



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
(ONLINE)
SEMESTER I
SESSION 2020/2021**

COURSE NAME : ENVIRONMENTAL ENGINEERING
TECHNOLOGY
COURSE CODE : DAK 23503
PROGRAMME CODE : DAK
EXAMINATION DATE : JANUARY / FEBRUARY 2021
DURATION : 2 HOURS 30 MINUTES
INSTRUCTION : ANSWER ALL QUESTIONS

TERBUKA

THIS QUESTION PAPER CONSISTS OF SIX (6) PAGES

- Q1**
- (a) Coagulation and flocculation are the process involved in water treatment process. The aim of the process is to remove the impurities.
 - (i) State the impurities which are removed by coagulation and flocculation. (1 mark)
 - (ii) Discuss the difference between coagulation and flocculation (2 marks)
 - (iii) A jar test is performed to stimulate or predict the treatment of input water by several different chemical doses. Explain **four (4)** steps involve in conducting the jar test and sketch the graph to show optimum dosage. (8 marks)
 - (b) Flocculation and settling tanks should be placed as close as possible. Justify the given statement (2 marks)
 - (c) Environmental Protection Agency (EPA) requires the turbidity of a treated water should be at least at 0.3 NTU. In order to achieve the standard, filtration process is normally used. Discuss the most common filtration used. (3 marks)
 - (d) Drinking water need to undergo disinfection process before entering the water distribution system.
 - (i) Analyze the difference between disinfection and sterilization process. (2 marks)
 - (ii) Describe **one (1)** method of water distribution system. (2 marks)
- Q2**
- (a) The purposes of wastewater treatment is to reduce the threat of water pollution which are discharged from homes, businesses and industries. State **one (1)** main characteristic of wastewater. (2 marks)
 - (b) Physical, biological and chemical process involved in wastewater treatment methods. Explain the function of each process. (3 marks)

TERBUKA

(c) The objective of primary treatment is to provide protection to wastewater treatment plant equipment.

(i) Describe the function and process involve in the primary treatment. (3 marks)

(ii) Calculate the detention time (h) of the following tank design. Draw the conclusion based on detention time calculated.

Design data:

Flow = $0.20 \text{ m}^3 \cdot \text{s}^{-1}$

Length = 54 m

Width = 10 m

Liquid depth = 2.0 m

(3 marks)

(d) Sketch and explain the system used for municipal wastewater treatment. (9 marks)

Q3 (a) Solid wastes are the wastes arising from human activities and are normally solid as opposed to liquid or gaseous and are discarded as useless or unwanted. Discuss **two (2)** classification of solid waste. (4 marks)

(b) Information on the chemical composition of the components that constitute solid waste is important in evaluating alternate processing and recovery options. Point out **three (3)** most important properties to be known. (3 marks)

(c) The solid waste generation rates depend on the standard of living and culture of the people living in a city or town. Describe **three (3)** factors that affect waste generation rates. (3 marks)

(d) A town of 2000 homes in Johor Bahru generates 0.965kg/person.day of municipal solid waste. Another town of the same size in Kuala Lumpur generates 1.9kg/person.day. Assuming that each home is consist of 10 residents, determine the municipal solid waste generated in each town per day. (4 marks)

TERBUKA

- (e) Calculate the compacted volume of solid waste to be collected per week if the following data is applicable.

Residences – 664

Occupants per residence = 5

Solid waste generation rate = 1.5 kg/person.day

Compacted density of solid waste in collection vehicle – 325 kg/m³

(2 marks)

- (f) Estimate the density of solid waste sample with the composition stated in **Table Q3 (f)**. Assume 1000kg sample of waste.

(4 marks)

- Q4** (a) Hazardous waste is any discarded material, liquid or solid that contains substances known to be fatal to humans or lab animals in low doses, toxic, carcinogenic, mutagenic, or teratogenic to humans or other life forms ignitable with a flash point less than 60°C, corrosive and explosive or highly reactive.

- (i) List **five (5)** household hazardous products.

(5 marks)

- (ii) State **three (3)** waste management process in of hazardous waste.

(3 marks)

- (b) Treatment methods for hazardous waste are important in order to preserve the environment. Discuss **two (2)** types of treatment methods for hazardous waste.

(4 marks)

- (c) Differentiate between biomedical and hazardous waste.

(6 marks)

- (d) Determine the authority and act responsible to regulate biomedical waste management.

(2 marks)

TERBUKA

- Q5** (a) Differentiate between primary and secondary air pollutions. (2 marks)
- (b) Humans depend on air to live and breathe. Polluted air can cause damage to health and affect human in a negative way. Point out **three (3)** effects of air pollutions on human health. (6 marks)
- (c) List **four (4)** major pollutants for which the Environmental Protection Agency (EPA) has developed national standards. (4 marks)
- (d) Write **three (3)** techniques which does not involve the use of emissions control devices in order to control air pollution. (6 marks)
- (e) Describe the differences between adsorption and absorption method used for air pollution control. (2 marks)

-END OF QUESTIONS-

TERBUKA

FINAL EXAMINATION

SEMESTER / SESSION : SEM 1 / 2020/2021
COURSE NAME: ENV. ENG. TECHNOLOGY

PROGRAMME CODE : DAK
COURSES CODE : DAK 23503

Table Q3 (f)

Component	% by mass	Density (kg/m³)
Food waste	15	290
Paper	45	85
Cardboard	10	50
Plastics	10	65
Garden wastes	10	105
Wood	5	240
Tin cans	5	90

TERBUKA