

**M.Sc. Bio-Informatics - 3rd Sem.**

**(2118)**

**Paper: BI-632**

**Advanced Algorithms for Computational Biology**

**Time allowed: 3 hrs.**

**Max. Marks: 75**

**Section A**

Section A is compulsory.

Explain the following

1.5X10 = 15

- |                            |                                |
|----------------------------|--------------------------------|
| 1) Abstract data type      | 6) Perceptron                  |
| 2) Optimization techniques | 7) Machine learning techniques |
| 3) Interval graph          | 8) Backpropogation             |
| 4) Physical genome map     | 9) Genetic operator            |
| 5) Motifs                  | 10) Fitness function           |

**Section B**

**Answer one question from each unit**

15X4 = 60

**Unit 1**

- 1) Discuss the principle and techniques of algorithm design.
- 2) Explain integer programming and simulated annealing.

**Unit 2**

- 3) What are emission and transition probabilities in HMM? Discuss a model of HMM used in bioinformatics.
- 4) What are clone libraries? Discuss libraries of complete and partial digestion.

**Unit 3**

- 5) Explain multilayer perceptron. Discuss application of machine learning tools in bioinformatics.
- 6) What is support vector machine? Discuss an application in bioinformatics.

**Unit 4**

- 7) What is genetic algorithm? Explain its application in sequence alignment.
- 8) Discuss algorithm of hierarchical clustering.

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