1 (Sem–4) BOT 3

2025

BOTANY

Paper : BOT0400304

(Microbiology)

Full Marks : 45

Time : 2 hours

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

1. Choose the right option : 1×5=5

(A) Koch's postulates were designed to

(a) Discover antibiotics

(b) Classify bacteria

(c) Prove germ theory of disease

(d) Observe microbial motility

(B) Which phase in a bacterial growth curve shows maximum metabolic activity ?

(a) Lag phase

(b) Log phase

(c) Stationary phase

(d) Death phase

(C) Which of the following lacks a protein coat ?

(a) Prion

(b) Viroid

(c) Virus

(d) Bacteriophage

(D) The Baltimore classification is based on

(a) Host type

(b) Capsid shape

(c) Type of nucleic acid and replication method

(d) Disease caused

(E) Mycoplasma differs from other bacteria by lacking

(a) DNA

(b) Cell wall

(c) Ribosomes

(d) Flagella

2. Answer ***any five*** very briefly : 2×5=10

(A) Name the major nutritional types of microorganisms based on carbon and energy source.

(B) Define Koch's postulates in brief.

(C) Name *two* RNA viruses that infect humans.

(D) Mention *two* agriculturally important bacteria.

(E) What role do soil microorganisms play in plant health ?

(F) Name *two* fungal diseases of plants and their causative organisms.

(G) Name *two* primary lymphoid systems.

(H) Define biopesticide with *one* example.

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

(A) Explain the phases of microbial growth curve with a diagram.

(B) Compare the life cycles of lytic and lysogenic bacteriophages.

(C) Describe the ultrastructure of a bacterial cell.

(D) Explain conjugation and its genetic significance in bacteria.

(E) Discuss the role of microbes in carbon and phosphorus cycling.

(F) Explain the mechanism of plant defense against fungal pathogens.

(G) Describe Rh antigen and its clinical significance.

(H) Explain the use of microbes in biocomposting and waste management.

4. Answer ***any one*** of the following : 10

(A) Elaborate on the Germ Theory of Disease with contributions of Louis Pasteur and Robert Koch.

(B) Discuss horizontal gene transfer in bacteria and its evolutionary importance.

(C) Describe in detail the role of microorganisms in biogeochemical cycling of N and P.

(D) Discuss microorganisms in extreme environments and their adaptations.

(E) Discuss host-pathogen interactions and the immune responses generated.

(F) Explain different types of immunity and their roles in pathogen defense.

(G) Describe in detail the production and use of SCP and fermented foods.

(H) Discuss the use of microorganisms in pollution control and oil exploration.
