

Reg No.: _____

Name: _____



APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
B.Tech Degree S8(R, S)(FT/PT/WP) Examinations April 2026 (2019 Scheme)

Course Code: CST402
Course Name: DISTRIBUTED COMPUTING

Max. Marks: 100

Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks.

Marks

- | | | |
|----|--|-----|
| 1 | Describe the benefits of a distributed system | (3) |
| 2 | What is the causal precedence relation in distributed executions? | (3) |
| 3 | List the fundamental properties of scalar time. | (3) |
| 4 | Describe the concept of Termination Detection. | (3) |
| 5 | Describe the challenges in Deadlock Detection. | (3) |
| 6 | What are the requirements of a Mutual Exclusion Algorithm? | (3) |
| 7 | List the benefits of distributed shared memory. | (3) |
| 8 | How does coordinated checkpointing differ from uncoordinated checkpointing | (3) |
| 9 | What are the key requirements of a Distributed File System? | (3) |
| 10 | List the benefits of the Google File System. | (3) |

PART B

Answer any one full question from each module, each carries 14 marks.

Module I

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|----|---|-----|
| 11 | a) Describe the design challenges of a distributed system. | (8) |
| | b) Explain the different primitives used for distributed communication. | (6) |

OR

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| 12 | a) What are the various types of send and receive primitives in distributed communication? | (7) |
| | b) Explain the concept of the global state in distributed systems. | (7) |

Module II

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| 13 | a) Describe how the Spanning Tree-based Termination Detection Algorithm works. | (8) |
| | b) Explain the Chandy-Lamport algorithm in detail. | (6) |

OR

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|----|---|-----|
| 14 | a) Describe the operation of the spanning tree-based termination detection algorithm. | (7) |
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- b) Explain the termination detection method using weight throwing. (7)

Module III

- 15 a) Describe Lamport's algorithm for achieving mutual exclusion. (8)
b) Describe and demonstrate how the Ricart-Agrawala algorithm achieves mutual exclusion. (6)

OR

- 16 a) Explain how quorum-based mutual exclusion algorithms are different from other mutual exclusion algorithms. (7)
b) Describe how the Wait-for Graph is used for deadlock detection. (7)

Module IV

- 17 a) Prove that Lamport's Bakery algorithm for shared memory mutual exclusion meets the three requirements of the critical section problem. (8)
b) Explain the difference between a consistent and inconsistent state with appropriate examples. (6)

OR

- 18 a) Describe Lamport's Bakery algorithm for achieving mutual exclusion in shared memory systems. (7)
b) Discuss the challenges involved in failure recovery. (7)

Module V

- 19 a) Describe the consensus algorithm for handling crash failures in synchronous systems. (8)
b) Explain the architecture of the Andrew File System. (6)

OR

- 20 a) Describe the architecture of the SUN NFS (7)
b) Describe the assumptions underlying Consensus and Agreement algorithms. (7)
