



MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

THIRD YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

DIPLOMA IN ELECTRICAL ENGINEERING

EED 312: MICROPROCESSOR SYSTEMS

DATE: 19/01/2021

TIME: 2.00-4.00 PM

INSTRUCTIONS

Answer Question One and any Other Two Questions

QUESTION ONE (30 MARKS)

- a) Draw a labeled diagram of structure of a typical 8-bit microprocessor and explain the function of the main components. (9 marks)
- b) Describe the function of the following registers with reference to the Intel 8085 microprocessor;
 - i. Flags register
 - ii. Memory Address Register
 - iii. Stack pointer (6 marks)
- c) A certain computer has a ROM memory with 16384 words. Each word is 8 bits wide. Determine;
 - i. Number of address lines
 - ii. Capacity in kilobytes
 - iii. Number of hexadecimal digits needed to state an address value. (6 marks)
- d) Explain the meaning of the following assembly instructions and for each case state the addressing modes used.;
 - i. LXI H,4532H

- ii. STA 4000_H
- iii. XCHG

(9 marks)

QUESTION TWO (20 MARKS)

- a) Draw a flowchart illustrating the process of developing a microcomputer system. (7 marks)
- b) Write an assembly language program for the following algorithm:

- move data 32H to register B
- load register A with immediate value 96H
- move data 1900H to register pair BC
- transfer content of accumulator to memory address 2000h
- move data in memory address 7000h to register C
- move content of H and L to memory starting at address 8000h
- exchange content of register pair DE to that of HL
- transfer content of memory address 2000h and 2001h to register pair HL
- move content of accumulator to register C
- processor halt.

(13 marks)

QUESTION THREE (20 MARKS)

- a) Describe the various computer generations highlighting the processor technology and salient features. (10 marks)
- b)
 - i Explain two software testing methods.
 - ii Explain the function of any three hardware tools in microcomputer development

(10 marks)

QUESTION FOUR (20 MARKS)

- a) State the function of each of the following software development tools:
 - i. Assembler
 - ii. Interpreter
 - iii. debugger
 - iv. loader
 - v. Compiler

(5 marks)

- b) Describe three microprocessor addressing modes and for each case state an instruction example. (9 marks)
- c) Determine the condition of the flags after each of the following arithmetic
- i. 85H+ACH
 - ii. C5-27H. (6 marks)

QUESTION FIVE (20 MARKS)

- a) i Distinguish between maskable and non-maskable interrupts
- ii Outline the sequence of events when a CPU receives an interrupt signal. (8 marks)
- b) With an aid of a labeled diagram explain the Daisy Chain method for prioritizing interrupting devices in a computer system. (12 marks)