

(b) What are catabolism and anabolism, and how do they contribute to metabolic processes in living organisms?

(c) What are the main causes and consequences of food oxidation, and what are some of the strategies used to prevent or minimize it in the food industry?
(4,4,4.5)

7. (a) Illustrate the inter-relationship in metabolic pathways of protein, fats and carbohydrates.

(b) What is hydrogenation of oil? Mention its merit and demerits.

(c) Draw the secondary structure of protein
(4,4,4.5)

8. Write short notes on **any three** of the following :

(a) Krebs cycle

(b) Iodine number

(c) Allosteric inhibition

(d) Merrifield solid phase synthesis.

(e) Configuration of glucose (4,4,4.5)

(200)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 972

H

Unique Paper Code : 32175912

Name of the Paper : GE - Molecules of Life

Name of the Course : **B.Sc. (H) Chemistry**

Semester : II/IV

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **six** questions.
3. **All** questions carry equal marks.

1. (a) What is mutarotation, and how does it occur in carbohydrates, Explain with a suitable example.

(b) Explain, what is the difference between the anomeric and epimeric carbons in the Haworth projection of glucose.

(c) What are disaccharides? Give the structure of lactose and sucrose and mention the linkage.

(4,4,4.5)

P.T.O.

2. (a) Show the steps to create peptide linkage between glycine and valine using dicyclohexylcarbodiimide method.
- (b) The three pKa values of aspartic acid are as follows
1.89, 3.65 and 9.60. Calculate the *pI* of the amino acid.
- (c) What is a zwitterion, and how does its structure and behaviour differ from that of a neutral molecule or an ion? Write two examples of zwitterions found in biological systems? (4,4,4.5)
3. (a) What are the different types of enzymes, and how are they classified based on their functions and mechanisms of action.
- (b) How do changes in temperature, pH, substrate concentration, and enzyme concentration influence the rate of reaction.
- (c) What is the structure-activity relationship (SAR) of drug molecules, how does the presence of the -OH and -NH₂ functional groups affect the binding affinity of a drug molecule to its target receptor? (4,4,4.5)

4. (a) What are the processes of transcription and translation in molecular biology, and how do they work together to produce functional proteins?
- (b) Explain, how do messenger RNA (mRNA), transfer RNA (tRNA), ribosomal RNA (rRNA) differs in terms of their functions.
- (c) Define the basic structure of nucleotides and nucleosides. What is the chemical structure of cytidine and adenosine 5'-monophosphate (AMP)? (4,4,4.5)
5. (a) Describe some methods for measuring lipid composition and quality. Explain any one method in detail.
- (b) What is the importance of triglycerides in biological systems, and how do they play a critical role in human health and disease?
- (c) What is difference between the structure of omega-3 and omega-6 fatty acids. Mention some dietary sources of omega-3 and omega-6 fatty acids. (4,4,4.5)
6. (a) Show the steps involved in the conversion of glucose to pyruvate in the glycolysis.