Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/M.TECH (PHMC)/SEM-2/PHMC-203/2011

2011
AGRICULTURAL & SOIL MICROBIOLOGY

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.

Answer question No.1 and any *three* from each Group.

GROUP – A
(Objective Type Questions)

1. a) What is the difference between Paleolithic, Mesolithic and Neolithic periods ? 1

   b) What is the difference between Edible and Non-edible Oilcakes ? 1

   c) What is the difference between dS/m and mmho/cm ? 1

   d) Why is the decomposition of organic manure in soil essential ? 1

   e) In HYV Rice N : P : K is 36:18:18.

   What does it mean ? 1

   f) Name one free-living N-fixer and one Pseudo-Nodule forming Rhizobia. 1

g) Se, As and I are important to the plant but they are not essential for plant nutrition – comment. 1

h) Soil + $CaCO_3$ → products ? 1

i) Name one Commercially important Fungal, one Bacterial and one Viral Biopesticide. 1

j) N_2 (g) + 3 H_2 (g) → $2NH_3$ (g) (Δ H = 92.4 kJ. mol). Comment on this equation. 1

GROUP - B

2. a) Why is Organic Farming better than Chemical Farming ?

b) The use of Rhizobium for Nitrogen fixation is cost effective than the use of Urea. Explain with example.

c) Name some microbes used as N-Biofertilizer. How one could get good response to biofertilizer application ?

3 + 2 + 5

3. a) Explain the procedure of commercial production of Biocompost.

b) How does Biocompost help in recovering soil health ?

c) Briefly describe the different types of Biocompost.

4 + 3 + 3

4. Write short notes on the following : 5×2

a) Green Manure and Farm Yard Manure

b) Solid and Liquid Biofertilizers

c) Nodulation in Rice

d) Explanation of one of the following being not a biopesticide :

Trichoderma, Larval-parasitoid, *Pseudomonas fluorescence,* NPVs, DDT, Azadirectin.

e) EPA and NCIPM.

5. a) Name two Nitrifying bacteria and state their role in controlling water pollution.

b) Which PGPRs solubilize phosphate and potash in the soil and how ?

c) Name four major genus of the Family Rhizobiaceae.

d) Differentiate between symbiotic and free-living N-fixers.

3 + 3 + 2 + 2

6. a) State the basic differences between INM and IPM.

b) How are they related to Organic Farming ?

c) Briefly describe the mechanism of action of Viral biopesticide with an example. 3 + 3 + 4

7. a) What is PGPR and how are they related to plant Growth ?

b) Define VAM and their role in plant growth promotion.

c) Differentiate Denitrification from Nitrogen Fixation and describe their importance in Sustainable Agriculture.

4 + 3 + 3

GROUP - C

8. a) What is soil organic matter ?
   b) Write the principle of determining soil organic matter.
   c) Explain how soil organic matter is determined. 3 + 2 + 5

9. a) Nitrogenase is a two-component protein. Explain.
   b) What is the obligatory part of introgen-spiltting reaction ?
   c) What are NOD genes ?
   d) Nodulation by *Rhizobium* does not necessarily guarantee nitrogen fixation. Explain. 2 + 1 + 3 + 4

10. a) How are pesticides classified ?
    b) Phosphoric acid is a triprotic acid. True of False ?
    c) Ban of pesticides leads to loss of crop, loss of jobs and world hunger. Explain
    d) Use of DDT is disastrous to biodiversity. Comment.
    3 + 1 + 4 + 2

11. a) What is DDT resistance ? Explain.
    b) Organophosphates and carbamates are structurally different but their mechanism of action as pesticide is same. Explain. 4 + 6

12. a) What is fertilizer burn ?
    b) Write a brief on environmental effects of fertilizer use.
    3 + 7