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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

(2019 Admission Regular)

Time : 3 Hours

Max. Marks : 80

SECTION – A [Very Short Answer Type]

[1 word to maximum of 1 sentence. Answer all questions]

1. Name the operations on stack.
2. What is an array?
3. What is a graph?
4. What is a queue?
5. What is a circular singly linked list?
6. What is a tree?
7. What is a stack?

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8. What is a full binary tree?
9. Name the data structure that is used for depth first traversal of a graph.
10. What is a set?

(10 × 1 = 10 Marks)

SECTION – B [Short Answer]

[Not to exceed **1** paragraph, answer **any eight** questions. Each question carries **2** marks]

11. What do you mean by adjacent vertices in a graph?
12. What do you mean by breadth first search?
13. What are the operations that can be implemented in a linked list?
14. What do you mean by closed path in a graph?
15. Name two types of graph traversal algorithm.
16. What are disjoint sets? Give example.
17. Give the syntax and example for initializing two-dimensional array.
18. What do you mean by column major order in two-dimensional array?
19. What is a structure?
20. Explain representation of set in set builder form.
21. What do you mean by priori analysis of an algorithm?
22. What do you mean by degree of node in a graph?
23. Mention four types of linked list.

24. Give any two applications of queues.
25. What is an AVL tree?
26. What is the purpose of adjacency list in a graph?

(8 × 2 = 16 Marks)

SECTION – C (Short Essay]

[Not to exceed **120** words, answer **any six** questions. Each question carries **4** marks]

27. What do you mean by time complexity of an algorithm?
28. Explain the concept of a recursive algorithm.
29. Explain the concept of merge sort.
30. Explain doubly linked list.
31. Explain the linked list implementation of inserting an element into stack.
32. Differentiate directed and undirected graphs.
33. Differentiate static and dynamic data structures.
34. Explain :
 - (a) Weighted graph
 - (b) Simple graph.
35. Write an algorithm to delete an element from a circular Queue.
36. What are the advantages of using binary search tree?
37. Write an algorithm for traversal in a singly linked list.
38. Explain the concept of array of pointers.

(6 × 4 = 24 Marks)

SECTION – D [Long Essay]

[Answer **any two** questions. Each question carries **15** marks]

39. Explain the concept of arrays and write algorithms for insertion and deletion in arrays.
40. Explain the insertion and deletion operation in Queues.
41. Explain the different binary tree traversals.
42. Explain with illustration of the algorithm.
43. Explain binary search algorithm with an example.
44. Explain set operations with examples.

(2 × 15 = 30 Marks)