
UNIVERSITI SAINS MALAYSIA

1st. Semester Examination
2005/2006 Academic Session

November 2005

EAP 411/3 – Solidwaste Management and EIA

Duration : 3 hours

Instructions to candidates:

1. Ensure that this paper contains **FOUR (4)** printed pages before you start your examination.
2. This paper contains **SIX (6)** questions. Answer **FIVE (5)** questions only. Marks will be given to the **FIRST FIVE (5)** questions put in order on the answer script and **NOT** the **BEST FIVE (5)**.
3. All questions **MUST BE** answered in English.
4. Each question carry equal marks.
5. All questions **MUST BE** answered on a new sheet.
6. Write the answered question numbers on the cover sheet of the answer script.

1. (a) Approximate analysis is one of the chemical characteristic of solid waste. What is approximate analysis and explain the steps to obtain it.

(4 marks)

- (b) Determine the chemical formula for organic solid waste base on the following data:

- Average wet weight of waste obtained = 12.0 kg
- Average dry weight of waste obtained = 4.5 kg
- The overall composition of organic waste is as follows

	% dry weight
C	48.0
H	12.0
O	6.5
N	1.6
S	0.05

Given the relative weight of atoms: C = 12, H = 1, O = 16, N = 14 and S = 32.

(6 marks)

- (c) With the help of a diagram, explain FIVE(5) rules that must be followed during the collection route of the municipal waste truck.

(6 marks)

- (d) Smell is one of the biological characteristics of solid waste. Explain the formation of smell from waste stored at the point of generation

(4 marks)

2. (a) Transfer station is required when distance of hauling to the disposal site is no longer economical.

i) List **FOUR (4)** items that must be considered when designing a transfer station.

ii) List **FOUR (4)** factors which determine its location.

(4 marks)

- (b) Every week a biscuit factory receives 15 ton of flour, 12 tons of sugar, 5 tons of boxes, 8 tons of margarine and 2 tons of tin. 5% of the flour spilled and was thrown away together with the wastewater, 30% was kept and the remainder was turned into biscuits of various tastes and varieties. Only 10 ton of sugar was used dan the rest kept. About 10 % of boxes was spoilt and was then burnt, 5% was kept dan the remainder used to pack the biscuits. For the margarine, 5 tons was used, 3% was spoilt and trown,and the remainder was kept for future used. 5% of the tin were dented and were recycled, 60% were used for packaging and the balance kept

i) Draw the material balance diagram for the factory

ii) Determine the total amount of waste produced

iii) Determine the total amount of waste produced per product

(6 marks)

3. (a) What is meant by EMP? List the items required to be written in an EMP report.

(8 marks)

3. (b) Discuss the following items in the context of EMP.
- i) The duties of an environmental consultant (EC)
 - ii) Policy
 - iii) Environmental training and safety exercises
- (12 marks)
4. (a) Differentiate scoping from screening in EIA.
- (10 marks)
- (b) Briefly discuss relationships between mitigation measures and prohibition of environmental degradations.
- (10 marks)
5. (a) Nothern Port Authority has proposed a project to increase handling capacity of a container terminal. The container terminal should have an increment of 35 percent handling capacity after completion of the project. This upgrading project will involve land reclamation using sand imported from Bersatu state. You are to decide the type of EIA that should be carried in order for the project to get approval from the environment authority. Write a framework for the terms of references for this project following scoping.
- (20 marks)
6. (a) Describe the ways of solid waste handling in residential buildings and apartments.
- (8 marks)
- (b) Taman Induk is provided with three recycling containers for the separation and collection of wastes. Newspaper is put in one container, aluminium cans, plastics and glass in the second container and the remaining waste in the third. The municipal solid waste (MSW) generated at 2 kg/capita.day has the following composition:

Component	Weight, %	Specific weight, kg/m ³
Food waste	42.0	295
Paper	17.5	88
Plastics	16.0	67
Glass	8.0	205
Aluminium cans	2.0	160
Cardboards	4.5	50
Yard waste	2.0	95
Wood	1.5	244
Textiles	1.0	65
Leather	0.5	160
Rubber	0.5	135
Others	4.5	380

Assuming:

- (i) newspaper constitutes 22% of the total amount of paper
- (ii) containers are emptied weekly for collection
- (iii) the Taman has 950 houses, average 5 persons per house
- (iv) 80% material separation rate, and
- (v) 70% household participation in the recycling programme

Determine:

- (i) the amount of recycling achievable. (3 marks)
 - (ii) the total weight and volume of recyclable components generated per week. (3 marks)
- (c) Sketch the diagrams and describe the working of vibrating and trammel screens. (6 marks)