(*Knowledge for Development*)

KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS
2022/2023 ACADEMIC YEAR

END OF SEMESTER EXAMINATIONS
YEAR THREE SEMESTER ONE EXAMINATIONS

FOR THE DEGREE OF
BACHELOR OF SCIENCE COMPUTER SCIENCE

COURSE CODE : CSC 351E.

COURSE TITLE : ADVANCED ASSEMBLY LANGUAGE AND MICROPROCESSORS

DATE: 15 / 12 /2022 **TIME:** 2.00 P.M. – 4.00 P.M

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTIONS ONE AND ANY OTHER TWO.

QUESTION ONE (COMPULSORY) [30 MARKS]

a) Define the role of the tools below as used in programming:

i) A debugger (2 marks)

ii) A linker (2 marks)

iii) Compiler (2 marks)

b) Distinguish between memory mapped I/O and port address I/O (4 marks)

c) For each of the instruction below, state its category and write its hexcode:

i) ADI 40H (3 marks)

ii) STAX D (3 marks)

iii) JNC 4200H (3 marks)

d) A 1024KB memory chip has 16 pins for data. Find:

i) State its memory organisation. (2 marks)

ii) The number of address pins needed to address the memory. (2 marks)

iii) The address range of the chip (2 marks)

e) Write an ALP to exchange the memory contents 4400h and 4401h (5 marks)

QUESTION TWO [20 MARKS]

a) Explain the following DMA techniques:

i) Byte mode (2 marks)

ii) Block mode (3 marks)

iii) Burst mode (3 marks)

b) Dissemble each machine instruction below and state its task:

i) C6H 45H (2 marks)

ii) 21H, 00H, FFH (2 marks)

iii) 0AH (2 marks)

c) Distinguish between the following terms as applies to microprocessor programming:

i) *Instruction* (2 marks)

ii) Instruction format (2 marks)

iii) Instruction set (2 marks)

QUESTION THREE [20 MARKS]

a) Show the contents of the accumulator and the status of the flag bits after each of the following operations:

i) 37H+46H (4 marks)

ii) 50H + 50H – A0H (3 marks)

iii) 78H-A9H (3 marks)

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

QUESTION FOUR [20 MARKS]

a) Describe the stages of executing a PUSH B instruction in the microprocessor. (4 marks)

b) Below is a delay program:

```
        LXI B, 2000H
DELAY:  DCX B
        MOV A, C
        ORA B
        JNZ DELAY
        HLT
```

i) Given a clock frequency of 3MHz, calculate the duration of the delay program (7 marks)

ii) Write the algorithm of a delay program (5 marks)

iii) Convert the assembly language of the delay program into hand code. (4 marks)

QUESTION FIVE [20 MARKS]

a) Write a program to count from zero to 255 then downwards to 125 and stops (10 marks)

b) With the help of a suitable diagram, illustrate the interfacing of the PPI-8255 to the 8085 *microprocessor.* (10 marks)