

Code No: R21051

**R10****SET - 1****II B. Tech I Semester Regular Examinations, March - 2014****DATA STRUCTURES**

(Com. to CSE, IT, ECC)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions  
All Questions carry **Equal** Marks

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1. a) Analyze the linear search algorithm with an example.  
b) With an example, explain how you will measure the efficiency of an algorithm. (8M+7M)
2. Give an algorithm for quick sort and explain its time complexity. Trace the algorithm for the following data. 65 70 75 80 85 60 55 50 45 (15M)
3. a) Write an algorithm for converting infix expression to postfix expression.  
b) Explain the algorithm for evaluating postfix expression with suitable example (8M+7M)
4. Discuss any three types of special matrices with their implementation. Write pseudo code for adding two sparse matrices. (15M)
5. a) Give step wise procedure for in-order and post-order traversal of Binary Tree.  
b) Draw an expression tree for the given infix expression:  $a/(b*c/d+e/f*g)$  (10M+5M)
6. a) What is in order threaded binary tree? Write an algorithm for preorder traversal of a in order threaded binary tree  
b) Explain how Binary search tree is different from Binary tree? Construes a BST from the given list 9, 3, 5, 27, 4, 13, 20, 39, 46, 17 (7M+8M)
7. a) Explain the BFS technique in detail with an example.  
b) Describe various representation of graph. (7M+8M)
8. How will you represent sets using linked lists? Describe its operations using linked lists. (15M)

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**R10****SET - 2****II B. Tech I Semester Regular Examinations, March - 2014****DATA STRUCTURES**

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Answer any **FIVE** Questions  
All Questions carry **Equal** Marks

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1. a) What are the parameters on which an algorithm can be analyzed? Describe each with an example.  
b) Discuss the recursive algorithm for tower's of Hanoi problem. (8M+7M)
2. a) Explain how external sorting is different from internal sorting with an example?  
b) Explain merge sort with a suitable example. (7M+8M)
3. a) Write an algorithm for converting infix expression to postfix expression with an example.  
b) Write an algorithm to insert and delete a key in a circular queue. (8M+7M)
4. a) "Doubly linked list takes more space than singly linked list for storing one extra address". Under what conditions could be a doubly linked list be more beneficial than singly linked list.  
b) Create a circular linked list using dynamic memory allocation and show its advantages over linear linked list. (7M+8M)
5. a) What is a binary tree? Differentiate a binary tree from a binary search tree.  
b) Explain the process of displaying the nodes of a binary tree at a particular level. (7M+8M)
6. a) Explain the process of finding the minimum and maximum elements of the binary search tree.  
b) Construct a Binary Search Tree from the given values.  
45, 23, 29, 85, 92, 7, 11, 35, 49, 51 (8M+7M)
7. a) Explain the Kruskal's algorithm to find the minimum cost spanning tree with an example.  
b) What is a digraph? Define in- degree and out-degree with respect to a digraph. (10M+5M)
8. a) What are sets? Discuss their operations.  
b) Write ADT for array implementation of a queue. (5M+10M)

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**R10****SET - 3****II B. Tech I Semester Regular Examinations, March - 2014****DATA STRUCTURES**

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Time: 3 hours

Max. Marks: 75

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Answer any **FIVE** Questions  
All Questions carry **Equal** Marks  
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1. a) State various asymptotic relations used for denoting time complexity.  
b) Define algorithm? What is the criterion that every algorithm must satisfy? (8M+7M)
2. Describe insertion sort algorithm and trace the steps of insertion sort for sorting the list- 12, 19, 33, 26, 29, 35, 22, 37. Find the total number of comparisons made. (15M)
3. a) Why is circular queue better than standard linear queue? Explain.  
b) Discuss the algorithms for push and pop operations on a stack (7M+8M)
4. Write an algorithm to insert new node at the beginning, at middle position and at the end of a Singly Linked List. (15M)
5. How do you represent binary tree in a list? Write an algorithm for finding  $K^{\text{th}}$  element and deleting an element. (15M)
6. What is a binary search tree? Write an algorithm for inserting and deleting a node in a binary search tree. (15M)
7. Write Dijkstra's algorithm to find the shortest path and explain. (15M)
8. Write ADT for array implementation of polynomial addition. (15M)

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**R10****SET - 4****II B. Tech I Semester Regular Examinations, March - 2014****DATA STRUCTURES**

(Com. to CSE, IT, ECC)

Time: 3 hours

Max. Marks: 75

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Answer any **FIVE** Questions  
All Questions carry **Equal** Marks  
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1. a) Why recursive algorithms are inefficient? Analyze with the example of Fibonacci number.  
b) Explain time and space complexity related to algorithms and also state their importance  
(8M+7M)
2. Define heap. Explain heap sort with an example. (15M)
3. a) Convert the given Infix expression to Postfix expression using Stack and show the details of Stack at each step of conversion.  
Expression:  $(a + b * c ^ d) * (e + f / g)$ . Note : ^ indicates exponent operator.  
b) Mention the advantages in the array implementation of lists. (10M+5M)
4. a) Write the algorithm for interchanging the elements of position P and next(P) in a singly linked list.  
b) What are the advantages and disadvantages of circular linked lists? (8M+7M)
5. Write algorithms to perform insert, delete operations on binary tree and explain them with an example each. (15M)
6. What is Binary Search Tree? Draw a binary search tree when following keys are inserted in order 5, 75, 19, 36, 8, 62, 49, 84, 12, 18, 25. How can a binary search tree be used for sorting of the keys? (15M)
7. Give the Prim's algorithm and explain its purpose with an example and analyze the algorithm. (15M)
8. a) What are bit strings? How information storage is done using bit strings.  
b) Give the applications of sets. (10M+5M)