

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

SECOND YEAR EXAMINATION FOR THE AWARD OF DIPLOMA IN COMPUTER SCIENCE

COSC 0243: DATA STRUCTURES AND ALGORITHM

STREAMS: DIP. COMPUTER SCIENCE

TIME: 2 HOURS

DAY/DATE: MONDAY 17/12/2018

11.30 A.M - 1.30 P.M.

INSTRUCTIONS:

- Answer question **ONE** and **TWO** other questions
- Do not write anything on the question paper
- This is a **closed book exam**, no reference materials are allowed in the examination room
- There will be **NO** use of mobile phones or any other unauthorized materials
- Write your answers legibly and use your time wisely.

SECTION A

QUESTION ONE: [30 MARKS]

- a. Define the following terms in data structures. [10 Marks]
- Algorithm
 - Records
 - Arrays
 - Pointers
 - Stacks
- b. State the TWO common data types and provide TWO examples of each. [6 Marks]
- c. What are the properties of a GOOD algorithm? [5 Marks]
- d. Differentiate a Stack from a Queue [3 Marks]
- e. What is a Hash Table? Name three components a Hash table should have [6 Marks]

SECTION B

QUESTION TWO: [20 MARKS]

a. Given the following array of numbers: 5,1,4,2,8, demonstrate how you would sort the data using:

- i. Bubble sort [5 Marks]
- ii. Merge sort [5 Marks]
- iii. Quick sort [5 Marks]
- iv. Selection sort [5 Marks]

QUESTION THREE: [20 MARKS]

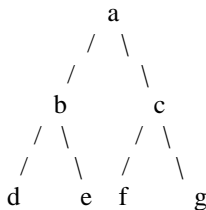
- a. Describe FOUR Common orders of growth in Big “O” notation along with descriptions and examples where possible. [10 Marks]
- b. Define a Linked Lists [2 Marks]
- c. Outline and Explain Two Advantages of Linked Lists. [4 Marks]
- d. Implement a Linked List as a self-referential structure. [4 Marks]

QUESTION FOUR: [20 MARKS]

- a. State and Explain FIVE different types of data structures and provide an example of each [10 Marks]
- b. i. What is a Pointer? ,Give an EXAMPLE [4 Marks]
- ii. Declare a Pointer using C programming syntax [6 Marks]

QUESTION FIVE: [20 MARKS]

a. List the nodes of the tree below in preorder, post order, and breadth-first order. [12 Marks]



b. Write an Algorithm for a linear array, for calling 9no.students and calculate length of the algorithm [8 Marks]

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