



# MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

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## UNIVERSITY EXAMINATIONS 2023/2024

FOURTH YEAR, FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE (PHYSICS OPTION) AND BACHELOR OF SCIENCE IN MATHEMATICS AND PHYSICS

### SPH 3406: MICROPROCESSOR APPLICATIONS

DATE: DECEMBER 2023

TIME: 2 HOURS

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**INSTRUCTIONS: Answer Question ONE and any other TWO questions.**

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#### QUESTION ONE (30 MARKS)

- a) State the functions of the CPU of a computer. (5 Marks)
- b) Define the following terms
  - i. Word size (2 Marks)
  - ii. Program (2 Marks)
- c) Distinguish between assembler and compiler. (4 Marks)
- d) For a 32K x8 EPROM, state
  - i. Number of address lines (1 Mark)
  - ii. Data Bus width (2 Marks)
- e) State the functions of the following microprocessor unit registers
  - i. Program counter (2 Marks)
  - ii. Flag register (2 Marks)
- f) i. Write an assembly language given the following comments (5 Marks)  
; Load the data byte 7BH into register B (4 Marks)



MUST is ISO 9001:2015 and



ISO/IEC 27001:2013 CERTIFIED

; Copy contents of register B into accumulator  
; Load the data byte 2CH into register D  
; Copy contents of Accumulator into the port 1  
; HLT

- ii. What value will be taken out through port 1 (1 Mark)  
g) state the functions of ALU

### QUESTION TWO (20 MARKS)

- a) what is a microprocessor? (3 Marks)  
b) why is the address bus Uni-directional? (3 Marks)  
c) differential between:  
i. Input and Output devices (Give relevant examples) (3 Marks)  
ii. Software and Hardware (Give examples) (3 Marks)  
d) How is the C-flag and Z-flag affected during ALU operations (5 Marks)  
e) Name three flags found in 8085 microprocessors (3 Marks)

### QUESTION THREE (20 MARKS)

- a) What is a subroutine? (2 Marks)  
b) Write the comments for the Assembly language program below:  
MVI B, FFH;  
MOV A, B;  
MVI C, 3DH;  
ADD C;  
OUT PORTI;  
i. What value will be taken out through port I (6 Marks)  
c) State two types of memories found in a microcomputer system. (2 Marks)



- d) For 8-bit microprocessor system, it required to use 1Kx8EPROM and 2Kx8RAM. Find the addresses of RAM and EPROM given that EPROM starts at memory location 0000H. (8 Marks)
- e) Explain briefly '*No operation*' (NOP) state in Microprocessors (2 Marks)

**QUESTION FOUR (20 MARKS)**

- a) State two ways in which a microprocessor can come out of **Halt** state. (2 Marks)
- b) Write an assembly language program to add two hexadecimal numbers 7DH and 35H and save the sum in register D. (5 Marks)
- c) State the two sections found in 8086 microprocessors? (2 Marks)
- d) Distinguish between High level and low-level programming languages. (8 Marks)
- e) Differentiate between general and special purpose registers. (3 Marks)

