

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

Name & code: Data Structures and Algorithms & BCSE202L

Duration: 90 Min.

Maximum Marks: 50

Answer all questions.

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

No.	Question	Max Marks
1.	<p>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  <b>Note</b> : Consider the first node is odd and the second node is even and so on</p> <p>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. <b>Hint</b>: The first node is the next of 'last/tail'.</p>	6 Marks
2.	<p>a) Convert the following generic tree to binary tree and write the postfix expression of the obtained binary tree [5+2]:</p> <div style="text-align: center;"> <pre> graph TD     A((A)) --- B((B))     A --- C((C))     A --- D((D))     B --- E((E))     C --- F((F))     C --- G((G))     C --- H((H))     D --- I((I))     D --- J((J))     J --- K((K))             </pre> </div>	7 Marks
	<p>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.</p>	3 Marks
	<p>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</p>	6 Marks
	<p>b) In the above Binary tree, delete the node having the value 70 and obtain the resulting binary tree. What is the replacement node (the deletion node) did you use in</p>	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.

10 Marks

'E','D','U','C','A','T','I','O','N'

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).

10 Marks

9	7	5	11	12	2	14	3	10	6
---	---	---	----	----	---	----	---	----	---

5	2	3	6	12	7	14	9	10	11
---	---	---	---	----	---	----	---	----	----


