DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING, UNIVERSITY OF CALCUTTA

CLASS TEST FOR M. SC. SEMESTER-II, 2023

Full Marks: 30 Time: 1 hour

1. Answer any five of the following: 2x5=10

   a) In a distributed system, what is the significance of finding two or more events as concurrent?
   b) Define the global state of a system.
   c) Define name transparency and explain its significance in a distributed system.
   d) Compare syntactic versus semantic distribution transparency.
   e) Explain how the forward and backward intersection of cuts are related to consistent state recording.
   f) Why, in a distributed system, periodic synchronization of clocks in the participating sites is not considered good?

2. Answer each of the following: 4x5=20

   a) How clocks in nodes are synchronized for Lamport's logical clock model in a distributed system?
   b) "It is required to record the state of the channel through which the first marker is delivered to any node as empty for the sake of consistent state record" - do you agree with this comment in the context of the Chandy-Lamport's state recording algorithm? Justify your opinion within 150 words.
   c) Is it possible to follow a Master clock in a Master node as the system's clock for an entire distributed system? Justify your opinion within 150 words.
   b) What would be the impact for finding initiator nodes if the network has more than one node with in-degree zero? Justify your opinion within 150 words.
   e) Identify the node set that can be reached from node A in the figure attached, in a maximum of 2-hops. Also identify the node(s) for the attached figure that can act as possible initiator node(s) for diffusion computation algorithms. Also, for each of the possible initiator nodes(s), identify the order in which the nodes will be traversed till all nodes in the network are reached.