1 (SEM–4/FYUGP) BOT 43 MJ

2026

BOTANY

(Major)

Paper : BOT4400304MJ

(Microbiology)

Full Marks : 45

Time : 2 hours

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

1. Answer the following questions : 1×5=5

(i) What is a SCP? Give a suitable example.

(ii) Name the causal organism of Rocky Mountain Spotted Fever (RMSF).

(iii) Who proposed the 'Germ Theory of Disease'?

(iv) Which immunoglobulin can cross the human placenta to provide passive immunity to the foetus?

(v) Write the scientific name of curd bacterium.

2. Answer ***any five*** of the following questions : 2×5=10

(i) Name the different methods of sexual reproduction in bacteria.

(ii) What are 'nod' and 'nif' genes?

(iii) What is a biopesticide? Give *two* examples of microbes used as biopesticides.

(iv) Draw and label the structure of TMV.

(v) Name *two* bacterial pathogens causing diseases in plants.

(vi) Write briefly about the role of microbes in space and oil exploration.

(vii) What is a 'fed-batch' culture?

(viii) Define microbial bioremediation. Give an example of a microbe used in bioremediation of oil spills.

(ix) What is 'Botulism'? Name the microbe associated with condition.

(x) What is 'Sake'? Which microbial species are associated with its production?

3. Answer ***any four*** of the following questions : 5×4=20

(i) Write a short note on — *a)* Mycoplasma ***Or*** *b)* Actinomycetes.

(ii) Mention the key steps of the nitrogen cycle in nature, alongwith the microbial genera involved in each step.

(iii) What is a bacterial growth curve ? Write briefly about the different phases of bacterial growth basing on the growth curve.

(iv) Classify viruses basing on the Baltimore System of Classification.

(v) Give a schematic diagram of the Sulpher cycle in nature. Name the microbes involved in each step.

(vi) Who proposed the 'Koch's Postulates' ? Write briefly about the Koch's Postulates of disease.

(vii) Write a note on the role of micro-organisms in industrial antibiotic preparation. Mention *two* common microbial species used in the process.

(viii) Write about the host defence mechanism in plants.

4. Answer ***any one*** of the following questions: 10×1=10

(i) What is Biological Nitrogen Fixation ? Write briefly about the process of root nodule formation and nitrogen fixation in leguminous plants. Give suitable diagrams. 2+6+2=10

OR

(a) Describe the process of transduction in bacteria. How is the process exploited in genetic engineering ? 4+1=5

(b) Discuss about the role of micro-organisms in GMO development. Give suitable examples. 4+1=5

(ii) (a) Classify microbes on the basis of carbon and energy source. Describe each group giving suitable examples. 2+4=6.

(b) Explain the process of transformation and its significance in the genetic recombination of bacteria. 3+1=4

OR

(a) Make a list of *five* bacterial diseases of animals and their causal organisms. 5

(b) Write a note on the role of microbes in agriculture.

(iii) What are immunoglobulins? Name their different types Describe the structures and functions of the immuno-globulins IgG and IgE. Give suitable diagrams. 2+4+4=10

OR

(a) What are antigens? Differentiate between 'alloantigens' and 'autoantigens'. 2+4=6

(b) What is an autoimmune disease? Name *one*. 2

(c) Define cellular immunity. Which lymphocytes are responsible for cellular immunity? 1+1=2

(iv) (a) Write a note on microorganisms adapted to extreme environmental conditions. 5

(b) Discuss the process of microbial citric acid fermentation. 5

OR

(a) What are 'viroids' and 'prions'? Name a disease caused by each of them. $2\frac{1}{2} \times 2 = 5$

(b) Discuss about the role of fungi in the food industry. 5
