room.

'Level controller, Interface' dengan nombor tag 12 dipasang di belakang panel di dalam bilik kawalan.

[3 marks]

[3 markah]

- iii. Temperature indicator with tag number 203 is mounted onto the board inside the plant.

'Temperature indicator' dengan nombor tag 203 dipasang di papan di dalam loji.

[3 marks]

[3 markah]

- iv. A storage tank is commonly used to store large quantities of petroleum products such as crude oil. The roof will rise and fall with the liquid level on the surface of liquid. The function of the roof is to reduce the evaporative loss of the stored.

Sebuah tangki simpanan biasanya digunakan untuk menyimpan kuantiti yang besar produk petroleum seperti minyak mentah. Bumbung tangki akan naik dan turun mengikut paras cecair pada permukaan cecair. Fungsi bumbung ialah untuk mengurangkan kehilangan penyejatan yang bahan tersimpan.

[2 marks]

[2 markah]

QUESTION 2**SOALAN 2**CLO2
C1

- (a) Block Flow Diagram (BFD) is used for a preliminary or basic processing concept without detail in illustration process book or catalogue. It is often used in management survey studies, research summaries and process proposal.

State **FOUR (4)** characteristics of BFD.

*Rajah Aliran Blok (BFD) digunakan untuk konsep pemprosesan awal atau asas tanpa terperinci dalam buku proses ilustrasi atau katalog. Ia sering digunakan dalam kajian kaji selidik pengurusan, ringkasan penyelidikan dan cadangan proses. Nyatakan **EMPAT (4)** ciri-ciri BFD.*

[4 marks]

[4 markah]

CLO2
C2

- (b) Discuss the differences between process flow diagram and utility flow diagram.

Bincangkan perbezaan antara rajah aliran proses dan rajah aliran utiliti.

[4 marks]

[4 markah]

Toluene and hydrogen are converted in a reactor to produce benzene and methane. The reaction does not go to completion, and excess toluene is required. The non-condensable gases are separated in gas separator. The benzene product and the unreacted toluene are then separated by distillation. The toluene is then recycled back to the reactor and the benzene removed in the product stream.

Toluena dan hidrogen ditukar dalam reaktor untuk menghasilkan benzena dan metana. Tindak balas tidak lengkap berlaku, dan toluena yang berlebihan diperlukan. Gas yang tidak terkondensasi dipisahkan dalam pemisah gas. Produk benzena dan toluena yang tidak bertindak balas kemudian dipisahkan melalui penyulingan. Toluena kemudian dikitar semula ke reaktor dan benzena dikeluarkan dalam aliran produk.

CLO2
C2

- (c) By referring to the statement above, convert the process into block flow diagram.

Dengan merujuk pernyataan di atas, tukarkan proses kepada rajah aliran blok.

[6 marks]

[6 markah]

CLO2
C3

(d)

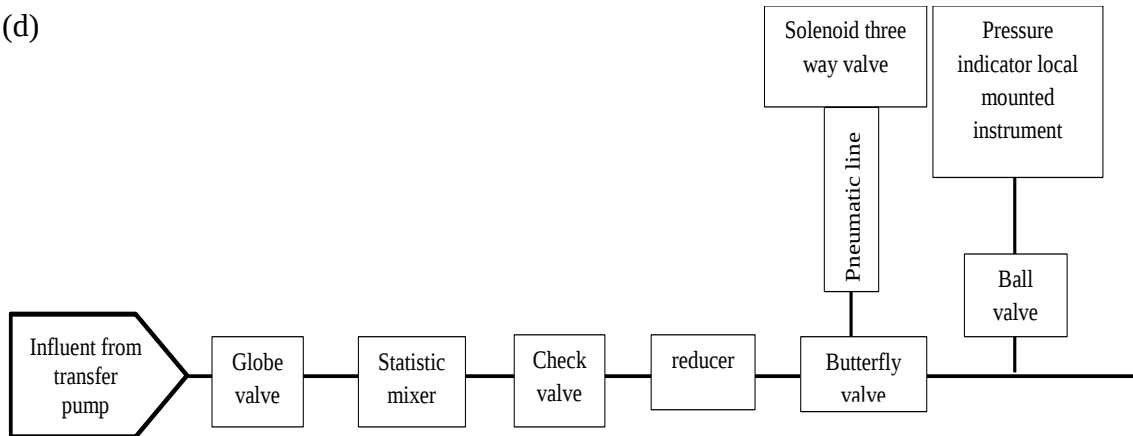


Diagram 2(c)

Rajah 2(c)

Based on the **Diagram 2(c)**, change the block flow diagram to process flow diagram.

Berdasarkan **Rajah 2(c)**, tukarkan rajah aliran blok kepada gambar rajah aliran proses.

[11 marks]

[11 markah]

QUESTION 3**SOALAN 3**

- | | |
|------------|---|
| CLO1
C1 | <p>(a) Give TWO (2) importance of Piping and Instrumentation Diagram (PIS).
<i>Berikan DUA (2) kepentingan Sistem Pengenalan Perpaipan (SPP).</i></p> <p style="text-align: right;">[4marks]
[4 markah]</p> |
| CLO1
C2 | <p>(b) Insulation type such as steam tracing, personnel protection and heat conservation is one of the important sections in Piping Identification System (PIS). Compare the function of steam tracing and personnel protection.
<i>Jenis penebat seperti 'steam tracing', 'personnel protection' dan 'heat conservation' adalah salah satu seksyen penting dalam Sistem Pengenalan Perpaipan (SPP). Bandingkan fungsi penebat 'steam tracing' dan 'personnel protection'.</i></p> <p style="text-align: right;">[4 marks]
[4 markah]</p> |
| CLO1
C2 | <p>(c) P - 18" - 1H3 - 02077 - P – 65
Interpret the Piping Identification System (PIS) above.
<i>Interpretasikan Sistem Pengenalan Perpaipan (SPP) di atas.</i></p> <p style="text-align: right;">[6 marks]
[6 markah]</p> |

CLO1
C3

(d) Write the Piping Identification System (PIS) for the data below.

Tuliskan Sistem Pengenalan Perpaipan(SPP) bagi data di bawah.

- i. A pipe with the acid properties 78A and 1H flows is located in unit 21 and pipeline 54. The pipe is also equipped with 76mm thickness of heat conservation insulation and steam tracing.

Satu paip dengan aliran asid mempunyai spesifikasi 78A dan 1H berada di unit 21 dan paip 54. Paip tersebut dilengkapi dengan penebat setebal 76mm jenis 'heat conversation' dan 'steam tracing'.

[6 marks]

[6 markah]

- ii. If pipe is installed with 32mm heat conservation insulation.

Jika paip dipasang dengan penebat 32mm dan penebat pengekalan haba.

[5 marks]

[5 markah]

QUESTION 4

SOALAN 4

CLO1
C1

- (a) List **THREE(3)** importance of instrumentation and interlock system in piping and instrumentation diagram.

*Senaraikan **TIGA(3)** kepentingan sistem instrumentasi dan 'interlock' dalam rajah perpaipan dan instrumentasi.*

[3 marks]

[3 markah]

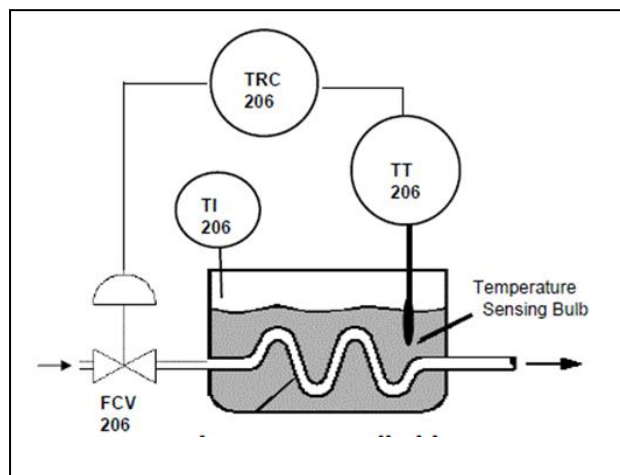


Diagram 4(b)

Rajah 4(b)

A temperature-controlled system as shown in **Diagram 4(b)** is a type of control system that automatically controls the temperature of an object or an area. The temperature is automatically adjusted as per the input settings.

*Sistem kawalan suhu seperti ditunjukkan dalam **Rajah 4(b)** adalah sejenis sistem kawalan yang secara automatik mengawal suhu objek atau kawasan. Suhu disesuaikan secara automatik seperti tetapan input.*

CLO2
C2

- (b) Explain the function of all control system above.

Terangkan fungsi semua system kawalan di atas.

[6 marks]

[6 markah]

CLO2
C2

- (c) Discuss the type of loop system if Temperature Recording Controller (TRC) is removed.

Ramalkan jenis sistem gegelung yang wujud jika TRC dialihkan.

[4 marks]

[4 markah]

(d)

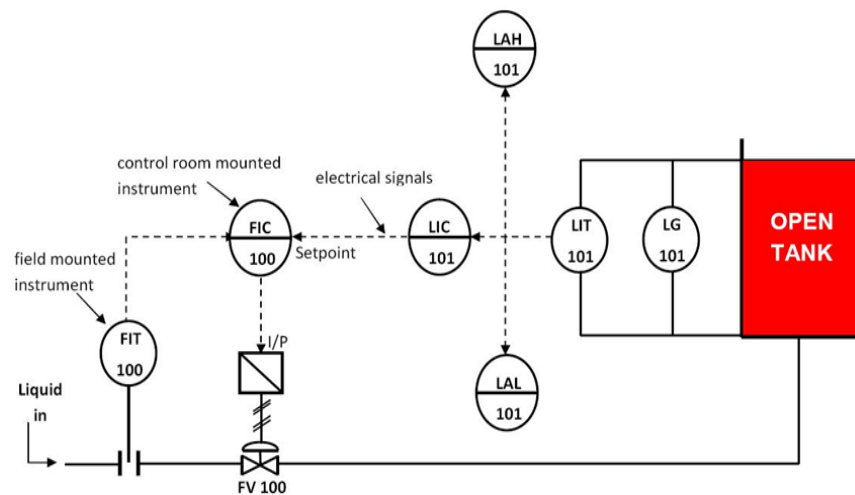


Diagram 4(d)

Rajah 4(d)

- i. Show **THREE (3)** kinds of signals that are represented in **Diagram 4(d)**.

*Tunjukkan **TIGA (3)** jenis signal yang terdapat dalam **Rajah 4(d)**.*

[3 marks]

[3markah]

- ii. Examine the type of control system and instrumentation used in the above diagram.

Periksa jenis system kawalan berserta instrumen dalam gambarajah di atas.

[9 marks]

[9 markah]

SOALAN TAMAT