

Code No: R21051

R10**SET - 1****II B. Tech I Semester, Regular Examinations, Nov – 2012****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) Derive the best, average and worst case time complexities of linear search algorithm.  
b) What is recursion? Comment on the efficiency of recursive procedures.
2. Compare the advantages and disadvantages of bubble, insertion and selection sort using the following list of numbers.  
23 56 14 34 58 97 72
3. a) Explain the application of stack for conversion of infix to postfix.  
b) Explain the role of stack in function call with suitable example.
4. a) Compare singly and doubly linked list to perform insertion and deletion operations.  
b) Explain about application of single linked list to represent polynomial expressions
5. a) Explain the different methods to represent a binary tree and compare them.  
b) What is meant by tree traversal? Explain the different traversal techniques.
6. Give an algorithm for constructing a binary search tree. While constructing the tree, take care that duplicate values are not added. Trace the algorithm on 2, 5, 9, 6, 12, 10, 13, 8
7. a) What is minimum spanning tree? Name any two algorithms used to find minimum spanning tree. Explain any one in detail.  
b) Explain the graph traversal methods with suitable examples.
8. a) Briefly explain the information storage using bit strings.  
b) Write ADT operations for array implementation of a queue.

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**R10****SET - 2****II B. Tech I Semester, Regular Examinations, Nov – 2012****DATA STRUCTURES**

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Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions  
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1. a) Give the recursive algorithm to calculate GCD of two numbers.
b) Develop an algorithm for binary search. Validate the algorithm with a suitable data set.
2. a) What is sorting? Mention different types of sorting.
b) Sort the following list using heap sort algorithm.
35 45 25 11 6 85 17 35
3. a) Find the equivalent prefix of : 7 5 2 + * 4 1 5 - / -
b) What are the advantages of priority queue? Explain the implementation of Priority Queue.
4. a) Give an algorithm to reverse a singly linked circular list in place.
b) What are the advantages and disadvantages of doubly linked list over singly linked list?
Explain the applications of doubly linked lists.
5. Construct the binary tree given the following traversals:
Pre-order: A B D G H C E I F
In-order: G D H B A E I C F
6. a) Write an algorithm to perform deletion operation in Binary Search Tree.
b) What is meant by threaded binary tree? Explain the impact of such a representation on the tree traversal procedure.
7. a) Define a graph. How is it differing from tree? Give examples.
b) Write an algorithm to find the minimum cost spanning tree of an undirected weighted graph.
8. a) Briefly explain the operations of sets using linked lists.
b) Write ADT operations for linked list implementation of a queue.

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R10**SET - 3****II B. Tech I Semester, Regular Examinations, Nov – 2012****DATA STRUCTURES**

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Time: 3 hours

Max. Marks: 75

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

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1. a) When will you say an algorithm efficient? Give the notations for time complexity.  
b) Write an algorithm for recursive Fibonacci search.
2. Write a 'C' program to sort the elements whose worst and average case are  $O(n \log n)$ .
3. a) What is a stack? Give its advantages and disadvantages.  
b) Write a 'C' program to illustrate Queue operations.
4. a) Why is linked list used for polynomial arithmetic? Explain the linked representations of polynomials in detail.  
b) Write a subroutine to concatenate two singly linked lists.
5. a) Write a procedure to swap nodes in a binary tree.  
b) List all possible non-similar binary trees having four nodes.
6. Construct a binary search tree for the following:
  - i) 80, 40, 75, 30, 20, 90, 50
  - ii) 100, 50, 200, 25, 90, 80, 150
7. a) Write and explain various graphs traversal algorithms with suitable examples.  
b) What is single source shortest path problem? Describe Dijkstra's single source shortest path algorithm with an example.
8. a) How sets are to be represented in computer memory? Explain each one with a suitable example.  
b) What is ADT? Give a model for Abstract Data type.

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**R10****SET - 4****II B. Tech I Semester, Regular Examinations, Nov – 2012****DATA STRUCTURES**

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Time: 3 hours

Max. Marks: 75

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

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1. a) Using linear search, delete the number 26 from the following list of numbers and give the steps.
10 6 3 7 17 26 56 32 87
b) What is recursion? How is it different from tail recursion.
2. Write 'C' a program to sort the elements whose worst case complexity is $O(n^2)$ and average case is $O(n \log n)$.
3. a) Write 'C' a program to convert an infix expression into prefix expression.
b) Transform the following expression to post fix expression using stacks.
(a+b)*((d-e)+f)
4. Write an algorithm to perform the following operations in to linked list.
 - i) Return sum of integers in the list
 - ii) Return the length of the list
5. a) Give an iterative algorithm for the in order traversal of a binary tree.
b) Is it possible to implement binary trees using linear arrays? If yes, explain how?
6. a) How does the height of a binary search tree affect its performance? Explain with an example.
b) List the differences between binary tree and binary search tree.
7. a) How are graphs represented inside a computer's memory? Which method do you prefer and why?
b) Draw a complete undirected graph having five nodes.
8. a) What are sets? How they are different from arrays? Give their applications.
b) Write ADT operations for stacks using linked lists.