PAN AFRICA CHRISTIAN UNIVERSITY

(BACHELOR OF BUSINESS INFORMATION TECHNOLOGY)

END OF TERM EXAMINATION

DEPARTMENT:	**COMPUTING & INFORMATION TECHNOLOGY**
COURSE CODE:	**BIT 200**
CAMPUS:	**ROYSAMBU**
COURSE TITLE:	**DATA STRUCTURES AND ALGORITHMS**
EXAM DATE:	**FRIDAY, 09TH AUGUST 2019**
TIME:	**START HOUR – END 17:30-19:30 HRS**

INSTRUCTIONS

- This exam script has **TWO (2)** sections.
- Read all questions carefully before attempting.
- Answer All questions in Section **A** and any other Three questions in Section **B.**
- Write only your **student number** on the answer booklet provided.
- None programmable calculators permitted
- Calculators on phones, tablets and computers are NOT permitted in Theory Papers

SECTION A
(Answer ALL questions in this section)

Question 1

a) Define the term **Data Structure,** giving two examples **(2 Marks)**
b) Explain the term **Tree** as used in data structures **(2 Marks)**
c) Distinguish a **set** from an **array** **(4 Marks)**
d) Illustrate the concept of **graph** as used in data structures and algorithms **(4 Marks)**
e) Distinguish Depth-First Search from Breadth-First Search **(4 Marks)**
f) Describe **recursion** and its rationale in computing **(6 Marks)**
g) Explain any **FOUR** application areas of data structures in computing **(8 Marks)**

SECTION B
(Answer any FOUR (4) questions in this section)

Question 2

a) Describe **TWO** searching techniques used in data structures **(6 Marks)**
b) Describe the difference between STACKS and QUEUES **(4 Marks)**

Question 3

a) Explain any **THREE** features that describe tree data structure **(6 Marks)**
b) Using a well label diagram, distinguish **level** from **height** of a tree data structure **(4 Marks)**

Question 4

a) State the criteria for constructing a complete binary tree **(3 Marks)**
b) Define the following terms as used in data structures trees

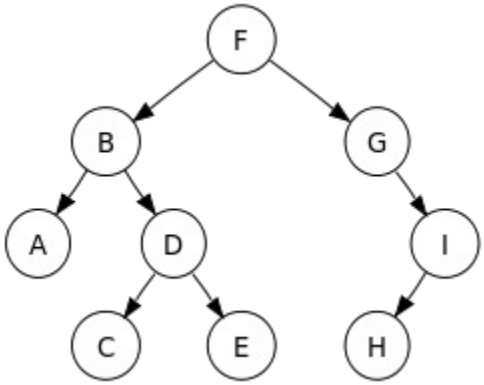
i. Search tree **(2 Marks)**
ii. Tree traversal **(2 Marks)**

c) Traverse the tree given below using the sequences given. List the elements in the nodes in the order of their respective traversals.

i. Pre-order **(1 Mark)**

ii. in-order **(1 Mark)**

iii. Post-order **(1 Mark)**



Question 5

a) Define a pointer and explain the term "pointer dereferencing" **(4 Marks)**

b) State your understanding of the term **algorithm** and write a simple algorithm to display the area of a circle **(6 Marks)**

Question 6

a) Describe the concept of **linked list** as used in data structures and algorithms **(4 Marks)**

b) It's advantageous to use singly linked list over doubly linked list. Explain. **(6 Marks)**