


Final Assessment Test – November 2025

Course: BABIT101 - Biochemistry

Class NBR(s): 7004 / 7011

Time: Three Hours

Slot: E1+TE1

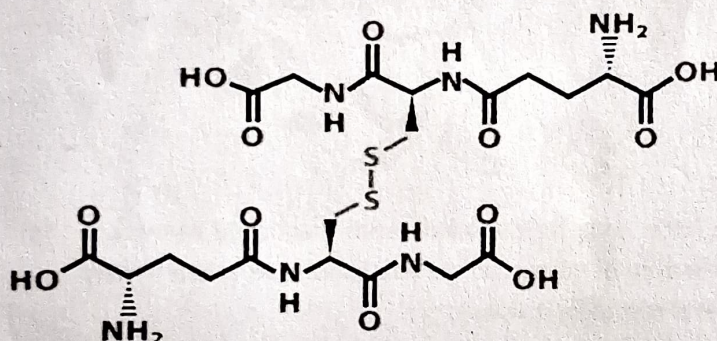
Max. Marks: 100

- KEEPING MOBILE PHONE/ANY ELECTRONIC GADGETS, EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE
- DON'T WRITE ANYTHING ON THE QUESTION PAPER

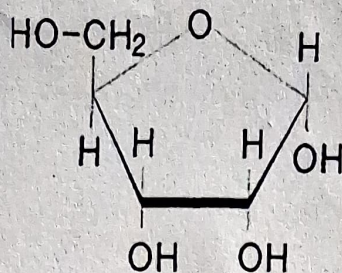
COs	CO Statements
CO1	Understand the foundations of biochemistry and the importance of solvents
CO2	Classify biomolecules based on their structure and properties
CO3	Describe the biochemical pathways
CO4	Infer the structure-function relation of biomolecules
CO5	Demonstrate the biochemical behaviour of biomolecules

BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)
Answer ALL Questions
(10 X 10 = 100 Marks)

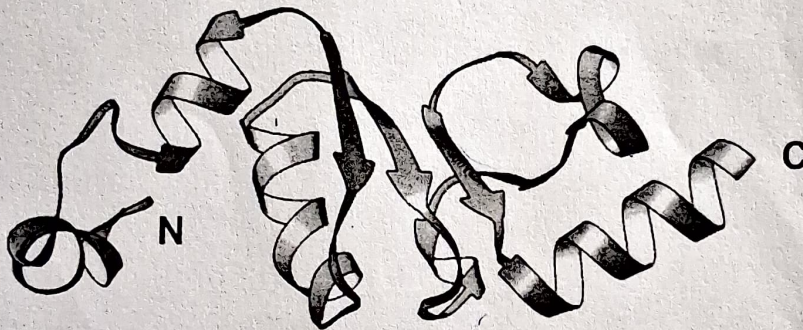
1. a) Identify the functional groups in the given molecule and state whether the groups are hydrophilic or hydrophobic. [6] CO1 BL4



- b) If the concentration of H^+ in a solution is 10^{-5} M, what will be the concentration of OH^- be in the same solution at $25^\circ C$. What will be the pH of the solution? [4]
2. a) The pK_a of the lysine sidechain is 10.53 at $27^\circ C$. Illustrate the chemical equation/reaction corresponding to this pK_a and calculate the change in free energy (ΔG) corresponding to this reaction. (Universal gas constant: $R = 8.314 \text{ JK}^{-1}\text{mol}^{-1}$). [6] CO1 BL3
- b) How many stereoisomers will the given molecule have? Justify your answer. [4]



3. Describe the common structural features and differences of each pair: CO2 BL3
- Glucose and galactose
 - Maltose and sucrose
 - Hyaluronic acid and heparin
4. Show the three reactions in the citric acid cycle in which NADH is produced, including the structures. None of these reactions involves molecular oxygen (O_2), but all three reactions are strongly inhibited by anaerobic conditions; explain why. CO3 BL2
5. a) Write the topological arrangement (order) of the secondary structural elements for the protein structure given below : [4] CO2 BL3



- b) Give the single letter code for the amino acids mentioned below and briefly explain the type of interaction the pair could have at the tertiary organizational level of protein structure: [6]
- Phe and Val
 - Tyr and Thr
 - Asp and Lys
6. State how prosthetic group of haemoglobin functions in comparison to that of cytochrome C. Detail on the structure function relation of haemoglobin CO4 BL2
7. How are fatty acids classified? Explain with examples CO2 BL1
8. a) Briefly explain denaturation of proteins. Why is the denaturation temperature of keratin higher than haemoglobin? [6] CO5 BL4
- b) Trace the synthesis of an amino acid from 3-phosphoglycerate(3). [4]

- 9.a) Polynucleotides are directional molecules- Explain why? Write briefly the functions of nucleic acids.

CO5 BL2

OR

- 9.b) Write about membrane lipids. Relate their structure to functional role.
- 10.a) What are nucleosides? Draw the structure of guanine containing nucleosides in DNA and RNA.

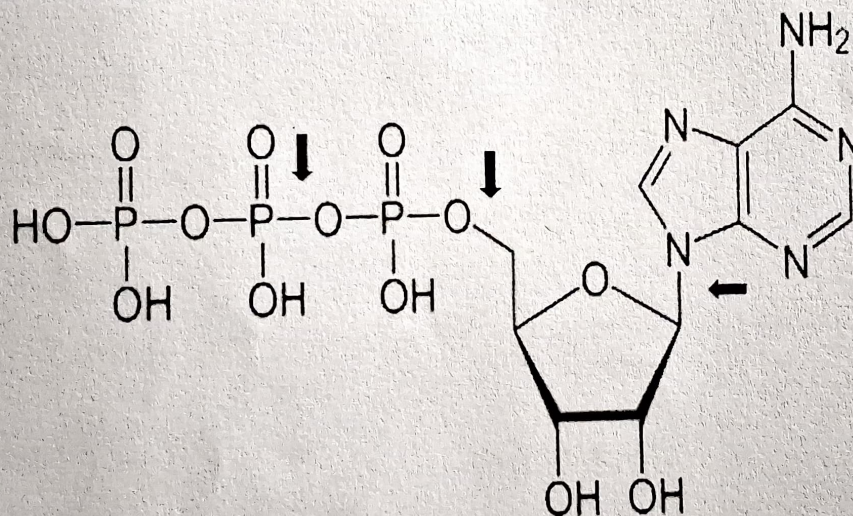
CO5 BL2

CO2 BL3

OR

- 10.b) Write about the bonds pointed by the arrows.

CO2 BL3



⇌⇌⇌ BG/K/TY ⇌⇌⇌