

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT  
TEST -2 EXAMINATION- 2024

B.Tech-IV Semester (BI)

COURSE CODE(CREDITS): 18B11BI413 (3)

MAX. MARKS: 25

COURSE NAME: Structural Biology

MAX. TIME: 1 Hour 30 Minutes

COURSE INSTRUCTORS: Dr. Raj Kumar, Dr. Poonam Sharma.

*Note: (a) All questions are compulsory.  
(b) Marks are indicated against each question in square brackets.  
(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems*

- Q1(a). Describe the requirement in X-ray crystallography with reasons. (CO-1,2) [2]  
(b). Explain Bragg's Equation with diagram. (CO-1,2) [3]
- Q2(a). Elaborate the different steps for structure determination of proteins. (CO-1,2) [3]  
(b). Discuss the properties of amino acids. (CO-1,2) [2]
- Q3. The 3D structure of proteins results from a delicate balance between various interactions acting between the amino acid present the polypeptide chain and also with the surrounding environment. Discuss the details of these interactions stabilizing protein tertiary structure. (CO-2,3) [3]
- Q4. Ethane may exhibit cis- and trans-conformations in three dimensions. Discuss how this concept is translated into understanding protein structure conformation stability? (CO-2,3) [3]
- Q5. Structural motifs are short segments of protein 3D structure, which are spatially close but not necessarily adjacent in the sequence. Describe such a structural motif that enables specific sequence binding characteristics. (CO-3) [3]
- Q6. Write the general equation to calculate the angle for helical wheel diagram preparation. (CO-3) [3]
- Q7. Short notes: (CO-1,2,3) [3]
- a) Heptad repeat
  - b) Beta-hairpin
  - c) Zinc finger motif