

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2025

B.Tech-VIII Semester (CSE/IT/ECE)

COURSE CODE (CREDITS): 18B1WCI847(2)

MAX. MARKS: 35

COURSE NAME: Social and Information Network Analysis

COURSE INSTRUCTORS: Ms. Seema Rani

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	CO	Marks
Q1	Illustrate how a visual network graph can reveal structural holes and their bridging actors?	CO[6]	4
Q2	Explain structural equivalence and automorphic equivalence with suitable examples.	CO[3]	3
Q3.	Find the Eigenvector Centrality of the following of matrix $A = \begin{bmatrix} 3 & 2 & 3 & 1 \end{bmatrix}$ Compute eigenvalue, principle eigenvalue and eigenvectors.	CO[2]	3
Q4	Compare and contrast Gatekeeper, Representative, and Liaison roles using group membership logic. What does the E-I Index measure, what +1 and -1 signify?	CO[4]	7
Q5	Describe the five brokerage roles proposed by Gould and Fernandez. Provide a real-life example for any two of them.	CO[5]	5
Q6	Consider an undirected graph with six nodes from A to F. Based on this network structure, Compute degree centrality of each node, determine the farness and closeness and compute its eccentricity. Finally calculate the betweenness centrality of node D and F.	CO[6]	8

	<pre> graph TD A[Node A] --> B[Node B] A --> C[Node C] B --> D[Node D] C --> D D --> E[Node E] E --> F[Node F] C --> A F --> A </pre>		
Q7	<p>What are SIENA and Exponential Random Graph Models (ERGMs)? List key difference between them. Differentiate between dyadic, monadic, and whole-network level hypotheses with example.</p>	CO[5]	5

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