

Enrollment No./Seat No.:

GUJARAT TECHNOLOGICAL UNIVERSITY
Bachelor of Engineering - SEMESTER - III EXAMINATION - WINTER 2025

Subject Code: BE03004021

Date: 15-12-2025

Subject Name: Computational Biology

Time: 10:30 AM TO 01:00 PM

Total Marks: 70

Instructions

- 1. Attempt all questions.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**
- 4. Simple and non-programmable scientific calculators are allowed.**

	Marks
Q.1 (a) Explain the difference between a value and a variable in Python, with one example each.	03
(b) List two arithmetic operators and two comparison operators in Python, with a brief description of their use	04
(c) Explain how to create a simple SQL database for storing basic genetic data, such as diseases and their associated gene functions (e.g., disease name, gene name, and a short description of the gene's role). Provide a brief overview of the design, along with key SQL commands to create the database and one table, insert sample data, and query it. Include 2-3 important SQL keywords with their uses in this context.	07
Q.2 (a) List three common string methods in Python and briefly describe what each does.	03
(b) Write a simple Python program to calculate the area of a rectangle using variables and arithmetic operators. Include comments and print the result.	04
(c) Explain basic sequence operations like length, indexing, and slicing using a DNA string example. Write a simple function that takes a DNA sequence (e.g., "ATCG"), calculates its length, indexes the first base, slices the middle half, and prints the results.	07
OR	
(c) Describe lists as Python's "workhorse" for mutable data, including the list() function and basic ops like adding (+). Create a script that converts a string of gene names to a list, adds a new gene, and prints the updated list.	07
Q.3 (a) List three common methods for lists in Python and describe one briefly.	03
(b) What is the output of 'Hello'[1:4] + ' ' + ('World' * 2)[0:5]?	04
(c) Predict the output of the following code and analyze operator precedence: <code>x = 10 y = "2" z = (x // 2) + int(y) * len("hi") > 10 print(z and "Python"[-1] == 'n')</code>	07
OR	
(a) What is the purpose of the break statement in a loop? Provide a one-line example.	03

- (b) Define a for loop in Python control flow. Write a script that uses a for loop to iterate over a list of fruits ("apple", "banana", "cherry"), prints each one, and counts the total items. 04
- (c) Explain slicing in sequences with a definition. Create a script that slices the middle 4 bases from a DNA string "ATCGATCGGC", prints the slice and original length, then uses a simple if/else to check if the slice has more C's than A's 07
- Q.4** (a) What is the output of len([1, 2, 3]) * 'ab'? Briefly explain the multiplication operation here. 03
- (b) Discuss adding and updating records in SQL. Provide INSERT and UPDATE commands with examples. 04
- (c) Define a Python list and its basic operation of adding elements with +. Write a simple script that starts with a list of colors ("red", "blue"), adds "green" using +, and prints the full list with its length. 07

OR

- (a) Write a code snippet using min() and max() on a tuple. Explain their behavior on sequences. 03
- (b) What are data types in SQL? Give examples of two types and explain handling missing data with NULL 04
- (c) Explain exception handling in Python using the try-except statement. Write a function that reads a file, handles potential FileNotFoundError and ValueError exceptions, and uses a built-in function like len() to process string content. Discuss why exception handling is preferable to checking conditions manually. 07
- Q.5** (a) State the role of SQL in database management and list two key features. 03
- (b) Differentiate between a while loop and a for loop. Provide a simple example of each for iterating over a list 04
- (c) Compare how operators behave on strings vs lists (e.g., +, *). Predict output for a mixed scenario: 07

```
Python
s = "py"
l = [1, 2]
print(s * 2 + str(l[0]) + l[1:])
```

OR

- (a) Define SQL statements and categorize them into main types with one example each. 03
- (b) Describe adding sequences in Python (e.g., using +). Provide examples for strings and tuples, and explain why lists use + differently. 04
- (c) Enlist key features of strings, lists, and dictionaries (at least two each). Compare them in a table for mutability, ordering, and duplication support. 07
