

U.S.N.								
--------	--	--	--	--	--	--	--	--

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

F February / March 2023 Semester End Main Examinations

Programme: B.E.

Branch: Information Science and Engineering

Course Code: 20IS7BSBIO

Course: Biology for IT Engineers

Semester: VII

Duration: 3 hrs.

Max Marks: 100

Date: 28.02.2023

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

UNIT - I

1	a) Describe Synapse and Synaptic plasticity.	06
	b) Explain the components of BCI and illustrate the functions of each block.	10
	c) Enumerate rapid rise and fall of membrane potential with spike generation.	04

UNIT - II

2	a) Justify why Computational Biology has emerged as an important discipline in recent years.	10
	b) Illustrate how RNA is produced when DNA is transcribed to different protein products. DNA → RNA → PROTEIN	10
	c) Will neurons be in resting potential? When does this condition occur?	

OR

3	a) Illustrate how RNA is produced from a DNA template during transcription	10
	b) Paraphrase the central dogma of molecular biology describing how genetic information is stored and interpreted in the cell.	10

UNIT - III

4	a) Briefly explain normalization schemes of RNA Sequencing and write 'R' code to compute CPM, RPKM and TPM	10
	b) Elaborate the common steps of high – throughput sequencing.	10

OR

5	a) Explain in detail the steps within the context of genomic data analysis.	10
	b) In Transcriptional and post-transcriptional regulation, explain how are genes controlled.	10

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
Revealing of identification, appeal to evaluator will be treated as malpractice.

UNIT - IV

6 a) i. Schematically represent the structure of DNA Nucleotide and how nucleotides can link together.
ii. Suppose that l (string length) is 8, that $f(x)$ is equal to the number of ones in bit string x (an extremely simple fitness function), that n (the population size) is 4, that $pc = 0.7$, and that $pm = 0.001$. Calculate Fitness value and Average Fitness value.

Chromosome Label	Chromosome String
A	00000110
B	11101110
C	00100000
D	00110100

b) Illustrate the Search space and Fitness algorithm with suitable examples. **10**

UNIT - V

7 a) Illustrate the Operations on DNA molecules. **10**
b) Provide the steps involved in Basic Genetic algorithm. Explain GA operators of a simple genetic algorithm. **10**
