

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DIPLOMA IN COMPUTER SCIENCE

COSC 0262: DISTRIBUTED SYSTEMS

STREAMS:

TIME: 2 HOURS

DAY/DATE: THURSDAY 13/04/2023

11.30 A.M. –1.30 P.M.

Instructions

- Answer question one and any other two from section B
- Do not write on this paper

SECTION A {compulsory}

Question One (30 Marks)

- Explain any **THREE** security threats in distributed systems (3 marks)
- As a network architect, explain any **FOUR** factors to consider when choosing a computer topology. (4 marks).
- Differentiate between administrative and geographical scalability (4 marks)
- Explain any **TWO** advantages of client-server architecture. (4 marks)
- What is a computer Network? With the use of relevant examples, discuss **TWO** types of computer topologies (5 marks).
- Explain any **THREE** importance of concurrency in distributed systems. (6 marks)
- An important goal of a distributed system is to make it easy for users (and applications) to access and share remote resources. Explain any **TWO** disadvantages of sharing resources. (4 marks)

SECTION B: ANSWER ANY TWO QUESTIONS FROM THIS SECTION

Question Two (20Marks)

- a. An event-driven architecture uses events to trigger and communicate between decoupled services. Explain any **THREE** benefits of the architecture. [6 marks]
- b. What is data replication? Explain any **TWO** disadvantages of file replication (6 marks)
- c. You have been assigned the task of implementing a distributed system in an NGO that has branches in major towns in Kenya. Discuss at least **FOUR** issues you would consider in your design layout. (8 marks).

Question Three (20 Marks)

- a. Explain any **FOUR** roles of middleware in distributed systems. (8 marks)
- b. Explain any **THREE** causes of network reliability issues. (6 marks)
- c. Discuss any **THREE** types of distribution transparencies in distributed systems. (6 marks)

Question Four (20 Marks)

- a. Discuss the significance of TCP/IP and its implementation in data networks. [8 marks]
- b. Discuss any **FOUR** security threats in distributed systems. (8 marks)
- c. What is the difference between a process and a thread? (4 marks)

Question Five (20 Marks)

- a. Multithreading models refer to types of relationships that can exist between the User and Kernel threads. Using illustrations, explain the **THREE** ways in which the relationship can be established. (6 marks)
- b. Briefly discuss how cryptographic techniques are used to provide security in distributed systems. (6 marks)
- c. Explain any **THREE** advantages and **THREE** disadvantages of distributed systems over centralized systems (6 marks)
- d. Highlight any **TWO** protocols used in Application layer. (2 marks)