



MACHAKOS UNIVERSITY

University Examinations for 2021/2022

SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY
SECOND YEAR SECOND SEMESTER EXAMINATION FOR
BACHELOR SCIENCE IN COMPUTER SCIENCE

SCO 201: COMPUTER ORGANIZATION AND ARCHITECTURE II

DATE: 6/12/2021

TIME: 2.00-4.00 PM

INSTRUCTION

Answer question **ONE** and **Any** other **Two** among the four selective questions

QUESTION ONE (COMPULSORY 30 MARKS)

- a) Explain three types of operations (6 marks)
- b) Describe computer instruction procession using instruction state cycle diagram (7 marks)
- c) A student wanted to improve on the performance of his computer. He decided to increase only the processor speed. Explain why this could result into bottleneck (5 marks)
- d) A computer has 512MB of memory. Each word in this computer is 2-Bytes, answer questions that follows
 - i. Find the number of bits needed to address any single word in memory (3 marks)
 - ii. Draw the bus structure of this computer (5 marks)
 - iii. Using block diagram, explain its memory organization (4 marks)

QUESTION TWO (20 MARKS)

- a) Using relevant diagram, describe the stack organized computer (4 marks)
- b) Using an accumulator type computer with one address instruction, write an assembly language statements to evaluate the arithmetic statement (4 marks)

$$Y = \frac{A - B + C}{G + H}$$

- c) Machakos university student would like to design a high performing computer, discuss the most appropriate input/output technique the student is likely to use (6 marks)
- d) Discuss the objectives of the following memories (6 marks)
 - i. Cache
 - ii. Virtual memory

QUESTION THREE (20 MARKS)

- a) Draw a diagram of a functioning microprogrammed unit (5 marks)
- b) A processor experiences an interrupt while running processing sequence. Explain how the interrupt is likely to be handle. (6 marks)
- c) By the help of diagrams, describe the following addressing modes showing clearly how effective address is calculate in each case (9 marks)
 - i. Register direct
 - ii. Indexed
 - iii. immediate

QUESTION FOUR (20 MARKS)

- a) Discuss two design issues in superscalar processors (6 marks)
- b) Using arithmetic circuit diagram, explain addition microoperation (9 marks)
- c) Describe ISA (5 marks)

QUESTION FIVE (20 MARKS)

- a) Illustrate how the instruction ADD a,b,c is represented in machine language (6 marks)
- b) A student in Machakos university opted for CISC over RISC architecture. Explain three reasons to support the student's decision (6 marks)
- c) Discuss the I/O module (8 marks)