BBCCT-105

ASSIGNMENT BOOKLET

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

PROTEINS

Valid from January, 2026 to December, 2026

School of Sciences
Indira Gandhi National Open University
Maidan Garhi
New Delhi-110068.

Dear Student,

Please read the section on assignments in the Programme Guide for Core Courses that we sent you after your enrolment. A weightage of 30 per cent, as you are aware, has been earmarked for continuous evaluation, **which would consist of one tutor-marked assignment** for this course. The total marks of all the parts are 100, of which 35% are needed to pass it.

Instructions for Formatting Your Assignments

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:

ROLL NO.: ……

NAME: ……

ADDRESS: ……

……

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COURSE CODE: …….

COURSE TITLE: …….

ASSIGNMENT NO.: ……..…

STUDY CENTRE: ……..….. **DATE:** …….……...

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

2) Use only foolscap size writing paper (but not of very thin variety) for writing your answers.

3) Leave 4 cm margin on the left, top and bottom of your answer sheet.

4) Your answers should be precise.

5) The assignment answer sheets are to be submitted to your Study Centre as per the schedule made by the study centre. **Answer sheets received after the due date shall not be accepted.**

   We strongly suggest that you retain a copy of your answer sheets.

6) This assignment is **valid from January 2026 to December, 2026** and submit it as per the instructions given in the Programme Guide.

7) **You cannot fill the exam form for this course** till you have submitted this assignment.

We wish you good luck.

ASSIGNMENT

PROTEINS

Course Code: BBCCT-105
Assignment Code: BBCCT-105/TMA/2026
Maximum Marks: 100

Answer **all the questions** given below.

1.	A)	Classify amino acids based on the nature of their side chains and describe the properties of hydrophobic, polar, and charged amino acids.	5 M
	B)	Explain how the diversity of protein structure (multimeric, conjugated, and metalloproteins) contributes to their wide range of biological functions.	5 M
2.	A)	Describe the principles involved in solubilization and extraction of proteins from cellular sources.	5 M
	B)	Compare different protein extraction methods and justify the choice of a suitable technique for isolating a membrane-bound protein.	5 M
3.	A)	Explain the principle of ammonium sulphate fractionation and dialysis in protein purification.	5 M
	B)	Describe how solvent fractionation and lyophilization are used to concentrate and stabilize proteins during purification.	5 M
4.	A)	Describe the principles of ion-exchange, gel filtration, and affinity chromatography.	5 M
	B)	Design a purification strategy using chromatographic techniques to isolate an enzyme from a crude protein extract.	5 M
5.	A)	Describe methods used for determining protein purity and molecular weight.	5 M
	B)	Explain how SDS-PAGE, isoelectric focusing, and 2-D electrophoresis can be used to analyze complex protein mixtures.	5 M
6.	A)	Explain the principle of Edman degradation for protein sequencing.	5 M
	B)	Describe how overlapping peptides are generated and used to determine the complete amino acid sequence of a protein.	5 M
7.	A)	Describe the basic principle of mass spectrometric analysis of proteins.	5 M
	B)	Explain how Ramachandran plots are used to predict and validate protein secondary structure.	5 M
8.	A)	Describe the principles of X-ray diffraction and NMR spectroscopy used in protein structure determination.	5 M
	B)	Discuss how defects in protein folding lead to diseases such as Alzheimer's disease and prion disorders.	5 M
9.	A)	Describe the protein sequence and structure databases.	5 M
	B)	Explain how structural proteins such as collagen and actin contribute to cellular integrity and movement.	5 M
10.	A)	Describe the oxygen-binding properties of haemoglobin and myoglobin with the help of oxygen dissociation curves.	5 M

B) Explain the molecular mechanism of ATP-driven actin–myosin interaction during muscle contraction. 5M