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UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2016/2017**

COURSE NAME : WASTEWATER TREATMENT
TECHNOLOGY
COURSE CODE : DAK 20803
PROGRAMME : 2 DAK
EXAMINATION DATE : DECEMBER 2016/JANUARY 2017
DURATION : 3 HOURS
INSTRUCTION : ANSWER **FOUR (4)** QUESTIONS
ONLY

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

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- Q1** (a) Explain the sewage discharge of Standard A and Standard B in Environmental Quality Act 1974.
(4 marks)
- (b) Wastewater is discharged from homes, commercial establishments and industrial plants by means of sanitary sewers. Distinguish between domestic and industrial wastewater
(9 marks)
- (c) Sewerage systems divided into two type which is combine sewer and separated sewer.
- (i) State the definition of both sewer system.
(4 marks)
- (ii) Differentiate both system by illustration of diagrams clearly.
(8 marks)
- Q2** (a) Describe how color of wastewater can be related with physical parameter.
(4 marks)
- (b) Organic oxygen demand usually measured to determined amount of oxygen consume during degradation in natural water.
- (i) Calculate the BOD for greywater sample with dissolved oxygen depletion of 10 mg/L and dilution factor value of 0.1 for a standard BOD test using 300 mL BOD bottle.
(4marks)
- (ii) Differentiate between biological oxygen demand (BOD) and chemical oxygen demand (COD).
(8 marks)
- (c) Water quality are divided into three parameter including physical, biological and chemical characteristic. Explained **THREE (3)** types of bioindicators parameter.
(9 marks)

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- Q3** (a) List **TWO (2)** type of screens in pre-treatment process. (2 marks)
- (b) Describe **THREE (3)** important of pre-treatment process in wastewater treatment system. (6 marks)
- (c) (i) Illustrate the typical unit process nitrating municipal wastewater including pre-treatment process. (8 marks)
- (ii) Analyze the waste load reduction in a wastewater treatment process from the influent towards the primary, secondary and advance treatment prior discharge to the surface water in terms of organic matter. (9 marks)
- Q4** (a) Define the suspended growth and attached growth system by giving **ONE (1)** example each. (4 marks)
- (b) A food processing plant of Industri Kecil dan Sederhana (IKS) in Parit Raja Johor has generated 925 m³/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 aerated tank with dimension of (8m width, 10 m long and 4 m depth. Soluble BOD₅ is 200 mg/L with suspended solid of 100 mg/L after primary settling and 1800 mg/L of ML VSS (X) entering the activated sludge system.
- (i) Calculate the removal efficiencies of BOD and suspended solid in tank. (6 marks)
- (ii) Determine the aeration period in hour. (5 marks)
- (iii) Calculate the F/M ratio. (5 marks)
- (c) Illustrate the bacteria growth curve in pure cultures and label each phase. (5 marks)

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- Q5** (a) List the sources of sludge production from the wastewater treatment process. (4 marks)
- (b) Briefly explained the characteristics of sludge produced from different processes in wastewater treatment system. (6 marks)
- (c) Based on **Figure Q5 (c)** Briefly describe **TWO (2)** of the treatment methods of sludge produced from a wastewater treatment system. (7 marks)
- (d) Sludge from a wastewater treatment must be disposed accordingly to minimize the environmental hazards. Briefly discuss the options available for sludge disposal. (8 marks)

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-END OF QUESTIONS-

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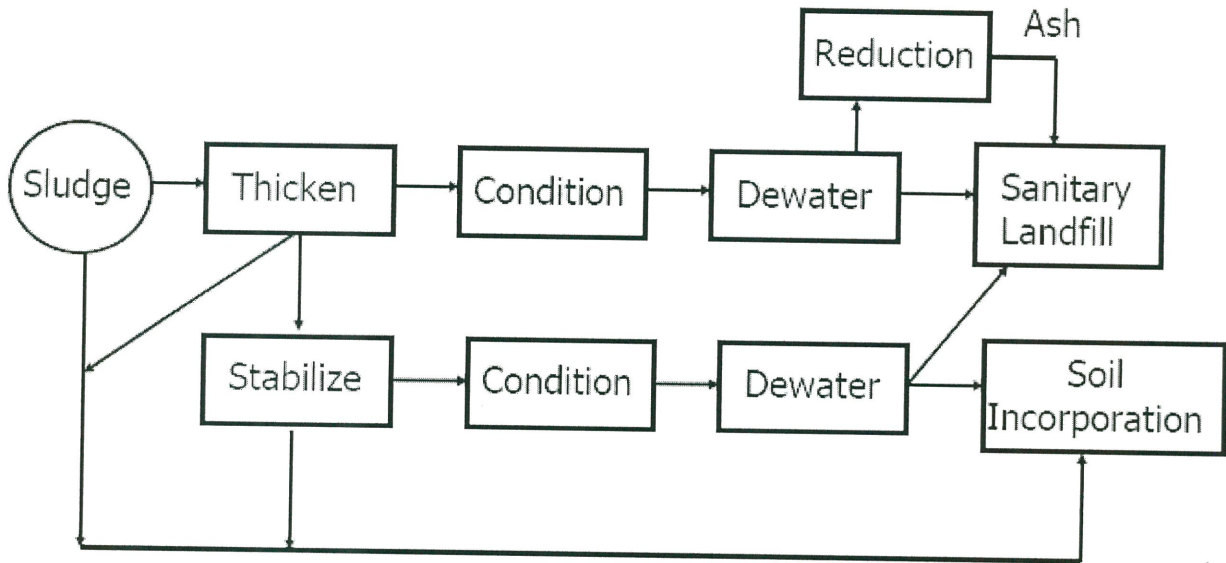


Figure Q5 (c)

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