



**KOLEJ UNIVERSITI TEKNOLOGI
TUN HUSSEIN ONN**

**PEPERIKSAAN AKHIR
SEMESTER 1
SESI 2004/2005**

NAMA MATAPELAJARAN : TEKNOLOGI PERSEKITARAN
KOD MATAPELAJARAN : DTA 2133
KURSUS : 2 DTA
TARIKH PEPERIKSAAN : OKTOBER 2003
JANGKA MASA : 3 JAM
ARAHAN : 1. JAWAB (5) SOALAN, DUA (2)
SOALAN DARIPADA BAHAGIAN A
DAN TIGA (3) SOALAN DARIPADA
BAHAGIAN B. JAWAB BAHAGIAN A
DAN B DALAM BUKU JAWAPAN
YANG BERASINGAN

KERTAS SOALAN INI MENGANDUNGI 9 MUKA SURAT

BAHAGIAN A

- S1** (a) Definiskan sebatian organik ? Berikan contoh dua (2) sebatian organik dan formula molekul bahan tersebut.

(4 markah)

Nilai kepekatan larutan dan jisim F masing-masing ialah 28.6 ppm dan 0.493 g. Kira isipadu cecair pelarut dalam mm untuk membentuk larutan.

(4 markah)

- (c) Dalam satu penyediaan larutan piawai logam Cr, dengan jisim 1800 μg dilarutkan ke dalam air ternyahion sehingga mencapai isipadu 1000 mL. Tentukan kepekatan sampel tersebut dalam unit ppm ?

(3 markah)

Sebanyak 100 mL sampel air sungai diambil dan dicairkan dengan nisbah 1:10. Sampel air ini kemudian diletakkan dalam botol BOD piawai dengan isipadu 300 mL. Kuantiti oksigen terlarut dalam air tersebut adalah 8.5 mg/L. Selepas 5 hari nilai oksigen terlarut menurun kepada 5.6 mg/L. Diberi pemalar $k=0.14/\text{hari}$.

- (i) Nyatakan definisi BOD ?

(markah)

- (ii) Kira nilai BOD_5 dan BOD_L .

(4 markah)

- (iii) Terangkan perkaitan di antara kuantiti BOD dan kualiti air sungai tersebut.

(2 markah)

- (iii) Nyatakan dua (2) perbezaan di antara ujian BOD dan COD.

(2 markah)

- S2** (a) (i) Terangkan secara ringkas tiga (3) piawai asas yang digunakan dalam kawalan pencemaran udara. (3 markah)
- Beri satu (1) contoh gas pencemar dan satu (1) cadangan kaedah pengawalan gas pencemar tersebut. (3 markah)
- (b) Huraikan fenomena eutrofikasi dalam sebuah tasik. (6 markah)
- (c) Terangkan kaedah kawalan pencemaran haba dalam sistem akuatik. (5 markah)
- (d) Huraikan secara ringkas dua (2) jenis hakisan tanah. (3 markah)
- S3** (a) Terangkan dengan ringkas proses-proses rawatan air bersih berikut
- (i) Pengudaraan
 - (ii) Flokulasi
 - (iii) Pengeapan
 - (iv) Penapisan
- (12 markah)
- (b) (i) Terangkan keperluan rawatan tertier dalam proses rawatan air sisa. (3 markah)
- Huraikan secara ringkas rawatan sekunder dalam proses rawatan air sisa. (2 markah)
- (c) Nyatakan tiga (3) pendekatan oleh organisasi bagi mengurangkan penajanaan sisa. (3 markah)

BAHAGIAN B

S4 (a) Terangkan dengan ringkas penjanaan sisa pepejal? Lakarkan diagram aliran bahan dan penjanaan sisa pepejal dalam masyarakat. (6 markah)

(b) Terangkan maksud komposisi sisa pepejal dan kepentingannya dalam sistem pengurusan sisa pepejal. (5 markah)

Berikan empat (4) contoh komposisi sisa pepejal yang lazim diasingkan dalam pengurusan sisa pepejal. (4 markah)

Dengan berbantuan rajah, terangkan aktiviti yang berlaku di stesen pindah. (5 markah)

S5 (a) Terangkan dua (2) jenis sistem pengutipan sisa bagi kediaman bertingkat rendah. (6 markah)

Huraikan secara ringkas sistem tambak tanah kebersihan (*sanitary landfill*)? (5 markah)

(c) Huraikan dengan ringkas dua (2) faktor pemilihan tapak pelupusan sisa pepejal. (4 markah)

(d) Lakar dan terangkan gambarajah penyerapan lapisan kuras. (5 markah)

- S6 (a) Sebuah bandar mempunyai penduduk seramai 45, 000 orang menandakan sisa pepejal pada kadar purata 9.5 kg/kapita/hari. Anggarkan keluasan tanah (dalam hektar) yang diperlukan bagi tapak kambusan sanitari berdasarkan maklumat berikut :

Hayat rekabentuk	25 tahun
Ketumpatan sisa pepejal termampat	350 kg/m ³
Kedalaman tambakan	15 m
Nisbah sisa pepejal dengan tanah penutup	4:1 (25 %)
	(13 markah)

Sebanyak 250 m³ sisa pepejal terlerai dimampatkan ke dalam kenderaan kenderaan pengangkut yang mempunyai kapasiti mampatan maksimum 60 m³. Jika masih terdapat 20 peratus ruang kosong dalam kenderaan pengangkut selepas dimuat dan dimampatkan, kira peratus pengurangan isipadu dan nisbah mampatan sisa.

(5 markah)

- (c) Satu komuniti mempunyai penduduk seramai 15, 000 orang menandakan sisa pepejal pada kadar purata 6 kg/kapita/hari. Sebuah tapak kambusan sanitari seluas 40 ekar dengan kedalaman tapak 12 m, purata ketumpatan sisa termampat 800 kg/m³ dan 25 % ruang tapak kambusan sanitari diperuntukkan untuk menyimpan bahan penutup. Tentukan rekabentuk hayat tapak tersebut.
- (12 markah)

- S7 (a) Beri definasi keradioaktifan.
- (2 markah)
- (b) Berikan tiga (3) contoh sisa berbahaya daripada punca spesifik.
- (3 markah)
- (c) Berikan tiga (3) kelebihan kaedah penunuan sebagai satu kaedah pelupusan sisa berbahaya.
- (3 markah)
- (d) Huraikan secara ringkas proses perawatan sisa berbahaya berikut
- (i) Peleraian
 - (ii) Penyahtoksikan
 - (iii) Pemisahan sisa
 - (iv) Pengurangan isipadu
- (12 markah)

PART A

- S1** (a) Define the term organic compound? Give two (2) examples of organic compound and their molecule formula.

(4 marks)

The concentration value and the the weight of solid F are 28.6 ppm and 0.493 g. What is the volume of liquid solvent in mm to form the F solution?

(4 marks)

In the preparation of standard solution of Cr, which has a weight of 1800 μg were dissolved in deionized water until it achieves a volume of 1000 mL.

What is the concentration of the samples in ppm?

(3 marks)

The river water sample was collected in 100 mL with 1:10 dilution factor. The sample was placed in a bottle of standard BOD with a volume of 300 mL. The quantity of dissolved oxygen in the sampled water was 8.5 mg/L. After 5 days, the dissolved oxygen dropped to 5.6 mg/L.

Given the constant $k = 0.14/\text{day}$.

- (i) Define the term BOD ?
(1 marks)
- (ii) Calculate the value BOD_5 and BOD_L
(4 marks)
- (iii) What is the relationship between BOD and the river water quality.
(2 marks)
- (iii) Give two (2) differences between BOD and COD.
(2 marks)

S2 (a) (i) Briefly describe the three (3) basic standards used in the air pollution control. (3 marks)

(ii) Give one (1) example of polluted gas and one (1) proposed control method to reduce the polluted gas. (3 marks)

Describe about the eutrophication phenomena that occurs in a lake. (6 marks)

Explain the methods to control heat pollution in an aquatic system. (5 marks)

Briefly define two (2) types of soil erosion. (3 marks)

S3 (a) Briefly describe the processes occur in clean water treatment as follows

(i) Aeration

(ii) Flocculation

(iii) Sedimentation

(iv) Screening

(12 marks)

(i) State the importance tertiary treatment in waste water treatment ? (3 marks)

(ii) Briefly describe the secondary treatment in the waste water treatment process. (2 marks)

(c) State three (3) methods that can be used in an organization to reduce waste generation. (3 marks)

PART B

- S4** (a) What is meant by the solid waste generation? Sketch schematically the flow of material and solid waste generation in a community. (6 marks)
- (b) Explain what is meant by the solid composition and also describe its importance in the solid waste management. (5 marks)
- (c) Give four (4) examples of typical materials composition that can be separated. (4 marks)
- (d) Describe the activities in the transfer station helped with the sketch diagram. (5 marks)
- S5** (a) Describe the two (2) ways for the waste collection for a low rise building. (6 marks)
- Briefly describe the sanitary landfill system (5 marks)
- Choose and briefly describe two (2) factors to develop a disposal site. (4 marks)
- Sketch schematically and explain the leachate absorption in a landfill. (5 marks)

- S6** (a) A town is inhabited by 45, 000 people produces waste at the average rate of 9.5 kg/capita/day. Estimate the land acreage require (in hectares) for maintain as a sanitary landfill site which characteristics are as follows ;
- | | |
|---|-----------------------|
| Design life of site | 25 years |
| Density of compacted solid waste at sanitary landfill | 350 kg/m ³ |
| Depth of landfill | 15 m |
| Ratio of solid waste with land cover | 4:1 (25 %) |
- (13 marks)
- (b) A used container keeps dispersed solid waste of 250 m³. All of the waste is compacted in a loader vehicle which has a maximum capacity of 60 m³. Calculate the percentage of volume reduction and the ratio of the compacted waste if there is 20 percent empty space in the loader vehicle after loading of waste.
- (5 marks)
- (c) A community is inhabited by 15, 000 people that generate waste at the average rate of 6 kg/capita/day. A sanitary landfill of 40 acres with a depth of 12 meters and the average density compacted of solid waste is 800 kg/m³ and covered material occupies 25 percent of landfill space. Determine the design life for the landfill site.
- (12 marks)
- S7** (a) What is meant by “radioactive”
- (2 marks)
- (b) Give three (3) examples of hazardous waste from specific waste.
- (3 marks)
- (b) Describe in brief the waste treatment process for hazaedous waste as follows
- (i) Dispersion
 - (ii) Detoxication
 - (iii) Waste Separation
 - (iv) Volume Reduction
- (12 marks)
- (c) Explain the advantage of incineration as a one method in the hazardous waste disposal.
- (3 marks)