JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2025

B.Tech-VIII Semester (BI)

COURSE CODE (CREDITS): 18B1WBI831 (3) MAX. MARKS: 15

COURSE NAME: Computational Molecular Evolution

COURSE INSTRUCTOR: Dr. Tiratha Raj Singh MAX. TIME: 1 Hour

Note: (a) All questions are compulsory. Calculator is permitted.

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

Q.No	Question	CO	Marks
Q1	Two genes X and Y were observed duplicated from an ancestor X followed by the speciation process. If the substitution rate of X is 0.7 and of Y is 0.5. Their time for speciation (divergence) was 500 years. Compute the time of gene duplication for X and Y while the average rate of substitution for four pairwise comparisons is 2.33. Write concluding remarks on your answer.	2	3
Q2	Depict the biological similarity through multiple evolutionary terms such as homologs, analogs, orthologs, paralogs and homoplasy. Describe with an example how homology is associated with homoplasy?	1	3
Q3	Create your own story of evolution through various discoveries, mechanisms and evidences available. Illustrate the significance of various theories of evolution in these scenarios.	1, 2	4
Q4	Comprehend the value of orthologs and paralogs in genomic data. Explain the duplication and speciation events around these terms in the language of molecular evolution.	1	2
Q5	Correlate the process of gene and protein evolution through genetic code systems. Discuss about various kind of genetic codes available till date and explain how evolution is changing these codes on regular basis?	2	3