(The University of Choice)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

UNIVERSITY EXAMINATIONS

MAIN CAMPUS

2022/2023 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: 13/12/2022   **TIME: 08:00-10:00AM**

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) Explain the functional units of a computer   (6 Marks)
b) Briefly explain the concept of cache memory   (3 Marks)
c) Compare RISC and CISC   (4 Marks)
d) Explain the significance of interrupts during the execution of a program   (4 Marks)
e) Bus plays essential role in connecting peripherals to microprocessor,   briefly, describe the
   structure of a bus.   (6 Marks)
f) Evaluate (1111) with (0111) using additional algorithm   (4 Marks)
g) List two advantages and disadvantages of micro programed control   (3 Marks)

QUESTION TWO (20 MARKS)

a) Explain Two types of registers   (4 Marks)
b) With suitable example, explain any 3 types of addressing modes in MIPS   (9 Marks)
c) What are the two locality principles observed with respect to user programs? How are these principles
   exploited in computer design?   (7 Marks)

QUESTION THREE (20 MARKS)

a) Explain instruction format   (4 Marks)
b) Instruction is of variable length depending upon the number of addresses it contains. Given

   the following expression: $X = (A+B)*(C+D)$, generate a **Three** address and **One** address

   instruction   (8 Marks)

c) Write control sequencing for the executing the instruction. Add R4,R5,R6.   (4 Marks)

d) What are the main differences between a multi-processor system and a multi-computer

   system?   (4 Marks)

QUESTION FOUR (20 MARKS)

a) Discuss in detail the concept of memory hierarchy   (8 Marks)
b) Write an assembly program to perform the multiplication operation: A, B, C, where A,B and
   C are memory locations.   (8 Marks)
c) Explain the characteristics of I/O systems   (4 Marks)

QUESTION FIVE (20 MARKS)

a) State the advantages of using assembly language   (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 $X.Z + X^I.Y^I.Z = F$
    i.   Draw a logic diagram   (4 marks)
    ii.   Generate Truth table   (4 marks)