MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)
University Examinations for 2015/2016 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SECOND SEMESTER EXAMINATION FOR DIPLOMA IN TELECOMMUNICATION ENGINEERING

EED 312: MICROPROCESSOR SYSTEMS

DATE: **TIME:**

INSTRUCTIONS

ATTEMPT QUESTION ONE AND ANY OTHER TWO QUESTIONS

SECTION A: (COMPULSORY)

1. (a) Describe the four major central processing unit evolution stages stating the technology used in each case. (8 marks)

   (b) With an aid of a labeled diagram, describe the main components of a digital computer. (10 marks)

   (c) Describe the function of the following microprocessor registers;

   I. program counter

   II. Instruction register

   III. Stack pointer (6 marks)

   (d) Draw flowchart diagram illustrating procedure for microcomputer development. (6 marks)

2. (a) (i) Distinguish between microprocessor and multiprocessor computer.

(ii) A typical computer has 16 lines for data and 24 lines for address.

Determine for system;

I. Word size

II. Maximum addressable locations

III. Capacity in mega bytes

IV. Number of hexadecimal digits needed to state an address value. (8 marks)

(b) Describe four microprocessor addressing modes and for each case cite an instruction example. (12 marks)

3. (a) Explain the meaning of the following assembly instructions and for each case state the addressing modes used.;

I. STA 3000_H

II. LHLD 1949_H

III. XCHG (9 marks)

(b) Draw a typical 8 bit microprocessor architecture schematic diagram and explain the function of each element. (11 marks)

4. (a) Write an assembly program for the following algorithm:

-load register B with immediate value 67

-move data 55h to accumulator

-move data 19AF h to register pair HL

-transfer content of register A to memory address 2000h

-move data in memory address 6000h to register C

-move content of H and L to memory starting at address 8000h

-exchange content of register pair BC to that of HL

-transfer content of memory address 2000h and 2001h to register pair HL

-add content of accumulator to register C

-processor halt. (5 marks)

(b) Handcode the program resulting in 4 (a) assuming that it originates at address 0000h (5 marks)

(c) Define the following terms as applied to programming:

(i) Machine code

(ii) Assembly language

(iii) Assembler

(iv) Interpreter

(v) Compiler (5 marks)

5. (a) (i) Outline the sequence of events when an interrupt occurs in a microcomputer.

(ii) Distinguish between maskable and non-maskable interrupts.

(iii) Draw a diagram illustrating how a microprocessor is connected to two devices via a programmable interrupt controller (PIC) (12 marks)

(b) Explain the function of the following pins on the Intel 8085 chip;

i) ALE

ii) HOLD

iii) RESET IN

iv) CLOCK OUT (8 marks)