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**GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY UNIVERSITY, ODISHA, GUNUPUR
(GIET UNIVERSITY)**



Ph.D. (Second Semester-Winter) Examinations, April – 2026
SOIL-609, Recent Trends in Soil Microbial Diversity
(Agronomy)

Time: 3 hrs

Maximum: 70 Marks

The figures in the right hand margin indicate marks.

Answer ANY FIVE Questions.

(14 x 5 = 70 Marks) Marks

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| 1.a. Define soil microbial biodiversity. Discuss the importance of microbial communities in soil ecosystem and plant performance. | 8 |
| b. Write short notes on: (i) Rhizosphere microorganisms (ii) Soil microbial diversity as an indicator of soil health. | 6 |
| 2. a. Explain the methods used for measuring microbial biomass and microbial activity in soil. | 8 |
| b. Differentiate between microbial biomass carbon and soil respiration. Mention their significance in soil fertility studies. | 6 |
| 3.a. Discuss the important nitrogen-fixing microorganisms found in agricultural soils and explain their functions. | 8 |
| b. Write short notes on any three: Rhizobium, Azotobacter, Azospirillum, Cyanobacteria. | 6 |
| 4. a. What are bacterial fertilizers? Explain their advantages in sustainable agriculture. | 8 |
| b. Give examples of any three bacterial fertilizers and mention their functions. | 6 |
| 5.a. Discuss the role of bacterial fertilizers in sustainable agriculture. | 8 |
| b. Write short notes on phosphate-solubilizing bacteria and their importance in crop production. | 6 |
| 6.a. Explain the role of microorganisms in soil, waste and water management. | 8 |
| b. Differentiate between biodegradation and bioremediation. Mention two advantages of each. | 6 |
| 7. a. Explain the role of microorganisms in decomposition of organic matter and nutrient cycling | 8 |
| b. Write briefly on carbon cycle and nitrogen cycle in soil. | 6 |
| 8.a. What are xenobiotic pollutants? Discuss their harmful effects on soil and crops. | 8 |
| b. Explain how microorganisms help in the degradation of pesticides present in soil. | 6 |

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