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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 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**. [11]

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