NAVRACHANA UNIVERSITY
a UGC recognized University

School:	School of Science
Program/s:	Master of Science
Year: 2nd	**Semester:** III
Examination:	End Semester Examination
Examination year:	December - 2022

Course Code: LS251 **Course Name:** Environmental Biotechnology
Date: 02/12/2022
Time: 11:30 to 13:30

Total Marks: 40
Total Pages: 2

Instructions:

→ Write each answer on a new page
→ Draw neat and well-labelled diagrams wherever required
→ * COs=Course Outcome mapping. # BTL=Bloom's Taxonomy Level mapping

Q. No.	Details	Marks	COs*	BTL#
Q.1	**Choose the correct option**	12	CO1 CO2 CO3 CO4 CO5	BTL1 BTL2 BTL3
	1. _____are ionic, glycolipid type biosurfactants, produced by nonpathogenic yeast species *Starmerella bombicola* and *Candida bombicola* a. trehalo lipid b. rhamnolipid c. Viscosin d. None of the above			
	2. _____based sensors are widely utilized for recognition of organophospohorous compounds. a. enzyme based b. amperometry based c. surface plasmon resonance based d. None of the above			
	3. Whole-cell biosensors can be used for the detection of____in soil. a. Hg b. Zn c. Cu d. all of the above			
	4. Electrochemical biosensors for lead and cadmium make use of____ a. archaeal cells b. bacterial cells c. fungal cells d. None of the above			
	5. The first biosensor was made using ____electrode a. nickel b. enzymatic c. H_2O_2 d. none of the above			
	6. Biosurfactants chiefly possess____groups that is/are responsible an overall chemistry of the molecule a. 1 b. 2 c. 3 d. None of the above			
	7. Bulking sludge formation during waste water treatment can be formed due to a. higher COD b. higher BOD c. massive development of filamentous bacteria d. all of the above			

8. For bioxidation of chlorinated compounds, microbes utilize _____ as source of energy
   a. carbon dioxide
   c. H2S gas
   b. methane
   d. All of the above

9. _____ is essential step in bioleaching of heavy metals
   a. solubilization
   c. both a and b
   b. precipitation
   d. none of the above

10. _____ are especially useful to remove heavy metals and radionuclides
    a. Methanotrophs
    c. sulfate reducing bacteria
    b. acidophiles
    d. None of the above

11. Microbial production of _____ in anaerobic condition mediates metal solubilization
    a. organic acids
    c. CO2
    b. phosphates
    d. H2S

12. During anaerobic digestion of wastes, CO2, NO3-, NO2-, Fe3+,SO42- etc. act as
    a. electron acceptors
    c. have no role in the process
    b. electron donors
    d. none of the above

Q.2	Answer the following in short. **Any six**			
	1. What are the genetic aspects of microbial environmental remediation processes? 2. Define BOD, COD and TOC. 3. How does the flocculation hinder waste water processing? 4. Provide key steps involved in the process of biomethanation. 5. What are the key characteristics of vermicomposting and biocomposting? 6. What is the difference between bioleaching and biomining? 7. What is the application of biosurfactants in environmental remediation, provide suitable example. 8. Provide basic frame work of biosensors with suitable example.	12	CO1 CO2 CO3 CO4 CO5	BTL1 BTL2 BTL3	

Q.3	Answer the following in detail. **Any four**			
	1. What are the various levels for waste water treatment? explain in detail. 2. Provide various methods for the treatment of gaseous waste. 3. Provide comparative analysis between various composting methods. 4. Provide schematic diagram of Sanitary landfills. 5. What is the role of biotechnology in environmental remediation? Explain using suitable examples.	16	CO1 CO2 CO3 CO4 CO5	BTL1 BTL2 BTL3	

***********End of Question Paper***********