

UNIVERSITY OF RUHUNA
THIRD EXAMINATION IN B.Sc GREEN TECHNOLOGY (PART I) - JULY/AUGUST – 2022

Wastewater Treatment – ID 3101

M.C.Q. Type

TIME: 30 Minutes

Index Number

Answer all questions.

Mark your answers by placing “√” against the selected alternative among the five alternatives provided in each question.

Only one answer should be marked in each question.

Only non-programmable calculators are permitted.

Mobile phones are not permitted.

1. Select the correct statement/s based on the following statements.

- A. Wastewater treatment is performed to reduce environmental impacts and reduce the wastewater disposal costs
- B. Recover of energy, nutrients, water, and other resources from wastewater are several objectives of Wastewater treatment.
- C. Wastewater treatment is a solution for the diminishing water resources.

- i. Only statement A is correct
- ii. Only statements A and B are correct
- iii. Only statement B is correct
- iv. Only statements A and C are correct
- v. All statements are correct.

2. The list “I” and “II” show the different types of solids in wastewater and respective definitions of solids. Select the correct answer that shows the correct match of two lists.

Lists I

- A -Fixed Solids
- B -Volatile Solids
- C -Dissolved Solids
- D -Suspended Solids

List II

- 1- Dissolved substances in water
- 2- Solids in water greater than 1µm in size
- 3- Solids remain after heating at 600°C
- 4- Solids evaporate at 600°C

- i. A-1, B-3, C-4, D-2
- ii. A-2, B-1, C-3, D-4
- iii. A-3, B-4, C-1, D-2
- iv. A-3, B-4, C-2, D-1
- v. A-4, B-2, C-3, D-1

3. Select the correct answer based on the given statements.

- A. One of the major objectives of the determination of properties of wastewater is to check the suitability of wastewater disposal.
- B. Wastewater treatment plants would use one or more treatment methods of physical, chemical, and biological.
- C. Biological treatment methods are commonly used in municipal wastewater plants

- i. Only statement A is correct
- ii. Only statement B is correct
- iii. Only statement C is correct
- iv. All statements are correct
- v. All statements are incorrect

4. is basically caused by clay, silt, and finely divided organic and inorganic materials.

- i. Alkalinity
- ii. pH
- iii. Color
- iv. Turbidity
- v. Odor

5. Select the correct statement.
- Industry discharges only are responsible for the color in wastewater
 - People prefers to drink colored water.
 - Color of water is determined using Potassium Dichromate
 - Metallic sulfide in water forms light colors
 - Comparison of color in water can be performed using UV-Visible spectrometers.
6. Chemical Oxygen Demand (COD) in a water sample taken from a wastewater collection tank of a food factory tells the
- organic matter content in the wastewater.
 - organic matter content in the wastewater 5 days ago.
 - organic matter content in the wastewater 1 days ago.
 - inorganic matter content in the wastewater.
 - amount of Nitrogen content in the wastewater.
7. removes the solids that have greater density than water.
- Chemicals
 - Aeration
 - Sedimentation
 - Retention
 - Filtration
8. The following information were taken from a 5-day BOD test conducted on a wastewater sample. Three hundred milliliters (300 mL) of the sample was added directly into a BOD incubation bottle. The initial dissolved oxygen concentration of the diluted sample was 8.4 mg/L, and the final dissolved oxygen concentration after 5 days was 2.1 mg/L. What is the BOD₅ of the wastewater sample?
- 6.3 mg/L
 - 63.0 mg/L
 - 17.64 mg/L
 - 2.1 mg/L
 - 4.0 mg/L
9. Particles that have a higher density than the liquid can be lifted and removed from the wastewater by
- Flocculation
 - Sedimentation
 - Coagulation
 - Adsorption
 - Filtration
10. Select the correct answer based on the given two statements.
- A- Unit operations are the physical operations to remove the impurities present in the water and wastewater.
- B- Chemical reactions will not occur in the unit operations.
- Both statements A and B are individually true, but B is not the correct explanation of A
 - Both statements A and B are individually true, and B is the correct explanation of A
 - Statement A is true, and B is false
 - Statement B is false, and B is true
 - Both two statements are false
11. Select the incorrect statement.
- Sedimentation removes dissolved solids in wastewater.
 - Sedimentation and filtration remove solid particles.
 - Turbidity of water can be removed by coagulation and flocculation.
 - Flocculation is the process of aggregation of the destabilized particles and precipitation of products.
 - Properties of coagulants are nontoxic at the working dosage, high charge density, and insoluble in the neutral pH range

12. Carbonate (CO_3^{2-}), Bicarbonate (HCO_3^{-1}) and Hydroxyl (OH^{-1}) ion concentration of a wastewater sample are 0.67, 5.00 and 0.02 eq/m³, respectively. If the equivalent weight of CaCO_3 is 50 g, total alkalinity of wastewater sample as CaCO_3 is;
- 5.69 g/m³
 - 8.79 g/m³
 - 284.5 mg/m³
 - 284.5 g/m³
 - 284.5 eq/m³
13. Select the correct statements from the followings.
- Flotation is frequently used for the removing of grit particles in wastewater.
 - Adsorption is the process of removing the solutes in water by separating them using their ionic strengths
 - Filtration is a unit process of separating solids from fluids.
 - Reverse osmosis is a unit process that separate dissolved solids in water.
 - Electrodialysis is a unit operation that can be used for the separation of dissolved solids in water.
14. Select the correct answer based on the given two statements.
- A- Adsorption process is a chemical process.
B- Adsorption can effectively be used for the removal of organic and inorganic
- Both statements A and B are individually true, but B is not the correct explanation of A
 - Both statements A and B are individually true, and B is the correct explanation of A
 - Statement A is true, and B is false
 - Statement A is false, and B is true
 - Both two statements are false
15. Select the correct answer based on the given statements on advanced oxidation.
- A- It is used for the oxidation of simple organic substances.
B- Primary degradation makes structural changes in parent compound
C- Structural changes in parent compound that results increase toxicity will occur in unacceptable degradation.
- Only statement A is correct
 - Only statements A and B are correct
 - Only statements B and C are correct
 - All statements are correct
 - All statements are incorrect
16. Wastewater sampling plan should include
- Numbers of sample locations, number of samples, types of samples, and time intervals
 - Numbers of sample locations, number of samples, name of the sapling personal, and time intervals
 - Numbers of sample locations, sampling distribution pattern, types of samples, and time intervals
 - Numbers of sample locations, size of samples, types of samples, and time intervals
 - Numbers of sample locations, number of samples, dates of samples, and time intervals
17. A sample of water has Calcium content of 70 mg/L as CaCO_3 and Magnesium content of 90 mg/L as CaCO_3 .
What is the total hardness?
- 70 mg/L
 - 90 mg/L
 - 160 mg/L
 - 3500 mg/L
 - 4500 mg/L
18. Why is the sludge aerated?
- To avoid bacterial growth
 - To increase bacterial growth
 - To maintain pH
 - To maintain temperature
 - To maintain the EC

19. Which is the next reactor after activated sludge reactor in the treatment process?
- Flocculation unit
 - Aeration unit
 - Clarifier
 - Disinfection unit
 - Heating unit
20. Which of the following factors do not influence biological treatment efficiency?
- Surface area
 - Void space
 - Drainage
 - High BOD
 - Oxygen
21. By controlling the organic strength of wastewater into a trickling filter, an operator can directly control:
- The amount of filter flies breeding
 - The thickness of biological buildup
 - The amount of wastewater flow into the filter
 - The amount of inorganic materials treated
 - The amount of oxygen concentration
22. Two main gases produced by the breakdown of volatile matter in a digester are:
- Oxygen and Methane
 - Methane and Carbon Dioxide
 - Hydrogen Sulfide and Carbon Monoxide
 - Carbon Dioxide and Oxygen
 - Carbon dioxide and Ozone
23. The activated sludge process is an example of
- anaerobic suspended growth process
 - anaerobic attached growth process
 - aerobic suspended growth process
 - aerobic attached growth process
 - facultative suspended growth process
24. Select the correct answer based on the given statements
- The quality of wastewater is determined on the basis of DO
 - The BOD test is based on DO
 - Determination of DO helps in controlling corrosion
 - Trickling filter is an attached growth process
- Only statements A and B are correct
 - Only statements B and C are correct
 - Only statements C and D are correct
 - Only statements A, B and C are correct
 - Only statements A, B and D are correct
25. The treatment given to settled wastewater in an aeration tank is accomplished by;
- Simple chemical reactions involving the combination of nitrogen with organic matter.
 - The agitation that causes the wastewater solids to become so finely divided that settling in the receiving stream is impossible.
 - The attachment of air bubbles to the wastewater solids thus forcing them to be carried into the final settling tank.
 - The organisms living in the activated sludge that use the organic matter for food and convert it to a less objectionable condition.
 - none of the above