

II B.Tech I Semester Supplementary Examinations, November 2006
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

1. Write a program to find the sum of all digits in a given number. Repeat this operation successively until the result is a single digit. [16]
2. (a) Formulate an algorithm that will change the INFO field of the K th node of a linked list value given by Y.
(b) Formulate an algorithm which will perform a deletion operation in a single linked list. [8+8]
3. (a) Write a 'C' Program to convert an infix expression into prefix expression
(b) Transform the following expression to prefix, using the approach
 $(A + B) * (C * (D - E) + F) - G$ [8+8]
4. (a) Mention and explain various types of queues and give an example for each
(b) Compare various types of queues. [8+8]
5. Write a C program for creating, inserting and deletion in a Binary tree. [16]
6. (a) List and explain about the basic operations on a graph.
(b) Write a C program for depth first search of a graph. [7+9]
7. (a) Using linear search delete the number 17 from the list of numbers and give the steps.
42,12,10,91,17,59.
(b) Write a C program to implement the same. [8+8]
8. Write an algorithm for quick sort. What is its time complexity. [16]

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1. Write a C program to print the lower triangular of a given square matrix. [16]
2. Write an algorithm to perform each of the following operations to a linked list.
 - (a) Return the sum of the integers in a list.
 - (b) Return the number of elements in a list. [8+8]
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) Mention and explain various types of queues and give an example for each
 - (b) Compare various types of queues. [8+8]
5.
 - (a) Describe different types of trees.
 - (b) Write a C program to implement Binary tree. [6+10]
6.
 - (a) List and explain about the basic operations on a graph.
 - (b) Write a C program for depth first search of a graph. [7+9]
7.
 - (a) Distinguish between linear and binary search methods.
 - (b) Write an algorithm for non-recursive binary search method. [8+8]
8. Write an algorithm for quick sort. What is its time complexity. [16]

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1. Write a C program to Perform the following string operations:
 - (a) Find length of a given string
 - (b) Reverse a given string. [6+10]
2. Design insertion and deletion algorithms for a doubly linked circular lists. [16]
3.
 - (a) Derive a method to convert a postfix expression into its prefix form
 - (b) Consider the following arithmetic expression in postfix notation: 7 5 2 + * 4
1 5 - / -
 - i. Find the equivalent prefix form of the above .
 - ii. Obtain the computed value of the expression from its postfix notation [8+4+4]
4.
 - (a) Mention and explain various types of queues and give an example for each
 - (b) Compare various types of queues. [8+8]
5. Write a C program for creating, inserting and deletion in a Binary tree. [16]
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.
 - (a) Using linear search delete the number 26 from the list of numbers and give the steps.
10,7,17,26,32,92
 - (b) Write a C program to implement the same. [8+8]
8.
 - (a) compare quick sort and heap sort methods.
 - (b) Explain quick sort method for the elements.
11,51,71,21,61,41,91,31, [8+8]

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1. Write a C program to remove duplicate elements from a given array. [16]
2. (a) Define a doubly linked list. Write an algorithm to insert and delete a node in a doubly linked list.
(b) List the applications of doubly linked lists. [12+4]
3. (a) Derive a method to convert a postfix expression into its prefix form
(b) Consider the following arithmetic expression in postfix notation: 7 5 2 + * 4 1 5 - / -
 - i. Find the equivalent prefix form of the above .
 - ii. Obtain the computed value of the expression from its postfix notation [8+4+4]
4. (a) Mention and explain various types of queues and give an example for each
(b) Compare various types of queues. [8+8]
5. (a) Describe different types of trees.
(b) Write a C program to implement Binary tree. [6+10]
6. (a) List and explain about the basic operations on a graph.
(b) Write a C program for depth first search of a graph. [7+9]
7. (a) Using linear search delete the number 26 from the list of numbers and give the steps.
10,7,17,26,32,92
(b) Write a C program to implement the same. [8+8]
8. (a) Write an algorithm for selection sort
(b) Sort the following numbers using selection sort and give the required steps.
96,31,27,42,34,76,61,10,4 [8+8]
