

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -I EXAMINATIONS-2023

M.Tech-I Semester [BT]

COURSE CODE (CREDITS): 18M1WBT133 (3)

MAX. MARKS: 15

COURSE NAME: Advances in Computational Systems Biology

COURSE INSTRUCTORS: Dr. Tiratha Raj Singh

MAX. TIME: 1 Hour

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

Q1. Realize the importance of computational modelling process in systems biology. Explain how biological networks behave while dealing with their dynamisms to achieve the robustness? [2]

Q2. Five genes (*A*, *B*, *C*, *D* and *E*) were given for a specific pathway. *A* activated *B* and *C*, *B* repressed itself as well as *D* and *E*. *D* is neutral in its activity while *E* is activating *A* and *B* both. *C* is a repressor for *E* while activator for *A*. Solve this problem using gene interaction network approach with proper use of arrows and symbols. Identify various kind (regulatory and regulated) of genes also. [4]

Q3. Discuss how system's behaviour is associated with its overall functioning. List important parameters utilized for the same. [2]

Q4. Elaborate following terms *w.r.t.* biological systems: [1*4=4]

- (a) 4 Points for system's handling (b) Omics Cascade and directions
(c) Reverse Engineering (d) Reductionist and integrative approaches

Q5. What are various 'traversal challenges' to be studied for a biological network? Discuss each with its respective role in the process of achieving robustness and reliability for any biological system of your choice. Describe your system accordingly. [3]