REV-01
MBT/15/20

2023/06

SET A

M.Sc. BIOTECHNOLOGY
FOURTH SEMESTER
ENVIRONMENTAL BIOTECHNOLOGY
MBT-401

[USE OMR SHEET FOR OBJECTIVE PART]

Duration: 3 hrs. Full Marks: 70

Objective

Time: 30 mins. Marks: 20

Choose the correct answer from the following: ***1×20=20***

1. Which is causing Gastroenteritis?
   a. *Escherichia coli* b. *Rota virus*
   c. *Microcystis aeruginosa* d. All of these
2. Measurement of TOC is required when concentration of organic matter is:
   a. High b. Moderate
   c. Low d. All of these
3. Which of the following is the index organism in sewage?
   a. *Streptococus faecalis* b. *Clostridium perfingens*
   c. Both a & b d. None of these
4. Optimum temperature of thermophiles:
   a. 80° C b. 40-50° C
   c. 65-75° C d. 55-65° C
5. Which of the following is an aerobic attached growth treatment process?
   a. Roughing filter b. Oxidation ditch
   c. Sequencing batch reactor d. Expanded-bed process
6. Which is of the following is a fermented product?
   a. *Propionate* b. *Purines*
   c. *Acetate* d. CO2
7. Which is of the following produces fluorescent compound?
   a. 4-methylumbelliferyl β-D-glucuronides b. O-nitrophenyl β-D-galactopyranoside
   c. α-galactosidase d. All of these
8. Conversion of ammonia to nitrate is known as:
   a. Natrofication b. Nitrifraction
   c. Nitrofication d. Nitrification
9. In IMViC test *i* stands for:
   a. *Indole test* b. *Isomerase test*
   c. *Inole test* d. None of these
10. Which are NOT involved in trickling filter?
    a. *Alcaligenes* b. *Utothrix*
    c. *Stigeoclonium* d. *Streptococus faecalis*

11. Which of the following is not a type of bioremediation?
    a. Biostimulation
    b. Bioaugmentation
    c. Natural attenuation
    d. Bioaccumulation

12. Which of the following is a potential limitation of phytoremediation?
    a. It can take a long time to achieve full remediation
    b. It requires the use of harmful chemicals
    c. It only works for certain types of contaminants
    d. All of the above

13. Which one bacterial genus provides surfactants during bioremediation?
    a. *Pseudomonas*
    b. *Achromobacter*
    c. *Lactobacillus*
    d. *E. coli*

14. The use of living microorganism to degrade environmental pollutants is called:
    a. Nanoremediation
    b. Bioremediation
    c. Microremediation
    d. All of these

15. Bioaugmentation involves:
    a. Addition of microbes to a cleanup site
    b. Eliminating microbes
    c. Plants usage for bioremediation
    d. Bioventing

16. The process biostimulation mainly depends upon:
    a. Naturally occurring microbes
    b. Environmental factors
    c. Nutrients to stimulate the growth of the microbes in the environment
    d. All of the above

17. This cleanup approach includes removal of groundwater or soil from its natural setting to permit for bioremediation:
    a. Bioaugmentation
    b. *in situ* bioremediation
    c. *ex situ* bioremediation
    d. Phytoremediation

18. What is metagenomics?
    a. Genomics as applied to a species that most typifies the average phenotype of its genus
    b. The sequence of representative genes from several species
    c. Sequencing DNA from a group of species from the same ecosystem
    d. Sequencing of only the highly conserved genes in a lineage

19. Which of the following is an example of Homology and similarity tool used in metagenomics?
    a. RasMol
    b. EMBOSS
    c. PROSPECT
    d. BLAST

20. Which of the following is primarily used in bio degradation of xenobiotics?
    a. Chemicals
    b. Physical sorting
    c. PAHs
    d. Enzymes

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Descriptive

Time : 2 hr. 30 mins. **Marks : 50**

[Answer question no.1 & any four (4) from the rest]

1.	What is waste water or sewage? Discuss details on composition, and types of sewage. Elaborate on measurement of water pollution.	1+2+7=10
2.	Write short note on: a) Biosensors b) Alkaliphiles	5+5=10
3.	Discuss in detail how organic and inorganic sewage materials are treated in the absence of oxygen?	10
4.	Write short note on: a) Primary treatment b) RBC	3+7=10
5.	What is bioremediation? Differentiate between in situ and ex situ bioremediation. Give a brief account on petroleum hydrocarbon remediation.	2+3+5=10
6.	What is a heavy metal contamination? Give a brief account on heavy metal clean-up by plant and microbes.	2+8=10
7.	What is metagenomic? Give a detailed account on environmental application of metagenomic approach.	2+8=10
8.	What is phytoremediation? Write about various mechanisms of phytoremediation. Write about the various plants globally used in environmental clean-up.	1+6+3=10

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