THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of Jkuat)

Faculty of Engineering and Technology

DEPARTMENT OF ELECTRICAL & ELECTRONIC ENGINEERING

INSTITUTIONAL BASED PROGRAMME

DIPLOMA IN TECHNOLOGY (ELECTRICAL POWER ENGINEERING)

EEE 2256: MICROPROCESSOR TECHNOLOGY I

END OF SEMESTER EXAMINATION

SERIES: NOVEMBER 2011

TIME: 2 HOURS

Instructions to Candidates:

This paper consists of **FIVE** questions

- *Answer Booklet*
- *Intel 8085 Instruction set*

Answer question **ONE (COMPULSORY)** in **SECTION A** and any other **TWO** questions in **SECTION B**

Marks are indicated for each part of the question

This paper consists of **THREE** printed pages

SECTION A ***(Answer all questions in this section - 20 Marks)***

Question One

a) Draw the block diagram of a microcomputer and describe the functions of each part. (4 marks)

b) Explain the functions of each of the following registers
   (i) Program counter
   (ii) Stack pointer
   (iii) Memory Address Register (6 marks)

c) Six data bytes A2, FA, DF, E5, 98 and 8B are stored in memory locations starting from 2050H. Register B is to be used to store any carries generated while adding the data bytes. The entire sum is to be stored at memory locations 5040H and 6041H

   i) Analyze the problem using a flow chart
   ii) Write the program (10 marks)

SECTION A ***(Answer all questions in this section - 20 Marks each)***

Question Two

a) Explain the following addressing modes and give ONE example in each case
   i) Immediate addressing
   ii) Direct addressing
   iii) Register addressing (6 marks)

b) State and explain the **THREE** instruction sizes, giving ONE examples for each case (9 marks)

c) A 64KB memory consists of 5KB of ROM starting at address 0100H and 16KB of RAM starting from address 0600H. Draw the memory map and show the start and end address for each section (5 marks)

Question Three

a) Write a program for the 8085/8080A microprocessor that subtracts the decimal number 67 from 123 and saves the difference in register C. (10 marks)

b) Use the instructions PUSH B and POP B to explain the operation of the stack (10 marks)

Question Four

a) (i) Give **ONE** example of an instruction for each of the following processor operations

   I) Logical
   II) Data transfer
   III) Arithmetic

   (ii) The instruction MOVA, B has 4 T-states. Calculate the execution time if the processor has a clock speed of 3MHZ (10 marks)

b) (i) Write instructions for the 8085 processor to perform the following tasks:

(I) Initialize memory location 2050H in register pair D, E
(II) Load byte D6H into Accumulator
(III) Multiply contents of B by two
(IV) Store the sum in memory

(ii) Explain the functions of the following instructions

(I) INX H
(II) DAD D (10 marks)

Question Five

a) Explain the functions of the following instructions

(i) JNC 4000H
(ii) CALL
(iii) RET (6 marks)

b) Explain any **THREE** elements of program documentation (6 marks)

c) The following bytes of data are to be stored in memory beginning from address 5000H:
Data (H): 28, A9, D5, F2, 68, 79, and E3

(i) Write instructions to store the data bytes in required memory locations
(ii) Write a program that transfers the entire block of data to new memory locations from memory location 8000H (8 marks)