JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATIONS-2022

B.Tech-V111 Semester (CS/IT)

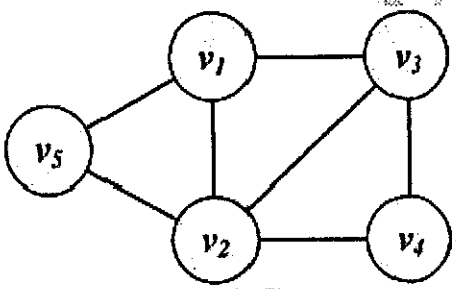
COURSE CODE (CREDITS):18B1WCI732 (3) MAX. MARKS: 35

COURSE NAME: Social and Information Network Analysis

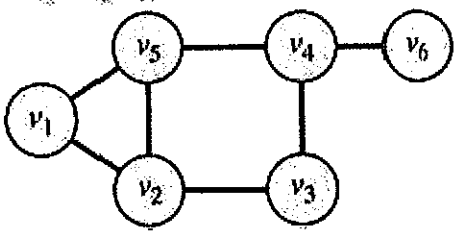
COURSE INSTRUCTORS: Dr.Ruchi Verma MAX. TIME: 2 Hours

Note: *All questions are compulsory. Marks are indicated against each question in square brackets.*

Q1. Using a neighbourhood-based link prediction method compute the top two most likely edges for the following figure: [CO-5, 5 marks]



Q2 . Compute the most likely edge for the following figure for each path based link prediction technique: [CO-4 ,5 marks]



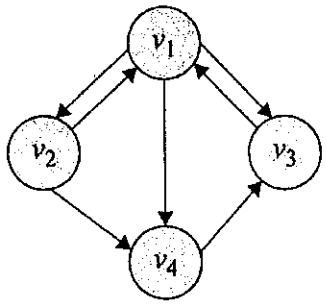
Q3. Consider the "commenting under a blogpost" behavior in social media. Follow the four steps of behaviour analysis to analyze this behaviour. [CO-5 ,5 marks]

Q4. Does the linear threshold model (LTM) converge? Why? [CO -2.5 marks]

Q5.How is preferential attachment applied in analyzing social networks. [CO-3,2.5 marks]

Q6. State an example of a directed connected graph in which eigenvector centrality becomes zero for some nodes. Describe when this happens. [CO-6 ,5 marks]

Q7 . Calculate PageRank values for this graph when [CO-6 ,5 marks]



α =1 ,β=1

α =0.85 , β=1

α=0 , β=1

Discuss the effects of different values of **α** and **β** for this particular problem.

Q8 . Compute the missing rating in this table using user-based collaborative filtering (CF). Use cosine similarity to find the nearest neighbours . (CO-4)

	God	Le Cercle Rouge	Cidade de Deu	Rashomon	La vita e bella	ru
Newton	3	0	3	3	2	
Einstein	5	4	0	2	3	
Gauss	1	2	4	2	0	
Aristotle	3	?	1	0	2	1.5
Euclid	2	2	0	1	5	

Assuming that you have computed similarity values in the following table, calculate Aristotle's rating by completing these four tasks:

	Newton	Einstein	Gauss	Euclid
Aristotle	0.76	?	0.40	0.78

I. Calculate the similarity value between Aristotle and Einstein.(2 marks)

II. Identify Aristotle's two nearest neighbors.(1mark)

III. Calculate $\bar{r}u$ values for everyone (Aristotle's is given).(1 mark)

IV. Calculate Aristotle's rating for Le Cercle Rouge(1mark)