MACHAKOS UNIVERSITY COLLEGE

(A Constituent College of Kenyatta University)
University Examinations for 2014/2015 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

…….SEMESTER EXAMINATION FOR DEGREE IN BACHELOR …….

ASSEMBLY LANGUAGE PROGRAMMING

Date: **Time:**

INSTRUCTIONS:

1. Attempt question **ONE** and any other **TWO** questions
2. Question one carries **30 marks** while the rest carry **20 marks each**

QUESTION ONE (30 MARKS)

a) Distinguish between the following terms:

(i) Operation and micro operation (2 marks)
(ii) Fetch cycle, indirect cycle and execute cycle (3 marks)
(iii) Memory – reference, register – reference and input – output reference Instructions. (3 marks)
(iv) Instructions and Pseudo-instructions (2 marks)
(v) Source programs and Object programs (2 marks)

b) (i) List the four Pseudo-instructions that can be recognized by the Assembler. (2 marks)
(ii) Briefly give a definition of each (2 marks)
(iii) Software systems can be subdivided into six categories. Name them and indicate their applications (6 marks)

c) (i) The organization of a digital computer is best defined by specifying three parameters. Name them. (2 marks)

(ii) On the basis of one of the parameters named in c (i), classify digital systems (2 marks)

(iii) In basic computers, what do you understand by term 'stored program concept' (1 mark)

(iv) A line of code in an assembly language program is as follows

DEC -35

Show that four memory words are required to store the line of code and give their

binary content. (3 marks)

QUESTION TWO (20 MARKS)

An instruction in address $(021)_{16}$ in the basic computer has a mode bit I = 0, an operation code of the AND instruction, and an address part equal to $(083)_{16}$. The memory word at address $(083)_{16}$ contains the operand $(B8F2)_{16}$ and the content of the *AC* is $(A937)_{16}$. Go over the fetch and execute cycles and determine the content of the following registers at the end of the execute cycle: *PC, MAR, MBR, AC,* and *OPR.*

QUESTION THREE (20 MARKS)

(a) What is a control flow chart? (2 marks)

(b) Name two types of blocks used in a flow chart, clearly explaining the function of each of them. (8 marks)

(c) Use a control flow chart to summarize the paths taken by the control during an execute cycle. (10 marks)

QUESTION FOUR (20 MARKS)

(a) Write a program in assembly language to add two operands A and B (8 marks)

(b) Show that the line of code

PL3, LDA SUB I

Can be stored in seven consecutive memory locations (12 marks)

QUESTION FIVE (20 MARKS)

A memory unit has a capacity of 65,535 words of 25 bits each. It is used in conjunction with a general purpose computer. The instruction code is divided into four parts. An indirect mode bit, operation code, two bits that specify a processor register and an address part.

(a) What is the maximum number of operations that can be incorporated in the computer if the instruction is stored in one memory word. (5 marks)

(b) Draw the instruction word format indicating the number of bits and the function of each part. (6 marks)

(c) How many bits are there in MBR, MAR and PC for the said memory capacity (9 marks)