

(ii) What is the difference between the greenhouse effect and global warming? Name the greenhouse gases, its sources and also mention the effects of them on the environment. 3+2+2+3=10

(iii) Write note on :

(a) Non-symbiotic biofertilizer

(b) PGPRs 5+5=10

(iv) Write a note on mechanism of action of microbial biocontrol agents against plant pathogens.

(v) What are GM crops? Explain the mechanism of GM crop production and types of Bt crops. Also add a note on its environmental benefits. 2+5+1+2=10

(vi) Write notes on the following :

(a) Silage

(b) Soil profile 5+5=10

Total number of printed pages-4

3 (Sem-6/CBCS) MIC RE

2024

### MICROBIOLOGY

(Regular Elective)

Paper : MIC-RE-6016

(Microbes in Sustainable Agriculture and Development)

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Answer the following questions : 1×7=7

(i) Name one Bt crop.

(ii) What are lichens?

(iii) Name a biocontrol agent that is used against caterpillars of butterflies.

(iv) Mention the organic matter on which methanogens are grown to produce biogas.



(v) Name the greenhouse gas that are present in very high quantity in the atmosphere.

(vi) Which of the following is incorrectly matched?

**Column A**

**Column B**

(a) Alnus Frankia

(b) Alfalfa Rhizobium

(c) Nitrogen fixer Anabaena

(d) Mycorrhiza Rhodospirillum

(vii) The loss of nitrogen from soil is caused by which one of the process mentioned below?

(a) Ammonification

(b) Denitrification

(c) Nitrification

(Choose the correct option)

2. Write very short answer on the following  
 $2 \times 4 = 8$

(i) What is mineralization of organic matter in the soil?

(ii) Mention two phosphorous solubilizing soil inhabiting bacteria.

(iii) What are biocontrol agents?

(iv) Mention two application of transgenic animals for benefit of human being.

3. Write short notes on the following :  
(any three)  $5 \times 3 = 15$

(i) Method of creating transgenic animal

(ii) Composition and the process of formation of soil

(iii) Role of microorganisms in improving soil fertility

(iv) Mineralization of hemicellulose in soil

(v) Role of microbes in production of biogas

4. Answer any three of the following questions  
 $10 \times 3 = 30$

(i) What are biofuels? Write a note on the production of biofuels from plant products and also mention about advantages and disadvantages of biofuels.

$2 + 4 + 2 + 2 = 10$