22MBU414N

**PSG COLLEGE OF ARTS & SCIENCE**
(AUTONOMOUS)

**BSc DEGREE EXAMINATION MAY 2025**
(Fourth Semester)

Branch - **MICROBIOLOGY**

**SOIL AND AGRICULTURAL MICROBIOLOGY**

Time: Three Hours Maximum: 75 Marks

**SECTION-A (10 Marks)**

Answer **ALL** questions

**ALL** questions carry **EQUAL** marks (10 × 1 = 10)

| Module No. | Question No. | Question | K Level | CO |
|---|---|---|---|---|
| 1 | 1 | Which of the following is soil flora?<br>a. Fungi b. Actinomycetes<br>c. Protozoa d. Nematode | K1 | CO1 |
| | 2 | ____influences the structure and texture of soil besides enriching with nutrients for plants and microorganisms.<br>a. Soil pH b. Soil air<br>c. Soil temperature d. Soil Organic matter | K2 | CO1 |
| 2 | 3 | The relationship of nitrogen-fixing bacteria with root legumes is an example of _____.<br>a. Mutualism b. Proto co-operation<br>c. Commensalism d. Neutralism | K1 | CO2 |
| | 4 | Which of the following types of association is present among *Staphylococcus aureus* and *Aspergillus terreus?*<br>a. antagonism b. mutualism<br>c. parasitism d. commensalism | K2 | CO2 |
| 3 | 5 | Soil microbes serially degrade nitrogenous organic compounds derived from dead plants and animals to coverts them finally into NH3, the process is _____.<br>a. Denitrification b. Nitrogen fixation<br>c. Nitrification d. Ammonification | K1 | CO3 |
| | 6 | Sulphates are reduced to hydrogen sulphide by _____.<br>a. *Desulfotomaculum* sp.<br>b. *Thiobacillus thiooxidans*<br>c. Photosynthetic sulfur bacteria<br>d. *Rhodospirillum sp* | K2 | CO3 |
| 4 | 7 | The root hair curls as a result of the action of substances excreted by the bacterial cell_____.<br>a. Nif gene b. Nod gene<br>c. Sym Plasmid d. trp gene | K1 | CO4 |
| | 8 | Which of the following is a pair of biofertilizers?<br>a. *Salmonella* and *E.coli* b. *Rhizobium* and grasses<br>c. *Nostoc* and legume d. *Azolla* and BGA | K2 | CO4 |
| 5 | 9 | This is a third generation pesticide _____.<br>a. Pheromones<br>b. Pathogens<br>c. Carbamates and organophosphates<br>d. Insect repellants | K1 | CO5 |
| | 10 | Which of the following fungi is not known to degrade DDT insecticide?<br>a. *Aspergillus niger* b. *Mucor alternans*<br>c. *Penicillium* sp. d. *Bacillus cereus* | K2 | CO5 |

**Cont...**

## SECTION - B (35 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks (5 × 7 = 35)

| Module No. | Question No. | Question | K Level | CO |
|---|---|---|---|---|
| 1 | 11.a. | Enlighten the distributions microbial population in soil. | K3 | CO1 |
| | | (OR) | | |
| | 11.b. | Brief out the hypothesis of zymogenous microflora distribution and significant role of in soil. | | |
| 2 | 12.a. | Criticize the microbial interactions with examples - (i) Competition (ii) Parasitism. | K4 | CO2 |
| | | (OR) | | |
| | 12.b. | Interpret the negative microbial association within single microbial population with suitable examples. | | |
| 3 | 13.a. | Contrast the beneficial association of microbes in biogeochemical cycles. | K4 | CO3 |
| | | (OR) | | |
| | 13.b. | Discuss the Phosphorus biogeochemical cycle with neat sketch. | | |
| 4 | 14.a. | Prioritize the symbiotic and non-symbiotic nitrogen fixation. | K5 | CO4 |
| | | (OR) | | |
| | 14.b. | Brief the Azolla- Anabena association. | | |
| 5 | 15.a. | Inference the role of fungal insecticide and its application. | K4 | CO5 |
| | | (OR) | | |
| | 15.b. | Summarize the brief note on viral bio-pesticide and its beneficial microbial association. | | |

## SECTION -C (30 Marks)

Answer ANY THREE questions

ALL questions carry EQUAL Marks (3 × 10 = 30)

| Module No. | Question No. | Question | K Level | CO |
|---|---|---|---|---|
| 1 | 16 | Justify how the environmental factors influence the microbial community in soil. | K5 | CO1 |
| 2 | 17 | Discuss the importance of positive microbial interactions with examples. | K4 | CO2 |
| 3 | 18 | Construct Nitrogen cycle and explain the role of microorganism in nitrogen fixation. | K4 | CO3 |
| 4 | 19 | Elaborate the importance of nif and nod gene in nodulation process. | K6 | CO4 |
| 5 | 20 | Describe in detail about nematode insecticide mass production and explain its symbiotic association with insect. | K5 | CO5 |

Z-Z-Z END