

**II B.Tech I Semester Regular Examinations, November 2005**  
**DATA STRUCTURES THROUGH C**  
**( Common to Mechanical Engineering, Mechatronics, Metallurgy &**  
**Material Technology, Production Engineering, Aeronautical Engineering**  
**and Automobile Engineering)**

**Time: 3 hours**

**Max Marks: 80**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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1. Write a C program to sort the given n number of strings. [16]
2. Write an algorithm to create a doubly linked list of integer elements and do the following operations
  - (a) Add a node at given locations
  - (b) Delete a node from the given location. [8+8]
3.
  - (a) Explain how is stack represented as an abstract data type.
  - (b) Explain nesting depth and parenthesis count using stacks with suitable examples. [8+8]
4. Write algorithms for various operations performed on queues and explain with a suitable example. [16]
5. Write a C program to create a tree and traversing the same in preorder and post order [16]
6.
  - (a) Write relative merits and demerits of different graph representations.
  - (b) What is spanning tree? When is it called a minimum spanning tree? [8+8]
7. Write an algorithm for linear search and explain with a suitable example [16]
8. Write a C program to implement quicksort [16]

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1. Write a C program to find the trace of the given matrix(sum of diagonal elements)  
[16]
2. (a) What are the advantages and disadvantages of linear linked lists.  
(b) Write the applications of singly linked list, double linked list and circular linked lists. [5+11]
3. (a) Write algorithm for push and pop operations on stack.  
(b) Explain nesting depth and parenthesis count using stacks with suitable examples. [8+8]
4. Explain how shall a queue be represented in C with different queue operations. [16]
5. Write a C program to show basic operations on a tree. [16]
6. What are different graph traversal methods. Explain them with neat sketches.[16]
7. Write a C program for implementing the linear search and search for the specified number in the stack. [16]
8. Write a C program to perform selection sort and arrange the same in the stack. [16]

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1. Write a C program to sort the given n number of strings. [16]
2. Design an algorithm to split a circular list into two circular lists. such that the alternative records are in two different lists. Illustrate with a suitable example situation. [16]
3. (a) Write a 'C' Program to convert a prefix string to infix string .  
(b) Consider the following arithmetic expression in prefix notation:  
++ A -\* \$BCD/ + EF\*GHI  
Find the equivalent infix form of the above. [8+8]
4. (a) Define queue. Explain how to represent queues in terms of arrays and linked lists  
(b) A queue is maintained in an array, and F and R are the front location and rear location of the queue respectively. Obtain a formula for N, the number of elements in the queue in terms of F and R.  
(c) Explain the difference between general queue and circular queue. [6+5+5]
5. (a) Define Binary tree. Explain basic operations on Binary tree.  
(b) Write C program for inorder and postorder traversal of a Binary tree. [6+10]
6. (a) Write C function for minimum spanning tree of a weighted undirected graph  
(b) Write a C program to implement depth first traversal of graph. [10+6]
7. Write an algorithm for binary search and explain with a suitable example [16]
8. Sort the following numbers using selection sort  
16,91,108,4,75,82,27,32  
and write a C program to implement the same. [16]

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1. Write a C program to print the Magic square [16]
2. Formulate insertion and deletion operations for a Queue which is represented by a circular list. [16]
3. perform the following tasks using stack primitive operations:
  - (a) Set i to the second element from the top of the stack, leaving the stack without its top two elements
  - (b) Given an integer n, set i to the nth element from the top of the stack, leaving the stack without its top n elements. [8+8]
4. (a) Define queue. Explain how to represent queues in terms of arrays and linked lists  
(b) A queue is maintained in an array, and F and R are the front location and rear location of the queue respectively. Obtain a formula for N, the number of elements in the queue in terms of F and R.  
(c) Explain the difference between general queue and circular queue. [6+5+5]
5. (a) Differentiate between complete binary tree and strictly binary tree.  
(b) Write a C program for post order traversal of a tree. [6+10]
6. What are different graph traversal methods. Explain them with neat sketches.[16]
7. Write an algorithm for binary search and explain with a suitable example [16]
8. Write a C program for tree sort and sort the numbers using the same.  
108,34,56,23,103,45,3. [16]

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