

Roll No.....

B.Sc-M.Sc. Integrated Programme (Chemistry)

Semester-IV Examination, August 2022

Paper Title: Introduction to Biological Data Analysis

Paper Code: BCH-GE-04

Time: Three Hours

Max Marks: 75

Attempt all questions. ~~Use only A4 sheets.~~ All parts of a question must be attempted in continuation. Start answer of a fresh question on a new page. Cite suitable examples wherever necessary.

Q1: Attempt ALL the questions. State whether TRUE or FALSE. [1X15=15]

- i. Linux is a programming language.
- ii. The output of `len(DNA)` will be 3.
- iii. If `x = "AATTGGCG"` then `x[3:5]` will print "TGG".
- iv. If `x = "@@ATGCCC@TGCAA@@"` then `x.strip("@")` will print "ATGCCCTGCAA".
- v. Are strings mutable?
- vi. `$ wc -l file_name` will print the number of lines in the file named `file_name`.
- vii. `$ grep -c "pattern" file_name` will print the number of lines that matches the given pattern.
- viii. `ls` command is used to list all files and directories in Linux.
- ix. `cat` command can be used to concatenate two or more files in Linux.
- x. Python debugger can be used to find bugs in the script.
- xi. `Map` is higher-order function in python.
- xii. `"\n"` is a newline character in python.
- xiii. `sort()` function can be used to sort any iterable in python.
- xiv. The expression `"ACGTC{2,4}"` will match "ACGTC" pattern
- xv. `"Hello" + 4` will give an error.

Q2. Attempt any THREE questions. [3X5=15]

A. Write a short note on the following Linux commands:

- i. `cat`
- ii. `sort`
- iii. `wc`

B. Briefly describe the conditional statements in Linux.

C. How piping is helpful in Linux. Explain this with an appropriate example.

D. How do regular expressions make the `grep` and `awk` commands more robust? Explain this with a suitable example.

- E. Redirection of data in and out of files is important in Linux. Explain input and output redirection.

Q3. Attempt any **THREE** questions.

[3X5=15]

- A. List1 = ["ATGC", "TTAAGGA", "ATG", "TTGGCA"]

Write a python script that will print DNA sequences having lengths in odd numbers. The script should print the results in a new file.

- B. List is mutable. Explain this statement with the proper functions of the list citing appropriate examples.
- C. Write a function that calculates "AT" and "GC" content of a DNA sequence given by a user.
- D. Explain conditional tests with the help of appropriate examples.
- E. Write a short note on various data-types in python.

Q4. Attempt any **THREE** questions.

[3X5=15]

- A. What are the uses of filter and reduce functions in python? Illustrate with examples.
- B. Write a short note on object-oriented python.
- C. Explain tuple and set with appropriate examples.
- D. Why do we use the anonymous function in python? Using the anonymous function, count the "G" content in "ACCATTGGGG".
- E. Briefly explain the exception handling in python.

Q5. Attempt any **THREE** questions.

[3X5=15]

- A. How modules differ from packages. Explain by giving examples of each.
- B. Which module helps the user to know the progress of your program? How will you install this module? Explain the significance of this module with a suitable code.
- C. Write a short note on organizing and sharing codes in python.
- D. What are the different types of text editors? How text editors help in improving the code.
- E. Write a short note on Google Colab. Explain its features.
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