

REV-01
MMB/17/22

2023/06

**M.Sc. MICROBIOLOGY
FOURTH SEMESTER
AGRICULTURAL MICROBIOLOGY
MMB-402 B**
[USE OMR SHEET FOR OBJECTIVE PART]

**SET
B**

Duration: 3 hrs.

Full Marks: 70

(Objective)

Time: 30 mins.

Marks: 20

Choose the correct answer from the following:

1 × 20 = 20

- Bioaugmentation involves:
 - Addition of microbes to a cleanup site
 - Eliminating microbes
 - Plants usage for bioremediation
 - Bioventing
- The process biostimulation mainly depends upon:
 - Naturally occurring microbes
 - Environmental factors
 - Nutrients addition to stimulate the growth of the microbes in the environment
 - All of the above
- Which of the following is not a biofertilizer?
 - Mycorrhiza
 - Agrobacterium*
 - Rhizobium*
 - Nostoc*
- Mycorrhiza shows:
 - Symbiosis
 - Parasitism
 - Endemism
 - Antagonism
- Which of the following microorganism use H₂S as the electron donor to reduce carbon dioxide?
 - Chromaticum*
 - Chlorobium*
 - Both a and b
 - Rhodomicrobium*
- Which of the following organic compounds are present in biogas?
 - Butane gas and carbon dioxide
 - Methane gas and CO₂
 - Sodium
 - Nitrogen
- Which of the following converts energy from the combustion of fuel directly to the electrical energy?
 - Dynamo
 - Ni-Cd cell
 - Fuel cell
 - Electrolytic cell
- Transgenic plants are the one:
 - Generated by introducing foreign DNA into cell and regenerating a plant from that cell
 - Produced by a somatic embryo in an artificial medium
 - Grown in the artificial medium after hybridisation in the field
 - Produced after protoplast fusion in an artificial medium

9. The..... is where organisms that are found on and in the aerial surface plants are growing.
 - a. Rhizosphere
 - b. Phyllosphere
 - c. Rhizoplane
 - d. Microfilm
10. The genetically modified brinjal in India has been developed for:
 - a. Enhancing mineral content
 - b. Drought resistance
 - c. Enhancing shelf life
 - d. Insect resistance
11. The bioremediation process involving the usage of plants to degrade pollutants is:
 - a. Composting
 - b. Phytoremediation
 - c. Biopile
 - d. Land farming
12. 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
13. Which of the following nitrogen fixers is found in rice fields associated with *Azolla*?
 - a. *Frankia*
 - b. *Tolypothrix*
 - c. *Spirulina*
 - d. *Anabaena*
14. Which of the following is a pair of biofertilizers?
 - a. *Salmonella* and *E. coli*
 - b. *Nostoc* and legume
 - c. *Rhizobium* and grasses
 - d. *Azolla* and BGA
15. The process of denitrification involves conversion of nitrite to:
 - a. Nitric oxide
 - b. Nitrous oxide
 - c. Di-nitrogen
 - d. All of the above
16. The process of usage of organic material to generate energy is known as:
 - a. Biomass energy
 - b. Hydro thermal energy
 - c. Geothermal energy
 - d. Nuclear energy
17. Which of the following technologies are used to convert biomass into useful energy forms?
 - a. Galvanization
 - b. Bio-chemical process
 - c. Doping
 - d. Photoelectric effect
18. Chemical energy is converted to which energy by a fuel cell?
 - a. Mechanical
 - b. Potential
 - c. Solar
 - d. Electrical
19. Golden rice is a promising transgenic crop. When released for cultivation, it will help in:
 - a. Herbicide tolerance
 - b. Alleviation of vitamin A deficiency
 - c. Pest resistance
 - d. Producing a petrol-like fuel from rice
20. Methanotrophic bacteria:
 - a. Utilize methane as the electron source
 - b. Produce methane gas
 - c. Oxidize methane gas
 - d. Responsible for the greenhouse effect

(Descriptive)

Time : 2 hr. 30 mins.

Marks : 50

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

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| 1. Write a detailed note on mycorrhiza with special emphasis on its role in agriculture. | 10 |
| 2. Write a detailed note on biological Nitrogen fixation which increases soil fertility. | 10 |
| 3. Write a detailed note on industrial production of biofertilizers. | 10 |
| 4. What is a transgenic? Write a detailed account on transgenic plants and its significances. | 2+8=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 PGPR organism? Write a detailed note on how PGPR contribute in agriculture. | 2+8=10 |
| 7. What is biofuel? Write a note on concept of utilization of microbes as a source of biofuel. | 2+8=10 |
| 8. What is herbicide? How it is beneficial for crop cultivation? How herbicides may have detrimental effects also? | 2+5+3=10 |

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