

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2026
(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	An abrupt increase in simple organic compounds in the soil typically favors which group? a) Opportunistic microflora b) Autochthonous microflora c) Allochthonous microflora d) Zymogenous microflora	K1	CO1
	2	Phototrophic bacteria that are important in soils where light and water are available. a) Cyanobacteria b) Nocardia. c) Rhizoctonia d) Agrobacterium	K2	CO1
2	3	Which of the following is NOT a type of positive interaction? a) Commensalism b) Synergism c) Ammensalism d) Mutualism	K1	CO1
	4	Neutralism is most likely to occur when: a) Microorganisms compete for the same limiting nutrient b) Microorganisms occupy different ecological niches c) Microorganisms form symbiotic associations d) One microorganism produces toxins against another	K2	CO1
3	5	A biogeochemical cycle that does not include atmosphere- a) Phosphorus cycle b) Nitrogen cycle c) Sulphur cycle d) Carbon cycle	K1	CO2
	6	A reaction that oxidizes ammonium to dinitrogen gas using nitrite as the electron acceptor under anoxic conditions during Nitrogen cycle a) Denitrification b) Ammonification c) Anammox reaction d) Nitrification	K2	CO2
4	7	The main purpose of quality testing of biofertilizers before release is to check: a) Colour and texture b) Packaging quality c) Presence of pathogens d) Viability and efficiency of inoculant strain	K1	CO3
	8	Which cyanobacterium is a symbiotic nitrogen fixer in water fern Azolla? a) Nostoc b) <i>Anabaena azollae</i> c) Oscillatoria d) Azotobacter	K2	CO3
5	9	Mode of action of Bt toxin in insects involves: a) Inhibiting DNA replication b) Disruption of midgut epithelial cells c) Blocking nerve synapses d) Preventing molting hormones	K1	CO3
	10	NPVs and GVs are usually formulated and applied in the form of: a) Polyhedral occlusion bodies (POBs) b) Cry toxins c) Protein crystals d) Virions	K2	CO3

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.	Explain the role of fungi in soil organic matter decomposition.	K2	CO1
	(OR)			
	11.b.	Summarize the population dynamics of soil actinomycetes.		
2	12.a.	Demonstrate how competition among soil microbes influences nutrient availability.	K2	CO1
	(OR)			
	12.b.	Outline the ecological significance of commensalism among soil microorganisms.		
3	13.a.	Illustrate the steps involved in the immobilization and mineralization of sulphur in soils.	K2	CO2
	(OR)			
	13.b.	Explain the ecological significance of carbon cycling in terrestrial ecosystems.		
4	14.a.	Categorize the steps involved in the mass production of Azotobacter biofertilizers.	K4	CO3
	(OR)			
	14.b.	Analyze the sequence of events from root hair infection to nodule formation in symbiotic nitrogen fixation.		
5	15.a.	Describe the production process of a microbial insecticide using <i>Bacillus thuringiensis</i> .	K4	CO3
	(OR)			
	15.b.	Examine the role of fungal insecticides in managing pest resistance.		

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	Explain the vertical distribution of bacteria in soil and the factors influencing their abundance at different depths.	K2	CO1
2	17	Compare positive and negative microbial interactions with examples from soil ecosystems.	K2	CO1
3	18	Analyze the role of different microbial groups -nitrogen-fixing, nitrifying and denitrifying bacteria in maintaining the nitrogen cycle in soil.	K4	CO2
4	19	Compare the mass production techniques of bacterial vs BGA biofertilizers with respect to scalability and cost-effectiveness.	K4	CO3
5	20	Critically analyze the role of microbial insecticides in sustainable agriculture and integrated pest management.	K4	CO3