(Knowledge for Development)

KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS
2017/2018 ACADEMIC YEAR

SPECIAL/SUPPLEMENTARY EXAMINATIONS
YEAR TWO SEMESTER ONE EXAMINATIONS

FOR THE DEGREE OF
BACHELOR OF SCIENCE COMPUTER SCIENCE

COURSE CODE : CSC 222

COURSE TITLE : **ASSEMBLY LANGUAGE PROGRAMMING AND MICROPROCESSOR**

DATE: 11/10/2018 **TIME:** 11:30 A.M – 1:30 P.M

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTIONS ONE AND ANY OTHER TWO.

QUESTION ONE [COMPULSORY] **[30 MARKS]**

a) State two distinctions between assembly language and machine language (4 marks)

b) Write a program that subtracts the content of register B from contents of the accumulator and stores the result in memory location 4030H (3 marks)

c) Outline the features of a microprogrammed control unit and give its advantages (3 marks)

d) Discuss the five modes of addressing in 8085uP (5 marks)

e) Below is a Hexcode for a certain program. Write its equivalent Assembly Language.

3AH 10H 30H 47H 3AH 11H 30H 80H 32H 12H 30H 76H (5 marks)

f) Describe the role of a programmer in the following phases of software design: (5 marks)

i. Problem specification
ii. Program design
iii. Program coding
iv. Testing and debugging
v. Program documentation

g) Describe each line in the program below and state the overall objective of the program (5 marks)

```
MVI C, FFh
LOOP: DRC C
JNZ LOOP
HLT
```

QUESTION TWO

a) Perform the following operation 1010 1010 + 1011 1100. Write the result and determine the status of each flag after the operation (6 marks)

b) Discuss the features of a Vonn Neumann model (4 marks)

c) i. Write a program to subtract 58H from 80H. The results be stored in memory location 2030H and any borrow be stored in memory location 2031H (6 marks)

ii. Hand code the program you have written in part c(i) above (4 marks)

QUESTION THREE

a) Clearly outline the functions: (4 marks)

i. Auxillary Carry flag
ii. Parity flag

b) Highlight the features of a Complex Instruction Set Computer (6 marks)

c) Discuss the functions of the following registers: (10 marks)

i. Program counter
ii. Memory Address Register
iii. Instruction Register
iv. Memory Data Register
v. Stack Pointer

QUESTION FOUR

a) Distinguish between a compiler and an assembler (4 marks)

b) Describe each command line in the program below: (10 marks)

```
OP 1   EQU   3010H
OP2    EQU   OP1+1
OP3    EQU   OP1+2
       ORG   3000H
       LDA   OP1
       MOV   B, A
       LDA   OP2
       ADD   B
       STA   OP3
       HLT
```

c) Develop a trace table for the memories and registers in the program in part (b) above. Given that the contents of memory 3010H and 3011H are initially 2AH and 61H respectively. (6 marks)

QUESTION FIVE

a) Develop an algorithm that indicates the steps involved in adding two eight-bit numbers that are in the register and storing them in another register. Your algorithm should also check for any resulting Carry (5 marks)

b) Develop a flowchart of the algorithm you have written in part (a) above (5 marks)

c) Write an assemble program to multiply a value 12H by 8 and provide output through port 80H. (10 marks)