

MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END THEORY EXAMINATION

B.Sc.(Hons.) Agriculture

Semester	: IV (New)	Term	: Second	Academic Year	: 2023-24
Course No.	: ELE-PATH 243	Title	: Biofertilizers, Biocontrol agents and Biopesticides		
Credits	: 3 (2+1)				
Day & Date	: Sunday, 05.05.2024	Time	: 9:00 to 12:00 hrs.	Total Marks	: 80

- Note :**
1. Solve ANY EIGHT questions from SECTION 'A'.
 2. All questions from SECTION 'B' are compulsory.
 3. All questions carry equal marks.
 4. Draw neat diagram wherever necessary.

SECTION 'A'

- Q.1 a) Write in detail about the growth characteristics of *Rhizobium* and *Azospirillum*.
b) Write in short about nitrogenase enzyme with its components.
- Q.2 a) Describe the cross inoculation groups of *Rhizobia*.
b) Write in brief the various application methods of carrier based biofertilizers.
- Q.3 a) Mention the strategies of marketing of bioagents.
b) Write the importance of *Pseudomonas* as a biocontrol agent.
- Q.4 a) What are the ideal features for establishing an insectary?
b) Write in short about the importance of HaNPV.
- Q.5 a) Describe about packaging material and labeling requirement for biopesticides.
b) Describe the importance of *Metarhizium* biopesticides.
- Q.6 a) Enlist the factors responsible for effectiveness of biocontrol agents on soil borne plant pathogens and explain one of them in brief.
b) Write in short about the importance of *Verticillium*.
- Q.7 a) Mention the microbiology of decomposition of major constituents of soil organic matter and plant residues.
b) Write in short about Indian standard specifications for *Azotobacter* inoculants.
- Q.8 a) Mention the brief account of classification of biofertilizers based on microorganisms used.
b) Write in short about the importance of *Trichogramma*.
- Q.9 a) Write in brief the quality assessment tests for *Azotobacter*.
b) Write in short about mode of action and plant diseases controlled by *Trichoderma*.
- Q.10 a) Describe the role of *NiF* and *Nod* genes in BNF.
b) Describe Nitrogen cycle along with the involvement of biochemical process.

(P.T.O.)

SECTION 'B'

Q.11 Match the pairs:

'A'

- 1) Nitrogen fixing actinomycetes
- 2) Aquatic fern as a biofertilizer
- 3) Nematode disease
- 4) *Fusarium* wilt disease
- 5) Symbiosis
- 6) *Trichogramma*
- 7) *Bt*
- 8) *Rhizobium japonicum*

'B'

- a) *Bacillus thuringiensis*
- b) Positive association between the microbes
- c) Frankia
- d) Egg parasitoid
- e) *Paecilomyces*
- f) Soybean
- g) Azolla
- h) *Trichoderma*

Q.12 Do as directed:

- 1) Enlist any two species of *Rhizobium*.
- 2) What do you mean by Biopesticide?
- 3) Enlist any two microorganisms, which are used as biocontrol agents.
- 4) Define the concept of Biofertilizer.
- 5) Write the long form of AMF.
- 6) Write the contribution of any two Scientists in the area of biofertilizers.
- 7) Enlist any two books related to biofertilizers, biocontrol agents and biopesticides.
- 8) Which species of *Azotobacter* occurs in acid soil?

