JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -2 EXAMINATION- APRIL-2023

COURSE CODE(CREDITS): 20MSWBT433 (2)

COURSE NAME: Computational Systems Biology

COURSE INSTRUCTORS: Dr. Tiratha Raj Singh

MAX. MARKS: 25

MAX. TIME: 1 Hour 30 Minutes

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

Q.1. Discuss 4 important characteristics of a biological system. Explain how a biological system can perform well in adverse conditions?

[3]

Q.2. Describe domain fusion and correlated mutations methods with an example of each. Indicate their respective category of methods for classification.

[4]

Q.3. Realize the significance of PPIs in biological systems setup. Briefly discuss any 3 experimental methods used for PPIs.

[4]

Q.4. Calculate sub graph concentrations of network motifs for a 3 node motif set where 5 motif type were absent and remaining were utilized with equal probability. Total number of motifs used were 88.

[4]

Q.5. Compare coherent and incoherent FFL. Explain how the computational implementations of AND and OR logic gates in FFL could be associated with the regulatory mechanisms in real biological systems and/or pathways?

[4]

Q.6. Elaborate about the significance profile (SP) of network motifs. Discuss its mathematical formulations to calculate SP in a given pathway.

[2]

Q.7. Explain with an example, how a stoichiometry matrix could be utilized in systems biology.

[2]

Q.8. How network motifs evolve? Write your systematic opinion on their evolution in bacterial systems.

[2]