
UNIVERSITI SAINS MALAYSIA

Second Semester Examination
Academic Session 2005/2006

April/May 2006

EKC 374E – Environmental Engineering
[Kejuruteraan Persekitaran]

Duration : 3 hours
[Masa : 3 jam]

Please ensure that this examination paper contains SIX printed pages before you begin the examination.

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

Instruction: Answer **FOUR** (4) questions. If a candidate answers more than four questions only the first four questions in the answer sheet will be graded.

[Arahan: Jawab **EMPAT** (4) soalan. Jika calon menjawab lebih daripada empat soalan hanya empat soalan pertama mengikut susunan dalam skrip jawapan akan diberi markah].

[Pelajar dibenarkan menjawab semua soalan dalam Bahasa Inggeris ATAU Bahasa Malaysia ATAU kombinasi kedua-duanya.]

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1. [a] Give the definition of the followings as given in Environmental Quality Act and Regulations:

- [i] Environment
- [ii] Industrial plant
- [iii] Pollutant
- [iv] Environmental Management System
- [v] Environmentally Hazardous Substances

[10 marks]

[b] Briefly discuss the objective (s) of the following International Multilateral Environmental Agreements:

- [i] Montreal Protocol on substances that deplete the ozone layer (1987).
- [ii] United Nations Framework Convention on Climate Change (UNFCCC).
- [iii] Prior Informed Consent (Rotterdam Convention)
- [iv] ASEAN Agreement on Transboundary Haze Pollution.

[10 marks]

[c] What is environmental ethics? Briefly discuss the importance of environmental ethics.

[5 marks]

1. [a] *Berikan takrifan yang berikut seperti di dalam Akta dan Peraturan Kualiti Alam Sekitar:*

- [i] *Alam Sekitar*
- [ii] *Loji Industri*
- [iii] *Bahan cemar*
- [iv] *Sistem Pengurusan Alam Sekitar*
- [v] *Bahan Berbahaya Alam Sekitar*

[10 markah]

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[b] *Bincangkan dengan ringkas objektif-objektif untuk Perjanjian Alam Sekitar Antarabangsa yang berikut:*

[i] *Protokol Montreal (1987) mengenai bahan-bahan yang menipiskan lapisan ozon.*

[ii] *Persidangan Rangka Kerja Bangsa-Bangsa Bersatu terhadap Perubahan Cuaca (UNFCCC).*

[iii] *Persidangan Rotterdam mengenai kebenaran terhadap pemberitahuan.*

[iv] *Perjanjian ASEAN terhadap Pencemaran Jerebu Melempi- sempadan.*

[10 markah]

[c] *Apakah etika alam sekitar? Bincangkan dengan ringkas kepentingan etika alam sekitar.*

[5 markah]

2. [a] Briefly describe an air pollution control system.

[5 marks]

[b] What are criteria and noncriteria air pollutants? List 3 examples for each type of air pollutants.

[5 marks]

[c] The exhaust gas from an automobile contains 1.5 percent by volume of carbon monoxide. What is the concentration of carbon monoxide (CO) in mg/m^3 at 25°C and 1 atm pressure?

[5 marks]

[d] There are several type of plumes dispersion may be identified, each associated with different atmospheric stabilities. Briefly, discuss four (4) type of plume dispersions.

[10 marks]

2. [a] *Terangkan dengan ringkas sistem kawalan pencemaran udara.*

[5 markah]

[b] *Apakah bahan cemar udara yang dikelaskan sebagai kriteria dan bukan kriteria? Senaraikan 3 contoh untuk setiap jenis bahan cemar udara tersebut.*

[5 markah]

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- [c] Gas ekzos dari kereta mengandungi 1.5 peratus isipadu karbon monoksida. Apakah kepekatan karbon monoksida (CO) dalam mg/m^3 pada suhu 25°C dan tekanan 1 atm?
[5 markah]
- [d] Terdapat beberapa jenis serakan plum yang boleh dikenal pasti, di mana setiap satunya dikaitkan dengan kestabilan atmosfera yang berbeza. Bincangkan dengan ringkas empat (4) jenis serakan.
[10 markah]
3. [a] What are the sources of wastewater?
[3 marks]
- [b] What are the standards available to control the quality of wastewater?
[4 marks]
- [c] What are the undesirable wastewater characteristics?
[6 marks]
- [d] Briefly described three organic chemical characteristics of wastewater analysis.
[6 marks]
- [e] Briefly describe the three major categories of wastewater treatment.
[6 marks]
3. [a] Apakah punca-punca air sisa?
[3 markah]
- [b] Apakah piawai yang ada untuk mengawal kualiti air sisa?
[4 markah]
- [c] Apakah ciri-ciri air sisa yang tidak diingini?
[6 markah]
- [d] Terangkan secara ringkas 3 jenis analisis ciri-ciri kimia organik air sisa.
[6 markah]
- [e] Terangkan secara ringkas 3 katogeri utama rawatan air sisa.
[6 markah]

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4. [a] Determine the area required for a new landfill site for full quantity of waste (111500 tonne/year) if the expected life is to be 20 years. [6 marks]
- [b] List and discuss briefly 3 solid waste treatment methods. [9 marks]
- [c] Leachate is a contamination from one type of solid waste treatment. Explain how can it be treated. [5 marks]
- [d] Briefly explained the physical composition of solid waste. [5 marks]
4. [a] *Hitungkan luas kawasan yang diperlukan bagi satu tapak pembuangan sampah yang berkualiti penuh sampah 111500 tan setahun, jika hayatnya dianggarkan selama 20 tahun.* [6 markah]
- [b] *Senarai dan bincangkan tiga kaedah rawatan sisa pepejal.* [9 markah]
- [c] *Air kuras adalah pencemaran dari satu jenis rawatan sisa pepejal. Terangkan bagaimana ia boleh dirawat.* [5 markah]
- [d] *Terangkan dengan ringkas komposisi fizikal sisa pepejal.* [5 markah]
5. [a] What are the four nature of hazardous waste? [5 marks]
- [b] List 10 type of industries that produces hazardous waste. [5 marks]
- [c] Briefly explain why hospital/medical waste is considered hazardous. [5 marks]
- [d] What are the commercial treatment available for hazardous waste? Explain briefly each of them. [5 marks]
- [e] List 8 polluting substances of principle concern from an incineration plant. [5 marks]

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