MURANG'A UNIVERSITY COLLEGE

(A Constituent College of Jomo Kenyatta University of Agriculture and Technology)

University Examinations 2013/2014

FIRST YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

BIT 2104: INTRODUCTION TO PROGRAMMING AND ALGORITHMS

COURSE: BSc IT **TIME: 2HRS**

DAY/TIME: Tuesday 2:00 – 4:00 p.m. **DATE: 17/12/2013**

Instructions: Answer Question 1 and Any Other Two.

Question ONE: (30 marks) - Compulsory

(a) Define the following terms as used in programming

i) Coding

ii) Debugging

iii) Algorithm

iv) Deploying

v) Dry running [10 marks]

(b) Explain two types of algorithms that one can develop before coding, using some examples [6 marks]

(c) Describe three types of errors that a programmer can encounter when programming. [6 marks]

(d) Differentiate the following problem solving strategies, and state when each is appropriate

i) Top-down decomposition

ii) Bottom-up decomposition [8 marks]

Question TWO (20 marks)

(a) State what the following translators do and describe how they work.

i) Assembler

ii) Compiler

iii) Interpreter [12 marks]

(b) Write a simple program in C to calculate the average of any two numbers typed in through the keyboard. [8 marks]

Question THREE (20 marks)

(a) Explain some FIVE characteristics of a good algorithm. [5 marks]

(b) Explain the advantages of using a pseudocode over a flowchart [2 marks]

(c) Design a flowchart for a program to calculate the average of the first 20 integers starting from the largest to the least, using a loop. [6 marks]

(d) Use any available loop structure in C programming language to implement the above algorithm (in a) [7 marks]

Question FOUR (20 marks)

Your Mathematics lecturer wants to write a program to solve the following quadratic equation.

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

Required:

(a) Develop a pseudocode for the above problem [6 marks]

(b) Draw an equivalent flowchart from the above pseudocode in (a) [6 marks]

(c) Write a program in C programming language to implement the above problem. [8 marks]

Question 5 (20 marks)

(a) Compare and contrast the following pairs of terms

i) Object code and source code

ii) Program and algorithm [8 marks]

(b) Develop an algorithm for a program to accept the student marks (one input only) and assign the grade according to the table below:

Marks	Grade
0 – 39	F
40 – 49	D
50 – 59	C
60 – 69	B
70 -100	A
Any other marks	Invalid

[6 marks]

(c) Write a C program for the above algorithm. [6 marks]