



MACHAKOS UNIVERSITY

University Examinations for 2019/2020

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FIRST YEAR FIRST SEMESTER EXAMINATION FOR
BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)

SIT 105: INTRODUCTION TO COMPUTER HARDWARE

DATE: 4/12/2019

TIME: 8.30-10.30 AM

INSTRUCTIONS

Answer **question ONE** and any other **TWO** questions.

QUESTION ONE (30 MARKS)

- a) Explain the following terms (6 marks)
 - i. Multiplexer
 - ii. Integrated Circuit.
 - iii. Truth table
- b) Explain each of the following terms as used in a microprocessor system (6 marks)
 - i. Arithmetic Logic Unit (ALU)
 - ii. General Purpose Registers
 - iii. Control Unit
- c) State two registers in a computer system (2 marks)
- d) Explain the term instruction as used in a computer system (4 marks)
- e) Explain how the Von-Newmann architecture machine handles an interrupt to the fetch-execute cycle. (4 marks)
- f) With the aid of a diagram, list the major components of a computer system and explain the functions of each component listed. (6 marks)

QUESTION TWO (20 MARKS)

- a) With the aid of a diagram, explain how a 4-bit 2's complement adder-subtractor works. Which component of the microprocessor would you find such an adder-subtractor (8 marks)
- b) With the aid of a diagram, explain how a 4-bit controlled shift left register with broadside loading works. Which component of the microprocessor would you find such a register and why? (7 marks)
- c) With the aid of a diagram, explain how a 4-bit controlled ripple counter works and where it is used in a microprocessor system. (5 marks)

QUESTION THREE (20 MARKS)

- a) With the aid of diagrams, explain the three basic elements that are used in algorithmic state machine (ASM) charts. (9 marks)
- b) Differentiate between a conventional flowchart and an algorithmic state machine (ASM) chart (4 marks)
- c) Describe a 1-Bit full-adder using ASM Chart and its truth table (7 marks)

QUESTION FOUR (20 MARKS)

- a) With the aid of a diagram, explain the computer bus structure or Architecture. (5 marks)
- b) With the aid of a diagram, explain how a 4-bit controlled buffer register works with input control signal called LOAD, a CLR signal that reset's the register and an output control signal called ENABLE. (8 marks)
- c) With the aid of a diagram, explain how the 4-bit controlled buffer register in a) can be used to implement bus-organized computer architecture between 4 general-purpose registers called A, B, C and D. (7 marks)

QUESTION FIVE (20 MARKS)

- a) Explain the concept of addressing modes in computer systems (3 marks)
- b) Explain the concept of paging as used in computer systems (3 marks)
- c) Explain **any five** types of addressing modes that are used in computer systems (10 marks)
- d) Differentiate between hardwired and micro-programmed control in a microprocessor system. (4 marks)