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**

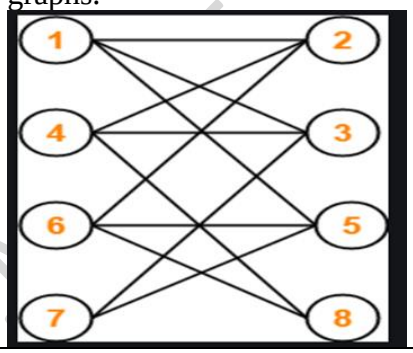
Branch: Artificial Intelligence & Machine Learning **Duration: 3 hrs.**

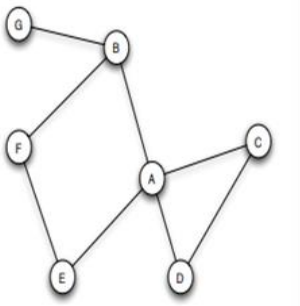
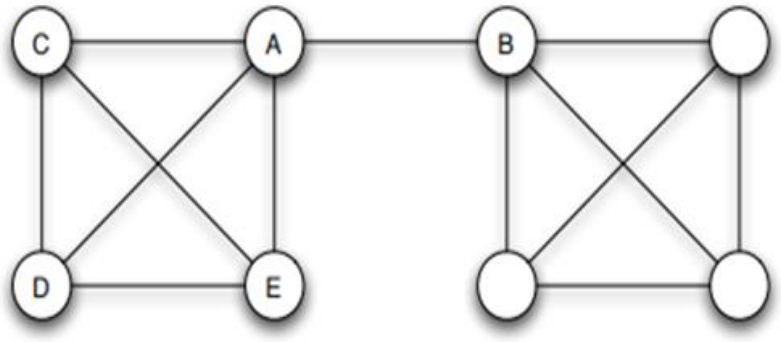
Course Code: 24AM6PESNA **Max Marks: 100**

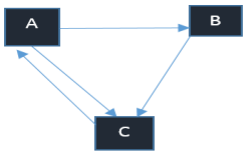
Course: SOCIAL NETWORK ANALYSIS

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)	Elaborate on the various types of networks frequently examined in Social Network Analysis (SNA) with a suitable example.	CO1	PO2	**10**
	b)	Illustrate the influence of boundary specification and sampling techniques in social network analysis.	CO1	PO2	**5**
	c)	How do measurements impact the unit of observation, overall network cohesion and modeling unit in an organizational network?	CO1	PO2	**5**
		OR			
2	a)	Differentiate between dyads and triads with suitable example for each.	CO1	PO2	**6**
	b)	Identify the graph type and write the adjacency matrix for the given graphs. 	CO1	PO2	**6**
	c)	In the context of a global e-commerce company managing supply chain operations across multiple continents, identify the most suitable network mode to optimize communication and data exchange between regional hubs. Discuss different network modes with appropriate examples.	CO1	PO2	**8**
		UNIT - II			
3	a)	Prefer the graph and answer the following questions:	CO2	PO3	**6**

			 i. Identify the common nodes by applying triadic closure. ii. Specify the new path that can be framed within the graph. iii. Justify the clustering coefficients for the same.			
		b)	Explicate selection and social influence with suitable example for each.	*CO1*	*PO2*	**7**
		c)	Examine the roles of triadic closure, focal closure, and membership closure in forming triangles within social-affiliation networks with suitable example for each.	*CO2*	*PO2*	**7**
			OR			
	4	a)	Write a short note on the following i. Social Capital ii. Structural holes	*CO1*	*PO2*	**5**
		b)	Analyze the graph  i. Identify the common nodes by applying triadic closure. ii. Specify the new path that can be framed within the graph. iii. Justify the clustering coefficients for the same. iv. Specify the nodes that connects the sub graph	*CO2*	*PO2*	**7**
		c)	Illustrate how to track link formation in an online data frame in the context of social network analysis with suitable example.	*CO2*	*PO4*	**8**
			UNIT - III			
	5	a)	Calculate the page rank for the given graph by considering the damping factor =0.85 and initial page rank for all the web pages =1.	*CO2*	*PO3*	**10**

						
		b)	Depict and elaborate the bow-tie structure with suitable example in context of web.	*CO2*	*PO3*	**10**
			OR			
6		a)	In the context of a content-sharing platform where users upload, link to, and reference various resources, explain the fundamental concepts of hubs and authorities in link analysis. How would these concepts be used to identify influential content creators and reliable resources on the platform?	*CO2*	*PO3*	**10**
		b)	Analyze how world wide web can be represented as an information network.	*CO2*	*PO3*	**10**
			UNIT - IV			
7		a)	Provide the detailed analysis on A Simple Herding Experiment.	*CO2*	*PO2*	**10**
		b)	Elaborate how Bayes' Rule provides a mathematical framework for updating probabilities based on new evidence, making it a powerful tool for decision-making under uncertainty.	*CO3*	*PO4*	**10**
			OR			
8		a)	Explain the General Cascade Model using three key ingredients.	*CO3*	*PO2*	**10**
		b)	In a city, 80% of the taxi cabs are black, and the remaining 20% are yellow. A hit-and-run accident has occurred involving a taxi, and a witness claims that they saw a yellow taxi. The reliability of the witness's identification is as follows: ➢ If the taxi is actually yellow, the witness will correctly identify it as yellow 80% of the time and If the taxi is actually black, the witness will correctly identify it as black 80% of the time. Solve the following: i. What is the probability that the taxi involved in the accident is actually yellow given that the witness reported seeing a yellow taxi? ii. What is the probability that the taxi involved in the accident is black given that the witness reported seeing a yellow taxi? iii. Explain how Bayes' Rule is applied in this scenario to update the probability of the taxi being yellow based on the witness's report, and discuss the significance of the witness's reliability in influencing the final probabilities.	*CO3*	*PO3*	**10**

			UNIT - V			
	9	a)	Elucidate the ontology-based knowledge representation with pictorial representation.	*CO3*	*PO2*	**10**
		b)	Analyze the primary ontology languages used in the Semantic Web.	*CO3*	*PO2*	**10**
			OR			
	10	a)	Identify the challenges associated with modeling and aggregating social network data.	*CO3*	*PO2*	**5**
		b)	Differentiate Resource descriptor framework and web ontology with suitable example for each.	*CO3*	*PO2*	**9**
		c)	Explain in detail the three important technologies for developing the Semantic Web.	*CO3*	*PO2*	**6**

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