JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2025

B.Tech-VII Semester (BT)

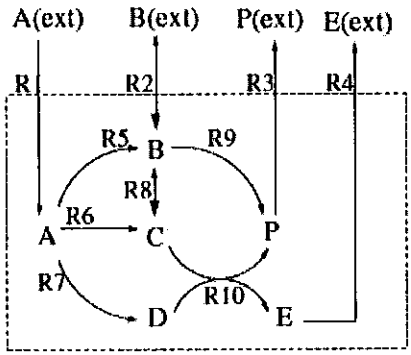
COURSE CODE (CREDITS): 18B1WBI731(3) MAX. MARKS: 25

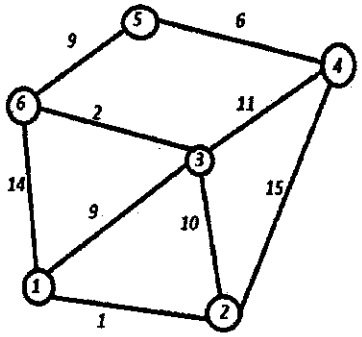
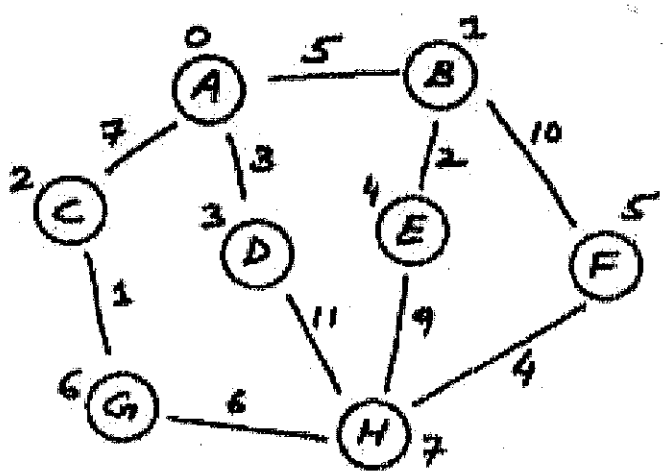
COURSE NAME: Computational Systems Biology

COURSE INSTRUCTORS: Dr. Raj Kumar MAX. TIME: 1 Hour 30 Min

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

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

Q.No	Question	CO	Marks
Q1	An external signal, Signal, binds to and activates a receptor protein, Receptor. The active Receptor then phosphorylates a cytoplasmic protein, Protein A, which converts it into its active form. Next, the active Protein A acts as an enzyme, phosphorylating a second protein, Protein B, thereby activating it. Finally, the active Protein B translocates into the nucleus and binds to a specific region of DNA, promoting the transcription of the Target Gene. Represent Process Description of the above pathway using SBGN.	CO-2	5
Q2	create a stoichiometric matrix for the following network: 	CO-2	5
Q3	Calculate the minimum spanning tree for the following graph.	CO-4	4

			
Q4	Calculate the adjacency matrix for the given graph: 	CO-4	3
Q5	Describe the role of ODEs in modeling biological pathways.	CO-3	2
Q6	Describe the following topological properties in biological networks. a) The degree of a network b) Scale-free networks and transitivity c) Centralities	CO-3	2 × 3 = 6