



Kasarani Campus
Off Thika Road
Tel. 2042692 / 3
P. O. Box 49274, 00100
NAIROBI
Westlands Campus
Pamstech House
Woodvale Grove
Tel. 4442212
Fax: 4444175

KIRIRI WOMEN'S UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2023/2024 ACADEMIC YEAR
FOURTH YEAR, SECOND SEMESTER EXAMINATION
FOR THE BACHELOR OF SCIENCE IN COMPUTER SCIENCE
KCS 413 – PARALLEL SYSTEMS

Date: 11TH AUGUST 2023
Time: 11:30AM – 1:30PM

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

- a) Distinguish between the following:
- i) Parallel computing and concurrent computing. (4 Marks)
 - ii) Process and thread. (4 Marks)
 - iii) Distributed Memory and shared memory. (4 Marks)
- b) With the aid of a well labelled diagram discuss the lifecycle of a thread. (6 Marks)
- c) Explain the concept of temporal parallelism in parallel computing. (6 Marks)
- d) Discuss three parameters used in the evaluation of parallel computer systems. (6 Marks)

QUESTION TWO (20 MARKS)

- a) Explain the concept of pipeline processing. (4 Marks)
- b) Programs are executed on computers to provide various functionality to the users. Briefly describe the stages involved in the creation of a process with an analogy of the word processing functionality. (8 Marks)
- c) Discuss the four levels of parallel processing. (8 Marks)

QUESTION THREE (20 MARKS)

- a) Discuss superscalar processors and mention their relevance in computing. (4 Marks)
- b) Distinguish between tightly coupled and loosely coupled systems. (4 Marks)
- c) Discuss the application of parallel computing in the field of healthcare citing a relevant example applied in the local context of the East African Region. (6 Marks)
- d) Discuss any three issues which should be considered when designing an interconnection network. (6 Marks)

QUESTION FOUR (20 MARKS)

- a) Discuss the following concepts:
- i) Granularity. (4 Marks)
 - ii) Memory access models. (4 Marks)

- iii) Pipeline processing. (4 Marks)
- b) Describe the variables which Bernstein's conditions rely on for detecting parallelism. (4 Marks)
- c) With the aid of relevant diagrams, describe two interconnection networks implemented for distributed systems. (4 Marks)

QUESTION FIVE (20 MARKS)

- a) Applications receive input from the users who operate them during execution with an intention of receiving particular services. Briefly explain the instruction cycle and data streams involved during such an operation. (6 Marks)
- b) Discuss the Occam Concurrency Model using a diagram in parallel system (6 Marks)
- c) With the aid of diagrams, demonstrate message queue and shared memory methods of Interposes communication. (6 Marks)