

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- FEB-2023

BTech-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: All questions are compulsory. Marks are indicated against each question in square brackets. Calculator is permitted.*

Q.1. What do you mean by the rate of evolution. Explain it with a simple mathematical model for a set of homologous sequences. (CO-1,2) [2]

Q.2. Discuss how the genetic code systems are evolving? Explain the process through various genetic codes with their respective variations. (CO-2,3) [3]

Q.3. A set of homologous genes were duplicated from an ancestral gene with the substitution rate of 10.4 and 15.6 respectively. Their time for rate of evolution were 6 and 5 years respectively for gene 1 and 2. Find out the time of gene duplication while no other complication is being incorporated at this stage of evolution. (CO-1,2) [3]

Q.4. How theory of evolution is contradictory with the creationist theory? Realize your views through various mechanisms, hypotheses and their respective evidences. (CO-1-3) [4]

Q.5. A sequence contains 1500 base pairs with total number of 35 substitutions, while evolution was observed. What will be the proportion of nucleotide changes in this sequence? Additionally, calculate the relative substitution frequency for these nucleotide replacements. (CO-1,2) [3]