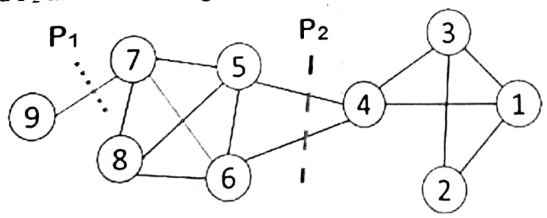
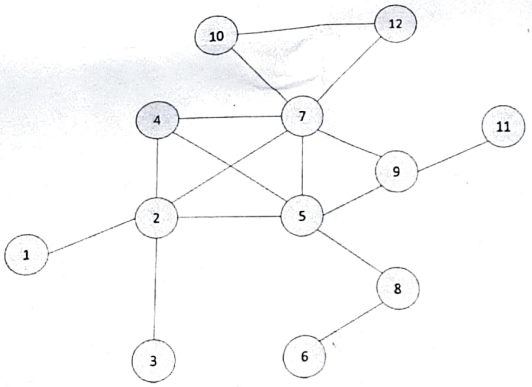
National Institute of Technology Silchar
End-Semester (UG) Examinations, May 2022

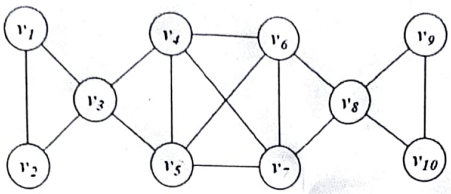
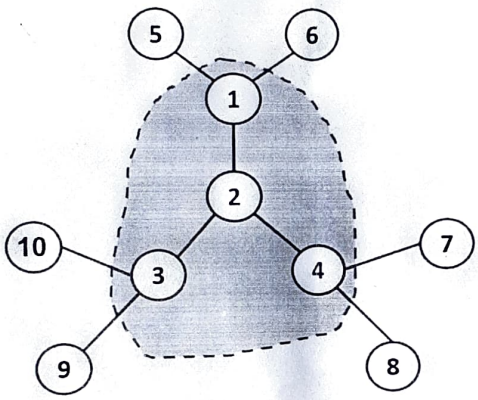
Subject Code: CS 331 Subject: Social Network Analysis

Semester: 6th Department: Computer Science and Engineering

Duration: Two Hours Total Marks: 50

Answer Question 1-4 and any one of 5 or 6.
Write all parts of the questions in the same place.

Q.No.	Questions	Marks	CO
1. (a)	What is six-degrees-of-separation?	2	CO-2
(b)	Define the three small-worldness measures of social networks.	3	CO-2
(c)	Briefly explain hubs and authorities in directed networks. Show how the computation of authority centrality is dependent on computation of hub centrality.	5	CO-2
2. (a)	What is the key difference between structural and regular equivalence?	2	CO-2
(b)	How centrality of nodes and edges in a network can be measured? Explain with suitable examples for both.	4	CO-1
(c)	Compute ratio cut and normalized cut, considering partitions as indicted by P_1 and P_2 in the following network. 	4	CO-1
3. (a)	How trust and reputation are differ from each other?	2	CO-2
(b)	Derive the relationship between local clustering and redundancy.	4	CO-2
(c)	Identify k-cores for $k = \{1, 2, 3, 4\}$ from the following network. 	4	CO-1

4. (a)	Show the role of homophily property in the derivation of modularity of a social network.	**5**	**CO-4**
(b)	Identify the communities from the following network using clique percolation method showing clique-adjacency graph. 	**5**	**CO-3**
5. (a)	Explain how viral marketing strategy can be achieved with the help of influence maximization.	**4**	**CO-4**
(b)	Determine the permitted permutations of the following network considering shaded portion as rumour horizon and node 1 as source. 	**6**	**CO-3**
	(OR)		
6. (a)	Explain with suitable examples how the same solution can be applied for the following pairs of problems. (i) Link Prediction & Recommender System (ii) Sentiment Analysis & Rumour Detection	**4**	**CO-4**
(b)	Perform a comparative analysis of SI, SIS and SIR models in the context of their components and growth pattern.	**6**	**CO-3**

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