

Name :

Roll No. :

Invigilator's Signature :

CS/B.Tech/(BT-New)/SEM-6/BT-604E/2013

2013

BIOFERTILIZERS AND BIOPESTICIDES

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

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

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :
 $10 \times 1 = 10$

i) A nitrogen fixing cyanobacterium is

- | | |
|----------------|---------------|
| a) Nostoc | b) Anabaena |
| c) Tolypothrix | d) Gleocapsa. |

ii) Aquatic fern which is an excellent biofertilizer is

- | | |
|----------------|------------------|
| a) BGA | b) Azolla |
| c) Trichoderma | d) Trichogramma. |



iii) Biofertilizers include

- a) Cow dung manure and farm yard waste
- b) a quick growing crop ploughed back
- c) BGA/Anabeana and Azolla
- d) All of these.

iv) Farmers have reported 50% higher yield of rice by using biofertilizer

- a) *Azolla pinnata*
- b) Legume – Rhizobium symbiosis
- c) Cyanobacteria
- d) Mycorrhiza.

v) Heterocyst contains enzyme

- | | |
|----------------|-------------------|
| a) Pectinase | b) Cellulase |
| c) Nitrogenase | d) Phosphorylase. |



- vi) Leghaemoglobin takes part in
- a) Energy release
 - b) Stimulating growth of Rhizobium
 - c) Protecting nitrogenase
 - d) Supply of oxygen.
- vii) Mycorrhiza is symbiotic association between
- a) fungus and gymnosperm stem
 - b) fungus with angiosperm leaves
 - c) fungus with legume fruits
 - d) Fungus with gymnosperm and angiosperm roots.
- viii) All biopesticides are basically pest pathogen.
- a) True
 - b) not true
 - c) partially true
 - d) none of these.



ix) *Autophaga californica* belongs to Baculovirus of

- a) C group
- b) NPV group
- c) GV-group
- d) none of these.

x) Chromatium and chlorobium are

- a) non-photosynthetic nitrogen fixing bacteria
- b) photosynthetic nitrogen fixing bacteria
- c) anaerobic nitrogen fixing bacteria
- d) symbiotic nitrogen fixing bacteria.

xi) Anabaena found growing in association with fern Azolla represents

- a) symbiotic heterocystous cyanobacteria
- b) non-symbiotic cyanobacteria
- c) non-heterocystous cyanobacteria
- d) non-symbiotic heterocystous cyanobacteria.



xii) genes are responsible for nitrogen fixing ability of Rhizobia.

- a) Lac and trp genes
- b) Lac and nod genes
- c) Nif and trp genes
- d) Nif and nod genes.

GROUP - B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. What is VAM ? Write the importance of leghaemoglobin.

2 + 3

3. Briefly explain Azolla-anabaena symbiosis. Explain the mechanism of N_2 fixation in specialized cells of cyanobacteria.

2 + 3

4. What is biopesticide ? Discuss about commercially available biopesticides in India.

1 + 4

5. How phosphobacteria is beneficial in crop production ?

6. How different cry proteins show insecticidal activities ?

7. Discuss the role of Trichoderma as biofertilizer. How is it applied to the field ?

3 + 2



GROUP - C
(Long Answer Type Questions)

Answer any *three* of the following.

$3 \times 15 = 45$

8. How protoxin gene product of *B.thuringiensis* ultimately kills host pest ? Name three different strain types killing lepidoptera, diptera and coeleptera. Describe how BT spores are produced in large scale and formulated for application.

6 + 6 + 3

9. Describe efforts on improvement of biopesticidal baculovirus and fungi as more effective biopesticides by genetic engineering.

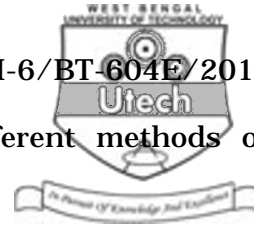
10 + 5

10. Discuss how a symbiotic relationship is established between the nodule-forming bacteria and specific plant by a flow chart. Describe the arrangement of *nif* genes in both free living and symbiotic nitrogen fixers. Mention their function.

6 + 5 + 4

11. What are cyanobacteria ? Where are they found ? How do they fix N_2 ? Are there common characteristics shared with other nitrogen fixing bacteria ? Explain why biofertilizers offers a distinct advantage over the use of chemical fertilizers.

2 + 1 + 4 + 2 + 6



12. a) What is composting ? Discuss different methods of composting.

b) What is C : N ratio ? How is it linked to composting ?

c) Discuss the role of microorganisms in composting process. $2 + 4 + 2 + 3 + 4$

13. Write short notes on any *three* of the following : 3×5

a) Integrated Pest Management (IPM)

b) Vermicompost

c) Symbiotic nitrogen fixation

d) Organic fertilizer.

=====