

2020

**MICROBIOLOGY — GENERAL**

**Paper : SEC-A-2**

**(Biofertilizers and Biopesticides)**

**Full Marks : 80**

*The figures in the margin indicate full marks.*

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

**Question no. 1** is compulsory and answer **any six** questions from the rest.

1. Answer **any ten** questions : 2×10
- (a) Name two microorganisms that we can use as biofertilizer.
  - (b) 'Legumes do not fix nitrogen'— *True* or *False*. Justify the statement.
  - (c) Distinguish between mycopesticide and viropesticide.
  - (d) What is the role of nitrogenase enzyme complex in cyanobacteria?
  - (e) State the importance of vermicompost in crop yields.
  - (f) How is Bt. toxin activated?
  - (g) What are nod genes?
  - (h) What are the characteristics of free living nitrogen fixers?
  - (i) Name one microorganism that you can use as a nitrogen fixer in paddy fields.
  - (j) What is VAM?
  - (k) What do you mean by PGPR?
  - (l) Distinguish between ectomycorrhizae and endomycorrhizae.
2. (a) What are the different stages of nitrogen fixation?  
(b) Distinguish between hormogones and hormospores.  
(c) What are true and false branching in cyanobacteria? 3+4+3
3. Write short notes on (**any four**) : 2½×4
- (a) Nif operon
  - (b) Importance of PGPR in agriculture along with example
  - (c) Mass inoculum production of PSM
  - (d) Importance of *Azolla* in rice cultivation

**Please Turn Over**

- (e) Importance of *Baculo* virus  
 (f) Heterocysts.

4. (a) Describe the synergistic effect of various (*at least two*) microorganisms with VAM fungi.  
 (b) What is mass inoculum?  
 (c) Match the following :

Rhizobium species	Associated legume
(i) <i>R. melilotii</i>	(A) Trifolium
(ii) <i>R. leguminosorum</i>	(B) Medicago
(iii) <i>R. japonicum</i>	(C) Pisum
(iv) <i>R. trifolii</i>	(D) Vigna

(2½+2½)+2+3

5. (a) Why is the usage of bioinsecticide preferred to synthetic pesticide?  
 (b) Name a plant of economic importance stating the infection that it is susceptible to.  
 (c) Describe how the infection mentioned in (b) is biologically controlled. 4+2+4
6. (a) What does PSM stand for? Give examples.  
 (b) How can you isolate PSM?  
 (c) Elucidate the methods for increased uptake of phosphorus by mycorrhizal plant. 3+3+4
7. (a) Distinguish between vesicles and arbuscles.  
 (b) What are the deleterious effects of cyanobacteria?  
 (c) Describe the association of cyanobacteria and fungi in lichen formation. 3+3+4
8. (a) How is NPK useful as a chemical fertilizer?  
 (b) Name two Bt crops stating their advantageous use.  
 (c) What are the limitations of *Rhizobium* being grown in any type of soil? 3+4+3
9. (a) Elucidate the different steps in nodule formation by detailed diagram.  
 (b) State the function of leghaemoglobin.  
 (c) What are endophytes? Give example. 4+3+3
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