CBCS SCHEME

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18MCA22

Second Semester MCA Degree Examination, Aug./Sept.2020
Data Structures using C++

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. What is the difference between data structure and abstract data type? Explain classification of data structures. **(10 Marks)**

b. Explain any four built-in string handling functions. Write a C++ program to concatenate two strings. **(10 Marks)**

OR

2 a. Briefly explain infix, prefix, postfix expressions. **(05 Marks)**

b. Define stack and convert the following infix expression to prefix and postfix expressions: $((A+(B-C)*D)\,\hat{}\,E+F$. **(05 Marks)**

c. Write a function to implement stack operations. **(06 Marks)**

d. Write a function to check the given string is palindrome or not. **(04 Marks)**

Module-2

3 a. What is recursion? Compare iterative and recursive functions. And discuss why the programmer choose one approach over the other in a particular situation. **(08 Marks)**

b. Discuss the different methods of computing GCD numbers. **(08 Marks)**

c. Write a recursive algorithm to find the factorial of N. **(04 Marks)**

OR

4 a. Explain circular queue with the pictorial representation and discuss what are the steps to be followed while inserting an element in circular queue. **(08 Marks)**

b. What is dequeue? Briefly discuss different operations that can be performed on dequeues. **(12 Marks)**

Module-3

5 a. What are the differences between static memory allocation and linked list memory allocation? **(08 Marks)**

b. Write a note on getnode( )and freenode( ). **(06 Marks)**

c. Write a C++ program to implement insert operation on singly linked list. **(06 Marks)**

OR

6 a. What is a linked list? Briefly explain different types of liked lists. **(12 Marks)**

b. Write suitable steps how to insert a node at the front end of the circular linked list. **(08 Marks)**

Module-4

7 a. What are the various terminologies normally associated with trees? Define each of them. **(10 Marks)**

b. What is a binary tree? Discuss the different traversal techniques of binary tree. **(10 Marks)**

OR

8 a. What is a Binary Search Tree? Briefly discuss BST operations. **(10 Marks)**
b. Write a note on storage representation of a binary trees. **(10 Marks)**

Module-5

9 a. Write the selection sort algorithm and sort the following data using the merge sort technique:
Data: 60, 50, 25, 10, 35, 25, 75, 30 **(10 Marks)**
b. Discuss binary search algorithm and analyze its complexity. **(10 Marks)**

OR

10 a. What is hash table? Write its strengths and weakness. **(04 Marks)**
b. What is difference between static and dynamic hashing? **(06 Marks)**
c. Write a note on collision resolving strategies. **(10 Marks)**

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