

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) State TWO (2) sources of waste water.</p> <p><i>Nyatakan DUA (2) sumber air sisa.</i></p> <p style="text-align: right;">[4 marks]
[4 markah]</p> |
| CLO1 | <p>(b) Adaptation to climate change, emerging health and environmental concerns, storm management, the problem of industrial wastes and the impact of new regulations are common concerns in waste water treatment. Elaborate TWO (2) current concerns of waste water treatment.</p> <p><i>Penyesuaian perubahan iklim, kebimbangan kesihatan dan alam sekitar yang muncul, pengurusan ribut, masalah sisa industri dan kesan peraturan baharu adalah kebimbangan umum dalam rawatan air sisa. Huraikan DUA (2) kebimbangan semasa mengenai rawatan air sisa.</i></p> <p style="text-align: right;">[4 marks]
[4 markah]</p> |

CLO1 (c)

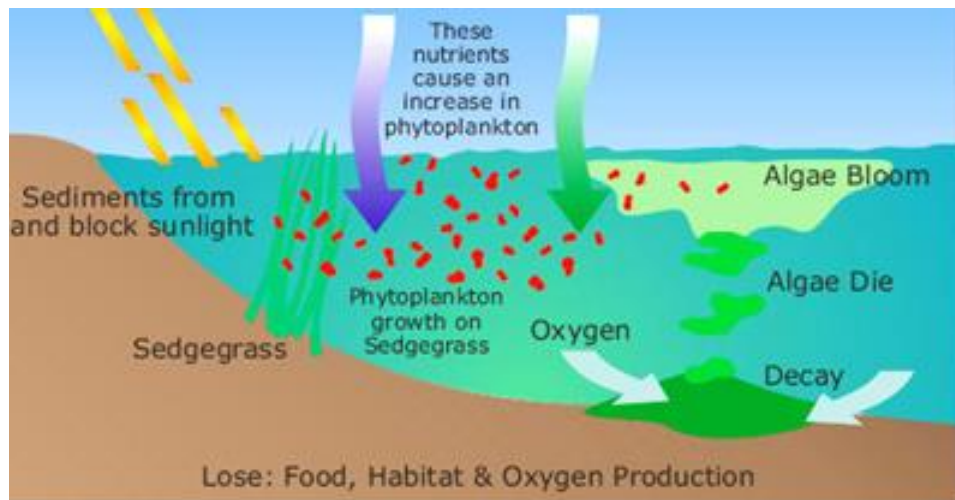


Figure 1: Eutrophication Process

Rajah 1: Proses Eutrofikasi

- i) Write **TWO (2)** potential constituents that can promote the eutrophication process.

*Tuliskan **DUA (2)** juzuk yang berpotensi boleh menggalakkan proses eutrofikasi.*

[3 marks]

[3 markah]

- ii) Tabulate the constituents of suspended solids, biodegradable organics, and heavy metals with their concern for water quality.

Jadualkan juzuk-juzuk pepejal terampai, organik terbiodegradasi, dan logam berat dengan keprihatinannya terhadap kualiti air.

[14 marks]

[14 markah]

QUESTION 2

SOALAN 2

- CLO1 (a) Define the term Storm Sewage.
Takrifkan istilah Kumbahan Ribut.
[2 marks]
[2 markah]
- CLO1 (b) Domestic waste water sources are also known as sanitary sewage. Discuss **TWO (2)** possible constituents that may exist in the domestic waste water.
Sumber air sisa domestik juga dikenali sebagai kumbahan sanitari. Bincangkan DUA (2) juzuk yang mungkin terdapat dalam air sisa domestik.
[4 marks]
[4 markah]
- CLO1 (c) The size and capacity of waste water treatment systems are determined by the estimated volume of sewage generated from residences connected to sewer systems as well as the anticipated inflows and infiltration.
Saiz dan kapasiti sistem rawatan air sisa ditentukan oleh anggaran jumlah air sisa yang dijana daripada kediaman yang disambungkan kepada sistem pembetung serta jangkaan aliran masuk dan penyusupan.
- i) Write **TWO (2)** possible factors that can influence the volume of domestic waste water generated.
Tuliskan DUA (2) kemungkinan faktor boleh mempengaruhi isipadu air sisa domestik yang terhasil.
[4 marks]
[4 markah]
- ii) A batch reactor is usually applied in the waste water treatment process. Provide **TWO (2)** possible processes which uses this type of reactor in waste water treatment.
Reaktor kelompok biasanya digunakan dalam proses rawatan air sisa. Sediakan DUA (2) proses yang mungkin digunakan reaktor jenis ini dalam rawatan air sisa.
[5 marks]
[5 markah]

- iii) Average daily flow, minimum hour, minimum day, minimum month, and peak hour are important flow factors in waste water flow rate design. Tabulate the purpose of these flow factors.

Purata aliran harian, jam minimum, hari minimum, bulan minimum, dan jam puncak adalah faktor aliran penting dalam reka bentuk kadar aliran air sisa. Jadualkan tujuan faktor - faktor aliran ini.

[10 marks]

[10 markah]

QUESTION 3

SOALAN 3

- CLO2 (a) State **TWO (2)** objectives installation of the preliminary waste water treatment.

*Nyatakan **DUA (2)** objektif pemasangan rawatan air sisa awal.*

[2 marks]

[2 markah]

- CLO2 (b) Discuss the potential physical unit applications that might be appropriate for the following waste water.

Bincangkan aplikasi unit fizikal yang berpotensi yang mungkin sesuai untuk jenis air sisa berikut.

- i) Domestic waste water

Domestik air sisa

[4 marks]

[4 markah]

- ii) Mixed effluent of storm waste water

Efluen campuran air sisa ribut

[4 marks]

[4 markah]

CLO2 (c)

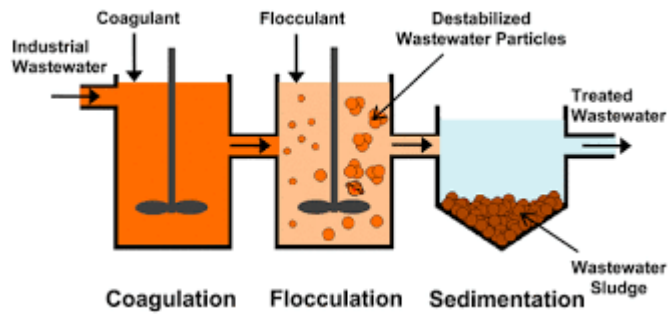


Figure 2 Coagulation process

Rajah 2 Proses pengumpulan

The coagulation process can be used to treat dissolved solids in waste water.
Proses pengentalan boleh digunakan untuk merawat pepejal terlarut dalam air sisa.

- i) Provide the explanation of the coagulation process with examples of coagulant agents used.

Sediakan penerangan tentang proses pengentalan dengan contoh agen pengental yang digunakan.

[7 marks]

[7 markah]

- ii) Provide **FOUR (4)** factors that contribute to the characteristics of colloidal particles in the waste water.

*Sediakan **EMPAT (4)** faktor – faktor yang menyumbang kepada ciri – ciri zarah koloid dalam air sisa.*

[8 marks]

[8 markah]

QUESTION 4**SOALAN 4**

- CLO2 (a) Define the aerobic process in biological waste water treatment.
Takrifkan proses aerobik dalam rawatan air sisa biologi.
[2 marks]
[2 markah]
- CLO2 (b) Discuss the **FOUR (4)** fundamental conditions under which the activation of sludge occurs.
*Bincangkan **EMPAT (4)** keadaan asas di mana pengaktifan enap cemar berlaku.*
[8 marks]
[8 markah]
- CLO2 (c) Moisture, oxygen concentrations, temperature, pH, and mechanical sonic stress are the common environmental factors affecting microbial growth in the biological treatments process.
Kelembapan, kepekatan oksigen, suhu, pH, dan tekanan sonik mekanikal adalah faktor persekitaran biasa yang mempengaruhi pertumbuhan mikrob dalam proses rawatan biologi.
- i) Provide the explanation of pH and temperature influences towards the microbial growth.
Sediakan penerangan tentang pengaruh pH dan suhu terhadap pertumbuhan mikrob.
[5 marks]
[5 markah]
- ii) Provide **FOUR (4)** phases of the microorganism growth with aid of a diagram.
*Sediakan **EMPAT (4)** fasa pertumbuhan mikroorganisma dengan bantuan gambarajah.*
[10 marks]
[10 markah]

SOALAN TAMAT