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Daffodil International University

Faculty of Science & Information Technology
Department of Computer Science & Engineering
Mid Examination, Summer 2026
Course Code: CSE115
Course Title: Introduction to Biology and Chemistry for Computation
Level: 1 Term: 1 Batch: 72

Time: 01:30 Hrs. **Marks: 25**

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1.		A water quality management plant is designing an automated system to identify industrial pollutants in municipal water supplies. The plant aims to replace manual testing with a fully automated, real-time diagnostic stream.	[5]	CO2
	a)	Explain the working procedure of the methods that need to be applied by the plant for pollutant detection and automation.		
2.		All life depends on three critical molecules. One of these molecules is duplicated before cell division. Another one has a single strand.		CO1
	a)	Explain the functional relationship between the three critical molecules.	[3]	
	b)	Distinguish the different variations of the single stranded molecule.	[3]	
3.		To align a pair of sequences of DNA, two methods can be used based on the target outcome. Given the sequences: Sequence 1 = GATTA Sequence 2= TTAGG Scoring scheme: Match = +1 , Mismatch = –1, Gap = –2		CO3
	a)	Apply the appropriate method to align the given sequences so that the final alignment does not exclude any nitrogen base.	[5]	
	b)	Calculate the final alignment score.	[2]	
4.		Gene sequence for five species (A, B, C, D, E) are given below, A: ATGCATGCATGC B: ATGCATGCGGGG C: CCGCGCGAATTT D: TTTTAGCTAGGT E: ATGCATAGCTGT		CO2
	a)	Compare the given sequences to calculate p-value based distance matrices and draw the UPGMA tree step by step.	[7]	