

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2025

B.Tech-V Semester (BI)

COURSE CODE (CREDITS): 18B1WBI531 (3)

MAX. MARKS: 25

COURSE NAME: Structural Bioinformatics

COURSE INSTRUCTORS: Dr. Raj Kumar

MAX. TIME: 1 Hour 30 Min

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	CO	Marks
Q1	A bond has an equilibrium bond length of $r_0=1.50 \text{ \AA}$, $k_b=200 \text{ kcal/mol/\AA}^2$. If potential energy $E=0.5 \text{ kcal/mol}$, find the actual bond length r .	CO-5	3
Q2	Consider two atoms i and j , respectively. The minimum distance between the two atoms upon superimposition is $2\text{ \AA}$ in 1D. What is the RMSD of the two atoms?	CO-5	3
Q3	For an actual sequence (10 residues), the secondary structures (SS) is: H H E E C C H E C H For a predicted sequence SS is: H E E E C H H E C C. Compute Q3 score for above prediction.	CO-4	3
Q4	Describe the secondary structure assignments by the STRIDE program.	CO-4	3
Q5	Define a typical potential energy function.	CO-4	3
Q6	Describe the simplest criteria for the hydrogen bond assignment? How can you improve this assignment to suite more sophisticated H-bond assignment by compute programs such as DSSP?	CO-4	5
Q7	Structural alignment attempts to establish homology between two or more polymer structures based on their shape and three-dimensional conformation. Describe working of a method which utilizes distance matrix for structural alignment.	CO-5	5