UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
(TAKE HOME)
SEMESTER I
SESSION 2020/2021

COURSE NAME	:	WASTEWATER TREATMENT: BIOCHEMICAL TECHNOLOGY
COURSE CODE	:	BNN 40703
PROGRAMME	:	BNN
EXAMINATION DATE	:	JANUARY/FEBRUARY 2021
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWERS **ALL** QUESTIONS **OPEN BOOK** EXAMINATION

THIS QUESTION PAPER CONSISTS OF **THREE (3)** PAGES

Q1 (a) Describe the following terms.

(i) Digested sludge
(ii) Raw sludge
(iii) Primary sludge

(6 marks)

(b) Contrast anaerobic contact process and anaerobic biofilter in terms of its biological characteristics.

(3 marks)

(c) Show how anaerobic wastewater treatment results in the effluent with reduced BOD and COD.

(6 marks)

(d) There are possibilities of encountering failure/ disruption at UASB wastewater treatment unit where the BOD and COD removal efficiencies are much lesser than 75% and 74%, respectively. Propose **FIVE (5)** preventive measures in order to prevent any failures associated with this unit during it's operation.

(10 marks)

Q2 (a) Explain the objective of sludge stabilization.

(5 marks)

(b) Determine the benefits and disbenefits of

(i) sewage sludge applications in agricultural activities
(ii) incineration of sewage sludge

(12 marks)

(c) Explain briefly what it means by composting.

(2 marks)

(d) Compare anaerobic digestion and aerobic digestion

(6 marks)

Q3 (a) Contrast activated sludge and trickling filters in terms of bacterial characteristics.

(3 marks)

(b) Explain a problem associated with the application of biofilm processes and propose the solution to the problem.

(6 marks)

(c) Determine a problem that commonly found during the application of trickling filter but is not found during RBC application.

(4 marks)

(d) You are an engineer at a wastewater treatment plant. A new trickling filter has been installed at the plant. However, there was an operation disruption during the

commissioning of the new trickling filter. You have been asked by the management to investigate and produce a report regarding this matter.

(i) Propose **THREE (3)** possible causes associated with the failure of the trickling filter unit operation. (6 marks)

(ii) Propose **THREE (3)** solutions (Your answer must be based on the failures described in answer **Q1(e)(i)**) to prevent such failures from reoccurring in the future.

(6 marks)

Q4 (a) Describe what it means by nitrogen content in wastewater.

(5 marks)

(b) You are an engineer at a wastewater treatment plant. The chemist at the wastewater treatment plant inform you that the quality of effluent have exceeded the acceptable condition of the discharge standard in term of phosphorus removal. By considering the anaerobic/oxic process, propose **TWO (2)** citerias that need to be investigated which you think can cause the failure in discharging the effluent which is within the accetable condition of the discharge standard in terms of phosphorus removal and propose **TWO (2)** solutions to prevent the problems from reoccurring in the future.

(8 marks)

(c) You are an engineer at a wastewater treatment plant. The chemist at the wastewater treatment plant inform you that the quality of effluent have exceeded the acceptable condition of the discharge standard in term of nitrogen removal. By considering the processes at the secondary treatment, propose **THREE (3)** citerias that need to be investigated which you think can cause the failure in discharging the effluent which is within the accetable condition of the discharge standard in terms of ni and propose **THREE (3)** solutions to prevent the problems from reoccurring in the future.

(12 marks)

-END OF QUESTIONS –