



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAM
SEMESTER II
SESSION 2014/2015**

COURSE : SOLID AND HAZARDOUS WASTE
MANAGEMENT

COURSE CODE : BFA 40303

PROGRAMME : BACHELOR OF CIVIL
ENGINEERING WITH HONOURS

DATE : JUNE 2015 / JULY 2015

DURATION : 3 HOURS

INSTRUCTION : ANSWER **FOUR (4)** QUESTIONS
ONLY

THIS PAPER CONSIST OF **FOUR (4)** PAGES

- Q1** (a) Describe in detail on solid waste management. (5 marks)
- (b) Differentiate between municipal solid waste and construction waste (6 marks)
- (c) Solid waste composition in one community as tabulated in Table 1

Table 1: Solid waste composition

Composition	Percentage (%)	Moisture (%)	Typical density (kg/m ³)
Food waste	38	75	320
Paper	12	7	45
Plastic	15	2.5	33
Garden waste	15	54	147
Can	10	4	54
Wood	10	25	125

- (i) Determine moisture content of the waste based on 100 kg waste
 (ii) Calculate density of the waste sample based on 5,000 kg waste
 (iii) What could you conclude based on answer in (i) and (ii)
- (14 marks)

- Q2** (a) Discuss the importance of ultimate and energy content analysis in solid waste Management (5 marks)
- (b) Explain briefly on transfer station and what purpose it serves (6 marks)
- (c) A community generates 50000 kg/day of solid waste that is to be disposed off in a landfill. The refuse cover mass ratio is 3:1. What is the volume needed for 10 years operate. Assume the density of waste and cover is 1000 kg/m³. (6 marks)
- (d) As a civil engineer at a newly developed town, write up an executive summary on how to determine the solid waste generation rate of that area . (8 marks)

- Q3** (a) List **THREE (3)** pick up method of solid waste
(3 marks)
- (b) Compare advantages and disadvantages of any **TWO (2)** of the pick up method
(6 marks)
- (c) Explain in detail the function of “Perbadanan Sisa Pepejal Negara” in Malaysia
(6 marks)
- (d) Write up a proposal with the title integrated solid waste management in a construction industry
(10 marks)
- Q4** (a) Describe on a sanitary engineered landfill.
(5 marks)
- (b) Explain in detail on **THREE (3)** most important features in landfill design
(6 marks)
- (c) Discuss on problems and concerns related to landfill
(6 marks)
- (d) Determine the total area required for a new landfill with the projected life of 30 years for a population of 250,000 and generation rate of 2.02 kg/capita/day. The density of the waste is 470 kg/m³. The height of the landfill cannot exceed 15 m.
(8 marks)

- Q5** (a) List **THREE (3)** characteristic and carcinogenic effects of waste that consider as hazardous waste. (3 marks)
- (b) Describe the importance of manifest for hazardous waste management (6 marks)
- (c) Write up a brief contingency plan for handling hazardous waste (8 marks)
- (d) Discuss **TWO (2)** control methods for groundwater contamination due to hazardous waste. (8 marks)

- END OF QUESTION -