UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2021/2022

COURSE NAME	:	SOLID WASTE MANAGEMENT
COURSE	:	MFE 10403
PROGRAMME	:	MFA
EXAMINATION DATE	:	JANUARY / FEBUARY 2022
DURATION	:	3 HOURS
INSTRUCTION	:	1. ANSWER **ALL QUESTIONS** 2. THIS FINAL EXAMINATION IS AN **ONLINE** ASSESSMENT AND CONDUCTED VIA **OPEN BOOK**

THIS QUESTION PAPER CONSISTS OF **THREE (3)** PAGES.

TERBUKA

Q1 **(a)** Discuss **TWO (2)** main challenges in implementing municipal solid waste management systems in Malaysia.

(4 marks)

(b) Differentiate the definition of waste, solid waste and municipal solid waste.

(5 marks)

(c) NGOs are motivated primarily by humanitarian and/or developmental concerns rather than an interest in service improvement for their own members. Evaluate the role of NGOs that can contribute to solid waste management local industries.

(6 marks)

(d) Student population of Batu Pahat High School is 650 with 26 standard classrooms. By assuming 5-day school per week with solid waste pickups on Monday and Thursday every morning, waste generation rate is 120 g/capita/day and 3.4 kg/room/day and density of waste is 110 kg/m^3

    (i)   Design the size of storage containers that required for the school.

(6 marks)

    (ii)   Propose **TWO (2)** plans for reducing volume of solid waste in the school

(4 marks)

Q2 **(a)** Explain **FIVE (5)** factors affecting generation rate of municipal solid waste.

(5 marks)

(b) Distinguish house-to-house collection and community bin collection. Comment the advantage and disadvantage of both methods.

(10 marks)

(c) Mathematical programming and geographic information system approaches are decision support tools that can be apply to design truck routing. By using these tools, propose the optimal method in designing truck routing to increase the efficiency of waste collection.

(10 marks)

Q3 **(a)** Explain the issues and challenges of 3R implementation in Malaysia.

(6 marks)

(b) In the Eleventh Malaysia Plan 2016- 2020, the stated solid waste management goals were to achieve a rate of 40% waste diversion from landfill and 22% recycling rate by 2020. Predict the recycling rate in 2030 and explain **FOUR (4)** main factors that influence the recycling rate.

(8 marks)

(c)   Household hazardous waste should also be separated from source. Discuss on the suitable method to identify the household hazardous waste identification and characterization.

(11 marks)

Q4   **(a)**   Environmental quality monitoring should be strictly controlled by an owner or occupier of a landfill. Identify the environmental quality monitoring that should be conducted.

(3 marks)

     (b)   Poor leachate treatment will contribute to low effluent quality. Recommend **TWO (2)** the effective method to treat old leachate for Simpang Renggam landfill.

(8 marks)

     (c)   Compare **TWO (2)** main difference characteristics between groundwater and surface water contamination.

(4 marks)

     (d)   Journals such as Environmental Science and Technology, Journal of Contaminant Hydrology, and Water Research were the major sources of the body of knowledge of groundwater remediation. Based on these journals, select **ONE (1)** the latest technology of groundwater treatment and discuss the advantage and disadvantage of the groundwater treatment.

(10 marks)

- END OF QUESTIONS –