UGANDA MARTYRS UNIVERSITY
NKOZI

UNIVERSITY EXAMINATIONS

FACULTY OF SCIENCE

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION SYSTEMS

END OF SEMESTER FINAL   EXAM

SECOND YEAR EXAMINATION FOR BACHELOR OF INFORMATION TECHNOLOGY, GENERAL, COMPUTER SCIENCE & EDUCATION
Programming Data Structures and Algorithms

CSC2103

DATE: Thursday 8th DEC 2022   2:00 pm -   5 :00 pm
DURATION: 3HRS

Instructions:

1. *Carefully read through ALL the questions before attempting*

2. ***Answer ANY 8 Questions***

3. *No **names** should be written anywhere on the examination book.*
4. *Ensure that your **Reg number** is indicated on all pages of the examination answer booklet.*
5. *Ensure your work is **clear** and **readable**. Untidy work shall be penalized*
6. *Any type of examination Malpractice will lead to automatic disqualification*
7. *Do not write anything on the question paper.*

Qn1. Explain the following terminologies

a. Algorithm
b. Data
c. entity
d. Group data item

(10 Marks)

Qn2. Write about any three data structures.
(10 Marks)

Qn3. Explain any 5 data structure operations. (10 Marks)

Qn4. Write an algorithm which deletes the Tth element from a non empty array DATA containing N elements. (10 Marks)

Qn5. With clear examples write about the various notations used while writing expressions.
(10 Marks)

Qn6. By inspection and hand translate the following expressions from infix to prefix
   i) $d*k$ ii) $r * m \wedge j + p$ (10 Marks)
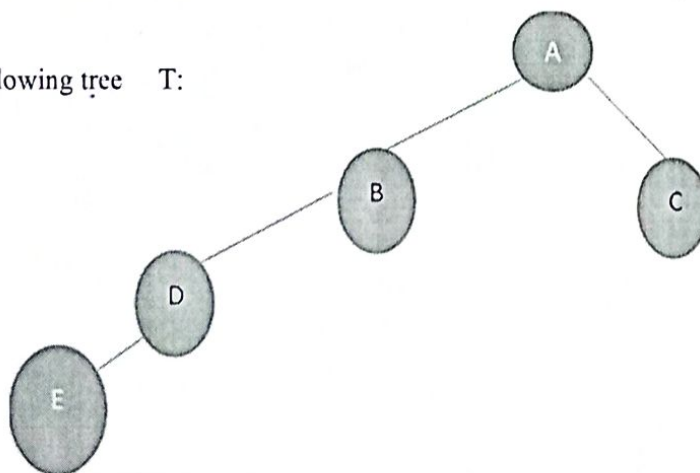
Qn7. Given the expression M: $6 * 2 + 3 - 5$

   With the help of the stack:
a). Convert M from infix to its equivalent postfix expression P   (5 Marks)
b) Evaluate   P   (5Marks)

Qn8. Given the following expression w: $a * b - c \wedge d$
a)   Give the tree T representation of the above expression W.
b)   List all the leaves   in T
c)   List all the descendants in T   (10 Marks)

Qn9. Given the following tree   T:

a)
b)   State all the right children in the above tree T.
c)   Give the height   of the above tree T.
d)   **Give the link or the single array representation of the above tree T**

(10 Marks)