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UNIVERSITI SAINS MALAYSIA

Second Semester Examination  
Academic Session 2007/2008

April 2008

**EAP 412/4 - Environmental Studies**  
**[Pengajian Alam Sekitar]**

Duration: 3 hours  
[Masa : 3 jam]

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Please check that this examination paper consists of **EIGHT (8)** printed pages including appendix before you begin the examination.

*[Sila pastikan kertas peperiksaan ini mengandungi **LAPAN (8)** muka surat bercetak termasuk lampiran sebelum anda memulakan peperiksaan ini.]*

**Instructions:** This paper contains **SIX (6)** questions. Answer **FIVE (5)** questions only. All questions carry the same marks.

**[Arahan:** Kertas ini mengandungi **ENAM (6)** soalan. Jawab **LIMA (5)** soalan sahaja. Semua soalan membawa jumlah markah yang sama.]

You may answer the question either in Bahasa Malaysia or English.

*[Anda dibenarkan menjawab soalan sama ada dalam Bahasa Malaysia atau Bahasa Inggeris.]*

All questions **MUST BE** answered on a new page.

*[Semua soalan **MESTILAH** dijawab pada muka surat baru.]*

Write the answered question numbers on the cover sheet of the answer script.

*[Tuliskan nombor soalan yang dijawab di luar kulit buku jawapan anda.]*

1. (a) Name **THREE** (3) Guidelines of an ambient noise levels and vibration in Malaysia.  
(3 marks)
- (b) Define impulse noise.  
(5 marks)
- (c) A day traffic noise monitoring has resulted in the following data:

Duration (Minutes)	Sound level dB (A)
10	71
20	75
30	70
40	78
50	80
60	84
70	60
80	66
90	67
100	70
110	65
120	67

Calculate:

- (i) Ldn  
(6 marks)
- (ii) the values of  $L_{50}$  and  $L_{95}$   
(6 marks)
- (a) Namakan **TIGA** (3) Garis Panduan paras bunyi ambien serta gegaran di Malaysia.  
(3 markah)
- (b) Definisikan bunyi denyutan.  
(5 markah)

(c) Suatu pemantauan bunyi trafik waktu siang memberikan nilai bunyi seperti berikut:

<i>Masa (Minit)</i>	<i>Paras Bunyi dB (A)</i>
10	71
20	75
30	70
40	78
50	80
60	84
70	60
80	66
90	67
100	70
110	65
120	67

*Kirakan:*

(i) *L<sub>dn</sub>*

(6 markah)

(ii) *Kirakan nilai L<sub>50</sub> dan L<sub>95</sub>*

(6 markah)

2. (a) Give **TWO (2)** factors each that influence noise propagation indoor and outdoor. (5 marks)
- (b) Describe **FIVE (5)** methods that normally applied in controlling noise emission from earthworks at construction site. (5 marks)
- (c) A Sound Power from a generator is  $1 \times 10^{-3}$  watt. Determine the sound intensity and sound intensity level which will be heard by a person who stands 10 m away of the source. (6 marks)
- (d) Averaged the sound pressure levels 90, 84 and 78 dB (A) using formula. (4 marks)

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- (a) Berikan masing-masing **DUA** (2) faktor yang mempengaruhi penyebaran bunyi di tempat terkurung dan tempat terbuka. (5 markah)
- (b) Terangkan **LIMA** (5) kaedah yang biasanya diaplikasikan dalam mengawal pelepasan bunyi dari kerja tanah di tapak bina. (5 markah)
- (c) Kuasa Bunyi dari suatu janakuasa adalah  $1 \times 10^{-3}$  watt. Tentukan keamatan bunyi dan Paras Keamatan Bunyi yang akan didengari oleh seorang yang berdiri 10 m dari sumber. (6 markah)
- (d) Puratakan paras tekanan bunyi 90, 84 and 78 dB (A) mengguna formula. (4 markah)
3. (a) Describe the criteria approach for classification of hazardous wastes (6 marks)
- (b) i. Give **FOUR** (4) main group of clinical waste. (4 marks)
- ii. Discuss the management aspect of any **TWO** (2). (10 marks)
- (a) Huraikan pendekatan kriteria untuk mengkalsifikasikan sisa berbahaya. (6 markah)
- (b) i. Berikan **EMPAT** (4) kumpulan utama sisa klinikal (4 markah)
- ii. Bincangkan aspek pengurusan **DUA** (2) daripadanya (10 markah)

4. (a) Describe any **TWO (2)** of the following :

- i. Anaerobic filter
- ii. Gravity thickener
- iii. Secured landfill stability
- iv. Cover system for secured landfill

(10 marks)

(b) A treatment plant is to be installed for treating a slaughter house washwater.

- i. State the main water quality parameter to be considered in the design of a treatment plant.

(4 marks)

- ii. Suggest one of the treatment processes suitable for treating this wastewater.

(6 marks)

(a) Huraikan sebarang **DUA (2)** dari yang berikut :

- i. *Penuras anaerobik*
- ii. *Pemekat graviti*
- iii. *Kestabilan tapak pelupusan terjamin*
- iv. *Sistem penutup untuk tapak pelupusan terjamin*

(10 markah)

(b) *Suatu loji olahan perlu dibina untuk mengolah air sisa rumah sembelihan.*

- i. *Nyatakan parameter utama kualiti air yang perlu dipertimbangkan dalam reka bentuk loji olahan ini.*

(4 markah)

- ii. *Cadangkan salah satu proses olahan yang sesuai untuk mengolah air sisa ini.*

(6 markah)

5. (a) State critical concentrations of **FIVE (5)** main air pollutants referring to scale **one hundred (100)** in Malaysian Air Pollutants Index in volumetric or gravimetric.

(5 marks)

- (b) Discuss briefly **FIVE (5)** methods to control vehicles emissions and their implementations in Malaysia.

(10 marks)

- (c) List **FIVE (5)** instruments capable to measure air pollutants concentrations on site.

(5 marks)

5. (a) Nyatakan kepekatan kritikal **LIMA (5)** pencemar udara utama pada skala **seratus (100)** Indeks Pencemar Udara Malaysia dalam unit volumetrik atau gravimetrik.

(5 markah)

- (b) Bincangkan dengan ringkas **LIMA (5)** kaedah kawalan emisi kenderaan dan perlaksanaannya di Malaysia.

(10 markah)

- (c) Senaraikan **LIMA (5)** jenis peralatan yang boleh digunakan untuk mengukur kepekatan pencemaran udara di lapangan.

(5 markah)

6. (a) List **FIVE (5)** air pollution control legislations in Malaysia according to source type.

(5 marks)

- (b) Give **THREE (3)** examples of treatment technology and controlling device to reduce air pollutants.

(6 marks)

- (c) Calculate concentrations of Sulphur dioxide (SO<sub>2</sub>) (in  $\mu\text{gm}^{-3}$ ) at ground level, 6 kilometer downwind during cloudy weather condition emitted from a stack of a coal fired power station (stack height = 100 m). The coal burning rate is 3000 tonne/day. Slushier content is 1.4%. Effective release height is 214 m, and windspeed at stack height is 11.3  $\text{ms}^{-1}$ .

(9 marks)

6. (a) Senaraikan **LIMA** (5) undang-undang berkaitan pengawalan pencemar udara di Malaysia mengikut jenis sumber. (5 markah)
- (b) Berikan **TIGA** (3) contoh teknologi perawatan and paranti kawalan yang berfungsi mengurangkan pencemar udara. (6 markah)
- (c) Kirakan kepekatan gas sulfur dioksida ( $SO_2$ ) (dalam  $\mu g m^{-3}$ ) pada aras tanah pada satu kawasan 6 kilometer di bawah aruhan angin dalam cuaca mendung berawan dari serombong sebuah stesen kuasa bahanapi arang batu setinggi 100m, jika arang batu dibakar pada kadar 3000 ton sehari. Arang batu mengandungi 1.4% sulfur. Ketinggian pelepasan efektif serombong ialah 214 m, dan halaju angin pada hujung serombong adalah  $11.3 ms^{-1}$ . (9 markah)

APPENDIX/LAMPIRAN

Useful formula :

1)  $I = w/s$

2)  $L_I = 10 \log_{10} I/10^{-12}$

3)  $L_p = 20 \log_{10} (P/P_0)$ ,  $P_0 = 20 \mu\text{Pa}$

4)  $L_w = 10 \log_{10} (w/10^{-12})$

5)  $L_{eq} = 10 \log_{10} \sum t_i 10^{L_i/10}$

6)  $L_{wp} = 10 \log_{10} 1/N \sum 10^{(L_j/10)}$

7)  $L_{pp} = 20 \log_{10} 1/N \sum 10^{(L_j/20)}$

8)  $T_L = \left\{ \frac{10 \log_{10} s}{\tau_1 s_1 + \tau_2 s_2 \dots + \tau_n s_n} \right\}$

9)  $T_L = 10 \log_{10} 1/\tau$

10)  $NNI = \text{Average Peak Noise Level} + 15 \log_{10} N - 80$   
Average Peak Noise Level =  $10 \log_{10} 1/N \sum 10^{\text{Peak noise level}/10}$  dB (A)

$\sigma_z$  (kelas stabiliti C) =  $0.08x (1 + 0.0001x)^{-0.5}$

$\sigma_z$  (kelas stabiliti D) =  $0.06x (1 + 0.0001x)^{-0.5}$

$\sigma_z$  (kelas stabiliti F) =  $0.04x (1 + 0.0001x)^{-0.5}$

$\sigma_y$  (kelas stabiliti C) =  $0.11x (1 + 0.0001x)^{-0.5}$

$\sigma_y$  (kelas stabiliti D) =  $0.08x (1 + 0.0001x)^{-0.5}$

$\sigma_y$  (kelas stabiliti F) =  $0.16x (1 + 0.0003x)^{-1}$

$$F_b = \frac{W_o R_o^2 g (T_{po} - T_{ao})}{T_{po}}$$

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