P. P. SAVANI UNIVERSITY

Third Semester of M.Sc. Examination

December-2021

SSBT8010– Genomics and Computational Biology

06.12.2021, Monday **Time: 09:00 a.m. to 011:30 a.m.** **Maximum Marks: 60**

Instructions:

1. The question paper comprises of two sections.
2. Make suitable assumptions and draw neat figures wherever required.
3. Use of scientific calculator is allowed.

Section-I

Q.1 Very Short Questions (Attempt any five) **[10]**

1.1 What is the use of substitution matrix?

1.2 Although protein alignment is more sensitive, DNA alignment is also important in some cases. Explain why?

1.3 Why is sequence assembly done before analyzing RNA-seq data?

1.4 What does PAM and BLOSUM stands for?

1.5 Explain how sequencing technology played a significant role in the evolution of the genomics

1.6 What is the fundamental difference between Ion Torrent and Illumina sequencing method?

Q.2 Write Short Notes (Attempt any two) **[06]**

2.1 Methyl sequencing

2.2 Application of multiple sequence alignment

2.3 Application of 'Dot matrix'

Q.3 Detail questions (Attempt any two) **[14]**

3.1 ChIP-seq

3.2 Describe substitution matrices

3.3 Use the dynamic programming for global alignment and create the complete matrix and the alignment for the two sequences-(Seq 1 GATTACA, Seq 2 GTCGACGCA). The scoring parameters are as follows:
Match Score = (1)
Mismatch Score = (-1)
Gap Score = (-2)

Section-II

Q.1 Very Short Questions (Attempt any five) **[10]**

1.1 Write a python script for creating two variables for floating numbers and getting their sum in the form of an integer as the output.

1.2 In Python 3, what will be the outputs of the following commands:

```
protein_length = 143
print(protein_length == 143)
```

1.3 What will be the output of the following python code?

```
x = 30
y = 23
z = x
x = y
y = z
print(x,y)
```

1.4 Identify the mistake(s) in the following code:

```
if x == 1
print("x is 1.")
```

1.5 In Python 3, what will be the outputs of the following commands:

```
print(11%3)
num = "2020"
print("float(num)")
```

1.6 Why is module important in Python?

Q.2 Write Short Notes (Attempt any two) **[06]**

2.1 Write a function to count each nucleotide in a DNA seq

2.2 Why is a module

2.3 What will be the output of the following codes:

(a)

```
print('Hello world! It's an era of Bioinformatics')
```

(b)

```
x = 5+3
if x == 8
    print('x is 8')
```

Q.3 Detail questions (Attempt any two) **[14]**

3.1 Write a function to obtain (i) GC content, (ii) AT content, (iii) GC %, and (iv) AT %

3.2 Write a function to transcribe a DNA sequnece

3.3 Create two variables (myfloat and yourfloat) with one floating number each of your choice.

(a) add the variables in print command

(b) create a third variable (ourint) to add both variables

(c) convert the float to integer and add the values in print command