COURSE CODE(CREDITS): 18B1WCI847(2)

COURSE NAME: Social and Information Network Analysis

MAX. MARKS: 35

COURSE INSTRUCTORS: MS. SEEMA RANI

Note: (a)All questions are compulsory.

MAX. TIME: 2 Hours

(b)Marks are indicated against each question in square brackets.

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

1. Find the Eigenvector Centrality of the following of matrix $A = \begin{bmatrix} -5 & 2 \\ -7 & 4 \end{bmatrix}$. Compute eigenvalue, principal eigenvalue, and eigenvectors.

[C0-6] [6M]

2. How do SIENA and exponential random graph models contribute to understanding social networks, and what are their respective applications in analyzing social structures and dynamics?

[C0-6] [5M]

3. Explain following types of network data:
   a) One Mode Network
   b) Two-Mode Network
   c) Ego-Centered Network

[C0-4] [6 M]

4. What do you mean by fragmentation measure in social network? Explain all three-fragmentation measures.

[C0-5] [6M]

5. What are the key metrics to compute for a given graph to understand its centrality and connectivity? Compute the Degree Centrality, Eccentricity, Radius, and Closeness measures for the graph node A to D and interpret their significance in analyzing network structures.
Assign weights to the edges: AB: 5, AC: 3, BC: 1, BD: 4, CD: 6

[C0-5,6] [7M]

6. How would you define betweenness centrality in the context of a directed connected graph? Compute the betweenness centrality of node D and F.

[CO-6] [5M]