

THE NATIONAL UNIVERSITY OF LESOTHO
BSc. ENVIRONMENTAL HEALTH
2nd SEMESTER EXAM – MAY, 2023
DRAINAGE SYSTEMS & LIQUID WASTE MANAGEMENT (EHS3203)

DURATION: 3 HRS

MARKS: 100

INSTRUCTIONS:

1. Section A is multiple choice questions, choose **ONE** correct letter and write it for each question.
 2. Answer **ALL** questions from Section B and C
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SECTION A

[15]

- 1. Which of the following can reduce the risk of flooding?**
 - A. Zoning and building regulations for new developments
 - B. Dams, detention basins and levees
 - C. All of the above
- 2. In the future, which of the following is expected to increase the risk of flooding?**
 - A. Population growth
 - B. Urbanisation
 - C. All of the above.
- 3. Which of the following insecticides is relatively safe and recommended for controlling flies in sludge drying beds?**
 - A. Malathion.
 - B. Parathion.
 - C. Endrin
- 4. If objectionable odours are produced from a stack of a sludge incinerator, the most probable cause is:**
 - A. Too low a temperature.
 - B. A septic sludge.
 - C. Organic content of the sludge is too high.
- 5. For screenings to be able to settle, wastewater velocity has to be in the range:**
 - A. 5 – 8m/s
 - B. 0.5 – 0.9m/s
 - C. 5 – 9m/s
- 6. Odours from waste stabilization ponds are usually caused by:**
 - A. High nitrate concentration in the raw wastewater.
 - B. Overloading of the pond
 - C. Shallow depth of the pond.
- 7. A trickling filter causes nitrification, which is defined as:**

- A. Conversion of nitrogen to nitrate.
- B. Conversion of ammonia to nitrate and nitrite nitrogen;
- C. Conversion of nitrate to nitrogen.

8. The gas produced in largest volume due to proper digestion of wastewater solids in a lagoon is:

- A. Hydrogen sulphide.
- B. Carbon dioxide.
- C. Methane.

9. Untreated wastewater discharged into a stream may:

- A. Add oxygen needed by fish.
- B. Decrease organic content of the stream.
- C. Add dangerous bacteria to the stream.

10. Green algae in a stream will add DO to water:

- A. Only in warm weather.
- B. Only during the night or cloudy days.
- C. Only in the presence of sunlight.

11. The zone of recent pollution in a stream is best characterised by:

- A. Low DO, balanced species of stream organisms, and low turbidity.
- B. High DO, few species of stream organisms, and medium turbidity.
- C. Variable DO, shifting in species of stream organisms, and high turbidity.

12. The discharge of wastewater and their effluent from treatment plants into streams, is most effectively modified by:

- A. The depth of flow at the point of discharge.
- B. The use of multiple outlets.
- C. Dilution in the streams.

13. A good settling tank will always:

- A. Provide detention time to allow efficient settling
- B. Have long weirs to reduce the overflow velocities;
- C. Provide for all the above.

14. Sloughing from trickling filters refer to:

- A. Troughs
- B. Waste Activated Sludge
- C. Material washed off trickling filter media

15. is the best test for efficiency of a trickling filter

- A. Total solids
- B. DO
- C. BOD

SECTION B

[40]

Define the following terms as used in Drainage Systems and Liquid Waste Management:

- a. Wastewater
- b. Grey water
- c. Waste water management

- d. Wastewater reclamation
 - e. Eutrophication
 - f. Disinfection
 - g. Percolation test
 - h. Facultative pond
 - i. Sludge thickening
 - j. Sewerage system
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Section C

Question 1: As an Environmental Health Practitioner at one local company, which factors would you align yourself with when choosing pipes that would to be installed in a town for its sewerage system? **[10]**

Question 2: Fill in the following table to show what the wastewater parameters in the first column might indicate: **[08]**

Parameter	Indicates:
Free residual chlorine	
Faecal coliform	
EC	
Phosphates	
Nitrates	
Ammonia	
pH	
COD	

Question 3: Explain how screenings may be disposed of after preliminary effluent treatment **[07]**

Question 4: Provide a fully labelled diagram to show sludge treatment (until its safe disposal) **[20]**