



Attempt questions first; check the separate key afterward. Use labelled diagrams where asked. Give scientific reasons; answer key covers closed questions.

A. Very short answers - 1 mark each

1. Name bacteria commonly used in curd production.
2. Name the yeast widely used for bread and brewing.
3. Name the mould associated with penicillin discovery.
4. Name the microbe used industrially for citric acid.
5. Name a bacterium used to produce acetic acid.
6. Name the microbe associated with statin production in NCERT.
7. Expand BOD.
8. Name the main combustible component of biogas.

B. Short answers / practice - 2 marks each

9. Explain microbial changes during curd formation.
10. Why does fermented dough rise?
11. Compare fermented beverages with distilled alcoholic products.
12. Explain large-scale fermentation and the need for controlled conditions.
13. Describe the significance of antibiotics and judicious use.
14. State industrial uses of lipases and pectinases.
15. Explain streptokinase as a microbial product.
16. Name the source of cyclosporin A in the textbook.
17. Compare primary and secondary sewage treatment.
18. Describe flocs and their role in aeration tanks.
19. Explain why BOD falls during effective biological treatment.
20. Describe activated sludge and the purpose of recycling part of it.

C. Application / reasoning - 3 marks each

21. Explain anaerobic sludge digestion.
22. Name a methanogen commonly discussed in biogas production.
23. Describe the role of cattle dung in a biogas plant.
24. Explain biological control using *Bacillus thuringiensis*.
25. State the role of *Trichoderma* as a biocontrol agent.
26. Why can baculoviruses be useful in integrated pest management?
27. Explain *Rhizobium* as a biofertiliser.
28. Compare free-living nitrogen fixers and cyanobacterial biofertilisers.
29. Describe mycorrhizal benefits to plant nutrition and stress tolerance.
30. BOD falls from 200 to 40 mg/L. Find percentage reduction.
31. Does low BOD alone prove water is safe to drink?

D. Extended practice - 5 marks each

32. Describe sewage treatment from screening to sludge digestion with a flow diagram.
33. Draw a biogas plant and explain microbial processes and useful products.
34. Compare microbes in food, industrial products, biocontrol and biofertilisers with examples.
35. Design an environmentally sensible farming approach integrating biofertilisers and biological control.

ANSWER KEY - Numerical / closed questions

- 1) Lactic acid bacteria/*Lactobacillus*. 2) *Saccharomyces cerevisiae*. 3) *Penicillium*. 4) *Aspergillus niger*. 5) *Acetobacter aceti*. 6) *Monascus purpureus*. 7) Biochemical oxygen demand. 8) Methane. 16) *Trichoderma polysporum*. 22) *Methanobacterium*. 30) 80%. 31) No.