

**TECHNICAL UNIVERSITY OF KENYA**

**FACULTY OF APPLIED SCIENCES AND TECHNOLOGY**

**SCHOOL OF COMPUTING & INFORMATION TECHNOLOGY**

**UNIVERSITY SEMESTER EXAMINATION SERIES**

**THIRD YEAR EXAMINATIONS FOR THE DEGREE OF**

**BACHELOR OF TECHNOLOGY IN COMPUTER TECHNOLOGY**

**ECSI 3108: ASSEMBLY LANGUAGE PROGRAMMING**

**TIME: 2 Hours**

**Instructions to candidates:**

This paper consists of FIVE Questions.

Answer Question ONE [30 Marks] and any other TWO Questions [20 Marks Each].

Write your college number on the answer sheet.

This paper consists of 3 printed pages

**Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.**

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**QUESTION ONE (30 MARKS) COMPULSORY**

1. Distinguish between the three levels of programming languages [3 Marks]
2. Write an assembly language program to add two 8-bit hexadecimal numbers stored at memory locations 09C4 and 09C5 and store the result in at 09C6 [4 Marks]
3. Explain the three special programs that are used to convert a program from the human instructions [3 Marks]
4. Explain the following terminologies as used in Assembly programming with an example in each case [4 Marks]
   1. General Purpose Registers
   2. Program counter
5. Describe four classifications of 8085 processor instructions [4 Marks]
6. Explain the sections of the assembly language programming [4 Marks]
7. Write a program in assembly language to exchange the 16-bit data [4 Marks]
8. Given that the value 05h is stored in register B and the value 6h is stored in register C, write an assembly language that will calculate the totals of the two values and store the results in the accumulator [4 Marks]

**QUESTION TWO (20 MARKS)**

1. Explain the role of five flags used in assembly programming language [10 Marks]
2. Outline the five steps in writing an assembly language program [5 Marks]
3. Explain the following microprocessor instructions as used in assembly language programming [5 Marks]
   1. CMP B
   2. STAX B
   3. INR A
   4. INR M
   5. SPHL

**QUESTION THREE (20 MARKS)**

1. Describe four types of addressing modes used in assembly programming with an example illustration of each mode [8 Marks]
2. Distinguish between “an instruction” and “an instruction set” as used in assembly programming languages [4 Marks]
3. Draw a well labeled architecture of a 8085 microprocessor [8 Marks]

**QUESTION FOUR (20 MARKS)**

1. Write an assembly programming language to perform the multiplication of two 8 bit numbers using 8085 [10 Marks]
2. The 8085 instruction set is classified into three groups according to word size. Explain with examples the three classes [6 Marks]
3. Write an assembly program to multiply a number by 8 [4 Marks]

**QUESTION FIVE (20 MARKS)**

1. In assembly programming, a segmented memory divides the memory into groups of segmented sections. Explain any three sections of a memory segments [6 Marks]
2. Write an assembly language program to subtract the contents of memory location 4001H from the memory location 200H and place the result in memory location 4002H [6 Marks]
3. Write a program to fine the 2’s complement of the number stores at memory location 2500H and store at memory location 2503H and store the complemented number at memory location 2505H [4 Marks]
4. Outline four comparisons (Dissimilarity ) between the 8085 and 8086 microprocessors using the tables provided [4 Marks]

|  |  |  |
| --- | --- | --- |
| Comparison by | 8085 | 8086 |
| Size |  |  |
| Cost |  |  |
| Instruction queue |  |  |
| Pipelining |  |  |