

B.TECH.

THEORY EXAMINATION (SEM-IV) 2016-17

DATA STRUCTURE

Time : 3 Hours

Max. Marks : 100

Note : Be precise in your answer. In case of numerical problem assume data wherever not provided.

SECTION A

1. Answer all the questions.

10x2=20

- Given a 2-D Array A [-100: 100, -5: 50]. Find the address of element A [99, 49] considering base address 10 and each element requires 4 bytes for storage. Follow row major order.
- Write down the difference between static and dynamic memory.
- What is the advantage of doubly linked list over singly linked list? What is an algorithm?
- What is recursion? A recursive procedure should have two properties. What are they?
- Define the following: (i) Tree (ii) Level of a node. (iii) Height of a tree.
- Write down any four applications of queues.
- Define garbage collection and compaction
- What is a sparse matrix? How is it stored in the memory of a computer?
- Differentiate between Linear and Non-Linear Data Structures with examples.
- Define adjacency matrix with suitable example.

SECTION B

2. Answer any five questions from this section. 5x10=50

- Explain Breadth First Search with suitable example.
- Explain Kruskal's algorithm to find minimum spanning tree in a weighted directed graph. Can there be two minimum spanning trees of given weighted directed graph?
- Convert $E=abcde^{**}+$ postfix expression to infix and prefix using stack.
- Write an algorithm for finding solution to the Towers of Hanoi problem. Explain the working.
- Write a C-Function for Linked List Implementation of stack. Write all the Primitive Operations.
- Perform the Merge Sort on following set of elements. Also, write merge sort algorithm. 18, 25, 4, 26, 10, 15, 20, 5.
- Why circular queue is used over simple queue? Write algorithms to implement all operations in a circular queue using arrays.
- Explain binary search tree and its operations. Make a binary search tree for the following sequence of numbers, show all steps : 45,32,90,34,68,72,15,24,30,66,11,50,10 .

SECTION C

Answer any two questions of the following. Each question carries equal marks. 2x15=30

3. a) Draw a binary tree which has following traversal

Inorder : D J G B A E H C F I

Preorder : A B D G J C E H F I

b) Explain threaded binary tree with suitable example.

4. i) What are doubly linked lists? Write a C program to create doubly linked list.

ii) Define internal sorting techniques

5. Write short notes on any three of the following.

- a) Huffman Algorithm
- b) Depth First Search
- c) Priority Queue
- d) Abstract Data Type(ADT)

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