

**UNIVERSITY COLLEGE TATI (UC TATI)****FINAL EXAMINATION QUESTION BOOKLET**

COURSE CODE	: BCE 3114
COURSE	: POLLUTION CONTROL
SEMESTER/SESSION	: 1- 2023/ 2024
DURATION	: 3 HOURS

**Instructions:**

1. This booklet contains **5** questions. Answer **ALL** questions.
2. All answers should be written in answer booklet.
3. Write legibly and draw sketches wherever required.
4. If in doubt, raise up your hands and ask the invigilator.

**DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO**

**THIS BOOKLET CONTAINS 5 PRINTED PAGES INCLUDING COVER PAGE**

**QUESTION 1**

- (a) Choose two **(2)** common water sampling methods and compare them (4 marks)
- (b) Discuss three **(3)** parameters of water quality and explain in details. (3 marks)
- (c) The following information is available for a seeded 5-day BOD test conducted on a wastewater sample. 10 mL of the waste sample was added directly into a 300-mL BOD incubation bottle. The initial DO of the diluted sample was 10.8 mg/L and the final DP after 5 days was 3.6 mg/L. the corresponding initial and final DO of the seeded dilution water was 9.5 and 7.5, respectively. Calculate is the 5-day BOD ( $BOD_5$ ) of the wastewater? (4 marks)
- (d) The following test results were obtained for a waste water sample taken from industrial facility. The test was performed using a sample size of 150 mL. Calculate the concentration of total solid, total volatile solid and total suspended solids for the sample. (9 marks)

<b>Item</b>	<b>Weight (g)</b>
Tare mass of evaporating dish	54.6424
Mass of evaporating dish plus residue after evaporation at 105 °C	54.7224
Mass of evaporating dish plus residue after ignition at 550 °C	54.6801
Tare mass of Whatman GF/C filter	1.5347
Mass of Whatman GF/C filter plus residue after drying at 105 °C	1.5622

**QUESTION 2**

- (a) Water treatment is a process of removing contaminants from raw water to produce water that is chemically and bacteriological safe for human consumption. Prepare and describe the process and steps involve in water treatment. (10 marks)
- (b) Wastewater treatment process consists of preliminary, primary, secondary and final treatment. Discover the general activities during primary and secondary treatment. (4 marks)
- (c) Activated sludge process is one of the common processes used for treating sewage and industrial wastewater. Interpret **(6) six** steps involve in this process. (6 marks)

**QUESTION 3**

- (a) Pollution is 'controlled' through the mechanism of licenses issued by the Department of Environment. Interpret three **(3)** activities that require licenses from the government. (6 marks)
- (b) Sanitary landfill is one of the solid waste management systems. Carry out four **(4)** factors that influence the site selection of sanitary landfill? (4 marks)
- (c) Incineration is the burning of waste treatment process that involves the combustion of organic substances contained in waste material. Predicts three **(3)** disadvantages of this process. (6 marks)
- (d) Carry out three **(3)** pathways of solid waste-to-energy conversion and explain one **(1)** factor affecting energy recovery from waste. (4 marks)

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**QUESTION 4**

- (a) There are two **(2)** types of air pollution. Make differentiate between the first and second type. ( 4 marks)
- (b) Air pollution is caused either by human activities or natural sources. Discuss two **(2)** examples of natural sources. ( 4 marks)
- (c) Explain two **(2)** side effects of acid rain and describe how acid rain is formed. ( 5 marks)
- (d) Explain three **(3)** negative effects of ozone depletion on human. ( 3 marks)
- (e) Analyze two **(2)** factors that cause greenhouse effect and describe what is the greenhouse effect. ( 4 marks)

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**QUESTION 5**

- (a) One of the factors that affecting the dispersion of air pollutants is mixing height. Describe briefly about the mixing height and provide the examples based on weather conditions. (5 marks)
- (b) Predicts the effective height of a stack given the following data. (5 marks)
- (i) Physical stack is 188 m tall with 2.30 m inside diameter.
  - (ii) Wind velocity is 3.56 m/s.
  - (iii) Air temperature is 15 °C.
  - (iv) Barometric pressure is 1000 milibars.
  - (v) Stack gas velocity is 11.18 m/s.
- (c) Categorize four **(4)** sampling methods in measuring air pollution (4 marks)
- (d) Fabric bag filter is one of the air pollution devices. Explain briefly about this device and outline three **(3)** of its advantages. (6 marks)

-----End of question-----

