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UNIVERSITI SAINS MALAYSIA

First Semester Examination  
2007/2008 Academic Session

October / November 2007

**EAP 585/4 – Solid And Hazardous Waste Management**

Duration: 3 hours

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Please check that this examination paper consists of **THREE** pages of printed material 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.

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

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

1. (a) Solid wastes are usually divided into different types depending on their source. Describe briefly about their sources? (10 marks)

- (b) How will you analyse the characteristics of solid waste? (10 marks)

2.

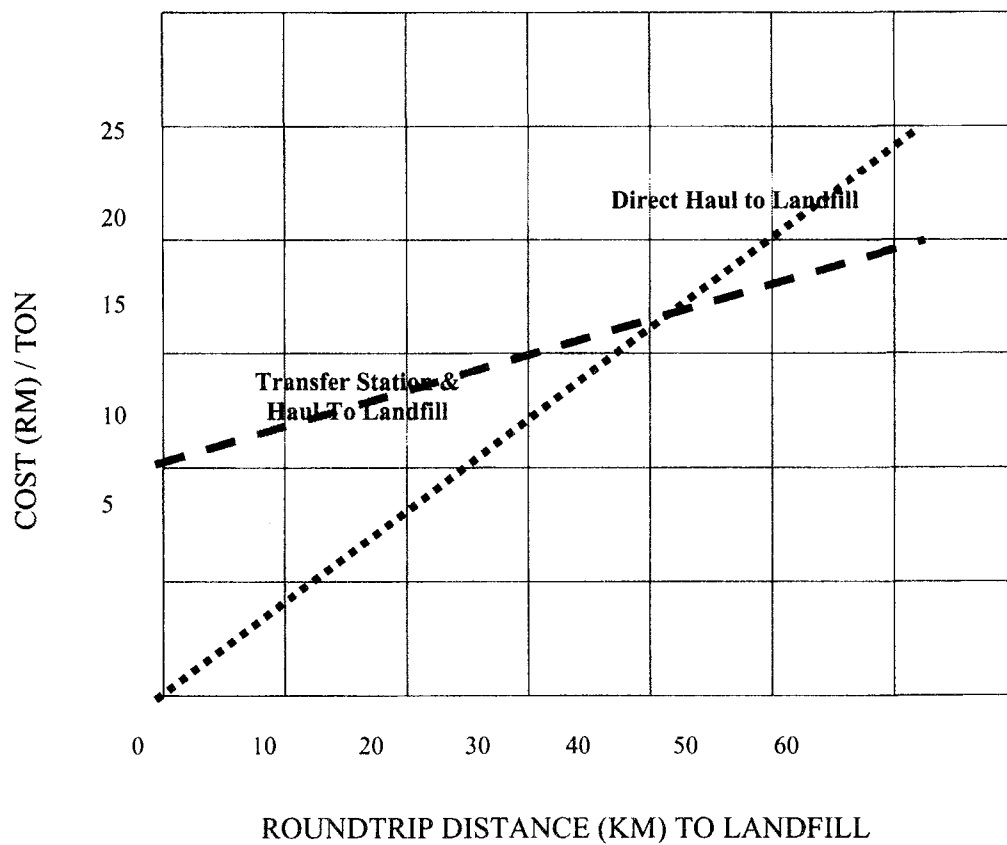


Figure 1

- (a) The above Figure 1 has shown the break even analysis (transfer versus direct haul). Define what break even point is and describe briefly about the figure? (10 marks)

2. (b) Using the information provided in table below, calculate:
- The overall recycling efficiency
  - The composition of the generated and recycled wastes, and
  - The volumetric reduction (%) in disposed wastes due to recycling.

Component	Disposed Waste Composition, % by weight	Recycle Efficiency, % by weight	Specific Weight, kg/m <sup>3</sup>
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)

3. (a) A community is composed of 500 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 600 kg/m<sup>3</sup>. 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), and a 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) Compare and contrast the **TWO (2)** major types of composting operations?

(10 marks)

4. (a) Describe approaches used to classify hazardous wastes in Malaysia.

(8 marks)

- (b) Explain **TWO (2)** of the terminology below:-

- LD<sub>50</sub>
- LC<sub>50</sub>
- IL<sub>m</sub>
- 9h h TL<sub>m</sub>

(4 marks)

- (c) List and briefly discuss generic characteristics of hazardous waste.

(8 marks)

5. Discuss disposal and management of clinical wastes in Malaysia.

(20 marks)

6. (a) Explain **THREE (3)** types of hazardous waste incinerators, use illustrations to assist you.

(12 marks)

- (b) Discuss final disposal of hazardous waste.

(8 marks)