C

(Printed Pages 4)

Roll No. _____

21/1087

B.C.A. Third Semester

Examination, 2021

Second Paper

(Data Structure Using C & C++)

Time : Three Hours | *| Maximum Marks : 75*

Note : Attempt any **five** questions. **All** questions carry equal marks.

1. (a) Define : Array, Multidimensional Array, Sparse array, Tridiadonal array. Give examples of each.   8+7

   (b) How are sparse matrices represented in memory? Write an algorithm to add two such matrices.

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2. Write an explanatory note on :   8+7

   (a) Polish Notation and its application to Computer Science.

   (b) Evaluation of Postfix Notation.

3. Explain the following with respect to the Stack Data Structure :   5+10

   (a) Overflow and underflow condition.

   (b) Applications of stack in implementing recursion.

   Give examples in support of your answer.

4. Differentiate between the following :   5+5+5

   (a) Queue and Deque

   (b) Prefix and Infix

   (c) D- Queue and Priority Queue.

5. What are the applications of linked lists in Computer Science? Why are linked list known as "dynamic data structures"? Illustrate the operations of list traversal and insertion with the help of pseudo code.   15

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6. (a) Give the recursive definition for tree. 3

(b) Define : Binary tree, complete Binary tree. 4

(c) What do you understand by Binary search tree? Construct the Binary search tree for the following numbers 102, 10, 13, 21, 4, 18, 0, 47, 6, 94. Explain how search may be carried out efficiently on this tree. 8

7. Write short notes on : 5+5+5

(a) Tree Traversal

(b) Expression Trees

(c) Path length

8. Differentiate between : 5+5+5

(a) Circular list and Doubly linked list.

(b) B-Tree and Binary Search Tree.

(c) Indexing and Searching in a B-Tree.

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9. (a) Write the recursive algorithm for inserting an element into a tree. 7

(b) Write the algorithm for converting from Infix to Post fix notation. Illustrate with an example. 8