



PAPER ID : 1072-N

TCS-407

Printed Pages : 4

Paper ID and Roll No. to be filled in your Answer Book

Roll No.

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B. Tech.

(SEM. IV) EXAMINATION, 2009

DATA STRUCTURE USING 'C'

Time : 3 Hours]

[Total Marks : 100

1 Attempt any four part :

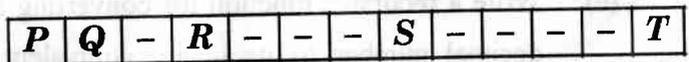
- (a) A structure 'S' contains a string and a float as its members. Write a function to initialize and display 'S'. 5
- (b) Give an example of passing pointers to a function. What is a pointer to a pointer. 5
- (c) Evaluate the postfix expression giving contents of the stack after each step 5
 $6\ 5\ 2\ 3 + 8 * + 3 + *$
- (d) What is Big 'O' notation and for what is it used for. Give examples of $O(1)$, $O(n)$ and $O(n \log n)$ algorithms. 5
- (e) Write a recursive function for converting a decimal number to its binary equivalent. 5

2 Attempt any **four** parts :

- (a) Write functions for initialization, insertion and deletion in a queue. 5
- (b) What is a circular queue. Write functions for initialization and emptying a circular queue implemented by an array. 5
- (c) Write a function for deleting all the odd numbered nodes of a singly linked list. 5
- (d) Write the node structure for a term of a polynomial represented by a singly linked list. Write down the steps for addition of two polynomials. 5
- (e) How will you represent a stack using a linked list ? Write a function for checking a stack overflow. 5

3 Attempt any **four** parts :

- (a) Prove that the maximum number of nodes in a binary tree of height ' h ' is $2^{h+1} - 1$, $h \geq 0$.
Compute the number of edges for a binary tree with ' m ' nodes.
- (b) How will you represent a binary tree by arrays.5
Construct a tree from the array



Where (-) represents no element.

- (c) Write functions for traversing a binary tree, represented by a linked list, in any two orders. 5
- (d) Write the Huffman's algorithm for representing the following coding scheme : 5

Character	Code	Frequency	Bit
a	001	10	30
e	01	15	30
i	10	12	24
s	00000	3	15
t	0001	4	16
spae	11	13	25

- (e) What is hashing ? Write two functions for hashing. 5

4 Attempt any two parts :

- (a) Write a program for quick sorting. Run your code on the following data set : 10
31, 0, 13, 43, 26, 57.
What is the complenity of quick sort under various conditions ?
- (b) Explain any two methods of graph representation. 10
Write and run a function for BFS of a graph.
- (c) Write a function for checking whether a binary tree is complete on not. Explain AVL tree and B-trees with example. 10

- (d) Show all steps of Kruskal's algorithm for the following graph : 10

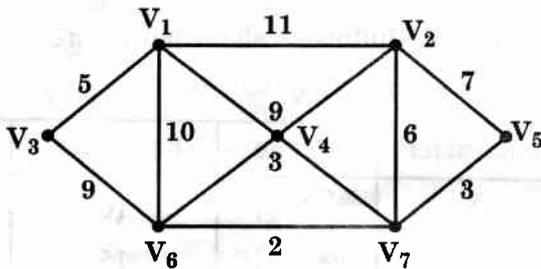


Fig.

5 Attempt any two :

- (a) List eight functions of C-file system. Show with the help of a function the working of *fscanf()* and *fprintf()* functions. 10
- (b) Explain the use of random file access functions. What are the user of these functions, give examples ? 10
- (c) Write functions for deletion of a node in a doubly linked list. Consider all possibilities. How will you check an overflow in a doubly linked list ? 10
- (d) Radix sort is an example where linked list can be used, how. Give complete function and an example. 10