



End Term Examinations (April 2019)

School: School of Engineering

Program: BCA(Data Science)

Course: Problem Solving Using Data Structure

Course Code: CSC119

Semester: II

Max Marks: 50

Duration (mins): 90 mins

Section A

Q1. Answer the following. (Any Five)

10 Marks

a) Explain with examples:

i) Linear data structure

ii) Non-Linear data structure

b) What is difference between static and dynamic memory allocation.

c) Define prefix, infix and postfix notation with example.

d) What are the front and rear pointers of queue?

e) State advantages of linked list over arrays. Explain different applications of linked list.

f) What is overflow and underflow in queues?

g) What are various Binary tree traversal techniques?

Section B

Q2. Answer the following (Any Four)

20 Marks

a) Compare asymptotic notation: Big O, Omega and Theta

b) Consider the following array

$A = \{32, 36, 41, 45, 53, 58, 64, 67, 70, 75, 78, 82, 86, 98, 99\}$ and search for element $e=58$ using binary search technique. (Solution needs to be demonstrated pictorially with solution for each iteration).

- c) Write the bubble sort algorithm/pseudocode with example
- d) Write an algorithm for evaluation of the postfix expression. Evaluate following expression using stack. Show all the steps.
- $$5 \ 6 \ 2 \ + \ * \ 12 \ 4 \ / \ -$$
- e) What is Queue? Explain circular queue and double ended queue with diagram.
- f) Define Graph. Explain any three application area of graph

Section C

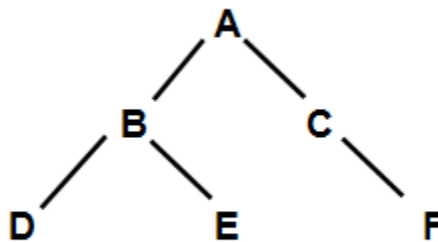
Q3. Answer the following (Any Two)

20 Marks

- a) Write a c program for memory allocation functions: malloc() and calloc()
- b) Explain selection sorting technique with algorithm. Use selection sort algorithm to sort following list of numbers:

| | | | | | | | | | |
|----|----|----|----|----|---|----|----|----|----|
| 25 | 98 | 34 | 32 | 42 | 6 | 72 | 60 | 12 | 18 |
|----|----|----|----|----|---|----|----|----|----|

- c) What is Stack? Write an algorithm and pseudocode/C code for PUSH () and POP () operations in Stack.
- d) Write and explain the procedure and diagram for inserting and deleting a node at any position in the singly linked list.
- e) What are binary trees? Enlist various binary tree traversal techniques.
Apply these techniques to traverse the following tree:



*****ALL THE BEST*****