Your Roll No .....

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M.Sc. BOTANY
I SEMESTER EXAMINATION DECEMBER 2025

Paper Name: **Plant Biochemistry and Metabolism** Paper Code: **MBOCC103**
Time: **2 ½ hours** Maximum Marks: **60**
Note: This paper has 3 sections A, B, and C.
Section A: Answer **all the questions**.
Section B: Attempt any **04 out of 06,** Section C: Attempt any **02 out of 03**

Abbreviations used:
CLO-Course Learning Outcomes
CO1: explain the principles of bioenergetics and principles, kinetics and regulation of enzymes (understand);
CO2: interpret the composition, structure and function of carbohydrates, proteins, vitamins, lipids and nucleic acids (evaluate);
CO3: examine the conformation and stability of proteins and nucleic acids (analyze); and
CO4: recognize the metabolism of carbohydrate, lipids and nucleic acids (remember).
BTL-Bloom's Taxonomy Levels
1- Remembering, 2-Understanding, 3-Applying, 4-Analyzing, 5-Evaluating, 6-Creating

SECTION A

Very Short Type Question (15 questions) 15 x 1 = 15 marks

Q.No.	Question	Marks	CLO	BTL
1	Heavy exercises causes cramps due to accumulation of _____	1	4	3
2	Expand PUFA and NADH	1	4	1
3	Give one example of aromatic amino acid.	1	2	1
4	Define zwitter ion? Give one example.	1	2	5
5	What are pyranoses and furanoses?	1	2	2
6	$\Delta G = \Delta H - T\Delta S$ is the equation for _____	1	1	1
7	Define gluconeogenesis.	1	4	1
8	What do you understand by amphibolic pathways?	1	1	2
9	All enzymes are proteins. True/False	1	1	4
10	Name the conformational form of DNA that exist in cell under normal physiological conditions.	1	3	2
11	Lactose exists in two anomeric forms, but no anomeric forms of sucrose have been reported. Why?	1	2	5
12	All enzymes of TCA cycle are present in mitochondrial matrix except one which is present in the inner membrane of mitochondria. Name this enzyme.	1	4	4

Please turn over

13	On keeping lipid-rich food for too long, they develop unpleasant smell and less palatability. What is the reason for this?	1	2	3
14	Define coenzyme. Give one example.	1	1	1
15	Proteins that help in correct folding of other proteins are called _____	1	3	2

SECTION B

Short Type Question. (Attempt any **FIVE**) 5 x 5 = 25 marks

Q.No.	Question	Marks	CLO	BTL
1	Explain proton motif force (pmf). How is it generated? Elucidate its role in ATP formation.	5	1	2,5
2	Comment on two different types of secondary structures of proteins with special reference to interactions involved in its stability.	5	3	4
3	What are epimers, anomers and enantiomers? Give examples in each from carbohydrate.	5	4	3
4	Explain hyperchromicity in nucleic acids. Discuss it in relation with DNA denaturation-renaturation kinetics.	5	3	4
5	Critically evaluate the statement that protein's conformation is stabilized largely by weak interactions.	5	3	6
6	a. Discuss the laws of thermodynamics that govern the biological reactions and systems. b. b. Discuss the different fates of the pyruvate formed in glycolysis.	2 3	1 4	2 4

SECTION C

Long type Question (Attempt any **TWO**) 2 x 10 = 20 marks

Q.No.	Question	Marks	CLO	BTL
1	a. Explain β-oxidation pathway of breakdown of fatty acids. b. Differentiate between competitive and allosteric inhibition in enzyme activity with examples.	7 3	4 1	1 5
2	Discuss in detail the role of fat-soluble enzymes as hormone precursors and oxidation-reduction cofactors.	10	2	4
3	a. Discuss the structure and role of pyruvate dehydrogenase (PDH) complex in oxidative phosphorylation with the steps involved. b. Give an account of coupled reactions with examples from biological systems.	6 4	4 1	5 4

END OF QUESTION PAPER