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AY 25

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

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

24MLSPC11001 – Biophysics and Biochemistry

(Lifescience)

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)**

		CO #	Blooms Level
Q.1.	Answer ***ALL*** questions		
a.	What is super-secondary structure? Give an example.	CO3	K1
b.	Conformation and configuration provide important information about 3D structure. Justify.	CO1	K5
c.	What are colloids? Comment of its optical properties.	CO1	K2
d.	Illustrate the general structure of triacylglycerols (TAGs).	CO2	K3
e.	Compare between hexokinase and glucokinase as isoenzymes.	CO3	K4

PART – B **(10 x 5 = 50 Marks)**

	Answer ***ALL*** the questions	Marks	CO #	Blooms Level
2. a.	What are the characteristics of α-helix ? Explain giving suitable diagrams.	5	CO3	K2
b.	Justify why ATP is an energy rich molecule. Add a note on the roles of ATP in cellular processes.	5	CO2	K5
	(OR)			
c.	Describe the structure of B-DNA using suitable diagram.	5	CO3	K2
d.	Compare and contrast between the different ultrafiltration methods.	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.	Suppose you can regulate which source of energy you can use for ATP production. Whether you will go for fatty acids or glucose to complete your ATP requirement. Justify your choice.	5	CO2	K5
	(OR)			
c.	What are dihedral angles (φ and ψ)? How a plot of these angles helps identify secondary structures and study allowed conformations.	5	CO2	K2
d.	Compare and contrast between the different enzyme inhibitors.	5	CO2	K4
4.a.	What are carbohydrates? Provide a brief note on glycosylation of biomolecules.	5	CO 1	K2
b.	Compare and contrast between the different phospholipids based on their composition.	5	CO3	K4
	(OR)			
c.	What is adsorption? Add a note on the factors affecting adsorption.	5	CO1	K2
d.	Highlight the similarities and differences between Starch and Glycogen.	5	CO2	K4
5.a.	Highlight the role of F0-F1 ATPase in ATP synthesis.	5	CO4	K2
b.	Calculate the total ATP generated for the oxidation of glucose under anaerobic and aerobic conditions.	5	CO4	K3

	(OR)			
c.	Provide a detailed account of non-cyclic photophosphorylation.	5	CO1	K2
d.	Do you agree that the laws of thermodynamics govern biological systems? Support your view with suitable justification.	5	CO 2	K5
6.a.	What are the different phases in HMP shunt. Explain the shunting pathway using suitable flowchart.	5	CO3	K2
b.	The biological system overcomes the limitation of NADH transport across the mitochondrial membrane through shuttle system. Defend this statement.	5	CO5	K4
	(OR)			
c.	Explain the process of glycogenolysis using suitable flow chart. Add a note on their regulation.	5	CO2	K2
d.	Compare and contrast between the different intermolecular forces of attraction.	5	CO 1	K4

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