



# (University of Choice) MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

#### **MAIN CAMPUS**

### UNIVERSITY EXAMINATIONS 2021/2022 ACADEMIC YEAR

## FOURTH YEAR SECOND SEMESTER SPECIAL/SUPPLEMENTARY EXAMINATIONS

## FOR THE DEGREE OF BACHELOR OF TECHNOLOGY EDUCATION

**COURSE CODE: TEE 425** 

COURSE TITLE: MICROPROCESSOR SYSTEMS

DATE: FRIDAY, 07th October, 2022

TIME: 09.00 - 11.00am

#### **INSTRUCTIONS TO CANDIDATES**

Answer Question ONE and any other TWO (2) questions

Marks will be awarded for correct working even if the answer is wrong

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 3 Printed Pages. Please Turn Over.

#### Question 1 (30 MARKS)

- a) With the aid of a well labelled diagram, Explain
  - (i) the 8086 Microprocessor architecture.

(6mks)

(ii) three main functions of the C.P.U.

(3 mks)

b) List three functions of the main memory.

(3 mks)

c) State any THREE microprocessor internal registers and explain their function(s).

#### (6mks)

- d) State and explain two parameters used in classifying microprocessors. (4 mks)
- e) A microcomputer system requires 8Kbytes of ROM and 1024 Bytes of RAM.
  - (i) Determine the start and end address of each memory block if the two blocks occupy contiguous memory address with ROM address starting at 0000H.
  - (ii) Draw the memory map of the system.

(8 mks)

#### Question 2 (20 MARKS)

- a) State any **TWO** advantages of weighted resistor over R-LR ladder network of an analogue to Digital converter.(2 mks)
- b) With the aid of a block diagram explain the principle of operation of a successive approximation analogue to digital converter (ADC). (6 mks)
- c) Determine the equivalent digital word which results from a 3.217V input to a 5-bit
   Analogue to Digital converter with a 5V reference using the successive approximation technique.
- d) List **FOUR** typical functions of an I/O.

(4 mks)

#### Question 3 (20 MARKS)

- a) During the normal operation, the microprocessor goes through the fetch-execute cycle. Explain what happens in each phase. (3 mks)
- b) Distinguish between machine and assembly language.

(1mks)

c) State the type of translator necessary for a program written in:

(i) High level language (ii) Assembly language.

(1 mks)

d) Explain what action is initiated by the following instruction in an 8086Microprocessor.

MOV B, C

MOV D, A

MVI A, FFH

LXI H, 2400H

MOV M, A

MOV B, M

MVI M, 20H.

(15 mks)

#### Question 4 (20 mks)

a. Explain the meaning of the phrase addressing mode

[1mark]

i. Explain any three addressing modes of the 8086 microprocessor

[6marks]

ii. Using assembly language, give examples each of *immediate addressing* and register addressing in 8085 microprocessor.

[4 marks]

b. Explain the following two instructions; MOV CX, CS and MOV AX, [12H]

[2 marks]

- c. Give the two important reasons why although the 8086 is a 16-bit processor it deals with 8-bit memory. [3 marks]
- d. Enumerate any five advantages of memory segmentation.

[5marks]

#### Question 5 (20 mks)

a. Differentiate between;

i. a compiler and an interpreter

[2 marks]

ii. a compiler/interpreter and an assembler.

[3 marks]

- b. State the addressing modes for each of the following 8086 microprocessor instructions:
  - i. JMP [BX+DI]
  - ii. MOV AX, CX
  - iii. MOV AX, [SI]
  - iv. ADD AX, 1224H

[4 marks]

- c. List any four tasks that a microcomputer is capable of doing. [4 marks]
- d. With the aid of a well labeled diagram, mention the total number of registers of 8086 and show how they are grouped.
   [7 marks]

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