PAPER ID

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 $2^{h+1} - 1$, $h \geq 0$. 5

Compute the number of edges for a binary tree with 'm' nodes.

(b) How will you represent a binary tree by arrays. Construct a tree from the array 5

P	Q	–	R	–	–	–	S	–	–	–	–	T

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. Write and run a function for BFS of a graph. 10

(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**

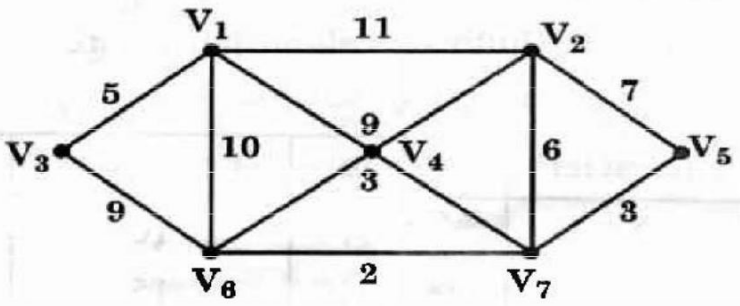

Fig.

5 Attempt any **two** :

(a) List eight functions of C-file system. Show with the help of a function the working of *f*scan*f*( ) and *f*print*f*( ) functions.

(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**
