MASENO UNIVERSITY

UNIVERSITY EXAMINATIONS 2017/2018

FIRST YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

CITY CAMPUS

CIT 104: COMPUTER ARCHITECTURE

Date: 12th June, 2018 Time: 5.00 - 8.00pm

INSTRUCTIONS:

- Answer Question ONE and any other TWO
- Write your registration number on all sheets of the answer book used
- Use a NEW PAGE FOR EVERY QUESTION attempted and indicate the question number on the space provided on each page of the answer sheet
- Fasten together all loose answer sheets used
- No mobile phones in the exam room.

QUESTION ONE (30 MARKS)

a) State four main functions performed by a computer system**(4 marks)**

b) Identify and explain four types of memory that can be found in a computer architecture memory hierarchy**(8 marks)**

c) Perform the following computations**(10 marks)**

i) Convert 2B0F(Hexadecimal) to Binary
ii) 0.865(Base 10) to Binary
iii) 1101001 - 1011100 (Base 2) using Two's complements
iv) 10011 x 101 (Base 2)
v) 11010001Divide by 1011(Base 2)

d) If ADD is an arithmetic operation and R0, R1,R2 are registers in a given computer architecture, explain the meaning of the statement: ADD R1, R2, R0 then identify the possible values that each register can store in a single instruction**(4 marks)**

e) Differentiate between machine language and Assembly language **(4 marks)**

QUESTION TWO (20 MARKS)

a) Determine and explain the practical issues that need to be considered when writing assembly language programs for a specific computer architecture**(12 marks)**

b) Use an appropriate diagram to explain the three steps in the assembly and execution process of a program written in assembly language**(8 marks)**

QUESTION THREE (20 MARKS)

Use an appropriate diagram to explain the organization of Von Neumann machine**(20 marks)**

QUESTION FOUR (20 MARKS)

Use relevant examples to explain how the following addressing modes are used on operands

(20 marks)

a) Immediate Mode

b) Direct (Absolute) Mode
c) Indirect Mode
d) Indexed Mode
e) Autoincrement mode

QUESTION FIVE (20 MARKS)

a) Describe how assembler works in a simple assembly language **(8 marks)**

b) Use assembly of a simple CPU that does not have a multiplication operation to write an assembly program to perform the multiplication operation: Z←X*Y, where X, Y, and Z are memory locations. Assume X and Y are initialized to 8 and 12 respectively **(12 marks)**