



MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY
P.O. Box 972-60200 – Meru-Kenya
Tel: +254(0) 799 529 958, +254(0) 799 529 959, + 254 (0) 712 524 293,
Website: info@must.ac.ke Email: info@must.ac.ke

University Examinations 2023/2024

**THIRD YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR
OF MATHEMATICS AND COMPUTER AND BACHELOR OF SCIENCE IN
MATHEMATICS**

CCS 3301: SYSTEM PROGRAMMING

DATE: APRIL 2024

TIME: 2 HOURS

INSTRUCTIONS: *Answer question **one** and any other **two** questions*

QUESTION ONE (30 MARKS)

(a) Describe the following terms as used in systems programming

- i. Application programming interface
- ii. File API
- iii. Thread

[6 marks]

(b) Explain the following terms from inter process communication

- i. Semaphore
- ii. System call
- iii. Datagram



MUST is ISO 9001:2015 and



ISO/IEC 27001:2013 CERTIFIED

- iv. socket stream [12 marks]
- (c) Give function prototype to perform the following tasks, discuss each parameter used in each case.
- i. Create a message
 - ii. Delete a shared memory . [6 marks]
- (d) Describe how client processes communicate with server process using file RPC mechanism. Outline specific functions on client and on server side. [6 marks]

QUESTION TWO (20 MARKS)

- a) Explain why file system is important in programming [3 marks]
- (b) Explain any three framework such as Java virtual machine (JVM) and Microsoft. Let framework Common Language Run time (CLR) [8 marks]
- (c) Write a server program that creates a socket, bind and listen to incoming connection request, explain parameters used in each call [9 marks]

QUESTION THREE (20 MARKS)

- (a) Discuss any three Input/Output buffering techniques. [6 marks]
- (b) Briefly explain how shared memories are used in process communication. [6 marks]
- (c) Briefly describe sequence of step required to establish communication between two process using Socket communication mechanisms. [8 marks]

QUESTION FOUR (20 MARKS)

- (a) Differentiate between the following [6 marks]



MUST is ISO 9001:2015 and



ISO/IEC 27001:2013 CERTIFIED

- i. Partitioning and replication
 - ii. File structure and file system
 - iii. Signal and semaphores
- (b) Briefly explain how processes accessing same resources are coordinated using semaphores. [8 marks]
- (c) "Understanding file structure is important to systems programmer"; justify such sentiment. [6 marks]

QUESTION FIVE (20 MARKS)

- (a) State and explain parameters required when calling Socket() function. [6 marks]
- (b) Differentiate between double buffered IO and circular buffered IO. [6 marks]
- (c) Differentiate processes on connection-oriented separate hosts while and using connectionless sockets mechanisms. communication Describe between the circumstances under which connection-oriented or connectionless communication would be appropriate [8 marks]

