AFRICA UNIVERSITY
A United Methodist-Related Institution

"Investing in Africa's Future"

COLLEGE OF ENGINEERING AND APPLIED SCIENCES(CEAS)

NCSC 305: PARALLEL AND DISTRIBUTED COMPUTING

END OF FIRST SEMESTER EXAMINATIONS

NOVEMBER 2023

LECTURER: Dr C. KURANGA

DURATION: 3 HOURS

INSTRUCTIONS

Answer any **FOUR** questions.

Total possible mark is **100.**

Start **each** question on a new page on your answer sheet.

Question One

a) Discuss the four areas used to improve system performance and how each of these areas had hit a wall that impedes further growth. [9]

b) Compare and contrast grid computing and cloud computing. [16]

Question Two

a) Justify the need for parallel computing. [10]

b) Explore five Multicore Navigator notification methods. [10]

c) Describe how multiple processor cores on a single chip allow designers to meet performance goals without using the maximum operating frequency. [5]

Question Three

Explain the following parallel programming models:

a) Shared Memory (without threads); [6]

b) Distributed Memory; [6]

c) Data Parallel; and [6]

d) Hybrid. [7]

Question Four

a) Write a Fibonacci program using OpenMP tasks. [13]

b) Discuss different ways to classify parallel computers using Flynn's taxonomy. [12]

Question Five

a) Differential a Distributed System from a Parallel System. [10]

b) Discuss a four-step process that can be used to guide the design of the mapping and scheduling of the tasks across a multicore system. [9]

c) Explore three goals for heterogeneous multicore processors. [6]

Question Six

a) Discuss the five areas that present challenges in programming for multicore systems. [10]

a) Describe the following concepts:

(i) Amdahl's law; [6]

(ii) Computational Granularity; and [4]

(iii) Virtualization. [5]

END OF EXAMINATION