

Reg. No. : .....

Name : .....

**Fourth Semester B.Sc. Degree Examination, May 2021**

**First Degree Programme under CBCSS**

**Computer Science**

**Complementary Course for Statistics and Mathematics**

**CS 1431.2/CS 1431.3 : DATA STRUCTURES AND ALGORITHMS**

**(2013 and 2015 Admn)**

Time : 3 Hours

Max. Marks : 80

**SECTION – A (Very Short Answer Type)**

**(One word to maximum of one sentence. Answer all questions).**

1. Give any two examples for data structures.
2. Name the data structure that is known as First In First Out.
3. List two properties used for measuring the performance of an algorithm.
4. What do you mean by best case for the time required by an algorithm?
5. What is an array?
6. Name the two basic operations on stack.
7. Give two sorting algorithms that follows divide and conquer approach.
8. What is a leaf node in a tree?

9. What is a graph?
10. Name the different types of tree traversal.

(10 × 1 = 10 Marks)

SECTION – B (Short Answer)

(Not to exceed **one** paragraph, answer any **eight** questions. Each question carries **two** marks).

11. What do you mean by space complexity?
12. What is column major ordering?
13. What are the advantages of linked list over arrays?
14. What is a binary search tree?
15. What is a connected graph?
16. What are the applications for a stack?
17. What is Big oh notation?
18. How will you create a node in a singly linked list?
19. What do you mean by linked list representation of binary tree?
20. What is a sparse matrix? How will you represent sparse matrix using linked list?
21. How will you represent polynomials using arrays?
22. What do you mean by dynamic memory allocation?

(8 × 2 = 16 Marks)

### SECTION – C (Short Essay)

(Not to exceed **120** words, answer any **six** questions. Each question carries **four** marks).

23. Explain the characteristics of an algorithm.
24. Explain two dimensional arrays.
25. Explain with algorithm, the PUSH operation on stack.
26. Differentiate prefix and postfix notations.
27. Write down the algorithm to delete an element from a circular queue.
28. Explain a circular singly linked list.
29. Explain AVL trees.
30. Explain linked list representation of a graph.
31. Write the algorithm for quick sort.

(6 × 4 = 24 Marks)

### SECTION – D (Long Essay)

(Answer any **two** questions. Each question carries **15** marks).

32. Explain with algorithm the concept of binary search.
33. Explain with algorithms the operations on Queue.
34. Explain Depth First Search Algorithm.
35. Explain merge sort algorithm.

(2 × 15 = 30 Marks)