



MANICALAND STATE UNIVERSITY OF APPLIED SCIENCES

FACULTY OF ENGINEERING, APPLIED SCIENCES AND TECHNOLOGY

DEPARTMENT: COMPUTER SCIENCE AND INFORMATION SYSTEMS

MODULE: BLOCKCHAIN TECHNOLOGIES

CODE: INSY416

SESSIONAL EXAMINATIONS

OCTOBER-2023

DURATION: 3 HOURS

EXAMINER: MR L. RUVINGA

INSTRUCTIONS

- 1. Answer ALL questions in Section A*
- 2. Answer Any **three (3)** questions in Section B*
- 3. Start a new question on a fresh page*
- 4. Total marks 100*

Additional material(s): None

SECTION A:

Question 1

- a. Define the following terms:
 - i. Blockchain [2 Marks]
 - ii. Smart Contract [2 Marks]
 - iii. Decentralised Autonomous Organisation (DAO) [2 Marks]
 - iv. Decentralised Apps (Dapps) [2 Marks]
 - v. Distributed Peer to Peer System [2 Marks]
- b. Distinguish between Fungible and Non-Fungible Tokens [10 Marks]
- c. Chishiri community has for years been enduring the pain of walking long distances to fetch water for their day-to-day use. A Water Project was proposed to drill boreholes and set up a reservoir. Various initiatives to raise funds have been proposed in the past without success. Trust has been eroded and community members are now reluctant to participate in the Water Project.
As a consultant develop a write up justifying how Blockchain technologies could be used to make the project a success. [20 Marks]

SECTION B:

Question 2

- a. Explain the role of Ethereum Virtual machine on the Ethereum network [4 Marks]
- b. Distinguish between Ethereum and Bitcoin [4 Marks]
- c. Compare and contrast Proof of Work (PoW) and Proof of Stake (PoS) [6 Marks]
- d. Giving practical examples explain how smart contracts could be used in conducting business transactions [6 Marks]

Question 3

- a. Distinguish between a permissionless and permissioned Blockchain. Give practical examples in your answer. [8 Marks]
- b. State and explain the benefits of Distributed Ledger Technology [12 Marks]

Question 4

- a. Bitcoin has gained widespread use over the past decade. Explain why Bitcoin is considered TRUSTLESS [5 Marks]
- b. With aid of diagrams illustrate the differences between Centralised and Distributed systems. Your answer should include practical examples of each. [15 Marks]

Question 5

With clearly labeled diagrams Illustrate the process of a Bitcoin transaction [20 Marks]

Question 6

- a. Illustrate the Merkle Tree and discuss its importance in Blockchain [10 Marks]
- b. Describe how Blockchain is useful in e-commerce [10 Marks]

END OF EXAMINATION