
UNIVERSITI SAINS MALAYSIA

First Semester Examination
Academic Session 2009/2010

November 2009

EAP 585/4 – Solid And Hazardous Waste Management

Duration : 3 hours

Please check that this examination paper consists of **FOUR (4)** printed pages before you begin the examination.

Instructions:

This paper contains **SIX (6)** questions. Answer **FIVE (5)** questions only.

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

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

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

1. (a) Describe incompatible scheduled waste and onsite treatment facility. Please use examples to assist your explanation.

(10 marks)

(b) In the First Schedule of Regulation 2 of the Environmental Quality Scheduled Waste Regulations 2005, waste is classified into several categories. List all categories and give **TWO (2)** examples for each category.

(10 marks)

2. (a) Explain the characteristics of solid waste.

(10 marks)

(b) What are list and describe **FIVE (5)** the factors that influence the waste generation?

(10 marks)

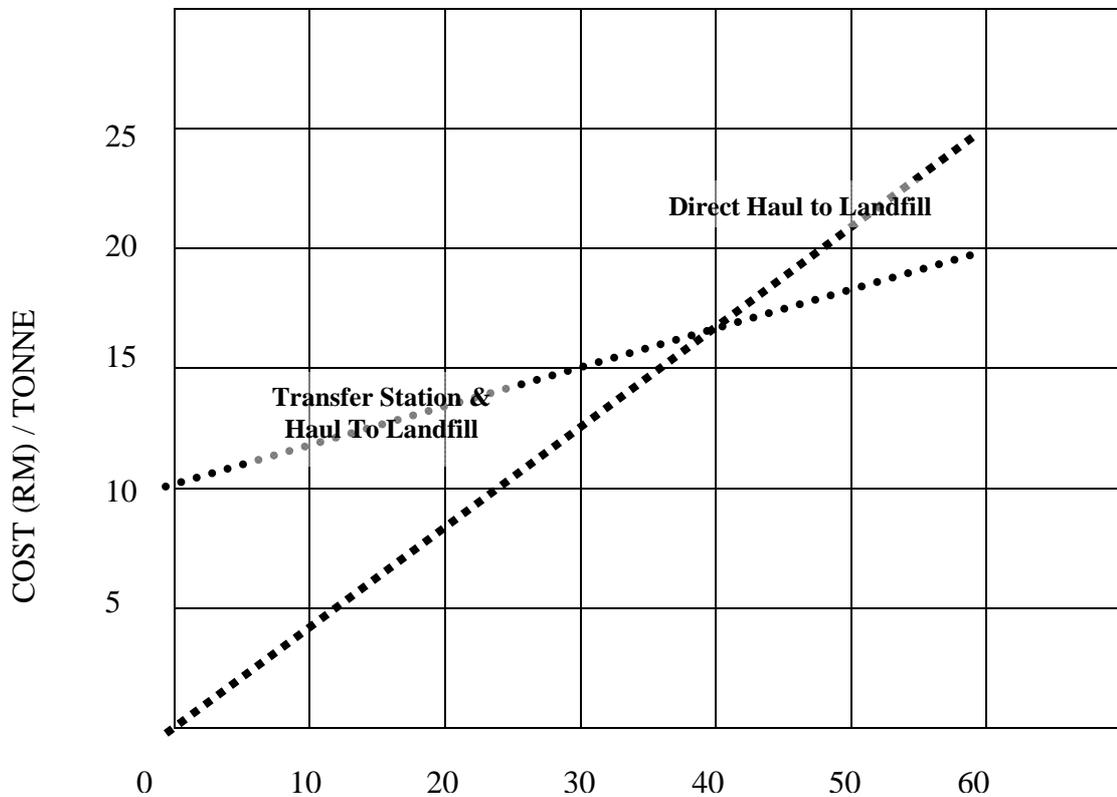


Figure 1 : ROUNDTRIP DISTANCE (KM) TO LANDFILL

3. (a) Figure 1 above shown the break even analysis (transfer versus direct haul). Define break even point and briefly describe Figure 1.

(10 marks)

- (b) Using the information provided in Table 1 below, calculate:

- i) The overall recycling efficiency
- ii) The composition of the generated and recycled wastes, and
- iii) The volumetric reduction (%) in disposed wastes due to recycling.

Table 1

Component	Disposed Waste Composition,% by weight	Recycle Efficiency,% by weight	Specific Weight, kg/ms
Misc. Organics	19	25	166
Mixed Paper	30	30	86
Glass	20	50	196
Plastics	11	15	65
Metal	12	10	320
Miscellaneous	8	0	100
sum	100.0		

(10 marks)

4. (a) A community is composed of 1500 homes with an average of 3.5 persons per home. It has been estimated that waste generation rate is 0.9kg/capita/day. The maximum density of the waste is 0.6 tan/m³. A new landfill is being proposed with an expected life of 20 yrs. If the landfill is above ground, has a square footprint (base), side slopes of 3:1 (run to rise), waste to cover soil ratio 4:1 and maximum height of 10 m, determine the area required for the base of the landfill and the length of a side of the square base.

(10 marks)

- (b) With the helping a suitable diagram, discuss **FIVE (5)** different phase of landfill stabilization.

(10 marks)

5. (a) Explain the meaning of 'Scheduled Wastes' in Malaysia. Give **FIVE (5)** examples of this waste and suggest their main source in your answer.

(10 marks)

- (b) Describe any **TWO (2)** of the following hazardous wastes treatment methods:

- (i) Gasification Process
- (ii) Pyrolysis Processes
- (iii) Advanced Electric Reactor
- (iv) Plasma Arc Technology

(10 marks)

6. (a) Explain the classification and management of clinical wastes.

(10 marks)

- (b) List **SIX (6)** functions that a landfill cover should be able to perform.

(3 marks)

- (c) How is post-closure care provided for a landfill?

(7 marks)