Winter Semester 2022-2023

CAT – 1I

SLOT: C1 + TC1

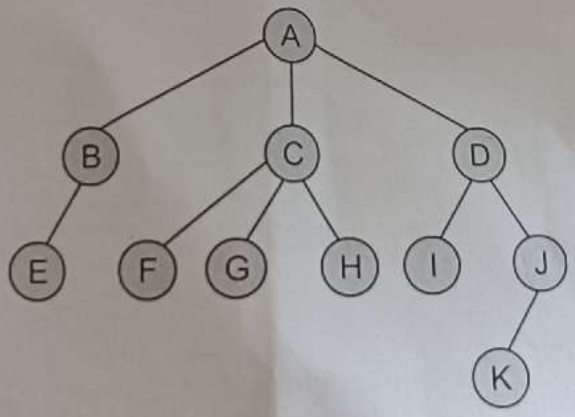
me Name &Branch: B.Tech – Computer Science and Engineering & Specializations

Name & code: Data Structures and Algorithms & BCSE202L

ion: 90 Min. **Maximum Marks: 50**

Answer all questions.

tructions: Wherever steps required, they must be explained clearly (with diagrams, if required).

.No.	Question	Max Marks
1.	**a)** Develop a pseudocode and illustrate with neat diagrams to group all odd nodes followed by the even nodes for the given singly linked list 2,1,3,5,6,4,7 **Note :** Consider the first node is odd and the second node is even and so on	6 Marks
	b) Develop a pseudocode to find the node having the largest value in the circular linked list having the values 20, `14, 181, 100. Assume that the circular linked list is having only one reference 'last/tail' and the reference 'head' is not available. **Hint:** The first node is the next of 'last/tail'.	4 Marks
2.	**a)** Convert the following generic tree to binary tree and write the postfix expression of the obtained binary tree [5+2]:  	7 Marks 3 Marks
	b) Given the infix expression OQRSPT and the prefix expression RQOTSP, construct the corresponding binary tree. Assume the capital alphabets are the nodes of the tree.	
	a) Construct a Binary Search Tree (BST) for the following sequence of numbers 50, 70, 60, 20, 90, 10, 40, 80, 110, 30, 75, 65	6 Marks
	b) In the above Binary tree, delete the node having the value 70 and obtain the resulting binary tree. Which ... place the deletion node) did you use in	4 Marks

4.	Apply the heapsort to the following characters using maxheap and extract the top 3 characters (i.e., in descending order). Show the heapified tree after each extraction (of the root). Note: You are not expected to sort the whole given characters. Do the sorting up to 3 characters only. 'E','D','U','C','A','T','I','O','N'	10 Marks
5.	Sort the given numbers 9,7,5,11,12,2,14,3,10,6 in the increasing order. Identify the type of sorting and fill the following blanks (given are step 0 and step 1). 9 | 7 | 5 | 11 | 12 | 2 | 14 | 3 | 10 | 6 5 | 2 | 3 | 6 | 12 | 7 | 14 | 9 | 10 | 11	10 Marks