



# MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

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## UNIVERSITY EXAMINATIONS 2023/2024

THIRD YEAR, SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR  
OF INFORMATION TECHNOLOGY

### CIT 3357: BLOCK CHAIN TECHNOLOGY

DATE: APRIL 2024

TIME: 2 HOURS

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**INSTRUCTIONS: Answer Question ONE and any other TWO questions.**

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#### QUESTION ONE (30 MARKS)

- a) Define the following terms in relation to blockchain technology (5 Marks)
  - i. Distributed Ledger
  - ii. Blockchain
  - iii. Bitcoin
  - iv. Smart Contract
  - v. Cryptographic hash function
- b) State any five elements of blockchain (5 Marks)
- c) Discuss the evolution of blockchain technology highlighting significant milestones (5 Marks)
- d) Explain the importance of smart contracts in blockchain ecosystems. (4 Marks)
- e) Describe any three types of distributed ledger systems (6 Marks)
- f) Discuss the structure of blocks and the blockchain, focusing on security transactions and architecture. (5 Marks)



MUST is ISO 9001:2015 and



ISO/IEC 27001:2013 CERTIFIED

## QUESTION TWO (20 MARKS)

- a) To maintain a secure and consistent ledger, blockchain apply various consensus mechanisms and consensus algorithms. State and explain three such consensus mechanism (6 Marks)
- b) Discuss three types of Blockchains (6 Marks)
- c) Describe four factors to consider when choosing the right distributed ledger for a use case application of your choice. (4 Marks)
- d) Distributed Ledgers systems made up of a number of nodes. Each node propagates transactions and ledger updates to all other nodes and fulfils one or more roles. State and briefly explain these two roles (4 Marks)

## QUESTION THREE (20 MARKS)

- a) Discuss any three challenges associated with bitcoin mining (6 Marks)
- b) Describe the potential role of blockchain technology in combating counterfeit goods. (5 Marks)
- c) Explain the concept of tokenization in blockchain ecosystems. (4 Marks)
- d) List five key strengths of distributed ledger technologies as compared to tradition ledgers (5 Marks)

## QUESTION FOUR (20 MARKS)

- a) Discuss the potential applications of blockchain technology in supply chain management (5 Marks)
- b) Explain the concept of scalability in blockchain technology (5 Marks)
- c) Describe the importance of blockchain cryptography in securing transactions (5 Marks)
- d) Explain the significance of blockchain hashes in blockchain applications (5 Marks)

## QUESTION FIVE (20 MARKS)

- a) Describe the concept of interoperability in blockchain networks (4 Marks)
- b) Discuss the concept of Merkle tree citing its benefits in Blockchain. (5 Marks)
- c) Explain the regulatory and legal challenges facing blockchain technology (6 Marks)
- d) Discuss the potential applications of blockchain technology in the healthcare industry (5 Marks)

