

KATHMANDU UNIVERSITY
End Semester Examination [C]
June/July 2024

Marks Scored:

Level : B.Tech.
Year : II

Course : BIOT 211
Semester : II

Exam Roll No. :

Time: 30 mins.

F. M. : 20

Registration No.:

Date

01 JUL 2024

SECTION "A"

[20Q. × 0.5 = 10 marks]

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

1. Fungus *Aspergillus* grow in the gastrointestinal tract of humans without harming the host is an example of
 Parasitism protocoooperation
 commensalisms amensalism
2. The addition of non- indigenous microbial population or genetically engineered microbes in the contaminated site is:
 Bioremediation Composting
 Bioaugmentation Biostimulation
3. The activated sludge technology in which the diffusers or aeration devices are spaced closer together at the head end of the tank to match the oxygen demand.
 Tapered Aeration Step feed aeration
 Contact stabilization Extended aeration
4. The removal and detoxification of pollutants by microbes in the obligate presence of a growth substrate is;
 Co-metabolism Biodegradation
 Biotransformation mixed substrate utilization
5. The defining features of micro-organisms that make them ideal for environmental management, EXCEPT;
 less generation time Metabolic flexibility & versatility
 Ease of gene transfer & mobilization not visible to our naked eye
6. What is the correct incubation time and temperature for BOD test?
 5 days at 20°F 48 hrs at 37°C
 5 days at 20°C 5 days at 37°C
7. A process of stimulating the natural in situ biodegradation of contaminants in soil by providing air or oxygen to existing soil microorganisms.
 Bioventing Composting Biopile Land farming
8. The technology that utilize plants to transport and concentrate metals from the soil into the harvestable parts of roots and above-ground shoots.
 Phytostabilisation Rhizofiltration
 Phytoextraction Phytodegradation

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Level : B.Tech.

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Time : 2 hrs. 30 mins.

Course : BIOT 211

Semester : II

F.M. : 55

01 JUL 2024

SECTION "C"

[4Q × 7 = 28 marks]

Attempt *ALL* questions.

1. Describe the significance of microbes in environmental management.
2. What is Activated Sludge technology? Explain any three modified activated sludge process with diagram.
3. What are xenobiotic compounds? Explain the factors that influence their bioremediation.
4. What is ecofriendly technology? Describe any two ecofriendly technology with significance.

SECTION "D"

[27 marks]

Attempt *ALL* questions.

5. What is biosorption? Emphasize its importance in bioremediation. [1+4=5]
6. Describe any three interactions that exist in the ecosystem with example. [2×3=6]
7. Define Biochemical Oxygen Demand? Calculate the efficiency of BOD removal of a Wastewater treatment plant when the influent BOD is 245 mg per liter and the effluent BOD is 22 mg per liter? [1+3= 4]
8. Differentiate between the following:[*ANY TWO*] [2×2=4]
 - a. Autotrophic succession and heterotrophic succession
 - b. *in situ* and *ex situ* bioremediation technology
 - c. Slow sand filter and rapid sand filter technology
9. Short notes on: [*ANY TWO*] [4×2=8]
 - a. Anaerobic digestion technology
 - b. Sanitary landfill
 - c. Biofuel

100-1000



22. Typically, only _____% of the volume of stirred reactors is filled with liquid.
23. The rate of oxygen consumption per cell, known as the _____.
24. Residence time in continuous operation is defined mathematically as _____.
25. The amount of steam needed for continuous sterilization is _____% that used in batch processes
26. _____ reactors are used with immobilized or particulate biocatalysts.
27. For single-pass heat exchangers, the logarithmic-mean temperature difference is defined as _____
28. Bio reactors operated with neither input nor output of liquid are classified as _____ process.
29. The unit of mass transfer coefficient ($K_L a$) is _____.
30. The unit of specific growth rate (μ) is _____.

