M.Sc DEGREE (CSS) EXAMINATION, OCTOBER 2024

Third Semester

M.Sc ARTIFICIAL INTELLIGENCE

ELECTIVE - AI800302 - BIOINFORMATICS

2020 ADMISSION ONWARDS

337FB04A

Time: 3 Hours

Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. Describe the main goals of bioinformatics.

2. What is Knowledge Discovery?

3. What is the role of data cleaning in improving data quality?

4. What are the primary sources of biomedical data?

5. Explain the significance of sequence classification in bioinformatics.

6. How do Bayesian networks differ from Boolean networks in bioinformatics?

7. Discuss the strategies used for motif detection in bioinformatics.

8. How are two-dimensional DNA walk models different from one-dimensional models in terms of application and analysis?

9. Discuss the significance of gridding in microarray image analysis.

10. What is the role of computer programs in microarray data analysis?

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. What are the common data formats used in bioinformatics databases?

12. Describe a biological data integration system and its components.

13. Explain Major Nucleotide Sequence Database, Protein Sequence Database, and Gene Expression Database?

14. Explain the principles of Hidden Markov Models (HMM) and their applications in biological data analysis.

15. Explain the overview of machine learning techniques used in bioinformatics for gene prediction and sequence alignment. Discuss specific algorithms and their effectiveness in analyzing complex genomic data.

16. Explain DNA walk models and how they are applied in one-dimensional, two-dimensional, and higher-dimensional analyses.

17. Describe the process of image analysis for data extraction in microarray experiments.

18. What is a cost matrix in the evaluation of scientific data management systems?

(6×2=12 weightage)

Part C (Essay Type Questions)
*Answer any **two** questions.*

*Weight **5** each.*

19. List two examples each of virtual and materialized data integration systems used in bioinformatics.

20. Explain the various types of bioinformatics data and discuss the challenges associated with managing and analyzing this data.

21. Explain the concept of evolutionary groupings in comparative genomics and their significance in gene classification.

22. Describe the principles of multifractal analysis and its application in bioinformatics.

(2×5=10 weightage)