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Paper Id: 2 3 1 3 5 6 Roll No.

B.TECH.

(SEM VII) THEORY EXAMINATION 2022-23

DISTRIBUTED SYSTEMS

Time: 3 Hours ***Total Marks: 100***

Note: Attempt all Sections. If you require any missing data, then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2x10 = 20

(a)	Explain the concept of consistent global state and transitless global state.
(b)	Show the vector clocks are more suitable than Lamport's logical clock for a distributed system.
(c)	Differentiate between resource and communication deadlock.
(d)	List various performance metrics for distributed mutual exclusion algorithm.
(e)	Give some applications of agreement protocols.
(f)	Discuss the benefits of grouping files into volumes in Coda.
(g)	Differentiate between consistent and strongly consistent checkpoints.
(h)	Discuss forward and backward recovery in distributed systems.
(i)	List basic, multi version and conservative timestamp ordering algorithm in increasing order of transaction abort.
(j)	Differentiate between flat and nested transactions.

SECTION B

2. Attempt any *three* of the following: 10x3 = 30

(a)	Discuss the major issue in designing a distributed system.
(b)	Classify the Deadlock detection algorithms. Describe the Path-Pushing deadlock detection algorithm.
(c)	Discuss the architecture of distributed file system.
(d)	Explain dynamic voting protocol. Also compare it with static voting protocol.
(e)	Discuss lock based concurrency control algorithms.

SECTION C

3. Attempt any *one* part of the following: 10x1 = 10

(a)	Discuss the limitations of distributed system. List some problem arises because of these limitations.
(b)	Explain fundamental and architectural model of distributed system.

4. Attempt any *one* part of the following: 10 x1 = 10

(a)	Give the deadlock handling strategies in distributed system. Also differentiate among centralized, distributed and hierarchical deadlock detection strategies in distributed system.
(b)	Discuss the concept of Mutual Exclusion? Describe the requirements of mutual exclusion in distributed system. Is mutual exclusion problem more complex in distributed system than single computer system? Justify your answer.

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5. Attempt any *one* part of the following: 10x1 = 10

(a)	Describe Byzantine agreement problem, and explain its solution. Show that Byzantine agreement cannot always be reached among four processors if two processors are faulty.
(b)	Give the design issues in distributed shared memory. State the algorithm for implementation of distributed shared memory.

6. Attempt any *one* part of the following: 10x1 = 10

(a)	List various issues in a fault tolerant system. Also differentiate between fault and failure.
(b)	Discuss the requirement of inserting checkpoints in message passing in distributed system. Show that when checkpoints are taken after every K messages sent, where K is greater than 1, the recovery system suffers from domino effect. Assume that a process take a checkpoint after sending the K^{th} message but doing nothing else.

7. Attempt any *one* part of the following: 10x1 = 10

(a)	Discuss Atomic commit in distributed transaction with suitable example.
(b)	Explain the followings (i) Transaction with replicated data (ii) Highly available services

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