

**II/IV B.Tech. DEGREE EXAMINATIONS, NOVEMBER- 2019****First Semester****CSE/IT****DATA STRUCTURES USING C****Time: Three Hours****Maximum marks:60****Answer Question No.1 Compulsory****6X2=12 M****Answer ONE Question from each Unit****4X12=48 M**

1. a) Advantages of linked list over arrays
- b) Big O notation
- c) Differences between hashing and skip lists
- d) Time complexity of Bubble and Insertion sort (s)
- e) What is a height balanced tree?
- f) Discuss the advantages of hashing

**UNIT-I**

2. a) Define Sparse matrix. Write a program to perform addition of two matrices represented using sparse matrix.
- b) What are the features of an efficient algorithm? Explain with an example.

**(OR)**

3. a) Write a program to create an array of n elements and sort the same.
- b) Define stack and give its applications. Write a functions to insert and delete elements from a stack.

**UNIT-II**

4. a) Write a brief on Dynamic memory allocation and compaction exploring their purpose.
- b) Write a program to create a sorted linked list and give a function to delete an element.

**P.T.O**

**(OR)**

5. a) Write a program to implement circular queue and different operations over it using arrays.
- b) Define a suitable data structure to represent a polynomial and write a function to add two polynomials.

### **UNIT-III**

6. What is an AVL tree? Explain the need for rotation of AVL trees. Construct an AVL Tree for the list 8,9,11,6,5,7,10 by using successive insertion. Illustrate the steps clearly.

**(OR)**

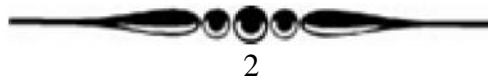
7. What is a minimum spanning tree? Explain with an example, Krushkal's algorithm for constructing a minimum cost spanning tree.

### **UNIT-IV**

8. a) Is merge sort is stable sort? Discuss. Write an algorithm for merge sort and also explain with one example.
- b) Write a function to perform linear search.

**(OR)**

9. a) Show that outcome of different passes for sorting the following sequence of data using quick sort algorithm choose the first element as pivot. 8, 11, 3, 15,6,9,12,39.
- b) How to derive the lower bounds from decision trees for sorting algorithms? Explain.



**II/IV B.Tech. (Supple) DEGREE EXAMINATIONS, JUNE 2019**

**First Semester**

**CSE/IT**

**DATA STRUCTURES USING C**

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**Answer Question No.1 Compulsory**

**6X2=12 M**

**Answer ONE Question from each Unit**

**4X12=48 M**

1. a) In an array 'int a[10]' what a, \*(a+i) represent
- b) How to initialize the elements of variables of type structure? Give example
- c) Garbage collection
- d) Differentiate binary and binary search trees
- e) Define height balanced tree
- f) Time complexity of Radix sort

**UNIT-I**

2. a) Write a brief on time and space complexity. Explain various components of space complexity?
- b) Define stack and write a program to implement stack operations.

**(OR)**

3. a) Explain the concept of sparse matrix and write a program to perform addition of two matrices represented using sparse matrix.
- b) Define an array. What are the different types of arrays? Explain in brief.

**UNIT-II**

4. a) Define a suitable structure for polynomial and write functions to add two polynomials.
- b) Explain the concept of dynamic storage management and compaction.

**(OR)**

5. a) Implement circular queue using linked list and give necessary functions to perform insertion, deletion and display of elements of the same.

**P.T.O**

- b) Write functions to insert and delete elements from circular linked list.

### **UNIT-III**

6. a) What is an AVL search tree? How do we define the height of it? Explain about the balance factor associated with a node of an AVL tree.  
b) Explain how an AVL tree can be used to sort a sequence of n elements in  $O(n \log n)$  time.

**(OR)**

7. a) Explain how to represent binary search tree with duplicates? Write a function to perform the insertion operation of binary search tree with duplicates?  
b) Explain topological sort and write the code to implement the same.

### **UNIT-IV**

8. a) Analyse the worst case performance of Quick sort and compare with Selection sort.  
b) Explain the concept of hashing and hash table representation with a suitable example.

**(OR)**

9. Write a C program to search for a given element in the integer array using binary search. Derive the time complexity of binary search.

