

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020 **Bioinformatics**

Time: 3 hrs.

Note: Answer any FIVE full questions, selecting

Max. Marks:100

at least TWO full questions from each part.

PART - A

- a. Discuss the file formats of GenBank, Highlight the importance of sanger, TIGR, uniprof and KEGG databases in various bioinformatics exercises.

 (12 Marks)
 - b. Explain the utilities of PDB and CATH databases.

(08 Marks)

- 2 a. Qualitatively describe Markov chains with a neat flow diagram. Add a note on their utility and applications to analysis to protein sequences. (06 Marks)
 - b. Discuss the utility of progressive alignment techniques towards multiple sequence alignment. Mention various bioinformatics resources for the multiple alignment of sequences.

 (08 Marks)
 - c. Explain various types of bioinformatics tools for similarity searching of molecular sequences. (06 Marks)
- 3 a. What are phylograms? Discuss the elements of phylogenetic models? Add short note on the steps and tools involved in phylogenetic data analysis. (12 Marks)
 - b. Using FM algorithm, calculate the distance a, b, c and draw a phylogenetic tree. Given: a + b = 22; a + c = 39; b + c = 41. (05 Marks)
 - c. Calculate the possible number of rooted trees for a systems of eight taxa.

(03 Marks)

4 a. Discuss the secondary structure prediction of proteins by various bioinformatics tools.

(08 Marks)

b. Discuss the secondary structure prediction of RNA.

(06 Marks)

c. Briefly discuss the bioinformatics prediction of functional sites present in genes. (06 Marks)

PART - B

- 5 a. What are restriction maps? Briefly discuss various web based tools available for restriction mapping. (08 Marks)
 - b. Discuss various guild lines followed to design an in silico primer. From the output of an online tool write the forward and reverse primers. Calculate the Tm and percentage GC content. Comment on the quality of the primer.

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(12 Marks)

- 6 a. What are EST? Explain the significance of ESTs in genome bioinformatics. (06 Marks)
 - b. What are gene chip? Explain various resources and tools available for microarray data analysis. (06 Marks)
 - c. Write short note on: i) Neural networks ii) Genetic algorithm. (08 Marks)

- 7 a. What is molecular modeling? Explain the steps involved in molecular modeling with relevant tools.

 (10 Marks)
 - b. Explain the concept of energy minimization and superimposition in molecular modeling.

(06 Marks)

c. Discuss the utility of GRASP.

(04 Marks)

8 a. What is molecular docking? Discuss various methods and tools for docking studies.

(08 Marks)

- b. Write relevant note on:
 - i) Receptor mapping
 - ii) QSAR
 - iii) Pharmacophore pattern.

(12 Marks)

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