

KATHMANDU UNIVERSITY
End Semester Examination
August, 2018

AUG 23 2018

Level : B.Tech.
Year : III
Time : 2 hrs. 30 mins.

Course : BIOT 305
Semester: II
F.M. : 30

SECTION "B"

[3Q. × 6 = 18 marks]

Attempt **ANY THREE** questions

1. Explain the steps of dynamic programming with an appropriate example
2. With the given sequence below make a matrix based on the position of the nucleotide in the sequence and evaluates the probability of sequence AAGTGGC fitting to that matrix.

Position	1	2	3	4	5	6	7
Seq. 1	A	T	G	T	C	G	G
Seq. 2	A	A	G	A	C	T	C
Seq. 3	T	A	C	T	C	A	C
Seq. 4	C	G	G	A	G	G	C
Seq. 5	A	A	C	C	T	G	T

3. In a wet lab experiment, microbes were sampled from a nearby pond, without extensive knowledge on morphology, it was difficult to identify them as well as to characterize and establish relationships. Explain in detail, the course of action by which the species would have been identified and phylogeny reconstructed.
4. Provided with a RNA sequence, elaborate how secondary structure could be predicted? How does this prediction method differ from protein structure prediction?

SECTION "C"

[6Q. × 2 = 12 marks]

Attempt **ANY SIX** questions.

5. What are the differences between PAM and BLOSUM matrices?
6. How does BLAST return the alignment? What will happen when the neighborhood word threshold is increased?
7. Discuss the principles of X-ray diffraction in brief.
8. How could a protein coding region of a prokaryote be predicted?
9. How does sequencing method works in 454 pyrosequencing?
10. Highlight the applications of bioinformatics studies.
11. Calculate the secondary structure preference of Glutamine and Valine; if 25 out of 55 Glutamine exists in alpha helix and 30 out of 45 Valine exists in beta sheet protein of 1000 aa in which 350 and 550 aa exist in alpha helix and beta sheet respectively.

