25BTP103

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION DECEMBER 2025
(First Semester)

Branch – **BIOTECHNOLOGY**

APPLIED 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	Who introduced the concept of "pure culture technique" in microbiology? a) Antonie van Leeuwenhoek b) Robert Koch c) Louis Pasteur d) Joseph Lister	K1	CO1
	2	Polyphasic taxonomy integrates _____. a) Only morphological and biochemical traits b) Molecular, ecological, morphological, biochemical traits c) Culture collection methods only d) Preservation and maintenance strategies	K2	CO2
2	3	Which method is considered the "gold standard" for prokaryotic phylogenetic analysis? a) G+C content analysis b) DNA–DNA hybridization c) 16S rRNA sequencing d) Fatty Acid Methyl Ester (FAME)	K1	CO2
	4	NGS-based metagenomics is superior to classical culture methods because it _____. a) Can study only aerobic microbes b) Requires no DNA extraction c) Captures entire microbial communities including unculturable species d) Is less expensive and less data-intensive	K2	CO2
3	5	Which of the following antibiotics inhibits protein synthesis? a) Tetracycline b) Penicillin c) Polymyxin d) Rifampicin	K1	CO3
	6	Amphotericin B primarily acts on fungal membranes by_____. a) Inhibiting DNA synthesis b) Targeting ergosterol c) Blocking peptidoglycan cross-linking d) Inhibiting RNA polymerase	K2	CO3
4	7	Rhizobium contributes to agriculture through _____. a) Nitrification b) Denitrification c) Symbiotic nitrogen fixation d) Sulfur oxidation	K1	CO4
	8	HACCP in food microbiology is associated with _____. a) Traditional preservation methods b) Systematic food safety risk management c) Biopesticide production d) DNA barcoding of microbes	K2	CO4
5	9	Which fungal pathogen is commonly associated with opportunistic infections in immunocompromised patients? a) Candida b) Plasmodium c) Yersinia d) Streptococcus	K1	CO5
	10	AIDS virus attacks immune function by _____. a) Binding to CD4+ T cells and co-receptors b) Lysing red blood cells c) Integrating only into mitochondrial DNA d) Releasing toxins against neutrophils	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.	Differentiate between synchronous and diauxic growth with examples.	K3	CO1
		(OR)		
	11.b.	Analyze the role of international microbial culture collection centers in research.		
2	12.a.	Explain the significance of DNA-DNA hybridization in microbial taxonomy.	K3	CO2
		(OR)		
	12.b.	Compare and contrast metagenomic library construction using small and large inserts.		
3	13.a.	Summarize the five modes of antibacterial action with examples.	K4	CO3
		(OR)		
	13.b.	Evaluate the effectiveness of antiviral drugs such as Acyclovir and AZT in treatment.		
4	14.a.	Explain the microbial role in phosphorus transformation.	K4	CO4
		(OR)		
	14.b.	Discuss food safety indicators and their role in quality control measures.		
5	15.a.	Describe the epidemiology and prevention strategies of Rabies.	K4	CO5
		(OR)		
	15.b.	Infer the pathogenesis of *Salmonella* infections.		

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	Evaluate the importance of polyphasic taxonomy in the accurate classification of microorganisms with examples.	K4	CO2
2	17	Critically assess the applications of NGS in studying extremophiles and uncultured microorganisms.	K5	CO2
3	18	Design a treatment strategy for a bacterial infection by integrating different classes of antimicrobial agents and justify.	K5	CO3
4	19	Critically analyze the role of plant-microbe interactions in sustainable agriculture.	K5	CO4
5	20	Propose a comparative framework of bacterial and fungal diseases in terms of epidemiology, prevention and treatment.	K5	CO5

Z-Z-Z END