UNIVERSITI SAINS MALAYSIA

First Semester Examination
2007/2008 Academic Session

October / November 2007

# EAP 583/4 – Air and Noise Pollution Control

Duration : 3 hours

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

**Instructions**: Answer **FIVE (5)** questions only. All questions carry the same marks.

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

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

1. Vehicles emissions have been the main contributor to air pollution loading especially in urban areas. Suggest comprehensive vehicles emission reduction actions that could be implemented to reduce them in short and long term.

(20 marks)

2. Calculate the concentrations of sulphur dioxide at ground level open area at points located 0.5, 1.0, 1.5, 2.0 and 2.3 km downwind in bright and stable atmospheric condition emitted from a stack of a coal fired power station, with daily mass of solid fuel burned 5000 tonne. The stack is 50 m height with internal radius of 10 m, exit velocity of 20 m/s at temperature 373 K. Wind velocity at 10 meter height is 12 m/s. Plume rise (dh) value is 120m. Given sulphur content of solid fuel is 2.4%. Draw the air pollutant map as a function of distance and concentrations.

(20 marks)

3. (a) Discuss the effects of increasing air pollutions on building materials by giving appropriate examples.

(10 marks)

(b) Clearly, describe methods for measuring particles in ambient air.

(10 marks)

4. (a) Name **THREE (3)** Guidelines of an ambient noise levels and vibration in Malaysia.

(6 marks)

(b) With the help of a sketch, explain the measurement procedures of an exhaust noise from a motorcycle in Malaysia, as given in the Third Schedule of the Environmental Quality (Motor Vehicle Noise) Regulations 1987, under the Environmental Quality Act 1974.

(8 marks)

(c) A concrete wall is having a transmission coefficient, $\tau = 2.5 \times 10^{-2}$. Another wall (mortar) is having a transmission coefficient, $\tau = 2.5 \times 10^{-7}$. Calculate the noise reduction in dB for both walls.

(6 markah)

5. (a) Define the Equivalent Noise Level (Leq) and Day and Night Noise Level (Ldn).

(6 marks)

5. (b) A vehicle monitoring station located 15 m from the traffic has recorded the following data:

| | |
|---|---|
| Truck daily average | 30% |
| Annual daily average | 20,000 vehicle/day |
| Number of cars | 880 vehicle/hour |
| Number of trucks | 300 vehicle/hour |
| Average speed | 75 km/hour |

(i) Calculate the predicted Leq in dB (A)

(7 marks)

(ii) Calculate the predicted Ldn in dB (A)

(7 marks)

6. (a) Define the Traffic Noise Index (TNI).

(4 marks)

(b) A traffic noise monitoring has resulted in the following data:

| Time (minute) | dB (A) |
|---|---|
| 10 | 75 |
| 20 | 73 |
| 30 | 78 |
| 40 | 80 |
| 50 | 91 |
| 60 | 58 |
| 70 | 66 |
| 80 | 75 |
| 90 | 82 |
| 100 | 79 |

Calculate:

(i) The TNI

(12 marks)

(ii) $L_{NP}$

(4 marks)