

B. TECH
(SEM-III) THEORY EXAMINATION 2019-20
DATA STRUCTURES

Time: 3 Hours

Total Marks: 70

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.**SECTION A**

1. **Attempt all questions in brief.** **2 x 7 = 14**

a.	Define the term Array. What are various ways of representing two-dimensional array in memory?
b.	What is the condition of circular queue to check if circular queue is full.
c.	What is basic difference between a binary tree and a threaded binary tree?
d.	Define multigraph and pendant vertex
e.	Differentiate between linear and non-linear data structure.
f.	What is a Multi-way search tree?
g.	What are the number of edges in a complete undirected graph with n vertices.

SECTION B

2. **Attempt any three of the following:** **7 x 3 = 21**

a.	What is sparse matrix? How are sparse matrices stored efficiently in the computer's memory? Also explain the upper triangular and lower triangular sparse matrices.
b.	What are the advantages of linked list over array? Write an algorithm/C code to insert a node at the end of a singly linked list.
c.	Convert the given infix expression into postfix expression and evaluate it using stack: $5*(6+2)-12/4$
d.	Why is Huffman coding technique used? Create Huffman's coding for the following string "duke blue devils"
e.	Construct the binary tree from the following traversal: Post Order: 9,1,2,11,7,5,3,11,4,8 In order: 9,5,7,2,12,8,4,3,11

SECTION C

3. **Attempt any one part of the following:** **7 x 1 = 7**

(a)	What is a AVL Tree? Construct the following elements in the given order. 63,9,19,27,18,108,99
(b)	What do you mean by queue? Write a C program for array implementation of queue using linked list.

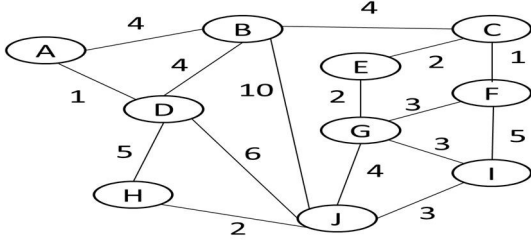
4. **Attempt any one part of the following:** **7 x 1 = 7**

(a)	What do you mean by stack? What do you mean by overflow and underflow condition? Write an algorithm/C function for push and pop operations.
(b)	What is Linear probing? Describe the pros and cons of linear probing. Also suggest to avoid primary clustering, what are the other techniques to be used

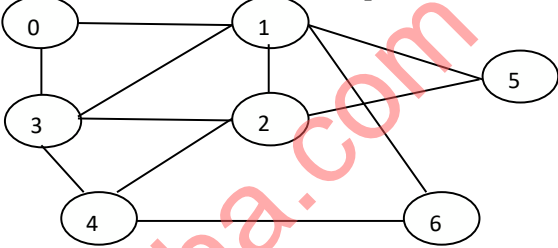
5. **Attempt any one part of the following:** **7 x 1 = 7**

(a)	What is Quick sorting technique? Sort the following array using quick sort: 24,56, 47, 35, 10, 90, 82 ,31
(b)	Write an algorithm/C program that reverses the order of all the elements in a singly linked list.

6. Attempt any *one* part of the following: 7 x 1 = 7

(a)	<p>What is spanning tree? Find a minimum cost spanning tree by kruskal's algorithm of the following graph. Also explain the complexity.</p> <div style="text-align: center;">  </div>
(b)	<p>Differentiate between linear search and binary search techniques? Write a C program to search an element in an array using binary search. Also write its time complexity.</p>

7. Attempt any *one* part of the following: 7 x 1 = 7

(a)	<p>Implement Breadth First Search algorithm to find the shortest path from the following graph:</p> <div style="text-align: center;">  </div>
(b)	<p>Explain various types of Queues? Why circular queue is more desirable than linear queue? Explain applications of queues.</p>

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