

**M.Sc. BOTANY
FOURTH SEMESTER
MICROBIOLOGY
MSB-401 E**

**SET
A**

[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

- Bacteriophage can function as a vector to transfer genetic material from the donor to the recipient in:
 - Transformation
 - Conjugation
 - Horizontal gene transfer
 - Transduction
- When F-plasmid is integrated with chromosomal DNA, then such bacteria is known as:
 - High frequency recombination strain
 - F⁺ - F recombination strain
 - Hfr - F⁻ recombination strain
 - All of the above
- Which of the following is not a type of mutation?
 - Transformation
 - Transduction
 - Random mutation
 - Polymerase chain reaction
- A type of mutation in which a STOP codon UAA is replaced by another STOP codon UAG and does not lead to any phenotypic changes is called:
 - Silent mutation
 - Hereditary mutation
 - Suppressive mutation
 - Neutral mutation
- The enzyme photolyase remove the damaged DNA caused by thymine dimer in:
 - Photo-repair pathway
 - Nucleotide excision pathway
 - Base excision pathway
 - DNA damage due to oxidative events
- In Agrobacterium-mediated gene transfer, the infected plant releases phenolic compounds that the bacterium can recognize with the help of:
 - VirA protein present on the bacterial cell wall
 - VirD binding proteins that activate VirA
 - VirG complex
 - Vir D1 and D2
- The basic requirement in recombinant DNA technology is:
 - Restriction endonucleases
 - Cloning vectors
 - Plasmids
 - Ligase enzymes
- The short stretches of DNA strands that are free to form hydrogen bonds are known as:
 - Methylated bases
 - Blunt ends
 - Sticky ends
 - None of the above
- The first artificial cloning vector designed is:
 - Bacterial Artificial Chromosome
 - Yeast Artificial Chromosome
 - pBR322
 - pUC19

10. Linkers are short double stranded DNA segments which are formed from oligonucleotides with:
 - a. Two blunt ends
 - b. Two sticky ends
 - c. One blunt end
 - d. One sticky end
11. The use of living microorganisms to degrade environmental pollutants is called:
 - a. Microremediation
 - b. Nanoremediation
 - c. Bioremediation
 - d. All of the above
12. Which of the following bacterium is called as the superbug that could clean up oil spills?
 - a. *Bacillus subtilis*
 - b. *Pseudomonas putida*
 - c. *Pseudomonas denitrificans*
 - d. *Bacillus denitrificans*
13. The process of extracting metals from ore bearing rocks is called:
 - a. Bioextraction
 - b. Microbial extraction
 - c. Biotitration
 - d. Bioleaching
14. The process of converting environmental pollutants into harmless products by naturally occurring microbes is called:
 - a. *Ex-situ* bioremediation
 - b. Intrinsic bioremediation
 - c. Extrinsic bioremediation
 - d. None of the above
15. Microorganisms remove metals by:
 - a. Adsorption and complexation
 - b. Adsorption and precipitation
 - c. Adsorption and volatilization
 - d. All of the above
16. A non-directed physico-chemical interaction between heavy metal ions and microbial surface is called:
 - a. Biotransformation
 - b. Bioconversion
 - c. Biosorption
 - d. Biomining
17. During which stage wastewater treatments are methanogenic?
 - a. Primary treatment
 - b. Sludge digestion
 - c. Biological oxidation
 - d. Disinfection
18. Anaerobic bacteria often play important roles in bioremediation. Which of the following is not an electron acceptor used by anaerobes during biodegradation reaction?
 - a. CO_2
 - b. NO_3
 - c. H_2O
 - d. SO_4
19. Bioaugmentation is a process that involves:
 - a. Using plants for bioremediation
 - b. Bioventing
 - c. Sludge removal
 - d. Adding microbes to clean up a site
20. Which bioremediation approach involves using plants to degrade pollutants?
 - a. Biopile
 - b. Dendroremediation
 - c. Composting
 - d. Land farming

-- -- --

(Descriptive)

Time : 2 hr. 30 mins.

Marks : 50

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

- | | |
|---|----------|
| 1. What is mutation? Differentiate between forward and backward mutations. Write short note on molecular mechanism of DNA repair. | 2+3+5=10 |
| 2. Write short notes on:
a) Transformation
b) Site directed mutagenesis | 2×5=10 |
| 3. What is recombinant DNA technology? Discuss in brief the role of microorganisms in gene transfer. | 2+8=10 |
| 4. Write short notes on:
a) Restriction endonucleases, sticky ends and blunt ends
b) pBR322 vector | 2×5=10 |
| 5. What is rhizoremediation? How do the microorganisms play an important role in stress environment? | 2+8=10 |
| 6. What is dendroremediation? How do plants help in remediation of contaminated soil? | 2+8=10 |
| 7. How microorganisms act as indicators in prospecting for hydrocarbon deposits? | 10 |
| 8. What is MEOR? Write in brief the different methods that involved in MEOR in the oil fields. | 2+8=10 |

= = *** = =