

Time: 3 Hours

DECEMBER 2015

Max. Marks: 100

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE:

- Question 1 is compulsory and carries 28 marks. Answer any FOUR questions from the rest. Marks are indicated against each question.
- Parts of a question should be answered at the same place.

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- Q.1**
- Explain different data types used in 'C' programming Language.
 - Write a C function to traverse a circular linked list.
 - Write the algorithm for selection sort.
 - Write the recursive algorithms for in-order and post-order binary tree traversal.
 - Explain the adjacency matrix representation for graph data structure.
 - Define Multi way search tree.
 - Convert the expression $A*B+C/D-F$ to equivalent Prefix and Postfix notations. (7×4)
- Q.2**
- Write a C program to find the sum of first n natural numbers where n is entered by user. (5)
 - What is pointer variable? Write a C program to copy one string to another, using pointers and without using library functions. (5)
 - Define structure. How structures are declared? Discuss with the help of program how the members of a structure can be accessed? (8)
- Q.3**
- Write an algorithm or C function to insert a new node at the end of singly linked list. (5)
 - How the sparse matrix is represented in memory? (5)
 - Suppose a two dimensional array A is declared as A (1: 5, 1: 4). Assume the base address to be 500 and that each element requires 2 words of storage. Calculate the address of A[4,3] if the array is stored in
 - Row Major Order
 - Column major order(4+4)
- Q.4**
- What do you understand by STACK? Write a C program for array implementation of STACK data structure. (9)

- b. What do you mean by Queue data structure? Write the algorithms or C function for inserting & deleting an element in linked list based implementation of queue data structure. (9)
- Q.5** a. What is threaded binary tree? Write a function in C that traverses a threaded binary tree in in-order. (9)
- b. Define Binary search tree. Write an algorithm to insert a new element in a binary search tree. (9)
- Q.6** a. Write a C function to implement Merge sort. Also compute the time complexity of merge sort. (9)
- b. What is minimum spanning tree? Write & explain Kruskal algorithm for finding minimum spanning tree. (9)
- Q.7** a. Explain the Buddy system approach used for dynamic memory management. (9)
- b. Define B – tree. Explain the procedure of inserting a new element in B Tree. (9)