

**B. Tech. SEM -II (Computer Science & Business Systems) (CBCS  
2018 Course) : SUMMER - 2019**

**SUBJECT: DATA STRUCTURE & PROBLEM SOLVING**

Day : Monday  
Date : 27/05/2019

**S-2019-2521**

Time : 10.00 AM To 01.00 PM  
Max Marks : 60

N.B.:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Assume suitable data if **NECESSARY**.

**Q.1** What is recursion? Why is it used? How are recursive algorithms analyzed? (10)  
Explain in detail.

**OR**

**Q.1** Define and explain the asymptotic notations for expressing algorithm analysis (10)  
with the help of appropriate example.

**Q.2** What is a Queue? How is a circular queue different from a linear queue? Explain (10)  
the operations on circular queue with its algorithm.

**OR**

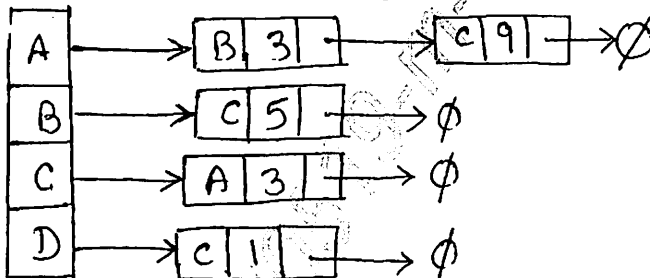
**Q.2** Why are linked lists advantageous over arrays? Explain the procedure of inserting (10)  
into a linked list which maintains the data in a sorted order.

**Q.3** Why are AVL trees needed? With suitable example explain the balancing (10)  
techniques for AVL trees.

**OR**

**Q.3** With a neat diagram and example, explain any non-recursive traversal of a binary (10)  
tree.

**Q.4** Write an algorithm for generating minimum cost spanning tree using Kruskal's (10)  
method. Consider the following graph represented using Adjacency list



Find the minimum Spanning tree for the above graph using Kruskal's method.

**OR**

**Q.4** With a suitable example explain the depth first traversal of a graph. What is the (10)  
use of this traversal method?

**Q.5** Sort the following data using merge sort. Show all passes: (10)  
22, 3, 55, 2, 60, 10, 50, 14, 36, 18

What is the complexity of merge sort in best and worst case?

**OR**

**Q.5** Apply binary search on the following numbers and show all comparisons till the (10)  
termination of search.

23, 76, 17, 9, 57, 90, 45, 38, 100, 79, 50

The numbers -10 and 17 are to be searched from the list.

**Q.6** What is a file? List the different modes of opening files. Explain the Direct Access (10)  
File organisation in brief.

**OR**

**Q.6** What is collision? What are different collision resolution techniques? Explain any (10)  
one in detail.

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