21

SULIT

POLITEKNIK
Jabatan Pengajian Politeknik

BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENGAJIAN POLITEKNIK
KEMENTERIAN PENDIDIKAN MALAYSIA

JABATAN KEJURUTERAAN AWAM

PEPERIKSAAN AKHIR

SESI JUN 2013

CC607: WATER AND WASTE WATER ENGINEERING

TARIKH : 23 OKTOBER 2013
TEMPOH : 2 JAM (2.30 PM - 4.30 PM)

Kertas ini mengandungi **SEPULUH (10)** halaman bercetak.
Bahagian A: Soalan pendek (10 soalan. Jawab semua)
Bahagian B: Struktur (4 soalan. Jawab 3 soalan sahaja)
Dokumen sokongan yang disertakan : Tiada

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

QUESTION 3

SOALAN 3

CLO2
C2

(a) A sewerage system is important to preserve health and to improve the living standards of the people. Explain the sewerage system below:

i. Combined System

ii. Separated System

Sistem pembetung adalah penting untuk kesihatan dan meningkatkan taraf kehidupan.Huraikan sistem pembentungan di bawah:

i. Sistem Gabungan

ii. Sistem Berasingan

[10 marks]

[10 markah]

CLO2
C3

(b) Desa Gemilang residential consist of 12 rows of single storey bungalows and each row contain 20 housing unit. The following are some criteria for sewerage system in that residential area.

Water demand per capita	= 275 litre/capita/day
Household	= 5 person/unit
Flow rate factor	= 6 for population < 10,000 persons
Self-cleaning velocity	= 0.45 m/s
Manning coefficient, n	= 0.014

Circular sewer with gradient 1:150

Assumption: full pipe flow

Based on the criteria above, calculate sewer's pipe diameter and identify whether the velocity is adequate or not.

Perumahan Desa Gemilang mengandungi 12 baris banglo setingkat dan setiap baris mempuntai 12 unit rumah. Berikut adalah beberapa kriteria untuk sistem pembentungan bagi kawasan perumahan tersebut.

Permintaan air per kapita	*= 275 liter/kapita/hari*
Isirumah	*= 5 orang/unit*
Faktor Kadar alir	*= 6 untuk populasi < 10,000 orang*
Halaju cuci diri	*= 0.45 m/s*
Pekali Manning, n	*= 0.014*

Pembentung bulat dengan kecerunan dasar 1:150

Anggapan: paip aliran penuh

Berdasarkan kriteria di atas, kirakan diameter paip betung dan tentukan samada halaju adalah mencukupi atau tidak. [10 marks]

[10 markah]

QUESTION 4

SOALAN 4

CLO2 C2 (a) Explain briefly **FOUR (4)** purposes of wastewater treatment.

*Terangkan dengan ringkas **EMPAT (4)** tujuan rawatan air sisa.*

[4 marks]

[4 markah]

CLO2 C2 (b) Describe the process below:

i. Thickening

ii. Dewatering

Huraikan proses di bawah:

i. Penebalan

ii. Penyahairan

[6 marks]

[4 markah]

SECTION B: 60 MARKS

BAHAGIAN B: 60 MARKAH

INSTRUCTION:

This section consists of **FOUR (4)** structured questions. Answer **THREE (3)** questions only.

ARAHAN:

*Bahagian ini mengandungi **EMPAT (4)** soalan berstruktur. Jawab **TIGA (3)** soalan sahaja.*

QUESTION 1

SOALAN 1

CLO1
C2

(a) There are three types of surface and ground water quality characteristics. Describe **FOUR (4)** physical characteristics.

*Terdapat tiga jenis sifat air permukaan dan air bawah tanah. Huraikan **EMPAT (4)** sifat fizikal air tersebut.*

[8 marks]

[*8 markah*]

CLO1
C4

(b) Human daily activities result in a reduction of fresh water and degradation of water quality. Relate how human impact results in a reduction of fresh water and degradation of water quality.

Aktiviti harian manusia akan mengakibatkan kemerosotan kualiti air dan pengurangan air bersih. Hubungkaitkan bagaimana impak manusia menyebabkan kemerosotan kualiti air dan pengurangan air bersih.

[12 marks]

[1*2 markah*]

QUESTION 2

SOALAN 2

CLO1 C2

(a) Identify **TWO (2)** physical processes and **TWO (2)** chemical processes in raw water treatment.

*Nyatakan **DUA (2)** proses fizikal dan **DUA (2)** proses kimia yang berlaku dalam rawatan air mentah.*

- Chlorination , Aeration

[2 marks]

[2 markah]

CLO1 C4

(b) Water treatment process is difference among the water treatment plant depent to the quality of water resources. Explain the following raw water treatment processes :

i) Aeration – use as mean of adding O_2 to water for oxidation of iron, manganese & hydrogen sulfite & organic matter.

ii) Filtration –

iii) Disinfections

Proses rawatan air adalah berbeza anatara loji-loji rawatan air bergantung kepada kualiti sumber air. Terangkan proses rawatan air mentah di bawah :

i) Pengudaraan

ii) Penurasan

iii) Penyahkuman

[9 marks]

[9 markah]

CLO1 C2

(c) Describe **THREE (3)** water treatment plant layout and site factor.

*Jelaskan **TIGA (3)** faktor susunatur tapak loji rawatan air.*

[9 marks]

[9 markah]

QUESTION 5

SOALAN 5

CLO2
C2

There are various of bacteria in water resources that need to be removed.
Describe the importance of disinfection in water treatment process.

Terdapat pelbagai kuman dalam sumber air yang perlu di basmi.
Jelaskan kepentingan pembasmian kuman di dalam proses rawatan air.

[4 marks]
[4 markah]

QUESTION 6

SOALAN 6

CLO1
C1

State **ONE (1)** advantage and disadvantage of pumping system in a water supply distribution network.

*Senaraikan **SATU (1)** kebaikan dan keburukan sistem pam sebagai kaedah agihan air.*

[4 marks]
[4 markah]

QUESTION 7

SOALAN 7

CLO3
C2

The objective of water distribution system is to supply water to each and every house, industrial plants and public places. State **FOUR (4)** factors of a good water distribution system.

*Objektif sistem agihan air adalah untuk mengagihkan air ke rumah-rumah,kawasan perindustrian dan kawasan awam. Nyatakan **EMPAT (4)** faktor sistem agihan air yang baik.*

[4 marks]
[4 markah]

QUESTION 8

SOALAN 8

CLO3
C1

List **TWO (2)** advantages and disadvantages of combined sewerage system.

*Senaraikan **DUA (2)** kelebihan dan kelemahan sistem pembetungan bergabung.*

- where foul and surface water are conveged in same pipe.

[4 marks]

[*4 markah*]

QUESTION 9

SOALAN 9

CLO3
C2

A circular sewer for full flow has a diameter of 2.0 m and has a gradient of 1:600. Determine the velocity of sewage by using Manning formula with n = 0.015 (bricks). Then, check the velocity value with self-cleansing velocity 0.45 m/s.

Pembetung yang mengalir penuh mempunyai diameter 2.0 m dan bercerun 1:600. Tentukan halaju kumbahan dengan menggunakan formula Manning dengan n = 0.015 (bata). Kemudian, bandingkan dengan halaju cuci diri 0.45 m/s.

[4 marks]

[*4 markah*]

QUESTION 10

SOALAN 10

CLO 1
C1

Describe the primary treatment and secondary process in wastewater treatment.

Terangkan proses yang berlaku di dalam rawatan premier dan rawatan sekunder di dalam proses perawatan air sisa.

[4 marks]

[*4 markah*]

SECTION A: 40 MARKS

BAHAGIAN A: 40 MARKAH

INSTRUCTION:

This section consists of **TEN (10)** short questions. Answer **ALL** questions.

ARAHAN:

*Bahagian ini mengandungi **SEPULUH (10)** soalan pendek. Jawab **SEMUA** soalan.*

QUESTION 1

SOALAN 1

CLO1
C1

Water is one of the most important natural resources. State TWO **(2)** sources of water.

*Air adalah merupakan salah satu sumber asas kehidupan yang penting di bumi. Nyatakan **DUA (2)** sumber air.*

[4 marks]

[4 markah]

QUESTION 2

SOALAN 2

CLO3
C3

Turbidity is one of the water quality parameter. List **TWO (2)** reasons why turbidity test is significant for water quality.

*Kekeruhan merupakan salah satu daripada parameter kualiti air. Senaraikan **DUA (2)** sebab mengapa ujian kekeruhan penting untuk kualiti air.*

[4 marks]

[4 markah]

QUESTION 3

SOALAN 3

CLO1
C1

Define water demand and water usage.

Definasikan dengan ringkas permintaan air dan penggunaan air.

[4 marks]

[4 markah]

QUESTION 4

SOALAN 4

CLO2
C3

The following data was obtained from Taman Harmoni in 2000. Calculate the estimation population in year 2010.

Total household	=	1000 households
Average household members	=	5 people
Population growth	=	2.5 % per year

$P_n = P_0 (1 + r)^n$

Berikut adalah data yang diperolehi dari Taman Harmoni pada tahun 2000. Kirakan anggaran penduduk pada tahun 2010.

Jumlah rumah	=	*1000 buah*
Purata isi rumah	=	*5* orang
Pertumbuhan penduduk	=	*2.5 % setahun*

$P_n = P_0 (1 + r)^n$

[4 marks]

[4 markah]