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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2017/2018**

COURSE NAME : INTRODUCTION TO ENVIRONMENTAL ENGINEERING TECHNOLOGY

COURSE CODE : BNP21403

PROGRAMME CODE : BNA/BNB/BNC

EXAMINATION DATE : JUNE/JULY 2018

DURATION : 3 HOURS

INSTRUCTION : ANSWER ALL QUESTIONS

THIS QUESTION PAPER CONSISTS OF FOUR (4) PAGES

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TERBUKA

- Q1**
- (a) State the **THREE (3)** new laws established in 2009 which have replaced the Environmental Quality (Sewage and Industrial Effluents) Regulations 1979. (3 marks)
 - (b) Climate change affects biodiversity. Explain it using **ONE (1)** example. (4 marks)
 - (c) For any **TWO (2)** of the environmental issues in **Table 1** below,
 - (i) Assess the impacts of selected environmental issue to the living things and the environment. (5 marks)
 - (ii) Propose the solutions to overcome the selected issues. (8 marks)

Table 1

| | |
|---|---|
| A | Plastic pollution in the ocean |
| B | Heavy metals in aquatic organisms |
| C | Abundance of polystyrene at disposal site |

- Q2**
- (a) 6 ml of wastewater is diluted to 300 ml distilled water in standard BOD bottle. Initial DO in the bottle is determined to be 8.5 mg/l. After 5 days the DO at 20 °C is found to be 5 mg/l. Determine BOD₅ of wastewater and compute the ultimate BOD. (3 marks)
 - (b) Determine the total hardness as CaCO₃ of a sample of water that has calcium content of 28 mg/L and magnesium content of 9 mg/L. (4 marks)
 - (c) Distinguish total solids, fixed dissolved solid and volatile suspended solid by a flow diagram. (4 marks)
 - (d) Based on the National Water Quality Standard, water service providers in Malaysia are most concerned when turbidity in the raw water source exceeds 50 NTU. Thus, the final effluent of water treatment plant is targeted to be less than 1 NTU.

- Q4** (a) Sketch the typical unit processes in treating municipal wastewater and state the objectives of each treatment including pretreatment, primary and secondary treatment in a wastewater treatment processes. (6 marks)
- (b) Define the following term of “tertiary treatment” (advanced treatment) systems by giving **ONE (1)** example each:
- (i) Nitrogen Removal
 - (ii) Phosphorus Removal
- (2 marks)
- (c) Design a primary settling tank to handle maximum hourly wastewater flow of 0.5 m³/s at an overflow rate of 30 m³/d/m²/day as the following:
- (i) Surface area of the tank
 - (ii) Hydraulic detention time (HRT) if the tank depth is 3.5 m.
- Give comments on your HRT value either within the acceptable range or not as the design criteria for HRT is between 1.5 - 2.5 hrs. (6 marks)
- (d) Propose **THREE (3)** treatment methods of sludge produced from a wastewater treatment plant. (6 marks)
- Q5** (a) By giving **TWO (2)** specific examples, define the term “garbage” and “rubbish”. (4 marks)
- (b) Explain **THREE (3)** factors that may influence the rate of solid waste generation. (6 marks)
- (c) Discuss the importance of source separations of Municipal Solid Waste and how it will lead to successful of waste separation in Malaysia. (4 marks)
- (d) Differentiate with the aid of sketches the device to control particulate matter and gases emission at it source. (6 marks)

- END OF QUESTIONS-