C

Reg. No. : | | | | | | | | | | | | |

Question Paper Code: U4410

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2024

Fourth Semester

Electronics and Communication Engineering

21UEC410 DATA STRUCTURES AND PROGRAMMING TECHNIQUES

(Regulations 2021)

Duration: Three hours | Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. Linked list data structure offers considerable saving in ____ CO1- U

   (a) Computational Time (b) Space Utilization

   (c) Space Utilization and Computational Time (d) None of the mentioned.

2. Given pointer to a node X in a singly linked list. Only one pointer is given, pointer to head node is not given, can we delete the node X from given linked list? CO2- App

   (a) Possible if X is not last node.

   (b) Possible if size of linked list is even.

   (c) Possible if size of linked list is odd.

   (d) Possible if X is not first node.

3. The queue, which wraps around upon reaching the end of the array is called ___. CO3-App

   (a) Priority Queue (b) Queue (c) Circular Queue. (d) None of the above

4. B- Tree restricts the number of keys in a node between _____. CO1- U

   (a) m to 2m (b) m/2 to m-1 (c) m/2 to m+1 (d) m/2 to m

5. How a stack can be implemented? CO1- U

   (a) Using arrays (b) Using linked lists (c) Both (a) & (b) (d) None of the above

PART – B (5 x 3= 15 Marks)

6. State the difference between arrays and linked lists? CO1-U

7. Write the routine for insertion operation of singly linked list. CO2-App

8.		Write down the operations that can be done with queue data structure?	CO1-U	
9.		Define Graph, Path, Degree and Cycle.	CO1-U	
10.		Draw a 2-3 tree with the keys 1, 2 3, 4, 5.	CO2-App	

PART – C (5 x 16= 80 Marks)

11.	(a)	Given a list 10,20,30,40 generalize the steps along with the routine and pictorial representation to insert a node from the beginning of the singly linked list, deletion of last node in the list, searching the second node in a list and traversing the whole list	CO2-App	(16)
		Or		
	(b)	Construct an algorithm and develop the coding for doubly linked list for the following operations: a) Creation of a list b) Display the List c) Insertion of a node d) Deletion of a node and also explain the performance of the operation with neat diagrammatic representation.	CO2-App	(16)
12.	(a)	Explain the various operations for array implementation of lists	CO1-U	(16)
		Or		
	(b)	Describe how elements can be inserted and deleted in a circular linked list.	CO1-U	(16)
13.	(a)	Convert Infix Expressions into Postfix Expressions (i) (A +B *(C-D))/ E. (ii) A+B*C/D –E	CO1-U	(16)
		Or		
	(b)	Apply Enqueue and dequeue operations on Circular Queue.	CO1-U	(16)
14.	(a)	Describe the insertion and deletion operations performed on stack	CO1-U	(16)
		Or		
	(b)	Explain the routines used to insert and delete an element in a priority queue.	CO1-U	(16)
15.	(a)	Construct a binary tree if the preorder and in order outputs are given. Preorder traversal: A B D G H E I C F J K Inorder traversal: G D H B I E A C J F K Also, find the post order traversal output.	CO2-App	(16)
		Or		

(b) Find a shortest path between any two vertices of a weighted graph or digraph and Estimate the efficiency of Dijkstra's Algorithm. CO2-App (16)