







**ENGINEERING & MANAGEMENT EXAMINATIONS, APRIL - 2009**  
**BIO-FERTILIZERS AND BIO-PESTICIDES**  
**SEMESTER - 8**



Time : 3 Hours ]

[ Full Marks : 70

**GROUP - A**

**( Multiple Choice Type Questions )**

1. Choose the correct alternatives for any *ten* of the following : 10 × 1 = 10
- i) One example of gymnosperm plant and microbe association capable of fixing atmosphere N<sub>2</sub> is
- a) *Rhizobium* — Legume association
  - b) *Gumneara* — Nostoc
  - c) *Frankia* — non-legume association
  - d) *Azolla* — *Anabena* association.
- ii) There is key role of inorganic atom in actual reduction of dinitrogen, which is
- a) Iron
  - b) Molybdenum
  - c) Magnesium
  - d) Sulphur.
- iii) Mycoparasitism is referred to fungus being parasitised by
- a) another fungus
  - b) bacteria
  - c) nematode
  - d) virus.
- iv) *Trichoderma harzianum* is a
- a) Symbiotic bacteria
  - b) Biofungicide
  - c) weed
  - d) parasitic bacteria.



v) Lectin is carbohydrate containing protein which

- a) facilitate biological  $N_2$  fixation
- b) enables recognition of *Rhizobium* — legume host for effective nodulation
- c) protect  $N_2$  fixing enzymes from  $O_2$  exposure
- d) is chemiluminescent.

vi) Bt toxin acts in pest gut which is

- a) neutral
- b) alkaline
- c) acedic
- d) none of these.

vii) Nod genes encode

- a) Nitrogenase
- b)  $\beta$ -galactosidase
- c) nodulins
- d) SCP.

viii) Amensalism is a phenomenon where

- a) one population adversely affects another population whilst itself being unaffected
- b) both the populations are benefited
- c) none of the population is affected
- d) one is harmed while the other benefits.

ix) Symbiotic structure formed by cyanobacteria and fungi

- a) Lectin
- b) Legume
- c) Lichen
- d) Mushrooms.



x) *Bacillus thuringiensis* was first isolated in 1902 by Ishiwata in Japan from a diseased larva of

a) *Apis mellifica*

b) *Anopheles sp.*

c) *Manduca sexta*

d) *Bombyx mori.*




xi) Phenomenon of eating of nematodes by fungi is

a) mycophagy

b) nematophagy

c) hyperparasitism

d) antagonism.

**GROUP – B**

**( Short Answer Type Questions )**

Answer any *three* of the following.

3 × 5 = 15

2. What is leg haemoglobin ? State briefly regarding its composition and function. 2 + 3
3. Point out the distinction between *Rhizobium* and *Bradyrhizobium* citing examples and commenting on the biological significance of such separation of types. 2 + 3
4. Briefly state the mechanism of *Rhizobium* infection to the host plant, commenting on the chemicals / factors which ensure successful host *Rhizobium* association possible. 5
5. Briefly describe the advantages of biopesticides over chemical pesticides. 5
6. Write a short note on neem as biopesticide. 5

**GROUP – C**

**( Long Answer Type Questions )**

Answer any *three* of the following questions.

3 × 15 = 45

7. State concisely what are (a) chemical fertilizers and (b) biofertilizers. Contrast these two in general terms regarding (i) the composition, (ii) role in plant growth and (iii) role in soil health keeping. 3 + 12



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8. Referring to a nitrogen fixing bacteria, the detailed make up of 'nif' genes is now known. State briefly on genetic control of these gene members stating their roles and one/two special characteristics. 15
9. What is Biofungicide ? Discuss in brief its field applications citing suitable examples. 3 + 12
10. Discuss about the protein antipest material of *Bacillus thuringiensis*. Describe its mode of action. 7 + 8
11. Name the enzymes which play key roles in biological fixation of dinitrogen by plants including microbes. Through diagrammatic presentation and brief explanatory notes, state the sequence of intermediate productions. 3 + 12

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END