

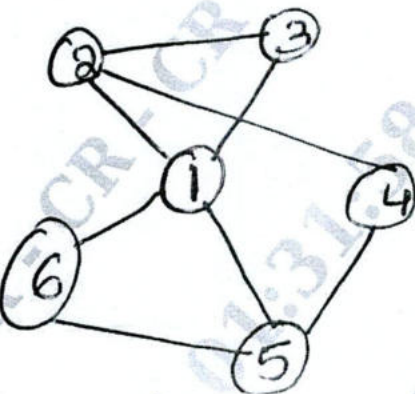


Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Social Network Analysis

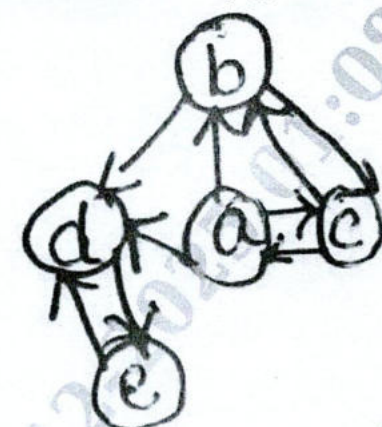
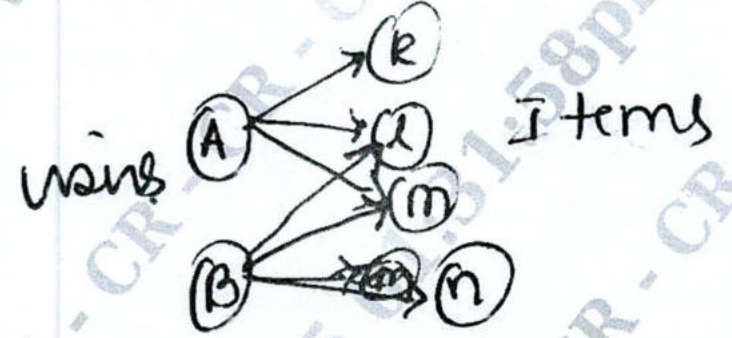
Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

Module – 1				M	L	C
Q.1	a.	What is Social Network Analysis? Discuss on applications of social network analysis.	14	L2	CO1	
	b.	Discuss on three levels of Social Network Analysis.	6	L2	CO1	
OR						
Q.2	a.	Calculate the eigen vector, Katz centrality and page rank scores of all nodes as shown in Fig.Q2(a) keeping $\alpha = 0.1$, $d = 0.85$ and maximum number of iterations 100.	10	L3	CO1	
						
		Fig.Q2(a)				
	b.	Discuss the similarity measures and degeneracy of network.	10	L2	CO1	
Module – 2						
Q.3	a.	Explain the properties of real world networks.	10	L2	CO2	
	b.	Differentiate between Random Network and Real World Network.	4	L2	CO2	
	c.	Discuss on Ring Lattice Network Model.	6	L2	CO2	
OR						
Q.4	a.	Explain any two real-world properties captured by Barabasi –Albert model and state some of assumptions/open ended questions regarding basic Barabasi-Albest Model.	10	L2	CO2	
	b.	Explain local World Network Growth Model.	10	L2	CO2	

Module – 3

Q.5	a.	For the network shown in Fig.Q5(a) determine the first iteration of ranks, assuming damping factor $d = 0.8$, where initial rank of each node is same. $R_0 = [1/5, 1/5, 1/5, 1/5, 1/5]$. Also each node will be randomly insisted. $E = [1/5, 1/5, 1/5, 1/5, 1/5]$. Consider iterative page fault also.	10	L3	CO3	
						
		Fig.Q5(a)				
	b.	Discuss DivRank algorithm is a network.	10	L2	CO3	
OR						
Q.6	a.	Calculate the similarity between 2 user A and B in Heterogeneous Bipartite Network.	10	L2	CO3	
						
		Fig.Q6(a)				
	b.	Given a bibilography network containing the following object type find out the metapaths to determine author similarity valid object types includes {Author (A), Paper (P), Venue(V), Terms T}.	10	L3	CO3	
Module – 4						
Q.7	a.	Discuss on various places where community detection algorithm can be applied.	10	L2	CO4	
	b.	Considering a unique subgraph contrast on problems, reachability of members and degree of a mode.	10	L3	CO4	
OR						
Q.8	a.	Discuss Lovuian method for community detection.	10	L2	CO5	
	b.	How the Bigclam algorithm find a model that fits the network.	10	L3	CO5	

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Module – 5					
Q.9	a.	Discuss link prediction applications and various cases when nodes are added and removed from network.	10	L2	CO5
	b.	Consider applying link prediction model applied to a network the samples are actual and predicted sets : AL_p = Actual positive links – {(a, b), (b, c), (c, d)} AL_n = Actual negative links = {(a, d), (a, c), (b, d)} PL_p = Predicted Positive links = {(a, b), (b, c), (b, d)} PL_n = Predicted negative links = {(a, d), (a, c), (c, d)} Calculate confusion matrix based Score for the link prediction model.	10	L3	CO5
OR					
Q.10	a.	In a face book friendship network, explain various node level and edge – level attributes that can be extracted.	10	L2	CO5
	b.	Consider the Fig.Q10(b) find the probabilities Pr based on maximum –likelihood formula. Given graph and Den diagram.	10	L3	CO5

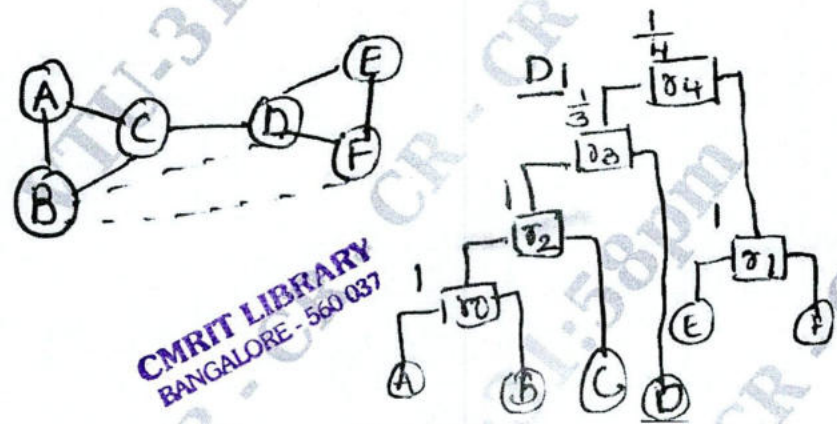


Fig.Q10(b)
