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**UTHM**  
Universiti Tun Hussein Onn Malaysia

**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**FINAL EXAMINATION  
(ONLINE)  
SEMESTER II  
SESSION 2019/2020**

COURSE NAME : SOLID AND HAZARDOUS WASTE  
MANAGEMENT

COURSE CODE : BFA 40303

PROGRAMME : BFF

EXAMINATION DATE : JULY 2020

DURATION : 6 HOURS

INSTRUCTIONS : ANSWER **ALL** QUESTIONS

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

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- Q1** (a) Assess thoroughly on how the physical, chemical and biological properties identification of a waste could benefit waste management system. (10 marks)
- (b) With the aid of illustration, evaluate the hierarchy of Integrated Solid Waste Management (ISWM) and its contribution towards a better waste management system. (10 marks)
- Q2** (a) Examine **FOUR (4)** actions that could be taken to enhance waste minimization. (4 marks)
- (b) Pointing out the problems that could occur in waste collection based on labour and technological issues. (6 marks)
- (c) Propose short term and long term action plans to improve solid waste management system with respect to the implementation, education and regulations that lead towards sustainability as well as supporting the economic productivity. (10 marks)
- Q3** (a) With the aid of a diagram, differentiate between conventional landfill and sanitary landfill. (4 marks)
- (b) Compare between physical/chemical and biological process in leachate treatment. (6 marks)
- (c) With the aid of diagram, evaluate **TWO (2)** types of facilities that have been installed to capture gas in landfill and discuss on the effectiveness of each facility. (10 marks)
- Q4** (a) Display **FOUR (4)** characteristics of hazardous waste. (4 marks)
- (b) Evaluate **THREE (3)** main issues in the implementation of incineration process as a disposal method. (6 marks)

- (c) An engineer who has sufficient experience in designing solid waste landfill has decided to use the same design to landfill that contains hazardous waste. Evaluate on the chances of success or failure of the particular design.

(10 marks)

- Q5** (a) Identify **FOUR (4)** laws and regulations that is important in hazardous waste management.

(4 marks)

- (b) Kim Kim river is contaminated with hazardous waste and required a remedial design. With the aid of a flow chart, propose step by step the groundwater remediation procedure that should be taken according to the guidelines by Environmental Protection Agency (EPA)

(6 marks)

- (c) Remedial technologies focus to minimize or eliminate the hazard to human health and the environment. Critically

- (i) Compare between passive and active remediation systems.

(6 marks)

- (ii) Explain **TWO (2)** examples for each remediation system.

(4 marks)

- END OF QUESTIONS -

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