

KATHMANDU UNIVERSITY
End Semester Examination
January/February 2024

Marks Scored:

Level : B.Tech.

Year : II

Exam Roll No. :

09 FEB 2024

Time: 30 mins.

Course : BIOT 211

Semester : II

F. M. : 20

Registration No.:

Date :

SECTION "A"

[10Q. × 1 = 10 marks]

Choose and mark [X] the most appropriate option from each set of choices.

1. Microbial populations within biofilms are orders of magnitude more resistant to antimicrobial agents than suspended cells of the same organisms is function of;
 Competition cooperation amensalism mutualism
2. The defining features of micro-organisms that make them ideal for environmental management, **EXCEPT**;
 small sizes of microorganisms Metabolic flexibility & versatility
 Ease of gene transfer & mobilization Xenobiotic
3. The chemical pollutants such as toxic pesticides which are not biodegradable are called:
 Xenobiotics Recalcitrants Toxicants Carcinogens
4. Transformation/degradation of a non-growth substrate in the obligate presence of another growth substrate.
 Co-metabolism Biostimulation
 Biotransformation mixed substrate utilization
5. A full-scale technology in which excavated soils are mixed with soil amendments, placed on a treatment area, and bioremediated using forced aeration.
 Bioventing Composting Biopile Land farming
6. Plant-mediated immobilization or binding of contaminants into the soil matrix thereby reduces their bioavailability.
 Phytostabilisation Rhizofiltration
 Phytoextraction Phytodegradation
7. If the depletion of oxygen is found to be 5 mg/litre after incubating 5% solution of sewage sample for 5 days at 20 degrees Celsius, what would be the BOD of the sewage?
 100 mg/l 500 mg/l 200 mg/l 250 mg/l
8. The addition of known active microbes to soil or water with the purpose of accelerating microbial processes is called
 Biodegradation Bioremediation
 Biostimulation Bioaugmentation
9. One of the mechanisms for biocontrol.
 Commensalism antibiosis
 Synergism proto-cooperation

10. Which of the following bacterium is called as the superbug that could clean up oil spills
[] *Bacillus subtilis* [] *Pseudomonas putida*
[] *Pseudomonas denitrificans* [] *Bacillus denitrificans*

SECTION "B"

[10Q. × 1 = 10 marks]

Fill in the blanks.

11. The use of microorganisms to remove pollutants is called _____.
12. The wastewater treatment system consists of a series of closely spaced circular discs that are partially submerged in wastewater and rotate slowly through it is _____.
13. The novel compounds introduced into nature, not easily degraded by the indigenous microflora and fauna are termed _____.
14. _____ is the use of a plant's ability to uptake contaminants from the growth matrix and subsequently transform and volatilize contaminants into the atmosphere.
15. Metabolism independent binding or adsorption of heavy metals to living or dead cells is termed as _____.
16. _____ are used frequently as indicator of fecal pollution in drinking water & sanitation.
17. The liquid emanated out of the landfill which percolate horizontally and vertically are called _____.
18. Amount of chlorine needed to destroy bacteria, to oxidize organic matter and ammonical substances present in the water is called _____.
19. In _____ technology the diffusers or aeration devices are spaced closer together at the head end of the tank to match the oxygen demand.
20. *Eisenia fetida* is most widely used in _____.

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F.M. : 55

SECTION "C"

[4Q × 7 = 28 marks]

Attempt *ALL* questions.

1. Why micro-organisms are considered ideal than other organisms for environment management?
2. Differentiate between fixed film and suspended growth wastewater treatment technology with examples
3. What is ecofriendly technology? Describe any two ecofriendly technology with significance.
4. Compare and contrast *in situ* and *ex situ* bioremediation technology.

SECTION "D"

5. "Within a single population microbes cooperate at low and compete at high cell densities." Justify the statement. [4]
6. List out any four criteria to be considered in sanitary landfill technology with significance. [4]
7. What is biosorption? Emphasize its importance in bioremediation. [1+2]
8. Distinguish between on *ANY TWO*: [2×2=4]
 - a. Commensalism and mutualism
 - b. Autotrophic succession and heterotrophic succession
 - c. Active composting and passive composting
9. The slow sand filter is also called biosand filter. Why? [3]
10. What is biocontrol agent? Give an account on bacteria as biocontrol agent. [1+2]
11. What is the efficiency of BOD removal in a plant when the influent BOD is 245 mg per liter and the effluent BOD is 22 mg per liter? [2]
12. Write a short note on *ANY TWO* [2×2= 4]
 - a. Biosand filter technology
 - b. Bioremediation
 - c. Cometabolism

