Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

VI SEMESTER B.TECH. (INFORMATION TECHNOLOGY/COMPUTER AND COMMUNICATION ENGINEERING) MAKEUP EXAMINATIONS, JUNE 2018

SUBJECT: PROGRAM ELECTIVE III – SOCIAL NETWORK ANALYTICS [ICT 4021]

REVISED CREDIT SYSTEM
(22/06/2018)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer ALL questions.
- Write the detailed steps for all the problems.
- Missing data, if any, may be suitably assumed.

1A. Explain the Erdos-Renyi random network model by highlighting the assumptions, key parameters, steps to construct the model, degree distribution, and the number of edges per node. 5

1B. Explain the three different ways of representing a social network as a graph with an example. 3

1C. Give the matrix g_2 that represents walks of length 2 from a node i to node j for the graph shown in Fig.Q.1C

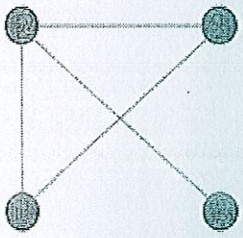

Fig.Q.1C 2

2A. Find the normalized between centrality and normalized closeness centrality for the network given in Fig.Q.2A

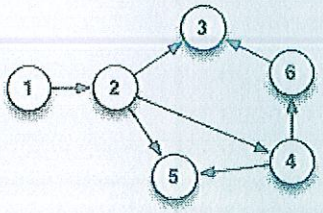

Fig.Q.2A 5

2B. Define the length of a path. Determine the shortest distance from node 'c' to node 'e' and distance from node 'b' to node 'd' by drawing neat diagrams of breadth-first-search for the network given in Fig.Q.2B 3

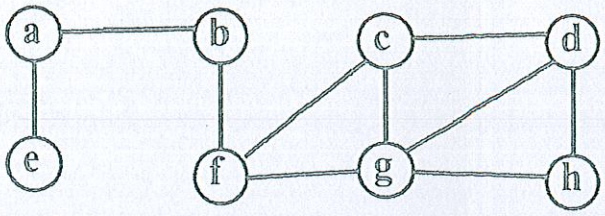

Fig.Q.2B

2C. Find the diameter and average clustering coefficient of the network given in Fig.Q.2B 2

3A. Explain the following:
(i) Threshold contagion
(ii) Triadic closure
(iii)Assumptions of Kleinberg model
(iv)Trawling 5

3B. Explain the Freeman's network centralization with an example. 3

3C. Describe the 2 steps used to develop scale-free network in Barabasi-Albert model. 2

4A. Explain the game theoretical model of diffusion based on two-player coordination game. Describe the simple myopic model that helps a node 'v' in decision making, if the two-player game needs to be expanded for a large network. 5

4B. Explain the "giant component" with an example. How is it different from the connected component? 3

4C. Differentiate between "overlapping" and "nonoverlapping" communities with an example. 2

5A. Explain any one application of SNA. 5

5B. Explain the small-world network model proposed by Watts-Strogatz. 3

5C. Describe the two effects of imitating the behavior of others. 2