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B.TECH
PECS5410

8th Semester Regular / Back Examination 2016-17
ALGORITHMS FOR BIO-INFORMATICS

BRANCH(S): BIOTECH, CHEM
Time: 3 Hours
Max Marks: 70
Q.CODE: Z143

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions:** **(2 x 10)**

a) Name two positive and negative charged amino acids.
b) What carries information between DNA and Proteins? Explain.
c) What is Neurospora?
d) Note down various variants of BLAST
e) What is break point? Explain.
f) What are platelet-derived growth factor (PDGF)?
g) What are Point accepted mutations?
h) What is interval graph?
i) What is the difference between Keyword tree and Suffix tree?
j) What is BLAST? Why it is required?

Q2 **a)** Mention the various applications of Phylogeny. Also describe the character based method for the reconstruction of phylogeny. **(5)**

b) Explain polymerase chain reaction (PCR) with diagrams. **(5)**

Q3 **a)** What is the difference between Motif finding problem and Median string problem? Explain with examples. **(5)**

b) How do use brute force approach to solve Motif finding problem? Explain using an example. **(5)**

Q4 **a)** Why Simple Reversal Sort is not a correct algorithm? Explain using an example. **(5)**

b) Prove the theorem as follows: **(5)**
If a permutation π contains a decreasing strip, then there is a reversal ρ that decreases the number of breakpoints in π, that is, $b(\pi.\rho) < b(\pi.\rho)$.

Q5 **a)** What is the Longest Common Subsequences problem? Explain using an example. **(5)**

b) Construct the recursion tree for MergeSort on the input 2, 5, 7, 4, 3, 6, 1, 8. **(5)**

Q6 **a)** Write down the divide & conquer approach to merger sorting. **(5)**

b) Explain about De-Novo peptide sequencing and Peptide identification **(5)**

Q7 **a)** Give an account of Sequencing by Hybridization (SBH) as a Hamiltonian Path Problem. Explain through example. **(5)**

b) What is Exact Pattern Matching? Give an example that uses a Pattern matching problem. **(5)**

Q8 **Answer any two of the following:** **(5 x 2)**

a) Structure of DNA

b) Manhattan Tourist Problem

c) Bridges of Königsberg