U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

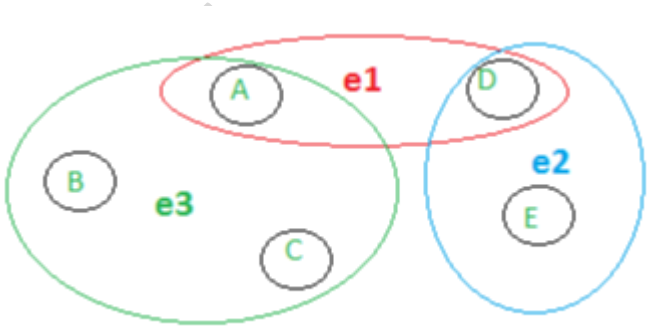
Autonomous Institute Affiliated to VTU

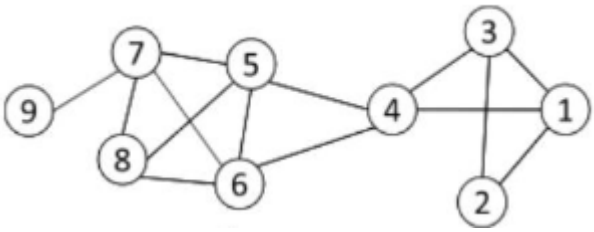
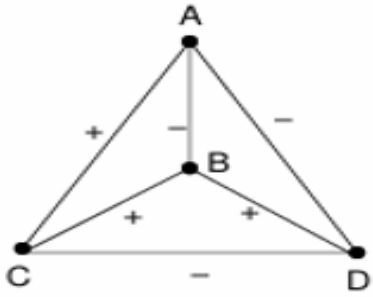
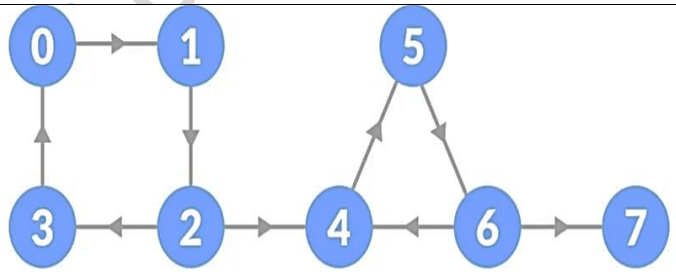
June 2025 Semester End Main Examinations

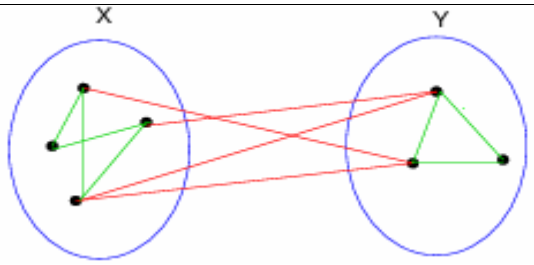
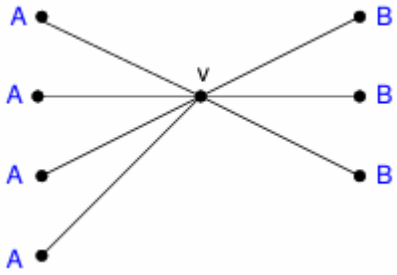
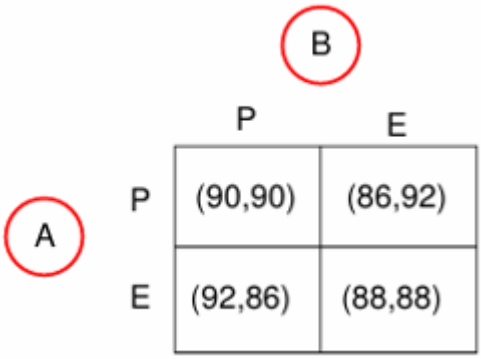
Programme: B.E. **Semester: VI**
Branch: Information Science and Engineering **Duration: 3 Hrs.**
Course Code: 23IS6PESNA / 22IS6PESNA / 20IS6PESNA **Max Marks: 100**
Course: Social Network Analysis

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	CO	PO	Marks
1	a)	Explain the importance of graphs in real-world applications. With suitable drawings show the simple graphs, digraphs, bipartite graphs, multigraphs, and hypergraphs with respective adjacency matrices.	CO2	PO2	10
	b)	Write a Python program using the Networkx library to construct and visualize a simple undirected graph and bipartite graph.	CO2	PO2	10
		OR			
2	a)	What are hypergraphs? How do they differ from traditional graphs? Explain its possible applications. Identify if this graph is a hypergraph. Justify. 	CO1	PO1	10
	b)	Write a Python program using the iGraph library to construct and visualize a simple graph and directed graph.	CO1	PO3	10
		UNIT - II			
3	a)	Explicate the statement “Job offers comes from Acquaintances” and its importance in social networks.	CO4	PO2	10
	b)	Discuss the concept of Triadic Closure and its implications in social network analysis. Compute the clustering coefficient of Node 6.	CO4	PO3	10

						
			OR			
	4	a)	What is Homophily? Describe the mechanisms that lead to homophily in social networks.	***CO4***	***PO1***	**10**
		b)	Explain the concept of Structural Holes and their significance in network structure and social capital.	***CO3***	***PO2***	**10**
			UNIT - III			
	5	a)	For the given graph identify the social network property. Provide your inferences for the graph given. 	***CO3***	***PO2***	**10**
		b)	What is the significance of centrality measures in a network? With suitable illustrations give a description of Degree, Closeness and Betweenness Centrality with examples.	***CO3***	***PO2***	**10**
			OR			
	6	a)	 For the given graph, identify the various components and list the DAG if possible. Justify your answer suitably.	***CO1***	***PO2***	**6**

		b)	 Identify the given graph. Provide your analysis on X and Y using a problem statement.	*CO1*	*PO2*	**6**
		c)	Mention any 4 SNAP databases? How is it useful in analyzing different types of networks?	*CO1*	*PO1*	**8**
			UNIT - IV			
	7	a)	Write the PageRank algorithm. How does it help in ranking the pages?	*CO2*	*PO2*	**10**
		b)	Write HITS algorithm. What are the role plays of Hubs and Authorities in link analysis? Explain its significance in web search.	*CO2*	*PO1*	**10**
			OR			
	8	a)	Describe how diffusion occurs in networks. What are the possibilities of V accepting the behavior of A or B. Provide your explanation using suitable formulas. 	*CO3*	*PO2*	**10**
		b)	A & B are teammates while P is project exams and E is theory exams. Write the details used to prepare the given matrix. Also explain the term coordination game. 	*CO3*	*PO1*	**10**

			UNIT - V			
	9	a)	What is the Small-World Phenomenon? Explain the concept of 'Six Degrees of Separation' with an example.	***CO3***	***PO2***	**10**
		b)	Explain Associative Memory and Prepare a semantic network for FireAlarm.	***CO4***	***PO3***	**10**
			OR			
	10	a)	The World Wide Web is structured as a directed graph. Justify the statement. What are the key components of this graph?	***CO2***	***PO3***	**10**
		b)	What is core-periphery nodes. Give a neat illustration for college friends network.	***CO1***	***PO2***	**10**

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