(ii) Explain Recovery mechanism and check-pointing in distributed databases.

(c) What is self-stabilization ? Discuss various types of algorithms and issues in design of these algorithms. Elaborate. (CO4)

5. (a) Define Distributed File System. Explain working and architecture of distributed file system. Also give various features of distributed file system. (CO5)

(b) What is NFS ? Discuss stateless and statement protocols of NFS. Also, give basic architecture and some common messages of NFS protocol. (CO5)

(c) Give a detailed case study on distributed file system by using any example. Explain its design overview containing basic points, constraints and architecture. (CO5)

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H Roll No. .....

TCS–801

B. TECH. (CSE) (EIGHTH SEMESTER)
END SEMESTER
EXAMINATION, May, 2022

DISTRIBUTED SYSTEMS

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each sub-question carries 10 marks.

1. (a) State various types of clocks : Physical clocks and Logical clocks. Explain Lamport and vector logical clocks with the help of an suitable examples. (CO1)

(b) Explain the following terms : (CO1)

(i) Resource Sharing

(ii) Absence of global clock

(c) Answer the following : (CO1)

(i) Causal ordering of messages 3 Marks

(ii) Describe Huang's termination detection algorithm. Give an example to support your answer. 7 Marks

2. (a) Discuss token-based and non-token based algorithms in brief. Explain Meekawa Quorum Based Algorithms. Use proper steps and data structures in support of your answer. (CO2)

(b) Explain the following terms : (CO2)

(i) Performance metric for distributed mutual exclusion algorithms

(ii) Requirements and basic idea of distributed mutual exclusion algorithms

(c) What to do you understand from the term Leader election in a ring ? State LeLann, Chang-Robert's algorithm and its complexity using an example. (CO2)

3. (a) Define Distributed Deadlock Detection. Describe system model and deadlock handling strategies in distributed deadlock detection. (CO3)

(b) Answer the following : (CO3)

(i) Discuss centralized dead lock detection and global wait for graph.

(ii) Explain Path Pushing algorithm with proper steps and example.

(c) What are Agreement Protocols ? Give basic system model. Elaborate Byzantine agreement problem with the help of an suitable example. (CO3)

4. (a) State Distributed Transactions and basic issues in distributed transactions. Explain Distributed Two-phase commit protocol by mentioning proper steps. (CO4)

(b) Answer the following : (CO4)

(i) What are the various types of failures in distributed databases ? Discuss handling of Failures : Site failure, Coordinator failure, Network Partition.