

ASSIGNMENT BOOKLET

**Master Degree Programme
M.Sc. in Biochemistry (MSCBCH)**

**CONCEPTS AND CONNECTIONS IN METABOLISM
(Valid from 1st January, 2026 to 31st December, 2026)**



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

Dear learners,

Please read the section on assignments in the Programme Guide of M.Sc. Biochemistry (MSCBCH) 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 the course-Concepts and Connections in Metabolism which is the second semester core course of MSCBCH. The assignment in this booklet consists of two parts, Part A and B. It covers all blocks (I-IV) 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	:	NAME:
COURSE CODE	:	ADDRESS:
COURSE TITLE	:
ASSIGNMENT CODE	:	SIGNATURE:
STUDY CENTRE	:	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. 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 January, 2026 to 31st December, 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

CONCEPTS AND CONNECTIONS IN METABOLISM

Course Code: **MBC-005**

Assignment code: **MBC-005/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) Discuss the role of ATP and cellular energy currency. **[5 x 2=10]**
b) State the second law of thermodynamics. How is it applicable on living organisms?

2. a) What is the difference between hexokinase and glucokinase? **[2.5 x 4=10]**
b) Give an example of substrate level phosphorylation reaction in glycolysis.
c) Enlist the enzyme components of pyruvate dehydrogenase complex and state their role.
d) Explain the role of debranching enzyme during glycogenolysis and draw the reactions.

3. a) What is biochemical basis and symptoms of essential pentosuria? **[5 x 2=10]**
b) Explain two tests used for detection of lactose intolerance.

4. a) How does mobilization of lipids stores in adipose tissue to the target tissues **[5 x 2=10]** take place?
b) State the differences between mitochondrial and peroxisomal β -oxidation pathways.

5. a) How is fatty acid synthesis regulated in animals by covalent modification? **[5 x 2=10]**
b) Explain the dihydroxy acetone phosphate (DHAP) pathway of triglyceride synthesis.

PART- (B)

Marks: 50

6. a) Describe the concept of Ammonia Assimilation. [5]
b) Classify amino acids based on the fate of their carbon skeleton. [5]
7. Discuss the biosynthesis of non-essential amino acids of serine family. [10]
8. Explain the de novo synthesis pathway of purine ribonucleotides. [10]
9. (a) What are the inhibitors of nucleotide synthesis? [5+5=10]
(b) Compare the degradation of purines and pyrimidines.
10. Describe diagnosis and symptoms of: [5+5=10]
 - i) Gout
 - ii) Phenylketonuria