CHUKA   **UNIVERSITY**

UNIVERSITY EXAMINATIONS

SECOND YEAR EXAMINATION FOR THE AWARD OF DIPLOMA IN COMPUTER SCIENCE

COSC 0274: EMERGING TECHNOLOGIES IN COMPUTER SCIENCE

STREAMS: DIP. COMPSCI Y2S2   **TIME: 2 HOURS**

DAY/DATE:

INSTRUCTIONS:

- Answer question **ONE** and **TWO** other questions
- Do not write anything on the question paper
- This is a **closed book exam**, No reference materials are allowed in the examination room
- There will be **NO** use of mobile phones or any other unauthorized materials
- Write your answers legibly and use your time wisely.
- Marks are awarded for clear and concise answers.

QUESTION ONE (30 Marks)

a. You are working for a cloud computing service provider and have been sent to explain to a client why they should adopt cloud computing. Discuss THREE main areas in which the client will experience the gains of cloud computing technology.   (6 Marks)

b. Briefly explain the structure and components of blockchains   (6 Marks)

c. Explain each of the following types of clouds:
    i. Public Cloud   (2 Marks)
    ii. Private Cloud   (2 Marks)
    iii. Hybrid Cloud   (2 Marks)

d. Blockchain is the underlying foundation for the Bitcoin cryptocurrency. State and explain THREE advantages of Bitcoin over current transaction systems   (6 Marks)

e. Blockchain has the potential for revolutionizing business networks, briefly discuss each of the following key concepts of a blockchain.   (6 Marks)
    i. Shared Ledger
    ii. Smart Contract

      iii.   Consensus

SECTION B (Answer any TWO questions)

QUESTION TWO (20 Marks)

    a. While providing examples in each, state and explain THREE cloud computing models.   (6 Marks)

    b. Discuss each of the following major cloud computing challenges   (8 Marks)
- i.   Data Protection
- ii.   Data Recovery and Availability
- iii.   Management Capabilities
- iv.   Regulatory and Compliance Restrictions

    b. List any THREE cloud computing providers today together with the service or product they provide.   (6 Marks)

QUESTION THREE (20 Marks)

    a. Giving examples, state and explain THREE types of blockchains (9 Marks)

    b. Blockchains are now recognized as the "fifth evolution" of computing, the missing trust layer for the Internet. Discuss the validity of this conclusion.   (5 Marks)

    c. Discuss each of the following as relates to the Blockchain Lifecycle:
- i. Bitcoin   (2 Marks)
- ii. Ethereum   (2 Marks)
- iii. Factom   (2 Marks)

QUESTION FOUR (20 Marks)

    a. Discuss the framework of four common communication models used by IoT devices.   (8 Marks)

    b. Describe the various technology and trends that have enabled Internet of Things.   (10 Marks)

    c. List two applications of IoT in the world today.   (2 Marks)

QUESTION FIVE (20 Marks)

    a. Briefly explain each of the following types of cyberattacks and the countermeasures to detect and prevent them:

        i. Phishing   (1 Mark)

        ii. Sniffing   (2 Marks)

        iii. Denial-of-service Attack   (2 Marks)

        iv. Zero-day Exploit   (2 Marks)

    b. Cryptography plays a very important role in securing data. State and briefly explain FOUR main goals of cryptography   (8 Marks)

    c. List any FIVE certifications a computer science student can pursue towards becoming a professional in cybersecurity   (5 Marks)