

(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 2012267

Roll No.

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B.TECH

Regular Theory Examination (Odd Sem - III), 2016-17

DATA STRUCTURES USING 'C'

Time : 3 Hours

Max. Marks : 100

Section - A

1. Attempt all parts. All parts carry equal marks. Write answer of each part in short. (10×2=20)
- a) Define time complexity and space complexity of an algorithm.
 - b) What are the merits and demerits of array data structures?
 - c) How do you push elements in a linked stack?
 - d) Differential linear and non linear data structures.
 - e) What is the significance of priority queue?
 - f) Define complete binary tree. Give example.
 - g) When does a graph become tree?
 - h) Prove that the number of odd degree vertices in a connected graph should be the even.

- i) What is sorting? How is sorting essential for database applications?
- j) Give the worst case and best case time complexity of binary search.

Section - B

Note : Attempt any 5 questions from this section.

(5×10=50)

2. What is recursion? Write a recursive program to find sum of digits of the given number. Also calculate the time complexity. [Ex: 259 = 16 = 7(Answer)].
3. Solve the following :
 - a) $((A - (B + C) * D) / (E + F))$ [Infix to postfix]
 - b) $(A + B) + *C - (D - E) ^ F$ [Infix to prefix]
 - c) 7 5 2 + * 4 1 5 - / - [Evaluate the given postfix expression]
4. Write a C program to implement the array representation of circular queue.
5. Write a C program to implement binary tree insertion, deletion with example.
6. Write the C program for various traversing techniques of binary tree with neat example.

7. What is quick sort? Sort the given values using quick sort; present all steps/iterations :
38, 81, 22, 48, 13, 69, 93, 14, 45, 58, 79, 72
8. Illustrate the importance of various traversing techniques in graph along with its application.
9. Compare and contrast the difference between B+ tree index files and B tree index files with an example.

Section - C

Note : Attempt any 2 questions from this section.

(2×15=30)

10. What is meant by circular linked list? Write the functions to perform the following operations in a doubly linked list.
 - a) Creation of list of nodes.
 - b) Insertion after a specified node.
 - c) Delete the node at a given position.
 - d) Sort the list according to descending order
 - e) Display from the beginning to end.
 11. Define AVL Trees. Explain its rotation operations with example. Construct an AVL tree with the values 10 to 1 numbers into an initially empty tree.
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NCS - 301

12. Discuss Prim's and Kruskal's algorithm. Construct minimum spanning tree for the below given graph using Prim's algorithm (Source node = a).

