

Enrolment No/Seat No.: \_\_\_\_\_

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**MCA INTEGRATED-SEMESTER-VII • EXAMINATION-WINTER 2024**

**Subject Code:2678605**

**Date:26/11/2024**

**Subject Name: 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. **Use of simple calculators and non-programmable scientific calculators are permitted.**

- Q.1** (a) What is blockchain technology, and what are its fundamental concepts? **07**  
(b) What are distributed ledger technologies (DLT), and how do they relate to blockchain? **07**
- Q.2** (a) What is the architecture of a blockchain system? **07**  
(b) What is cryptography, and why is it important in blockchain technology? **07**
- OR**
- (b) What are hash functions, and how are they used in blockchain technology? **07**
- Q.3** (a) Difference between symmetric and asymmetric cryptography ? **07**  
(b) Explain the Ethereum Virtual Machine and its role in Ethereum. **07**
- OR**
- Q.3** (a) What is the role of smart contracts in proving the origin of products (proofs of origin)? **07**  
(b) Describe the process of bitcoin transactions.. **07**
- Q.4** (a) Explain the concept of Merkle trees in the context of bitcoin. **07**  
(b) How does blockchain integrate with artificial intelligence technologies? **07**
- OR**
- Q.4** (a) How is blockchain utilized in the insurance industry? **07**  
(b) Discuss the concept of smart assets and their implementation using blockchain technology. **07**
- Q.5** (a) What is a Message Authentication Code (MAC), and how does it differ from hash functions? **07**  
(b) Discuss the differences between synchronous and asynchronous Byzantine agreement methods. **07**
- OR**
- Q.5** (a) Explain the Proof of Stake (PoS) consensus algorithm and how it differs from PoW. **07**  
(b) Discuss the challenges and vulnerabilities associated with hash functions in cyber security. **07**

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