



# Daffodil International University

Department of Computer Science and Engineering

Faculty of Science and Information Technology

Mid Term Examination, Semester: Spring, 2017

Course Code: CSE 235 Course Title: Introduction to Bioinformatics Section: All

Time: 1.5 Hours

Full Marks: 25

**Answer any THREE including Question No.1**

(The figure of the right margin indicates the full marks)

- ✓ a) What bioinformatics can do? 2.5
- b) Write the chemical composition of cell. 2.5
- ✓ a) Write the differences between DNA and RNA. 3
- b) Describe various steps of Sequencing Reaction and Capillary Electrophoresis for determining DNA sequence according to Dideoxy DNA Sequencing Technique /Sanger Method. 5
- c) Identify the mutations occurred in the following examples: 2
- i) ACCCTATGA      ii) ACCGTATGC  
TCGTATGA      ACCGCCGTATGC
3. a) Multiple sequence alignments (MSA) can reveal subtle similarities that pair-wise alignment does not reveal. However, MSA faces several problems and challenges while solving through global alignment. What are those challenges? Explain. 3
- b) Let two DNA sequences S1 and S2 are following: 7
- Sequence1= "GACTAC"
- Sequence2= "ACGC"
- Use **Smith-Waterman** (Local Alignment) algorithm to calculate all the possible optimal alignments between given sequences. Where, matching reward=+4, mismatch penalty= -1 and gap penalty= -2.
- ✓ a) Consider four sequences for multiple sequence alignment. How you will calculate the score of any particular position S (i, j, k, l) using dynamic programming? 5
- b) Why sequence alignment is necessary? 3
- c) Write short notes on: (i) Homolog. (ii) Paralog. 2

Be specific! Avoid unnecessary discussions while writing the answers.

Good Day ☺