



**Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET UNIVERSITY)**

M.Sc. (First Semester - Regular) Examinations, January – 2026

24MBIPC11001 – Biochemistry

(Biotechnology)

Time: 3 hrs

Maximum: 60 Marks

**Answer ALL questions
(The figures in the right hand margin indicate marks)**

PART – A

(2 x 5 = 10 Marks)

Q.1. Answer *ALL* questions

	CO #	Blooms Level
a. Provide the reaction for glyoxylate cycle.	CO2	K2
b. Glucokinase and hexokinase are isoenzymes. Justify.	CO1	K5
c. What is Levinthal Paradox?	CO2	K1
d. Differentiate between simple and mixed TAGs.	CO2	K4
e. What is the basis of R/S configuration?	CO1	K2

PART – B

(10 x 5 = 50 Marks)

Answer *ALL* the questions

	Marks	CO #	Blooms Level
2. a. Discuss how aromatic amino acids help in quantification of amino acids/proteins.	5	CO3	K2
b. pH and buffer play a crucial role in biological systems. Justify using suitable example.	5	CO1	K5
(OR)			
c. Provide a brief account of B-DNA using suitable diagram.	5	CO2	K2
d. Examine the properties of water that makes it unique and enables life to flourish.	5	CO1	K4
3.a. Calculate the pI for titration of histidine with $pK_1 = 1.82$, $pK_R = 6.00$ and $pK_2 = 9.17$. Show the transition with the help of chemical structures.	5	CO3	K3
b. Briefly describe the synthesis of fatty acids (palmitic acid) using suitable flow chart.	5	CO2	K2
(OR)			
c. Justify how the ϕ and ψ angles of the peptide bonds (Ramachandran plot) provide information on allowed conformations and help identify secondary structures.	5	CO2	K5
d. Describe the Michaelis-Menten equation for enzyme activity. How is the Lineweaver-Burk plot interpreted?	5	CO2	K2
4.a. Diagrammatically show the Calvin cycle. Justify why six rounds of Calvin cycle are needed for the generation of one molecule of glucose.	5	CO2	K5
b. Explain the process of glycogenolysis using suitable flow chart.	5	CO2	K2
(OR)			
c. Give an account on the structure function relationship of chymotrypsin.	5	CO2	K2
d. Compare and contrast between the different inhibitors of enzyme activity using suitable examples and graphs.	5	CO1	K4
5.a. Describe the process of ATP synthesis highlighting the role of F ₀ -F ₁ ATPase.	5	CO4	K2

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| b. Glycolysis is a universal pathway. Justify this statement and describe the process with a flow chart. | 5 | CO4 | K5 |
| (OR) | | | |
| c. Provide a detailed account of non-cyclic photophosphorylation. | 5 | CO1 | K3 |
| d. What are phospholipids. Provide a note on the different phospholipids based on their composition. | 5 | CO3 | K2 |
| 6.a. What are the different phases in HMP shunt . Explain the shunting pathway using suitable flowchart. | 5 | CO3 | K2 |
| b. Compare the different types of shuttle systems working for NADH transport. | 5 | CO5 | K4 |
| (OR) | | | |
| c. Antiparallel β -sheets are more stable than parallel β -sheets. Justify. | 5 | CO2 | K5 |
| d. Explain how molecular chaperons assist in protein folding or repair misfolded proteins. | 5 | CO2 | K2 |

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