JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2025

M.Tech. - Ist Semester (BT)

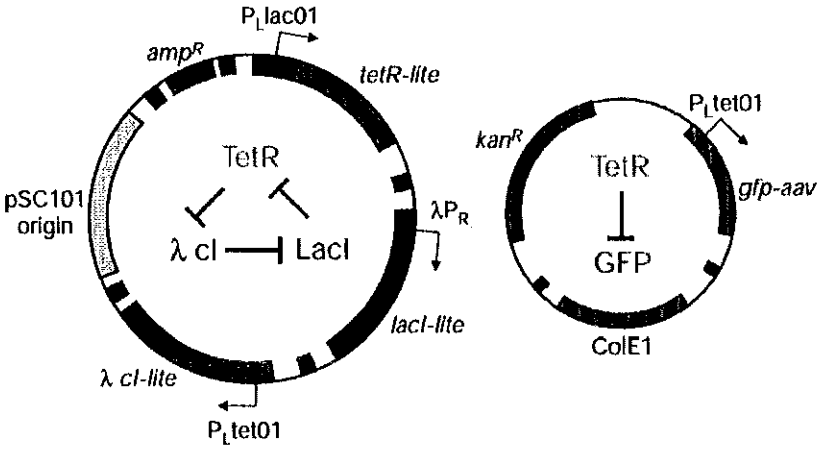
COURSE CODE (CREDITS): 18M1WBT133 (3) MAX. MARKS: 25

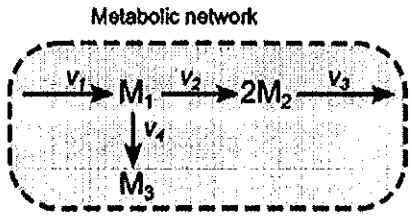
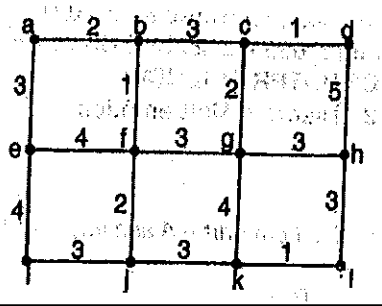
COURSE NAME: Advances in Computational System Biology

COURSE INSTRUCTORS: Dr. Raj Kumar MAX. TIME: 2 Hours

Note: *(a) All questions are compulsory.*

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

Q.No	Question	Marks
Q1	Give a brief account of the various types of protein–protein interactions, and enumerate the methods used for identifying PPIs.	3
Q2	The BioCyc database collection is a set of several pathway/genome databases (PGDBs). Provide a short summary of tasks involved in curating BioCyc databases?	3
Q3	Explain the working of the given synthetic gene circuit: 	5
Q4	Create a possible XML output for the following Vet. Data: [illegible] [illegible] [illegible] Hafsah Downs Cashew 2 Carrie Pope Chase 1 Jim Chandler Otis 20	5

Q5	Given a simple metabolic network with four reactions and three metabolites, construct the stoichiometric matrix and set up the FBA optimization problem (objective function + constraints). 	5
Q6	Use Kruskal's Algorithm to find a minimum spanning tree in the weighted graph given below: 	4
Q7	Systems biology is a scientific approach that studies complex biological systems. Explain the following in the context of systems biology. a) Reductionist Vs. systems approach b) Emergent properties c) Model organisms d) Kinetic Modelling e) Systems biology and synthetic biology	2 × 5 =10