

**II B. TECH I SEMESTER REGULAR EXAMINATIONS, FEB - 2022**  
**DATA STRUCTURES**  
**(ELECTRICAL AND ELECTRONICS ENGINEERING)**

**Time: 3 Hours****Max. Marks: 70**

**Note:** Answer **ONE** question from each unit (**5 × 14 = 70 Marks**)

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UNIT-I

1. a) What is a data structure? Explain different types of data structures with suitable examples. [7M]
- b) Explain the concept of recursion. Arrange the following list of elements using quick sort 45, 31, 55, 77, 63, 99, 22, 88, 72. [7M]

(OR)

2. a) Demonstrate the procedure for searching the element 40 using Binary search in the following list [7M]  
11 22 30 33 40 44 45 60 66 77 80 88 90
- b) Write a C routine for insertion sort algorithm. [7M]

UNIT-II

3. a) Explain the basic operations on queue. [7M]
- b) List the applications of stacks and queues. [7M]

(OR)

4. a) Convert the following infix expression to postfix expression with neat procedure:  $(A+B) * C/D + (E+F)$ . [7M]
- b) Write an algorithm for deleting an element from the circular queue with suitable example. [7M]

UNIT-III

5. a) Differentiate singly linked list and doubly linked list. [7M]
- b) Write an algorithm that inserts a node into circular singly linked list. [7M]

(OR)

6. a) What problem occurs when we insert a node to the front of a circular linked list? Suggest a possible solution for the same. [7M]
- b) Write a C program to create a singly linked list with the following features. [7M]
  - i. To insert a node at the beginning of the list
  - ii. To delete all the occurrences of a given key element
  - iii. To display the contents of list

UNIT-IV

- 7. a) Formulate algorithms to perform insertion and deletion in a binary search tree. [7M]
- b) Construct a binary tree from the following traversals and write post order traversal. [7M]  
Preorder: A B D F G C E  
Inorder: B F D G A E C

(OR)

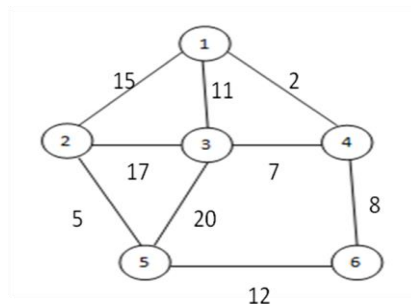
- 8. a) Draw a binary search tree corresponding to the input 25, 60, 71, 19, 30, 40, 9,10, 25, 65, 81. What will be the resultant tree after the deletion of the element 60. [7M]
- b) Give the properties of Binary trees [7M]

UNIT-V

- 9. a) Define Graph and explain how graphs can be represented in adjacency matrix and adjacency list. [7M]
- b) What is DFS? Which traversal technique is used for the DFS and also explain the concept of DFS with example. [7M]

(OR)

- 10. a) Illustrate the kruskal's algorithm for minimum cost spanning tree. [7M]
- b) Find out the minimum cost spanning tree for the following graph by prims algorithm. [7M]



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