
UNIVERSITI SAINS MALAYSIA

Second Semester Examination
2010/2011 Academic Session

April/May 2011

IUK 303 – INDUSTRIAL WASTE MANAGEMENT
[PENGURUSAN SISA INDUSTRI]

Duration: 3 hours
[Masa: 3 jam]

Please check that this examination paper consists of FIVE pages of printed material before you begin the examination.

[Sila pastikan bahawa kertas peperiksaan ini mengandungi LIMA muka surat yang bercetak sebelum anda memulakan peperiksaan ini.]

Instructions: Answer FIVE questions. You may answer the questions either in Bahasa Malaysia or in English.

Arahan: Jawab LIMA soalan. Anda dibenarkan menjawab soalan sama ada dalam Bahasa Malaysia atau Bahasa Inggeris.]

In the event of any discrepancies, the English version shall be used.

[Sekiranya terdapat sebarang percanggahan pada soalan peperiksaan, versi Bahasa Inggeris hendaklah diguna pakai.]

Answer FIVE out of seven questions.

1. Explain briefly the following terms.
 - (a) Biochemical oxygen demand (BOD)
 - (b) Total suspended solids (TSS)
 - (c) Turbidity
 - (d) Sludge
 - (e) Bioassay Methods

(20 marks)

2. Define landfilling as means of industrial waste management. Discuss the important issues pertinent to this waste management system and suggest methods of improvement for the system.

(20 marks)

3. Discuss 3R principles in industrial waste management. Illustrate the principle by stating examples.

(20 marks)

4. Answer all parts of this question
 - (a) Sources of radioactive waste
 - (b) Effects of radioactive on health
 - (c) Disposal of radioactive waste

(20 marks)

5. Write short note on the following
 - (a) Sources of wastewater

(5 marks)

 - (b) Quality of wastewater

(5 marks)

 - (c) The effects of important contaminants in wastewater on the environment and human health

(10 marks)

6. Discuss in detail 'secondary treatment' in industrial waste water treatment.

(20 marks)

7. Answer both parts of this question

(a) The sludges accumulated in a wastewater treatment process must be treated and disposed of in a safe and effective manner. In brief discuss how sludge treatment and disposal are carry out.

(10 marks)

(b) Briefly describe the natural system for waste water treatment.

(10 marks)

Jawab LIMA daripada tujuh soalan.

1. Huraikan secara ringkas istilah-istilah berikut

- (a) "Biochemical oxygen demand (BOD)"
- (b) "Total suspended solids (TSS)"
- (c) "Turbidity"
- (d) "Sludge"
- (e) "Bioassay Methods"

(20 markah)

2. Berikan definisi bagi "Landfilling" yang merupakan kaedah pegurusan sisa industri. Bincangkan isu penting berkaitan system pengurusan sisa ini dan cadangkan kaedah bagi memperbaiki system ini.

(20 markah)

3. Bincangkan prinsip-prinsip 3R dalam pengurusan sisa industri. Gambarkan prinsip ini dengan memberikan contoh-contoh yang sesuai.

(20 markah)

4. Jawab semua bahagian soalan ini

- (a) Sumber-sumber sisa radioaktif
- (b) Kesan-kesan radioaktif keatas kesihatan
- (c) Penghapusan sisa radioaktif

(20 markah)

5. Tuliskan catatan ringkas atas tajuk berikut

(a) Sumber air sisa

(5 markah)

(b) Kualiti air sisa

(5 markah)

(c) Kesan-kesan pencemar utama didalam air sisa keatas persekitaran dan kesihatan manusia.

(10 markah)

6. *Bincangkan secara terperinci 'rawatan sekunder' dalam rawatan air sisa industri.*
(20 markah)
7. *Jawab kedua-dua bahagian soalan ini*
- (a) *Enapcemar yang terhasil dari proses rawatan air sisa perlu dirawat dan dibuang secara selamat dan berkesan. Secara ringkas bincangkan bagaimana enap cemar dirawat dan dibuang.*
(10 markah)
- (b) *Secara ringkas huraikan sistem rawatan air sisa secara natural.*
(10 markah)