Sri Sivasubramaniya Nadar College of Engineering, Kalavakkam – 603 110.

(An Autonomous Institution, Affiliated to Anna University, Chennai)

B.E. / B.Tech. End Semester Theory Examinations, November/December 2022.

Seventh Semester

Computer Science and Engineering

UCS1722 SOCIAL NETWORK ANALYSIS

(Regulations 2018)

Time: Three Hours   Answer ALL Questions   Maximum: 100 Marks

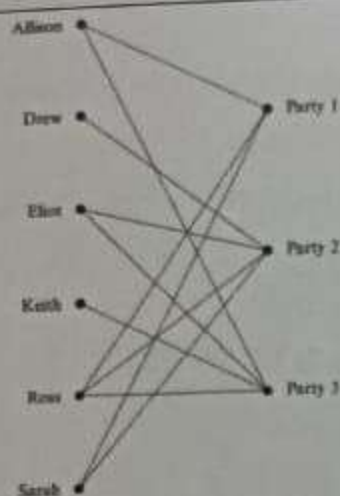K1: Remembering   K2: Understanding   K3: Applying   K4: Analyzing   K5: Evaluating

PART – A (10 × 2 = 20 Marks)

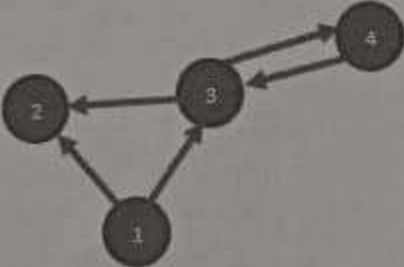|			
K1	What is Social Network Analysis?		CO1
K3	Assume a network of 30 countries that shares common borders between them. Identify whether the network is a directed or non-directed network and find out the maximum possible borders that can exist between the countries.		CO1
K4	Distinguish between node-generated subgraph and line-generated subgraph.		CO2
K1	List any four examples of non-directional relations in social network.		CO2
K1	What does the local definition of communities focus on?		CO3
K4	Distinguish between optimization-based and heuristics-based algorithms for solving Network Community Mining Problem in Social Networks.		CO3
K3	Develop a NetworkX code to find top 10 betweenness centrality nodes in the network.		CO4
K2	Compare eigen vector centrality with degree centrality.		CO4
K1	List the advantages of node-link diagrams.		CO5
K1	What way visualization help in social network analysis?		CO5

PART – B (5 × 6 = 30 Marks)

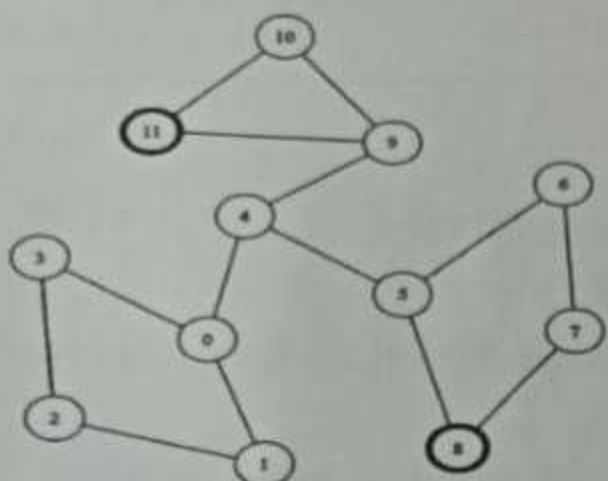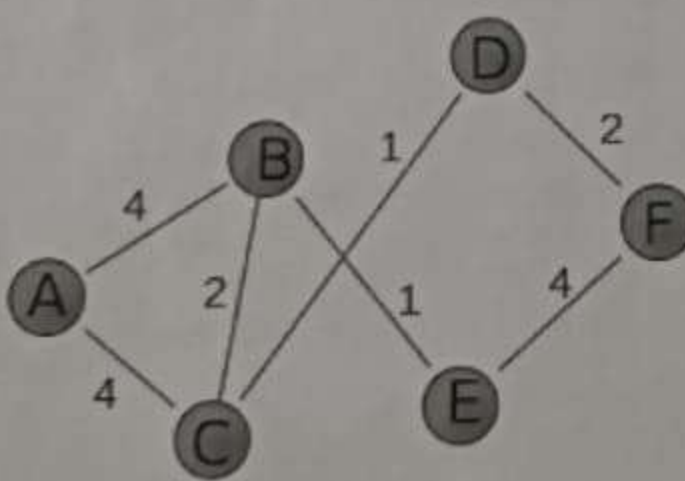|		
K3	Build a one-mode affiliation network for the given two-mode affiliation network, where the actors are children and the events are the birthday parties they attended.	CO1

2.	K2	Explain the three different mathematical notational schemes for representing network data.	CC
3.	K2	Explain the three categories of definitions for communities.	CC
4.	K4	Examine how network community mining algorithms finds the communities in a network using heuristic approach.	CC
5.	K4	Distinguish between matrix based and node-link based diagrams.	CC

PART – C (5 × 10 = 50 Marks)

	K2	Explain the different dimensions of Social Capital by Nahapiet and Ghoshal.	CC

(OR)

	K2	Explain the data collection complexities in social networks and detail the alternatives.	CC

K3	Apply the appropriate matrix operations for the network shown below and find the following measures.	C

a) Distance/connectivity matrix
b) Geodesic of length 2
c) Indegrees of nodes
d) Outdegrees of nodes
e) Density of the network

(OR)

19.	K3	Apply the graph theory concepts for social networks and find the following measures for the network given below. 1 Eccentricity of Node 10 2. Bridges and Tour in the graph 3. Nodal degrees of all nodes 4. Variance of degree 5. Edge Connectivity 	CO2
20.	K2	Explain any three applications of community mining algorithms.	CO3
		(OR)	
21.	K2	Explain the various optimization-based algorithms for detecting the communities in social networks.	CO3
22.	K3	Develop a social network using NetworkX code as a labelled weighted graph. Node's colors should be in green and the link's colors should be in blue. Use spring layout for positioning. Apply NetworkX command to implement a depth-first traversal method and display the list of nodes in the order it was visited. 	CO4
		(OR)	
3.	K3	Develop NetworkX code to extract the core of the network using the following methods: a) The Island method b) Trimming edges and nodes method	CO

K4	Assume there is a visualization tool which is designed in a way that can use the benefits of both matrix and node-link representations. Analyze the various processes that must be incorporated at different stages to achieve the best of both representations.	CO	

(OR)

K4	Assume there is a criminal network. Based on your knowledge what are the different social network analysis measures and algorithms you could use toanalyze the network? Justify your answer with proper explanation.	CO	

rse Outcomes:

Explain Social network concepts, measures and data (K2)

Represent social networks mathematically (K2)

Understand the working of community detection algorithms for online social networl (K2)

Use SNA tools for analyzing social networks (K3)

Apply Visualization to social networks (K3)