

Quiz-1

Course Code: CSE115

Course Title: Introduction to Biology and Chemistry for Computation

Level: L1 Term: T1 Batch: 71 Section: 71_K

Time: 25mins

Marks: 15

[Answer ALL Questions]

1. You are working as a **bioinformatics analyst** in a pharmaceutical research lab. Your team is [11] investigating a **drug-resistant bacterial strain** to understand how mutations have altered a critical gene. To analyze the mutation pattern, you are asked to perform a **global sequence alignment** between the original gene and the mutated gene so that **every nucleotide from start to end of both sequences is considered**.

Given DNA sequences:

S1 = ATGACG

S2 = AGTACG

Scoring Scheme:

Match = +2 Mismatch = -1 Gap = -2

a. Apply a suitable algorithm to construct the optimal end-to-end alignment for these two sequences and calculate the final alignment score.

2. What is the main purpose of Computational Fluid Dynamics (CFD)? [1]

- a. Monitoring environmental pollution
- b. Modeling fluid and gas flow
- c. Sequencing DNA
- d. Developing distributed systems

3. What is chromatography used for in research? [1]

- a. DNA sequencing
- b. Separating mixtures into components
- c. Monitoring pollution
- d. Analyzing quantum behavior

4. Which industry uses chromatography to identify pesticide content? [1]

- a. Pharmaceutical
- b. Food and beverage
- c. Diagnostic labs
- d. Chemical plants

5. Thermodynamics focuses on the rate of reactions and how quickly reactants are converted into products. While Kinetics tells us whether a reaction is possible (spontaneous), kinetics tells us how fast it will happen.

- a. True
- b. False