



TECHNICAL UNIVERISTRY OF MOMBASA

# Faculty of Engineering & Technology

DEPARTMENT OF ELECTRICAL & ELECTRONIC ENGINEERING

DIPLOMA IN ELECTRICAL POWER ENGINEERING DIPLOMA IN  
INSTRUMENTATION & CONTROL ENGINEERING  
(DEPE 4, DICE 4)

**EEE 2206: MICROPROCESSOR TECHNOLOGY I**

END OF SEMESTER EXAMINATION

**SERIES: DECEMBER 2014**

**TIME: 2 HOURS**

**Instructions to Candidates:**

You should have the following for this examination

- *Answer Booklet*

This paper consists of **FIVE** questions. Answer any **THREE** questions

Maximum marks for each part of a question are as shown  
This paper consists of **THREE** printed pages

### Question One

- a) (I) Explain the functions of the following registers:  
(i) Stack pointer  
(ii) Program counter  
(iii) Instruction register
- (II) State any THREE functions of the flag register. **(9 marks)**
- b) (i) Explain any THREE addressing modes and give ONE instruction example for each case.  
(ii) Determine the size of memory that can be addressed by a 13-bit wide address bus **(11 marks)**

### Question Two

- a) (I) Explain the following terms:  
(i) T-state  
(ii) Machine cycle  
(iii) Instruction cycle
- (II) Write instructions to add 32H with A2H, then subtract 47H from the sum and store the difference in register D. **(8 marks)**
- b) Explain the operations for the following instructions:  
(i) PUSH H  
(ii) POP D **(6 marks)**
- c) Explain the functions of the following:  
(i) Subroutine  
(ii) CALL  
(iii) RET

### Question Three

- a) Sixteen bytes of data stored in memory starting from 4000H are to be transferred to new memory locations starting at 8000H.  
(i) Draw the flow chart  
(ii) Write the program given ORG 2000H **(14 marks)**
- b) For the program listing of figure 1, draw the trace table: **(6 marks)**  
L X 1 H, 4500H  
L X1 D, 2050H  
IN X H  
IN X D  
MVI A, A5H  
MOV B, A

Figure 1

#### Question Four

- a) (i) Draw the circuit diagram of a DRAM cell and explain its operation.  
(ii) A 64KB memory consists of 24KB of ROM followed by a 32KB of RAM. Draw the memory map **(10 marks)**
- b) (I) Explain the operation in the following instructions:  
(i) XCHG  
(ii) ANA A
- (II) Explain the functions of the following:  
(i) Control bus  
(ii) Interrupt controller  
(iii) Memory Address Register **(10 marks)**

#### Question Five

- a) Six bytes of data stored in memory starting from 2080H are to be added together. Register C is to be used to store any carries generated during addition. The entire sum is stored in memory location 5000H and 5001H  
(i) Draw the flow Chart  
(ii) Write the program **(14 marks)**
- b) Explain the THREE instruction sizes used by the 8085 microprocessor and give ONE instruction examples in each case. **(6 marks)**