



(The University of Choice)

**MASINDE MULIRO UNIVERSITY OF  
SCIENCE AND TECHNOLOGY  
(MMUST)**

**UNIVERSITY EXAMINATIONS**

**MAIN CAMPUS**

**2023/2024 ACADEMIC YEAR**

**SECOND YEAR FIRST SEMESTER EXAMINATIONS**

**FOR THE DEGREE  
OF  
BACHELOR OF COMPUTER SCIENCE**

**COURSE CODE:** BCS 212/BIT 217

**COURSE TITLE:** Computer Organization and Architecture

**DATE:** 07/12/2023

**TIME:** 8:00 – 10:00 AM

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**INSTRUCTIONS TO CANDIDATES**

Answer questions ONE and any other TWO questions.

**TIME:** 2 Hours

**MMUST observes ZERO tolerance to examination cheating**

This Paper Consists of 2 Printed Pages. Please Turn Over. ►

### QUESTION ONE (30 MARKS)

- a) Using an illustration, describe the structure of CPU and explain the function of its components (8 Marks)
- b) Explain computer architecture in terms of the following viewpoint: structure, organization, implementation and performance. (6 Marks)
- c) State Four features of bus interconnection structure (4 Marks)
- d) Describe the locality principles and how they are exploited in computer design (6 Marks)
- e) Explain any four parameters used to characterize memory hierarchy (4 Marks)
- f) State two benefits of RAID systems (2 Marks)

### QUESTION TWO (20 MARKS)

- a) Instruction is of variable length depending upon the number of addresses it contains. Given the following expression:  $Z=(c+d)*(a+b)$ , generate a one, two and three address instruction (8 Marks)
- b) Explain three types of registers (4 Marks)
- c) Distinguish between CISC and RISC microprocessor architecture (8 Marks)

### QUESTION THREE (20 MARKS)

- a) With suitable example, explain types of addressing modes in MIPS (10 Marks)
- d) The Describe different instruction types. (4 Marks)
- e) Explain interleaving and bust access mode as memory performance enhancements technique (6 marks)

### QUESTION FOUR (20 MARKS)

- a) The most universal acceptable method of classifying processes is Flynn taxonomy. Discuss four categories based on classification (10 Marks)
- b) State the advantages of using assembly language (4 marks)
- c) Write an assembly program to perform the multiplication operation:  $Z, X, Y$ , where  $X, Y$ , and  $Z$  are memory locations. (6 marks)

### QUESTION FIVE (20 MARKS)

- a) Distinguish between analogue system and digital system (4 marks)
- b) Distinguish between sequential and combinational logics (4 marks)
- c) Implement an AND using only a NAND gate (4 marks)
- d) Given the Boolean algebra equation  $X=A+BC^1$ 
  - i. Draw a logic diagram (4 marks)
  - ii. Generate Truth table (4 marks)