

ENVIRONMENTAL 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 bacteria is a well-known microbial predator? (i) <i>Streptococcus pyogenes</i> (ii) <i>Bdellovibrio bacteriovorus</i> (iii) <i>Lactobacillus acidophilus</i> (iv) <i>Escherichia coli</i>	K1	CO1
	2	Keystone species in microbial communities are those that (i) Live only in soil (ii) Are most abundant always (iii) Have a disproportionate ecological impact (iv) Are largest in size	K2	CO1
2	3	Biological carbon sequestration mainly occurs through (i) Photosynthesis (ii) Nitrification (iii) Fermentation (iv) Respiration	K1	CO2
	4	Multiple dilutions are used in MFT to (i) Increase nutrient content (ii) Obtain accurate estimation of coliform density (iii) Reduce incubation time (iv) Identify fungi	K2	CO2
3	5	The breakdown of xenobiotics by microbes results in (i) Detoxification or mineralization (ii) Bioaccumulation only (iii) Increased toxicity always (iv) Polymer synthesis	K1	CO3
	6	Acidic conditions in bioleaching are important because they (i) Enhance metal solubilization (ii) Kill all microbes (iii) Prevent oxidation (iv) Neutralize sulfides	K2	CO3
4	7	Microorganisms inhabiting the phyllosphere are called (i) Rhizobacteria (ii) Epiphytes (iii) Endophytes (iv) Saprophytes	K1	CO4
	8	The characteristic leaf symptom of black rot is (i) Circular brown spots (ii) Powdery white growth (iii) V-shaped yellow lesions from leaf margins (iv) Mosaic mottling	K2	CO4
5	9	A major plant growth-promoting substance produced by <i>Azospirillum</i> is (i) Penicillin (ii) Melanin (iii) Insulin (iv) Auxin (IAA)	K1	CO5
	10	Infection by <i>Nosema locustae</i> mainly occurs through (i) Vector transmission (ii) Inhalation (iii) Ingestion of spores (iv) Skin penetration	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.	Summarize the ecological importance of microbial cultivation by animals in food conversion.	K2	CO1
		(OR)		
	11.b.	Explain the process of succession within microbial communities and its stages.		
2	12.a.	Apply the concept of air-borne transmission to explain the spread of bacterial and fungal diseases.	K3	CO2
		(OR)		
	12.b.	Illustrate the role of greenhouse gases in global warming with suitable examples.		
3	13.a.	Apply microbial bioaccumulation to design an experiment for removing lead from industrial wastewater.	K3	CO3
		(OR)		
	13.b.	Apply suitable methods to control microbial deterioration in paper archives.		
4	14.a.	Evaluate the role of microbial antagonism in controlling plant pathogens.	K5	CO4
		(OR)		
	14.b.	Critically analyze the impact of red rot infection on sugarcane yield and quality.		
5	15.a.	Assess the effectiveness of Rhizobium-based biofertilizers in enhancing legume crop productivity.	K5	CO5
		(OR)		
	15.b.	Evaluate the contribution of <i>Beauveria bassiana</i> to sustainable agriculture and reduction of pesticide residues.		

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 various types of interactions between diverse microbial populations with suitable examples.	K2	CO1
2	17	Illustrate the stepwise methodology of the MPN test with suitable diagrams.	K3	CO2
3	18	Develop a stepwise microbial bioleaching strategy to maximize metal recovery from copper, gold and uranium ores.	K3	CO3
4	19	Evaluate the relative contributions of biotic and abiotic processes in carbon and nitrogen cycling.	K5	CO4
5	20	Critically evaluate the role of soil microbiome engineering in enhancing soil carbon sequestration.	K5	CO5

Z-Z-Z

END