BIOFERTILIZERS AND BIOSPESTICIDES
(BIOT 4132)

Time Allotted : 3 hrs **Full Marks : 70**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group – A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**

(i) Azospirrilum is used in
(a) rice field (b) cane sugar
(c) corn (d) none of these.

(ii) Yellow muscardine disease of of pest caused by
(a) M. Anisopliae (b) Beauveria sp
(c) Tricoderma sp (d) none of these.

(iii) Rhizothamnia is found in
(a) Frankia (b) Cyanobacteria
(c) Rhizobia (d) none of these.

(iv) The regulatory protein of nif operon is
(a) Nif A (b) Nif L
(c) Nif D (d) none of these.

(v) The first chemical pesticide introduced commercially is
(a) DDT (b) chlorinated hydrocarbon
(c) BT protein (d) none of these.

(vi) Autophaga californica belongs to Baculovirus of
(a) C group (b) NPV group
(c) GV group (d) none of these.

(vii) Nif genes are arranged as
(a) cassette (b) multigene family
(c) operon (d) split genes.

(viii) Nodulins are
(a) bacterial genes (b) plant genes
(c) both bacterial and plant genes (d) none of these.

(ix) The genes responsible for nitrogen fixing ability in Rhizobium are
(a) nif and nod genes (b) lac and hup genes
(c) nif and trp genes (d) all of these.

(x) B. thuringiensis Var kurastaki is used to control the attack of
(a) mosquito (b) moth and butterfly
(c) beetle (d) none of these.

Group- B

2. (a) What is VAM? Why it is used as biofertilizer? [(CO1)(Remember/LOCQ)]
(b) Briefly explain one mutualistic association and its importance where one of the partner is algae. [(CO1)(Remember/LOCQ)]
6 + 6 = 12

3. (a) Explain why biofertilizers offer a distinct advantage over chemical fertilizer. [(CO2)(Justify/IOCQ)]
(b) Mention one fungi that shows dual role as biofertilizer as well as biopesticide and its mode of action. [(CO2)(Remember/IOCQ)]
7 + 5 = 12

Group - C

4. (a) Briefly explain different kinds of diazotroph. [(CO3)(Remember/LOCQ)]
(b) How can you identify Azotobacter sp from soil? [(CO3)(Analyze/LOCQ)]
6 + 6 = 12

5. (a) Why cellulomona sp is important as biofertilizer? [(CO2)(Understand/IOCQ)]
(b) Briefly discuss the process of composting and vermicomposting. [(CO3)(Evaluate/IOCQ)]
6 + 6 = 12

Group - D

6. (a) What is Shepherds cook? Describe how it is formed? [(CO4)(Remember/IOCQ)]
(b) Discuss the different theories for host-microbe interaction in formation of nodules. [(CO4)(Understand/IOCQ)]
6 + 6 = 12

7. (a) Discuss the structure of two megaplsmids where the nif genes are arranged in *R. Meliloti*. [(CO4)(Analyze/HOCQ)]
(b) Mention the functions of fix genes. [(CO5)(Understand/IOCQ)]
8 + 4 = 12

Group - E

8. (a) What are the sub classes of *B. thurigiensis*? Write their use as biopesticide. [(CO5)(Analyze/IOCQ)]

(b) Mention different steps of achieving effective management of pests.

[(CO6)(Understand/IOCQ)]

6 + 6 = 12

9. (a) What are cry and cyt genes? Write the mode of action of cry toxin.

[(CO6)(Remember/IOCQ)]

(b) What is entamopathogenic fungi? Discuss the biological role of this fungi.

[(CO6)(Evaluate/HOCQ)]

6 + 6 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	25	60.41	14.58

Course Outcome (CO):

After completing this course, students will be able to:

1. Explain the role of beneficial microbes in sustainable agriculture
2. Gain knowledge on isolation and identification of nitrogen fixing bacteria
3. Role of phophate solubilizing bacteria
4. Understand molecular biology of nitrogen fixation
5. Understand the importance of biopesticide over chemical pesticide
6. Isolate and identify biopesticides for increased agricultural productivity

*LOCQ: Lower Order Cognitive Question; IOCQ: Intermediate Order Cognitive Question; HOCQ: Higher Order Cognitive Question