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Daffodil International University

Department of Computer Science and Engineering
Faculty of Science & Information Technology
Quiz-01, Semester: Fall 2025
Course Code: CSE115
Course Title: Introduction to Biology and Chemistry for Computation

Time: 25 minutes **Marks: 15** **ID:** **Name:**

Lina, a biology student, is examining a nucleic acid isolated from dividing animal cells. She notices that the molecule:

1. has two strands twisted into a helix,
2. contains a sugar–phosphate backbone,
3. and carries the nitrogenous bases adenine, thymine, cytosine, and guanine.

When she looks at the sugar molecules, she finds that they do not have a hydroxyl group (–OH) at the 2′ carbon, unlike RNA.

Her teacher explains:
"Before a cell divides, this molecule must make **an exact copy of itself**, so that each new cell gets the same genetic information. First, **an enzyme unwinds the two strands**, then another **enzyme adds complementary nucleotides following the base-pairing rules**."

Lina asks, "So this molecule can make a copy of itself using the original strands as templates?" Her teacher smiles and replies, "Exactly — that's how genetic information is faithfully passed to the next generation."

Later in the lab, Lina also wants to **analyze the purity and composition** of nucleotides extracted from this molecule. Her teacher suggests using **chromatography**, a technique that separates molecules based on size, charge, or solubility.

Answer below questions:

a) What is the name of this molecule? 0.5

b) Name and describe the biological process that allows it to make an exact copy of itself. 1.5

c) Identify the enzymes involved in this process and explain their roles. 5

d) According to you, how does this process ensure that genetic information is copied accurately? 3

e) Describe the four steps during performing chromatography. 5

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ID: Sec: Course Code:

Given Sequence : banana

1. Create the Burrows Wheeler Matrix (Transform).
2. Generate the suffix array.
3. Show the LF Mapping.
4. Find the original Gene sequence.