Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2019/2020

COURSE NAME	:	ENVIRONMENTAL ENGINEERING TECHNOLOGY
COURSE CODE	:	DAK 23503
PROGRAMME	:	DAK
EXAMINATION DATE	:	DECEMBER 2019 / JANUARY 2020
DURATION	:	2 HOURS 30 MINUTES
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

THIS QUESTION PAPER CONSISTS OF **SIX (6)** PAGES

Q1 (a) Turbidity, suspended solids and dissolved oxygen are chemical water quality parameter. Answer the followings.

(i) Definition of turbidity.

(1 mark)

(ii) State the difference between turbidity and suspended solids.

(2 marks)

(iii) Correlation between turbidity and dissolved oxygen.

(2 marks)

(iv) Explain the meaning of dissolved oxygen and **two (2)** factors influence the levels of dissolve oxygen.

(3 marks)

(b) A water sample is collected from an activated sludge process of municipal wastewater treatment. The relevant information is as follow:

weight of the clean filter paper (g) = 1.6329
weight of filter paper and the residue (g) = 1.6531
volume of the sample (mL) = 50

Determine:

(i) weight of residue (g)

(2 marks)

(ii) the concentration of total suspended solids (mg/L)

(3 marks)

(c) Calculate biochemical oxygen demand for seeded dilution water based on information as follow:

dissolved oxygen initial = 7 mg/L
dissolved oxygen final = 6.3 mg/L
dissolved oxygen initial blank = 7.1 mg/L
dissolved oxygen final blank = 7.0 mg/L
volumetric fraction of sample = 1/10
fraction = 0.9

(3 marks)

(d) Describe **two (2)** types of bioindicators for biological water quality.

(4 marks)

Q2 (a) List **three (3)** characteristics of groundwater and surface water.

(3 marks)

(b) Explain **three (3)** distribution method of water system.

(6 marks)

(c) Raw water is a broad term that describes any water that has not been treated to remove bacteria and other contaminants. Most untreated water is unsafe for consumption. In order to remove these contaminants, and to comply with state and federal water quality standards, water is treated before it is distributed for consumption. Based on **Figure Q2(c)**, sketch and explain the process of water treatment plant from the water supply (lake) to the water distribution system.

(11 marks)

Q3 (a) The purposes of treatment wastewater is to manage water discharged from homes, businesses, and industries to reduce the threat of water pollution. Explain **three (3)** main characteristics of wastewater.

(6 marks)

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

(i) Describe briefly about 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 = 0.150 $m^3.s^{-1}$
Length = 40 m
Width = 10 m
Liquid depth = 2.0 m

(3 marks)

(c) Sketch and explain the system used for municipal wastewater treatment.

(8 marks)

Q4 (a) Define municipal solid waste.

(2 marks)

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

(3 marks)

(c) The solid waste generation rates depends on the standard of living and culture of the people living in a particular 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. Assume 1 home have 10 residents.

(i) Determine municipal solid waste in each town per day.

(4 marks)

(ii) Determine municipal solid waste in each town per week.

(4 marks)

(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/m^3

(4 marks)

Q5 (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 product.

(5 marks)

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

(3 marks)

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

(4 marks)

(c) Differentiate between biomedical waste and hazardous waste.

(6 marks)

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

(2 marks)

-END OF QUESTIONS-

FINAL EXAMINATION

SEMESTER / SESSION : SEM 1 / 2019/2020 PROGRAMME : DAK
COURSES : ENVIRONMENTAL ENGINEERING TECHNOLOGY COURSES CODE : DAK 23503

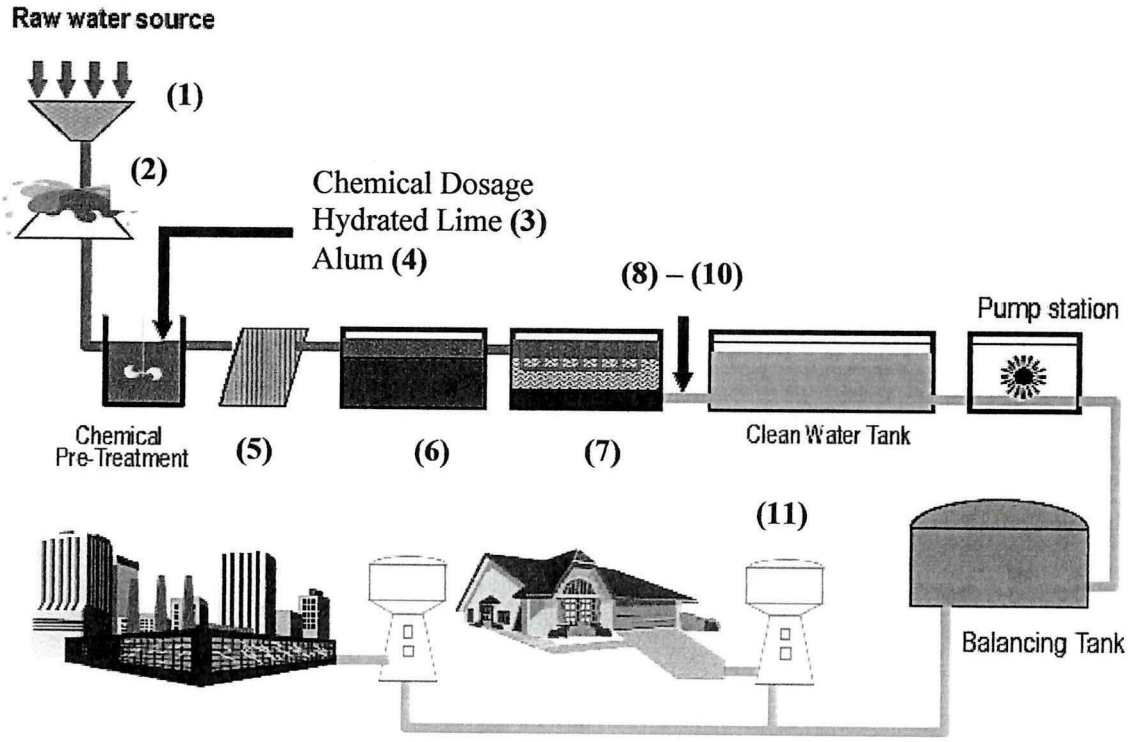

Figure Q2(c)