

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) Pumps are very important pieces of equipment used in industries such as oil & gas, agriculture, mining and manufacturing.

Pam adalah peralatan penting yang digunakan dalam industri seperti minyak & gas, pertanian, perlombongan dan pembuatan.

(i) Give the definition of pump.

Berikan definisi bagi pam.

[1 mark]

[1 markah]

(ii) Draw the symbols of screw pump, centrifugal pump and vacuum pump.

Lukiskan simbol bagi pam skru, pam empur dan pam vakum.

[3 marks]

[3 markah]

CLO1
C2

(b) Line symbols are used to show the primary and secondary flow paths in the flow diagram. Describe the function of the line symbols below.

Simbol garisan digunakan untuk menunjukkan laluan aliran utama dan sekunder. Terangkan fungsi simbol garisan dibawah.

(i)



[3 marks]

[3 markah]

(ii)



[3 marks]

[3 markah]

CLO1
C2

(c) Based on **Diagram 1(c)**, explain the function of the equipment denoted by labelling A,B,C,D, and E in the process flow diagram below.

Berdasarkan Gambarajah 1(c), terangkan fungsi bagi peralatan yang dilabelkan A,B,C,D dan E di dalam gambarajah aliran proses di bawah..

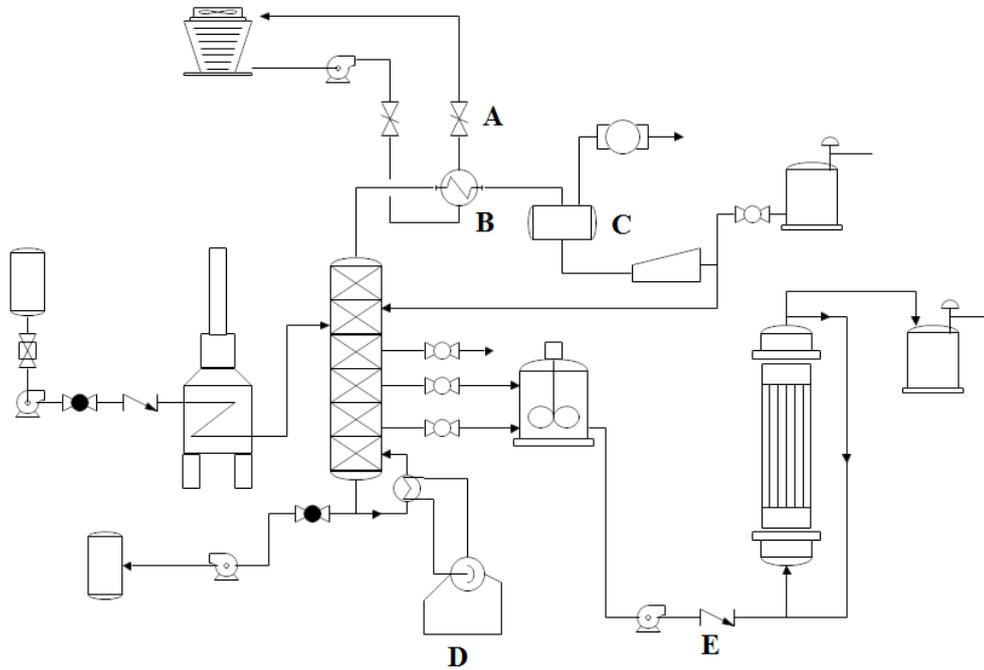


Diagram 1(c)

Gambarajah 1(c)

[7 marks]

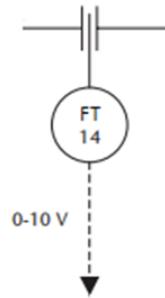
[7 markah]

CLO1
C3

(d) Interpret the following symbols of instrumentation:

Tafsirkan simbol bagi instrumentasi berikut:

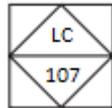
(i)



[4 marks]

[4 markah]

(ii)



[4 marks]

[4 markah]

QUESTION 2**SOALAN 2**CLO1
C1

(a) Process Flow Diagram (PFD) is a schematic drawing which showing the process flow paths and equipment's arrangement in a plant. List **FOUR (4)** standard material balance data that should be included in a process flow sheet.

*Gambarajah Aliran Proses (PFD) adalah lukisan skematik yang menunjukkan laluan aliran proses dan susunan peralatan di loji. Senaraikan **EMPAT (4)** data keseimbangan bahan yang perlu dimasukkan dalam lembaran aliran proses.*

[4 marks]

[4 markah]

CLO1
C2

(b) Describe **THREE (3)** differences between Block Flow Diagram (BFD) and Process Flow Diagram (PFD).

*Terangkan **TIGA (3)** perbezaan diantara Gambarajah Aliran Blok dan Gambarajah Aliran Proses.*

[6 marks]

[6 markah]

CLO1
C2

(c) Based on **Diagram 2(c)** below, explain the separation process of ammonia from ammonia-air mixtures as shown in the Block Flow Diagram.

Berdasarkan Gambarajah 2(c) di bawah, huraikan proses pemisahan ammonia daripada campuran ammonia-udara seperti yang ditunjukkan di dalam Gambarajah Aliran Blok.

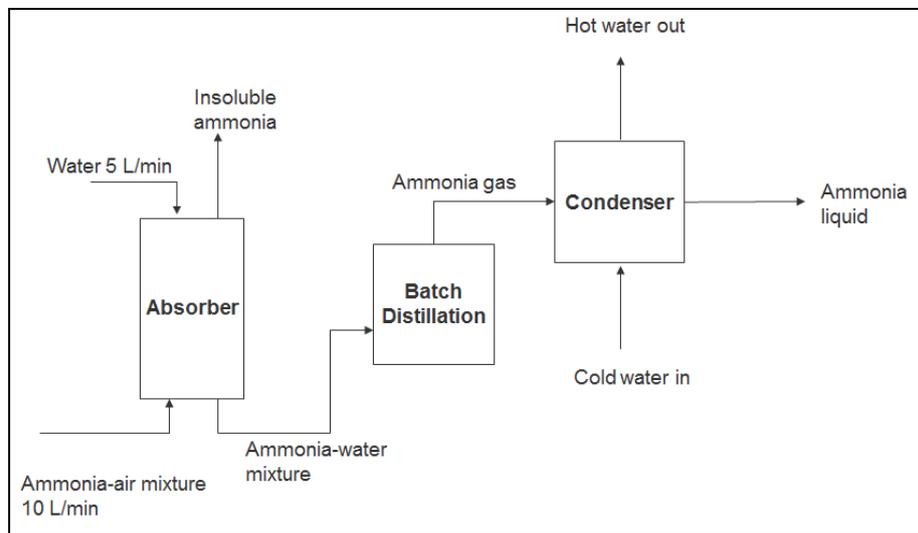


Diagram 2(c)

Gambarajah 2(c)

[7 marks]

[7 markah]

CLO1
C3

(d) Based on **Diagram 2(d)**, convert a Block Flow Diagram into a Process Flow Diagram.

Berdasarkan Gambarajah 2(d), tukarkan Gambarajah Aliran Blok kepada Gambarajah Aliran Proses.

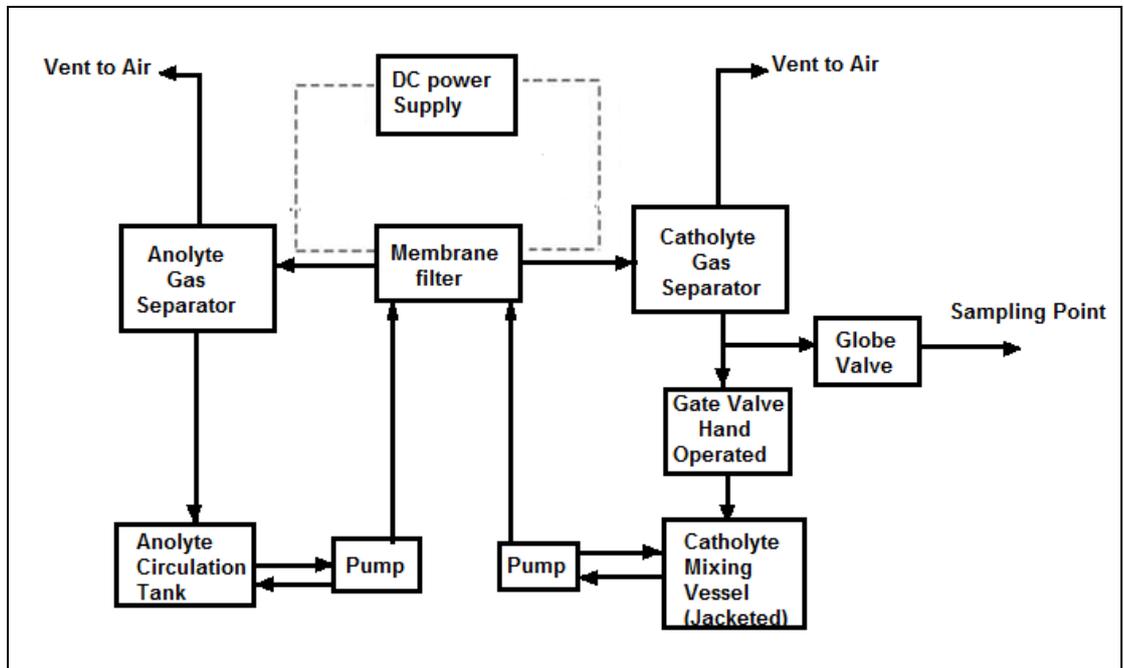


Diagram 2(d)

Gambarajah 2(d)

[8 marks]

[8 markah]

QUESTION 3**SOALAN 3**CLO1
C1

(a) Piping and Instrumentation Diagram (P&ID) is a schematic diagram which showing piping, equipment and instrumentation arrangement of a plant. State **FOUR (4)** usage of the diagram.

Gambarajah Pempaipan Dan Instrumentasi (P&ID) adalah gambarajah skematik yang menunjukkan susunan paip, peralatan dan instrumentasi suatu loji. Nyatakan EMPAT (4) kegunaan gambarajah tersebut.

[4 marks]

[4 markah]

CLO1
C2

(b) Explain the Piping Identification System (PIS) below :

Terangkan mengenai Sistem Pengenalan Paip berikut:

LSC-1¹/₂"-3P2-01005-P-40

[6 marks]

[6 markah]

CLO1
C2

- (c) In unit 10 of the oil refinery plant, a pipe with diameter of 50 mm and material specifications 1H3 are found to bring heavy naphtha into the next unit. The pipe is equipped with 84 mm personal protection insulation. The line is located at number 122. Identify the Piping Identification System (PIS) for the pipeline.

Pada unit 10 dalam loji penapisan minyak, suatu paip dengan diameter 50 mm dan spesifikasi bahan 1H3 didapati membawa nafta berat ke unit seterusnya. Paip ini dilengkapi dengan penebat perlindungan diri berukuran 84mm. Paip ini berada pada kedudukan 122. Kenalpasti Sistem Pengenalan Paip bagi barisan tersebut.

[6 marks]

[6 markah]

CLO1
C3

(d) In industry, piping is a system used to convey fluids (liquids and gases) from one location to another. Based on **Appendix 1**,

*Dalam industri, sistem perpaipan digunakan untuk menyalurkan bendalir (cecair dan gas) dari satu lokasi ke lokasi yang lain. Berdasarkan **Lampiran 1**,*

(i) List **SEVEN (7)** Piping Identification System for pipelines which conveys utilities in the process plant.

*Senaraikan **TUJUH (7)** Sistem Pengenalan Paip bagi talian paip yang menyalurkan utiliti di dalam loji proses tersebut.*

[7 marks]

[7 markah]

(ii) Interpret the type and thickness of insulation used based on the Piping Identification System listed in (i) (if any).

Tafsirkan jenis dan ketebalan penebat yang digunakan berdasarkan Sistem Pengenalan Paip yang telah disenaraikan dalam (i) (jika ada).

[2 marks]

[2 markah]

QUESTION 4**SOALAN 4**CLO1
C1

(a) A control system manages, commands, directs, or regulates the behavior of other devices or systems using control loops. There are two common classes of control action which are open loop and closed loop. State **THREE (3)** characteristics of an open loop control system.

*Suatu sistem kawalan mengurus, mengarah, atau mengawal atur tingkah laku peranti atau sistem lain menggunakan gelung kawalan. Terdapat dua jenis tindakan kawalan iaitu gelung terbuka dan gelung tertutup. Nyatakan **TIGA (3)** ciri-ciri sistem kawalan gelung terbuka.*

[3 marks]

[3 markah]

CLO1
C2

(b) Based on **Diagram 4(b)** shown below:

Berdasarkan **Rajah 4(b)** di bawah:

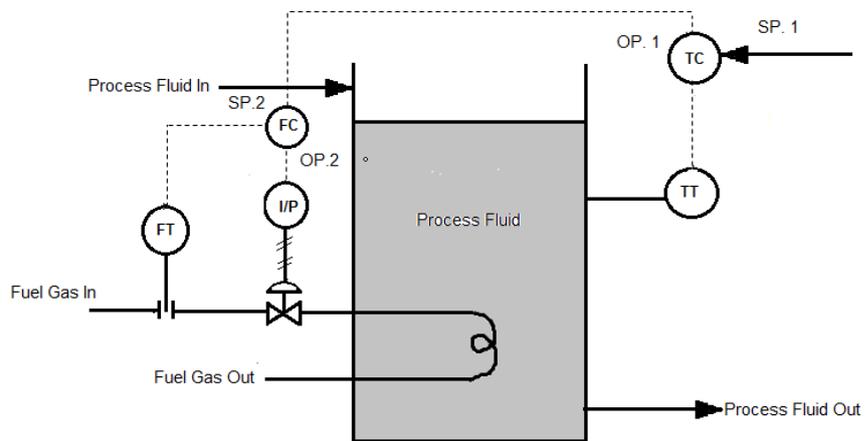


Diagram 4(b)

Rajah 4(b)

(i) Determine the type of control system used.

Tentukan jenis sistem kawalan yang digunakan..

[1 mark]

[1 markah]

(ii) Identify the measured variable and manipulated variable.

Kenalpasti pembolehubah yang diukur dan pembolehubah yang dimanipulasi.

[2 marks]

[2 markah]

(iii) Describe briefly the mechanism of the control system involved.

Terangkan secara ringkas mekanisma sistem kawalan yang terlibat.

[2 marks]

[2 markah]

The following questions are based on the flow diagram given in **Appendix 1**.

Soalan berikut adalah berdasarkan kepada gambarajah aliran yang diberikan dalam

Lampiran 1

CLO1
C2

(c) Identify **FIVE (5)** types of valves shown in the Piping And Instrumentation Diagram.

*Kenalpasti **LIMA (5)** jenis injap yang terdapat di dalam Gambarajah Pempaipan dan Instrumentasi tersebut.*

[5 marks]

[5 markah]

CLO1
C3

(d) At equipment EB-0106 Regenerant Cooler;

Pada peralatan EB-0106 “Regenerant Cooler”;

(i) Interpret the instrumentation used at loop number 1509 and 1109.

Tafsirkan instrumentasi yang digunakan pada nombor gelung 1509 dan 1109.

[4 marks]

[4 markah]

(ii) Explain briefly the cooling process of superheated regenerant vapor through EB-0106 Regenerant Cooler.

Terangkan secara ringkas proses penyejukan bagi “superheated regenerant vapor” melalui EB-0106 “Regenerant Cooler”.

[5 marks]

[5 markah]

(iii) **Interpret** the abbreviations for LO and **explain** its function.

[3 marks]

Tafsirkan singkatan LO dan jelaskan fungsinya.

[3 markah]

SOALAN TAMAT