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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2017/2018**

COURSE NAME : SOLID AND HAZARDOUS WASTE
MANAGEMENT

COURSE CODE : BNA 31003

PROGRAMME CODE : BNA

EXAMINATION DATE : JUNE/JULY 2018

DURATION : 3 HOURS

INSTRUCTION : ANSWER ALL QUESTIONS

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THIS QUESTION PAPER CONSISTS OF **FOUR (4)** PAGES

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- Q1** (a) Municipal Solid Waste (MSW) is a type of waste consisting of everyday items that are discarded by the public. Rapid economic development and population growth, inadequate infrastructure and expertise, and land scarcity make the management of MSW become one of Malaysia's most critical environmental issues.
- (i) Identify **FOUR (4)** negative effect of MSW. (8 marks)
 - (ii) List **FOUR (4)** elements of proximate composition in solid waste. (4 marks)
 - (iii) Propose the **FOUR (4)** action that could be taken to reduce waste generation rates. (8 marks)
- (b) Briefly classify **FIVE (5)** types of low rise detached dwelling collection services used in solid waste management. (5 marks)
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- Q2** (a) Waste collection system is the transfer of solid waste from the point of use and disposal to the point of treatment or landfill.
- (i) Illustrate **THREE (3)** diagrams of waste collection system. (9 marks)
 - (ii) Propose the best waste collection system with sufficient reason based on answer **Q2 (a) (i)**. (6 marks)
 - (iii) Discuss **FOUR (4)** advantages of the system describe in **Q2 (a) (ii)**. (4 marks)
- (b) Material Recovery and Transformation Facility (MTRF) is a facility for waste material to be separated for different purposes. Plan the activities involved at the MTRF prior the waste to be transferred to the final disposal. (6 marks)

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- Q3** (a) List the laws and regulation due to hazardous and clinical waste management that are currently in place in Malaysia. (3 marks)
- (b) Examine the engineering technologist role in hazardous solid waste management (HWSM). (8 marks)
- (c) Proper packing to prevent accidental discharge of hazardous waste during both normal and potentially dangerous during transport situations.
- (i) Describe the term of discharge of hazardous waste in HWSM. (2 marks)
- (ii) Plan the emergency response if the discharge of hazardous occurred. (9 marks)
- (iii) Evaluate the importance of emergency response for community. (3 marks)

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- Q4** (a) Recycling are limited for many materials, source reduction will assume more importance for those waste material that are now typically discarded.
- (i) Illustrate basic steps in recycling. (6 marks)
 - (ii) Propose **FOUR (4)** manufacturer plans for recycling contributions at industries. (8 marks)
- (b) The process of waste incineration poses a significant threat to public health and the environment. Analyze **SIX (6)** issues related to the incineration process in HWSM. (6 marks)
- (c) Screening is a unit operation used to separate mixture of materials of different sizes into two or more size fractions by means of screen surfaces.
- (i) List **THREE (3)** device that incorporated as screening unit. (3 marks)
 - (ii) Identify the application of this operation, as mention in answer **Q4 (c) (i)**. (2 marks)

-END OF QUESTION-

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