TECHNICAL UNIVERSITY OF MOMBASA

FOET

COMPUTING AND INFORMATICS

UNIVERSITY EXAMINATION FOR:

BACHELOR OF TECHNOLOGY IN INFORMATION AND COMMUNICATION TECHNOLOGY

EIT 4306: SYSTEMS PROGRAMMING

END OF SEMESTER EXAMINATION

SERIES: 2016/2017

TIME: 2 HOURS

DATE: Pick DateSelect MonthPick Year

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of 5 questions. Attempt **Question ONE (Mandatory) and any TWO questions**

Do not write on the question paper.

INSTRUCTIONS: Answer Question ONE and any TWO questions.

SECTION A

QUESTION 1(30 Marks)

a. Explain the function of the following assembler directives:

i. Assume
ii. Org
iii. Ends
iv. DB (4 Marks)

b. Define opcode and operand, and specify the opcode and the operand in the instruction MOV H, L. (3 Marks)

c. Differentiate between the following types of interrupts

i. Hardware and software interrupts
ii. Vectored and Non Vectored interrupt:
iii. Maskable and Non Maskable interrupts. (6 Marks)

c. Explain in brief the functions of the following 8086 pins:

i. ALE
ii. INTR
iii. Ready
iv. Reset
v. $\overline{BHE}$ /S7 (5 Marks)

e. Write a program in assembly language that displays the message "welcome to assembly language programming" on the screen. (6 Marks)

f. Draw and explain the timing diagram of write cycle in 8086 in minimum mode.

(6 Marks)

QUESTION 2(20 Marks)

a. List any four flag registers in 8086 (4 Marks)

b. Distinguish between:
i. Compiler and assembler program
ii. Macro and procedure
iii. External and internal interrupts (6 Marks)

c. Identify the function of the following string commands in assembly language
i. SCAS
ii. INS
iii. LODS (6 Marks)

d. Explain the two separate units of the 8086 CPU (4 Marks)

QUESTION 3(20 Marks)

a. What are the advantages of an assembly language in comparison with high level Languages? (3 Marks)

b. Differentiate RISC and CISC processors. (3 Marks)

c. What is the need for unconditional jump instructions, explain different conditional jump supported by 8086. (8 Marks)

d. Discuss the modes of data transfer in Direct Memory access (DMA) (6 Marks)

QUESTION 4(20 Marks)

a. Explain the following assembly language development tools
i. Loaders

ii. Linker
iii. Assembler (3 Marks)

b. Describe the assembly language development phases (6 Marks)

c. Using example explain the function of the following assembly directives
i. ORG
ii. PROC
iii. EQU (6 Marks)

d. State conditions that will make execution unit (EU) of 8086 enter wait mode (6 Marks)

QUESTION 5(20 Marks)

a. What is interrupt vector table? (2 Marks)
b. What is the difference between minimum and maximum modes of 8086? How are these modes selected? (4 Marks)
c. Differentiate between the following instructions:
i. RCL and RCR

ii. ADD and ADC

iii. ROL and ROR (6 Marks)

d. Describe the steps of how the 8086 processor handles an interrupt once an interrupt signal is asserted in INTR pin (8 Marks)