

[Time:2.30 Hrs]

[ Marks:75 ]

**Please check whether you have got the right question paper.**

- N.B:**
- 1. All question are compulsory.**
  - 2. Figures to the right indicate full marks.**

- Q.1 Attempt any Three of the following: 15**
- a. What is an adjacency matrix? How is it used to represent a graph?
  - b. What are symmetric and asymmetric relationships? Illustrate with examples from social interactions.
  - c. How does SNA contribute to understanding social structures?
  - d. What is graph distance? How is it calculated in a social network?
  - e. Differentiate between ego-centric and socio-centric density.
  - f. Write a short note Link Analysis.
- Q.2 Attempt any Three of the following: 15**
- a. What is reachability in a network? How is it determined?
  - b. What is degree centrality? How does it reflect a node's prominence in a network?
  - c. What is N-cliques? How do they differ from cliques?
  - d. What is reciprocity in directed networks? Provide an example.
  - e. What is closeness centrality? How is it calculated?
  - f. Distinguish between group-external and group-internal ties.
- Q.3 Attempt any Three of the following: 15**
- a. Explain the process of finding equivalence sets in a network.
  - b. What is clustering in social network analysis?
  - c. What is covariance? How is it used to measure similarity?
  - d. Discuss the significance of measuring similarity in valued relations.
  - e. Explain the concept of hierarchical clustering.
  - f. Explain the concept of linkage criteria in agglomerative clustering.
- Q.4 Attempt any Three of the following: 15**
- a. Discuss the challenges in analyzing affiliation and attribute networks.
  - b. Discuss the advantages and limitations of using SVD for analyzing two-mode networks.
  - c. Write a short note on visualizing two-mode data
  - d. Differentiate between exploratory and confirmatory factor analysis
  - e. Write a short note on Bi-partite data structures
  - f. Discuss the applications of faction analysis in social network research.
- Q.5 Attempt any Three of the following: 15**
- a. Differentiate between directed and undirected networks.
  - b. Discuss the concept of graph centers in network analysis.
  - c. What is the Jaccard index? How is it calculated?
  - d. What challenges are associated with visualizing two-mode networks?
  - e. What is K-cores? Discuss their utility in analyzing the core-periphery structure of networks.
  - f. Define graph diameter. Why is it important in understanding the structure of a network?

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