TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

DIPLOMA IN ELECTRICAL POWER ENGINEERING

DEPE4

EEE2206 MICROPROCESSOR TECHNOLOGY I

END OF SEMESTER EXAMINATIONS

SERIES: May, 2016

TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES:

1. You should have the following for this examination:
    - Answer booklet
    - Electronic calculator
    - 8085 Instruction set
2. This paper consists of FIVE questions.
3. Answer ANY THREE Questions
4. All questions carry equal marks

QUESTION ONE

(a) (i) Draw the block diagram of the microprocessor architecture.
(ii) Explain the functions of the following:

I. Stack pointer

II. Program pointer

III. Flag register

IV. Memory address register (12marks)

(b) Explain the operation in each of the following instructions:

i. PUSH D
ii. POP D
iii. XCHG (8 marks)

QUESTION TWO

(a) Explain any THREE addressing modes and give ONE instruction example for each case. (10 marks)

(b) Explain the following terms

i. Machine cycle
ii. Stack
iii. T-state
iv. Subroutine (6 marks)

(c) (b) The program of figure Q2 is run by a microprocessor whose clock speed is 12MHz. Determine the time it takes to execute the program.
FIGURE Q2C

LABEL	**Instruction**		**T – state**
	MVI	A, 05H	5
NXT	DCR	A	4
	JNZ	NXT	5/4
	MOV	B, A	4
	HLT		4

(4 marks)

QUESTION THREE

(a) Explain the THREE types of instruction sizes giving ONE example for each case.(6 marks)

(b) A block of twelve data bytes, shown in Table Q3, is stored in memory beginning from address 4050H. A program is required to move the entire block of data to new memory locations beginning from address 5000H.

i. Draw the flowchart

ii. Write the program (14 marks

Table Q5a

Data (H): 75, E5, 64, 2D, 4F, 5E, 78, 22, 9B, 3A, 15, 30

QUESTION FOUR

(a) (i) A microprocessor has 10 wires in its address bus and 8 wires in its data bus. Determine:

I. The size of memory it can address

II. The word size

III. Memory capacity in bytes

(ii) Distinguish the operations for the instructions CPE and RPE (7 marks)

(b) A microprocessor addresses 64kB of memory consisting of 8kB of ROM starting at address 2000h followed by 36kB of RAM. The rest of the memory is current not used. The ROM starts from address 2000H.

i. Determine the size of the address bus

ii. Draw the memory map. (7 marks)

(c) Explain THREE reasons for interfacing (6 marks)

QUESTION FIVE

(a) Table Q5a shows twenty data bytes stored in memory starting from address 3050H. All the data bytes are to be added together. Register B is to be used to store any carries generated while adding. The entire sum is stored in two consecutive memory locations 5000H and 6001H.

i. Draw the flowchart

ii. Write the program (14 marks)

Table Q5a

Data (H): 78, 22, 9B, 06, 3A20, 2D, 4F, 5E, 35, 42, 1F, 75, D3, E5, 22, 9B, 3A, 15, 30

(b) For the program listing of table Q5b draw the trace table. (6 marks)

Table Q5b

```
LXI   SP, 3040h
LXI   H, 5000h
MVI   A, 48h
MVI   B, 30H
ADD   B
INR   B
MOV   C, B
MOV   D, C
```