



COLLEGE OF ENGINEERING AND APPLIED SCIENCES(CEAS)

NCSC 305 PARALLEL AND DISTRIBUTED COMPUTING

END OF SECOND SEMESTER EXAMINATION

APRIL 2025

LECTURER: MR J. CHINZVENDE

TIME: 3 HOURS

INSTRUCTIONS

Answer questions instructed in each section

Start **each** question on a new page.

The marks allocated to **each** question are shown at the end of the section.

Answer all questions in Section A and Chose any Two in section B

Credit will be awarded for logical, systematic and neat presentations.

Section

Answer **all** questions from this section

Question One

Define the following terms as they are used in Parallel and Distributed Computing

- a. Load Balancing:
- b. Fault Tolerance
- c. Parallel Computing
- d. Distributed Computing
- e. Message Passing Interface [10]

Question Two

What is the difference between the following terms Parallel and Distributed Computing?

- a. Deadlock and Fault tolerance
- b. Data Synchronisation and Process Synchronisation
- c. Software as a service (**SAAS**) and Platform as a service (**PAAS**)
- d. Network Time Protocol (NTP) and Precision Time Protocol (PTP)
- e. Message Passing Interface (MPI) and Parallel Virtual Machine (PVM) [10]

Question Three

Examine the impact of cloud computing on parallel and distributed computing. How has cloud technology changed the way resources are managed and utilized in these systems? [10]

Question Four

Analyze the importance of fault tolerance in distributed systems. Discuss common techniques for achieving fault tolerance and their effectiveness in real-world applications. [10]

SECTION B

Answer any **two (2)** questions from this Section

Question Five

Africa University is exploring applications of **parallel computing** in various fields.

- a. Identify at least two fields where parallel computing can have a significant impact and explain why.
 - b. What emerging trends in parallel computing should the company consider for future projects?
 - c. How might advancements in hardware (e.g., GPUs, TPUs) influence parallel computing strategies?
- [25]

Question Six

Africa University is developing a critical application for processing financial transactions and needs to ensure **high fault tolerance**.

- a. What are the key principles of fault tolerance that should be considered in this application?
 - b. Discuss how redundancy can be implemented to enhance fault tolerance.
 - c. What monitoring techniques can be employed to identify faults in real-time?
- [25]

Question Seven

You are designing a **distributed computing** system for processing large datasets. Each node in the system has different processing capabilities.

- a. Describe a load balancing strategy you would implement to ensure that all nodes complete their tasks efficiently.
 - b. What challenges might you face in this scenario
 - c. How would you address the challenges?
- [25]

End of Paper