I. Attempt the following:
   a) What is Zipf Law?
   b) Why closeness centrality is better than degree centrality?
   c) Define Kendall-Tau rank distance.
   d) Why scientists do epidemics modelling?
   e) What is Social Contagion? (5x2)

UNIT – I

II. Describe the various quantitative measures which can be used to assess the
    importance of a vertex in a network, and explain the basis of their use to measure
    importance. (10)

III. State the HITS algorithm for the computation of hub and authority scores based on
     the adjacency matrix of a directed network. (10)

IV. What is Erdos-Renyi random network? What are its properties and its uses? (10)

UNIT – II

V. What is a random walk? Consider an undirected and unweighted graph, derive the
   relationship between stationary distribution of random walker and degree of the
   nodes. Compute the stationary distribution for the Graph above. (10)

VI. What are SIS and SIR models? Discuss them for homogeneous population mixing
    case? (10)

VII. What do you understand by spreading rumors on social networks? How to model this
     phenomenon? (10)