

## ASSIGNMENT BOOKLET

**Bachelor's Degree Programme (B.Sc.)  
BIOCHEMISTRY****Valid from January 1, 2023 to December 31, 2023****Please Note**

- You can take electives (56 to 64 credits) from a minimum of TWO and a maximum of FOUR science disciplines, viz. Physics, Chemistry, Life Sciences and Mathematics.
- You can opt for elective courses worth a MINIMUM OF 8 CREDITS and a MAXIMUM OF 48 CREDITS from any of these four disciplines.
- At least 25% of the total credits that you register for in the elective courses from Life Sciences, Chemistry and Physics disciplines must be from the laboratory courses. For example, if you opt for a total of 64 credits of electives in these 3 disciplines, at least 16 credits should be from lab courses.
- You cannot appear in the Term-End Examination of any course without registering for the course. Otherwise, your result will not be declared and the onus will be on you.



School of Sciences  
Indira Gandhi National Open University  
Maidan Garhi, New Delhi-110068  
(2023)

Dear Student,

We hope, you are familiar with the system of evaluation to be followed for the Bachelor's Degree Programme. At this stage you may probably like to re-read the section on assignments in the Programme Guide 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. The assignment is based on Blocks 1, 2, 3 and 4.

### Instructions for Formatting Your Assignments

Before attempting the assignments, 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:

---

ENROLMENT NO:.....

NAME:.....

ADDRESS:.....

.....

.....

COURSE CODE : .....

COURSE TITLE : .....

ASSIGNMENT NO.: .....

STUDY CENTRE : ..... DATE:.....

(NAME AND CODE)

---

**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 While writing answers, clearly indicate the Question No. and part of the question being solved.
- 6 Please note that:
  - i) Last date for submission of Assignment is December 31, 2023.
  - ii) The response to this assignment is to be submitted to the Study Centre Coordinator within eight weeks of the receipt of this booklet in order to get the feedback and comments on the evaluated assignment.
  - iii) In any case, you have to submit the assignment response before appearing in the term end examination.
- 7 **We strongly suggest that you should retain a copy of your assignment responses.**  
**Wishing you all good luck.**

**Tutor Marked Assignment**  
**Biochemistry**  
**Elective Course in Chemistry and Life Sciences**

Course Code: CHE-09  
Assignment Code: CHE-09/TMA/2023  
Maximum Marks: 100

**Note:** \* This assignment is based on all the four Blocks of the entire course.  
\* All questions are compulsory. Marks for the questions are shown within brackets on the right hand side.

1. a) What will be the sequence of separation of the organelles, ribosomes, nucleus and mitochondria in a tissue homogenate when subjected to centrifugation. Explain your answer. (4)
- b) How are peroxisomes and lysosomes generated in a cell? (2)
- c) Briefly describe different modes through which cell membrane controls the transport of ingoing and outgoing molecules? (4)
2. a) What are reducing sugars? Sucrose is made up of two reducing sugars however it does not show the property of a reducing sugar. Explain. (5)
- b) A fat has low iodine number and a high saponification number. What do you infer from that? What are essential fatty acids and why are they essential? (5)
3. a) Draw the structure of a dinucleotide of adenosine – 5'-phosphate and uridine- 5'-phosphate. (2)
- b) In which process of protein biosynthesis, t-RNA is involved? Illustrate the gross structural features of t-RNA. Indicate the different regions. (4)
- c) Write a short note on the different forms of DNA. (4)
4. a) Briefly describe the four ways by which enzymes can lower the activation energy. (6)
- b) What is optimal pH? How can a change in pH render an enzyme inactive? (4)
5. a) Name the vitamin whose coenzyme is unknown. What is the importance of this enzyme in our diet? (3)
- b) Why is calcitriol classified as a hormone? (1)
- c) What is the difference between macrominerals and trace elements? Write the main functions of any four trace elements? (6)
6. a) How is the standard free energy for chemical reactions different from the standard free energy for biochemical reactions? (2)
- b) Find out the value of free energy for a reaction when  $K_{eq}$  is 1.0 and for another reaction where  $K_{eq}$  is 10. (4)
- c) With the help of an example explain the significance of coupling in biological reactions. (4)
7. a) Standard free energy change alone cannot predict the direction of a biochemical reaction. Comment (5)
- b) Enlist all the enzymes involved in glycolysis and write the type of reaction they catalyse. (5)

8. a) What is meant by respiratory control? How is the rate of flow of electrons through the electron transport chain regulated? (5)
- b) Why are chlorophyll molecules coloured? What are the other types of light absorbing substances in plants and how they are significant? (5)
9. a) Compare the function of RNA polymerase with DNA polymerase. How is transcription terminated? (5)
- b) What are the components of the initiation complex during protein biosynthesis in *E.coli*? How does the elongation of chain take place? (5)
10. a) What is genetic engineering? Discuss its significance to mankind. (5)
- b) List different types of antibodies. What are the gross structural features of antibody molecules? Discuss any one mechanism by which antibodies interact with antigens. (5)