JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY WAKNAGHAT

MID SEMESTER EXAMINATION-2015

B.Tech VI SEMESTER

COURSE CODE: 10B11BI614   **MAX MARKS:** 30

COURSE NAME: Advanced Algorithms for Bioinformatics   **MAX TIME:** 2 hrs

COURSE CREDITS: 4

Note: All questions are compulsory

Section A   [Marks: 6]

Q1. Answer each of the following in brief with a suitable example: **[0.5 X 4= 2]**

    i.   What are five criteria to be satisfied by all algorithms while designing?
    ii.   Explain arrow preference in dynamic programming for pair wise alignment.
    iii.   Differentiate between Hamming and Levenshtein distances.
    iv.   Discuss various kinds of complexities for algorithms.

Q2. Explain each of the following with supporting examples: **[1X 4]**

    i.   What is test code statistics?
    ii.   Design architecture of 3D alignment cell for DP in MSA.
    iii.   What is STAR alignment?
    iv.   Explain Greedy approach for MSA.

Section B   [Marks: 9]

Q1. Describe in detail all the mathematical properties of distance and similarity functions along with their summary of properties.   **[3]**

Q2. Generate alignment for FASTA through lookup table and offset vector for the following set of sequences: A= ARHARFYAAQI and B = HARFYVID.   **[3]**

Q3. Explain semi-global alignment with a suitable example using two nucleotide sequences of your choice along with arbitrary scoring system. Fill matrix and generate final alignment through it.   **[3]**

Section C   [Marks: 15]

Q1. Write DP algorithm for LCS problem along with PrintLCS pseudocode. Fill matrix and find out LCS for given two sequences: TAGTCTA and ATACGT.   **[5]**

Q2. Explain exon-chaining algorithm for gene prediction along with its pseudocode. Solve the exon-chaining for the following set of data: (11,15,6) (10,16,12) (13,17,4) (1,6,4) (3,7,4) (2,4,3) (9,12,5) (5,8,5) and (14,18,4).   **[5]**

Q3. What is sum of pair's method? How it is different from progressive and iterative methods for MSA? Explain any one algorithm for iterative refinement method?   **[5]**