

MAHARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END THEORY EXAMINATION

B.Sc.(Hons.) Agriculture

Semester	: IV (New)	Term	: Second	Academic Year	: 2022-23
Course No.	: ELE-PATH 243	Title	: Bio-fertilizers, Bio-control agents and Bio-pesticides		
Credits	: 3 (2+1)				
Day & Date	: Thursday, 13.07.2023	Time	: 09:00 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 the contributions made by the following Scientists:
i. S.N. Winogradsky ii. J.B. Boussingault iii. M.W. Beijerinck iv. S.A. Waksman
b) Enlist different microorganisms used as a biofertilizer, bioagent and biopesticide in organic farming system.
- Q.2 a) Describe the growth characteristics of *Azotobacter* and *Rhizobium*.
b) Give brief account of classification of biofertilizers based on microorganism used by citing suitable example.
- Q.3 What is the Nitrogen cycle in nature? Draw a neat diagram of nitrogen cycle. Describe the biochemical reactions in nitrogen cycle.
- Q.4 a) Write in short:
i. Enzyme nitrogenase and its components ii. Cross inoculation groups of *Rhizobia*
b) Explain in detail any two methods used for studying selection of efficient strain of *Rhizobium*.
- Q.5 a) Write in brief different methods of application of carrier based biofertilizers.
b) Explain in short:
i. Mechanism of nodule formation ii. Mechanisms of disease controlled by bioagents
- Q.6 a) Discuss the role of microorganism in decomposition of organic farm waste.
b) What are the factors responsible for effectiveness of biocontrol agent on soil borne plant pathogen? Explain in brief.
- Q.7 Describe (Any Two):
a) Registration of biopesticides with CIB b) Ideal features for establishing insectary
c) Ideal features for establishing biofertilizer laboratory
- Q.8 Explain in brief Standard Quality parameters for the following microbial inoculants:
a) *Rhizobium* spp. b) *HaNPV* c) *Metarhizium* spp. d) *Pseudomonas* spp.
- Q.9 Explain in detail mass multiplication and packing of the following (Any Two):
a) *Trichoderma* spp. b) *HaNPV* c) *Azotobacter* spp. d) *Metarhizium* spp.
- Q.10 Describe the importance of the following (Any Four):
a) *SINPV* b) *Verticillium* spp. c) *Beauveria* spp. d) *Pseudomonas* spp.
e) *Trichogramma* spp.

(P.T.O.)

SECTION 'B'

Q.11 Answer in one sentence:

- 1) Name the fungal bioagent used for the management of soil borne pathogens.
- 2) Name the biopesticide which causes the white muscardine disease in insects.
- 3) Name the biopesticide which causes the green muscardine disease in insects.
- 4) Write any one bacterial bioagent used for the management of plant diseases.
- 5) Name the medium used for the isolation of BGA.
- 6) Write the full form of CIB.
- 7) The NPV is effective for the management of which insect?
- 8) The *Cryptolaemus* spp. is effective for the management of which insect?

Q.12 Choose the correct answer-option:

- 1) The *Paecilomyces lilacinus* is effective to manage _____ disease.
a) Fungal b) Bacterial c) Viral d) Nematode
- 2) _____ is a selective medium for isolation of *Azospirillum* spp.
a) NFB semi-solid medium b) Pikovaskya's medium
c) CRYEMA d) Jenesen's medium
- 3) The _____ encoding enzymes are involved in the fixation of atmospheric nitrogen into available form of nitrogen.
a) Nif gene b) Nod gene c) Both 'a' and 'b' d) None of these
- 4) In carrier based biofertilizer, the proportion of broth culture and carrier powder by weight, is _____.
a) 1:10 b) 1:5 c) 1:4 d) 1:2
- 5) A genus which belongs to Vesicular Arbuscular Mycorrhiza (VAM) is _____.
a) *Pseudomonas* spp. b) *Gigaspora* spp. c) *Nocardia* spp. d) *Micromonospora* spp.
- 6) Vinegar is obtained from molasses with the help of _____.
a) Yeast and *Acetobacter* b) Yeast and *Rhizobium*
c) Yeast and *Rhizopus* d) Yeast and *Mucor*
- 7) Which is the Potash Solubilizing as well as Mobilizing Bacteria?
a) *Fraturia aurantia* b) *Cellulomonas folia*
c) *Bacillus stearothermophilus* d) None of these
- 8) Who discovered the antibiotic 'Streptomycin' produced by *Streptomyces griseus*?
a) Alexander Fleming b) Hiltner c) S.A. Waksman d) M.W. Beijerinck

