

**ASSIGNMENT BOOKLET**

**Bachelor's Degree Programme  
B.Sc. Honours in Biochemistry (BSCBCH)**

**METABOLISM OF CARBOHYDRATES AND LIPIDS  
(Valid from 1<sup>st</sup> Jan, 2025 to 31<sup>st</sup> Dec, 2025)**



**School of Sciences  
Indira Gandhi National Open University  
Maidan Garhi, New Delhi-110068  
(2025)**

Dear Student,

Please read the section on assignments in the Programme Guide of B.Sc. (Hons.) Biochemistry (BSCBCH) programme that we sent you after your enrolment. A weightage of 30 percent, as you are aware, has been earmarked for continuous evaluation, **which would consist of one tutor-marked assignment** for this course. The assignment is in this booklet, and it consists of two parts, Part A and B. It covers all blocks of the course. The total marks of all the parts are 100, of which 35% are needed to pass it.

### **Instructions For Formatting Your Tutor Marked Assignments (TMA)**

Before attempting the assignment please read the following instructions carefully:

1) On top of the first page of your answer sheet, please write the details exactly in the following format:

**You may reproduce the Course Code and Assignment Code from the assignment.**

---

**ENROLMENT  
NO.:**

<b>PROGRAMME TITLE</b>	: .....	<b>NAME:</b> .....
<b>COURSE CODE</b>	: .....	<b>ADDRESS:</b> .....
		.....
<b>COURSE TITLE</b>	: .....	.....
<b>ASSIGNMENT CODE</b>	: .....	<b>SIGNATURE:</b> .....
		.
<b>STUDY CENTRE</b>	: .....	<b>DATE:</b> .....

---

**PLEASE FOLLOW THE ABOVE FORMAT STRICTLY TO FACILITATE  
EVALUATION AND TO AVOID DELAY.**

2. Use only foolscap size paper for your response and tie all the pages carefully. Avoid using very thin paper. Allow a 4 cm margin on the left and at least 4 lines in between each answer. This would facilitate the evaluator to write useful comments in the margin at appropriate places.
3. Write the responses in your own handwriting. Do not print or type the answers. Do not copy your answers from the Units/Blocks sent to you by the University. It is advised to write your answers in your own words as it will help in grasping the study material.
4. Do not copy from the response sheets of other students. If copying is noticed, the assignment will be rejected.
5. Write each assignment separately. All the assignments should not be written in continuity.
6. Write the question number with each answer.
7. **The completed assignment should be submitted within the due date** to the Coordinator of the Study Centre allotted to you. TMAs submitted at any other place and after due date will not be evaluated.
8. After submitting the TMA, get the acknowledgement from the Coordinator on the prescribed assignment remittance-cum-acknowledgement card. **We strongly suggest that you retain a copy of your answer sheets.**
9. In case you have requested for a change of Study Centre, you should submit your TMA only to the original Study Centre until the change of Study Centre is notified by the University.
10. This assignment is **valid from 1st Jan, 2025 to 31<sup>st</sup> Dec, 2025**. If you have failed in this assignment or fail to submit it by Dec, 2025, then you need to get the assignment for the year 2026, and submit it as per the instructions given in the Programme Guide.
11. **You cannot fill the examination form for this course** until you have submitted this assignment.

We wish you good luck.

## ASSIGNMENT

### Metabolism of carbohydrates and lipids Core Course in Biochemistry

Course Code: **BBCCT-109**

Assignment code: **BBCCT-109/TMA/2025**

Maximum marks: **100**

**Note: Attempt all questions. The marks for each question are indicated against it.**

Write the answers in your own words; do not copy from the course material.

#### PART-(A)

Marks: 50

1. Explain the terms in 2-3 sentences:

(5X2= 10)

- (a) Substrate level phosphorylation
- (b) Glycolysis
- (c) Anaplerotic reactions
- (d) Chemotrophs
- (e) Catabolism

2. (a) Explain different phases of glycolysis. Write the final equation indicating the net production of ATP. (5)

(b) Why is ATP known as the biological energy currency? Does ATP have any other role than energy currency? If yes, give a brief account of it. (5)

3. (a) Explain regulation of TCA cycle. (5)

(b) Justify the statement that gluconeogenesis from pyruvate is not the simple reversal of glycolysis. (5)

4. (a) Describe the process of glycogenesis and its regulation. (10)

5. (a) Explain the mechanisms involved in concentration of CO<sub>2</sub> in C<sub>4</sub> plants and indicate the relevance of these adaptations for plant growth (5)

(b) Explain the partitioning of fixed carbon to sucrose and starch synthesis in leaf cells. (5)

#### PART- (B)

Marks: 50

6. (a) Explain the major pathway of a fatty acid oxidation taking palmitic acid as an example. At which site of the cell do these reactions take place? (5)

- (b) What are ketone bodies and how are they synthesized? Why is level of ketone bodies increase in uncontrolled diabetes? (5)
7. (a) What is the role of fatty acids synthase complex in fatty acid metabolism? (5)  
(b) Calculate the number of ATP produced by oxidation of one molecule of glucose by glycolysis and TCA cycle. Is this number less or more than that produced during  $\beta$ -oxidation of palmitic acid you attempted in question 6a? (5)
8. (a) List different stages of cholesterol biosynthesis, explain first step in detail. (5)  
(b) Explain DAG transacylase pathway for triglyceride synthesis. (5)
9. (a) Describe the CPD-base pathway for phosphatidyl choline synthesis. (5)  
(b) What is ceramide? How is sphingomyelin synthesized from ceramide? (5)
10. (a) Discuss the fate of carbohydrates, lipids and proteins under well fed state. (5)  
(b) Name the lipid that accumulates in Faber's disease and Tay-Sach's disease. Explain the signs and symptoms of these diseases. (5)