Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–V EXAMINATION – WINTER 2025

Subject Code:3154502 Date:27-11-2025

Subject Name:Distributed Systems and Fundamentals of Block Chain Technology

Time:10:30 AM TO 01:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	What is a Distributed System? And Its key characteristics	**03**
	(b)	Discuss the different types of distributed systems and their key characteristics.	**04**
	(c)	Explain the role of networking in distributed systems. Why is network communication crucial in distributed systems?	**07**
Q.2	**(a)**	What are the types of system architectures used in distributed systems? Give examples.	**03**
	(b)	Explain self-management in distributed systems and how it enhances system resilience.	**04**
	(c)	Described the Remote Procedure Calls (RPC)? How do they differ from message-oriented communication? Explain the different types of communication in distributed systems.	**07**
		OR	
	(c)	Discuss stream-oriented communication and its use cases in distributed system explain in detail.	**07**
Q.3	**(a)**	What is clock synchronization in distributed systems, and why is it important?	**03**
	(b)	Define the logical clocks and their role in event ordering in distributed systems.	**04**
	(c)	Demonstrate How do election algorithms work in distributed systems? Provide an example.	**07**
		OR	
Q.3	**(a)**	Define the structured naming? How does it improve efficiency in large-scale systems?	**03**
	(b)	What is the difference between names, identifiers, and addresses in distributed systems?	**04**
	(c)	Explain attribute-based naming and give examples of where it is applied in details	**07**
Q.4	**(a)**	What are the main security threats in distributed systems?	**03**
	(b)	Discuss the different security policies and mechanisms used in distributed systems.	**04**
	(c)	Illustrate the basics of cryptography and its application in distributed systems in details.	**07**
		OR	

Q.4	**(a)**	What is authorization management, and how does it differ from authentication?	**03**
	(b)	Explain the role of firewalls in securing distributed systems.	**04**
	(c)	Demonstrate the significance of secure group management in distributed systems with details.	**07**
Q.5	**(a)**	What is blockchain technology? Its origin and key concepts.	**03**
	(b)	Described the concept of decentralization and distribution in blockchain.	**04**
	(c)	Explain the consensus protocol and key characteristics of a consortium blockchain. Its objectives in block chain networks.	**07**

OR

Q.5	**(a)**	What is a consensus mechanism in Blockchain?	**03**
	(b)	Explain the different types of smart contracts and how they are used in Blockchain.	**04**
	(c)	Explain the Proof of Stake (PoS) and Proof of Work (PoW) as a consensus mechanism and its pros and cons.	**07**

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