BBCCT-109

ASSIGNMENT BOOKLET

Bachelor's Degree Programme
B.Sc. Honours in Biochemistry (BSCBCH)
B.Sc. Biochemistry (Major) -BSCFBC

METABOLISM OF CARBOHYDRATES AND LIPIDS
(Valid from 1st January, 2026 to 31st December, 2026)

School of Sciences
Indira Gandhi National Open University
Maidan Garhi, New Delhi-110068
(2026)

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.:

PROGRAMME TITLE : .....

COURSE CODE : .....

COURSE TITLE : .....

ASSIGNMENT CODE : .....

STUDY CENTRE : .....

NAME: .....

ADDRESS:.....

.....

.....

SIGNATURE:.....

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DATE: .....

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. Tutor marked assignments (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, 2026 to 31st Dec, 2026**. If you have failed in this assignment or fail to submit it by Dec, 2026, then you need to get the assignment for the year 2027, 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/2026**
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. (a) Write five features of metabolism design. (5)
   (b) Discuss the feeder pathway of galactose metabolism.

2. (a) Name two coenzymes derived from the vitamin niacin. Write one reaction indicating their role. (2+3)
   (b) Explain Cori cycle and its significance. (5)

3. (a) Draw TCA cycle and write the equation showing net outcome of this cycle. Also calculate how many ATPs are produced by aerobic oxidation of one glucose molecule? (2+1+2= 5)
   (b) What is gluconeogenesis? Name five gluconeogenic substrates and explain the significance of this pathway. (1+2+2= 5)

4. (a) Which factors govern the reciprocal regulation of glycolysis and gluconeogenesis and why is it important? (5)
   (b) Demonstrate the role of hormones in regulation of glycogen metabolism. (5)

5. (a) Explain Kranz anatomy. How do such plants fix carbon? (5)
   (b) How are starch and sucrose synthesized in plants? (5)

PART- (B) Marks: 50

6. (a) Explain the steps of fatty acid oxidation and transport before these are oxidized. (5)

(b) Discuss the energetics of fatty acid oxidation, taking palmitic acid as an example. (5)

7. (a) State the differences between mitochondrial and peroxisomal β oxidation pathways of fatty acids. (5)

(b) Write the activities of fatty acid synthase I complex. (5)

8. (a) Name the key regulatory enzyme of *de novo* cholesterol biosynthesis. How does it exert the regulation? (5)

(b) Calculate the energy cost of synthesis of palmitic acid. (5)

9. (a) Explain the synthesis of triacylglycerols by DAG transcyclase pathway. (5)

(b) Explain CDP base pathway and its significance. (5)

10. (a) Discuss five stages of glucose homeostasis. (5)

(b) Explain the role of any two hormone signals which regulate fat metabolism. (5)