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25MBP102

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION DECEMBER 2025
(First Semester)

Branch - **APPLIED MICROBIOLOGY**

MICROBIAL BIOCHEMISTRY AND PHYSIOLOGY

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	The bond that links amino acids in proteins is called: a) Glycosidic bond b) Peptide bond c) Ester bond d) Disulfide bond	K1	CO1
	2	Which is an unsaturated fatty acid? a) Stearic acid b) Palmitate c) Oleic acid d) Lauric acid	K2	CO1
2	3	Archaeal lipids differ from bacterial lipids in having: a) Ester linkages b) Ether linkages c) Peptidoglycan d) Nucleotide bases	K1	CO2
	4	Differentiate between purine and pyrimidine rings. a) Single vs. Double b) Double vs. Single c) Single vs. Single d) Double vs. Double	K2	CO2
3	5	Bacteriochlorophyll is present in: a) Cyanobacteria b) Green and purple bacteria c) Plants d) Algae only	K1	CO3
	6	How does oxidative phosphorylation differ from substrate-level phosphorylation? a) ETC & H^+ gradient b) Phosphate transfer c) No membrane needed d) Anaerobic only	K2	CO3
4	7	Stickland reaction involves which metabolism? a) Sugars b) Amino acids c) Lipids d) Nucleotides	K1	CO4
	8	Why are heat shock proteins vital for thermophiles? a) Act as electron carriers b) Protein protection c) Raise osmotic pressure d) Break down DNA	K2	CO4
5	9	Which enzyme type mimics antibodies artificially? a) Zymogen b) Abzyme c) Oxidoreductase d) Hydrolase	K1	CO5
	10	Infer the effect of low substrate concentration on enzyme rate. a) Enzyme Rate $\propto$ [S] b) Vmax is reached c) Km decreases d) Turnover number increases	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.	Classify carbohydrates with examples.	K2	CO1
		(OR)		
	11.b.	Write a short note on the functions of fat-soluble vitamins (A, D, E, K).		
2	12.a.	Construct a graph of bacterial growth over time and demonstrate the lag, log, stationary, and death phases.	K3	CO1
		(OR)		
	12.b.	Sequence the steps involved in the synthesis of phosphatidylinositol from CDP-diacylglycerol.		
3	13.a.	Differentiate Oxygenic and Anoxygenic photosynthesis.	K5	CO2
		(OR)		
	13.b.	Critique the regulatory steps of the TCA cycle using the complete pathway diagram.		
4	14.a.	Explain the mechanism of quorum sensing in bacterial bioluminescence.	K5	CO3
		(OR)		
	14.b.	Summarize the outline of amino acid biosynthesis.		
5	15.a.	Analyse the general characteristics of enzymes.	K4	CO5
		(OR)		
	15.b.	Illustrate models of competitive and non-competitive inhibition with graphs.		

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	Express types of lipids with examples.	K2	CO1
2	17	Explain the stages of endospore formation in bacteria.	K3	CO1
3	18	Summarize the stepwise reactions of the Entner–Douderoff pathway.	K5	CO2
4	19	Trace the metabolic pathway by which glucose is converted into glutamate.	K5	CO3
5	20	Discuss the Lineweaver–Burk plot and saturation kinetics in detail.	K4	CO5

Z-Z-Z - END