

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 | <p>(a) Define the following items:
<i>Takrifkan perkara berikut</i></p> <p>i) Point Source
<i>Punca Titik</i></p> <p style="text-align: right;">[2 marks]
[2 markah]</p> <p>ii) Non-Point Source
<i>Bukan Punca Titik</i></p> <p style="text-align: right;">[2 marks]
[2 markah]</p> |
| CLO1 | <p>(b) The Clean Water Act (CWA) establishes the structure for regulating the discharge of pollutants and surface water quality by the Environmental Protection Agency. Discuss TWO (2) national goals for the introduction of the clean water act.
<i>Akta Air Bersih (CWA) menetapkan struktur untuk mengawal pelepasan bahan pencemar dan kualiti air permukaan oleh Agensi Perlindungan Alam Sekitar. Bincangkan DUA (2) matlamat kebangsaan akta air bersih diperkenalkan.</i></p> <p style="text-align: right;">[4 marks]
[4 markah]</p> |

- CLO1 (c) The water surface investigation at Tasik Kiambang in Kuching, Sarawak, is displayed in Table 1(c). As an appointed water quality firm,
Penyiasatan permukaan air di Tasik Kiambang di Kuching Sarawak dipaparkan dalam Jadual 1(c). Sebagai firma kualiti air yang dilantik,

Table 1(c): Water Surface Observation Concern at Tasik Kiambang, Kuching
Jadual 1(c): Penekanan pemerhatian permukaan air, Tasik Kiambang, Kuching

Water Surface Observation Concern

Penekanan Pemerhatian Permukaan Air

High level of toxicity

Tahap ketoksikan yang tinggi

Viscosity and poor turbidity

Kelikatan dan kekeruhan yang lemah

Depletion of oxygen dissolved

Pengurangan oksigen terlarut

- i) Provide **THREE (3)** potential constitution pollution that might be involved in this issue as tabulated in Table 1(c).
Sediakan TIGA (3) potensi pencemaran konstituen yang mungkin terlibat dalam isu ini seperti dinyatakan dalam Jadual 1(c).

[3 marks]

[3 markah]

- ii) Provide an explanation of each constituent of pollution listed in **c(i)** that led to water surface observation concern at Tasik Kiambang.
Sediakan penjelasan setiap konstituen pencemaran yang disediakan dalam c(i) yang membawa kepada penekanan pemerhatian permukaan air di Tasik Kiambang.

[14 marks]

[14 markah]

QUESTION 2

SOALAN 2

- CLO1 (a) Waste water is the dirty and unfit water source for drinking, swimming and fishing. State **TWO (2)** sources of waste water.
*Air sisa ialah sumber air yang kotor dan tidak sesuai untuk diminum, berenang dan memancing. Nyatakan **DUA (2)** punca sumber air sisa.*
[2 marks]
[2 markah]
- CLO1 (b) Flow rates of domestic waste water are dependent on the population density and characteristics. Discuss **TWO (2)** other possible factors that may affected flow rates of domestic waste water.
*Kadar aliran air sisa domestik bergantung kepada kepadatan dan ciri populasi. Bincangkan **DUA (2)** faktor lain yang mungkin memberi kesan kepada kadar aliran air sisa domestik.*
[4 marks]
[4 markah]
- CLO1 (c) As illustrated in Figure 2(c), the batch reactor is usually used in waste water treatment plant.
Seperti yang digambarkan dalam Rajah 2(c), reaktor kelompok biasanya digunakan dalam loji rawatan air sisa.

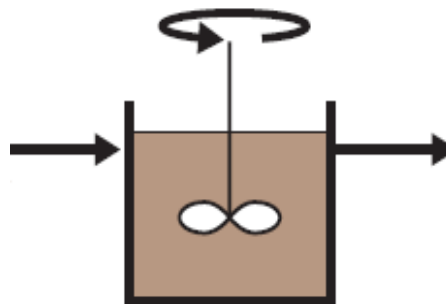


Figure 2(c) Batch Reactor
Rajah 2(c) Reaktor Kelompok

- | | |
|------|--|
| CLO1 | <p>i) Provide TWO (2) treatment processes that can be used in a waste water treatment facility with this type of reactor.</p> <p><i>Sediakan DUA (2) proses rawatan yang boleh digunakan di kemudahan rawatan air kumbahan dengan reaktor jenis ini.</i></p> <p style="text-align: right;">[4 marks]
[4 markah]</p> |
| CLO1 | <p>ii) Provide TWO (2) purpose for considering design mass loading in the waste water treatment plant.</p> <p><i>Sediakan DUA (2) tujuan pemuatan jisim reka bentuk dipertimbangkan di loji rawatan air sisa.</i></p> <p style="text-align: right;">[5 marks]
[5 markah]</p> |
| CLO1 | <p>iii) Minimum month, minimum day, maximum day, maximum month, and sustained loading are factors for designing mass loading in the waste water treatment plant. Provide the PURPOSES for considering these factors in the design of the waste water treatment plant.</p> <p><i>Bulan minimum, hari minimum, hari maksimum, bulan maksimum, dan pemuatan berterusan adalah faktor untuk mereka bentuk pemuatan jisim di loji rawatan air sisa. Sediakan TUJUAN faktor-faktor ini yang diambil kira dalam reka bentuk loji rawatan air sisa.</i></p> <p style="text-align: right;">[10 marks]
[10 markah]</p> |

QUESTION 3**SOALAN 3**

- CLO2 (a) Primary treatment is also called primary sedimentation. State the purpose of primary sedimentation in waste water treatment.
Rawatan primer juga dipanggil pemendapan primer. Nyatakan tujuan pemendapan primer dalam rawatan air sisa.
- [2 marks]
[2 markah]
- CLO2 (b) Preliminary treatment operations typically include coarse screening, grit removal and, in some cases, comminution of large objects. Explain the following process:
Operasi rawatan awal biasanya termasuk penyaringan kasar, penyingkiran pasir dan, dalam beberapa kes, pengurangan objek besar. Terangkan proses berikut:
- i) Solid Reduction
Pengurangan Pepejal
- [4 marks]
[4 markah]
- ii) Screening
Saringan
- [4 marks]
[4 markah]

- CLO2 (c) Some of the dissolved solids such as cyanide (NaCN) component in waste water is not suitable for undergoing the coagulation and precipitation process. To overcome this problem, the oxidation process is proposed.
- Sebahagian daripada pepejal terlarut seperti komponen sianida (NaCN) dalam air sisa tidak sesuai untuk menjalani proses pembekuan dan pemendakan. Untuk mengatasi masalah ini, proses pengoksidaan dicadangkan.*
- i) Provide the explanation of the transformation of Cyanide to Cyanate in oxidation process.
- Sediakan penjelasan tentang transformasi Sianida kepada Sianat dalam proses oksida.*
- [8 marks]
[8 markah]
- ii) Provide the explanation for the transformation of Cyanate to carbon dioxide and nitrogen gas.
- Sediakan penjelasan tentang perubahan Sianat kepada karbon dioksida dan gas nitrogen.*
- [7 marks]
[7 markah]

QUESTION 4**SOALAN 4**

- CLO2 (a) The biological treatment processes usually undergo the aerobic and anaerobic process. Define the anaerobic process in biological treatment.
- Proses rawatan biologi biasanya melalui proses aerobik dan anaerobik. Takrifkan proses anaerobik dalam rawatan biologi.*
- [2 marks]
[2 markah]

- CLO2 (b) The activated sludge method keeps microorganisms suspended in a bioreactor. Discuss **FOUR (4)** basic requirements of activated sludge process.
Kaedah enapcemar teraktif mengekalkan mikroorganisma terampai dalam bioreaktor. Bincangkan EMPAT (4) keperluan asas bagi proses enapcemar teraktif.
- [8 marks]
[8 markah]
- CLO2 (c) Microorganism in biological waste water treatment required the energy and carbon source to treat waste water.
Mikroorganisma dalam rawatan air sisa biologi memerlukan tenaga dan sumber karbon untuk merawat air sisa.
- i) Provide the purpose of energy and carbon source during biological treatment.
Sediakan tujuan tenaga dan sumber karbon semasa rawatan biologi.
- [5 marks]
[5 markah]
- ii) Attached-growth processes also known as fixed-film processes are biological waste water treatment processes with the biomass attached to some type of media such as trickling filter. Provide the operating mechanism of trickling filter.
Proses pertumbuhan melekat yang juga dikenali sebagai proses filem tetap ialah proses rawatan air sisa biologi dengan biojisim melekat pada beberapa jenis media seperti penapis titisan. Sediakan mekanisme operasi penapis tetesan.
- [10 marks]
[10 markah]

SOALAN TAMAT