18MCA22

Second Semester MCA Degree Examination, Dec.2019/Jan.2020
Data Structures Using C++

Time: 3 hrs.   Max. Marks: 100

Note: *Answer FIVE full questions, choosing ONE full question from each module.*

Module-1

1 a. What is data structures? Explain the classification of data structures. **(10 Marks)**
   b. Define stack and write a C++ function to implement stack operations. **(10 Marks)**

OR

2 a. Convert the following infix expression to postfix expression using stack.
      A + (B * C − (D/E * F) * G). **(12 Marks)**
   b. Design a program for Evaluation of postfix. Expression and evaluate the following
      expression 6, 2, +, 2, *, 6, 9, 7, -, /, - **(08 Marks)**

Module-2

3 a. Define Recursion. Write a function to implement factorial of a number. **(10 Marks)**
   b. List and explain various character string operations. **(10 Marks)**

OR

4 a. Explain Queue. Write a C++ function to implement the operations of Queue. **(12 Marks)**
   b. Write a function to implement circular Queue. **(08 Marks)**

Module-3

5 a. Define linked list and explain different types of linked list. **(08 Marks)**
   b. Write a function to implement singly linked list operations like
      i)   Inserting a node at the beginning
      ii) Deleting a node at the beginning
      iii) Display the contents of the list. **(12 Marks)**

OR

6 a. Explain doubly linked list and write a function to implement stack operations using the
      same. **(12 Marks)**
   b. Define header Node. Write a function to delete a node whose information is provided.
      (08 Marks)

Module-4

7 a. Construct a binary search tree for the following data 100, 50, 200, 25, 90, 150, 300, 140 and
      perform true traversals. **(12 Marks)**
   b. What is a binary tree? Explain different types of binary tree. **(08 Marks)**

OR

8   a.   Define Binary search tree. Write a function to insert an element into binary search tree.

                                                                    (12 Marks)

    b.   Construct the binary search tree for following data and list pre-order, post order and in order traversal Data values 40, 50, 30, 20, 10.   **(08 Marks)**

Module-5

9   a.   Write a function to implement Quicksort and trace the same for the input values 5, 3, 1, 9, 8, 2, 4, 7.   **(10 Marks)**

    b.   Explain Insertion sort with suitable example.   **(10 Marks)**

OR

10   a.   Explain linear search and binary search with an example for each.   **(10 Marks)**

    b.   Explain haring with example and how do you resolve the hash-clash.   **(10 Marks)**

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