2021

MICROBIOLOGY — HONOURS

Paper : DSE-B-2

[Microbes in Sustainable Agriculture and Development (Th)]

Full Marks : 50

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*** questions from the rest.

1. Answer ***any ten*** of the following questions : 2×10

(a) How can you distinguish *Rhizobium* and *Bradyrhizobium*?

(b) Give examples of two biopesticides.

(c) What is 2G-ethanol?

(d) Name two lytic enzymes produced by microorganisms having hyperparasitic activity.

(e) Microbial populations differ in rhizosphere and non-rhizosphere region. Why?

(f) What is siderophore?

(g) Define heterocyst.

(h) Why is lignin difficult to breakdown?

(i) State the disadvantages of Bt-cotton.

(j) Distinguish between mineralization and immobilization of nitrogen.

(k) State the importance of *Frankia* in agriculture.

(l) Name two common microbial pathogens found in soil.

(m) Give two examples of phosphate solubilizing microbes.

(n) Define PGPR with example.

(o) What do you mean by biotech feed?

2. (a) What are the factors which affect microbial community in soil?

(b) How the biofertilizers are also involved in bioremediation regarding heavy metal toxicity?

(c) Briefly describe the role of MHBs in soil fertility.

(d) Define soil horizon. 3+3+3+1

3. (a) How are silica and potassium important as soil components?

(b) Presence of some microorganisms in suppressive soil causes disease suppression. — Explain.

(c) Describe in a flowchart how you can isolate cyanobacteria from a natural sample.

(d) State the role of leghaemoglobin in N_2-fixation. 2+2+3+3

4. (a) What are the different components (%) of biogas? How they are formed by microbes? Describe this with reactions.

(b) What do you mean by upgradation of biogas?

(c) Give example of a novel combination of microbes as biofertilizers. (2+3+2)+1+2

5. (a) Define denitrification. Name two organisms involved in this process.

(b) How do microbes produce nitrous oxide (N_2O) and nitric oxide (NO) in soil?

(c) How can weeds be controlled biologically?

(d) What do you mean by soil profile? (2+2)+3+1½+1½

6. Write short notes on : 2½×4

(a) Cation exchange capacity

(b) Silage

(c) Transgenic animals

(d) Significance of Mycorrhizae.