Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

POST GRADUATE DIPLOMA IN BIOINFORMATICS (DB) - SEMESTER - 1 EXAMINATION - WINTER - 2023

Subject Code:1310203 **Date: 18 Dec 2023**

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.	Python key features that make it suitable for a wide range of applications.	
	2.	Loops available in Python and when to use each type	
	3.	Concept of paired data in Python	
	4.	Key steps of file handling and usage	
	5.	Module 're' and its usage	
	6.	List data structure	
	7	Control flow in python	
	8	Exception handling in python	
	9	Differentiate "open" and "with open" in Python for working with files	
	10.	Variables in python	
Q.2		**Answer the following (Any 2 out of 3)**	**(Marks-2X10=20)**
	1.	Write a Python/ Biopython program that reads a collection of DNA sequences from a file and saves the length of each sequence in different file.	
	2.	Explain the importance of handling biological sequence data in bioinformatics. Describe how Python can assist in this process	
	3.	Discuss the concept of text manipulation in Python. Provide examples of common text manipulation operations and their applications in real-bioinformatics problems.	
Q.3		**Answer the following (Any 6 out of 8)**	**(Marks-6X5=30)**
	1.	Write a Python function that calculates the frequency or percentage of each amino acid in the given amino acid sequence.	
	2.	Differentiate between syntax errors and logical errors in programming, providing examples for each.	
	3.	Describe the applications of Python libraries such as Biopython and NumPy in bioinformatics research.	
	4.	Write a Python program that reads the file, calculates the GC content of each sequence, and stores the results in a dictionary. Explain the key steps in the code.	
	5.	Define Strings in Python and illustrate their usage with an example	

	6.	Write a Python script that counts the occurrence of a specific amino acid (e.g., "Lysine") in each sequence and stores the results in a new list. Use a for loop for the calculation.	
	7	Write a Python script that takes a DNA sequence as input and returns the reverse complement of sequence.	
	8	Write a python script to print out the genes names for all the genes between 90 to 110 bases long.	

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