

Name:	
Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2018

Course: Social Analytics	Semester: VII
Programme: B.Tech (CSE with CSF/MI)	Course Code: CSIB480
Time: 03 hrs.	Max. Marks: 100
Instructions:	

SECTION A

S. No.	Question	Marks	CO
Q 1	What is the difference between degree, average degree and degree distribution of a graph? Justify with an example.	4	CO1
Q 2	What is the average geodesic distance? Explain with an example.	4	CO1
Q 3	What do you understand by six degrees of separation?	4	CO2
Q 4	What are the three ways of storing a graph? Demonstrate each of the three ways with a graph having four nodes and six edges.	4	CO3
Q 5	What do you understand by small world phenomenon observed in real world networks?	4	CO1

SECTION B

Q 6	Explain the Watts-Strogatz model with an example.	8	CO4
Q 7	For the closeness centrality, it is being stated that the more central a node, the closer it is to all the other nodes. Comment on it with the sufficient examples.	8	CO2
Q 8	Describe the HITS algorithm.	8	CO3
Q 9	What is a random walk? Explain with sufficient examples. Or Differentiate between closeness and node betweenness centrality with sufficient examples.	8	CO4
Q 10	Why does the loglog plot of a scale free network is a straight line? Give an analytical explanation in support of your reason. List at least five networks which shows a scale-free degree distribution. Or Differentiate between lognormal, fat tailed and stretched exponential distribution.	8	CO1

SECTION-C

Q 11	Describe any four centrality measures of a network. Explain with sufficient examples.	20	CO5
Q 12	What is the difference between preferential attachment and non-preferential attachment model of the graph generation? Support your explanation by giving an example for anyone of these models. Or Describe the Ravasz algorithm of the graph generation with sufficient examples. Briefly explain the deterministic and stochastic versions of the Ravasz algorithm.	20	CO4

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SECTION A

S. No.		Marks	CO
Q 1	What is the key characteristic of a scale free network?	4	CO1
Q 2	What is an Erdos-Renyi graph?	4	CO1
Q 3	What is the difference between a random network and a scale free network?	4	CO2
Q 4	What do you understand by the transitivity phenomenon in a graph?	4	CO3
Q 5	What is the difference between local clustering coefficient and global clustering coefficient of a graph?	4	CO4

SECTION B

Q 6	Differentiate between Eigenvector centrality and Katz centrality.	8	CO4
Q 7	Differentiate between the $G(N,m)$ and $G(n,p)$ models of generating the random networks with sufficient examples.	8	CO1
Q 8	For the closeness centrality, it is being stated that the more central a node, the closer it is to all the other nodes. Comment on it with the sufficient examples.	8	CO2
Q 9	Differentiate between lognormal, fat tailed and stretched exponential distribution. Or Give an analytical derivation for the number of edges in a clique	8	CO4
Q 10	Suppose that there are two sets of nodes such that one of the set has five nodes while the other set has four nodes. Construct a bipartite networks for them and further construct the different type of one mode projections for them. List at least eight real world networks which can be modelled as the bipartite networks. Or Differentiate between closeness and node betweenness centrality with sufficient examples.	8	CO5

SECTION-C

Q 11	Differentiate between SI, SIS, SIR and SIRS model with sufficient examples. Or Explain the Barabasi-Albert model of the graph generation.	20	CO5
Q 12	Explain the Xalvi-Brunet and Sokolov algorithm. What is the primary usage of this algorithm?	20	CO3