Kasarani Campus
Off Thika Road
Tel. 2042692 / 3
P. O. Box 49274, 00100
NAIROBI
Westlands Campus
Pamstech House
Woodvale Grove
Tel. 4442212
Fax: 4444175

KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2016/2017 ACADEMIC YEAR
SECOND YEAR, FIRST SEMESTER EXAMINATION
FOR THE DEGREE OF BACHELOR OF SCIENCE
(COMPUTER SCIENCE)

Date: 9th August, 2016.
Time: 8.30am – 10.30am

KCS 204 - DATA STRUCTURES AND ALGORITHMS

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

a) Define the terms;

i) Data structure

ii) Algorithm

(4 Marks)

b) Explain the following;

i) Importance of algorithm analysis

ii) Criteria for algorithm analysis

(4 Marks)

c) Explain the term linear data structure.

(2 Marks)

d) State the most suitable data structure to use in the following areas;

i) RDBMS

ii) Network data model

iii) Hierarchical data model.

(3 Marks)

e) Describe three operations commonly performed on any data structure.

(6 Marks)

f) Describe the operations applicable on a stack.

(5Marks)

g) Write down the prefix and post fix notation of a + b (c + d)

(6 Marks)

QUESTION TWO (20 MARKS)

a) Explain bubble algorithm, giving an advantage and disadvantage.

(4 Marks)

b) Illustrate bubble sort using the following values

40	5	25	70	15	3

(5 Marks)

c) Write a C++ program which prompts the user to enter ten(10) values into an array and sort them in ascending order. The program should display the sorted values.

(11 Marks)

QUESTION THREE (20 MARKS)

a) Describe binary tree and its property.

(6 Marks)

b) Generate a binary search tree using the following values;

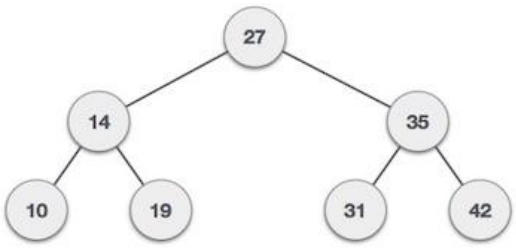
50	25	45	60	80	70	35	55	65	40

(4 Marks)

c) Explain the term tree traversal, outlining the various traversal methods.

(4 Marks)

d) Traverse the binary search tree below using all available methods;



(6 Marks)

QUESTION FOUR (20 MARKS)

a) Explain three advantages of a linked list compared to an array.

(4 Marks)

b) Describe the Heap data structure, giving a suitable example .

(4 Marks)

c) Illustrate quick sort and heap sort methods using the following data items.
24, 56 ,47, 35, 10, 90 ,82 ,31.

(12 Marks)

QUESTION FIVE (20 MARKS)

a) Describe the following search algorithms;

i) Sequential search

ii) Binary search

(6 Marks)

b) Write a C ++ program to implement the POP and PUSH functions of stack ADT.

(10 Marks)

c) Evaluate the following postfix expression;

P=xya^bc-*+ where x-4, y=3, a=2,b=7, c=5

(4 Marks)