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 **PRESIDENCY UNIVERSITY**

  **Bengaluru**

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| **End - Term Examinations – JANUARY 2025** |
| **Date:** 13 - 01- 2025 **Time:** 09:30 am – 12:30 pm |

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| **School:** SOCSE | **Program:** B. Tech. CSE |
| **Course Code :** CSE2052 | **Course Name :** Distributed Systems |
| **Semester**: V | **Max Marks**: 100 | **Weightage**: 50% |

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| **CO - Levels** | **CO1** | **CO2** | **CO3** | **CO4** | **CO5** |
| **Marks** | **24** | **24** | **26** | **26** | **--** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Do not write anything on the question paper other than roll number.*

**Part A**

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| **Answer ALL the Questions. Each question carries 2marks. 10Q x 2M=20M** |
| **1** | What is a Distributed System? | **2 Marks** | **L1** | **CO1** |
| **2** | List the types of Distributed Systems | **2 Marks** | **L1** | **CO1** |
| **3** | What is Transient & Persistent communication**?** | **2 Marks** | **L1** | **CO2** |
| **4** | Define Authentication & Authorization | **2 Marks** | **L1** | **CO2** |
| **5** | Define Clock Skew & Clock Drift | **2 Marks** | **L1** | **CO3** |
| **6** | What is starvation in Mutual Exclusion? | **2 Marks** | **L1** | **CO3** |
| **7** | Why computer clock synchronization is necessary? | **2 Marks** | **L1** | **CO3** |
| **8** | Define Execution Cost and Inter Task Communication Cost that is used in task assignment approach | **2 Marks** | **L1** | **CO4** |
| **9** | What is Naming and locating facility? | **2 Marks** | **L1** | **CO4** |
| **10** | Write the Taxonomy of Load Balancing Algorithms  | **2 Marks** | **L1** | **CO4** |

**Part B**

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| **Answer the Questions Total 80 Marks.** |
| **11.** | **a.** | Demonstrate Why is scalability an important feature in the design of a distributed system? Discuss some of the guiding principles for designing a scalable distributed system.  | **10 Marks** | **L3** | **CO1** |
| **b.** | Determine different types of transparencies required in distributed systems? | **10 Marks** | **L3** |
| **or** |
| **12.** | **a.** | List Distributed system Models. Construct Processor Pool Distributed System Model  | **10 Marks** | **L3** | **CO1** |
| **b.** | Illustrate Loosely Coupled and tightly coupled Multiprocessor Systems , Compare Centralized Systems vs Distributed Systems  | **10 Marks** | **L3** |
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| **13.** | **a.** | How does the Remote Procedure Call (RPC) mechanism enable communication between distributed systems, and what are the main challenges associated with handling issues such as network latency, partial failures, and fault tolerance during RPC execution?  | **10 Marks** | **L2** | **CO2** |
| **b.** | Describe the Desirable Features of a good message passing system | **10 Marks** | **L2** |
| **or** |
| **14.** | **a.** | Explain Failure Semantics in Detail | **10 Marks** | **L2** | **CO2** |
| **b.** | How does Distributed Shared Memory (DSM) provide an abstraction for memory management in a distributed system, and what are the key challenges associated with maintaining consistency and synchronization of shared data across multiple nodes?  | **10 Marks** | **L2** |

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| **15.** | **a.** | How does Cristian's Algorithm work to synchronize clocks in a distributed system, and what are the potential sources of error or inaccuracy when using this algorithm, especially in systems with significant network latency?  | **10 Marks** | **L3** | **CO3** |
| **b.** | How does Berkeley's Algorithm ensure clock synchronization in a distributed system, and what are the potential drawbacks of using this algorithm in a system with unreliable or highly variable network conditions? | **10 Marks** | **L3** |  |
| **Or** |
| **16.** | **a.** | Interpret Ring based election algorithm with an example in detail. | **10 Marks** | **L3** | **CO3** |
| **b.** | What are the primary conditions for a deadlock to occur in a distributed system, and what strategies can be employed to detect, prevent, or recover from deadlocks in such a system? | **10 Marks** | **L3** |

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| **17.** | **a.** | Describe how task assignment can be implemented to ensure load balancing in a distributed system with an example  | **10 Marks** | **L2** | **CO4** |
| **b.** | What are the issues in designing load balancing algorithms? Clearly illustrate the policies for load estimation  | **10 Marks** | **L2** |
| **Or** |
| **18.** | **a.** |  Explain the different states a process can be in, the process control block (PCB), and how the operating system manages processes during multitasking. Discuss the role of process management in an operating system  | **10 Marks** | **L2** | **CO4** |
| **b.** | Define Name space, Describe the desirable features of a good naming system for a distributed system. | **10 Marks** | **L2** |

**\*\*\*\*\* BEST WISHES \*\*\*\*\***