

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST - 3 EXAMINATIONS-2022

BTech VIII Semester (BT/BI)

COURSE CODE (CREDITS): 18B1WBI831 (3)

MAX. MARKS: 35

COURSE NAME: Computational Molecular Evolution

COURSE INSTRUCTORS: Tiratha Raj Singh

MAX. TIME: 2 Hours

Note: All questions are compulsory. Marks are indicated against each question in square brackets.

- Q.1. Realize the significance of nested gens in the genomes. Are these different or similar to the overlapping genes? Give an example to demonstrate this phenomenon. (CO-3) [5]
- Q.2. Appraise the formation of pseudogenes or zombie genes through an example where all the processes of retrotransposition is also included. (CO-4) [5]
- Q.3. Two species A and B diverged from a parental species X and their gene contents are differing upto some extent. Some of the genes from the pool of A and B became non-functional. Is there any method or procedure to identify the divergence mechanism for A and B along with non-functionalization of one or more gene in either A or B? Discuss this phenomenon with a suitable but comprehensive example. (CO-4,5) [6]
- Q.4. If multiple genes are being diverged from a single parent then which of these multiple genes will have the exact characteristics of the parental gene? How we can compute the rate of evolution for such a condition? (CO-1,2) [4]
- Q.5. We can utilize molecular as well as morphological data for the reconstruction of evolutionary trees. Which data is better and how? Interpret the significance of molecular data through 'multiregional' and 'out of Africa' hypotheses. (CO-2,3) [5]
- Q.6. Compute the distance between the species for an unrooted tree where total 6 species are there. Assume the distances arbitrarily however the direction of evolution is left to right. All the distances are in the range of 1-9 only. (CO-5) [5]
- Q.7. Differentiate between God's existing and natural selection theories. Devise your viewpoint to demonstrate the existence of life on Earth through the justification of three parameter model i.e. mechanisms, hypothesis and applications. (CO-1,5) [5]