Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESSION 2015/2016

COURSE NAME	:	WASTEWATER TREATMENT TECHNOLOGY
COURSE CODE	:	DAK 20803
PROGRAMME	:	2 DAK
EXAMINATION DATE	:	DECEMBER 2015/JANUARY 2016
DURATION	:	2 HOURS 30 MINUTES
INSTRUCTION	:	ANSWER **FOUR (4)** QUESTIONS ONLY

THIS QUESTION PAPER CONSISTS **FIVE** (**5**) OF PAGES

Q1 (a) Define the terms of water pollution.

(4 marks)

(b) Explain briefly any **three (3)** sources of water pollution in Malaysia.

(6 marks)

(c) Guiyu, China is one of the heavily polluted stream in the world occupied with *e-waste* along the river. Discuss *e-waste* with the examples and **two (2)** impacts towards human and environment.

(5 marks)

(d) Sewerage systems divided into two, which is combined sewer and separated sewer. State definition of both sewer systems and differentiate with illustration of diagrams clearly.

(10 marks)

Q2 (a) Describe physical,chemical and biological parameters in determination of water quality. Give **two (2)** examples for each parameter.

(6 marks)

(b) Temperature and colour are one of the major factors affecting water quality. Explain how colour are related with physical parameter.

(4 marks)

(c) In chemical parameters, organic oxygen-demanding materials measured by determining the amount of oxygen consumed during degradation in a manner approximately degradation in natural waters.

(i) Define Biochemical Oxygen Demand, BOD.

(2 marks)

(ii) Define Chemical Oxygen Demand, COD.

(2 marks)

(d) Biological parameters are used to describe the presence of microbiological organisms and water-borne pathogens.

(i) Describe the mechanism of pathogenic organisms.

(5 marks)

(ii) Give **three (3)** examples of pathogen groups and names with its related diseases.

(6 marks)

Q3 (a) Illustrate the typical unit processes in treating municipal wastewater and state the objectives of pretreatment including screening and grit chamber in a wastewater treatment processes.

(8 marks)

(b) Sketch an aid of diagram clearly showing the wastewater load reduction in a wastewater treatment system for the following treatment.

(i) Influent treatment

(1 mark)

(ii) Primary treatment

(1 mark)

(iii) Secondary treatment

(1 mark)

(c) Pre-treatment in industrial wastewater involving processes of screening (bar rack), grit channel and equalization.

(i) Identify the objective of the screening processes in pre treatment.

(2 marks)

(ii) List **two (2)** type of screens in pre- treatment processes.

(1 mark)

(iii) Compare **three** (3) differences design criteria of screens as in answer (c) (ii).

(6 marks)

(d) Discuss the processes occur during primary sedimentation.

(5 marks)

Q4 (a) Secondary treatment systems by aerobic bacteria are broadly categorized as suspended growth, attached growth and dual biological suspended and attached growth.

(i) Define what is suspended growth and list **two (2)** examples.

(2 marks)

(ii) Describe how activated sludge are formed.

(8 marks)

(b) A food processing plant of Industri Kecil danSederhana (IKS) in Parit Raja, Johor hasgenerated925 m^3/s of wastewater each day with BOD before primary settling is 1200 mg/L and suspended solids of 540 mg/L. The wastewater were then, treated using an activated sludge system with an aeration tank with dimension of(8 m width, 10 m long and 4 m depth). Soluble BOD_5 is 200 mg/L with suspended solid of 100 mg/L after primary settling and 1800 mg/L of MLVSS (X) entering the activated sludge system.

(i) Calculate the removal efficiencies of BOD and suspended solids in tank.
(2 marks)

(ii) Determine the aeration period in hour.
(3 marks)

(iii) Calculate the F/M ratio.
(2 marks)

(c) Give **three (3)** advantages and disadvantages of trickling filters of attached growth system.
(6 marks)

(d) Name **two (2)**latest technology of trickling filter medium.
(2 marks)

Q5 (a) List **four (4)** sources of sludge with brief explanation of their characteristics
(10 marks)

(b) Based on **Figure Q5(b)**, discuss the treatment method of wastewater treatment system.
(8 marks)

(c) During treatment of activated sludge, the 'thicken' process has separating much water by gravity and flotation. Compare the efficiency of sludge removal.
(4 marks)

(d) Discuss **three (3)** ways on how you can dispose the sludge after the treatment processes.
(3 marks)

-END OF QUESTIONS-

FINAL EXAMINATION

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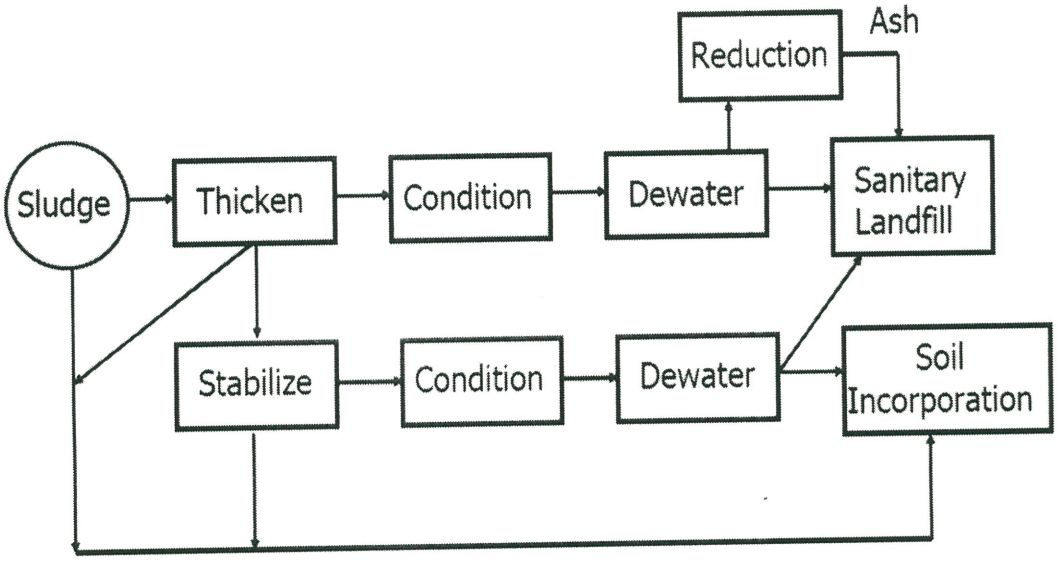

Figure Q5(b)