

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

FOURTH YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN COMPUTER SCIENCE

COSC 465: DISTRIBUTED SYSTEMS

STREAMS: BSC (COM SC) Y4S2

TIME: 2 HOURS

DAY/DATE: WEDNESDAY 19/4/2023

11.30 A.M. – 1.30 P.M.

INSTRUCTIONS:

- Answer question **ONE in section A** and any other **TWO** questions from section B
- This is a **closed book exam**, Reference materials are prohibited.

SECTION A: COMPULSORY

Question 1 [30 Marks]

- a) Distribution Transparency is one of the goals of most Distributed Systems. Discuss the several types of Transparencies that can exist in such a system. [8 marks]
- b) Mobile and Ubiquitous computing is a new phenomenon in Distributed Computing. Discuss [4 marks]
- c) One of the goals of any Distributed System is Openness. Discuss and explain its need. [4 marks]
- d) In order to mask failure in Distributed System, there is need for them to be detected as Well. Discuss. [4 marks]
- e) Threads usage in Distributed Systems presents several benefits. Describe any two. [4 marks]
- f) In Distributed Systems, virtualizations can take place in many different ways. Explain. [4 marks]

- g) Time synchronization algorithms such as NTP, the time server is passive. Explain a problem that can arise in using a passive time server as opposed to other Clock Synchronization algorithms [2 marks]

SECTION B: ANSWER ANY TWO QUESTIONS FROM THIS SECTION

Question 2 [20 marks]

- a) With use of appropriate examples and sketches, Discuss Mutual Exclusion and how it is achieved in Distributed System. [10 marks]
- b) Discuss any five(5) Characteristics of a distributed System [10 marks]

Question 3 [20 marks]

- a) What is a physical clock, Explain the various clock synchronization algorithms in a distributed system [10 marks]
- b) Being Fault Tolerance means that the system is also dependable. Discuss the properties of a dependable system. [10 marks]

Question 4[20 marks]

- a) A system that fails is not adequately providing the service it was designed for. Discuss the various types of failures that can occur in a Distributed system [10 marks]
- b) Discuss Scalability, types and importance. [10 marks]

Question 5 [20 marks]

- a) Discuss heterogeneity and how its masking is achieved in a Distributed System. [4marks]
- b) Discuss the various types of Transparencies in Distributed System [8 marks]
- c) Define and Discuss, the ACID properties of a transaction Processing System [8marks]
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