



MACHAKOS UNIVERSITY

University Examinations for 2022/2023 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

SECOND YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (COMPUTER SCIENCE)

SCO 209: MICROPROCESSOR AND ASSEMBLY LANGUAGE PROGRAMMING

DATE: 14/4/2022

TIME: 11:00 – 1:00 PM

INSTRUCTIONS: ANSWER QUESTION ONE AND OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS) [COMPULSORY]

- a) Describe FIVE basic operations of a Microprocessor. (5 marks)
- b) Discuss THREE characteristics of Assembly Language operations. (6 marks)
- c) Explain the advantages and disadvantages of having more general-purpose registers in a Microprocessor. (4 marks)
- d) Outline FIVE types of addressing modes in 8085 Processor. (5 marks)
- e) Describe TWO functions of the Accumulator in 8085 Processor. (4 marks)
- f) Given below is an example of a LABEL directive as used in Assembly language.

.DATA

count LABEL WORD

Lo_count DB 0

Hi_count DB 0

.CODE

...

mov Lo_count,AL

mov Hi_count,CL

Using the above example, explain what the following refers to;

- i. **count** (2 marks)
- ii. **Lo_count** (2 marks)
- iii. **Hi_count** (2 marks)

QUESTION TWO (20 MARKS)

- a) Using a simple diagram, illustrate the architecture of a basic Microprocessor. (4 marks)
- b) Explain FOUR ways of specifying an operand in Assembly language programming. (4 marks)
- c) Describe THREE common examples of microprocessors in use today. (6 marks)
- d) Arrange the below steps involved in the instruction execution cycle in the correct order, from the first step to the last one. (6 marks)
 - 1. Update the instruction pointer to point to the next instruction.
 - 2. Fetch the instruction operand(s) if necessary
 - 3. Execute the instruction
 - 4. Fetch the instruction at the instruction pointer into the instruction register.
 - 5. Decode the instruction in the instruction register.
 - 6. Go back to the beginning of the instruction execution cycle.

QUESTION THREE (20 MARKS)

- a) By providing an example in each case, distinguish between Microprocessor and Microcontroller. (4 marks)
- b) Describe the THREE different classes of Assembly language statements. (6 marks)
- c) Describe TWO advantages for defining constants in Assembly language programming. (4 marks)
- d) Write a short Assembly language program that prints the given message from a keyboard. Add comments in the program. (6 marks)

QUESTION FOUR (20 MARKS)

- a) Draw the flag register format of an 8085 microprocessor and explain all the flags. (6 marks)
- b) Assembly language uses the *define* directive. Explain the uses of this directive. (4 marks)
- c) Using examples illustrate THREE data transfer instructions utilized in Assembly language programming. (6 marks)
- d) Explain briefly what happens when the *Intr* signal goes High in 8085 processor. (4 marks)

QUESTION FIVE (20 MARKS)

- a) Using detailed examples explain the Assembly language statement syntax. (4 marks)
- b) Use a simple table with two columns showing instruction type and example to illustrate the FIVE types of operand combinations allowed in the *mov* instruction in Assembly language programming. (6 marks)
- c) Discuss the advantages and disadvantages of microprocessor-based systems. (4 marks)
- d) Discuss THREE practical applications of the Assembly the language. (6 marks)