GUJARAT TECHNOLOGICAL UNIVERSITY
POST GRADUATE DIPLOMA IN BIOINFORMATICS - SEMESTER – I EXAMINATION – WINTER - 2025

Subject Code: 1310203 **Date: 23-12-2025**

Subject Name: Python for Bioinformatics

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. Draw neat and clean diagrams as required.

Q.1	**Write a note on following**	**(Marks- 10X2=20)**

1. Define Python. List its key features and applications in bioinformatics.
2. Explain the types of programming paradigms with examples.
3. Describe the concept of data structures in Python. Provide examples of lists and dictionaries.
4. What are the common types of errors in Python? Explain how they can be handled.
5. Outline the steps to manipulate text data using Python.
6. Describe the role of loops in Python programming. Provide an example of a for loop.
7. Explain how paired data is handled in Python with an example.
8. Explain the difference between mutable and immutable data types in Python with examples.
9. What are functions in Python? Write the syntax and explain the importance of using functions in programming.
10. Define exception handling in Python. List the common keywords used for error handling with their functions.

Q.2	**Answer the following (Any 2 out of 3)**	**(Marks- 2X10=20)**

1. Write a Python program to calculate the AV amino acid content of a protein sequence. Explain the logic used in the program.
2. Develop a Python script to reverse a DNA sequence and find its complement. Discuss its biological significance.
3. Write a Python program to parse a FASTA file and extract the sequence information.

Q.3	**Answer the following (Any 6 out of 8)**	**(Marks- 6X5=30)**

1. Analyze the importance of exception handling in Python. Provide a simple example for file handling with exceptions.
2. Explain how Python can be used for pattern searching in biological sequences.
3. Discuss how Python's list comprehensions can be utilized for processing biological data. Write a script to filter DNA sequences longer than a specified length.
4. Discuss the steps to convert a DNA sequence into its corresponding

protein sequence using Python.

5. Explain the concept of dictionaries in Python. Write a program to count the occurrence of each base in a DNA sequence.

6. Discuss the process of concatenating multiple DNA sequences using Python. Provide an example.

7 Explain the use of if-else conditions in Python with a practical example for validating a DNA sequence.

8 Differentiate SET and Tuple datatypes used in Python

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