

**M.Sc. BOTANY**  
**FOURTH SEMESTER [SPECIAL REPEAT]**  
**MICROBIOLOGY**

**SET**  
**A**

**MSB-401 E**

[USE OMR SHEET FOR OBJECTIVE PART]

Duration: 3 hrs.

Full Marks: 70

Time: 30 mins.

Marks: 20

( Objective )

*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<sup>+</sup> - F recombination strain
  - Hfr - F<sup>-</sup> 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 dinitrificans*
  - 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.  $\text{CO}_2$
  - b.  $\text{NO}_3$
  - c.  $\text{H}_2\text{O}$
  - d.  $\text{SO}_4$
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 ]

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

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