



MACHAKOS UNIVERSITY

University Examinations for 2021/2022 Academic year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FIRST YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (MATHEMATICS AND COMPUTER SCIENCE)

BACHELOR OF SCIENCE (COMPUTER SCIENCE)

SCO 104: COMPUTER ORGANIZATION AND ARCHITECTURE 1

DATE: 28/1/2022

TIME: 11.00-1.00 PM

INSTRUCTIONS: Answer Question ONE and any other TWO Questions

QUESTION ONE (30 MARKS) (COMPULSORY)

- a) Subtract $(11010)_2 - (10000)_2$ using 1's complement and 2's complement method. (4 marks)
- b) Using real examples explain the basic components of Generic Computing system. (6 marks)
- c) Explain how DMA can improve the computer's I/O speed. (4 marks)
- d) Describe the hierarchy of buses, bus signals and its functionalities. (4 marks)
- e) Differentiate between SRAM and DRAM. (4 marks)
- f) With reference to an instruction cycle:
 - i. Define an instruction cycle (2 marks)
 - ii. Explain the phases of Instruction cycle (3 marks)
 - iii. Highlight the basic instruction formats for IO, Register and Memory Reference instructions. (3 marks)

QUESTION TWO (20 MARKS)

- a) Identify three components of a computer system. (6 marks)
- b) List the methodologies involved in handling Priority Interrupt. (2 marks)
- c) With the aid of a well labelled diagram, explain the Bus Interconnection Schemes (6 marks)
- d) Discuss three types of Interrupts (6 marks)

QUESTION THREE (20 MARKS)

- a) Highlight the importance of interfacing. (2 marks)
- b) Explain three types of computer organizational pipelining. (6 marks)
- c) Explain two basic operations performed by the processor (4 marks)
- d) Sketch the internal organization of CPU out with its functionalities and block diagram. (8 marks)

QUESTION FOUR (20 MARKS)

- a) Explain two advantages of using virtual memory (4 marks)
- b) With the aid of a labelled diagram, illustrate a processor with multiple functional units. (4 marks)
- c) Describe three approaches to achieving increased processor speed (6 marks)
- d) Identify the advantages of a write-through cache memory. (6 marks)

QUESTION FIVE (20 MARKS)

- a) Explain how to resolve multiple contentions in shared resources. (4 marks)
- b) With the aid of a well labelled diagram, explain the Basic Instruction Cycle (6 marks)
- c) Describe the classification of memory (6 marks)
- d) Identify the crucial features to design the instruction set architecture for a specific purpose processor. (4 marks)